Northeastern University

Graduate Catalog
2018–2019

Table of Contents

Graduate

General Admission and Transfer Credit

Regulations Applying to All Degree Programs

A copy of each graduate degree program as approved by the Board of Trustees and as officially amended is on file in the Office of the Provost. This record contains the goals of all requirements for the program. All descriptions of the program in the university, college, and department publications must conform to this officially approved record. Descriptions of PlusOne programs are also on file in the provost's office.

Standards of admission are specific to certificate and degree programs.

Admission Requirements

Prior to beginning a graduate program, students must meet one of the following conditions:

- Have received a bachelor's degree or equivalent from an accredited college or university
- Have received a master's degree or equivalent degree from an accredited college or university
- Have received a first professional or equivalent degree from an accredited college or university
- Have been accepted into an approved bachelor's-to-graduate-degree program

Registration

Northeastern University has a policy of continuous registration while enrolled full-time in a graduate degree program.

All students must register for course work, research, thesis, dissertation, or continuation courses for each semester in order to be in good standing in the program. Registration is continuous with the exception of summer. A student must be registered in summer only if he or she will be graduating in the summer or holds an award that requires registration. Students must be registered during the semester in which they complete all requirements for their degree.

When circumstances warrant, e.g., medical exigency, a student may seek a leave of absence.

The university parental leave policy is available in the University Policies section of the Office of the Provost (https://provost.northeastern.edu/policies) website.

Transfer Credit

A maximum of 9 semester hours of credit (or 12 quarter hours) obtained at another institution may be accepted toward the degree, provided the credits consist of work taken at the graduate level for graduate credit, carry grades of 3.000 or better, have been earned at an accredited institution, and have not been used toward any baccalaureate or advanced degree or certificate at another institution.

Transfer credits must be no more than five academic years old at the time the student is admitted to graduate study. Courses older than five years will be accepted only in rare circumstances.

Grades earned in transferred credits are not counted as part of the overall grade-point average earned at Northeastern.

Transfer credits will only be accepted at the discretion of the academic department and the college's graduate office.

Note: The College of Professional Studies' (CPS) transfer policy (p. 301) is available in the CPS section of the catalog.

Special Student Status

Those students who are not pursuing a specific degree program are classified as special students. Special students must satisfy the requirements for admission and perform at a satisfactory level in course work in order to continue as special students. Performance of a special student in graduate courses should average at least 3.000 in order for the student to be allowed to register for any subsequent classes. The number of credits that may be earned by a student enrolled as a special student is at the discretion of each graduate office. However, only a maximum of 12 graduate semester hours may be applied to a graduate program. Students interested in pursuing a degree program must make a formal application to the degree program. Special students who do not register for four consecutive semesters, excluding summer semester, will be subject to review and possible withdrawal.

Special students are not eligible for Northeastern financial aid awards or federal financial aid.

Provisional Student Status

Provisional students are students whose academic records do not qualify them for acceptance as regular students. Provisional students must obtain a 3.000 grade-point average in the first 9 semester hours of graduate courses in order to continue in the graduate program or meet specifically delineated departmental requirements to qualify for full acceptance to a degree program. Students may not earn more than 9 semester hours while enrolled in provisional status. After the completion of 9 semester hours, students must either satisfy regular admission standards or be denied further registration in the graduate program.

Provisional students are not eligible for Northeastern financial aid awards or federal financial aid.

International students cannot be admitted provisionally or conditionally.

Undergraduate Credit for Graduate Courses

Undergraduate students who are juniors or seniors may enroll in graduate courses for credit toward their undergraduate degrees if they meet all prerequisites as determined by the graduate director and they receive

permission from the instructor of the course and from the student's undergraduate academic advisor.

Inter- and Intracollege Graduate Courses

In colleges that have a graduate school, units within the college that do not offer graduate degree programs may offer a maximum of two courses per year if the courses are approved within a unit or units offering a graduate degree program. These courses will be subject to the same review process as other graduate courses.

University-Mandated Training

All students must fulfill all university-mandated ethics and safety training.

<div style="background:red;color:white;">

Regulations Applying only to Doctor of Philosophy (PhD) Programs

</div>

Committee in Charge of the Graduate Student's Degree Program

The committee in charge of the graduate student's degree program is that body charged with overseeing all academic and administrative matters relating to the program. This committee will be a departmental or, in the case of colleges without departments, a college committee.

PhD Dissertation Committees

No dissertation committee shall have fewer than three faculty members, two of whom shall be from Northeastern University. The chair of the dissertation committee will be a full-time tenured or tenure-track member of the faculty of Northeastern University and will hold an appropriate doctorate. A research faculty member may chair a dissertation committee if he or she holds an appropriate doctorate and has received the approval to do so from the tenured and tenure-track faculty members of the unit(s) in which his or her appointment resides.

If a student's major advisor leaves Northeastern, that person may continue the research direction of the dissertation or thesis. However, a co-advisor must be appointed from the academic department or program. The student will then have two advisors, one an official member of the Northeastern faculty who will be available for research and administrative matters and the ex-Northeastern advisor. If a new major advisor is appointed, the ex-Northeastern faculty member may serve as an outside member of the committee.

The PhD committee should be appointed early enough to advise in the formulation of the student's program and in refining the research topic for the dissertation. Within the constraints of the above criteria, the PhD program faculty will determine the process by which dissertation committees are established. The final list of dissertation committee members shall be reported to the associate dean for graduate education.

Each PhD student shall have an annual review of his or her progress toward the degree. A copy of the review shall be submitted to the student.

After reaching candidacy, students must register for Dissertation for a minimum of two semesters in order to fulfill their formal residency requirement. Continuation status enrollment is for students who are postcandidacy, have completed all course work, and are actively engaged in completing a thesis or dissertation.

<div style="background:red;color:white;">

General Regulations and Requirements for Nondegree Certificate Programs

</div>

Certificates That Appear on the Transcript

DEFINITION

A nondegree certificate program is a program of study requiring at least four graduate courses, or 12 semester hours of graduate credit, but no more than 30 semester hours of graduate credit. In the College of Professional Studies (CPS), the number of credits for a certificate varies from 16 quarter hours to 30 quarter hours. Successful completion of such a certificate program will be recorded on the student's transcript. Appropriate graduate credits taken as part of a nondegree certificate program may be counted toward a regular graduate degree at the discretion of the committee in charge of the graduate program.

ADMISSION

All students admitted to a certificate program must satisfy the general requirements for admission as a graduate student and the requirements for the specific certificate program.

PROCEDURES FOR THE APPROVAL OF NEW CERTIFICATE PROGRAMS

New certificate programs are developed following the procedure outlined in the Guidelines for New Degree Programs found on the Office of the Provost (http://www.northeastern.edu/provost/policies) website.

PROCEDURES FOR CERTIFICATE PROGRAM REVIEW

Certificate programs will be reviewed in the context of departmental reviews. Information about these reviews can be found on the Office of the Provost (http://www.northeastern.edu/provost/policies) website.

GENERAL REGULATIONS

Except as indicated herein, certificate programs shall be subject to the same regulations and procedures as master's degree programs.

Course Programs That Do Not Appear on the Transcript

Colleges offering graduate programs may choose to recognize the completion of sequences of courses requiring fewer courses than a certificate program. No such recognition shall be placed on the student's transcript. Such a nontranscript program shall not involve more than four graduate courses or 12 semester hours of graduate credit. The requirements of any such nontranscript program will be forwarded to the vice provost for graduate education for record-keeping purposes.

<div style="background:red;color:white;">

General Regulations and Requirements for the Master's Degree

</div>

Admission

All students admitted to a master's program must satisfy the general requirements for admission as a graduate student and the requirements for the specific master's program.

Academic Classifications

Those students who have a bachelor's degree from an accredited college or university and satisfy the admissions requirements of the appropriate graduate school are classified as regular students. Domestic students whose records are not of acceptable quality may be accepted as provisional students. International students cannot be accepted provisionally. Provisional students must obtain a 3.000 grade-point average in the first 9 semester hours or otherwise fulfill the delineated departmental requirements to continue in the graduate program; they then become regular students. Any student whose record is not satisfactory may be dropped by action of the committee in charge of the degree program.

Course Requirements

A candidate for the master's degree must satisfactorily complete an approved program conforming to the requirements of the graduate school and department or program in which the candidate is registered.

The requirements for the master's degree are a minimum of 30 semester hours of graduate work beyond the bachelor's degree, except in the College of Professional Studies, in which 45 quarter hours of graduate work are required. There may also be other study required by the graduate school and department or program concerned. Students enrolled in a PlusOne program will be allowed to double-count prescribed graduate courses as part of their undergraduate degree.

Language Requirement

The committee in charge of the degree program may establish a language requirement.

Comprehensive Examination

At the discretion of the committee in charge of the degree program, final written or oral comprehensive examination(s) may be required. Such examinations will be given at least two weeks before the Commencement at which the degree is to be awarded.

Thesis

If a thesis is required in partial fulfillment of degree requirements, it must show independent work based, in part, on original material and must meet the approval of the student's thesis committee. The committee in charge of the degree program is responsible for providing instructions concerning preparation of the thesis.

The student must submit the thesis to ProQuest in sufficient time to allow for acceptance before the Commencement clearance deadline. Information on archiving a thesis with ProQuest is available in the program-relevant graduate office.

Time Limitation

Course credits earned in the program of graduate study, or accepted by transfer, are valid for a maximum of seven years unless the relevant graduate office grants an extension.

General Regulations and Requirements for the Certificate of Advanced Graduate Study

The Certificate of Advanced Graduate Study (CAGS) provides specialized study above the master's degree. It is a course of study that falls between the master's and doctoral degree and culminates in a graduate certificate.

Admission

An applicant for the CAGS must hold a master's degree in a related field from an accredited institution and must complete the admission procedure described in the material of the graduate school. All students admitted to a CAGS program must satisfy the general requirements for admission as a graduate student and the requirements for the specific CAGS program.

Academic Classifications and Degree Candidacy

Students admitted to a CAGS program will be designated as candidates for the Certificate of Advanced Graduate Study.

Course Requirements

A candidate for the CAGS must satisfactorily complete an approved program conforming to the requirements of the graduate school and department or program in which the candidate is registered. The

candidate must complete a minimum of 24 semester hours or, in the case of the College of Professional Studies, 32 quarter hours of credit beyond the master's degree.

Time Limitation

Course credits earned in the program of graduate study, or accepted by transfer, are valid for a maximum of seven years unless the relevant graduate office grants an extension.

General Regulations and Requirements for the Research Doctorate (PhD and EdD)

The formal requirements for the PhD degree are the following:

- Completion of the course work mandated by the individual degree program.
- Fulfillment of the residency requirement.
- Formal training in the Responsible Conduct of Research (http://ori.hhs.gov/sites/default/files/rcrintro.pdf) for students as appropriate.
- A comprehensive examination or equivalent if required by the degree program.
- Continuous registration.
- A final examination conducted by the student's PhD committee.
- Submission of a dissertation to the relevant graduate office and to ProQuest for archiving. The dissertation must be based on original and independent research.

Admission

All students admitted to a doctor of philosophy program must satisfy the general requirements for admission as a graduate student and the requirements for the specific PhD program.

Academic Classification and Degree Candidacy

DOCTORAL STUDENT

Students in this classification have been admitted to a doctoral program.

DOCTORAL CANDIDATE

Every degree program shall have a policy defining candidacy. Students in this classification will have completed all departmental, college, and university requirements except for the dissertation. These requirements vary by program but minimally include completion of approximately 30 semester hours of acceptable graduate work beyond the bachelor's degree or possession of a previously earned master's degree that is acceptable to the department and certified by the graduate office. The requirements frequently include a comprehensive examination or a proposal defense.

Residence

Every degree program shall have a policy defining residency for candidates for doctoral degrees. The committee in charge of the degree program defines residency and specifies the method by which any residence requirement is satisfied.

Course Requirements

The program committee in charge of the degree program specifies the doctoral course requirements.

Language Requirements

The committee in charge of the degree program establishes the nature of the language requirement, if any.

Responsible Conduct of Research

By the end of their third year, all doctoral students for whom the Responsible Conduct of Research training is required must have completed this training. Training sessions are highly recommended for all doctoral students. The Office of the Vice Provost for Research is responsible for ensuring that appropriate training is available for doctoral students.

Qualifying Examination(s)

In departments that require qualifying examinations, students must be notified in writing of the nature and regulations governing these examinations and of how their performance on the examinations will affect their normal progress toward the degree. The graduate office should be made aware of the department regulations concerning such examinations.

Comprehensive Examination(s)

Degree programs may require a comprehensive examination as the final step before becoming a PhD candidate. The purpose of this examination(s) is to test the knowledge and skills of the student in a particular area and his or her knowledge of recent research developments in the field. The PhD program faculty will determine the process by which comprehensive examination committees are established.

Dissertation

Candidates for the degree of Doctor of Philosophy must complete a dissertation that embodies the results of extended research and makes an original contribution to the field. This work should give evidence of the candidate's ability to carry out independent investigation and to interpret in a logical manner the results of the research. The committee in charge of the degree program establishes the method of approval of the dissertation.

Candidates for the degree of Doctor of Education must complete a dissertation that embodies the results of extended, creative, and independent research and proper evaluation and interpretation of the results. The committee in charge of the degree program establishes the method of approval of the dissertation.

Final Oral Examination and Submission of Dissertation

The final oral examination will be carried out after the completion of all other requirements of the degree. The final oral examination will be on the subject matter of the doctoral dissertation and significant developments in the field of the dissertation. Other fields may be included if recommended by the examining committee.

Students must have completed all degree conferral requirements (including having successfully defended their thesis and having submitted their approved thesis as required by the department and to ProQuest) by the last day of the final exam period in order to be graduated in that semester. Graduate students must be continuously enrolled through the end of the term in which they have successfully completed all degree conferral requirements.

Time Limitation

After the establishment of degree candidacy, a maximum of five years will be allowed for the completion of the degree requirements. Under extenuating circumstances, a student may request an extension of this time frame.

General Regulations and Requirements for Interdisciplinary Graduate Degrees

Northeastern University offers individually designed and ongoing interdisciplinary graduate programs. The individually designed program is for the student who wishes to pursue graduate studies in an area that substantially overlaps two or more units. In such cases, that student may design, in consultation with his or her faculty advisor(s), an interdisciplinary program. The program will correspond in scope and depth to Northeastern's established degree standards but need not agree exactly with the regulations of individual units. There are also ongoing programs for students who wish to pursue graduate studies in areas in which two or more units have jointly established a graduate program. As with individually designed programs, ongoing programs correspond in scope and depth to Northeastern's established degree standards but do not agree exactly with the regulations of individual units.

The general regulations and requirements for graduate programs apply to interdisciplinary programs. Additional regulations and requirements are stated below.

Admission

UNIVERSITY-APPROVED INTERDISCIPLINARY PROGRAMS

Ongoing interdisciplinary programs are university-approved programs in areas of study that combine study in two or more units.

Each interdisciplinary graduate program shall be managed as established in the approved design of the program. All interdisciplinary programs, both master's and PhD, shall identify a committee with representation from all of the units involved to oversee the administration of the program in accordance with the guidelines established above. All administrative details, including but not limited to admission, probation notification, and graduation clearance, shall be carried out by the registration unit. Curriculum design and any subsequent modifications to a program shall be approved by the established procedures within all of the units involved.

INDIVIDUALLY DESIGNED INTERDISCIPLINARY PROGRAMS

In order to pursue an individually designed interdisciplinary graduate program, a student must have been accepted into an approved graduate program that will serve as the registration unit for the interdisciplinary program.

Successful application for admission to an individually designed interdisciplinary program consists of a carefully thought-out, written proposal describing the areas of proposed study and research. Part of this proposal will be a list of courses to be taken; a description of the qualifying and comprehensive examination process to be used, if any; a timeline; and any other requirements of the program. This proposal must be designed and prepared in consultation with a terminally prepared faculty member at Northeastern University. In the case of an interdisciplinary PhD proposal, this faculty member must meet the qualifications defined in the section on PhD Dissertation Committees (p. 11). At least two units must be participating in order for the proposal to be deemed interdisciplinary. The proposal must correspond in scope and depth to Northeastern's established degree standards. All of the units and the associate dean(s) for graduate education of the participating college(s) must approve the proposal. Approval of the proposal indicates that appropriate curricular and other academic norms for the specified degree are satisfied. A proposal for a PhD must define an area of study in which original and independent research can take place.

Admission of the student to the interdisciplinary program of study requires favorable recommendation by all units involved, including the

registration unit. It also requires the commitment by a faculty member at Northeastern University to be the advisor of the student and chair of the interdisciplinary committee for the student. In the case of an interdisciplinary PhD program, this faculty member must meet the qualifications defined in the section on PhD Dissertation Committees (p. 11). This faculty member may or may not be a member of the registration unit. The committee must be assembled within the first semester of the program and must include faculty members from all of the participating units. At least two units must be represented on the committee.

This committee will be responsible for overseeing the completion of the degree requirements. It will also be responsible for the administrative elements of the program, such as the monitoring of satisfactory progress; the design and grading of the preliminary and comprehensive exams, if applicable; graduation clearance; etc. This interdisciplinary committee is also responsible for an annual review of the progress of the student and for reporting this progress to the registration unit on an annual basis.

Information for Entering Students

Graduate education at Northeastern integrates the highest level of scholarship across disciplinary boundaries with significant research and experiential learning opportunities in Boston and around the world. Northeastern offers more than 165 graduate programs, ranging from doctoral and full-time master's programs to part-time programs and graduate certificates, including an array of innovative PhD and master's programs designed to prepare students for emerging new fields. Students are able to take courses on campus, online, or in hybrid formats. This multidimensional learning environment offers students the knowledge and experience to excel and the flexibility to create the educational experience that best meets their needs. Our graduates are well positioned to meet the diverse demands of careers in academia, industry, and the professions.

Living in Boston

Boston is an exciting city that is the perfect place for students. For links to Boston landmarks, cultural institutions, news sources, city guides, and off-campus apartment listings, visit the links below.

Off Campus Student Services

226 Curry Student Center
617.373.8480
offcampus@northeastern.edu

Off Campus Student Services provides a wide range of information, resources, and educational workshops for students who are interested in living off campus or who already live off campus.

Off Campus Student Services provides assistance in searching for off-campus housing, finding roommates, and learning more about the communities surrounding Northeastern University. Our website offers a host of resources including an apartment search database, information on transportation, and City of Boston tenant services, as well as contact information for area real estate professionals.

Off Campus Student Services publishes a monthly e-newsletter that provides valuable tips and information on upcoming programs and events both on campus and off campus. Individuals interested in receiving our newsletter can email us at offcampus@northeastern.edu or stop into the office Monday through Friday.

For more information, visit the Off Campus Student Services website (http://www.northeastern.edu/offcampus).

Information for International Students

Office of Global Services

Website (http://www.northeastern.edu/ogs)
405 Ell Hall
617.373.2310
617.373.8788 (fax)

The Office of Global Services (OGS) offers a vast array of programs and services to more than 13,000 international students and scholars who represent approximately 147 nations.

The OGS also works to promote meaningful interaction and intercultural understanding among citizens of other countries and their peers from the United States, providing educational and cultural enrichment opportunities for all members of Northeastern and the community at large.

The OGS oversees the Student and Exchange Visitor Information System (SEVIS) at Northeastern, as mandated by the U.S. federal government, in order to ensure compliance with regulations and procedures affecting those international students and scholars in specified nonimmigrant visa classifications.

Affiliation with the OGS begins with admission to the academic program and continues through such initiatives as the OGS's cultural festival in February, "OGS Carnevale," which celebrates the cultural diversity of the entire university community. For a list of OGS services and programs, visit the OGS website (http://catalog.northeastern.edu/graduate/information-entering-students/international-students/northeastern.edu/ogs).

International students must maintain full-time status at Northeastern to be in compliance with immigration and SEVIS regulations. Also, they must not engage in any type of employment unless authorized by the OGS. Note that timely registration for courses is especially important so that they may remain in compliance with current federal regulations. They should consult with the OGS if they have questions about their individual status.

Coming to Boston

Preparing to travel to Boston and begin your studies at Northeastern University is exciting, and you have many things to do in preparation for both. When you plan carefully, your travels and arrival in Boston should go smoothly. Here are some of the key things you should do to prepare.

- **Obtain your F-1 or J-1 visa** from the U.S. embassy or consulate in your home country to be eligible to study in the United States. An international student may attend Northeastern in a nonimmigrant status other than F-1 or J-1 only if U.S. immigration regulations allow for study in the United States under that specific nonimmigrant visa classification. Some international students must apply and be approved for a change of status (e.g., from B-2 to F-1) before beginning the program at Northeastern. For detailed information/instructions specific to your current nonimmigrant status, as well as eligibility to participate in co-op or other forms of experiential learning required by your academic program, contact the OGS (http://www.northeastern.edu/ogs/visaprocess.html).
- **Mandatory Student Health Insurance:** Since September 1989, Massachusetts law (M.G.L. c.15A, § 18) has required every full-time and part-time student enrolled in a certificate, diploma, or degree-granting program in a Massachusetts institution of higher learning to participate in a Student Health Insurance Program (SHIP) or in a health benefit plan with comparable coverage. The Student Health Program defines a part-time student as a student enrolled in at least 75 percent of the full-time curriculum. (College of Professional

Studies graduate students—7 credits, part-time graduate students—6 credits).

- **Health report:** Prior to entering Northeastern, all enrolled students must complete and submit a health report to University Health and Counseling Services (UHCS). It must be completed and returned by the stated deadline. The required record of immunity section is necessary for compliance with the Massachusetts immunization requirements for college-age students. Failure to meet the requirement will prevent future course registration. Additionally, further documentation of immunity is mandatory for students in Bouvé College of Health Sciences. Visit the UHCS webpage (http://www.northeastern.edu/uhcs) to access the health report online.

Planning Information

As a new international student you are expected to arrive by the start date of your program stated on the I-20 issued by Northeastern or on the DS-2019 issued by Northeastern or by your sponsoring agency/government.

When you make your travel arrangements, you should seek admission to the United States no more than 30 days prior to the report date on your I-20 or DS-2019, and you should not arrive after the report date on your I-20 or DS-2019.

All international students will need to attend the scheduled international student orientation program and complete the international student online check-in process. For further details on the OGS international student orientation and online check-in process, and for other information pertinent to international students, check the OGS website (http://www.northeastern.edu/ogs).

International Student Orientation

At the beginning of each semester the OGS organizes sessions, events, and activities designed to ensure you have completed all U.S. documentation requirements and to provide you with information and support to ease your transition to life in the United States and at Northeastern University. During these sessions, you will also have the opportunity to meet other international students, learn from shared experiences, and find any assistance you may need.

Orientation week is very important. Make sure you are following all the instructions provided by your academic department and the OGS about the program, and attend as many scheduled events as you can to ensure a smooth transition during your first few weeks on campus.

For a schedule of required sessions and other events, see the OGS website (http://www.northeastern.edu/ogs/schedule.html).

If you are a U.S. citizen living abroad, you are not required to complete OGS's activities and sessions. You are more than welcome, however, to attend other sessions and events planned by the OGS during orientation. Visit the orientation schedule on the OGS website (https://www.northeastern.edu/ogs/home/new-students/orientation) to see a full listing of other sessions and events.

Participate in Cultural Events

We are proud to offer cultural events throughout the academic year to the Northeastern community. For more information and to register, check the schedule of events on the OGS website. (https://www.northeastern.edu/ogs/home/new-students/orientation)

SEVIS Compliance

The OGS is required to comply with immigration regulations governing your student status and must submit information every semester as required by the Department of Homeland Security.

The OGS: Your Resource for SEVIS Advice and Assistance

The OGS advises students on the complexities of immigration compliance and interfaces with various U.S. government agencies. The OGS maintains and updates the SEVIS system and advises students on relevant issues related to nonimmigrant student status by individual appointments or through workshops and information sessions. Consult the OGS whenever you have a question relating to your nonimmigrant student status or any aspect of SEVIS compliance.

Academic Resources

Libraries

Website (http://www.library.northeastern.edu)
Northeastern University Libraries
617.373.8778

Snell Library is the university's primary research library, with collections and services supporting research and teaching across disciplines. Holdings are extensive, with a large proportion available digitally. Collections include more than 800,000 print volumes, more than 500,000 e-books, 70,000 serial subscriptions, 74,000 licensed e-journals, and more than 6,300 feet of archival and manuscript collections. Additionally, Northeastern University Libraries is a selective federal depository, maintaining a collection of materials (mostly online) published and distributed by the federal government.

Snell Library is also the primary study environment on campus, open 24/7 to the whole university community, year-round. Spaces include group, quiet, and silent work areas, with more than 30 group study rooms with whiteboards and plug-in displays for collaborative group work. Individual study rooms are also available for graduate students. In partnership with Information Technology Services, the library supports the Digital Media Commons and InfoCommons computing areas, providing high-level media creation and editing capabilities. The Digital Media Commons also includes a 3D printing studio with a full suite of fabrication technologies and professional-level audio and video recording studios.

Services provided by Snell Library include both on-site and distance reference, the latter including 24/7 live chat with a reference librarian; subject-specialist librarians who provide in-depth consultation and research support for each academic program at the university; and an interlibrary loan system for providing materials not readily available at Northeastern. Digital scholarship project support and tools are also available through an institutional repository and data management services. The library also teaches workshops on digital media tools and resources and instructional sessions about library research for students and faculty.

A free, university-operated shuttle service provides students with a safe ride home (within a mile radius of campus) from Snell Library every 20 minutes from 7:00 p.m. to 6:00 a.m.

The School of Law Library, located on five floors in the Knowles Law Center, includes a comprehensive collection of U.S. legal materials in print and in electronic format. Of particular note is the library's collection in the areas of public interest law; international human rights law; and public health, death penalty issues, and progressive lawyering. Access to print and electronic materials is provided through Scholar OneSearch, the university's online library catalog. More information can be found at the School of Law Library webpage (http://www.northeastern.edu/law/library).

Office of the Registrar

Walk-in address
271 Huntington Avenue

Mailing address
Northeastern University
ATTN: Office of the Registrar, 230-271
360 Huntington Avenue
Boston, MA 02115-5000

617.373.2300
617.373.5351 (fax)
registrar@northeastern.edu
Website (http://www.northeastern.edu/registrar)

The Office of the University Registrar provides an important link between the university's academic programs and policies and the student. It administers a number of specific services, including class scheduling, registration, record functions, verification of enrollment, reporting, transcript services, and Commencement.

The registrar's office utilizes the myNEU web portal (http://myneu.neu.edu/cp/home/displaylogin) to provide students convenient access to information and services, including class schedules and registration, most recent grades, unofficial transcripts, and transcript and enrollment verification requests. Additional information is available at the registrar's office website (http://www.northeastern.edu/registrar).

Information Technology Services

Website (https://its.northeastern.edu)
617.373.4357 (xHELP)
help@northeastern.edu

Information Technology Services (ITS) is the centralized technology resource for students, faculty, and staff. ITS provides secure, high-speed internet access through the on-campus networks NUnet and ResNet; wireless internet connectivity through NUwave; centralized computer labs —the InfoCommons and the Digital Media Commons (DMC)—with the latest software; on-site and remote printing; access to the Blackboard learning management system; a vast array of software applications for Windows and Mac; access to myNortheastern, Northeastern's online portal; on-site and online training on popular software; and high-performance research computing.

ITS Service Desk

Help and Information Desk, Snell Library, First Floor
617.373.4357 xHELP
help@northeastern.edu
chat at https://northeastern.service-now.com/sp

The ITS Service Desk provides phone-based and walk-up technology support services to students, faculty, and staff. The ITS Service Desk staff also offers support for ITS-managed printers and answers general computing questions. Contact the ITS Service Desk for the following services:

- Assisting students with Northeastern University–provided accounts and applications, including email, myNortheastern, and Blackboard
- Investigating wired and wireless network connection problems
- Troubleshooting network printer problems
- Support with ITS-managed labs
- Access to equipment available for loan, including AV equipment, laptops, and laptop adapters

The ITS Service Desk is located at the Help and Information Desk on the first floor of Snell Library near the InfoCommons and provides assistance on computer-related issues to students, faculty, and staff with a valid Northeastern ID.

myNortheastern

Website (https://my.northeastern.edu)
help@northeastern.edu

myNortheastern—the online portal for the Northeastern community—is a central resource for students, faculty, and staff. Your myNortheastern username and password provide access to key university platforms, from the myNortheastern portal to other university systems, including wireless network access, printing, and email.

The myNortheastern portal offers services tailored to your role at Northeastern for all academic, personal, and recreational needs. Resources available for students include links to student email, information channels, financial aid, Blackboard, and online course registration. NU Alert, our real-time university emergency notification system, utilizes the contact information provided within myNortheastern. It is your responsibility to maintain accurate personal and emergency contact information.

ResNet and the ResNet Resource Center

Website (http://www.northeastern.edu/resnet)
Speare Commons
617.373.HELP (x4357)
resnet@northeastern.edu

ResNet—a service of Information Technology Services and Housing Services—provides internet access to all students living in Northeastern residence halls. The ResNet Resource Center, located in Speare Commons, provides students with support for the HuskyCable HD*plus* service, mobile devices, gaming systems and other devices, student email, computer troubleshooting, and repair services for Apple and Dell computers.

Printing

Website (https://www.northeastern.edu/its/services/printing-plan)
help@northeastern.edu

The Northeastern Printing Program provides a free allowance for printing each year to students, faculty, and staff. Each September, as an active member of the community, you are given an allowance of printing credit equivalent to $120 on your Husky Card to use at your discretion at any of the ITS-managed printers located across all Northeastern campuses. Print credits do not carry over from one academic year to the next.

Print jobs can be directly sent to the appropriate printer queue from any ITS computer labs or from your own computer by using the Virtual Print Client software available from Software Downloads on myNortheastern

(https://myneu.neu.edu) to print remotely. When you locate a printer associated with the appropriate printing queue, simply swipe your Husky Card, select your print job, and it will print.

Appropriate Use Policy

Appropriate Use Policy webpage (http://www.northeastern.edu/aup)

The information systems of Northeastern University are intended for the use of authorized members of the community in the conduct of their academic and administrative work. The Appropriate Use Policy (AUP) describes the terms and conditions of Northeastern information systems use.

Training Services

Snell Library
training@northeastern.edu

Information Technology Services provides a variety of web-based courses to all members of the Northeastern community including Mac tutorials, MS Office tutorials, some application-specific training provided by the application vendors, and via Lynda.com. Using Lynda.com, students with a myNortheastern username and password have 24/7 access to an extraordinary breadth of training modules. Web-based training is an innovative, self-paced learning method that allows students, faculty, and staff to train anytime or anywhere, using a computer with an internet connection.

To register for a class, visit the training section of the ITS website.

Academic Technology Services (ATS)

Website (http://www.ats.neu.edu)
212 Snell Library
ats@northeastern.edu

For graduate students performing teaching assistant/graduate assistant work, Academic Technology Services (ATS) is a resource for choosing and implementing technological solutions for a wide range of classroom goals. Whether creating online classes or incorporating flipped classroom techniques into on-ground classes, ATS offers consultation and support for implementation. Additionally, ATS manages the Discovery Lab, located on the first floor of Snell Library, which is a space for showcasing ideas and innovations at Northeastern. The Discovery Lab is an area to host both events and exhibitions.

Campus Resources

- Career Development (p. 18)
- Campus Recreation (p. 18)
- Center for Advancing Teaching and Learning Through Research (p. 18)
- Disability Resource Center (p. 19)
- Graduate Student Government (p. 19)
- Husky Card Services (p. 19)
- John A. and Marcia E. Curry Student Center (p. 19)
- Northeastern University Bookstore (p. 19)
- Parking (p. 20)
- Public Safety (p. 20)
- University Health and Counseling Services (p. 20)
- We Care (p. 21)

Career Development

Website (https://www.northeastern.edu/careers)

103 Stearns Center
617.373.2430
617.373.4231 (fax)
careerservices@northeastern.edu

Career Development provides resources, guidance, and opportunities that help students and alumni with the following:

- Choose a major and explore career options that fit their unique attributes
- Make career decisions that will engage them in productive and fulfilling work
- Prepare for and conduct successful job searches
- Create meaningful and effective engagement with employers
- Contribute to meeting global and societal needs

Northeastern's Career Development does not guarantee employment nor do student referrals to prospective employers regarding job openings.

Campus Recreation

Marino Recreation Center
617.373.4433
Website (https://www.northeastern.edu/campusrec)

Exercise your body, mind, and spirit. The campus recreation program provides many outlets to help clear your mind and recharge your spirit. Our fitness facilities, unique among Boston-area colleges and universities, are open year-round. All programs were designed with you in mind; so whether you enjoy group fitness classes, ice hockey or street hockey, basketball, weight training, or swimming, campus recreation has something for everyone.

Full-time Northeastern students in good standing who are enrolled in classes and/or co-op, or scheduled for vacation but have paid the campus recreation fee, have access to the Marino Recreation Center, Cabot Center, and the Badger and Rosen SquashBusters Center. Part-time students in good standing have access during any academic quarter in which they are enrolled and attending classes, as long as they have requested and paid the campus recreation fee. Help us maintain a safe and secure environment. Your Northeastern photo ID card—which must be a current, valid, and active card—must be swiped upon arrival in order to enter all facilities.

Center for Advancing Teaching and Learning Through Research

215 Snell Library
617.373.3157
617.373.7779 (fax)
learningresearch@northeastern.edu
Website (http://www.northeastern.edu/learningresearch)

The Center for Advancing Teaching and Learning Through Research (CATLR) provides professional development for all graduate students at Northeastern in their roles as teaching assistants, instructors, and future faculty and professionals. We provide a range of opportunities for graduate students to develop effective teaching skills, including course

design and communication. CATLR is committed to supporting your success at Northeastern and beyond, and we welcome you to:

- Participate in workshops and other events to learn about effective practices in teaching and course design and to adapt them for your own current or future use.
- Meet one-on-one with a CATLR consultant to discuss any aspect of teaching or preparing for the academic job market and postdoctoral careers, including developing course syllabi, teaching statements, teaching portfolios, and diversity statements.
- Invite a CATLR consultant to observe your class, recitation, lab, studio, or guest lecture and to meet with you afterward to share and discuss their observations in relation to your own goals and reflections.
- Register for the self-paced Future Faculty Program to prepare for and reflect on the various dimensions of teaching in higher education.

All of CATLR's services are provided on a formative and confidential basis.

Disability Resource Center

20 Dodge Hall
617.373.2675
617.373.7800 (fax)
www.northeastern.edu/drc

Northeastern University and the Disability Resource Center (DRC) are committed to providing disability services that enable students who qualify under Section 504 of the Rehabilitation Act and the Americans with Disabilities Act as Amended (ADAAA) to participate fully in the activities of the university. According to the ADAAA definitions, a person with a disability is one with a physical, mental, emotional, or chronic health impairment that *substantially limits* one or more major life activity such as caring for oneself, performing manual tasks, seeing, hearing, eating, sleeping, walking, standing, lifting, bending, speaking, reading, breathing, learning, working, concentrating, thinking, communicating, and nonvolitional bodily functions.

Students should provide documentation to the DRC at their earliest convenience to allow for sufficient time for review. After the documentation has been reviewed, a disability specialist will contact the student regarding appropriate next steps.

Graduate Student Government

Website (http://www.northeastern.edu/gsg)
236 Curry Student Center
617.373.4502
GSG@northeastern.edu

The Graduate Student Government (GSG) represents graduate students at Northeastern University, serving as a liaison among the administration, faculty, staff, and students. The role of the GSG is to address the professional, financial, social, and representative needs of the graduate community as follows:

- Seeks to improve the quality of graduate student life, academic affairs, and research
- Offers access to professional development resources and networking
- Facilitates cooperation among the graduate student groups and organizations
- Distributes the graduate activity fee

- Sponsors graduate orientation programs
- Fosters interdepartmental and intercultural communication and appoints graduate representatives to serve on university committees

All graduate students are eligible to be part of the GSG Senate. Representatives from the eight graduate and professional schools assist the executive board in the affairs of this governing organization. The senate meets regularly during the fall and spring semesters, and all meetings are open to all students.

Husky Card Services

4 Speare Commons
617.373.8740
HuskyCard@northeastern.edu

Husky Card Services prints Husky Cards, the official identification card of Northeastern University. The Husky Card is used for many purposes, including access to locations, parking, laundry, printing, vending machines, dining services, off- and on-campus vendors, and library book checkout.

Students who are registered for courses on the Boston campus of Northeastern University can come to the Husky Card Services office to obtain their card. A government-issued photo ID must be presented when receiving your Husky Card.

Students who have registered for courses at the Charlotte and Seattle campuses may contact their campus to obtain a Husky Card.

Students who are registered in online courses only are eligible to have their Husky Cards mailed to them. If you are an online student and would like a Husky Card mailed to you, send an email to HuskyCard@northeastern.edu (HuskyCard@neu.edu) with your name, Northeastern University ID number, address, and college/degree. Once we have this information, we will open the photo upload option through your myNEU account, which will allow you to upload a photo. Once your photo is submitted, it will take up to **two weeks** for the photo to be approved and the Husky Card to be mailed to you. Allow more time for international mail.

John A. and Marcia E. Curry Student Center

Website (http://www.northeastern.edu/curry)
434 Curry Student Center
617.373.2642

This campus "living room" serves as a hub of student activity. It is the crossroads of community life at Northeastern, offering cultural, social, and recreational programs and services.

The center offers ATM machines, an art gallery, the afterHOURS late-night club, food court and cafeteria, game room, lounge space, meeting rooms, Starbucks Coffee, student organization offices, a TV viewing area, and WRBB-FM.

Student center facilities may be reserved by recognized student organizations and university departments. The university reserves the right to limit the use of its facilities when the general public is involved.

Northeastern University Bookstore

Main Campus
Curry Student Center, ground floor

617.373.2286
Website (http://www.northeastern.bncollege.com)

The bookstore operates during the entire academic year, but days and hours may vary in accordance with the university's calendar.

Purchases can be made by cash, check, American Express, MasterCard, VISA, Discover, or Husky Card.

Parking

Student Financial Services
354 Richards Hall
617.373.7010
Commuting Services (http://www.northeastern.edu/commutingservices)

Parking spaces in the university lots and garages are filled on a first-come, first-served basis. To park in a university lot or garage, students must have a valid parking permit displayed on their vehicles. A parking permit does not guarantee a parking space.

New students may purchase a day-parking permit. Only eligible students will receive a permit. To be eligible, students must be registered for a class or on co-op. The cost of the permit will be charged to the student's tuition account.

Overnight parking permits are limited.

To apply for a parking permit, visit the self-service tab on myNEU and select "Apply for Parking."

To park in a handicap space, individuals must purchase a parking decal and display a state-issued handicap license plate, placard, or hangtag. Handicap parking spaces are located throughout campus. Please use the campus map (http://www.northeastern.edu/commutingservices/wp-content/uploads/2015/08/CampusMap2015_11x17.pdf) as a guide for handicap-accessible parking spaces on campus.

Operators of vehicles driven or parked on university property are responsible for knowing and complying with university driving and parking regulations.

Refer to the parking website (http://www.northeastern.edu/commutingservices) for more information.

Public Safety

Public Safety Division Administrative Offices
100 Columbus Place
617.373.2696
Website (http://www.northeastern.edu/publicsafety)

Police Operations Center
100 Columbus Place
617.373.3333 (EMERGENCY—police, fire, or medical)
617.373.2121 (nonemergency regular business)
617.373.3934 (TTY emergency or nonemergency)

Personal Safety Escort Service
617.373.2121

The Public Safety Division's mission is to provide a comprehensive program of police, security, fire safety, and emergency medical services to help ensure the campus remains a safe and pleasant place to live, work, and learn.

The University Police Department is the largest and most visible unit of the division and consists of professionally trained officers charged with the protection of life and property and the prevention and detection of crime on campus. University police officers have the same authority as municipal police officers and enforce both the Massachusetts laws and university regulations. Regulations mandate that students show their university ID cards whenever requested to do so by any university police officer. For more information, visit the public safety website (http://www.northeastern.edu/publicsafety).

The Public Safety Division takes pride in its comprehensive plan to minimize crime and protect the safety of the Northeastern community. But the division needs students' help and urges students to take responsibility for creating and maintaining a safe and secure environment. For tips on safety around campus and in the neighborhood, pick up a brochure or visit the website.

Fire egress drills are held each semester in all residence halls to familiarize residents and staff with the alarm system and the evacuation routes. Special fire safety and evacuation training is provided for students, faculty, researchers, and staff in high-risk laboratories. All building occupants are required to participate when an egress drill is held. For tips on fire safety, pick up a brochure or visit the website.

The Personal Safety Escort Service provides a door-to-door escort from one on-campus location to another whenever personal safety is a concern. After receiving your call, the university police dispatcher will assign an officer or cooperative education cadet within 10 to 15 minutes (if necessary, the dispatcher will advise you of any expected delays).

A special, nighttime off-campus escort service runs from dusk to dawn to transport students who reside within approximately one mile of the campus from the campus to their residence after dark. The only destination this service will take you to is your residence. A van stops at Snell Library and the Ruggles Public Safety Substation on the hour from 7:00 p.m. to 6:00 a.m. to pick up students.

If you are sexually assaulted, either by a stranger or an acquaintance, get to a safe place, then telephone the university police and a friend or family member. A university police officer who is a state-certified sexual assault investigator will meet with you and address your physical and emotional needs, as well as inform you of your rights and options regarding filing charges against the perpetrator. The police will provide you with important information about on-campus as well as off-campus counseling services as well as other options regarding changing your residence or class schedule.

If the sexual assault took place off campus, the University Police Department can still provide emergency medical treatment, transportation to a medical facility, and counseling referrals. However, the criminal investigation of such cases is the responsibility of the police department that has jurisdiction in the locale where the assault took place, and university police will assist you with making contact with the appropriate agency.

University Health and Counseling Services

Website (http://www.northeastern.edu/uhcs)
Forsyth Building, Suite 135
617.373.2772
UHCS@northeastern.edu

The University Health and Counseling Services team is eager to serve you. We hope that you will use our center as a resource to help stay

healthy, physically and mentally, and for care when you are ill or injured, depressed, or stressed.

We Care

Website (http://www.northeastern.edu/wecare)
104 Ell Hall
617.373.4384
we_care@northeastern.edu

We Care is a program that assists students experiencing unexpected challenges maintaining their academic progress. We Care works with the student to coordinate among university offices and to offer appropriate on- and off-campus referrals to support successfully resolving issues.

- Tuition and Fees (p. 22)
- Student Refunds (p. 22)
- Financial Aid Assistance (p. 23)
- Bill Payment (p. 25)

Tuition and Fees

Tuition

Graduate Program	Cost per Credit Hour
Applied Behavioral Analysis	$1,140
Arts, Media and Design	$1,505
Audiology (AuD) (per term)	$12,894
Audiology (AuD) clinical (per term)	$9,585
Biotechnology, Bioinformatics, Applied Math	$1,503
Bouvé College of Health Sciences	$1,500
Business Administration, including online graduate programs	$1,600
College of Professional Studies—Doctorate in Education	$829
College of Professional Studies—Graduate on campus and online (excluding MEd and MAT)	$698
College of Professional Studies—MEd and MAT programs	$574
College Professional Studies - MPS Analytics and Commerce Econ. Developement-Students Entering 07/01/18	$760
College Professional Studies - MPS Informatics & MPS Digital Media - Students Entering 07/01/18	$738
College Professional Studies - Master of Education Higher Ed. Administration Concentration - Students Entering 07/01/18	$607
Computer and Information Science	$1,540
Direct Entry PharmD (per term)	$25,225
Direct Entry PharmD Clinical	$14,875
Engineering	$1,569
Health Informatics	$1,212
Information Assurance	$1,450
Marine Biology	$1,390
MS in Accounting	$1,600
MS in Innovation	$1,600
MS/MBA (full program)	$68,000
Nurse Anesthetist clinical (in addition to tuition)	$3,755
Nursing, direct entry (per term)	$17,290
Physical Therapy—postbaccalaureate direct entry (DPT) (per semester)	$17,450
Physical Therapy—postbaccalaureate direct entry (DPT) clinical (per semester)	$11,901
Physician Assistant (per term)	$14,955
RN to BSN online	$830
Science	$1,503
Social Sciences and Humanities	$1,295
Dissertation (flat rate)	Equivalent to 1.5 times the college per-credit-hour rate listed above
Master's or doctoral continuation fee (flat rate)	Equivalent to the college per-credit-hour rate listed above

Fees

Item	Fee
Student center fee (per term, Boston campus only)	$70 full-time
	$10 part-time
College of Professional Studies student center fee (per quarter, Boston campus only)	$8.25
Student recreation fee (per term)	$56 full-time
	$25 part-time
College of Professional Studies student recreation fee (per quarter, Boston campus only)	$10
Student activities fee (per year, Boston campus only)	$15
Health and counseling fee	$225
Health plan fee (yearly, optional)	Visit the NUSHP website: www.northeastern.edu/nushp (http://www.northeastern.edu/nushp)
Parking (optional, per semester)	Visit the parking website: www.northeastern.edu/commutingservices (http://www.northeastern.edu/commutingservices)/
International student fee	$350

Student Refunds

Refund Policies

Inquiries about credit balances should be directed to Student Accounts. Refund requests for credit balances are made via the "Services & Links" section on the student's myNortheastern portal (https://my.northeastern.edu). Credit balances will be refunded to the student, unless otherwise directed by the student or the bill payer.

Note the following exception: If the credit in your account is due to a Parent Plus/Alternative Loan and/or payment plan payment(s), the borrower or bill payer must complete the Refund Authorization form (https://studentfinance.northeastern.edu/forms) prior to releasing the funds requested.

Official Withdrawal Adjustments

Students who officially withdraw, either from a course or from the university, during an academic term will receive a tuition refund based on the policy specified below. Institutional funds awarded by Northeastern University will be adjusted based on the actual charges incurred during the semester. Funds from federal Title IV programs will be returned to the government according to federal regulations. The federal government Return of Funds Policy dictates that a student's eligibility for federal financial aid is determined by the number of days enrolled during the semester. The refund will be calculated from the day the student submits a notification of withdrawal to the Office of the University Registrar.

Tuition credits are granted through the first five weeks of a semester or first four weeks of a half-semester, based on the date of the official withdrawal processed by the Office of the University Registrar. Nonattendance does not constitute official withdrawal. Credit policies vary according to the duration of the course. Typical tuition adjustments are made according to the following schedule. (The end of week three corresponds with the last day to drop a class without a W grade.)

DURING FULL SEMESTER

During weeks one through three—100% refund
During the fourth week—60% refund
During the fifth week—40% refund
After the fifth week—no refund

SUMMER HALF SEMESTERS AND COURSES OFFERED IN PART-OF-TERM FORMAT

During weeks one through two—100% refund
During the third week—50% refund
During the fourth week—25% refund
After the fourth week—no refund

Leave of Absence Tuition and Fee Adjustments

Leaves are granted when a student cannot complete the current academic period for health or personal reasons but is confident that he or she will reenroll (additional information about leaves of absence (p. 27)). Northeastern's medical and emergency leave policy states that all *tuition* paid for such periods of leave will be held by the university and applied to future charges. Outstanding balances (including unpaid balances) for the academic semester in which the leave is taken are still due to the university during that semester. Financial aid recipients should contact the graduate financial aid office to understand the effects on aid received. Medical leave information is available at the University Health and Counseling Services website (https://www.northeastern.edu/uhcs). Students who take a leave of absence should be aware that more than six months on leave will cause many student loans to go into repayment.

Disability Resource Center Tuition Adjustments

Students who are registered with Northeastern University's Disability Resource Center (DRC) and are approved for reduced course loads may be eligible to petition the center for tuition adjustments directly related to their documented disability. Further information is available from the DRC.

State-Specific Refund Policies

For refund information for Maryland, Oregon, and Wisconsin residents, visit the Student Financial Services website (https://studentfinance.northeastern.edu/policies-procedures).

Student Financial Services

354 Richards Hall
617.373.5899
617.373. 2897 (College of Professional Studies)
sfs@northeastern.edu
studentfinance.northeastern.edu (https://studentfinance.northeastern.edu)

Northeastern University is available to assist students in developing a plan for financing a Northeastern education. Through a variety of options—including federal financial aid, Northeastern's monthly payment plan, supplemental loans, and your own resources—a plan can be designed that will make your education costs affordable. Visit the Student Financial Services website (https://studentfinance.northeastern.edu) or call 617.373.5899 for additional information.

Federal Financial Aid

Student Financial Services is committed to working with you to identify federal financial aid options that can help make a Northeastern education affordable. To apply for federal financial aid programs, students must submit the Free Application for Federal Student Aid (FAFSA) (https://fafsa.gov) form. Meeting priority filing dates will allow the review of your eligibility for all available financial aid programs. The priority deadline for graduate students is March 1. For information regarding your financial aid application, log into your myNortheastern (https://my.northeastern.edu), click on "Services & Links" and select "My Financial Aid Status."

Students in the graduate colleges must meet the following criteria to be eligible for federal financial aid:

- Be enrolled in at least 6 credits per term for federal financial aid, unless you are on a co-op, clinical rotation, or residency or are enrolled in a full-time or part-time stand-alone course.
- Be citizens or eligible noncitizens of the United States
- Be matriculated in a degree-granting program
- Have received a high school diploma or GED
- Be registered with Selective Service (if required)
- Not be convicted of a drug-related crime in the last year
- Not be in default from previous student loans
- Maintain satisfactory academic progress

How to Apply

File the FAFSA by March 1 in order to be considered for all available federal aid. Northeastern's FAFSA school code is 002199.

To electronically sign your FAFSA, you will need your Federal Student Aid ID (FSA ID). If you do not have one or have forgotten your FSA ID, visit the Federal Student Aid (https://studentaid.ed.gov/sa/fafsa/filling-out/#get-fsaid) webpage to obtain one before starting the FAFSA online.

Awarding Timelines

New students are awarded on an ongoing basis throughout the spring after we have been notified that they have been accepted into their program.

Returning students are awarded throughout the summer.

Typical Graduate Financial Aid Award

Students who file the FAFSA will be eligible to receive up to $20,500 in a Federal Direct Unsubsidized Loan, assuming that all eligibility requirements have been met.

For more information about the Federal Direct Loan Program, visit the Student Financial Services website (https://studentfinance.northeastern.edu/applying-for-aid/graduate/types-of-aid).

Graduate Assistantships and Scholarships

These positions and awards are offered directly by the individual graduate schools or academic departments. Students seeking such assistance should contact their graduate school for eligibility criteria.

To review a description of available graduate assistantships and scholarships, visit the Student Financial Services website (https://studentfinance.northeastern.edu/applying-for-aid/graduate/types-of-aid).

Health Professions Student Loans and Nursing Student Loans

These federal loan programs carry a 5 percent interest rate during repayment. You must demonstrate financial need and meet Northeastern's priority filing date for consideration, as funds are limited. Northeastern serves as the lender, and the loan is made with government funds. Repayment is made to Northeastern. For nursing loans, there is a 9-month grace period prior to repayment following graduation, withdrawal, or a drop below half-time status. The grace period is 12 months for Health Professions Student Loans. Repayment on the loan is for a period of up to 10 years with a minimum 40 dollar monthly payment. The loan may be prepaid at any time without penalty.

To be eligible for the Health Professions Loan Program, applicants must be enrolled full-time in the School of Pharmacy in the Bouvé College of Health Sciences. To be eligible for the Federal Nursing Student Loan, applicants must be enrolled at least half-time in the School of Nursing in the Bouvé College of Health Sciences.

Physician Assistant Loan

The Physician Assistant Loan is awarded to full-time students in the graduate physician assistant program who demonstrate financial need after filing the FAFSA. The interest rate is fixed at 7 percent. Northeastern University is the lender, and repayment is made directly to Northeastern. The loan amounts range from $1,000 to $3,000, depending upon the student's financial need. Repayment begins one month after the student ceases to be enrolled full-time at Northeastern University.

Federal Direct Graduate PLUS Loan

Unlike Federal Direct Stafford Loans, the Federal Direct Graduate PLUS Loan requires credit approval by the direct loan servicer. Application requests are submitted to Student Financial Services. Students have up to 25 years to repay the Federal Direct Graduate PLUS Loan. The Federal Direct Graduate PLUS Loan can be consolidated with Federal Direct Stafford and Perkins loans upon graduation.

Graduate PLUS loans do not have a grace period. Repayment begins after a student is no longer enrolled at least half-time. Students who drop below half-time status and then reenroll above half-time status will need to request their loans be deferred again through their assigned direct loan servicer.

Graduate students with myNortheastern access can apply for a Federal Direct Graduate PLUS Loan through the student portal by clicking on the "Federal Graduate PLUS Loan Application" link under "Services & Links." Students who do not have portal access or have trouble applying via the portal should download, print, and complete the paper application that can be found at Student Financial Services (https://studentfinance.northeastern.edu/billing-payments/financing-options).

Supplemental Student Loans

There are a number of educational loan programs available to assist students in covering their expenses over and above any federal financial aid that may be awarded to them from Student Financial Services. Most private lenders have credit and income requirements that must be met before being approved for these programs. Additional information regarding private loans is available at Student Financial Services (https://studentfinance.northeastern.edu/billing-payments/financing-options). Student Financial Services recommends to students that, when researching the loan and lender that best meets their needs, they make sure they take into consideration the interest rate, origination, disbursement, or repayment fees and the quality of customer service.

General Financial Policies and Procedures

FINANCIAL AID POLICIES

Student Financial Services reserves the right to adjust a student's initial Offer of Financial Assistance based upon information brought to the office's attention subsequent to extension of the offer, including, but not limited to, increased or new institutional scholarships, outside scholarships, or revised family financial data.

APPEAL/CHANGE IN CIRCUMSTANCES

If the student feels that the aid process does not accurately reflect his or her situation, or if family circumstances change during the year, the student should notify his or her graduate student financial services counselor for further evaluation. We may request additional documentation from you that might indicate a change in financial circumstances.

CHANGE IN ENROLLMENT STATUS

Students must notify Student Financial Services about any change in planned period of enrollment, whether due to withdrawal from a class, a leave of absence, a change in co-op or academic division, or withdrawal from the university. Students should be aware that any change in enrollment status may result in a change in federal or institutional aid eligibility. It is the student's responsibility to notify Student Financial Services about any change in enrollment status and to ensure understanding of the ramifications of such changes. It is highly recommended that whenever possible, students discuss the impact of such changes with their financial aid counselor before making them.

OUTSIDE SOURCES OF AID

Students must notify Student Financial Services of any aid received from outside sources, such as scholarships. Receipt of these sources may require an adjustment to a student's financial aid award.

REAPPLICATION PROCESS

Students must reapply for financial aid each year by filing the FAFSA (https://fafsa.ed.gov) online. To receive priority consideration for aid, the federal processor must receive the FAFSA by March 1.

SATISFACTORY ACADEMIC PROGRESS

To continue receiving financial aid, graduate students must maintain the academic requirements for satisfactory progress set forth by their college. Refer to the Student Financial Services website (https://studentfinance.northeastern.edu/policies-procedures/satisfactory-academic-progress) for more information about how satisfactory progress impacts financial aid eligibility.

VERIFICATION

If a student is selected for verification, Student Financial Services may be required to collect additional documents, including tax returns and other

financial documents, to verify the information provided on the FAFSA. Aid cannot be disbursed until this process is completed.

RETURN OF TITLE IV FUNDS

Northeastern University is required by federal statute to recalculate federal financial aid eligibility for students who withdraw, drop out, are dismissed, or take a leave of absence prior to completing 60 percent of a term. Recalculation is based on the percentage of earned aid using the Federal Return of Title IV funds formula. Federal regulations require students to obtain at least one A, B, C, D, or S in at least one course for the term; students who receive all unsuccessful grades for a term (F, NE, W, I, U) may be considered unofficially withdrawn from the term and subject to an aid recalculation, including the possible loss of financial aid for that term.

Bill Payment

Student Financial Services

354 Richards Hall
617.373.2270
617.373.8222 (fax)
studentaccounts@northeastern.edu

Full payment of tuition and other related charges is due prior to the start of the term as specified on the original bill. For questions related to the billing process, late fees, payment methods, tuition payment plan, and refunds, contact us at the phone number and email address provided above.

Payment of Tuition

Full payment of tuition, residence hall fees, and other related charges is due before the start of each semester. Payments will be accepted for billable charges only. The university is not able to process payments for more than the balance due on the student's account. Accepted methods of payment are:

- Electronic check (e-check). Payments can be made online via NUPay on the myNortheastern portal (https://my.northeastern.edu) and are processed the same day they are received by the university.
- Through the monthly payment plan, administered through Tuition Management Systems. For additional information, visit the Student Financial Services website (https://studentfinance.northeastern.edu/billing-payments/financing-options).
- Supplemental loans. Review options at the Student Financial Services website (https://studentfinance.northeastern.edu/billing-payments/financing-options).
- Additional payment options and details can be found at the Student Financial Services website (https://studentfinance.northeastern.edu/billing-payments/payment-methods).
- International payments using Flywire. Northeastern University has partnered with Flywire to streamline the international wire payment process to the university. This service provides students and their families a safe, cost-effective, and convenient method of making payments to Northeastern University in foreign currencies. Review how to initiate payment at the Student Financial Services website (https://studentfinance.northeastern.edu/billing-payments/payment-methods).

Bills must be paid promptly. If a bill has not been received by the first week of the semester, contact Student Accounts. Transcripts and other academic records will not be released until all financial obligations to the university have been met.

Student Financial Responsibility Agreement

As compelled by federal law, all students who enroll in classes at Northeastern University are required to complete and accept the Student Financial Responsibility Agreement (SFRA). This agreement must be completed once per academic year and is located on the student's myNortheastern portal. Failure to complete the SFRA will result in a hold that prevents registration.

Discrepancies in Your Bill

Discrepancies in your bill should be addressed in writing via email to Student Financial Services at studentaccounts@northeastern.edu. Include your name, account number, dollar amount in question, date of invoice, and any other information you believe is relevant.

If there is a billing problem, pay the undisputed part of the bill to avoid responsibility for any late fees.

Late Fees

Late fees can be placed on accounts any time after the due date if the account remains fully or partially unpaid. The university typically waits, however, until after the conclusion of the add/drop period, for the specified semester, prior to assessment of late fees. These fees are based on the amount past due at the time of assessment, and can range from $75 to $200. Late fees are assessed once per semester.

If a student or payer wishes to dispute a late fee assessment, they must do so, in writing, to studentaccounts@northeastern.edu. Please be sure to include the student's name, NU ID, and reason for the dispute in the email.

In cases where students default on financial obligations, the student is liable for the outstanding balance, collection costs, and any legal fees incurred by the university during the collection process.

Tuition Paid Directly by Employers

When a third party pays tuition directly to the university, the student must provide the Office of Student Accounts with a purchase order or a written statement of intent to pay by the third party prior to the first week of classes. If there are stipulations associated with the payment agreement, such as a minimum grade level, then the student must either pay the university directly or enroll in one of the payment options. Documents pertaining to a third-party agreement can be emailed to thirdparty@northeastern.edu or mailed to the address below.

Student Financial Services/Third Party
354 Richards Hall
360 Huntington Avenue
Boston, MA 02115

617.373.8222 (fax)
thirdparty@northeastern.edu

Tuition Reimbursement

Many companies, embassies, and agencies directly reimburse students for their educational expenses upon successful completion of courses. In these situations, the student is responsible for paying the bill at the beginning of the semester or selecting another payment option. Tuition may not be left unpaid pending reimbursement by a third party.

Tuition and Fees and Default Policy

Tuition rates, all fees, rules and regulations, and courses and course content are subject to revision by the president and the Board of Trustees at any time. In cases where the student defaults on his or her tuition, the student shall be liable for the outstanding tuition and all reasonable

associated collection costs incurred by the university, including attorneys' fees.

Mandatory Student Health Plan

Since September 1989, Massachusetts law (M.G.L. c.15A, § 18) has required every full-time and part-time student enrolled in a certificate, diploma, or degree-granting program in a Massachusetts institution of higher learning to participate in a Student Health Insurance Program (SHIP) or in a health benefit plan with comparable coverage. Under SHIP, a part-time student is defined as one who is enrolled in at least 75 percent of the full-time curriculum (College of Professional Studies graduate students—7 credits; part-time graduate students—6 credits).

Students who have comparable health plan coverage may waive the Northeastern University Student Health Plan (NUSHP) by completing a waiver on their myNortheastern portal (https://my.northeastern.edu) by the designated deadline date each academic year. For deadlines and additional information, visit the NUSHP website. (http://www.northeastern.edu/nushp)

University-Wide Academic Policies and Procedures

Graduate Schools Academic Policies

Note that this information applies to both undergraduate and graduate students. Not all of the policies and procedures apply to both types of students. *Note:* International students must consult with Office of Global Services (OGS) (http://www.northeastern.edu/ogs) advisors concerning any of the following items in order to maintain compliance with Student and Exchange Visitor Information System (SEVIS) regulations and institutional policy. It is best to set up an appointment to discuss individual cases and learn about appropriate procedures to follow.

Attendance Requirements

The university expects students to meet attendance requirements in all courses to qualify for credit. Attendance requirements vary; it is the student's responsibility to ascertain what each instructor requires.

Failure to meet attendance requirements may force a student to drop the course, as recommended by the instructor and the college.

Permission to make up work may be granted by instructors for reasonable cause. Requests must be made immediately upon a student's return to class.

Absence Because of Student Activities

If students must miss classes to participate in athletic contests or other forms of scheduled intercollegiate activity, they are entitled to makeup privileges. Faculty members may require a written statement from the administrator in charge of the activity.

Absence Because of Illness

A student who is absent from school for an extended period of time must inform his or her college by email from an official university email account or by telephone.

Absence Because of Religious Beliefs

The university maintains the following guidelines regarding student absences because of religious beliefs:

Any student who is unable, because of his/her religious beliefs, to attend classes or to participate in any examination, study, or work requirement shall be provided with an opportunity to make up such examination, study, or work requirement that he/she may have missed because of such absence on any particular day; provided, however, that such makeup examination or work shall not create an unreasonable burden upon such school. No fees of any kind shall be charged by the institution for

making available to the said student such opportunity. No adverse or prejudicial effects shall result to any student because of availing himself/ herself of the provisions of this section. (Massachusetts General Laws, Chapter 151C, Section 2B, 1985)

Absence Because of Jury Duty

Members of the university community are expected to fulfill their obligations to serve on a jury if called upon.

A student selected for jury duty should inform his or her instructors and/or activity advisors. They will provide a reasonable substitute or compensatory opportunities for any required work missed. Absence will not be penalized in any way.

University Leave of Absence Policies
GENERAL POLICY

Students who wish to take a leave of absence are encouraged to apply for the leave by submitting a petition through the myNEU web portal (http://myneu.neu.edu) one month prior to the start of the semester during which they plan to take the leave.

The usual limit for a leave of absence is one academic semester. International students must contact the OGS (http://www.northeastern.edu/ogs) regarding specific leave of absence procedures. A leave of absence (general, medical, or emergency), if approved, will take into account the following conditions:

- Students who do not return at the end of the leave will be withdrawn and must submit a petition for subsequent readmission to the program.
- Students must return to classes, not cooperative education (co-op).
- Students must be currently enrolled in academic courses or co-op. If a student is withdrawn for any reason, a request for a leave of absence cannot be considered until the withdrawal is resolved.
- Students who receive financial aid should meet with a financial aid counselor before going on a leave.
- Students in university housing should refer to Residental Life and Housing for policy information.
- Students' enrollment status cannot include more than one academic year of consecutive nonclass enrollments.
- After the 11th week of the semester, a student may apply for a leave of absence only for medical reasons or due to military deployment.
- Students who take leaves should be aware that more than six months on leave will cause many student loans to go into repayment. Students should see their financial aid counselor for more information on how their loans may be affected by a leave of absence.

RETURNING FROM A GENERAL LEAVE OF ABSENCE

Students returning from an approved leave of absence may be required to submit to their college's student services office a notification of intent to return. It should be submitted no later than one month prior to the start of the semester in which they intend to return. Students are required to preregister for courses upon returning from a leave of absence. International students returning from a leave of absence should contact the OGS (http://www.northeastern.edu/ogs) regarding SEVIS procedures three to four months prior to anticipated return time.

LEAVE OF ABSENCE DUE TO MILITARY DEPLOYMENT

When a student in the Reserves or in the National Guard is called to active duty, the student must notify his or her college dean's office and provide proof of deployment prior to being deployed. The proof may be faxed, mailed, or hand-carried to the college dean's office. It may take the form of general orders cut by the company commander.

When a student is activated during the term, the university will:

- Excuse tuition for that term. Any payment made will be credited to the student's account.
- Place a "W" on the student's transcript for each class enrollment.

If a student is called to active duty near the end of the term, the student and faculty members may determine that incomplete (I) grades are more appropriate. In this case, tuition will not be waived.

When a student returns to the university after completion of a tour of duty, he or she will notify the college dean's office. The college dean's office will assist the student with registration.

MEDICAL OR EMERGENCY LEAVE OF ABSENCE

Medical leave is an option available to those Northeastern students who develop a major medical condition that precludes class attendance, completion of requirements, and/or co-op. Medical leave petitions must be initiated at University Health and Counseling Services (UHCS). Students are not allowed to take courses for credit toward their degree at Northeastern while on medical leave of absence. International students must contact the OGS (http://www.northeastern.edu/ogs) regarding medical leave of absence procedures. Students can petition their college for an exception to take courses elsewhere based on extenuating circumstances.

Students who wish to reenter the university following a medical leave must contact UHCS. Reentry from a medical leave requires receipt of all documentation delivered to UHCS on or around one month prior to the planned reentry to classes. Once all documentation is received by UHCS, it will be reviewed and the student will be notified of the decision. Students must attend classes on the Northeastern campus for the semester they wish to return from medical leave of absence.

More specific information about the medical leave and reentry process, along with the application for leave, can be found at the UHCS webpage (http://www.northeastern.edu/uhcs/access-to-care/medical-leave-of-absence).

Emergency leaves may be granted when a student cannot continue attending class after the start of the term due to life-changing situations beyond the student's control.

The university's medical leave of absence and emergency leave policy states that all *tuition* charged for the term in which the leave has been granted will be held by the university and applied toward future tuition charges in the same academic program. Outstanding balances (including unpaid balances) for the academic term in which the leave is taken are still due the university. Tuition adjustments are made depending on the timing of the leave. The adjustments would follow the same schedule as the official withdrawal adjustments. Financial aid recipients must contact their financial aid counselor to understand the effects on aid received.

If the leave extends more than six months, student loans may go into repayment. Students enrolled in the Northeastern University Student Health Plan (NUSHP) will remain enrolled in the plan for the plan year, ending August 31.

Emergency leave petitions are available in college academic student services offices and specify the conditions and procedures under which such leaves may be granted.

MEDICAL WITHDRAWAL

Permanent departure from the university due to the diagnosis of a major medical illness or injury, or psychiatric illness, necessitates a petition for medical withdrawal. The procedure follows that for the medical leave of absence.

University Withdrawal

Students seeking to withdraw from the university for any reason should contact the student services office of their college.

Students may be withdrawn from the university for financial, disciplinary, academic, or health reasons. In the last case, a committee will review the recommendations of the director of health services to determine whether the student should withdraw. The student has an opportunity to present his or her case to the committee. Withdrawals are made only when it is determined that the student is a danger to himself or herself, or to other members of the university community, or when the student has demonstrated behavior detrimental to the educational mission of the university. International students must contact the OGS (http://www.northeastern.edu/ogs) regarding any compliance issues implications deriving from university withdrawal.

University-Sponsored Travel

Northeastern University is committed to the health, safety, and security of its students and all other members of the university community. As a global institution, our university members undertake international travel in pursuit of teaching, research, consulting, service, cocurricular activities, and work intended to advance learning and the interests of the university. As a result, the university supports standards and expectations associated with international travel that are designed to reduce personal and university risk.

To ensure the safety of our students, you are required to comply with the university international travel policy when traveling abroad on university-sponsored travel. Such travel may include teaching, research, co-op, service, field studies, and volunteer and administrative work.

In order to provide assistance and support to you while traveling abroad, the university maintains a travel registry. In advance of any planned international travel, all students are required to enter their travel plans along with other requested information into the travel registry. To access the registry, go to the myNEU web portal (http://myneu.neu.edu), "Services and Links," and register your travel.

Students are responsible for familiarizing themselves with the university international travel policy and are encouraged to visit the international travel website for guidance.

Academic Calendars

The graduate schools' programs are offered on a semester calendar consisting of fifteen weeks. The College of Professional Studies graduate programs are offered on a quarter calendar consisting of twelve weeks.

Quarter Programs

For student records that include quarter hours, the approved semester-hour conversion rate is (quarter hours) x 0.750. For example, a 4-credit quarter course is equivalent to a 3-credit semester course.

Semester Programs

Traditional semester hours apply.

Full-Time Status

Note: Full-time status may be defined differently for federal loan purposes.

A graduate student is considered a full-time student if enrolled in a minimum of 8 semester hours of credit for the semester with the following considerations:

- Students who hold stipended graduate assistantships will be considered full-time if enrolled for a minimum of 6 semester hours of credit.
- Students for whom English is a second language, at the discretion of their departments, will be considered full-time if they are enrolled in a minimum of 8 semester hours or three courses, whichever is less.
- Students holding Dean's scholarships, Diversity fellowships, Double Husky awards, or being supported by Graduate Student Scholarships (GSSs) will be considered full-time if they are enrolled in a minimum of 8 semester hours.
- Students enrolled in Dissertation or Continuation are considered full-time.
- International students enrolled in graduate programs at Northeastern University must consult with the Office of Global Services (OGS) (http://www.northeastern.edu/ogs) on all matters regarding the maintenance of full-time status.

Overload Conditions for Graduate Assistants

Graduate assistants are expected to devote full-time effort to their studies and the duties of their award.

They are not permitted to hold any other job during the term of their assistantship; however, they may be offered limited extra work on campus. Graduate assistants who are not on F-1 or J-1 visas can be offered overload work that does not exceed an average of 6 hours a week or 90 hours a semester, for a total of 270 hours a year (or three semesters). As part of this work, graduate assistants may be hired to teach one 3-semester-hour course as an overload during the year (180 hours). The hours worked during the weeks between semesters are included in this total.

The OGS issues and verifies on-campus work authorization to eligible students in nonimmigrant visa classifications. Due to federal regulations, international graduate assistants cannot be offered overload work. All international students must acquire the appropriate work authorization from the OGS, 405 Ell Hall, prior to engaging each and every time in any form of employment.

Grading System

Grades are officially recorded by letters, evaluated as follows.

Letter Grade	Numerical Equivalent	Explanation
A	4.000	Outstanding achievement
A−	3.667	
B+	3.333	
B	3.000	Good achievement
B−	2.667	
C+	2.333	
C	2.000	Satisfactory achievement
C−	1.667	
F	0.000	Failure
I		Incomplete
IP		In progress
NE		Not enrolled
NG		Grade not reported by faculty
S		Satisfactory (pass/fail basis; counts toward total degree requirements)
U		Unsatisfactory (pass/fail basis)
X		Incomplete (pass/fail basis)
L		Audit (no credit given)
T		Transfer
W		Course withdrawal

An I, IP, or X grade shows that the student has not completed the course requirements.

Note: In the College of Professional Studies, the incomplete, or I, grade may be given only when the student was approved to make up a single key requirement of a course, such as a paper or major report. The student and instructor must complete an Incomplete-Grade Contract (http://www.northeastern.edu/registrar/form-inc-grade.pdf) before the end of the course. The completed contract should be sent to the Office of Academic and Student Support Services for the signature from the Office of the Dean: 50 Nightingale Hall; fax 617.373.5545; email (cpsadviser@neu.edu). The university has a one-year-limit policy to make up incomplete grades. Students have access to their online course materials in Blackboard for up to one year.

The IP grade is intended for courses that extend over several semesters. The time restrictions on the incomplete grade do not apply to the IP grade. While the IP grade is left unchanged, it is not included in computing the grade-point average (GPA). If the IP grade is never changed, the course does not count toward graduation requirements.

Dropping Courses

Not attending class does not constitute withdrawal. Students receiving a grade of W or NE in any course are responsible for the costs associated with that course. Students must drop courses using processes described below.

IN FALL AND SPRING SEMESTERS

- Through the third week of the semester, students may withdraw without any grade being posted to the transcript. Courses may be dropped via the myNEU web portal (http://myneu.neu.edu/cp/home/displaylogin).
- Between the fourth week and the last day of classes, course withdrawals are indicated by a W on the student's record. Courses may be dropped via the myNEU web portal. (http://myneu.neu.edu/cp/home/displaylogin) No financial adjustment is made for courses receiving a W grade.
- After the last day of classes, no withdrawals are accepted for any reason. A letter grade for the course will be posted on the transcript.

- Dropping below full-time enrollment may affect financial aid, health insurance eligibility, and the maintenance of proper nonimmigrant visa status.

IN SUMMER HALF SEMESTERS

- Through the second week of the half semester, students may withdraw without any grade being posted to the transcript. Courses may be dropped via the myNEU web portal (http://myneu.neu.edu/cp/home/displaylogin).
- Between the third week and the last day of classes, course withdrawals are indicated by a W on the student's record. Courses may be dropped via the myNEU web portal (http://myneu.neu.edu/cp/home/displaylogin). No financial adjustment is made for courses receiving a W grade.
- After the last day of classes, no withdrawals are accepted for any reason. A letter grade for the course will be posted on the transcript.
- Dropping below full-time enrollment may affect financial aid.

Pass/Fail System

The individual schools and colleges state how and when the pass/fail system may be used.

Clearing an Incomplete or Changing Other Grades

An incomplete grade may be reported by the instructor when a student has failed to complete a major component of a required course, such as homework, a quiz or final examination, a term paper, or a laboratory project. Students can make up an incomplete grade by satisfying the requirements of the instructor or, if the instructor is absent, the chair of the department. Be aware that instructors' policies on the granting of incomplete grades may vary and that the final decision on an incomplete grade is up to the instructor. The period for clearing an incomplete grade and for changing a grade other than an incomplete or failure (F or U) is restricted to one calendar year from the date it is first recorded on the student's permanent record.

To clear an incomplete grade, a student must obtain an Incomplete-Grade Contract (http://www.northeastern.edu/registrar/form-inc-grade.pdf)on which the precise agreement for clearing an incomplete grade is specified and that is signed by the student and the instructor. The student must make an appointment with the instructor to arrange for clearing the incomplete grade. He or she must then complete the form, sign the agreement, and obtain the instructor's signature; leave a copy with the instructor, take one copy to the college academic student services office, and retain a copy as a personal receipt. Any exception to this policy on change of grades must be recommended by the Academic Standing Committee (ASC) of the college in which the course was offered and must be forwarded in writing by the ASC to the registrar for implementation. (Finishing the agreed-upon course work must be completed within one calendar year from the end of the semester in which the course was offered.)

Commencing with grades given in the fall of 1986, the university policy is that any grade outstanding for 12 or more months cannot be changed.

Any exception to this policy on change of grades must be recommended by the ASC of the college in which the course was offered and must be forwarded in writing by the dean to the registrar for implementation.

Repeating Courses

When the appropriate course is available, courses may be repeated in order to earn a better grade. In all cases, the most recent grade earned in a course is the one used in calculating the overall GPA; however, previous grades remain on the transcript followed by the word "Repeat." Consult your academic advisor before repeating a course. Students are required to pay normal tuition charges for all repeated course work.

Substituting Courses

In some cases, it may not be possible to repeat a course if a student wishes to do so. In certain, unusual circumstances, students may petition to substitute one course for another they have already taken, as long as the subject matter of both courses is substantially alike. With the approval of the student's academic advisor and the agreement of the department that offered the first course taken, a grade received in the new course will be labeled "Substitute" on the transcript and will be treated in the GPA calculation as a "repeat" grade, as described above. The original grade will remain on the student's Northeastern transcript. Consult your academic advisor before enrolling in any proposed substitute course. Students are required to pay normal tuition charges for all substitute course work.

Audit Policy

Graduate students may, with permission, audit one class per term with no additional charge. Students are permitted to petition from the end of the course-add period to the end of the third week of classes. Permission is based on the availability of a seat in the class and is at the discretion of the instructor and college.

Students must obtain advisor approval and meet the prerequisites and any other required approvals for the class. Instructor permission as well as approval by the associate dean of the college offering the course is required. The course work required is at the discretion of the instructor. Once a student opts to audit a course, the audit status of the course cannot be changed. A signed Petition to Audit must be presented to the Office of the Registrar during the designated audit-add period. Excluded courses are co-op, labs, language courses, any off-campus course, any online course, and any course required for the major or degree. Audits carry no academic credit.

Clearing an Academic Deficiency

An academic deficiency occurs when a student fails to complete a course with a satisfactory grade. The deficiency may occur because the student has failed the course or because the student has passed the course but with a grade that does not meet the minimum required by the student's program.

Students who have academic deficiencies may be required to clear them before progressing within the curriculum, especially if the course work is a prerequisite for future course work. Deficiencies can affect the student's expected year of graduation.

With the approval of the appropriate program faculty and/or academic advisor, students can clear deficiencies in the following ways:

1. Repeat the same course at one of Northeastern's colleges, which will result in a "repeat" grade (see "Repeating Courses" policy above).
2. Substitute a comparable course at one of Northeastern's colleges, which will result in a "repeat" grade.

Appeal of Final Grades

Under certain circumstances, students have the right to appeal final grades given by either academic faculty or cooperative education coordinators. Criteria and procedures can be found under Appeals Policies and Procedures.

GPA

Numerical equivalents for scholastic averages are weighted according to the number of hours the course carries. For example, suppose a student

receives a grade of B in a course carrying 4 semester hours and a grade of A in a course carrying 1 semester hour. The weightings for these example courses are as follows:

Grade	Numerical Equivalent	Semester Hours	Weight
B	3.000	4	12
A	4.000	1	4
Totals:		5	16

The GPA for both courses would then be the total weight (16) divided by the total semester hours (5), or 3.200. Grades of I, IP, S, U, and X are not included in the calculation of the GPA.

Minimum Cumulative GPA

Grades submitted to satisfy, in whole or in part, the requirements for any graduate degree or certificate of advanced study must yield a cumulative GPA of 3.000 or higher. This requirement may be supplemented by additional restrictions established by the graduate program or the college's graduate office such as, but not limited to, the maximum number of individual courses with grades below 3.000 that may be obtained without being required to withdraw or a minimum GPA in each semester.

Students falling below 3.000 are placed on academic probation. If the student remains on academic probation for two semesters, he or she may be terminated from the graduate program.

Not more than two courses or 6 semester hours of credit, whichever is greater, may be repeated to satisfy the requirements for the degree. The last grade earned in each of these repeated courses is counted in the calculation of the cumulative GPA.

Any incomplete grades must be made up within one calendar year from the semester in which the student took the class that resulted in the incomplete course grade.

More information regarding course grading and academic disputes may be found at "Academic Appeals" under "Appeals Policies and Procedures."

Grade Reports

Grades are available to students approximately three days after the end of each semester via the myNEU web portal (http://myneu.neu.edu/cp/home/displaylogin). A missing grade means that none was received from the instructor. Grades received late from faculty are processed as they are received.

Transcripts

Currently enrolled students may obtain unofficial transcripts from the myNEU web portal (http://myneu.neu.edu/cp/home/displaylogin) and may also order official transcripts through myNEU. For further information on transcript requests, visit the registrar's website. (http://www.northeastern.edu/registrar/trans_request.html) All questions concerning transcript requests should be directed to 617.373.2300, (TTY) 617.373.5360.

Northeastern University Course Numbering

UNDERGRADUATE

0001−0999	**Orientation and basic**
	No degree credit
1000−1999	**Introductory level (first year)**
	Survey, foundation, and introductory courses, normally with no prerequisites and designed primarily for students with no prior background
2000−2999	**Intermediate level (sophomore/ junior year)**
	Normally designed for sophomores and above but in some cases open to freshman majors in the department
3000−3999	**Upper-intermediate level (junior year)**
	Designed primarily as courses for juniors; prerequisites are normally required, and these courses are prerequisites for advanced courses
4000−4999	**Advanced level (senior year)**
	Designed primarily for juniors and seniors; also includes specialized courses such as research, capstone, and thesis

GRADUATE

0001−0999	**Orientation and basic**
	No degree credit
5000−5999	**First-level graduate**
	Courses primarily for graduate students and qualified undergraduate students with permission
6000−6999	**Second-level graduate**
	Generally for master's and clinical doctorate only
7000−7999	**Third-level graduate**
	Master's- and doctoral-level courses; includes master's thesis
8000−8999	**Clinical/research/readings**
	Includes comprehensive exam preparation
9000−9999	**Doctoral research and dissertation**

Maintenance of Student Records

The university registrar is responsible for ensuring appropriate maintenance and safekeeping of student records. The transcript, which is stored electronically and maintained indefinitely, is the holistic record of student attendance and degree progress. In the event that the university discontinues operations, the archive of student records would be maintained by:

Massachusetts Department of Higher Education
One Ashburton Place
Room 1401
Boston, MA 02108

Course Cancellations

Northeastern University reserves the right to cancel any course if minimum enrollments, appropriate faculty, or academic facilities do not meet standards.

Final Examinations and Related Policies on Other Exams

All final examinations, term papers, or projects must be returned to the student or be retained by the department for a period of one year.

Graduation Requirements

All eligible degree candidates must complete the graduation application by the applicable deadline. Before you apply to graduate through your myNEU account, we recommend you take the time to review your current program information, i.e., degree, major, and concentration. To review this information, log in to your myNEU account; under the "Self-Service" tab click "Student Self-Service."

Family Educational Rights and Privacy Act (FERPA)

FERPA for Students—General Information

FERPA is a federal law that applies to educational institutions. Under FERPA, schools must allow students who are 18 years or over or attending a postsecondary institution:

- Access to their education records
- An opportunity to seek to have the records amended (see the *Student Handbook* for this procedure)
- Some control over the disclosure of information from the records

FERPA General Guidance for Parental Disclosure

When a student turns 18 years of age or attends a postsecondary institution, the student, and not the parent, may access, seek to amend, and consent to disclosures of his or her education records.

If you are an undergraduate day student and you choose not to share information with your parents, Northeastern will, if asked, indicate that you have restricted access to your records.

Release of Directory Information

The primary purpose of directory information is to allow Northeastern University to confirm attendance for employers, health insurance companies, and loan agencies. Northeastern may disclose appropriately designated "directory information" without written consent, unless you have advised the university to the contrary in accordance with the procedures below. If you choose not to release directory information, all communications with all third parties and agencies will need to be done through your written request to the university or in person.

As of June 30, 2016, Northeastern directory information includes:

- Student name
- Home address (city, state, country only)
- Major field of study
- College
- Class year
- Enrollment status (e.g., undergraduate or graduate, full-time or part-time)
- Dates of attendance
- Degrees, honors, and awards received
- Most recent educational agency or institution attended

- Sports activity participation, showing weight/height of members of athletic teams
- Participation in officially recognized activities

If Northeastern currently has permission to release data and you do not want the university to disclose directory information without your prior written consent, you must notify the university by coming to the Office of the Registrar, 271 Huntington Avenue.

Notification of Rights under FERPA

The Family Educational Rights and Privacy Act (FERPA) affords students certain rights with respect to their education records. These rights are:

1. The right to inspect and review the student's education records within 45 days of the day the university receives a request for access. Students should submit to the registrar, dean, or head of the academic department (or appropriate official) written requests that identify the record(s) they wish to inspect. The university official will make arrangements for access and notify the student of the time and place where the records may be inspected. If the records are not maintained by the university official to whom the request was submitted, that official shall advise the student of the correct official to whom the request should be addressed.

2. The right to request the amendment of the student's education record that the student believes is inaccurate or misleading. Students may ask the university to amend a record that they believe is inaccurate or misleading. They should write the university official responsible for the record, clearly identify the part of the record they want changed, and specify why it is inaccurate or misleading. If the university decides not to amend the record as requested by the student, the university will notify the student of the decision and advise the student of his or her right to a hearing regarding the request for amendment. Additional information regarding the hearing procedures will be provided to the student when notified of the right to a hearing.

3. The right to consent to disclosures of personally identifiable information contained in the student's education records, except to the extent that FERPA authorizes disclosure without consent. One exception, which permits disclosure without consent, is disclosure to school officials with legitimate educational interest. A school official is defined as a person employed by the university in an administrative, supervisory, academic, or support staff position (including law enforcement unit and health staff); a person or company with whom the university has contracted (such as an attorney, auditor, or collection agent); a person serving on the Board of Trustees; or a person assisting another school official in performing his or her tasks. A school official has a legitimate educational interest if the official needs to review an education record in order to fulfill his or her professional responsibility.

4. The right to file a complaint with the U.S. Department of Education concerning alleged failures by the university to comply with the requirements of FERPA. At Northeastern, the Office of the University Registrar, 271 Huntington Avenue, administers FERPA.

Additional Information

Additional information can be obtained at the U.S. Department of Education's website (http://www.ed.gov/policy/gen/guid/fpco/ferpa) or by writing to:

Family Policy Compliance Office
U.S. Department of Education
400 Maryland Avenue, SW
Washington, D.C. 20202-5920

For information about the Student Right-to-Know Act, visit the registrar's website. (http://www.northeastern.edu/registrar/right-to-know.html)

Code of Student Conduct

The Code of Student Conduct is online at the Office of Student Conduct and Conflict Resolution (http://www.northeastern.edu/osccr/code-of-student-conduct) website.

Appeals Policies and Procedures

Graduate Student Appeals Procedures

Northeastern University affirms that it is essential to provide an appeals mechanism to students who believe that they have been erroneously, capriciously, inappropriately, or otherwise unfairly treated.

Academic Appeals

It is the policy of the university that all students shall be treated fairly with respect to evaluations made of their academic performance, standing, and progress. The university presumes that academic judgments by its faculty are fair, consistent, and objective. Students must understand that the substitution of a different academic judgment for that of the original evaluator is a serious intrusion upon teaching prerogatives. Nonetheless, the university believes it is essential to provide an appeals mechanism to students who believe that they were erroneously, capriciously, or otherwise unfairly treated in an academic or cooperative education determination. This includes claims of misinterpretation or inequitable application of any academic provision of the student handbook or *Faculty Handbook.* Issues concerning admission or readmission into a program cannot be appealed beyond the college level.

Before invoking the appeals procedures, students are always encouraged to speak informally to their instructors or academic advisors about any determination or grade about which they have questions. If students choose to pursue an appeal, the process is described in the appeals section that follows.

Scientific or Research Misconduct

Scientific or research misconduct is defined as fabrication, falsification, plagiarism, or other practices that seriously deviate from those that are commonly accepted within the academic and scientific community for proposing, conducting, or reporting research and does not include honest error or honest differences in interpretation or judgments of data. (Further information can be obtained from the U.S. Office of Research Integrity, Department of Health and Human Services. (https://ori.hhs.gov) Possible incidences of misconduct are to be reported immediately to the vice provost for graduate education, who will initiate the appropriate procedures. Findings of scientific or research misconduct cannot be appealed through the process below.

Nonacademic Appeals

It is the policy of the university that all students shall be treated with respect and that all evaluations of their employment performance will be fair, consistent, and objective. This includes claims of misinterpretation or inequitable application of any employment provision of the student handbook. The student is always encouraged to speak informally to his or her supervisor about any determination about which he or she has questions prior to invoking the appeals procedures.

If the student chooses to pursue an appeal, the process is described in the appeals section that follows.

Appeal of Final Grades

It is the policy of the university that all students will be treated fairly in evaluations made of their academic performance, standing, and progress. The university presumes that academic judgments by its faculty are fair, consistent, and objective. Students must understand that the substitution of a different academic judgment for that of the original evaluator is a serious intrusion upon teaching prerogatives. Nonetheless, the university believes it is essential to provide an appeals mechanism to students who believe that they were erroneously, capriciously, or otherwise unfairly treated in an academic or cooperative education determination. This includes claims of misinterpretation or inequitable application of any academic provision of the university's undergraduate or graduate catalog, student handbook, or *Faculty Handbook.* However, graduate student issues involving admission or readmission in a program cannot be appealed beyond the college level.

In most cases, students should first discuss their concerns with the faculty member who taught the course to see if it is possible to reach agreement on the issue(s). If the student is not satisfied with the outcome of this discussion, or if the student is not comfortable discussing the issue with the instructor, the student should request a meeting with the department chair, or a person named by the chair, to attempt a department-level resolution of the appeal. If these informal attempts to resolve the issue fail, the student can enter the formal procedure at the college level as follows.

STEP 1

A student may appeal an academic determination by submitting a written statement (the Statement) that specifies the details of the action or judgment. This Statement should include when the problem occurred, who was involved, the basis of the appeal, and the resolution sought by the student. For students in the College of Professional Studies (CPS), the Statement is submitted to the school official designated by the Vice President for Professional and Continuing Studies. Graduate students (other than CPS) should submit the Statement to the graduate coordinator in the department (where one exists). If there is no department-level coordinator, the appeal should proceed to Step 2. All appeals of grades should be initiated and resolved before the student graduates. If a student wishes to dispute a grade in his or her final term, this must be done within forty-five calendar days of graduation. If the appeal concerns a cooperative education determination, it is submitted to the dean of the college in which the student is enrolled. The Statement must specify the details of the action or judgment and the basis for the appeal. All parties shall cooperate and act expeditiously in processing the appeal to completion.

Though students are always entitled to seek the advice of legal counsel, students may not be represented by a lawyer in the informal or formal academic appeal procedures. A student may consult with the Vice Provost for Graduate Education, Vice President for Professional and Continuing Studies (in the case of CPS students), or their designees at any point in this procedure for advice or assistance. The dean, vice president, or provost may take whatever steps they deem reasonably appropriate to achieve voluntary resolution of the problem at any stage of these procedures.

The Statement should be submitted within twenty-eight working days (or twenty working days [four calendar weeks] for CPS students) of the day when the student learns of the academic determination in question. For course grade appeal in the CPS, the Statement must be submitted within twenty days after grades are posted to the student academic

record. Grades are typically available the Tuesday after the term ends and are viewable through the student's myNortheastern account.

If a student feels that he or she has been the victim of harassment or of discrimination prohibited by law or by university policy, he or she should consult with the Office of Institutional Diversity and Equity as soon as he or she becomes aware of alleged prohibited harassment or discrimination and is not required to wait until a term grade or determination is received before seeking advice or redress. If the Office of Institutional Diversity and Equity is advised of such alleged prohibited conduct as part of an academic appeal (see below), the appeal shall be pursued and investigated first through the Office of Institutional Diversity and Equity. In such cases, the student should submit the appeal to the appropriate dean(s) described in this step, with a copy also given to the Office of Institutional Diversity and Equity. Following a resolution of the sexual harassment/discrimination issues, any remaining academic issues will be addressed, at the request of the student, according to the academic appeals procedures.

STEP 2

The dean or CPS vice president shall respond to the student in writing, including specific instructions for the student to seek an informal resolution to the matter, unless such course of action, as outlined by the student in his or her Statement, is demonstrably futile. These directions shall include discussing the matter with the person whom the student identifies as involved in the matter. If the student is not satisfied with the informal resolution, the dean or CPS vice president shall discuss the matter with the department chair (where one exists), graduate coordinator, consultant, program director, or associate dean (as appropriate) or equivalent supervisor and the dean of the college in which the faculty member involved in the matter serves, who shall attempt to effect an informal resolution. The student shall also have the right to discuss the matter with the chair (where one exists) or equivalent supervisor in which department the faculty member involved in the matter serves.

If the appeal involves allegations of prohibited harassment or discrimination, the dean shall consult with the Office of Institutional Diversity and Equity before making this response and shall, as part of this response, explain the role that the Office of Institutional Diversity and Equity will play in steps 2 and 3 of this procedure.

A copy of this response shall be sent to the department chair or equivalent supervisor of the appropriate unit.

STEP 3

If the appeal cannot be resolved informally within thirty calendar days of the student's original submission of his or her Statement to the dean or CPS vice president, or if he or she is not satisfied with the disposition of the matter at Step 2, the student may proceed with the appeal through his or her college's or school's established academic appeals procedure. The dean or the academic standing committee, as applicable, must provide the student and the involved faculty member with a written report of the finding(s) and decision.

This step involves a review by an academic standing committee making the recommendation to the dean or CPS vice president. The student may obtain a copy of the operating rules of the academic standing committee from the dean of the college involved.

In appeals involving allegations of prohibited harassment or discrimination, the dean or academic standing committee shall receive a report of the findings of the investigation of the Office of Institutional Diversity and Equity for incorporation into its own report on matters left unresolved by that finding that were referred to it. The dean/CPS vice

president or committee shall be without authority to reverse or modify the Office of Institutional Diversity and Equity finding(s) or resolution.

STEP 4

If the student or the involved faculty member is not satisfied with the dean's or CPS vice president's disposition of the matter or if the appeal is not resolved within thirty calendar days after originally submitted to the dean or CPS vice president pursuant to step 1, he or she may further pursue the matter by requesting in writing within fourteen calendar days that the university convene an academic appeals resolution committee to review the issue. Students may obtain information on this process in either the Office of the Vice President for Student Affairs (104 Ell) or the Office of the Provost (110 CH). This committee has been designated as the final authority on these matters. This request must be made within fourteen calendar days of the finding of the academic standing committee in step 3.

1. ***Academic Appeals Resolution Committee***
   The academic appeals resolution committee includes:

   - The Vice Provost for Graduate Education or a designee.

   - The student's faculty advisor will be appointed by the appropriate vice provost except in cases where no specific advisor exists, or where the faculty advisor is involved in the dispute. In those cases, a faculty member from the student's major college, department, or area of specialization will be appointed.

   - Two faculty members appointed by the Faculty Senate Agenda Committee (if the appeal is based on a cooperative education determination, one of the faculty members shall be a member of the cooperative education faculty, but not from the student's area of study) and a representative of the Office of Institutional Diversity and Equity (if the appeal had at any point involved a matter of sexual harassment/discrimination).

   - The chair shall be elected from among the committee's three faculty members but cannot be the student's faculty advisor.

2. ***Preliminary Matters***
   If the academic appeals resolution committee determines, by a majority vote, that the appeal is patently without substance or merit, it may dismiss the appeal.

3. ***Investigation***
   The academic appeals resolution committee shall investigate the matter under appeal as quickly as possible by studying the relevant documents, interviewing the parties (especially the student and the involved faculty member), and taking any other action it deems appropriate. At no time shall the committee be bound by rules of evidence but shall at all times conduct itself in a manner that is not arbitrary or capricious. The academic appeals resolution committee may, but is not required to, hold a hearing prior to resolving the issues. However, in all instances, the student and the involved faculty member shall have the right to appear and testify separately and privately before the academic appeals resolution committee. The student shall have the right to have an advocate from the university community present during his or her testimony to the academic appeals resolution committee.

4. ***Authority to Act***
   The academic appeals resolution committee has been designated as the final authority on these matters. At the conclusion of its investigation, the academic appeals resolution committee shall resolve, by majority vote, the issue by either upholding the finding of the academic standing committee or dean/CPS vice president, in

which case no further appeal is available, or granting such relief to the student as the appeals resolution committee deems appropriate.

    a. The academic appeals resolution committee may not determine a resolution that contradicts the prior findings or actions of the Office of Institutional Diversity and Equity with respect to elements of this appeal.

    b. In the event of a tie vote, the action of the academic standing committee or dean/CPS vice president shall be considered upheld.

5. *Resolution*
All direct parties to the appeal, including but not limited to the student, the CPS vice president or provost, the dean, the department chair or equivalent supervisors, graduate coordinator or equivalent supervisor, and the faculty member shall be promptly informed in writing of the decisions and actions taken (i.e., the Report) during this academic appeals procedure.

6. *Report*
A written Report of the appeal and its resolution shall be submitted by the chair of the academic appeals resolution committee to the student, the involved faculty member, the Faculty Senate Agenda Committee, the vice president for student affairs, the appropriate vice provost, the registrar, and the dean or CPS vice president, as appropriate.

7. *Action*
The dean(s) or CPS vice president or his or her designee in the involved college(s) shall take whatever action is necessary to implement fully the resolution of the academic appeals resolution committee. This includes reporting the change of grade to the registrar.

8. *Appeal*
No further appeal can be instituted by the student or the involved faculty member with respect to the issue(s) raised at any level of the formal appeals resolutions procedures once adjudicated.

General Regulations

Review the general regulations that follow as well as all other regulations or limitations included throughout this catalog. Your success at Northeastern depends, in part, on understanding your rights and fulfilling your responsibilities.

Legal Rights and Responsibilities
GRIEVANCE PROCEDURE FOR DISABLED STUDENTS
It is the policy of Northeastern University to comply with all laws governing access by and discrimination against disabled students. Accordingly, any student who believes that there has been a violation of these laws is encouraged to discuss the matter with the director of the Disability Resource Center and other persons identified by the director, or with the director of the Office of Institutional Diversity and Equality, to resolve the matter in a prompt and equitable manner. If such discussions do not resolve the matter, the student may then initiate a grievance by taking the steps outlined below.

1. All grievances made by students on the basis of being disabled are considered as being made to the president of the university.

2. In the case of a grievance, the student should discuss the objection with the individual responsible for the office or department where the objection was initially raised.

3. If not satisfied, the student should discuss the objection with the dean of the college or director under which the department falls.

4. If the grievance is not satisfactorily resolved, the student should complete a grievance form and file a written request for a formal hearing with the Grievance Committee for Disabled Students. The request should be filed with the vice president for student affairs. Upon receipt of a written request for a formal hearing, the grievance committee (including one faculty member from the student's college, one faculty member not from the student's college, one representative from the Disability Resource Center, a representative from the Office of Institutional Diversity and Equality, the vice president for student affairs or a designee, and another administrator not from student affairs) must hold a hearing within three calendar weeks. The grievance committee must allow a full and fair opportunity for the presentation of evidence relevant to the reason(s) for the hearing request and must render a decision in writing to the requesting student within one week of the conclusion of the hearing. The director of the Office of Institutional Diversity and Equality is compliance officer for Section 504 of the Rehabilitation Act of 1973.

GRIEVANCE PROCEDURE—SEXUAL HARASSMENT
No employee, agent, supervisory personnel, or faculty member shall exercise his or her responsibilities or authority in such manner as to make submission to "sexual advances, requests for sexual favors, or other verbal or physical conduct of a sexual nature" as an explicit or implicit term or condition of evaluation, employment, admission, advancement, or reward within the university. Neither shall any employee, agent, supervisory personnel, or faculty member make submission to or rejection of such conduct the basis for employment or academic decisions affecting any employee or student. Neither shall any employee, agent, supervisory personnel, or faculty member conduct himself or herself with respect to verbal or physical behavior of a sexual nature where such conduct has the purpose or effect of unreasonably interfering with an individual's work or academic performance or creating an intimidating, hostile, or offensive work or classroom environment.

Though sexual harassment will not be tolerated, the university recognizes that it is difficult to regulate emotional relationships between consenting adults. However, a consensual relationship may be suspect in instances in which one of the individuals has authority over the other. Therefore, no faculty or employee involved romantically or sexually with a student may teach or supervise that person either individually or as part of a group in any activity connected to the university.

Any student, teaching assistant, employee, or faculty member who feels that he or she has been the victim of sexual harassment may bring the matter to the attention of the director of the Office of Institutional Diversity and Equality. Copies of the sexual harassment grievance procedure can be obtained from the Office of Institutional Diversity and Equality, 424 Columbus Place.

HAZING—CHAPTER 269 OF THE MASSACHUSETTS GENERAL LAWS
Section 17. Whoever is a principal organizer or participant in the crime of hazing, as defined herein, shall be punished by a fine of not more than three thousand dollars or by imprisonment in a house of correction for not more than one year, or both such fine and imprisonment. The term hazing as used in this section and in sections eighteen and nineteen, shall mean any conduct or method of initiation into any student organization, whether on public or private property, which willfully or recklessly endangers the physical or mental health of any student or other person. Such conduct shall include whipping; beating; branding; forced calisthenics; exposure to weather; forced consumption of any food, liquor, beverage, drug, or other substance; or any other brutal treatment or forced physical activity which is likely to adversely affect the physical health or safety of any such student or other person, or

which subjects such student or other person to extreme mental stress, including extended deprivation of sleep or rest or extended isolation. Notwithstanding any other provisions of this section to the contrary, consent shall not be available as a defense to any prosecution under this action.

Section 18. Whoever knows that another person is the victim of hazing as defined in section seventeen and is at the scene of such crime shall, to the extent that such person can do so without danger or peril to himself or others, report such crime to an appropriate law enforcement official as soon as reasonably practicable. Whoever fails to report such crime shall be punished by a fine of not more than one thousand dollars.

Section 19. Each institution of secondary education and each public and private institution of postsecondary education shall issue to every student group, student team, or student organization that is part of such institution or is recognized by the institution or permitted by the institution to use its name and facilities or is known by the institution to exist as an unaffiliated student group, student team, or student organization, a copy of this section and sections seventeen and eighteen; provided, however, that an institution's compliance with the section's requirements that an institution issue copies of this section and sections seventeen and eighteen to unaffiliated student groups, teams, or organizations shall not constitute evidence of the institution's recognition or endorsement of said unaffiliated student groups, teams, or organizations.

Each such group, team, or organization shall distribute a copy of this section and sections seventeen and eighteen to each of its members, plebes, pledges, or applicants for membership. It shall be the duty of each such group, team, or organization, acting through its designated officer, to deliver annually to the institution an attested acknowledgement stating that such group, team, or organization has received a copy of this section and said sections seventeen and eighteen, that each of its members, plebes, pledges, or applicants has received a copy of sections seventeen and eighteen, and that such group, team, or organization understands and agrees to comply with the provisions of this section and sections seventeen and eighteen. Each institution of secondary education and each public or private institution of postsecondary education shall, at least annually, before or at the start of enrollment, deliver to each person who enrolls as a full-time student in such institution a copy of this section and sections seventeen and eighteen.

Each institution of secondary education and each public or private institution of postsecondary education shall file, at least annually, a report with the regents of higher education and, in the case of secondary institutions, the board of education, certifying that such institution has complied with its responsibility to inform student groups, teams, or organizations and to notify each full-time student enrolled by it of the provisions of this section and sections seventeen and eighteen and also certifying that said institution has adopted a disciplinary policy with regard to the organizers and participants of hazing and that such policy has been set forth with appropriate emphasis in the student handbook or similar means of communicating the institution's policies to its students. The board of regents and, in the case of secondary institutions, the board of education shall promulgate regulations governing the content and frequency of such reports and shall forthwith report to the attorney general any such institution that fails to make such report.

STUDENT RIGHT-TO-KNOW AND CAMPUS SECURITY ACT

In compliance with the Student Right-to-Know and Campus Security Act, information regarding graduation rates may be obtained in the Office of the Registrar, 271 Huntington Avenue, and in the Department of Athletics, 219 Cabot Physical Education Center; information regarding safety and security may be obtained in the Office of Admissions and the Public Safety Division, 100 Columbus Place. It is Northeastern University's policy to disclose to an alleged victim of any crime of violence the results of any disciplinary proceeding against the alleged perpetrator of such crime. Further information is available in the Office of Student Conduct and Conflict Resolution, 202 Ell Hall.

USE OF ALCOHOL AND DRUGS

The unlawful manufacture, distribution, dispensation, possession, or use of a controlled substance is prohibited in or on any Northeastern property. Any university employee or student determined to have violated this policy may be subject to disciplinary action up to and including dismissal. The use of alcohol while on Northeastern property is prohibited except where specifically authorized by the university. No employee may report to work while under the influence of alcohol or illegal drugs. Violation of these regulations may be reason to require evaluation/treatment for substance abuse in coordination with the University Center for Counseling and Student Development and/or for disciplinary action up to and including dismissal. Northeastern University works to provide a drug-free workplace for all university employees and students. The Center for Counseling and Student Development provides resources for treatment and referral for students and employees with substance abuse problems. Educational programs for students, employees, and managers are presented through Human Resources Management, the Office of Residential Life, and the Center for Counseling and Student Development and cover the dangers of alcohol and drug abuse, the availability of assistance for counseling and rehabilitation, and penalties for violating university policies. To comply with federal law, the university requires that employees directly engaged in performance of a grant or contract must notify their employers of any criminal drug statute conviction for a violation occurring in the workplace no later than five days after the conviction. The university must notify any federal contracting agency within ten days of having received notice that an employee engaged in the performance of such contract has had a criminal drug statute conviction for a violation occurring in the workplace. The university will take appropriate action up to and including dismissal and/or require participation in an approved abuse assistance or rehabilitation program.

USE OF WEAPONS

The use or possession on campus of firearms, explosive agents of any kind, as well as chemicals, mace, and tear gas, is specifically forbidden by the Code of Student Conduct. Violation of this university policy is cause for disciplinary action up to and including expulsion. In addition, it is worth noting that Massachusetts law states: "Whoever, not being a law enforcement officer and notwithstanding any license obtained by him under the provisions of chapter one hundred and forty, carries on his person a firearm as hereinafter defined, loaded or unloaded, in any building or on the grounds of any college or university without the written authorization of the board or officer in charge of said college or university shall be punished by a fine of not more than one thousand dollars or by imprisonment for not more than one year or both. For the purpose of this paragraph, 'firearm' shall mean any pistol, revolver, rifle, or smoothbore arm from which a shot, bullet, or pellet can be discharged by whatever means."

Massachusetts general law prohibits the possession of nunchaku or karate sticks; switchblades; knives; starter's pistols; ammunition; leather armbands or other clothing that has metallic spikes, points, or studs; or other dangerous weapons or articles. A student who possesses any

articles for sporting purposes (for example, bow and arrows) should check with the University Police Department or the Department of Residential Life to determine whether such articles are among those prohibited by statute or university regulation. Northeastern University also prohibits the possession of knives other than food utensils.

Policies and Procedures

ACADEMIC INTEGRITY POLICY

Essential to the mission of Northeastern University is the commitment to the principles of intellectual honesty and integrity. Academic integrity is important for two reasons. First, independent and original scholarship ensures that students derive the most from their educational experience and the pursuit of knowledge. Second, academic dishonesty violates the most fundamental values of an intellectual community and depreciates the achievements of the entire university community.

Accordingly, Northeastern University views academic dishonesty as one of the most serious offenses that a student can commit while in college. The following is a broad overview of what constitutes academic dishonesty but is not meant to be an all-encompassing definition.

Cheating

Defined as intentionally using or attempting to use unauthorized materials, information, or study aids in any academic exercise. Examples:

- Unauthorized use of notes, text, or other aids during an examination
- Copying from another student's examination, research paper, case write-up, lab report, homework, computer disc, and so on
- Talking during an examination
- Handing in the same paper for more than one course without the explicit permission of the instructor
- Perusing a test before it is given
- Hiding notes in a calculator for use during an examination

Fabrication

Defined as intentional and unauthorized falsification, misrepresentation, or invention of any information, data, or citation in an academic exercise. Examples:

- Making up the data for a research paper
- Altering the results of a lab experiment or survey
- Listing a citation for a source not used
- Stating an opinion as a scientifically proven fact

Plagiarism

Defined as intentionally or knowingly representing the words or ideas of another as one's own in any academic exercise without providing proper documentation of source by way of a footnote, endnote, or intertextual note. The following sources demand notation:

- Word-for-word quotation from a source, including another student's work
- Paraphrase: using the ideas of others in your own words
- Unusual or controversial facts—facts not apt to be found in many places
- Interviews, radio and television programs, and telephone conversations

Unauthorized Collaboration

This refers to instances when students, each claiming sole authorship, submit separate reports that are substantially similar to one another. While several students may have the same source material (as in case write-ups), the analysis, interpretation, and reporting of the data must be each individual's.

Participation in Academically Dishonest Activities

Examples:

- Stealing an examination
- Purchasing a prewritten paper through a mail-order or other service, including via the internet
- Selling, loaning, or otherwise distributing materials for the purpose of cheating, plagiarism, or other academically dishonest acts
- Alteration, theft, forgery, or destruction of the academic work of other students, library materials, laboratory materials, or academic records including transcripts, course registration cards, course syllabi, and examination/course grades
- Intentionally missing an examination or assignment deadline to gain an unfair advantage

Facilitating Academic Dishonesty

Defined as intentionally or knowingly helping or attempting to violate any provision of this policy. Examples:

- Inaccurately listing someone as coauthor of a paper, case write-up, or project who did not contribute
- Sharing with another student a take-home examination, homework assignment, case write-up, lab report, and so on, without expressed permission from the instructor
- Taking an examination or writing a paper for another student

All members of the Northeastern University community—students, faculty, and staff—share the responsibility to bring forward known acts of apparent academic dishonesty. Any member of the academic community who witnesses an act of academic dishonesty should report it to the appropriate faculty member or to the director of the Office of Student Conduct and Conflict Resolution. The charge will be investigated and if sufficient evidence is presented, the case will be referred to the Northeastern University Student Judicial Hearing Board. If found responsible for an academic dishonesty violation, a minimum sanction of deferred suspension will follow. If found responsible for a second violation, the student will be expelled from the university.

APPROPRIATE USE OF COMPUTER AND NETWORK RESOURCES POLICY

The information systems of Northeastern University are intended for the use of authorized members of the Northeastern community in the conduct of their academic and administrative work. To protect the integrity of computer resources against unauthorized or improper use, and to protect authorized users from the effects of unauthorized or improper usage, the university reserves the right, with or without notice, to monitor, record, limit, or restrict any account holder's usage. The university may also monitor, record, inspect, copy, remove, or otherwise alter any data, file, or system resources. The university reserves the right to periodically check these systems and to take any other action necessary to protect the computer and network facilities. The university also retains access rights to all files and electronic mail on its computing and network facilities. Anyone using these systems or networks expressly consents to such monitoring.

Any unauthorized, inappropriate, illegal, or illegitimate use of the university's computing resources, or failure to comply with these guidelines, shall constitute a violation of university policy and will subject the violator to disciplinary action by the university and may result in legal action. When a violation is identified, the appropriate system manager or unit head will undertake a review and initiate action in accordance with university policy. In addition, the university may require restitution for

any use of computer or network services that violate these guidelines. The university may also provide evidence of possible illegal or criminal activity to law enforcement authorities.

Notwithstanding any other provision of this policy, authorization to access the information systems of Northeastern University ends at the termination of employment, the end of a recognized role or relationship, or the loss of sponsorship. Students may continue to use their Northeastern electronic mail account for up to six months after graduation. Any questions about this policy or the applicability of this policy to a particular situation should be referred to the information technology security manager or the director of internal audit. The university's information systems consist of all networking wiring, equipment, networks, security devices, servers, computer systems, computers, computer laboratory equipment, workstations, internet connections, and all other intermediary equipment, services, and facilities. These assets are the property of Northeastern University.

1. Access to and use of Northeastern information systems is a privilege granted by the university to its faculty, staff, and students. Access for up to one academic year for others, including "sponsored" individuals whose relationship with Northeastern is a result of a university-recognized affiliation or relationship, must be approved by the authorizing unit's dean or vice president. Such access may not be renewed without the written approval of the senior vice president for administration and finance.
The university retains sole discretion over the extent to which access privileges are granted.

2. Users may only use those computer accounts that have been authorized by the university for their use. Use of another person's account, security devices, and/or the presentation of false or misleading information or credentials for the purpose of obtaining access to information systems is prohibited.

3. Users are responsible for all use of information systems conducted under their user ID(s) and are expected to take all precautions including password security and file protection measures to prevent use of their accounts and files by unauthorized persons. Sharing of passwords is prohibited.

4. Users may not offer, provide, lend, rent, or sell access to university information systems. Users may not provide access to individuals outside the university community.

5. Use of university information systems for hosting nonuniversity activities must have the explicit written authorization of the senior vice president for administration and finance prior to the use.

6. While the university attempts to protect electronic communication and files from unauthorized access, this cannot be guaranteed. Users may not access, copy, or move files including, but not limited to, programs, data, and electronic mail that belong to another account without prior authorization from the account holder. Files may not be moved to other computer sites without permission from the holder of the account under which the files reside.

7. Users may not use remote resources such as printer and file systems, regardless of location on or off the Northeastern network, unless the administrator of the remote resource has first granted permission.

8. Northeastern information systems may be used for lawful purposes only. Users must not use their accounts or Northeastern information systems for unlawful purposes including, but not limited to, the installation of fraudulently or illegally obtained software; illegal dissemination of licensed software; sharing of content where the disseminator does not hold lawful intellectual property rights; propagating chain letters, pyramid, Ponzi, other unlawful or deceptive schemes; or for any purpose contrary to local, state, and/or federal law.

9. Use of university information systems must comply with the provisions of copyright law and fair use. Copyright law limits the right of a user to copy, edit, or transmit electronically another's intellectual property, including written materials, images, sounds, music, and performances, even in an educational context, without permission, except in compliance with the fair use doctrine exception.

10. Users are responsible for the timeliness, accuracy, and content/consequences of their web pages. Posting of personal, family, or other identifying information is at the sole discretion of the user. Users are advised to exercise discretion when posting personal information to minimize the risk to personal privacy and safety.

11. University information systems may not be used for commercial purposes, except only as permitted with explicit prior written approval of university counsel and the senior vice president for administration and finance.

12. Internet use must comply with the terms of service stipulated by our internet service provider(s). These policies are incorporated by reference. In addition, the acceptable use, terms of service, and/or other policies of the system(s) also bind users of the internet connection and resources to which they connect. At the time of writing, the internet service provider for Northeastern University is Genuity (http://www.genuity.com).

13. Users may not use information systems irresponsibly, wastefully, or in a manner that adversely affects the work or equipment of others at Northeastern or on the internet.

14. The university strives to maintain the security and privacy of all electronic communications and content passed on the Northeastern network and, therefore, will not arbitrarily or frivolously review or inspect user files or electronic mail. However, all electronic communications and content presented to and/or passed on the Northeastern network, including that presented to and/or passed to and from the internet connection(s), may be monitored, examined, saved, read, transcribed, stored, or retransmitted in the course of daily operations by any duly authorized employee or agent of Northeastern University in the exercise of their duties or by law enforcement authorities who are called upon to assist the university in investigating possible wrongdoing. Electronic communications and content may be examined by automated means. Further, Northeastern reserves the right to reject from the network electronic communications and content deemed not in compliance with policies governing the use of information systems at the university. By accessing Northeastern information systems, users give Northeastern permission to conduct each of the operations described above.

15. The confidentiality of any message or material should not be assumed. Even when a message or material is deleted, it may still be possible to retrieve and read that message or material. Further, the use of passwords for security does not guarantee confidentiality. Messages read in HTML may identify the reader to the sender. Aside from the right of the university to retrieve and read any electronic communications or content, such messages or materials should be treated as confidential by other students or employees and accessed only by the intended recipient. Without prior authorization, students and employees are not permitted to retrieve or read electronic mail messages that are not sent to them.

16. All users are required to honor and observe the rules of confidentiality and protection of privacy when accessing and using any information that resides on Northeastern information systems and/or any information that pertains to university programs, students, faculty, and staff. All disclosures of student information must comply with

the provisions of the Family Educational Rights and Privacy Act (FERPA) of 1974.

17. Northeastern reserves the right at any time, without prior notice or permission from the user or users of a computer or other Northeastern-owned computing device, to copy or have copied any and all information from the data-storage mechanisms of such devices, as may be required at the sole discretion of the university, in connection with investigations of possible wrongdoing.

18. The Appropriate Use of Computer and Network Resources Policy specifically prohibits the use of Northeastern University's information systems to:
    - Harass, threaten, defame, slander, or intimidate any individual or group.
    - Generate and/or spread intolerant or hateful material, which in the sole judgment of the university is directed against any individual or group, based on race, religion, national origin, ethnicity, age, gender, marital status, sexual orientation, veteran status, or disability.
    - Transmit or make accessible material, which in the sole judgment of the university is offensive, violent, pornographic, annoying, or harassing, including use of Northeastern information systems to access and/or distribute obscene or sexually explicit material unrelated to university-sanctioned work or bona fide scholarship.
    - Generate unsolicited electronic mail such as chain letters, unsolicited job applications, or commercial announcements.
    - Generate falsely identified messages or message content, including use of forged content of any description.
    - Transmit or make accessible password information.
    - Attempt to access and/or access information systems and/or resources for which authority has not been granted by the system owner(s).
    - Capture, decipher, or record user IDs and/or passwords.
    - Intercept electronic communications not intended for the recipient.
    - Probe, by any means, the security mechanisms of any resource on the Northeastern network or on any other network through a connection to the Northeastern network.
    - Disclose or publish, by any means, the security vulnerabilities of or the means to defeat or disable the security mechanisms of any resource connected to or part of the Northeastern University network.
    - Alter, degrade, damage, or destroy data.
    - Transmit computer viruses or malicious/destructive code of any description.
    - Conduct illegal, deceptive, or fraudulent activity.
    - Obtain, use, or retransmit copyrighted information without permission of the copyright holder.
    - Place bets, wagers, or operate games of chance.
    - Tax, overload, impede, interfere with, damage, or degrade the normal functionality, performance, or integrity of any device, service, or function of Northeastern information systems, content, components, or the resources of any other electronic system, network, service, or property of another party, corporation, institution, or organization.
    - The above enumeration is not all-inclusive. If there is a question as to whether a specific use is appropriate or acceptable under this policy, the university's sole determination shall prevail.

19. Use of Northeastern University information systems must comply with all applicable local, state, and federal laws, including, but not limited to, the following, which are incorporated by reference:
    - Massachusetts General Laws Chapter 266, Subsections 33(a) and 120(f), which impose sanctions for, among other acts, destroying electronically processed and stored data or gaining unauthorized access to a database or computer system.
    - United States Code, Title 18, Computer Fraud and Abuse Act, which imposes sanctions for, among other acts, knowingly accessing a computer without authorization or in excess of authorized access, knowingly causing damage to protected computers, or trafficking in password information.
    - United States Code, Title 18, Electronic Communications Privacy Act, which imposes sanctions for, among other acts, interception of wire, oral, or electronic communications.

BEHAVIOR ON CO-OP, ON EXTERNSHIPS, AND IN THE NEIGHBORHOOD

As an urban institution, Northeastern University is a part of the vibrant community and business life of the surrounding neighborhoods. Maintaining amicable and considerate relations between the university and local residents and businesses is essential to the continued cooperation of the university and its neighbors in civic projects and issues and to the furtherance of the university's broader mission to contribute to the general good of society. The university endeavors to foster conditions under which such beneficial relations exist. Consequently, the university must consider conduct on the part of members of the university community, whether on or off campus and whether isolated or continuing in nature, that is disruptive of these relations; that impairs, interferes with, or obstructs the lawful missions, processes, and functions of the university; or that is found by the university to be abhorrent or offensive to generally accepted standards of social behavior, as inimical to the university's interests.

The university's Code of Student Conduct governs student behavior on co-op, externships, and in the community surrounding the university. In addition, misbehavior in these settings may violate the law, policies of the co-op employer, or rules of the externship sponsor.

BICYCLES

Wherever possible, students should use the bike racks available at various locations on campus. Bicycles should not be chained to fences, doors, trees, or other objects, and under no circumstances may bicycles be brought into any university building. The fire code dictates that all entrances, exits, corridors, and stairwells must be free and clear at all times. Bicycles found in violation of this code will be removed from the area.

CARD PLAYING AND GAMBLING

The university does not permit card playing of any kind in classrooms unless it is a regularly scheduled activity of an organization recognized officially by the Office of Student Activities. Social card games are permitted in the residence halls and in the Curry Student Center. Students may not gamble, play pyramid games, or sell lottery tickets. Casino or other game events are permitted in designated areas that are approved by city and state laws, as part of properly scheduled events, and in strict accordance with regulations issued by the Office of the Vice President for Student Affairs.

COPYRIGHTABLE MATERIALS

It is the general policy of the university that student papers or projects submitted in partial fulfillment of course requirements remain the property of the student authors.

This policy does not apply to:

1. "Work for hire" as defined by intellectual property laws
2. Work derived wholly or in part from other patented or copyrighted material

3. Work done as part of external grants or contracts in which the contracting documents or regulations define ownership
4. Work in which the university or its agents or employees contribute substantial time or resources
5. Work considered a thesis or dissertation

The university owns the copyright to any work created or developed by one or more students with the significant use of funds, space, facilities, equipment, materials, or other university resources. The university will not normally construe the payment of salary from unrestricted funds or the provision of office and library facilities as constituting significant use of funds, space, facilities, equipment, materials, or other resources of or administered by the university. Use of laboratory and/or computer facilities or assistance from one or more faculty or staff members to a student author specifically pertaining to the work constitutes significant use of university resources. In all cases, the provost or his or her designee shall make a good-faith determination concerning significant use, which shall be final and binding on all parties.

In the case of a thesis generated by research performed in whole or in part by a student in the course of or pursuant to an agreement for sponsored research or other written agreement, including an agreement between the author(s) and the university, or utilizing equipment or facilities provided to the university under conditions that impose copyright restrictions, ownership or control shall be determined in accordance with such agreement or restrictions. In the absence of such agreement or restrictions, copyright ownership in such a thesis shall reside in the student. However, the student, as a condition of a degree award, must grant the university the royalty-free right to reproduce and publicly distribute copies of the thesis for limited and noncommercial purposes.

Where necessary to secure to the university an ownership of copyright, students shall assign such rights of copyright, or grant the specified rights of reproduction and distribution, to the university. The university reserves the right to employ, at its discretion, the materials or portions of any work created or developed in the course of an author's relationship with the university, or otherwise covered by the University Patent and Copyright Policy, for promotional, professional, or noncommercial purposes on a royalty-free basis. Certain courses taught at Northeastern University involve students in individual or group assignments or projects involving the creation of materials, objects, or techniques that may be patentable or copyrightable. These courses generally require extraordinary levels of faculty organization and participation and/or substantial university resources.

1. Individual teachers or academic units may require that originals or copies of such papers or projects be retained either temporarily or permanently by the individual teacher or by the unit.
2. A thesis is a student work representing significant original or independent research and for which the student receives a substantial amount of credit toward a degree or certificate. Where there is a question concerning whether or not a student's work is a thesis, the provost or his or her designee shall make a good-faith determination concerning same, which shall be final and binding on all parties.
3. Copies of the university patent and copyright policies are available from the Division of Research Development, 405 Lake Hall, 617.373.4587.

In accordance with university patent and copyright policies, in such courses the university is the owner of all rights in technology, computer programs, or other creative work that may be developed by the undergraduate or graduate student as part of the student's work in those

courses. It is the university's intention, where applicable, to disclose and authorize the use of such technology, programs, or work to nonprofit organizations and to government agencies without a fee. The university may also have the opportunity to license such materials to a commercial enterprise, and in this event, it is the university's intention to share any revenue from such a license with student contributors in an amount determined in accordance with the then-existing university policy or plan. Students are informed early in the semester if the course in which they are enrolled falls within this category and will be asked to sign a letter of agreement. Should the student decline to sign an agreement, he or she will be assigned to another course section—one in which such agreement is not required—or will be given alternative activities not involving such assignments or projects.

COPYRIGHTS AND PATENTS

Any student who makes, as sole or joint inventor, an invention that involved significant use of university resources, including funds, space, facilities, equipment, or materials, or that is subject to terms of a sponsored research or other agreement between the university and another party, shall assign this invention and all associated applications and patents to the university or its designee unless the invention has been released to the inventor in accordance with the applicable provisions of the university patent policy. Any student, whether before or after terminating his or her association with the university, shall do whatever is necessary to enable the university or its designee to take out patents in any and all countries on such invention. The cost and expense of making such assignments and procuring such patents shall be borne by the university or its designee. When an invention is made by a student not involving significant use of funds, space, facilities, equipment, materials, or other resources of or administered by the university, the university will waive its rights, and the invention will be the exclusive property of the student, provided the student's rights in the invention are not altered by the terms of any financial aid received, including external sponsorship, scholarships, fellowships, traineeships, thesis expenses, or other assistance, whether or not administered by the university and provided the invention is not subject to third-party rights.

DEMONSTRATIONS

The university supports as fundamental to the democratic process the rights of all members of the university community to express their views and to protest actions or opinions with which there is disagreement. A university is where individuals express diverse ideas and viewpoints in an atmosphere free of any physical force. The university insists that all demonstrations be peaceful and orderly and abide by university regulations.

- Demonstrators must not block corridors or entrances or use loud noise to disrupt a conference, meeting, or assembly.
- Demonstrations may not be conducted in faculty or administrative offices, classrooms, libraries, or study areas.
- Moving picket lines in university corridors are prohibited. (Protests may be registered by individuals or groups standing in a single line against a corridor wall, but corridors must be kept open at all times for the free passage of other members of the community.)

Students, faculty, or other members of the university community who violate these regulations will be subject to disciplinary action; violators also jeopardize their right to remain in the university community.

DEPARTMENTAL JURISDICTION

Certain departments of the university shall have the power to set down rules and regulations governing the operation of the departments' respective areas of responsibility. Such rules and regulations shall be in accord with the "General Statement of Student Rights and

Responsibilities" as well as with the policies pertaining to student conduct as defined in this document.

DISMISSAL FROM CLASS
Students dismissed from classes for insubordination or other disciplinary reasons may not return without the approval of the college and the vice president for student affairs.

IDENTIFICATION CARDS
All students must have in their possession at all times the officially approved and properly validated photo identification card. It will be necessary to show this card as a means of identification when using the library and campus recreational facilities, at athletic contests, at student elections, at University Health and Counseling Services, at Student Accounts, at the Office of the Registrar, to campus police, and elsewhere around the university. All members of the community should be prepared and willing to identify themselves and their guests upon request by authorized personnel. An official photo identification card will be issued to new students during their initial orientation and registration periods. Replacements for lost cards can be obtained at the Office of the Registrar, 271 Huntington Avenue.

JURY DUTY
Northeastern expects students to fulfill their civic duties; the university cannot interfere in this process. Students who miss classes because of this obligation must notify their professors in writing, explaining which classes will be missed on which days. The professors will work with students to make up missed assignments or exams. Upon completion of their jury duty, students must bring a copy of the documentation of their service to the appropriate professors. Students on co-op are expected to inform their supervisors if called to jury duty.

MEDIA AND PUBLIC APPEARANCES
In all personal communications to newspapers or other media, as well as personal public appearances in which students identify themselves as members of the Northeastern University community, it should be made clear that the opinions presented are a student's own and not necessarily those of the university. Students who appear on public programs as representatives of Northeastern University must be particularly careful to avoid language or presentations that could be considered in bad taste or offensive.

PETS
Pets are prohibited in all university buildings out of consideration for the general community and to maintain a clean and healthy environment. Exceptions are made for guide dogs and other guide animals.

PUBLIC ACCESS
Access by the general public to attend special programs or functions is limited to those events approved for such attendance. The facilities of the university were designed for the use of members of this academic community. When appropriate, access may be permitted for events and programs when it is apparent that the students, faculty, staff, and alumni of the university and their guests will not fill the facility reserved for such use. In such cases, special provisions must be made to ensure that members of this academic community have priority to attend and are not precluded from attendance by the general public. Certain facilities, such as residence halls, classrooms, and laboratories, are designed for and are to be used by residence hall residents only, or in the case of classrooms and laboratories, by members of this academic community. In all cases, the essential educational purpose of the university cannot be interrupted or disturbed by the access of the general public. Officials of the university may restrict or prevent access by the public if such access disturbs or has the potential to disturb classes or other functions of Northeastern University. Occasionally, access to an area such as the Krentzman Quad will be granted to distribute free literature or provide a public forum for

speakers. Such use requires the prior approval of the director of student activities and will be granted only during the Wednesday and Thursday activity periods. The use of facilities such as residence halls or cafeterias for distribution of literature or for speakers is prohibited.

SAFETY GLASSES
Safety glasses must be worn in all chemistry laboratories and other facilities as required.

SALES AND SOLICITATIONS
Northeastern University is not a marketplace. Sales of material or solicitations, such as newspapers and other printed matter, insurance, foodstuffs, and all other articles are prohibited without the express written permission of designated officials of the university. Solicitations of any kind are also prohibited without the express written permission of designated officials. Exceptions to this policy are made for recognized student organizations and residence hall residents. Residence hall residents should request permission to sell within their housing unit from the director of residential life; recognized student organizations should request permission for sales from the director of student activities; all others should apply to the business manager of the university. Such permission, when granted, is for designated areas within the university and is subject to the restrictions imposed by the approving officials. General solicitation, especially in such areas as classrooms, lounges, and cafeterias, is not permitted.

SMOKING
All university administrative and classroom buildings are smoke free and tobacco free. The policy relates to all campuses. The only university facilities not covered by this policy are residence halls and apartment buildings. The sale of cigarettes and other tobacco products is prohibited on campus. Smoking cessation information and programs are available. For further information, contact the Office of Human Resources Management or University Health and Counseling Services.

TAPE RECORDERS
Students may not use tape recorders in the classroom without the instructor's consent. Students with disabilities who need a tape recorder in the classroom may make arrangements through the Disability Resource Center, 20 Dodge Hall.

TEXTBOOKS
Students should purchase or have in their possession the assigned textbooks, problem books, manuals, and other supplies that may be necessary in a classroom or laboratory.

Students' Bill of Academic Rights and Responsibilities

This bill was drafted by the Student Senate, the vice president for student affairs, and members of the Faculty Senate. It was passed in the spring of 1992.

Academic Rights
We, the students of Northeastern University, believe that a quality education is the paramount goal of all students. In order to fulfill this goal, the university must recognize certain rights, which are set down in this document. (The student rights, through their representatives in the Student Government Association [SGA], described in these sections arise from faculty and staff employment responsibilities and obligations to the university. Northeastern University students recognize and accept that it is the sole prerogative of the university to enforce these obligations and responsibilities and to determine whether and to what extent they are being carried out or violated in specific instances. Northeastern University students recognize and accept that their ability

to effect redress of complaints arising from these rights is limited to the procedures specified in "Appeals Policies and Procedures."

COURSE-RELATED RIGHTS

Article 1 Students have the right to instructors who attend scheduled classes on time.

Article 2 Students have the right to view work they submit to satisfy course requirements after it is graded.

Article 3 Students have the right to adequate access to instructors.

Article 4 Students have the right to receive a course outline, which includes a fair and explicit grading policy, at the beginning of each course.

Article 5 Students have the right to instructors who communicate the material pertaining to the course effectively in the English language, except in the case of foreign language instruction.

Article 6 Students have the right to participate in and have access to Student Government Association student teacher course evaluations.

RIGHTS TO UNIVERSITY ACADEMIC SERVICES

Article 7 Students have the right to adequate access to effective academic services, as described in the student handbook and other university publications, provided by the university.

Article 8 Students have the right to an environment conducive to learning. (Because the university operates on a 12-month calendar in an urban environment, many construction, remodeling, renovation, and repair projects must take place while the university is in session and while other potential distractions from the learning process arise from the surrounding urban environment on which it is dependent but over which it exerts little or no control. Thus, though the university is committed to maintaining an appropriate learning environment for its students, Northeastern University students recognize and accept, as part of their relationship with the university, that the conditions described above may cause occasional disturbances to that environment. The articles shall be interpreted by the Office of the Provost in conjunction with the Office of the Vice President for Student Affairs, and shall be monitored by the Student Government Association. Further, should any student discover that he or she has been subject to any violation of the principles stated herein, the student should follow the appropriate complaint resolution procedure in "Appeals Policies and Procedures (p. 33)." The Student Government Association, if requested by the student, will monitor the progress of any student academic grievances.)

Article 9 Disabled students have the right to be treated in a nondiscriminatory fashion in accordance with the policies described in university publications and consonant state and federal laws.

SCHEDULING RIGHTS

Article 10 Students have the right to nonconflicting final exam schedules.

Article 11 Students have the right to final exam schedules in accordance with established university policy.

Article 12 Students have the right to be excused from academic commitments for a religious observance.

GENERAL ACADEMIC RIGHTS

Article 13 Students have the right to be informed, in a timely fashion, of proposed or actual university action to be taken against them.

Article 14 Students have the right of access to their academic and financial aid records and maintenance of the privacy of these records, as provided by the Federal Educational Rights and Privacy Act.

Article 15 Students have the right to be free from harassment by other members of the university community.

Article 16 Students have the right to the redress of academic grievances.

Student Responsibilities

It is each student's responsibility to:

1. Contribute to a climate of open inquiry and honesty in all aspects of the university's academic life.
2. Commit sufficient time and effort for study and the use of library, studio, and computational facilities in connection with each course.
3. Contribute to the classroom/laboratory/studio learning environment through discussion and active participation.
4. Acquire the necessary prerequisites for full participation in each academic course.
5. Attend scheduled classes regularly and on time.
6. Obtain help with problems encountered in a given course by seeking out faculty and teaching assistants outside class time.
7. Respect the concept of academic freedom of each faculty member.
8. Assist the university in its self-evaluation by responding honestly and conscientiously.

PhD Programs

PhD Programs

Northeastern offers the following PhD programs:

B

- Bioengineering, PhD (p. 127)
- Biology, PhD (p. 375)
- Biomedical Sciences, PhD (p. 268)

C

- Chemical Engineering, PhD (p. 137)
- Chemistry, PhD (p. 379)
- Civil Engineering, PhD (p. 143)
- Computer Engineering, PhD (p. 157)
- Computer Science, PhD (p. 100)
- Counseling Psychology, PhD (p. 239)
- Criminology and Justice Policy, PhD (p. 412)

E

- Economics, PhD (p. 418)
- Electrical Engineering, PhD (p. 157)
- English, PhD (p. 422)

H

- History, PhD (p. 426)

I

- Industrial Engineering, PhD (p. 181)
- Information Assurance, PhD (p. 114)
- Interdisciplinary Engineering, PhD (p. 224)

L

- Law, Criminology and Justice Policy, JD/PhD (p. 412)

M

- Marine and Environmental Sciences, PhD (p. 386)
- Mathematics, PhD (p. 392)
- Mechanical Engineering, PhD (p. 181)
- Medicinal Chemistry, PhD (p. 268)

N

- Network Science, PhD (p. 407)
- Nursing, PhD (p. 255)

P

- Personal Health Informatics, PhD (p. 109)
- Pharmaceutical Sciences, PhD (p. 268)
- Pharmacology, PhD (p. 268)
- Physics, PhD (p. 398)
- Political Science, PhD (p. 429)
- Population Health, PhD (p. 228)
- Psychology, PhD (p. 405)
- Public Policy, PhD (p. 437)

S

- School Psychology, PhD (p. 239)
- Sociology, PhD (p. 455)

PhD Network

The Northeastern PhD Network is an organization designed to build community among PhD students. The PhD Network provides students with support and resources university-wide to enhance their educational experience and career preparation.

Shared values unite PhD-centered activities at Northeastern, which prepares critical thinkers to tackle society's most challenging problems:

- **Excellence with purpose:** All PhD programs combine academic rigor with societal impact.
- **Innovative thinking:** Our education programs, mentoring activities, and research scholarship promote novel content and pathfinding approaches.
- **Crossing boundaries:** PhD students transcend disciplinary and international boundaries during their innovative educational journey.
- **Integrative education:** The integration of scholarship and research training with collaborative fieldwork and professional development provides a uniquely experiential education.
- **Inclusive diversity:** Students and faculty from diverse cultures and backgrounds drive excellence by bringing a wide range of perspectives to our distinctive programs.

At Northeastern, every PhD student has opportunities to acquire experience beyond traditional dissertation research. Exposure to and integration with our many industry and academic partners—through internships, fieldwork, and other collaborations—and in authentic settings—from laboratories, startup companies, and nonprofit institutions—lead to research with greater impact and broader career opportunities, both within and beyond academia.

Explore the PhD Network website (https://phd.northeastern.edu/network/resources) to learn more about:

- Resources that support PhD students' educational, professional, and personal lives
- Events created especially for PhD students, both at Northeastern and through our partners
- Funding in support of fellowships, internships, and conference attendance

Experiential PhD

Northeastern's Experiential PhD programs enable students to expand critical inquiry, learn, work, and chart a path to professional success through challenging assignments at organizations in industry, government, and the nonprofit sector. Beyond the comfort zone of their own university research group, PhD students enjoy immersive experiences that help shape their research perspective. They also bring fresh ideas and talent to their host organizations.

The immersive Experiential PhD transforms lives by:

- **Challenging students to solve problems in the context of society's needs and limitations,** a quest that helps shape the questions they raise and answer through their dissertation research

- **Equipping students for a lifetime with the creativity, cultural agility, and professional skills**—public speaking and communications, project management, leadership, and teamwork—they'll need to turn discoveries into solutions

- **Enriching fields of expertise** by introducing new mentors and collaborators to each student's professional network, host institution, and university research laboratory

Experiential PhD offers major benefits to both students and institutional partners. As students work to solve complex problems and chart careers as future innovators, their host institutions gain advantages like these:

- A deeper engagement in rapidly evolving fields of research

- Access to university facilities and senior faculty expertise

- Opportunities for senior leadership to mentor and co-publish with students and to serve on their dissertation committees

- A chance to recruit emerging talent

- Opportunities to partner with Northeastern, an entrepreneurial research university known for its innovative collaborations with academia, government, and industry

Northeastern is one of the only universities in the world to offer students options for learning and pursuing research outside of their primary research group in all of its doctoral degree programs. These real-world placements are highly flexible and customizable, tailored to the needs of Northeastern's PhD students and institutional partners.

Experiential PhD Leadership, Graduate Certificate

At Northeastern, PhD students enjoy a uniquely broad range of immersive opportunities to expand critical inquiry, learn, perform original research, and chart a path to professional success. Experiential PhD opportunities enable PhD students to step outside the comfort zone of their campus research group where students can pursue challenging, creative, customized assignments within industry, government, or the nonprofit sector that inform and enhance their pursuit of a research doctorate.

This Graduate Certificate in Experiential PhD Leadership aims to:

• **Challenge students to address complex problems** through experience within the context of real-world needs and their associated limitations in complex industry, government, or nonprofit sector organizations, broadening their view of stakeholders and value, shaping the very questions they raise and answer.

• **Equip students for a lifetime with the cultural agility, creativity, and professional skills**—public speaking and communications, meeting goals and expectations (e.g., project management for personal and professional purposes), teamwork, leadership, peer influence, leading from the middle—that they will need to translate their findings into impactful solutions.

• **Enrich every student's research group and, ultimately, fields of expertise** by fostering a collaborative, entrepreneurial, innovative approach to knowledge creation that expands their network far beyond academia to include intellectual and professional mentors and collaborators.

This graduate certificate designed for PhD students across all of Northeastern's research-based PhD programs provides students embarking on an experiential PhD with the preparation, project delivery,

and guidance for contextual integration within the context of leadership development. All students pursuing this leadership certificate will be mentored by their sponsor supervisor and dissertation advisor(s).

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

A B or higher is required in each course.

Requirements

Code	Title	Hours
PHDL 7600	Leading Self and Others	4
PHDL 7660	Experiential PhD Challenge Project 1	4
PHDL 7662	Experiential PhD Challenge Project 2	4
PHDL 7666	Contextual Integration	0

Program Credit/GPA Requirements

12 total semester hours required
Minimum 3.000 GPA required

College of Arts, Media and Design

Website (https://camd.northeastern.edu)

Elizabeth Hudson, PhD, Dean

Andrea Raynor, MFA, Associate Dean for Undergraduate Programs
Jane Amidon, MLA, Associate Dean for Graduate Programs and Research
Hilary Poriss, PhD, Associate Dean for Faculty and Academic Affairs
Thomas Michael, MBA, Associate Dean for Administration and Finance
Katherine Calzada, M.Ed, Assistant Dean for Research Development
Adam Smith, MBA, Assistant Dean for Academic Programs

102 Ryder Hall
617.373.3682
617.373.5084 (fax)
camd@northeastern.edu (camdadvising@northeastern.edu)

Graduate Enrollment and Student Services
100 Meserve Hall
617.373.5329 or 617.373.2566
gradcamd@northeastern.edu

The College of Arts, Media and Design (CAMD) offers graduate programs that build on existing knowledge and establish innovative areas of inquiry and practice. We work with students to frame, research, and answer transformative questions. Together, we challenge, engage, and shape global cultures and marketplaces.

Our Mission

We create a distinctive experiential education by leveraging emergent practices and scholarship in the arts, media, and design. Our unique combination of disciplines empowers innovative thinking and making. Our students become informed citizens and creative leaders with an entrepreneurial spirit.

Graduate Studies in the College of Arts, Media and Design

Welcome to graduate studies at CAMD. This is an exciting time to pursue advanced education and scholarship in creative fields. Never have the arts and culture been so clearly essential to our social, economic, and environmental future. From artist outreach in underserved communities to "serious" game design for health and security; from green building innovation to sustainable urban design; from international entertainment and media to provocative performances in "found spaces"; from incisive data visualization that changes how we view the world to cutting-edge journalism—our faculty and students are involved in a wealth of academic experiences, creative enterprises, and professional endeavors.

At CAMD, we take our mission and vision very seriously. We deliver an outstanding graduate education in traditional areas while exploring new approaches to this generation's transformative questions. The "space between our disciplines" is intellectually rich, educationally vibrant, and professionally productive. Our interdisciplinary degree options provide a strong foundation of use-inspired, experientially informed course work and research opportunities. Our programs are designed to produce graduates equipped to engage the international marketplace and shape global culture.

Take a moment to introduce yourself to the faculty and graduate coordinators in your field of interest. Become familiar with the many events offered across CAMD and the campus. Stop by CAMD's graduate programs website (https://camd.northeastern.edu/academics/graduate) often, where you'll find current news and links to services such as the registrar's office. Familiarize yourself with the university's graduate school website (http://www.northeastern.edu/graduate) to explore numerous links to graduate resources, policies, and student organizations.

We look forward to getting to know you and to incorporating your individual education and career interests into the graduate community of CAMD.

Academic Policies and Procedures

- General Information (p. 45)
- Master's Degree Policies (p. 45)
- Graduate Student Classification (p. 46)

General Information

Five units in the College of Arts, Media and Design offer programs at the graduate level:

- Architecture
- Art + Design
- Game Design
- Journalism
- Music

Master's Degree Policies

The College of Arts, Media and Design (CAMD) graduate studies sets minimum standards for all students to fulfill. In addition, departments and programs may have requirements that exceed the standards outlined below. Finally, the CAMD Graduate Programs General Regulations booklet (found at the college's webpage (https://camd.northeastern.edu/academics/graduate/current-students)) further summarizes the expectations for student conduct, academic life, and the responsibilities of the students and the college to one another.

A candidate for the master's degree must complete a minimum of 30 semester hours of graduate-level course work and such other study as may be required by the department in which the student is registered. To qualify for the degree, a minimum cumulative grade-point average (GPA) of 3.000, equivalent to a grade of B, must be obtained. This average will be calculated each semester. A student who does not make satisfactory progress toward degree requirements, as specified by the individual department, may be terminated from the program.

To maintain current student status within CAMD, graduate students must make satisfactory progress in their degree, including working toward the graduation requirement of a GPA of 3.000 and the timely completion of course work. See the university's policy on academic standing ("Minimum Cumulative Grade-Point Average (p. 29)").

All students must be registered in the last semester of their program. Any student who does not attend Northeastern University for a period of one year will be required to apply for readmission.

Electives

No more than 8 credit hours (6 credit hours for students in the music industry leadership program) of electives may be taken outside of CAMD. Any additional non−CAMD elective hours will not count toward the degree.

Graduate Student Scholarship (GSS)

Students who are registered in degree programs are eligible for a CAMD Graduate Student Scholarship (GSS). Award recipients will receive an official award letter from CAMD graduate studies. Pay attention to this letter as it is an official contract that should be read carefully. Graduate Student Scholarships (GSS) are contingent on satisfactory academic progress toward the degree and meeting department-specific guidelines. Recipients must be in full-time status and be registered for a minimum of 8 semester hours. Receipt of financial support administered by CAMD graduate studies requires that all students receiving awards must maintain a 3.000 cumulative GPA. Students whose cumulative GPA is below 3.000 will be placed on academic probationary status and are not eligible to receive the award while on probation. The GSS can be reactivated by raising the cumulative GPA to 3.000 in the subsequent semester; students who do not meet the minimum GPA requirement at the end of the next semester cannot receive additional probationary periods.

Leave of Absence

Full-time students who are not involved in any academic endeavor for a period of time are required to petition the manager of student services, through their department, for a leave of absence by completing the leave of absence petition through the myNortheastern web portal. CAMD graduate studies will not accept retroactive leave requests. Note that if a student is requesting a leave for medical reasons, students should contact University Health and Counseling Services (http://www.northeastern.edu/uhcs/forms) at 617.373.2772. Leaves of absence generally are not approved for more than one calendar year at a time. International students should consult with an advisor at the Office of Global Services (https://www.northeastern.edu/ogs) for proper guidance. Leaves of absence are not appropriate for master's degree students who are working on a thesis but are away from the Northeastern campus. Except in the case of medical leaves, being on an approved leave of absence does not extend the amount of time allowed for degree completion or the makeup of incomplete grades.

Time Limitation

For the master's degree, course credits earned in the program of graduate study are valid for a maximum of seven years.

If students wish to apply for an extension of the time limit, they must submit a petition to their department of study. The petition must include a detailed plan for completion of all remaining degree requirements. In the case of time-limit extension requests for master's degree course work, the department must certify that the content of each of the courses has not changed since the time the student completed the course. If deemed appropriate, the department will recommend approval of the extension to CAMD graduate studies.

Changes in Requirements

The continuing development of CAMD graduate studies forces regular revision of curricula. When no hardship is imposed on the student because of changes and the facilities of the school permit, the student is expected to meet the most recent requirements. However, if it can be demonstrated that doing so imposes a substantial hardship, the requirements of the year in which the student matriculated will be applicable.

Thesis

Theses are required in some programs and should demonstrate the individual's capacity to execute independent work based on original material. Registration for the thesis course is required. Theses must be approved by the departmental graduate committee and must receive a grade of B (3.000) or better to be accepted. Students who have not completed their thesis after having registered for the specified number of thesis credits must register and pay for Thesis Continuation.

Graduate Student Classification

Regular Student

Those students who are admitted to a degree program.

Conditional Student

Students whose admissions files are missing documentation. Conditional students must submit the requested documentation, to the satisfaction of College of Arts, Media and Design (CAMD) graduate studies, no later than the completion of their first month of study. Once the documentation has been submitted, the student's status will be reevaluated.

Provisional Student

Students whose academic records do not qualify them for acceptance as regular students. Provisional students must obtain a B (3.000) average in the first 9 semester hours of study or meet specifically delineated departmental requirements to qualify for full acceptance to a degree program. Provisional students are not eligible for awards or financial aid.

Special Student

Special students are enrolled on a part-time basis (no more than 6 semester hours per semester). Credit can be earned for a maximum of 9 semester hours over time. Students interested in taking more than 9 semester hours must make a formal application to the degree program. Use the Internal Admission Application Notification form (https://camd.northeastern.edu/academics/graduate/current-students). Special students who do not register for four consecutive semesters (excluding summer semester) will be subject to review and possible withdrawal by CAMD graduate studies.

School of Architecture

Daniel Adams, MArch
Associate Professor and Director of the School of Architecture
151 Ryder Hall
617.373.4637
da.adams@northeastern.edu

Master of Architecture
Timothy Love, M.Arch, FAIA
Associate Professor and Graduate Coordinator
151 Ryder Hall
617.373.4637
t.love@northeastern.edu

Northeastern offers a Master of Architecture degree accredited by the National Architectural Accreditation Board (http://www.naab.org).

The program leverages the school's outstanding faculty and pragmatically grounded curriculum. The physical and cultural context of Boston serves as a laboratory for the program's design studios and is design focused but with a different approach than many schools. We find opportunities for innovation within the real estate and construction

industries and current policy debates—rather than outside them. This is how we intend to move architects to the center of the discussion about the future of our cities.

Students take courses in urban housing, practice-integrated design, and do original research on market-driven building types. The final degree project in the design studio offers an opportunity to leverage this research with real innovations in hybrid types, strategic alterations to existing ones, and to take on the challenge of finding prototypical solutions for systemic problems.

In addition to studio courses, graduate students take seminars in architectural theory and design strategy; and electives are available in real estate development, sustainable building techniques, urban landscape, and other topics. There is also a unique course that looks at case studies of architecture firms in practice, problem solving, and innovation. We seek to have students leave our program with a unique balance of technical, theoretical, and strategic tools to make a real difference in the profession.

Master of Design for Sustainable Urban Environments

Nicholas Brown
Associate Teaching Professor and Graduate Coordinator
617.373.4637
nic.brown@northeastern.edu

The Master of Design for Sustainable Urban Environments (MDes-SUEN) brings together the allied professional fields of environmental design, landscape architecture, and urban planning to offer advanced study and research opportunities in the design of ecologically and economically productive urban environments. The program seeks to supply graduates for the rapidly growing field of sustainable urbanism through a dynamic curricular mix of design, dialogue, and technical courses, enriched by diverse interdisciplinary electives.

The pedagogic and research focus of the MDes is the design, implementation, and management of sustainable urban environments from the scale of individual parcels to regional systems. Key topics include brownfield and waterfront revitalization, sustainable and secure pedestrian environments, urban habitat design and management, and green and blue infrastructure design and planning with an emphasis handling increased storm water and tidal influx in the urban landscape.

The MDes is a unique program of study in which urban landscape design, planning, and policy dovetail with environmental engineering, environmental science, art, and visualization. Boston's history of innovation in environmental design as well as its legacy of urban redevelopment provide a rich backdrop and laboratory of urban, infrastructural, and ecological prototypes that ideally position the program to creatively and critically explore local issues with global implications.

Contemporary urban theory includes a significant body of writing in the area of "Landscape-" and "Ecological-Urbanism," a critical discourse that looks at the full range of environmental strategies for urban sites with an emphasis on ecological thinking. The paradigm of sustainable environmental design is moving away from form-based planning toward dynamic ecosystem services. This program seeks to prepare students to be innovative and entrepreneurial designers able to combine economic, environmental, and social priorities to make next-generation public spaces and systems.

Programs
Master of Architecture (MArch)

Master of Design for Sustainable Urban Environments (MDes-SUEN)

Master of Architecture—One-Year Program

This program gives eligible candidates the opportunity to get a NAAB-accredited (http://www.naab.org) Master of Architecture degree in one year.

Open to candidates with either a Bachelor of Science in Architecture from Northeastern University or a professional Bachelor of Architecture degree from an accredited North American program with at least one year of IDP-approved professional experience.

Students engage in a two-semester research and design project based on pertinent contemporary topics chosen by the graduate faculty, or students may propose an independent research and design project. Team research is conducted and compiled into online and physical research books. This body of compiled research then becomes the basis of the intellectual framework for the individual students' design projects. This final degree project parallels an in-depth two-semester professional practice sequence that analyzes all of the contingencies of successful architectural projects, including architectural offices and their project management strategies, real estate development criteria, and associated project finance.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Professional Practice		
ARCH 6430	Case Studies 1	4
ARCH 6440	Case Studies 2	4
Topics and Seminars		
ARCH 6330	Seminar in Modern Architecture	4
ARCH 6340	Graduate Topics in Architecture	4
Research and Project		
ARCH 7130	Master's Research Studio	6
ARCH 7140	Master's Degree Project	6

Elective

Code	Title	Hours
Students must complete a 4-semester-hour graduate elective.		4

Program Credit/GPA Requirements

32 total semester hours required
Minimum 3.000 GPA required

Plan of Study

Year 1

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
ARCH 6330	4	ARCH 6340	4	Vacation	0	Vacation	0
ARCH 6430	4	ARCH 6440	4				
ARCH 7130	6	ARCH 7140	6				
Elective	4						
	18		14		0		0

Total Hours: 32

Master of Architecture—Two-Year Program

This program offers students who have earned a Bachelor of Science in Architecture from an institution other than Northeastern to engage in the urban-focused curriculum that is offered at the School of Architecture. Students are awarded a M.Arch degree, which is NAAB-accredited (http://www.naab.org).

YEAR ONE

Options Studio offers topical content that best aligns with the research and practice expertise of the faculty, which provides students with the latest concepts in architectural design, theory, and research on a consistently updated and rotating basis. Students select their top choices of studio topics and instructors, giving them more flexibility in the areas for which they would like to focus their education. The Comprehensive Design Studio challenges the students to consider architectural connections at all scales, from the nut and bolt to the scale of the door or window to the scale of the whole building and the city. Additionally, students take classes in technology as well as architecture seminars.

YEAR TWO

In the final year, students engage in a two-semester research and design project based on pertinent contemporary topics chosen by the graduate faculty, or students may propose an independent research and design project. Team research is conducted and compiled into online and physical research books. This body of compiled research then becomes the basis of the intellectual framework for the individual students' design projects. This final degree project parallels an in-depth two-semester professional practice sequence that analyzes all of the contingencies of successful architectural projects, including architectural offices and their project management strategies, real estate development criteria, and associated project finance.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Building and Environment		
ARCH 5210	Environmental Systems	4
ARCH 5220	Integrated Building Systems	4
Studio		
ARCH 5115	Option Studio	6
ARCH 5120	Comprehensive Design Studio	6
Case Study		
ARCH 6430	Case Studies 1	4
ARCH 6440	Case Studies 2	4

Code	Title	Hours
Topics and Seminars		
ARCH 5310	Design Tactics and Operations	4
ARCH 6330	Seminar in Modern Architecture	4
ARCH 6340	Graduate Topics in Architecture	4
Research and Project		
ARCH 7130	Master's Research Studio	6
ARCH 7140	Master's Degree Project	6

Electives

Code	Title	Hours
Complete 8–16 semester hours (5000 level or above) from outside the following subject area:		8-16
ARCH		

Program Credit/GPA Requirements

60–68 total semester hours required
Minimum 3.000 GPA required

Plan of Study

Year 1

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
ARCH 5115	6	ARCH 5120	6	Vacation	0	Vacation	0
ARCH 5210 and ARCH 5211	4	ARCH 5220	4				
ARCH 5310	4	Elective (Required)	4				
Elective (Required)	4	Elective (Optional)	4				
	18		18		0		0

Year 2

Fall	Hours	Spring	Hours
ARCH 6330	4	ARCH 6340	4
ARCH 6430	4	ARCH 6440	4
ARCH 7130	6	ARCH 7140	6
Elective (Optional)	4		
	18		14

Total Hours: 68

Master of Architecture—Three-Year Program

Open to candidates who do not have a Bachelor of Science in Architecture or equivalent.
Applicants from all disciplines are welcome. Those who have some architecture course work may be eligible for advanced placement.

The program requires three years of study. Students have the option to spend a semester at the school's Segovia program (https://camd.northeastern.edu/architecture/experiential-learning-co-op/experiential-learning/segovia-program) as well as the option to pursue a summer co-op opportunity managed by the university's co-op program.

After completing a first-year introductory curriculum, students in the three-year program merge into the two-year MArch curriculum. This is a NAAB-accredited (http://www.naab.org) degree program.

YEAR ONE

In the first year, students take intensive studios, technology classes, and architectural history classes to immerse them in the studio culture of the school and to give them a strong foundation to begin the upper-level studios. The introductory graduate skills and design studios are specifically designed for the students in this program who do not have experience doing architectural drawing and designing. Students complete a series of projects that will give them an opportunity to develop the skills and the critical thinking needed in the graduate curriculum.

YEAR TWO

Students in their second year have the option to either study in our Segovia program (https://camd.northeastern.edu/architecture/experiential-learning-co-op/experiential-learning/segovia-program) in Spain or study in Boston.

The Option Studio offers topical content that best aligns with the research and practice expertise of the faculty, which provides students with the latest concepts in architectural design, theory, and research on a consistently updated and rotating basis. Students select their top choices of studio topics and instructors, giving them more flexibility in the areas for which they would like to focus their education. The Comprehensive Design Studio in the second semester challenges the students to consider architectural connections at all scales, from architectural detail, to architectural systems, to the whole building and its urban context.

YEAR THREE

In the final year, students engage in a two-semester research and design project based on pertinent contemporary topics chosen by the graduate faculty, or students may propose an independent research and design project. Team research is conducted and compiled into online and physical research books. This body of compiled research then becomes the basis of the intellectual framework for the individual students' design projects. This final degree project parallels an in-depth two-semester professional practice sequence that analyzes all of the contingencies of successful architectural projects, including architectural offices and their project management strategies, real estate development criteria, and associated project finance.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
History		
ARCH 2330	Architecture, Modernity, and the City, 1800 to 1910	4
ARCH 2340	Architecture, Modernity, and the City, 1910 to 1980	4
Building, Design, and Environment		
ARCH 2240	Architectonic Systems	4
ARCH 3450	Advanced Architectural Communication	4
ARCH 5210	Environmental Systems	4
ARCH 5220	Integrated Building Systems	4
ARCH 5230	Structural Systems	4
Studio		
ARCH 5115	Option Studio	6
or ARCH 3155	Studio Abroad	
ARCH 5120	Comprehensive Design Studio	6

Code	Title	Hours
ARCH 6100	Graduate Skills Studio	6
ARCH 6200	Graduate Studio 1: Architectural Design	6
Professional Practice		
ARCH 6430	Case Studies 1	4
ARCH 6440	Case Studies 2	4
Topics and Seminars		
ARCH 5310	Design Tactics and Operations	4
or ARCH 3361	Architecture and Urbanism Abroad	
ARCH 6330	Seminar in Modern Architecture	4
Complete the following (repeatable) course twice:		8
ARCH 6340	Graduate Topics in Architecture	
Research and Project		
ARCH 7130	Master's Research Studio	6
ARCH 7140	Master's Degree Project	6

Electives

Code	Title	Hours
Required Electives		
Complete 8 semester hours of non-ARCH courses (required).		8
Optional Electives		
Complete 4 semester hours of ARCH courses (optional). Electives outside architecture may be taken in consultation with your faculty advisor.		

Program Credit/GPA Requirements

96–104 total semester hours required
Minimum 3.000 GPA required

Plan of Study

Year 1

Fall	Hours	Spring	Hours	Summer 1	Hours
ARCH 2240	4	ARCH 2340 and ARCH 2341	4	Vacation	0
ARCH 2330 (and)	4	ARCH 3450 (or Required Elective)	4		
ARCH 2331		ARCH 6200	6		
ARCH 5210 (and)	4	Elective (Optional)	4		
ARCH 5211					
ARCH 6100	6				
	18		18		0

Year 2

Fall	Hours	Spring	Hours
ARCH 5115 (or Global Study Abroad)	6	ARCH 3450 (or Required Elective)	4
ARCH 5230 (or Global Study Abroad)	4	ARCH 5120	6
ARCH 5310 (or Global Study Abroad)	4	ARCH 5220	4

	Hours		Hours
Optional Elective (or Global Study Abroad)	4	ARCH 6340 (1 of 2)	4
	18		18

Year 3

Fall	Hours	Spring	Hours
ARCH 6330	4	ARCH 6340 (2 of 2)	4
ARCH 6430	4	ARCH 6440	4
ARCH 7130	6	ARCH 7140	6
Elective (Optional)	4		
	18		14

Total Hours: 104

Total credits for the three-year track may range from 96–104 depending on optional electives. For students attending Segovia, the range will be 96–102.

Students must take Arch 5230 in the fall of year three if participating in the Segovia program in the fall of year two.

Master of Architecture—Three-Year Program—Advanced Degree Entrance

Open to candidates who do not have a Bachelor of Science in Architecture or an equivalent degree.

Students with some background in architecture may be eligible for advanced placement into the program. Advanced placement will be determined by an applicant's transcript and portfolio.

After completing a first-year introductory curriculum, students in the three-year program merge into the two-year MArch curriculum. This is a NAAB-accredited (http://www.naab.org)degree program.

Only select courses in the first year of the program will be waived. All waivers are at the discretion of the school and applicants will be required to provide documentation for any waivers (78–100 credits total based on waivers).

The minimum course work for all students in the first year of the program is:

- Two studio courses (minimum 10 credits total)

- Two graduate electives (minimum 8 credits total)

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

All advanced-entry students must complete a minimum of 10 semester hours per semester in the first year. Course waivers are determined by the faculty and students should consult with their advisor.

Prerequisites

Courses listed below may be waived as determined by faculty advisor.

Code	Title	Hours
History		
ARCH 2330	Architecture, Modernity, and the City, 1800 to 1910	4
ARCH 2340	Architecture, Modernity, and the City, 1910 to 1980	4
Building, Design, and Environment		
ARCH 2240	Architectonic Systems	4
ARCH 5210	Environmental Systems	4
ARCH 5230	Structural Systems	4

Core Requirements

Code	Title	Hours
Building, Design, and Environment		
ARCH 3450	Advanced Architectural Communication	4
ARCH 5220	Integrated Building Systems	4
Studio		
ARCH 5115	Option Studio (or)	6
or ARCH 3155	Studio Abroad	
ARCH 5120	Comprehensive Design Studio	6
ARCH 6100	Graduate Skills Studio	6
ARCH 6200	Graduate Studio 1: Architectural Design	6
Professional Practice		
ARCH 6430	Case Studies 1	4
ARCH 6440	Case Studies 2	4
Topics and Seminars		
ARCH 5310	Design Tactics and Operations	4
or ARCH 3361	Architecture and Urbanism Abroad	
ARCH 6330	Seminar in Modern Architecture	4
Complete the following (repeatable) course twice:		8
ARCH 6340	Graduate Topics in Architecture	
Research and Project		
ARCH 7130	Master's Research Studio	6
ARCH 7140	Master's Degree Project	6

Electives

Code	Title	Hours
Required Electives		
Complete 8 semester hours of non-ARCH courses.		8
Additional Elective or Topics		
Complete 8 semester hours of non-ARCH courses.		8

Program Credit/GPA Requirements

78–100 total semester hours required
Minimum 3.000 GPA required

Plan of Study

Year 1

Fall	Hours	Spring	Hours
ARCH 2240	4	ARCH 2340 and ARCH 2341	4
ARCH 2330 (and)	4	ARCH 3450 (or Required Elective)	4
ARCH 2331		ARCH 6200	6
ARCH 5210 (and)	4	Elective (Optional)	4
ARCH 5211			
ARCH 6100	6		
	18		18

Year 2

Fall	Hours	Spring	Hours
ARCH 5115 (or Global Study Abroad)	6	ARCH 3450 (or Required Elective)	4
ARCH 5230 (or Global Study Abroad)	4	ARCH 5120	6
ARCH 5310 (or Global Study Abroad)	4	ARCH 5220	4
Optional Elective (or Global Study Abroad)	4	ARCH 6340 (1 of 2)	4
	18		18

Year 3

Fall	Hours	Spring	Hours
ARCH 6430	4	ARCH 6340 (2 of 2)	4
ARCH 6330	4	ARCH 6440	4
ARCH 7130	6	ARCH 7140	6
Elective (Optional)	4		
	18		14

Total Hours: 104

Total credits for the AP track may range from 78–104 depending on waivers and optional electives. For students attending Segovia, the range will be 78–102.

Note: Only courses in year one may be waived. Course waivers are at the discretion of the program director.

Students must take ARCH 5230 in the fall of year three if participating in the Segovia program in the fall of year two.

Master of Design for Sustainable Urban Environments—One-Year Program

The one-year Master of Design for Sustainable Urban Environments (MDes-SUEN) is open to students holding an accredited, first-professional degree in landscape architecture, architecture, planning, or urban design. The 36-credit program offers a core sequence of advanced design research studios, proseminars, and urban ecology and technology workshops complemented by interdisciplinary electives.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Studio		
SUEN 7130	Master's Research Studio: Design and the Resilient City	6
SUEN 7140	Master's Research Studio: Master's Project	6
Proseminar		
Complete 8 semester hours from the following (repeatable) courses:		8
SUEN 7320	Pro-Seminar: Issues in Designed Urban Environments	
SUEN 6340	Topics in Urban Environmental Design	

Code	Title	Hours
Technology		
SUEN 7230	Urban Ecologies and Technologies 1	4
SUEN 7240	Urban Ecologies and Technologies 2	4

Electives

Electives in other disciplines may be taken in consultation with your faculty advisor.

Code	Title	Hours
Complete 8 semester hours from the following subject areas:		8
SUEN, ARCH, LARC, PPUA, LPSC, and SBSY		

Program Credit/GPA Requirements

36 total semester hours required
Minimum 3.000 GPA required

Plan of Study

Year 1

Fall	Hours	Spring	Hours
SUEN 7130	6	SUEN 7140 (or co-op*)	6
SUEN 7230	4	SUEN 7240	4
SUEN 7320	4	SUEN 7320 (or)	4
Elective (Required)	4	SUEN 6340	
		Elective (Required)	4
	18		18

Total Hours: 36

*Students may opt to do a graduate co-op. Co-op does not count toward degree credits.

Master of Design for Sustainable Urban Environments—Two-Year Program

The two-year Master of Design for Sustainable Urban Environments (MDes-SUEN) is open to students entering with a bachelor's degree in any field. The 64-credit program provides a full year of core skill sets including design; site analysis, implementation, and visualization; history/theory; and policy. This includes introduction to basic earthworks, water, and plants systems as well as the principles of landscape and urban ecology.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Studio		
SUEN 6110	Graduate Studio 1: Sustainable Urban Sites	6
SUEN 6120	Graduate Studio 2: Sustainable Urban Systems	6
SUEN 7130	Master's Research Studio: Design and the Resilient City	6
SUEN 7140	Master's Research Studio: Master's Project	6
Cities: Design and Planning		
SUEN 6310	Cities, Nature, and Design in Contemporary History and Theory	4

LPSC 7312	Cities, Sustainability, and Climate Change	4
Proseminar		
Complete 8 semester hours from the following (repeatable) courses:		8
SUEN 7320	Pro-Seminar: Issues in Designed Urban Environments	
SUEN 6340	Topics in Urban Environmental Design	
Technology		
SUEN 6210	Implementation and Visualization for Urban Environments 1	4
SUEN 6220	Implementation and Visualization for Urban Environments 2	4
SUEN 7230	Urban Ecologies and Technologies 1	4
SUEN 7240	Urban Ecologies and Technologies 2	4

Electives

Electives in other disciplines may be taken in consultation with your faculty advisor.

Code	Title	Hours
Complete 8 semester hours from the following subject areas:		8
SUEN, ARCH, LARC, PPUA, LPSC, SBSY		

Program Credit/GPA Requirements

64 total semester hours required
Minimum 3.000 GPA required

Plan of Study

Year 1

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
SUEN 6110	6	SUEN 6120	6	Vacation	0	Vacation	0
SUEN 6210	4	SUEN 6220	4				
SUEN 6310	4	LPSC 7312	4				
Elective (Required)	4	Elective (Required)	4				
	18		18		0		0

Year 2

Fall	Hours	Spring	Hours
SUEN 7130	6	SUEN 7140 (or co-op)*	6
SUEN 7320	4	SUEN 7320 (or)	4
SUEN 7230	4	SUEN 6340	
Elective (Optional)	4	SUEN 7240	4
		Elective (Optional)	4
	18		18

Total Hours: 72

Note: Students may opt to do a graduate co-op. Co-op does not count toward degree credits.
Total credits required are 64 (with two optional electives, 72).

Website (http://www.northeastern.edu/camd/artdesign/academics/graduate)

Tad Hirsch, PhD
Chair

239 Ryder Hall
617.373.4340
Nhora Delgado, Administrative Assistant, n.delgado@northeastern.edu

Graduate Program Coordinators

Dietmar Offenhuber, PhD
Assistant Professor and Information Design and Visualization Graduate Coordinator
311 Ryder Hall
617.373.3378
www.northeastern.edu/visualization (http://www.northeastern.edu/visualization)

Christoffer Holmgård Pederson, PhD
Assistant Professor and Game Science and Design and Game Analytics Graduate Coordinator
210B Lake Hall
www.northeastern.edu/camd/gamedesign (https://camd.northeastern.edu/gamedesign)

Sarah Kanouse, MFA
Associate Professor and Interdisciplinary Arts Graduate Coordinator
319 Ryder Hall
617.373.6371
camd.northeastern.edu/artdesign/academic-programs/mfa-interdisciplinary-arts/ (https://camd.northeastern.edu/artdesign/academic-programs/mfa-interdisciplinary-arts)

Kristian Kloeckl, PhD
Associate Professor and Experience Design Graduate Coordinator
448D Ryder Hall
617.373.6987
camd.northeastern.edu/artdesign/academic-programs/experience-design/ (https://camd.northeastern.edu/artdesign/academic-programs/experience-design)

The graduate programs in the Department of Art + Design are designed to cultivate capacity and fluency in a range of disciplines and practices to create and deliver value and benefit for an increasingly connected and diverse world. Spanning many subjects, interests, and intentions across disparate fields and manifold practices of art, media, and design, our master's and certificate programs will challenge and inspire you to push the boundaries of cultural production and stewardship and social and civic impact. We strive to empower you to bring your ideas to life through design conversations, media making, and artistic expression and enjoy richly rewarding careers and lives.

Programs
Master of Fine Arts (MFA)

- Experience Design (p. 53)
- Information Design and Visualization (p. 54)
- Interdisciplinary Arts (p. 55)

Master of Science (MS)

- Experience Design (p. 56)
- Game Science and Design (p. 57)

Graduate Certificate

- Experience Design (p. 58)
- Game Analytics (p. 59)
- Information Design and Visualization (p. 59)

<div style="background:red;color:white">

Experience Design, MFA

</div>

The Master of Fine Arts in Experience Design embraces research-driven design thinking for entrepreneurship, innovation, and other areas, preparing students to be vital contributors and leaders at the intersection of innovation and design.

Experience design is a holistic and integrative approach to design that utilizes investigation into the human experience in specific situations to improve its quality, given an understanding of human goals, needs, and desires. For example, in the context of healthcare, an experience designer does not focus on the design of any one technology product, information system, or physical space. Instead, the designer is charged with understanding and improving the overall sequence of events that impact the patient before and during a hospital stay as well as through follow-up care.

The experience design program moves beyond design thinking to produce outcomes that demonstrate the value of human-centered research and design methods. It draws on findings from a range of professional and scholarly disciplines (including business, psychology, human-computer interaction, engineering, cybernetics) to understand and shape specific situations. It extends across many industries and aspects of life: healthcare, technology, services, travel, education, entertainment, shopping, dining, and the nature of work itself.

Through examining how people behave in a *real* context in relation to emerging technologies, the Master of Fine Arts in Experience Design allows graduates from design and related disciplines (such as communications, computer science, business, architecture, art, journalism, humanities, and the social sciences) to gain knowledge and experience in the design competencies. To accomplish these goals, students will learn how to invoke cooperation, collaboration, and integration across disciplines and practices.

The Master of Fine Arts in Experience Design seeks to prepare students to be vital contributors and leaders of professional experience design teams where technological innovation intersects with design. Successful graduates will be able to analyze how people undergo real-world situations, enabling them to enrich experience by orchestrating new design-driven relationships. They will be equipped with the skills to identify shortcomings as well as opportunities for improved engagement between systems and elements—virtual or physical—with the humans who encounter them.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Required Core		
ARTG 5120	Research Methods for Design	4

ARTG 5600	Experience Design Studio 1: Principles	4
ARTG 5610	Design Systems	4
ARTG 5620	Notational Systems for Experience	4
ARTG 5640	Prototyping for Experience Design	4
ARTG 6310	Design for Behavior and Experience	4
ARTG 6600	Experience Design Studio 2: Group and Interpersonal	4
ARTG 6700		4
Thesis		
ARTG 7100	Thesis Seminar for Design	4
ARTG 7990	Thesis	8

Electives

Code	Title	Hours
Complete 16 semester hours from the following:		16
ARTD 5001	Art, Context, Action 1	
ARTG 5310	Visual Cognition	
ARTG 5320	Statistics Basics for Designers	
ARTG 5330	Visualization Technologies 1	
ARTG 6320	Design of Information-Rich Environments	
ARTG 6330	Information Design Mapping Strategies	
Other electives may be chosen in consultation with program coordinator.		

Program Credit/GPA Requirements

60 total semester hours required
Minimum 3.000 GPA required

Plan of Study
Sample Two Years, One Co-op (Optional) Plan of Study

Year 1

Fall	Hours	Spring	Hours	Summer Full Semester	Hours
ARTG 5600	4	ARTG 6600	4	Co-op (optional)	0
ARTG 5620	4	ARTG 6310	4		
ARTG 5610	4	ARTG 5640	4		
Elective	4	ARTG 5120	4		
	16		16		0

Year 2

Fall	Hours	Spring	Hours
ARTG 6700	4	ARTG 7990	8
ARTG 7100	4	Elective	4
Elective	4		
Elective	4		
	16		12

Total Hours: 60

Sample Two Years, No Co-op Plan of Study

Year 1

Fall	Hours	Spring	Hours	Summer Full Semester	Hours
ARTG 5600	4	ARTG 6600	4	Vacation	0
ARTG 5620	4	ARTG 6310	4		

ARTG 5610	4	ARTG 5640	4
Elective	4	ARTG 5120	4
	16	16	0

Year 2

Fall	Hours	Spring	Hours
ARTG 6700	4	ARTG 7990	8
ARTG 7100	4	Elective	4
Elective	4		
Elective	4		
	16	12	

Total Hours: 60

Information Design and Visualization, MFA

The Master of Fine Arts in Information Design and Visualization focuses on the analytical and visual communication of information. Successful graduates are experts in the visual languages of data who produce effective and meaningful visual displays of abstract information. They collaborate with other professionals, researchers, or clients in a variety of fields and settings.

Students have an opportunity to gain an understanding of the principles of translating data and information into visual, material, and dynamic forms and to learn to integrate theoretical, visual, and technical aspects of structuring and representing data to provide a broad range of audiences increased access to socially relevant issues. The curriculum is built upon an established undergraduate program in graphic, information, and interaction design and seeks applicants from diverse fields of study—not just visual communications—who are interested in information visualization and communication of information through visual and analytical means. Practicing professionals and recent undergraduates in a variety of fields (architecture, graphic design, journalism, communications, business, the humanities, and sciences) who desire a fluency in information design should apply.

Graduates are prepared to work effectively in a dynamic and burgeoning field of practice and research in environments including design firms, research centers, corporations, academic institutions, and government and urban agencies. The program seeks to produce professionals skilled in design principles and practices needed to assume leadership roles in an evolving interdisciplinary field. Students will also be well positioned to pursue PhDs and academic careers.

Fall semester 1 is dedicated to foundations, including an introductory course in information visualization and visual communication, a seminar on the history of visualization, a studio course, and an introduction to programming with d3. Students with strong prior experience in programming can replace the latter course with an elective.

Spring semester 2 is dedicated to the exploration of diverse research topics. In Studio 2 you will create an interactive visualization project; in information design theory, you will obtain theoretical background in design theory and concept mapping; the research methods class will prepare you for the thesis process by introducing you to different research methods; and an open elective will allow you to pick a research theme you are interested in.

Fall semester 3 is dedicated to developing your thesis in theory and practice. All courses in this semester are dedicated to this goal, including the research seminar and the Studio 3 course. Two electives allow you to add competencies related to your thesis topic.

Fall semester 4 is finally all about finalizing the thesis and the thesis exhibition.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Studio		
ARTG 5100	Information Design Studio 1: Principles	4
ARTG 6100	Information Design Studio 2: Dynamic Mapping and Models	4
ARTG 6200	Information Design Studio 3: Synthesis	4
Theory and Research Methods		
ARTG 5120	Research Methods for Design	4
ARTG 5330	Visualization Technologies 1	4
ARTG 6110	Information Design Theory and Critical Thinking	4
Typography and History		
ARTG 5110	Information Design History	4
ARTG 5130	Visual Communication for Information Design	4
Thesis		
ARTG 7100	Thesis Seminar for Design	4
ARTG 7990	Thesis	8

Electives

Code	Title	Hours
In consultation with faculty advisor, complete four courses from the following:		16
ARTG 5310	Visual Cognition	
ARTG 5320	Statistics Basics for Designers	
ARTG 6310	Design for Behavior and Experience	
ARTG 6320	Design of Information-Rich Environments	
ARTG 6330	Information Design Mapping Strategies	
ARTG 6900	Special Topics in Design	
DA 5020	Collecting, Storing, and Retrieving Data	
DA 5030	Introduction to Data Mining/Machine Learning	
PPUA 5301	Introduction to Computational Statistics	

Program Credit/GPA Requirements

60 total semester hours required
Minimum 3.000 GPA required

Plan of Study

Sample Two Years, One Optional Co-op Plan of Study

Year 1

Fall	Hours	Spring	Hours	Summer Full Semester	Hours
ARTG 5100	4	ARTG 5120	4	ARTE 6964	
ARTG 5110	4	ARTG 6100	4		
ARTG 5130	4	ARTG 6110	4		

ARTG 5330	4	Open elective	4		
	16		16		0

Year 2

Fall	Hours	Spring	Hours
ARTG 6200	4	ARTG 7990	8
ARTG 7100	4	ARTG 7991	4
Open elective	4	Open elective	4
Open elective	4		
	16		16

Total Hours: 64

Sample Two Years, No Co-op Plan of Study

Year 1

Fall	Hours	Spring	Hours	Summer Full Semester	Hours
ARTG 5100	4	ARTG 5120	4	Vacation	0
ARTG 5110	4	ARTG 6100	4		
ARTG 5130	4	ARTG 6110	4		
ARTG 5330	4	Open elective	4		
	16		16		0

Year 2

Fall	Hours	Spring	Hours
ARTG 6200	4	ARTG 7990	8
ARTG 7100	4	ARTG 7991	
Open elective	4	Open elective	4
Open elective	4		
	16		12

Total Hours: 60

Interdisciplinary Arts, MFA

Students in the **Master of Fine Arts in Interdisciplinary Arts** use creative work to inquire and intervene in today's most pressing social and ecological concerns. Positioned at the intersection of the visual arts, architecture, music, visual and media studies, and the expanded field of design, the curriculum supports the development of ambitious projects by a diverse, international group of creative practitioners.

Our students use the tools and insights of contemporary creative practice to intervene in public discourse and the social imagination through media, research-, and/or community-based approaches. The curriculum centers around a series of core critique seminars that provide a foundation and home base. Students then customize their education from a wide range of studio and academic courses. Regular workshops with visiting faculty emphasize hands-on engagement in the creative process of leading artists, while summer residency or co-op experiences allow students to complete self-directed projects, supported by faculty and peer mentoring. The MFA degree requires a thesis project and companion paper, as well as a minimum 3.000 GPA over 60 semester hours of study.

Over the course of the two-year program, successful students learn to articulate their goals, context, and audience and develop the professional skills necessary to sustain their practices. Successful graduates are prepared to forge their own paths as publicly engaged artists working independently or in arts organizations, social entrepreneurship ventures, the nonprofit sector, and as faculty in academic institutions.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Seminars		
Enrollment in a section of each course is required each term. The format of the course is critique-seminar.		16
ARTD 5001	Art, Context, Action 1	
ARTD 5002	Art, Context, Action 2	
ARTD 6001	Art, Media, Participation 1	
ARTD 6002	Art, Media, Participation 2	
Research Methods		
In consultation with your faculty advisor, complete one course from the following:		4
ARTG 5120	Research Methods for Design	
ARTE 6210	Research Methods for the Creative Arts	
GSND 5130	Mixed Research Methods for Games	
Project		
ARTD 5301	Independent Research Project 1	4
Thesis and Exhibition		
ARTE 7100	Thesis Proposal	4
ARTE 7990	Thesis	4
ARTE 7996	Thesis Continuation	0

Electives

Code	Title	Hours
Studio Electives		
In consultation with your faculty advisor, complete four courses from the following:		16
ARTD 5582	Collaborative Video and Community Engagement	
ARTE 5901	Special Topics in Art and Design Studio	
ARTG 5100	Information Design Studio 1: Principles	
ARTG 5310	Visual Cognition	
ARTG 5330	Visualization Technologies 1	
ARTG 5620	Notational Systems for Experience	
ARTG 6100	Information Design Studio 2: Dynamic Mapping and Models	
ARTS 5100	Visual Ideation	
ARTS 6000	Studio	
ARTS 7896	Studio Continuation	
Art History Electives		
In consultation with your faculty advisor, complete three courses from the following:		12
ARTH 5100	Contemporary Art Theory and Criticism	
ARTH 5200	Issues in Contemporary Art	
ARTH 5400	Contemporary Visual Culture	

ARTH 5902	Special Topics in Art and Design History

Program Credit/GPA Requirements

60 total semester hours required
Minimum 3.000 GPA required

Plan of Study
Sample Two Years, One Internship or Co-op (Optional) Plan of Study

Year 1

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer Full Semester	Hours
ARTD 5001	4	ARTD 5002	4	ARTD 5301	4	Internship or co-op (optional)	0
History, theory, and critical studies elective	4	History, theory, and critical studies elective	4			Note: Many art residencies can be pursued not as internships but for credit as independent research, ARTD 5301, or ARTD 6301.	
Studio elective	4	Research methods	4				
Studio elective	4	Studio elective	4				
	16		16		4		0

Year 2

Fall	Hours	Spring	Hours
ARTD 6001	4	ARTD 6002	4
ARTE 7100	4	ARTE 7990	4
History, theory, and critical studies elective	4		
Studio elective	4		
	16		8

Total Hours: 60

Sample Two Years, No Co-op Plan of Study

Year 1

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
ARTD 5001	4	ARTD 5002	4	Studio elective or		Studio elective or	
History, theory, and critical studies elective	4	History, theory, and critical studies elective	4	ARTD 5301	4	ARTD 6301	4
Studio elective	4	Research methods	4				

Studio elective	4	Studio elective	4		
	16		16	4	4

Year 2

Fall	Hours	Spring	Hours
ARTD 6001	4	ARTD 6002	4
ARTE 7100	4	ARTE 7990	4
History, theory, and critical studies elective	4		
	12		8

Total Hours: 60

Experience Design, MS

The Master of Science in Experience Design embraces research-driven design thinking for entrepreneurship, innovation, and other areas, preparing students to be vital contributors and leaders at the intersection of innovation and design.

Experience design is a holistic and integrative approach to design that utilizes investigation into the human experience in specific situations to improve its quality, given an understanding of human goals, needs, and desires. For example, in the context of healthcare, an experience designer does not focus on the design of any one technology product, information system, or physical space. Instead, the designer is charged with understanding and improving the overall sequence of events that impact the patient before and during a hospital stay as well as through follow-up care.

The experience design program moves beyond design thinking to produce outcomes that demonstrate the value of human-centered research and design methods. It draws on findings from a range of professional and scholarly disciplines (including business, psychology, human-computer interaction, engineering, cybernetics) to understand and shape specific situations. It extends across many industries and aspects of life: healthcare, technology, services, travel, education, entertainment, shopping, dining, and the nature of work itself.

Through examining how people behave in a *real* context in relation to emerging technologies, the Master of Science in Experience Design allows graduates from design and related disciplines (such as communications, computer science, business, architecture, art, journalism, humanities, and the social sciences) to gain knowledge and experience in the design competencies. To accomplish these goals, students will learn how to invoke cooperation, collaboration, and integration across disciplines and practices.

The Master of Science in Experience Design seeks to prepare students to be vital contributors and leaders of professional experience design teams where technological innovation intersects with design. Successful graduates will be able to analyze how people undergo real-world situations, enabling them to enrich experience by orchestrating new design-driven relationships. They will be equipped with the skills to identify shortcomings as well as opportunities for improved engagement between systems and elements—virtual or physical—with the humans who encounter them.

The MS degree is intended for graduate students from related fields—media, design, communications, data science, and more—who would like

to acquire competencies in experience design to complement their skills and address their professional needs. Embedded in the course offering of our Master of Fine Arts in Experience Design (p. 53) program, students in the MS program will have the opportunity to join MFA students for activities such as attending guest lectures and workshops.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
ARTG 5600	Experience Design Studio 1: Principles	4
ARTG 5610	Design Systems	4
ARTG 5620	Notational Systems for Experience	4
ARTG 5630		4
ARTG 6310	Design for Behavior and Experience	4
ARTG 6600	Experience Design Studio 2: Group and Interpersonal	4

Electives

Code	Title	Hours
Complete two of the following:		8
ARTG 5310	Visual Cognition	
ARTG 5320	Statistics Basics for Designers	
ARTG 5330	Visualization Technologies 1	
ARTG 5640	Prototyping for Experience Design	
Other electives may be chosen in consultation with program coordinator.		

Program Credit/GPA Requirements

32 total semester hours required
Minimum 3.000 GPA required

Plan of Study

Year 1

Fall	Hours	Spring	Hours
ARTG 5600	4	ARTG 5120	4
ARTG 5610	4	ARTG 6310	4
ARTG 5620	4	ARTG 6600	4
Elective	4	Elective	4
	16		16

Total Hours: 32

*Students may opt to do a graduate co-op. Co-op does not count toward credits required for the degree.

Game Science and Design, MS

The **Master of Science (MS) in Game Science and Design** is a program that seeks to give students a comprehensive understanding of how successful game products are created in a player-centric environment. Focusing on the science of game development, students have an opportunity to learn the design and technological skills needed to build a game and develop a deep understanding of playability and analytics that make products successful in an increasingly competitive marketplace.

The game industry has expanded to include social and mobile gaming; games in health, education, and training; and innovations in play psychology, middleware, graphics tools, game mechanics, game evaluation methods, and advanced artificial intelligence and narrative techniques. It has become an increasingly competitive space.

The selectiveness of the industry and the diversity of the skills required mean that students seeking entry need both broad and deep skills. As an emergent industry using diverse technology and collaborative practices, the game industry needs professionals with interdisciplinary skill sets who can meld knowledge about development with knowledge about evaluation methods and players' behavior and psychology.

Jointly offered by Northeastern's Colleges of Arts, Media and Design and Computer and Information Science (http://www.ccs.neu.edu), the **Master in Science in Game Science and Design** is a one-of-a-kind interdisciplinary program that seeks to prepare students to meet this need by weaving together science and design. This is a two-year, 34-credit-hour program.

The degree offers three concentrations:

- Game analytics: focusing on data analysis of gameplay and other game data to make the game successful
- Game user research: focusing on gauging the user experience to enable designers to develop an enjoyable game experience
- Game design and development: focusing on the design or technical side of game development

All admitted students will be assigned to an advisor who will help them select a pathway with a coherent set of electives depending on their career goals. The advisor will also monitor their progress through the master's degree.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Required Core		
GSND 5110	Game Design and Analysis	4
GSND 5111	Seminar for GSND 5110	1
GSND 5122	Business Models in the Game Industry	1
GSND 5130	Mixed Research Methods for Games	4
or PPUA 5301	Introduction to Computational Statistics	
Thesis		
GSND 7990	Thesis	4

Specializations

In consultation with your faculty advisor, declare one specialization option by spring of your first year.
Complete one of the following specializations:

GAME ANALYTICS

Code	Title	Hours
Complete three of the following:		12
DA 5020	Collecting, Storing, and Retrieving Data	
DA 5030	Introduction to Data Mining/Machine Learning	
GSND 6350	Data-Driven Player Modeling	
PPUA 5302	Information Design and Visual Analytics	

GAME USER RESEARCH

Code	Title	Hours
Complete three of the following:		12
CS 5340	Computer/Human Interaction	
GSND 6320	Psychology of Play	
GSND 6330	Player Experience	
GSND 6340	Biometrics for Design	

GAME DESIGN AND DEVELOPMENT

Code	Title	Hours
Complete three of the following:		12
CS 5150	Game Artificial Intelligence	
CS 5850	Building Game Engines	
GSND 6240	Exploratory Concept Design	
GSND 6250	Spatial and Temporal Design	

Electives

Note: In consultation with your faculty advisor, you may complete two other related courses offered by all options.

Code	Title	Hours
Complete two of the following:		8
CS 5150	Game Artificial Intelligence	
CS 5340	Computer/Human Interaction	
CS 5850	Building Game Engines	
DA 5020	Collecting, Storing, and Retrieving Data	
DA 5030	Introduction to Data Mining/Machine Learning	
GSND 6240	Exploratory Concept Design	
GSND 6250	Spatial and Temporal Design	
GSND 6320	Psychology of Play	
GSND 6330	Player Experience	
GSND 6340	Biometrics for Design	
GSND 6350	Data-Driven Player Modeling	
PPUA 5302	Information Design and Visual Analytics	

Program Credit/GPA Requirements

34 total semester hours required
Minimum 3.000 GPA required

Plan of Study
Sample Two Years, One Co-op (Optional) Plan of Study

Year 1

Fall	Hours	Spring	Hours	Summer Full Semester	Hours
GSND 5110	4	Concentration elective	4	Co-op (Optional)	0
GSND 5111	1	Concentration elective	4		
GSND 5130 or PPUA 5301	4				
	9		8		0

Year 2

Fall	Hours	Spring	Hours
GSND 5122	1	General elective	4
Concentration elective	4	GSND 7990	4
General elective	4		
	9		8

Total Hours: 34

Sample Two Years, No Co-op Plan of Study

Year 1

Fall	Hours	Spring	Hours	Summer Full Semester	Hours
GSND 5110	4	Concentration elective	4	Vacation	0
GSND 5111	1	Concentration elective	4		
GSND 5130 or PPUA 5301	4				
	9		8		0

Year 2

Fall	Hours	Spring	Hours
GSND 5122	1	General elective	4
Concentration elective	4	GSND 7990	4
General elective	4		
	9		8

Total Hours: 34

Experience Design, Graduate Certificate

The Graduate Certificate in Experience Design embraces research-driven design thinking for entrepreneurship, innovation, and other areas, preparing students to be vital contributors and leaders at the intersection of innovation and design.

Experience design is a holistic and integrative approach to design that utilizes investigation into the human experience in specific situations to improve its quality, given an understanding of human goals, needs, and desires. For example, in the context of healthcare, an experience designer does not focus on the design of any one technology product, information system, or physical space. Instead, the designer is charged with understanding and improving the overall sequence of events that impact the patient before and during a hospital stay as well as through follow-up care.

The Graduate Certificate in Experience Design moves beyond design thinking to produce outcomes that demonstrate the value of human-centered research and design methods. It draws on findings from a range of professional and scholarly disciplines (including business, psychology, human-computer interaction, engineering, cybernetics) to understand and shape specific situations. It extends across many industries and aspects of life: healthcare, technology, services, travel, education, entertainment, shopping, dining, and the nature of work itself.

Through examining how people behave in a *real* context in relation to emerging technologies, the Graduate Certificate in Experience Design allows working professionals or graduates from design and related disciplines (such as communications, computer science, business, architecture, art, journalism, humanities, and the social sciences) to gain knowledge and experience in the design competencies. To accomplish these goals, students need to learn how to invoke cooperation, collaboration, and integration across disciplines and practices.

The Graduate Certificate in Experience Design is designed to prepare students to be vital contributors and leaders of professional experience design teams where technological innovation intersects with design. Successful graduates will be able to analyze how people undergo real-world situations, enabling them to enrich experience by orchestrating new design-driven relationships. They will be equipped with the skills to identify shortcomings as well as opportunities for improved engagement between systems and elements—virtual or physical—with the humans who encounter them.

The certificate is intended for practitioners and graduate students from related fields—media, design, communications, data science, and more—who would like to acquire competencies in experience design to complement their skills and address their professional needs. Embedded in the course offering of our Master of Fine Arts in Experience Design (p. 53) program, students in the certificate program will have the opportunity to join MFA students for activities such as attending guest lectures and workshops.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
ARTG 5610	Design Systems	4
ARTG 5620	Notational Systems for Experience	4
ARTG 6310	Design for Behavior and Experience	4

Elective

Code	Title	Hours
Complete 4 semester hours of 5000- to 6000-level course work in the following subject area:		4
ARTG		

Program Credit/GPA Requirements

16 total semester hours required
Minimum 3.000 GPA required

Game Analytics, Graduate Certificate

The Graduate Certificate in Game Analytics offers students an opportunity to obtain the ability to analyze vast amounts of data, which has become critical as big data has rapidly become a competitive space across multiple industries from games to healthcare, urban planning, and social media.

In the game industry, data-driven techniques for analyzing game data have become a strategic necessity. The game development process has shifted from "design, develop, release" to "design, develop, release, and continuously fine-tune based on analytics." All free-to-play games on mobile, tablets, touch devices, and web-delivered platforms use analytics to develop strategies for monetization and assessment.

As game companies have realized the importance of data analytics in the process of design and production, they have dramatically increased the demand for qualified game analysts. Northeastern's unique Graduate Certificate in Game Analytics is a one-year, 20-semester-hour program developed to meet this need.

Program Requirements

Complete all five courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Data Science Core		
DA 5020	Collecting, Storing, and Retrieving Data	4
DA 5030	Introduction to Data Mining/Machine Learning	4
PPUA 5302	Information Design and Visual Analytics	4
Game Science and Design Core		
GSND 5110	Game Design and Analysis	4
GSND 6350	Data-Driven Player Modeling	4

Program Credit/GPA Requirements

20 total semester hours required
Minimum 3.000 GPA required

Information Design and Visualization, Graduate Certificate

The Graduate Certificate in Information Design and Visualization focuses on the data-driven analytical and visual design of information, preparing students to communicate visually while engaging advanced data analytics to produce meaningful information environments.

Successful graduates of the Certificate in Information Design and Visualization are professionals who are prepared to tackle new information communication challenges and communicate and collaborate with researchers in a variety of fields, as well as stakeholders and the public. Throughout the course of the certificate, students master how to think visually, while also learning how to produce effective, meaningful visual information from various sources of data.

The certificate is intended for practitioners and graduate students from related fields—media, design, communications, data science, and more—who would like to acquire competencies in information design and data visualization to complement their skills and address their professional needs. Embedded in the course offering of our Master of Fine Arts in Information Design and Visualization (http://www.northeastern.edu/camd/artdesign/academic-programs/mfa-in-information-design-and-visualization) program, students in the certificate program will have the opportunity to join MFA students for activities such as attending guest lectures and workshops.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
ARTG 5130	Visual Communication for Information Design	4
ARTG 5330	Visualization Technologies 1	4

Electives

Code	Title	Hours
Complete two from the following:		8
ARTG 5100	Information Design Studio 1: Principles	
ARTG 5110	Information Design History	
ARTG 5310	Visual Cognition	
ARTG 6100	Information Design Studio 2: Dynamic Mapping and Models	
ARTG 6310	Design for Behavior and Experience	
ARTG 6320	Design of Information-Rich Environments	
ARTG 6330	Information Design Mapping Strategies	
ARTG 6900	Special Topics in Design	
ARTG 5000 or 6000 level course		

Program Credit/GPA Requirements

16 total semester hours required
Minimum 3.000 GPA required

School of Journalism

Website (http://www.northeastern.edu/camd/journalism)

Jonathan Kaufman, MA
Professor and Director

102 Lake Hall
617.373.3236
617.373.8773 (fax)

Gladys Mckie, MS, Graduate Coordinator, g.mckie@northeastern.edu

Welcome to the graduate programs at Northeastern University's School of Journalism. Our school offers a Master of Arts in Journalism and a Master of Science in Media Advocacy. The Master of Arts in Journalism degree is designed to merge traditional journalism with the latest technology. Students new to the field or those with experience can choose one of two tracks—professional journalism or media innovation —to prepare them for the challenges faced by legacy and new media in the digital age. The Master of Science in Media Advocacy is designed to teach strategic advocacy skills and prepare graduates to succeed as resilient, media-empowered citizens in a global society. Moreover, these programs offer students hands-on training in preparation for careers in reporting, editing, multimedia design and production, social media, and data journalism.

As part of Northeastern's College of Arts, Media and Design, our graduate students are also part of an interdisciplinary and creative community. Our core curriculum is supplemented by electives that take advantage of course offerings from within our college and from other colleges in the university. And with our experiential education opportunities and outstanding co-op program, students do not have to wait until after graduation to begin developing skills as reporters, media advocates, or public relations professionals.

It is our goal to help you put your passion into practice. To that end, our graduate programs afford students the opportunity to study in Boston with a small and dedicated faculty of specialists with years of experience and extensive contacts in the media world.

Programs
Master of Arts (MA)

- Journalism (p. 60)

Master of Science (MS)

- Media Advocacy (p. 61)

Journalism, MA

The School of Journalism offers two pathways in a Master of Arts degree that seeks to prepare students for the challenges faced by legacy and new media in the digital age.

Students new to the field or those with experience can choose programs tailored to help them thrive during this time. Our programs are designed to merge traditional journalism with the latest information technology. Our professional track is designed for those with little or no journalism experience who want to pursue a career in journalism. Our media innovation track is designed for students with previous journalism experience who want to learn digital and multimedia skills.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirement

Code	Title	Hours
JRNL 6340	Fundamentals of Digital Journalism	4

Tracks

Complete one of the following two tracks:

PROFESSIONAL TRACK

Code	Title	Hours
JRNL 6200	Enterprise Reporting 1	4
JRNL 6201	Enterprise Reporting 2	4
JRNL 6202	Perspective on Journalism Ethics	4

MEDIA INNOVATION TRACK

Code	Title	Hours
JRNL 6306	Media Innovation Studio 1	4
JRNL 6307	Media Innovation Studio 2	4
JRNL 6341	Telling Your Story with Data	4

Electives

Code	Title	Hours
Complete 20 semester hours from the following areas:		20
JRNL 5309 to JRNL 7976		
Courses from other disciplines may be taken in consultation with your faculty advisor.		
No more than two courses outside of CAMD may be taken.		

Program Credit/GPA Requirements

36 total semester hours required
Minimum 3.000 GPA required

Plan of Study
Professional Track: Sample Two Years with Co-op

Year 1

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
JRNL 6100	1	JRNL 6201	4	Vacation	0	Co-op	0
JRNL 6200	4	JRNL 6202	4				
JRNL 6340	4	Elective 2	4				
Elective 1	4						
	13		12		0		0

Year 2

Fall	Hours	Spring	Hours
Co-op	0	Eletive 3	4
		Elective 4	4
		Elective 5	4
	0		12

Total Hours: 37

Media Innovation Track: Sample One-and-a-Half Years with No Co-op

Year 1

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
JRNL 6340	4	JRNL 6306	4	Vacation	0	Vacation	0
JRNL 6341	4	Elective 2	4				
Elective 1	4	Elective 3	4				
	12		12		0		0

Year 2

Fall	Hours
JRNL 6307	4
Elective 4	4
Elective 5	4
	12

Total Hours: 36

Media Advocacy, MS

The Master of Science in Media Advocacy places particular focus on developing direct and indirect advocacy skills: that is, to influence government decision makers directly and to change minds indirectly through shifting public opinion. The program uniquely combines grounding in governmental structures and the legal system with sophisticated training in the latest communication techniques including social media, web communications, and videography, as well as data analytics and data-driven storytelling. Successful graduates will be empowered to promote the public agenda of employers ranging from mission-driven organizations, such as the ACLU or the Sierra Club, to industry leaders, such as hospitals and technology companies, to lobbying and strategic communications groups and political consulting firms.

Program Requirements
Core Requirements

Code	Title	Hours
JRNL 5400	Media and Advocacy in Theory and Practice	4
JRNL	Advocacy Rese (TBA)	
LW 6400	Law, Policy and Legal Argument	4
LW 7667	Law and Ethics of Advocacy	3

Electives

Code	Title	Hours
Complete 18 semester hours from the following:		18

Advocating for Change

Complete 9–12 semester hours from the following:

JRNL 6202	Perspective on Journalism Ethics
LAW 7428	State Local Government
LAW 7600	Current Issues in Health Law and Policy
LAW 7651	Human Rights in the United States
LW 7329	Environmental Law
LW 7335	Health Law
LW 7488	Sexuality, Gender and the Law
LW 7491	International Human Rights and the Global Economy

Techniques of Advocacy

Complete 9–12 semester hours from the following:

ARTD 5001	Art, Context, Action 1
ARTD 5002	Art, Context, Action 2
ARTD 5582	Collaborative Video and Community Engagement
ARTG 5100	Information Design Studio 1: Principles
ARTG 5110	Information Design History
ARTG 5310	Visual Cognition
ARTG 5330	Visualization Technologies 1
ARTG 5600	Experience Design Studio 1: Principles
ARTG 5610	Design Systems
ARTG 5620	Notational Systems for Experience
ARTG 6310	Design for Behavior and Experience
ARTG 6320	Design of Information-Rich Environments
JRNL 5310	Photojournalism
JRNL 6340	Fundamentals of Digital Journalism
LAW 7635	Laboratory Seminar in Applied Design and Legal Empowerment

Program Credit/GPA Requirements

32 total semester hours required
Minimum 3.000 GPA required

Plan of Study
Sample One-and-a-Half Years with No Co-op

Year 1

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
JRNL 5400 Media and Advocacy in Theory and Practice	4	JRNL 5XXX Advocacy Research	4	Vacation	0	Vacation	0
LW 6400 Introduction to Law, Policy and Legal Argument	3	Elective 2	3-4				

Elective 1	3-4	Elective 3	3-4	
	10-11	10-12	0	0
Year 2				
Fall	**Hours**			
LW 6XXX Ethics of Advocacy	3			
Elective 4	3-4			
Elective 5	3-4			
Elective 6	3-4			
	12-15			

Total Hours: 32-38

Music

Website (http://www.northeastern.edu/camd/music)

Daniel Strong Godfrey, PhD
Professor and Chair

351 Ryder Hall
617.373.2776
617.373.4129 (fax)
Andrew Mall, Assistant Professor and Graduate Coordinator,
a.mall@northeastern.edu

The Master of Science in Music Industry Leadership (MS.MIL) program is an intensive one-year leadership program designed for individuals who want to manage the next generation of music companies (students who choose to do a co-op typically take longer than one year to complete the MS.MIL program). The MS.MIL offers advanced education in the areas of music management, leadership, research, and entrepreneurship with opportunities for immediate and ongoing application to each student's unique professional aspiration.

The Master of Science program focuses on the core scholarly areas of music industry. Courses seek to provide a solid foundation in music industry theory and analysis while offering students the opportunity to apply the foundational skills to an area of personal interest. Elective courses emphasize the creation and sustainability of music organizations in a rapidly evolving environment. Using an active-learning approach, the program focuses on developing music executives intellectually and ethically, while providing them with a keen appreciation for the complexities of managing in the creative industries. This approach focuses on long-term skill sets that enhance the potential of graduates within a fluid and ever-changing field. The program also emphasizes global leadership qualities that provide a broader vision of the music industry on an international level.

The JD/MS in Music Industry Leadership is a dual-degree program that offers students a variety of opportunities for real-world, experiential learning at the intersection of law and music business. Candidates for the JD/MS program must independently apply and gain admission to the School of Law and the College of Arts, Media and Design. Admission to one school does not ensure admission to the other. Candidates may apply to both schools prior to matriculation at the law school, or students may wait until they are enrolled in the School of Law before seeking admission to the College of Arts, Media and Design. During either the first or second year of law school, students may apply to the MS program during the winter or spring for enrollment the following September. Students enrolled in law school who are interested in pursuing this dual degree should contact the Office of Academic and Student Affairs and

Professor Kara Swanson, JD/MS faculty advisor, during the fall or winter of their first or second year for further information.

Curriculum

The MS.MIL program requires a minimum of 33 semester hours and 11 courses with a grade-point average (GPA) of 3.000 for graduation. Under consultation with the graduate coordinator, students choose courses and other curricular options (such as co-ops, research theses, directed studies, or entrepreneurial capstones) to highlight a student's strengths and longer-term goals.

Programs
Master of Science (MS)

- Music Industry Leadership (p. 62)

Dual Degree (JD/MS)

- Music Industry Leadership (p. 63)

Certificate

- NEC/NU Joint Certificate Program—Professional Studies Certificate in Music Performance (p. 63)

Music Industry Leadership, MS

Engaged with the Industry—and the World

Leveraging Northeastern's excellence in global experiential learning, our program allows students to study in Boston and gain real-world experience in New York, Nashville, Los Angeles, and other music capitals across the world.

Expert Faculty

With real-world research and professional experience with the issues facing today's music industry, our exceptional faculty bring fresh insight and innovation to their teaching.

Options

Students shape their own curriculum, following paths that meet personal and professional aspirations through a focus on practice, entrepreneurship, the profession, and research. We also offer a joint JD/Music Industry Leadership program in partnership with the Northeastern University School of Law.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Required Core		
MUSI 6000	Management of Music Organizations	3
MUSI 6100	Music Industry Research Methodology	3
MUSI 6200	Financial Management in the Music Industry	3
MUSI 6300	Intellectual Property for Music Management	3
MUSI 6400	Marketing Strategies in the Music Industry	3

Electives

Code	Title	Hours
Complete 18 semester hours in the following subject areas: [1]		18
MUSI 5000 level or above		
AACE 6000 level or above		

Program Credit/GPA Requirements

33 total semester hours required
Minimum 3.000 GPA required

[1] Electives in other disciplines may be taken in consultation with your faculty advisor. A maximum of 6 semester hours of electives may be taken outside the College of Arts, Media and Design.

Plan of Study
Sample One Year, No Co-op

Year 1

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
MUSI 6000	3	MUSI 6200	3	2 Electives	6	Elective	3
MUSI 6100	3	MUSI 6400	3				
MUSI 6300	3	2 Electives	6				
Elective	3						
	12		12		6		3

Total Hours: 33

Sample Two Year, One Co-op

Year 1

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
MUSI 6000	3	MUSI 6200	3	2 Electives	6	Co-op	
MUSI 6100	3	MUSI 6400	3				
MUSI 6300	3	2 Electives	6				
Elective	3						
	12		12		6		0

Year 2

Fall	Hours
Co-op	
Elective	3
	3

Total Hours: 33

Music Industry Leadership, JD/MS

Over the course of 45 months, the program enrolls students successively in the School of Law and the College of Arts, Media and Design. JD/MS candidates must complete the first and last years of the program in the School of Law. The year of music industry courses in the College of Arts, Media and Design may be taken during either the second or third year.

Program Requirements
Program Sequence

Year One
Fall and spring—traditional first-year law curriculum

Year Two
Summer—law co-op
Fall, winter, and spring—music industry courses (p. 62)

Year Three
Summer—music industry courses (p. 62)
Fall—law school courses
Winter—law co-op
Spring—law school courses

Year Four
Summer—law co-op
Fall—law school courses
Winter—law co-op
Spring—law school courses

Plan of Study

Year 1

	Hours
Insert law school year one	
	0

Year 2

	Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
	MUSI 6000	3	MUSI 6200	3	2 electives	6	Elective	3
	MUSI 61	3	MUSI 64	3				
	MUSI 6300	3	2 electives	6				
	Elective	3						
		12		12		6		3

Year 3

	Hours
Insert law school year two	
	0

Year 4

	Fall	Hours
	Insert law school year three	
		0

Total Hours: 33

NEC/NU Joint Certificate Program—Professional Studies Certificate in Music Performance

The School of Continuing Education at the New England Conservatory (NEC) and the Department of Music at Northeastern University (NU) offer a Professional Studies Certificate in Music Performance (48 credits). This program is geared toward NU undergraduate and graduate students who are interested in improving their abilities to perform on an instrument or voice in the classical or jazz styles.

The certificate in music performance is *in addition to* the student's Northeastern undergraduate or graduate degree—it is an entirely separate and distinct credential. Credits for courses toward the music performance certificate are accumulated and billed separately from credits toward Northeastern undergraduate or graduate degree programs and are not eligible for financial aid.

Courses are offered at NEC (predominantly related to music performance) and at NU (predominantly related to music history and music theory). NEC courses are scheduled during evenings and weekends.

Program Requirements
Northeastern University Requirements

Complete 22 credits of course work at Northeastern University as indicated below.

Code	Title	Hours
Music Theory and Musicianship Placement		
All students must take a theory placement exam. Students who do not place into MUSC 1201 or MUSI 1203 must first take the following course:		
MUSC 1119	Fundamentals of Western Music Theory	
Credits for MUSC 1119 do not count toward the certificate.		
Music Theory and Musicianship		
Music theory and musicianship courses should be taken concurrently. [1]		
MUSC 1201	Music Theory 1	4
MUSC 1202	Music Theory 2	4
Music in Context (Traditional, Ethnomusicological, Contemporary)		
Complete one of the following:		4
MUSC 1104		
MUSC 1105		
MUSC 1111	Rock Music	
MUSC 1112	Jazz	
Note: Since the following course is repeatable, music majors and combined majors may count the credits for the second time they take this course toward the music performance certificate:		
MUSC 3550	Historical Traditions: Special Topics	
Ensembles		
Complete 6 credits of music ensembles:		6
MUSC 1904	Chorus	
MUSC 1905	Concert Band	
MUSC 1906	Orchestra	
MUSC 1907	Wind Ensemble	
MUSC 1911	Jazz Ensemble	
MUSC 1912	Rock Ensemble	
MUSC 1913	Blues/Rock Ensemble	
MUSC 1914	Create Your Own Music	
MUSC 1915	Chamber Ensemble	
MUSC 1916	Contemporary Music Ensemble	
MUSC 1917	Jazz Choir and Combo	
MUSC 1918	World Music Ensemble	
MUSC 1919	Fusion Ensemble	
MUSC 1920	Pep Band	
MUSC 1921		

Code	Title	Hours
Recital Preparation and Performance		
MUSC 3410	Recital 1	1
MUSC 4622	Recital 2	1

[1] By replacing "Musicianship 1 (MUSC 1241)" with "Music Theory 2 (MUSC 1202)".

New England Conservatory Requirements

Complete 26 credits of course work at New England Conservatory School of Continuing Education as indicated below.

Code	Title	Hours
Private Studio Instruction		
Complete 16 credits of (repeatable) private studio instruction with New England Conservatory School of Continuing Education faculty. These credits may be accumulated in units of 2, 3, or 4 credits per semester. All private lessons require audition by NEC/NU faculty in order to assign private teacher placement. After being placed with a private teacher, and working with their certificate advisor, students must confirm with that teacher the length and number of lessons they will receive.		16
MPNC 1102	Music Instruction	
MPNC 1103	Music Instruction	
MPNC 1104	Music Instruction	
Music Technology		
MPNC 1201	Contemporary Music Production and Technology 1	1
Electives		
Complete 7 credits from the following:		7
MPNC 1301	Build Your Voice: Art/Skillful Singing	
MPNC 1401	Jazz Ear Training 1	
MPNC 1411	Jazz Theory 1	
MPNC 1421	Finale Chart Writing	
MPNC 1451	Jazz History 1	
MPNC 1501	Introduction to Music-in-Education	
MPNC 1612	Group Piano Class	
MPNC 1621	The Art of Musical Sight-Reading	
MPNC 1622	The Art of Practice and Performance	
MPNC 1623	Developing Perfect Pitch 1	
MPNC 1631	The Accidental Music Teacher: From Musical Artist to Creative Educator	
MPNC 1642	Sight-Singing for Singers	
MPNC 1801	Introduction to Composition 1	
MPNC 1802	Contemporary Improvisation: Skill Building	
MPNC 1803	Contemporary Improvisation: Music of the World—The African Diaspora	
MPNC 1901	Art and Soul of Cinema: An Appreciation of Film Music	
MPNC 1911	Latin American Classical Traditions 1	
MPNC 2401	Jazz Ear Training 2	
MPNC 2411	Jazz Theory 2	
MPNC 2431	Jazz Composition and Analysis	
MPNC 2451	Jazz History 2	
MPNC 2511	Music-in-Education Seminar	

MPNC 2512	Models for Teaching and Learning for Music-in-Education
MPNC 2525	Art and Science of Assessing Music Learning
MPNC 2526	Music, Brain Development, and Learning
MPNC 2547	Cross-Cultural Alternatives for Music-in-Education
MPNC 2548	Teaching and Learning with Music Technology
MPNC 2556	Improvisation in Music Education
MPNC 2561	String Pedagogy
MPNC 2571	Performing Artists in Schools
MPNC 2601	Music Production for Media
MPNC 2612	Piano Pedagogy
MPNC 2623	Developing Perfect Pitch 2
MPNC 2624	Advanced Perfect Pitch
MPNC 2644	Bach Arias for Singers and Instrumentalists
MPNC 2801	Introduction to Composition 2
MPNC 2911	Latin American Classical Traditions 2
MPNC 3401	Jazz Ear Training 3
MPNC 3411	Jazz Theory 3
MPNC 3431	Jazz Arranging
MPNC 3611	Piano Interpretation/Performance Seminar
MPNC 3631	18th-Century Tonal Counterpoint
MPNC 3633	Modal Counterpoint
MPNC 3641	Dramatic Coaching of Songs and Arias
MPNC 3643	Vocal Repertoire: Coaching and Performance
MPNC 3801	Composition Seminar 1
MPNC 3802	Composition Seminar 2
MPNC 4401	Jazz Ear Training 4
MPNC 4411	Jazz Theory 4
MPNC 4581	Music-in-Education Guided Internship
MPNC 4591	Music-in-Education Portfolio

Ensembles

Complete two music ensembles:		2
MPNC 1712	Baroque Ensemble	
MPNC 1713	NEC Voices: A New Choral Experience	
MPNC 1714	Renaissance Ensemble	
MPNC 1716	Contemporary Improvisation Ensemble: Walking between Worlds	
MPNC 1721	Guitar Ensemble 1	
MPNC 1731	Jazz Ensemble	
MPNC 1741	Chamber Music Ensemble	
MPNC 1742	Chamber Music Duo	
MPNC 1751	Vocal Chamber Music	
MPNC 1771	Improvisation and Composition Ensemble	
MPNC 1781	Medieval Folk Roots Ensemble	
MPNC 3642	Opera Ensemble Skills	

Interdisciplinary Programs

The "space between our disciplines" is intellectually rich, educationally vibrant, and professionally productive. Our interdisciplinary degree options provide a strong foundation of use-inspired, experientially informed course work and research opportunities. Our programs are designed to produce graduates equipped to engage the international marketplace and shape global culture.

Programs
Master of Science
- Arts Administration and Cultural Entrepreneurship (p. 65)
- Urban Planning and Policy (p. 66)

Graduate Certificate
- Arts Administration (p. 69)
- Cultural Entrepreneurship (p. 69)

Arts Administration and Cultural Entrepreneurship, MS

The arts and cultural industries are key drivers of each nation's economy, contributing more than $730 billion annually in the United States alone. While the economic impact of the arts and cultural industries can be measured, their social impacts are often underestimated. Music, dance, visual art, and theatre are critical to how we perceive, interpret, and critique the world and people around us. The arts articulate our beliefs, politics, familial and community ties, and history.

Arts administrators are the bridge between creative practitioners and audiences and between arts institutions and supportive stakeholders. In today's digitally driven, highly competitive, and increasingly global economy, traditional institutions for visual and performing arts face critical sustainability challenges. Leaders in the arts must adopt the creative thinking and problem-solving skills of an entrepreneur in order to envision new models for creative practice, audience engagement, and funding.

The interdisciplinary Master of Science in Arts Administration and Cultural Entrepreneurship (AACE) prepares arts leaders to both convey the human necessity of creative expression and apply creative thinking to manage resources, inspire audience engagement, and sustain financial support. The arts, and audience opportunities to experience them, are more dynamic and diverse than ever before, flourishing in major arts institutions as well as non-hierarchical organizations, from artist-run spaces and community organizations to annual festivals and pop-up exhibitions. It is time for a transformation in leadership training that matches the ingenuity of today's most exciting experiments in music, dance, theatre, and the visual arts. Arts leaders must also be equipped with the administrative, analytical, and technological skill sets necessary to excel within the complex, interdependent arts ecosystem.

The AACE curriculum is designed to meet the changing needs of arts leaders, from administrators in arts institutions to creative practitioners and entrepreneurs eager to make their art startup a reality. The program focuses on leadership innovation in a range of performance, visual arts, and cultural organizations. As an intellectual and practical course of study that merges the expertise of academics, creative professionals, administrators, and entrepreneurs, the program's aim is to support sustainable creative practice.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Arts Administration Foundation		
AACE 6000	Arts and Culture Organizational Leadership	3
AACE 6010	Planning for Arts and Cultural Organizations	3
AACE 6020	Experiential Study in Arts Administration	3
Cultural Entrepreneurship Foundation		
AACE 6200	Programming and Community Engagement for Cultural Entrepreneurs	3
AACE 6210	Building Value Through Cultural Enterprise	3
AACE 6220		3

Electives

Code	Title	Hours
Arts Administration Directed Elective		
AACE 6110	Information Technology for Arts and Cultural Organizations	3
Cultural Entrepreneurship Directed Elective		
Complete one of the following:		3
ENTR 6212	Business Planning for New Ventures	
ENTR 6210	Managing Operations in Early Stage Ventures	
ENTR 6214	Social Enterprise	
ENTR 6216	Global Social Entrepreneurship and Innovation	
ENTR 6218	Business Model Design and Innovation	
TECE 6222	Emerging and Disruptive Technologies	
TECE 6250	Lean Design and Development	
Experiential Electives in Arts Leadership		
Complete two of the following courses not taken to fulfill above requirements:		6
AACE 6100		
AACE 6120		
ARTG 6310	Design for Behavior and Experience	
MUSI 5540	Special Topics in Music Industry	
MUSI 6000	Management of Music Organizations	
MUSI 6300	Intellectual Property for Music Management	
MUSI 6400	Marketing Strategies in the Music Industry	

Program Credit/GPA Requirements

30 total semester hours required
Minimum 3.000 GPA required

Plan of Study
Sample Plans of Study:
One Year

Year 1

Fall	Hours	Spring	Hours	Summer 1	Hours
AACE 6000	3	AACE 6020	3	Cultural entrepreneurship directed elective	3
AACE 6010	3	AACE 6220	3	Experiential elective 2	3
AACE 6200	3	Arts administration directed elective	3		
AACE 6210	3	Experiential elective 1	3		
	12		12		6

Total Hours: 30

One and a Half Years

Year 1

Fall	Hours	Spring	Hours
AACE 6000	3	AACE 6020	3
AACE 6010	3	AACE 6220	3
AACE 6200	3	Arts administration directed elective	3
AACE 6210	3		
	12		9

Year 2

Fall	Hours
Cultural entrepreneurship directed elective	3
Experimental elective 1	3
Experiential elective 2	3
	9

Total Hours: 30

Urban Planning and Policy, MS

The Master of Science in Urban Planning and Policy (MUPP) program trains leaders interested in building just and sustainable solutions to today's critical urban problems, including challenges of affordable housing provision, equitable and sustainable economic growth, sustainable transportation, and climate change adaptation and mitigation. This innovative program combines the expertise in urban planning and policy analysis and data analytics of the School of Public Policy and Urban Affairs with expertise in physical planning, design, and data visualization at the School of Architecture. The core curriculum of the program provides students with a solid foundation in essential skills and concepts, including research design and statistics, economic analysis, legal foundations of urban planning and policy, and the history of urban development and urban planning. Students also have the opportunity to develop substantial expertise in a specialization area, including urban analytics, urban sustainability and resilience, urban

design and physical planning, and urban development policy and planning.

The optional cooperative education experience (co-op) is available to eligible students. Cooperative education is central to both the Northeastern experience and to the College of Social Sciences and Humanities experiential liberal arts framework. Northeastern's signature co-op ecosystem provides qualified master's students with six-month work experiences in businesses, nonprofits, and government agencies in Boston and across the United States. Graduate students take their work from campus learning spaces, apply their knowledge outside of the classroom, and then bring knowledge and skills gained in community learning spaces back to our campus learning spaces during the cocurricular experiential integration course.

In addition to the co-op option, students in the MUPP program have opportunities to gain experience in the application of their knowledge and skills via internships, class projects, and a capstone research report. They graduate prepared for careers working for state and local government, federal agencies, community development corporations and other nonprofit organizations, research institutes, and as private-sector planning consultants.

This program is not accepting applicants until spring 2019.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Planning and Policy		
LPSC 5201		4
PPUA 6201	The 21st-Century City: Urban Opportunities and Challenges in a Global Context	4
PPUA 6502	Economic Institutions and Analysis	4
SUEN 6340	Topics in Urban Environmental Design	4
Research Design		
PPUA 6205	Research Design and Methodology in Urban and Regional Policy	4
Quantitative Techniques		
Students in the urban analytics focus area are encouraged to take PPUA 5301.		
Choose one from the following:		4
LPSC 7305	Research and Statistical Methods	
or INSH 6500	Statistical Analysis	
or POLS 7202	Quantitative Techniques	
or PPUA 5301	Introduction to Computational Statistics	

Focus Areas

Complete one of the following focus areas:

- Urban Design and Physical Planning (p. 67)
- Urban Analytics (p. 67)
- Sustainability and Resilience (p. 67)
- Urban Development Policy and Planning (p. 68)

URBAN DESIGN AND PHYSICAL PLANNING

Code	Title	Hours
Gateway Course		
ARCH 6340	Graduate Topics in Architecture	4
Tracks		
Complete one of the following tracks:		8
Urban Design and Real Estate		
ARCH 5310	Design Tactics and Operations	
ARCH 5530	Innovative Models in Real Estate Development and Design	
Physical Planning and Design for Sustainable Urbanism		
SUEN 7230	Urban Ecologies and Technologies 1	
SUEN 7240	Urban Ecologies and Technologies 2	
Urban Experience Track		
ARTG 5150	Information Visualization Principles and Practices	
ARTG		
Capstone		
SUEN 6120	Graduate Studio 2: Sustainable Urban Systems	6

URBAN ANALYTICS

Code	Title	Hours
Gateway Course		
PPUA 5262	Big Data for Cities	4
Required Courses		
ARTG 5150	Information Visualization Principles and Practices	4
PPUA 5263	Geographic Information Systems for Urban and Regional Policy	4
Capstone		
PPUA 7673	Capstone in Public Policy and Urban Affairs	4

SUSTAINABILITY AND RESILIENCE

Code	Title	Hours
Gateway Course		
LPSC 7312	Cities, Sustainability, and Climate Change	4
or SUEN 6310	Cities, Nature, and Design in Contemporary History and Theory	
Methods		
Complete one of the following:		4
PPUA 5261	Dynamic Modeling for Environmental Decision Making	
PPUA 5263	Geographic Information Systems for Urban and Regional Policy	
SUEN 7230	Urban Ecologies and Technologies 1	
Capstone		
PPUA 7673	Capstone in Public Policy and Urban Affairs	4
Elective		
Complete one of the following:		4
PPUA 5260	Ecological Economics	
PPUA 5261	Dynamic Modeling for Environmental Decision Making	
PPUA 7231	Transportation Policy	

PPUA 7234	Land Use and Urban Growth Policy	
PPUA 7249	Urban Coastal Sustainability	
SUEN 6110	Graduate Studio 1: Sustainable Urban Sites	
SUEN 6120	Graduate Studio 2: Sustainable Urban Systems	
SUEN 6220	Implementation and Visualization for Urban Environments 2	
SUEN 6310	Cities, Nature, and Design in Contemporary History and Theory	
SUEN 6340	Topics in Urban Environmental Design	
SUEN 7230	Urban Ecologies and Technologies 1	
SUEN 7240	Urban Ecologies and Technologies 2	
SUEN 7320	Pro-Seminar: Issues in Designed Urban Environments	

URBAN DEVELOPMENT POLICY AND PLANNING

Code	Title	Hours
Gateway Course		
Complete one of the following:		4
PPUA 7230	Housing Policy	
PPUA 7231	Transportation Policy	
PPUA 7233	Contemporary Community Development	
Methods		
PPUA 5263	Geographic Information Systems for Urban and Regional Policy	4
or PPUA 7236	Introduction to Real Estate Development for Urban Policy Makers	
Capstone		
PPUA 7673	Capstone in Public Policy and Urban Affairs	4
Elective		
Complete one of the following:		4
PPUA 5270	Food Systems and Public Policy	
PPUA 6506	Techniques of Policy Analysis	
PPUA 6530	State and Local Public Finance	
PPUA 6551	Nonprofit Organizations and Social Change	
PPUA 7230	Housing Policy	
PPUA 7231	Transportation Policy	
PPUA 7232	Immigration and Urban America	
PPUA 7233	Contemporary Community Development	
PPUA 7234	Land Use and Urban Growth Policy	
PPUA 7236	Introduction to Real Estate Development for Urban Policy Makers	
SUEN 6110	Graduate Studio 1: Sustainable Urban Sites	
SUEN 6120	Graduate Studio 2: Sustainable Urban Systems	
SUEN 6340	Topics in Urban Environmental Design	

Electives

Code	Title	Hours
Complete two of the following:		8
ARCH 5310	Design Tactics and Operations	

ARCH 5530	Innovative Models in Real Estate Development and Design	
ARCH 6100	Graduate Skills Studio	
ARCH 6330	Seminar in Modern Architecture	
ARCH 6340	Graduate Topics in Architecture	
ARTG 5100	Information Design Studio 1: Principles	
ARTG 5120	Research Methods for Design	
ARTG 5130	Visual Communication for Information Design	
ARTG 5330	Visualization Technologies 1	
ARTG 6330	Information Design Mapping Strategies	
DA 5020	Collecting, Storing, and Retrieving Data	
DA 5030	Introduction to Data Mining/Machine Learning	
PPUA 5260	Ecological Economics	
PPUA 5261	Dynamic Modeling for Environmental Decision Making	
PPUA 5263	Geographic Information Systems for Urban and Regional Policy	
PPUA 5270	Food Systems and Public Policy	
PPUA 5302	Information Design and Visual Analytics	
PPUA 6506	Techniques of Policy Analysis	
PPUA 6530	State and Local Public Finance	
PPUA 6551	Nonprofit Organizations and Social Change	
PPUA 7245	Education Policy in the United States	
PPUA 7230	Housing Policy	
PPUA 7231	Transportation Policy	
PPUA 7232	Immigration and Urban America	
PPUA 7233	Contemporary Community Development	
PPUA 7234	Land Use and Urban Growth Policy	
PPUA 7236	Introduction to Real Estate Development for Urban Policy Makers	
PPUA 7237	Advanced Spatial Analysis of Urban Systems	
PPUA 7249	Urban Coastal Sustainability	
SUEN 6110	Graduate Studio 1: Sustainable Urban Sites	
SUEN 6120	Graduate Studio 2: Sustainable Urban Systems	
SUEN 6210	Implementation and Visualization for Urban Environments 1	
SUEN 6220	Implementation and Visualization for Urban Environments 2	
SUEN 6310	Cities, Nature, and Design in Contemporary History and Theory	
SUEN 6340	Topics in Urban Environmental Design	
SUEN 7230	Urban Ecologies and Technologies 1	
SUEN 7240	Urban Ecologies and Technologies 2	
SUEN 7320	Pro-Seminar: Issues in Designed Urban Environments	

AACE 6210	Building Value Through Cultural Enterprise (Building Value through Cultural Enterprise)	

Program Credit/GPA Requirements

12 total semester hours required
Minimum 3.000 GPA required

<div style="background:red">

Cultural Entrepreneurship, Graduate Certificate

</div>

Cultural entrepreneurs combine their passion for creative and cultural products and programs with creative, out-of-the-box thinking to forge the resilience of the arts sectors and the wider communities they serve. Cultural entrepreneurs employ innovative approaches to audience engagement – like a roving theater company, pop-up museum, or a smartphone app for artistic collaboration – to deliver artistic value to wide and diverse audiences and make a positive social, environmental, and economic impact. Today's cultural entrepreneurs operate in diverse professional environments, from consulting for organizational transformation to launching a creative startup. By understanding community impacts and activating a range of cultural and creative experiences, cultural entrepreneurs play a crucial role in ensuring the vitality of artistic engagement, advancing community goals, and strengthening society.

The **Graduate Certificate in Cultural Entrepreneurship** empowers students with a critical, creative perspective on arts programming and management and a myriad of creative management tools that harness new technologies for artistic engagement.

The Graduate Certificate in Cultural Entrepreneurship offers an interdisciplinary program to create diverse and viable projects and organizations for artistic experience and positive social impact. The program prepares students to become innovators in a range of artistic and cultural disciplines, from music, visual art, theater, and dance to community-building and transformation. The curriculum offers students the opportunity to identify opportunities for evolution in the arts and cultural sectors and to develop critical, creative practices; leadership acumen; and skill sets in arts management, strategic planning, and performance analysis to conceive and implement creative, cultural programming for community engagement and positive impact.

The program learning objectives provide students with opportunities to:

- Develop an understanding of methods and tools used to conceptualize, scope, pilot, evaluate, iterate and launch cultural entrepreneurship projects;

- Align creative practice and arts enterprise strategies with opportunities, challenges and resources to achieve desired impact;

- Apply communication, engagement and evaluation techniques to develop and sustain diverse audiences and stakeholder relationships;

- Engage in critical analysis of the work of peers and industry leaders by analyzing and contextualizing the quality, viability and sustainability of culturally-driven entrepreneurship.

The required curriculum includes three core courses and one directed elective for a total of 12 credit hours. All courses can be completed online.

Optional Co-op Experience

Code	Title	Hours
Requires two consecutive semesters of Co-op Work Experience and Experiential Integration:		2
PPUA 6964 and INSH 6864	Co-op Work Experience and Experiential Integration	

Program Credit/GPA Requirements

48 total semester hours required (50 with optional co-op)
Minimum 3.000 GPA required

<div style="background:red">

Arts Administration, Graduate Certificate

</div>

Today's arts sector is more vital and dynamic than ever, flourishing in both arts institutions and "non-hierarchical organizations," from artist-run spaces to community organizations. This context, paired with changes in the funding climate over the past 30 years, has generated a need to transform leadership training in the arts. Creative thinkers must be equipped with administrative, analytical, entrepreneurial, and technological skill sets to work within the complex, interdependent arts and cultural ecosystem.

The **Graduate Certificate in Arts Administration** offers an interdisciplinary graduate program focused on leadership innovation in performance, visual arts, cultural, and community organizations.

The Graduate Certificate in Arts Administration challenges students to create diverse, viable, and sustainable arts and culture projects and organizations; to use entrepreneurial practices in order to create transformation; to develop and deploy new arts and culture sector-focused business and analytic skills; and to design innovative planning and engagement strategies. Course and project work embeds experiential opportunities to explore and demonstrate transformational arts management approaches.

The required curriculum includes three core and one directed elective for a total of 12 credit hours. All courses can be completed online.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
AACE 6000	Arts and Culture Organizational Leadership	3
AACE 6010	Planning for Arts and Cultural Organizations	3
AACE 6020	Experiential Study in Arts Administration	3

Elective

Code	Title	Hours
Complete one of the following:		3
AACE 6110	Information Technology for Arts and Cultural Organizations	
AACE 6200	Programming and Community Engagement for Cultural Entrepreneurs	

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
AACE 6200	Programming and Community Engagement for Cultural Entrepreneurs	3
AACE 6210	Building Value Through Cultural Enterprise (Building Value through Cultural Enterprise)	3
AACE 6220	(Experiential Study in Cultural Entrepreneurship)	3

Elective

Code	Title	Hours
Complete one of the following:		3
AACE 6000	Arts and Culture Organizational Leadership	
AACE 6010	Planning for Arts and Cultural Organizations	
AACE 6110	Information Technology for Arts and Cultural Organizations	
ENTR 6212	Business Planning for New Ventures	

Program Credit/GPA Requirements

12 total semester hours required
Minimum 3.000 GPA required

D'Amore-McKim School of Business

Website (http://www.damore-mckim.northeastern.edu/academic-programs/graduate-programs?utm_source=neu-course-catalog&utm_medium=referral&utm_campaign=mofu)

Raj Echambadi, PhD, Dunton Family Dean

Emery A. Trahan, PhD, Senior Associate Dean of Faculty and Research
Jeffrey A. Born, PhD, Associate Dean of Undergraduate Programs
Kate E. Klepper, MBA, Associate Dean of Graduate Programs
Maureen Underhill, MEd, Associate Dean of Finance and Administration

D'Amore-McKim School of Business
360 Huntington Avenue
350 Dodge Hall
Boston, MA 02115-5000
617.373.5992

Boston campus Graduate Degrees: gradbusiness@northeastern.edu
Online MBA, Online MS in Finance, Online MS in
Taxation: onlinegradbusiness@northeastern.edu
Boston campus Graduate Certificates: gradcertificates@northeastern.edu
Online Graduate Certificates: onlinegradbusiness@northeastern.edu
MS in Business Analytics: j.pierce@northeastern.edu
MS in International Management: igaul.ipbs@gmail.com

Graduate School of Professional Accounting
360 Huntington Avenue
412 Dodge Hall
Boston, MA 02115-5000
617.373.3244
gspa@northeastern.edu

The D'Amore-McKim School of Business offers a unique model of business education that purposefully blends innovative classroom learning with real-world business application. Its students explore cutting-edge theory with professors, fusing knowledge with learning experiences that include cooperative education or corporate residency (six-month, full-time paid work assignments), study abroad, and community service. The school's resulting connections with the corporate world influence its research agendas, which, in turn, shape innovative new business practice. This synergy enables D'Amore-McKim students to become successful business leaders who are both thinkers and doers and, thus, highly qualified to think critically and leave their mark on the global business world.

Graduate students can choose from a number of different full-time and part-time MBA and MS programs and graduate certificates (both residential and online) designed to enable motivated professionals to accelerate their success in business. The school's approach reflects a commitment to embedding a global mind-set into all of these programs, as well as in its research and outreach activities.

Master of Science

At D'Amore-McKim School of Business, we designed our master's in business programs to prepare students for a rich and challenging career in the evolving 21st-century business world. If you are looking to expand your experience and broaden your professional horizons, we offer graduate business programs in multiple areas of study to provide you with the focused education needed to advance your career.

Accelerate your career whether it's pursuing your ideal profession or advancing in your current field with a degree in:

- Accounting
- Business analytics
- Finance
- Innovation and entrepreneurship
- International management and business
- Taxation

Programs
Master of Science (MS)

- Business Analytics (p. 71)

- Innovation (p. 72)

- International Management (p. 72)

- Technological Entrepreneurship (p. 73)

Master of Science in Accounting (MSA)

- Accounting (p. 73)

Master of Science in Finance (MSF)

- Finance (p. 74)
- Finance—Evening/Part-Time Program (p. 75)
- Finance—Online Program (p. 75)

Master of Science in International Business (MSIB)

- International Business (p. 75)

Master of Science in Taxation (MST)

- Taxation (p. 76)
- Taxation—Online Program (p. 76)

Business Analytics, MS

Businesses are looking for professionals who can connect the dots and build successful marketing strategies based on massive amounts of structured and unstructured data. Become one of them with our Master of Science in Business Analytics (http://www.damore-mckim.northeastern.edu/academic-programs/graduate-programs/ms/business-analytics) degree with a marketing focus.

This program addresses a critical need for those who can interpret and apply data in an increasingly competitive and technology-driven business environment. Core courses will introduce you to data analytics concepts, and our marketing track courses will build upon this foundation to emphasize the practice-oriented application of business analytics.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Required Core		
MISM 6200	Introduction to Business Analytics	3
MISM 6202	Foundations of Data Analysis for Business	3
MISM 6203	Business Analytics Methods	3
MISM 6210	Information Visuals and Dashboards for Business	3
MISM 6212	Data Mining and Machine Learning for Business	3
MISM 6213	Business Information Design, Quality, and Strategy	3
MISM 6214	Business Analytics Capstone	3
Marketing		
MKTG 6232	Engaging Customers and Markets	3
MKTG 6294	Customer-Centric Research Methods for Marketing	3
MKTG 6295	Customer Performance Modeling	3

Program Credit/GPA Requirements

30 total semester hours required
Minimum 3.000 GPA required

Innovation, MS

The Master of Science in Innovation is a part-time program, offered on Northeastern University's Boston campus and 100 percent online. The program is designed specifically for working professionals who want to become innovation leaders. Through project work, case studies, and real-world application, possibly at your own organization, you will study the principles of innovation from multiple perspectives. You'll have an opportunity to learn about product and service development, financing innovation, go-to-market strategies, lean development, managing high-performance teams, and more.

Build expertise in:

- Next-generation product, system, and service design
- Designing and leading innovation teams
- Reinventing business processes and introducing change
- Exploring new business models and ventures
- Selling new products and services

Learn more about this program (http://www.damore-mckim.northeastern.edu/academic-programs/graduate-programs/ms/innovation?utm_source=neu-course-catalog&utm_medium=referral&utm_campaign=msi-mofu) on the D'Amore-McKim website.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Required Core		
Complete one of the following:		3
On-campus only		

Code	Title	Hours
BUSN 6280	How Executives Shape and Lead Innovation and Enterprise Growth	
Online Only		
ENTR 6225	Corporate Entrepreneurship through Global Growth, Acquisitions, and Alliances	
Accounting and Finance		
ACCT 6280	Planning and Budgeting for Innovation	3
FINA 6284	Financing Innovation and Growth	3
Entrepreneurship		
ENTR 6217	Lean Innovation	3
ENTR 6222	Competing in Dynamic, Innovation-Driven Markets	3
Management		
HRMG 6280	The Human Side of Innovation	3
MGMT 6280	Innovation for Next-Generation Products and Systems	3
MGSC 6281	Service Innovation and Management	3
Marketing		
MKTG 6280	Gaining Customer Insight	3
MKTG 6283	Marketing and Selling Innovation	3

Program Credit/GPA Requirements

30 total semester hours required
Minimum 3.000 GPA required

International Management, MS

The MS in International Management is a full-time program that allows students to **live, study, and learn in two countries**. This master's program is available in single and double degree options. With a curriculum focusing on topics ranging from international trade to globalization of the world economy, the MS in International Management is designed to help young professionals thrive in today's international marketplace.

The **Single Degree MS in International Management** is a one-year global management program designed for young professionals. You may elect to study at D'Amore-McKim for either your fall or spring semester and at a partner business school in a different country for the other term. This master's program is collaboratively offered by six leading international business schools through the International Partnership of Business Schools (https://ipbsmim.com) (IPBS). The classes always start in fall. The length of the program varies depending on your choice of schools and their thesis requirements. D'Amore-McKim does not require a thesis, but you may elect to complete one in lieu of an elective course.

The **Double Degree MS in International Management** is an 18-month, challenging program that attracts high caliber students from around the world. You may elect to study at D'Amore-McKim for either your fall or spring semester and at NEOMA Business School (http://www.reims-ms.fr/fusion) for the other term. The classes always start in fall. After completing one semester of study on each campus, preparing a thesis for NEOMA, and undertaking a experiential learning opportunity (project work in the U.S. or a six-month internship in the European Union), you will graduate with degrees from both business schools.

Learn more about this program (http://www.damore-mckim.northeastern.edu/academic-programs/graduate-programs/ms/international-management?utm_source=neu-course-

catalog&utm_medium=referral&utm_campaign=mim-mofu) on the D'Amore-McKim website.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Required core		
FINA 6209	Introduction to International Accounting and Finance	3
INTB 6226	Becoming a Global Leader	3
INTB 6260	Advanced Topics in Global Management and Strategy	3
MGSC 6209	Business Statistics	3

Electives

Code	Title	Hours
Complete six electives from the following:		18
ENTR 6200	Enterprise Growth and Innovation	
ENTR 6220	Family Business Leadership and Governance	
ENTR 6225	Corporate Entrepreneurship through Global Growth, Acquisitions, and Alliances	
FINA 6204	International Finance Management	
INTB 6201	International Business Management	
INTB 6232	Doing Business in Emerging Markets	
MECN 6203	Global Managerial Economics	
MKTG 6206	International Marketing	
SCHM 6213	Global Supply Chain Strategy	
STRT 6210	Workforce Metrics and Analytics	

Program Credit/GPA Requirements

30 total semester hours required
Minimum GPA 3.000 required

Plan of Study

Year 1

Fall	Hours	Spring	Hours
FINA 6209	3	INTB 6226	3
MGSC 6209	3	INTB 6260	3
Complete three electives from the following:	9	Complete three electives from the following:	9
INTB 6201		FINA 6204	
MECN 6203		ENTR 6200	
MKTG 6206		STRT 6210	
ENTR 6220		SCHM 6213	
ENTR 6225		INTB 6232	
	15		15

Total Hours: 30

Technological Entrepreneurship, MS

To achieve success, you need more than just a good idea. You need entrepreneurial know-how to create new product lines and services from innovations, strong business models, go-to-market strategies, and business plans for investors. The Master of Science in Technological Entrepreneurship (http://www.damore-mckim.northeastern.edu/academic-programs/graduate-programs/ms/technological-entrepreneurship?utm_source=neu-course-catalog&utm_medium=referral&utm_campaign=mste-mofu) offers an immersion in the frameworks and methods needed for successful entrepreneurship.

You will be encouraged to start companies and help coach other startups within our on-campus accelerator, IDEA. IDEA supports more than 200 student and alumni ventures at any given time, with about one venture launched as a funded or self-sustaining company each month.

Our Master of Science in Technological Entrepreneurship program will strengthen your personal network, provide exposure to Boston's ecosystem and its technology companies, and help you plan and start your own company. Our teaching faculty have deep expertise in innovation, marketing, and finance, and many of the teachers have started their own companies.

The Master of Science in Technological Entrepreneurship is offered in both a full- and part-time options.

Program Requirements
Core Requirements

Code	Title	Hours
Entrepreneurship		
ENTR 6200	Enterprise Growth and Innovation	3
ENTR 6212	Business Planning for New Ventures	3
ENTR 6218	Business Model Design and Innovation	3
ENTR 6219	Financing Ventures from Early Stage to Exit	3
Technology		
TECE 6222	Emerging and Disruptive Technologies	3
TECE 6230	Entrepreneurial Marketing and Selling	3
TECE 6250	Lean Design and Development	3
TECE 6300	Managing a Technology-Based Business	3
TECE 6340	The Technical Entrepreneur as Leader	3

Elective

Code	Title	Hours
Complete 3 semester hours from the following subject areas:		3
ACCT, BUSN, ENTR, FINA, HRMG, INTB, MECN, MKTG, MGMT, SCHM, STRT, or TECE		

Program Credit/GPA Requirements

30 total semester hours required
Minimum 3.000 GPA required

Accounting, MSA

Heading for a great career in public accounting? You want to get there as soon as possible. With our MS in Accounting (http://www.damore-mckim.northeastern.edu/academic-programs/

graduate-programs/ms/accounting?utm_source=neu-course-catalog&utm_medium=referral&utm_campaign=msa-mofu), you will prepare to sit for the CPA exam in just seven months. Our program is approved by the Board of Public Accountancy in Massachusetts.

Your success will begin in the classroom. Our faculty includes a number of CPAs, many of whom are former partners in national and regional CPA firms. They are currently active consultants in the business community, ready to present you with real-world public accounting issues and challenges.

What's more, our audit and tax track offerings allow you to specialize your studies even further. In the audit track, students take courses geared toward being a professional in the audit and assurance industry. This means extensive exposure to ethics, auditing research, forensic accounting, and a detailed understanding of the industry environment. In the tax track, students are exposed to the intricacies of the tax industry with detailed course work and experience with tax research and communications, state and local taxation, income tax accounting, and international taxation.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Accounting		
ACCT 6203	Business Entity Taxation	3
ACCT 6204	Financial Reporting for Integrated Multinational Enterprises	3
ACCT 6229	Accounting for Foreign Currency Transactions	1
Ethics		
ACCT 6253	Ethics in the Accounting Profession	3
Financial Reporting		
ACCT 6207	Contemporary and Emerging Issues in Financial Reporting	3
ACCT 6216	Financial Reporting for Governments and Nonprofit Entities	2

Tracks

Complete one of the following tracks:

AUDIT TRACK

Code	Title	Hours
Required Core		
ACCT 6205	Auditing in a Big Data Environment	3
ACCT 6217	Corporate Governance, Ethics, and Financial Reporting	3
ACCT 6254	Accounting Research and Communication	3
Electives		
Note: An alternative course may be substituted for one of the courses listed below with the approval of the program administrator.		
ACCT 5255	Forensic Accounting	3
ACCT 5256	Internal Auditing	3

TAXATION TRACK

Code	Title	Hours
Required Core		
ACCT 6231	Corporations and Shareholders	3
ACCT 6235	Partners and Partnerships	3
ACCT 6254	Accounting Research and Communication	3
Electives		
Complete 6 semester hours from the following:		6
Note: An alternative course may be substituted for one of the electives listed below with the approval of the program administrator.		
ACCT 6239	State and Local Taxation	
ACCT 6240	International Taxation: Inbound Transactions	
ACCT 6246	Retirement Plans	
ACCT 6248	Income Taxation of Trusts and Estates	

Program Credit/GPA Requirements

30 total semester hours required
Minimum 3.000 GPA required

Finance, MSF

It's time to make a short-term investment in yourself, for long-term returns. We will prepare you to take your place among global financial leaders tackling real-world challenges.

Our full-time Master of Science in Finance (http://www.damore-mckim.northeastern.edu/academic-programs/graduate-programs/ms/finance?utm_source=neu-course-catalog&utm_medium=referral&utm_campaign=msf-mofu) offers rigorous training in finance, helping you to develop strong analytic and problem-solving skills that will set you apart from other professionals in the market. At our program's core is a top-tier curriculum that consists of challenging course work, real-world applications, and a commitment to ethics.

You will learn firsthand from distinguished faculty dedicated to your success. You will gain the confidence in yourself to be a financial leader, determining how your company will meet its strategic goals.

The full-time Master of Science in Finance is a 12-month program that has a strong emphasis on quantitative methods and finance theory. Students complete a lockstep curriculum together as a cohort.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Required Core		
FINA 6201	Financial Theory and Policy	3
FINA 6202	Analysis of Financial Institutions and Markets	3
FINA 6203	Investment Analysis	3
FINA 6204	International Finance Management	3
FINA 6205	Financial Strategy	3
FINA 6206	Finance Seminar	3

Optional

BUSN 6200	Career Management	

Electives

Code	Title	Hours
Complete four electives (course offerings are at the discretion of the finance department):		12
FINA 6211	Financial Risk Management	
FINA 6212	Fixed Income Securities and Risk	
FINA 6214	Mergers and Acquisitions	
FINA 6217	Real Estate Finance and Investment	
FINA 6219	Portfolio Management	
FINA 6231	Disrupting the Finance and Insurance Service Industries	
FINA 6260	Entrepreneurial Finance, Innovation Valuation, and Private Equity	
FINA 6292	Advanced Topics in Finance	

Program Credit/GPA Requirements

30 total semester hours required
Minimum 3.000 GPA required

Finance—Evening/Part-Time Program, MSF

It's time to make a short-term investment in yourself, for long-term returns. We will prepare you to take your place among global financial leaders tackling real-world challenges.

Our part-time MS in Finance (http://www.damore-mckim.northeastern.edu/academic-programs/graduate-programs/ms/finance?utm_source=neu-course-catalog&utm_medium=referral&utm_campaign=msf-mofu) offers rigorous training in finance, helping you to develop strong analytic and problem-solving skills that will set you apart from other professionals in the market. At our program's core is a top-tier curriculum that consists of challenging course work, real-world applications, and a commitment to ethics.

You will learn firsthand from distinguished faculty dedicated to your success. You will gain the confidence in yourself to be a financial leader, determining how your company will meet its strategic goals.

The part-time Master of Science in Finance program provides flexibility for working professionals seeking to brush up on their finance skills and advance in their current roles.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
FINA 6201	Financial Theory and Policy	3
FINA 6202	Analysis of Financial Institutions and Markets	3
FINA 6203	Investment Analysis	3
FINA 6204	International Finance Management	3
FINA 6205	Financial Strategy	3
FINA 6206	Finance Seminar	3

Electives

Code	Title	Hours
Finance Electives		
Complete 9 semester hours of FINA courses.		9
Business Elective		
Complete 3 semester hours in one of the following subject areas. Note that this course may be a finance course:		3
ACCT, ENTR, FINA, HRMG, INTB, MECN, MKTG, MGMT, SCHM, or STRT		

Program Credit/GPA Requirements

30 total semester hours required
Minimum 3.000 GPA required

Finance—Online Program, MSF

The practice-oriented curriculum of Online Master of Science in Finance explores a comprehensive range of relevant financial topics. Designed to serve the needs of working professionals in the finance field, this 30-credit-hour program—which includes six core courses and four electives—can be completed entirely online in as few as 16 months. Students in the Online MS in Finance are classified as part-time and participate in one course at a time, completing core courses in the first year and capstone and elective courses in the second year.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
FINA 6201	Financial Theory and Policy	3
FINA 6202	Analysis of Financial Institutions and Markets	3
FINA 6203	Investment Analysis	3
FINA 6204	International Finance Management	3
FINA 6205	Financial Strategy	3
FINA 6206	Finance Seminar	3

Electives

Code	Title	Hours
Complete 12 semester hours in the following range:		12
FINA 6211 to FINA 6219		

Program Credit/GPA Requirements

30 total semester hours required
Minimum 3.000 GPA required

International Business, MSIB

The Master of Science in International Business (http://www.damore-mckim.northeastern.edu/academic-programs/graduate-programs/ms/international-business?utm_source=neu-course-catalog&utm_medium=referral&utm_campaign=msib-mofu) is designed to expose talented, driven students to the global business environment that will distinguish them as they enter the workforce. This program offers the opportunity to learn in the heart of Boston, home to one of the

largest, most vibrant, and highly regarded global marketplaces in the United States.

Successful graduates of this master's program will be culturally sensitive, with an international orientation, business acumen, and the analytic skills needed to best be prepared to navigate an increasingly interconnected and fast-paced world. You will have an opportunity to develop critical skills to handle the opportunities and challenges in organizations and businesses operating internationally.

The Master of Science in International Business offers both a full- and part-time option.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Required Core		
FINA 6204	International Finance Management	3
FINA 6209	Introduction to International Accounting and Finance	3
INTB 6200	Managing the Global Enterprise	3
INTB 6226	Becoming a Global Leader	3
MECN 6203	Global Managerial Economics	3
MKTG 6206	International Marketing	3
SCHM 6213	Global Supply Chain Strategy	3
International Field Study		
INTB 6230	International Field Study	3

Electives

Code	Title	Hours
Complete 6 semester hours from the following subject areas:		6
ACCT, BUSN, ENTR, FINARMG, INTSTRT, TECEB, MECN, MKTG, MGMT, MGSC, SCHM, Students may also consider political science or sociology courses.		

Program Credit/GPA Requirements

30 total semester hours required
Minimum 3.000 GPA required

Taxation, MST

The next step in your taxation career.

Always changing and increasingly complex, the issue of taxes demands a professional who can confidently advise executives and organizations on a wide range of critical issues. Our Master of Science in Taxation (http://www.damore-mckim.northeastern.edu/academic-programs/graduate-programs/ms/taxation?utm_source=neu-course-catalog&utm_medium=referral&utm_campaign=mst-mofu) program meets this demand head-on with a sharp focus on preparing professionals who are ready to step up and put their expertise into action.

This program is ideal for those with an accounting or tax background seeking career progression as advisors and consultants, executives in public and private enterprises, and leaders in the field of taxation. As you sharpen your technical skills and command of current tax legislation, you learn how to research and navigate the current Internal Revenue

Code and other tax platforms and anticipate and respond to changes in regulation.

Courses are taught by leading professionals currently working in taxation, finance, and accounting. They bring a deep level of seasoned expertise to the courses they teach. In fact, many of our faculty are partners and managers at competitive firms. As they work with you one-on-one, you have an opportunity to gain a deep understanding of the relevant, practical insights that drive the industry today.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
ACCT 5230	Federal Tax Issues and Analysis	3
ACCT 5232	Estate and Gift Taxation	3
ACCT 6231	Corporations and Shareholders	3
ACCT 6233	Tax Research Methodology	1.5
ACCT 6234	Tax Practice, Procedure, and Ethics	1.5
ACCT 6235	Partners and Partnerships	3

Electives

Code	Title	Hours
Complete 15 semester hours from the following:		15
ACCT 6236	Reorganizations	
ACCT 6238	Income Tax Accounting	
ACCT 6239	State and Local Taxation	
ACCT 6240	International Taxation: Inbound Transactions	
ACCT 6241	International Taxation: Outbound Transactions	
ACCT 6243	Advanced Flow-Through Entities	
ACCT 6246	Retirement Plans	
ACCT 6248	Income Taxation of Trusts and Estates	
ACCT 6249	Financial Planning for Investments	
ACCT 6250	Financial Planning for Insurance	
ACCT 6262	Advanced Topics in Accounting	
ACCT 6264	Planning for Estate Tax Issues	
ACCT 6265	Tax Accounting for Income Taxes	

Program Credit/GPA Requirements

30 total semester hours required
Minimum 3.000 GPA required

Taxation—Online Program, MST

Our Online Master of Science in Taxation has been specifically designed and structured for working professionals like you. To accommodate your schedule, there are six start dates available throughout the year, so you can get started at your convenience. Students in the Online Master of Science in Taxation are classified as part-time and participate in one course at a time, completing core courses in the first year and elective courses in the second year.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
ACCT 5230	Federal Tax Issues and Analysis	3
ACCT 5232	Estate and Gift Taxation	3
ACCT 6231	Corporations and Shareholders	3
ACCT 6235	Partners and Partnerships	3
ACCT 6292	Tax Research, Practice, and Ethics	3

Electives

Code	Title	Hours
Complete 15 semester hours from the following:		15
ACCT 6239	State and Local Taxation	
ACCT 6240	International Taxation: Inbound Transactions	
ACCT 6241	International Taxation: Outbound Transactions	
ACCT 6243	Advanced Flow-Through Entities	
ACCT 6246	Retirement Plans	
ACCT 6248	Income Taxation of Trusts and Estates	
ACCT 6249	Financial Planning for Investments	
ACCT 6250	Financial Planning for Insurance	
ACCT 6264	Planning for Estate Tax Issues	
ACCT 6265	Tax Accounting for Income Taxes	

Program Credit/GPA Requirements

30 total semester hours required
Minimum 3.000 GPA required

Master of Business Administration

At the D'Amore-McKim School of Business, our global view guides us. The integration of academics with authentic experiential learning is fast becoming the proven method for developing essential skills to meet today's business demands. D'Amore-McKim was built on a foundation of this very approach to business education, which was pioneered by Northeastern University.

It's this approach that frames our unique MBA programs. Whether you choose to study full-time, part-time, or online, an MBA from D'Amore-McKim will offer distinctive opportunities for study and work across the country and around the world.

Programs

Business Administration, MBA—Full-Time Program

As the business world undergoes more and more complex changes, you need the expertise and insight to keep up—and keep ahead. You'll gain that knowledge with an MBA program that offers both academic rigor and valuable experience. Our Full-Time MBA (http://www.damore-mckim.northeastern.edu/academic-programs/graduate-programs/mba/full-time?utm_source=neu-course-catalog&utm_medium=referral&utm_campaign=ftmba-mofu) delivers the proficiency you need to accelerate your career.

The first powerful component of our program is the outstanding classroom experience. MBA course work is taught by leading professors in their fields, bringing years of expertise and decision making directly to the academic setting. The knowledge you gain gives you the skills that are in demand, helping you understand the intricacies of business and, more specifically, your field of interest.

The second dynamic component is your corporate residency. Far removed from the typical internship, this will take your work experience to a whole new level. As a valued member of the team at a leading business, you will be fully integrated in your company, working side-by-side with staff members to deliver on organizational goals. As you contribute to projects that are business critical, you not only gain experience but also gain confidence in your abilities.

Whether you're in the classroom or working in a company through your corporate residency, you'll form relationships with students, employers, and world-class faculty who have rich backgrounds in a variety of companies and industries. Without a doubt, this network will serve you well throughout your career.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

A GPA of 3.000 or higher is required at the end of each term.

Core Requirements

Code	Title	Hours
Required Core		
Marketing		
MKTG 6318	Customer Value and the Enterprise	2
Strategic Decision Making		
ACCT 6318	Analyzing Accounting Data for Strategic Decision Making	2
STRT 6318	Strategic Planning for the Future	2
Management		
FINA 6318	Financial Management	2
HRMG 6318	Managing the Organization	2
SCHM 6318	Managing Operations and the Supply Chain	2
Innovation and Social Impact		
BUSN 6363	Social Impact of Business	2
ENTR 6318	Innovating and Creating Futures	2
Career Management		
BUSN 6200	Career Management	0
BUSN 6950	MBA Skills Workshop	0
Experiential Experiences		
Complete 3 semester hours.		1-3
Corporate Residency		
BUSN 6964	Co-op Work Experience	0

Three-month, six-month, or two six-month Corporate Residency placement options

Concentration Options

Complete two of the following concentrations:

CONCENTRATION IN ANALYTICS

Code	Title	Hours
Required Core		
BUSN 6365	Business Analytics	3
Electives		
Complete 9 semester hours from the following:		9
CS 5100	Foundations of Artificial Intelligence	
CS 5200	Database Management Systems	
ECON 5140	Applied Econometrics	
MISM 6203	Business Analytics Methods	
MISM 6210	Information Visuals and Dashboards for Business	
MISM 6212	Data Mining and Machine Learning for Business	
MISM 6213	Business Information Design, Quality, and Strategy	
MKTG 6218	Marketing in Service Sector	
MKTG 6230	Driving Marketing Performance: Measure, Analyze, Profit	
PPUA 5302	Information Design and Visual Analytics	
SCHM 6215	Supply Chain Analytics	

CONCENTRATION IN CORPORATE INNOVATION AND VENTURING

Code	Title	Hours
Required Core		
ENTR 6320	Innovation, Entrepreneurship, and Dynamic Competition	3
Electives		
Complete 9 semester hours from the following:		9
ARTG 5610	Design Systems	
ENTR 6218	Business Model Design and Innovation	
ENTR 6224	Intellectual Property and Other Legal Aspects of Business and Innovation	
ENTR 6225	Corporate Entrepreneurship through Global Growth, Acquisitions, and Alliances	
GE 5100	Product Development for Engineers	
HRMG 6212	Creating an Innovative Organization	
HRMG 6280	The Human Side of Innovation	
MGMT 6280	Innovation for Next-Generation Products and Systems	
TECE 6222	Emerging and Disruptive Technologies	

CONCENTRATION IN ENTREPRENEURSHIP

Code	Title	Hours
Required Core		
ENTR 6320	Innovation, Entrepreneurship, and Dynamic Competition	3
Electives		
Complete 9 semester hours from the following:		9
ENTR 6200	Enterprise Growth and Innovation	
ENTR 6214	Social Enterprise	
ENTR 6218	Business Model Design and Innovation	
ENTR 6219	Financing Ventures from Early Stage to Exit	
ENTR 6224	Intellectual Property and Other Legal Aspects of Business and Innovation	
ENTR 6225	Corporate Entrepreneurship through Global Growth, Acquisitions, and Alliances	
FINA 6260	Entrepreneurial Finance, Innovation Valuation, and Private Equity	
GE 5030	Iterative Product Prototyping for Engineers	
GE 5100	Product Development for Engineers	
TECE 6230	Entrepreneurial Marketing and Selling	
TECE 6300	Managing a Technology-Based Business	

CONCENTRATION IN FINANCE

Code	Title	Hours
Required Core		
FINA 6320	Advanced Financial Management	3
Track		
Complete one of the following two tracks:		
Corporate Finance Track		
Complete 3 semester hours from the following:		3
FINA 6203	Investment Analysis	
FINA 6216	Valuation and Value Creation	
FINA 6260	Entrepreneurial Finance, Innovation Valuation, and Private Equity	
Complete 6 semester hours from the following:		6
FINA 6204	International Finance Management	
FINA 6205	Financial Strategy	
FINA 6211	Financial Risk Management	
FINA 6213	Investment Banking	
FINA 6214	Mergers and Acquisitions	
FINA 6215	Business Turnarounds	
FINA 6216	Valuation and Value Creation	
FINA 6217	Real Estate Finance and Investment	
FINA 6260	Entrepreneurial Finance, Innovation Valuation, and Private Equity	
Investments Track		
Complete 3 semester hours from the following:		3
FINA 6211	Financial Risk Management	
FINA 6219	Portfolio Management	
Complete 6 semester hours from the following:		6
FINA 6204	International Finance Management	
FINA 6211	Financial Risk Management	

FINA 6213	Investment Banking	
FINA 6214	Mergers and Acquisitions	
FINA 6216	Valuation and Value Creation	
FINA 6217	Real Estate Finance and Investment	
FINA 6219	Portfolio Management	
FINA 6260	Entrepreneurial Finance, Innovation Valuation, and Private Equity	
FINA 6360	Fund Management for Analysts	
FINA 6361	Fund Management for Managers	

CONCENTRATION IN HEALTHCARE MANAGEMENT

Code	Title	Hours
Required Core		
HINF 5105	The American Healthcare System	3
HRMG 6220	Health Organization Management	3
FINA 6220	Healthcare Finance	3
or SCHM 6223	Managing Healthcare Supply Chain Operations	
STRT 6220	Strategic Management for Healthcare Organizations	3
Optional Electives		
Note: electives are not required, the following course(s) are suggested beyond the concentration:		3-9
ENTR 6214	Social Enterprise	
FINA 6220	Healthcare Finance	
HINF 6202	Business of Healthcare Informatics	
HINF 6205	Creation and Application of Medical Knowledge	
HRMG 6213	Leadership	
MGMT 6214	Negotiations	
MKTG 6218	Marketing in Service Sector	
MKTG 6226	Consumer Behavior	
PHTH 5232	Evaluating Healthcare Quality	
PPUA 7247	Seminar in U.S. Health Policy and Management	
SCHM 6223	Managing Healthcare Supply Chain Operations	

CONCENTRATION IN INTERNATIONAL BUSINESS

Code	Title	Hours
Required Core		
INTB 6208	Global Management	3
Electives		
Complete 9 semester hours from the following:		9
FINA 6204	International Finance Management	
INTB 6212	Cultural Aspects of International Business	
INTB 6224	Competing to Win in Emerging Markets	
INTB 6226	Becoming a Global Leader	
INTB 6230	International Field Study	
INTB 6232	Doing Business in Emerging Markets	
INTB 6260	Advanced Topics in Global Management and Strategy	
MKTG 6206	International Marketing	

CONCENTRATION IN LEADING PEOPLE AND ORGANIZATIONS

Code	Title	Hours
Complete the following 12 semester hours:		12
HRMG 6219	Leadership for Environmental Sustainability	
HRMG 6221	Power and Influence	
HRMG 6223	Global Talent Management	
MGMT 6214	Negotiations	

CONCENTRATION IN MARKETING

Code	Title	Hours
Required Core		
MKTG 6320	(Advanced Marketing Management)	
Electives		
Complete 9 semester hours from the following:		9
MKTG 6210	Marketing Research	
MKTG 6212	International Marketing	
MKTG 6214	New Product Development	
or TECE 6250	Lean Design and Development	
MKTG 6216	Market Focused Strategy	
MKTG 6218	Marketing in Service Sector	
MKTG 6222	Digital Marketing	
MKTG 6223	Brand and Advertising Management	
MKTG 6224	B2B and Strategic Sales	
MKTG 6226	Consumer Behavior	
MKTG 6230	Driving Marketing Performance: Measure, Analyze, Profit	
MKTG 6260	Special Topics in Marketing	

CONCENTRATION IN OPERATIONS AND SUPPLY CHAIN MANAGEMENT

Code	Title	Hours
Required Core		
SCHM 6213	Global Supply Chain Strategy	3
Electives		
Complete 9 semester hours from the following:		9
SCHM 6211	Logistics and Transportation Management	
SCHM 6212		
SCHM 6214	Sourcing and Procurement	
SCHM 6215	Supply Chain Analytics	
SCHM 6221	Sustainability and Supply Chain Management	
SCHM 6223	Managing Healthcare Supply Chain Operations	
SCHM 6224	Demand Planning and Forecasting	

Electives

Code	Title	Hours
In consultation with faculty advisor, complete 6 semester hours:		6
ACCT, ENTR, FINA, HRMG, INTB, MECN, MKTG, SCHM, STRT, and TECE		
Complete 6 semester hours outside of D'Amore-Mckim School of Business; please consult program director for course options:		6
AACE 6000	Arts and Culture Organizational Leadership	

ARTG 6310	Design for Behavior and Experience
CS 5100	Foundations of Artificial Intelligence
CS 5200	Database Management Systems
ECON 5140	Applied Econometrics
GE 5030	Iterative Product Prototyping for Engineers
GE 5100	Product Development for Engineers
INTL 5200	Political Economy: Interdisciplinary Perspectives
JRNL 5311	Design and Graphics
LPSC 6313	Economic Analysis for Law, Policy, and Planning
ME 5645	Environmental Issues in Manufacturing and Product Use
PPUA 5301	Introduction to Computational Statistics
PPUA 5302	Information Design and Visual Analytics
PPUA 6553	Nonprofit Financial Resource Development

Program Credit/GPA Requirements

55 total semester hours required
Minimum 3.000 GPA required

Business Administration, MBA—Part-Time Program

You know where you want to go. Our Part-Time MBA (http://www.damore-mckim.northeastern.edu/academic-programs/graduate-programs/mba/part-time?utm_source=neu-course-catalog&utm_medium=referral&utm_campaign=ptmba-mofu) will help you get there. Experience an educational path designed by you, delivered at a pace you determine, surrounded by a learning network that inspires you to push your boundaries.

Our Part-Time MBA program is made for motivated professionals like you, who seek to expand their skill set and accelerate their career. Learn from our faculty thought leaders who apply their unique practice-oriented approach that has established Northeastern University as a leader in experiential education.

Become an agile leader with the confidence to make a meaningful impact. Grow to be a resilient agent of change, prepared to tackle modern business challenges in your current role and beyond.

The D'Amore-McKim Part-Time MBA is the catalyst you need to reach new professional destinations.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Accounting		
ACCT 6200	Financial Reporting and Managerial Decision Making 1	3
ACCT 6201	Financial Reporting and Managerial Decision Making 2	1.5
Management		

Code	Title	Hours
HRMG 6200	Managing People and Organizations	3
INTB 6200	Managing the Global Enterprise	3
MGSC 6204	Managing Information Resources	1.5
SCHM 6201	Operations and Supply Chain Management	3
Marketing		
MKTG 6200	Creating and Sustaining Customer Markets	3
MECN 6200	Global Competition and Market Dominance	3
Analysis		
FINA 6200	Value Creation through Financial Decision Making	3
MGSC 6200	Information Analysis	3
STRT 6200	Strategic Decision Making in a Changing Environment	3
Entrepreneurship		
ENTR 6200	Enterprise Growth and Innovation	3
Electives		
Note: Elective courses are either 1 or 3 credits. Of the 27 elective credits, no more than 6 can be drawn from 1-credit courses.		27 credits

Concentration Options

Students in the part-time program may apply for up to two concentrations. Each concentration requires 9 credits (unless noted otherwise) of course work as outlined below:

- Corporate finance (p. 80)
- Corporate renewal (p. 81)
- Entrepreneurship (p. 81)
- Healthcare management (p. 81)
- International business (p. 81)
- Investments (p. 81)
- Marketing (p. 81)
- Mutual fund management (p. 82)
- Supply chain management (p. 81)
- Technical entrepreneurship (p. 82)

Consult your college administrator for more information.

CONCENTRATION IN CORPORATE FINANCE

Code	Title	Hours
Required Core		
FINA 6205	Financial Strategy	3
Restricted Electives		
Complete two of the following:		6
FINA 6204	International Finance Management	
FINA 6213	Investment Banking	
FINA 6214	Mergers and Acquisitions	
FINA 6215	Business Turnarounds	
FINA 6216	Valuation and Value Creation	
FINA 6231	Disrupting the Finance and Insurance Service Industries	
FINA 6260	Entrepreneurial Finance, Innovation Valuation, and Private Equity	

CONCENTRATION IN MARKETING

Code	Title	Hours
Restricted Electives		
Complete three of the following:		9
MKTG 6210	Marketing Research	
MKTG 6212	International Marketing	
MKTG 6214	New Product Development	
MKTG 6216	Market Focused Strategy	
MKTG 6218	Marketing in Service Sector	
MKTG 6222	Digital Marketing	
MKTG 6223	Brand and Advertising Management	
MKTG 6224	B2B and Strategic Sales	
MKTG 6226	Consumer Behavior	
MKTG 6260	Special Topics in Marketing	

CONCENTRATION IN SUPPLY CHAIN MANAGEMENT

Code	Title	Hours
Restricted Electives		
Complete three of the following:		9
SCHM 6211	Logistics and Transportation Management	
SCHM 6213	Global Supply Chain Strategy	
SCHM 6214	Sourcing and Procurement	
SCHM 6215	Supply Chain Analytics	
SCHM 6221	Sustainability and Supply Chain Management	
SCHM 6223	Managing Healthcare Supply Chain Operations	
SCHM 6224	Demand Planning and Forecasting	

CONCENTRATION IN HEALTHCARE MANAGEMENT

Code	Title	Hours
Required Core		
HINF 5105	The American Healthcare System	3
STRT 6220	Strategic Management for Healthcare Organizations	3
HRMG 6220	Health Organization Management	3
Restricted Elective		
Complete one of the following:		3
PHTH 5234	Economic Perspectives on Health Policy	
PHTH 5232	Evaluating Healthcare Quality	
HINF 5101	Introduction to Health Informatics and Health Information Systems	
SCHM 6223	Managing Healthcare Supply Chain Operations	
FINA 6220	Healthcare Finance	

CONCENTRATION IN INVESTMENTS

Code	Title	Hours
Required Core		
FINA 6203	Investment Analysis	3
Restricted Electives		
Complete two of the following:		6
FINA 6211	Financial Risk Management	
FINA 6212	Fixed Income Securities and Risk	
FINA 6213	Investment Banking	
FINA 6217	Real Estate Finance and Investment	
FINA 6218	Personal Financial Planning	
FINA 6219	Portfolio Management	
FINA 6292	Advanced Topics in Finance	

CONCENTRATION IN CORPORATE RENEWAL

Code	Title	Hours
Restricted Electives		
Complete three of the following:		9
ENTR 6214	Social Enterprise	
ENTR 6224	Intellectual Property and Other Legal Aspects of Business and Innovation	
FINA 6215	Business Turnarounds	
FINA 6216	Valuation and Value Creation	
HRMG 6212	Creating an Innovative Organization	
HRMG 6213	Leadership	
MGMT 6210	Law for Managers and Entrepreneurs	
MGMT 6214	Negotiations	
MKTG 6214	New Product Development	
MKTG 6216	Market Focused Strategy	

CONCENTRATION IN INTERNATIONAL BUSINESS

Code	Title	Hours
Required Core		
INTB 6212	Cultural Aspects of International Business	3
Restricted Electives		
Complete two of the following:		6
ENTR 6225	Corporate Entrepreneurship through Global Growth, Acquisitions, and Alliances	
FINA 6204	International Finance Management	
INTB 6217	Creating Sustainable Competitive Advantage through Global Innovation	
INTB 6224	Competing to Win in Emerging Markets	
INTB 6226	Becoming a Global Leader	
INTB 6230	International Field Study	
INTB 6232	Doing Business in Emerging Markets	
MKTG 6212	International Marketing	
SCHM 6213	Global Supply Chain Strategy	

CONCENTRATION IN ENTREPRENEURSHIP

Code	Title	Hours
Restricted Electives		
Complete three of the following:		9
ENTR 6212	Business Planning for New Ventures	
ENTR 6214	Social Enterprise	
ENTR 6218	Business Model Design and Innovation	
ENTR 6219	Financing Ventures from Early Stage to Exit	
ENTR 6220	Family Business Leadership and Governance	
ENTR 6222	Competing in Dynamic, Innovation-Driven Markets	
ENTR 6224	Intellectual Property and Other Legal Aspects of Business and Innovation	

ENTR 6225	Corporate Entrepreneurship through Global Growth, Acquisitions, and Alliances	
MKTG 6214	New Product Development	
TECE 6300	Managing a Technology-Based Business	

CONCENTRATION IN TECHNICAL ENTREPRENEURSHIP

Code	Title	Hours
Restricted Electives		
Complete three of the following:		9
ENTR 6212	Business Planning for New Ventures	
ENTR 6224	Intellectual Property and Other Legal Aspects of Business and Innovation	
FINA 6260	Entrepreneurial Finance, Innovation Valuation, and Private Equity	
TECE 6222	Emerging and Disruptive Technologies	
TECE 6230	Entrepreneurial Marketing and Selling	
TECE 6250	Lean Design and Development	
TECE 6300	Managing a Technology-Based Business	
TECE 6340	The Technical Entrepreneur as Leader	

CONCENTRATION IN MUTUAL FUND MANAGEMENT

Code	Title	Hours
Required Core		
FINA 6203	Investment Analysis	3
FINA 6219	Portfolio Management	3
Restricted Elective		
Complete 3 semester hours of restricted electives. At least one credit must be from FINA 6361		3
FINA 6360	Fund Management for Analysts	
or FINA 6361	Fund Management for Managers	

Electives

Code	Title	Hours
Marketing		
MKTG 6210	Marketing Research	
MKTG 6212	International Marketing	
MKTG 6214	New Product Development	
MKTG 6216	Market Focused Strategy	
MKTG 6218	Marketing in Service Sector	
MKTG 6222	Digital Marketing	
MKTG 6223	Brand and Advertising Management	
MKTG 6224	B2B and Strategic Sales	
MKTG 6226	Consumer Behavior	
MKTG 6260	Special Topics in Marketing	
Finance Group A		
FINA 6203	Investment Analysis	
FINA 6204	International Finance Management	
FINA 6211	Financial Risk Management	
FINA 6212	Fixed Income Securities and Risk	
FINA 6213	Investment Banking	
FINA 6217	Real Estate Finance and Investment	
FINA 6218	Personal Financial Planning	
FINA 6219	Portfolio Management	

Finance Group B		
FINA 6205	Financial Strategy	
FINA 6204	International Finance Management	
FINA 6213	Investment Banking	
FINA 6214	Mergers and Acquisitions	
FINA 6215	Business Turnarounds	
FINA 6216	Valuation and Value Creation	
FINA 6260	Entrepreneurial Finance, Innovation Valuation, and Private Equity	
Supply Chain Management		
SCHM 6211	Logistics and Transportation Management	
SCHM 6213	Global Supply Chain Strategy	
SCHM 6214	Sourcing and Procurement	
SCHM 6215	Supply Chain Analytics	
SCHM 6221	Sustainability and Supply Chain Management	
SCHM 6223	Managing Healthcare Supply Chain Operations	
Entrepreneurship		
ENTR 6212	Business Planning for New Ventures	
ENTR 6214	Social Enterprise	
ENTR 6218	Business Model Design and Innovation	
ENTR 6219	Financing Ventures from Early Stage to Exit	
ENTR 6220	Family Business Leadership and Governance	
ENTR 6222	Competing in Dynamic, Innovation-Driven Markets	
MGMT 6210	Law for Managers and Entrepreneurs	
MKTG 6214	New Product Development	
TECE 6300	Managing a Technology-Based Business	
Technical Entrepreneurship		
TECE 6222	Emerging and Disruptive Technologies	
TECE 6230	Entrepreneurial Marketing and Selling	
TECE 6250	Lean Design and Development	
TECE 6300	Managing a Technology-Based Business	
TECE 6340	The Technical Entrepreneur as Leader	
ENTR 6212	Business Planning for New Ventures	
ENTR 6222	Competing in Dynamic, Innovation-Driven Markets	
FINA 6260	Entrepreneurial Finance, Innovation Valuation, and Private Equity	
Healthcare		
HINF 5105	The American Healthcare System	
HRMG 6220	Health Organization Management	
STRT 6220	Strategic Management for Healthcare Organizations	
HINF 5101	Introduction to Health Informatics and Health Information Systems	
PHTH 5232	Evaluating Healthcare Quality	
PHTH 5234	Economic Perspectives on Health Policy	

SCHM 6223	Managing Healthcare Supply Chain Operations	
Mutual Fund Management		
FINA 6203	Investment Analysis	
FINA 6219	Portfolio Management	
FINA 6360	Fund Management for Analysts	
FINA 6361	Fund Management for Managers	
International Business		
INTB 6212	Cultural Aspects of International Business	
FINA 6204	International Finance Management	
INTB 6217	Creating Sustainable Competitive Advantage through Global Innovation	
INTB 6226	Becoming a Global Leader	
INTB 6230	International Field Study	
MKTG 6212	International Marketing	
SCHM 6213	Global Supply Chain Strategy	
Corporate Renewal		
ENTR 6214	Social Enterprise	
FINA 6215	Business Turnarounds	
FINA 6216	Valuation and Value Creation	
HRMG 6212	Creating an Innovative Organization	
HRMG 6213	Leadership	
MGMT 6214	Negotiations	
MKTG 6214	New Product Development	
MKTG 6216	Market Focused Strategy	

Program Credit/GPA Requirements

60 total semester hours required
Minimum 3.000 GPA required

Business Administration, MBA—Online Program

Our online MBA is a 100 percent online program with no campus residency requirements. Students may enter the program at one of nine start dates per academic year. By adhering to a schedule established at the semester of entry, the program may be completed in as little as two years. Students in the online MBA are classified as part-time and participate in one course at a time, completing core courses in the first year and capstone and elective courses in the second year.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Accounting		
ACCT 6272	Financial Statement Preparation and Analysis	2.25
ACCT 6273	Identifying Strategic Implications in Accounting Data	2.25
Management		
SCHM 6201	Operations and Supply Chain Management	3
HRMG 6200	Managing People and Organizations	3
INTB 6200	Managing the Global Enterprise	3
MGSC 6204	Managing Information Resources	1.5
MGMT 6213	Managing Ethics in the Workplace and Marketplace	2
Marketing		
MKTG 6200	Creating and Sustaining Customer Markets	3
MECN 6200	Global Competition and Market Dominance	3
Analysis		
FINA 6200	Value Creation through Financial Decision Making	3
MGSC 6200	Information Analysis	3
STRT 6200	Strategic Decision Making in a Changing Environment	3
Entrepreneurship		
ENTR 6200	Enterprise Growth and Innovation	3

Electives

Code	Title	Hours
Choose 15 semester hours from the following subject areas:		15
ENTR, FINA, HRMG, INTB, MKTG, MGMT, MGSC, SCHM		

Concentration Options

- Finance (p. 83)
- Healthcare management (p. 83)
- High-technology management (p. 84)
- Innovation entrepreneurship (p. 84)
- International management (p. 84)
- Marketing (p. 84)
- Operations and supply chain management (p. 84)
- Sustainability (p. 84)

CONCENTRATION IN FINANCE

Code	Title	Hours
Choose 9 semester hours from the following:		9
FINA 6203	Investment Analysis	
FINA 6204	International Finance Management	
FINA 6205	Financial Strategy	
FINA 6213	Investment Banking	
FINA 6214	Mergers and Acquisitions	
FINA 6215	Business Turnarounds	
FINA 6216	Valuation and Value Creation	
FINA 6220	Healthcare Finance	
FINA 6225	Entrepreneurial Finance for High Tech Companies	
MECN 6205	Sustainability and the Economics of Markets	

CONCENTRATION IN HEALTHCARE MANAGEMENT

Code	Title	Hours
Choose 9 semester hours from the following:		9
FINA 6220	Healthcare Finance	
MGSC 6221	Introduction to Health Informatics and Health Information Systems	
MGMT 6222	Healthcare Industry	

| MGMT 6223 | Strategic Decision Making for Healthcare Professionals | |

CONCENTRATION IN HIGH-TECHNOLOGY MANAGEMENT

Code	Title	Hours
Choose 9 semester hours from the following:		9
FINA 6225	Entrepreneurial Finance for High Tech Companies	
HRMG 6217	Virtual, Vicious Teams: Building and Leading High-Performance Teams	
MGMT 6283	Business Law, Corporate Governance, and Intellectual Property Strategies	

CONCENTRATION IN INNOVATION ENTREPRENEURSHIP

Code	Title	Hours
Choose 9 semester hours from the following:		9
ENTR 6210	Managing Operations in Early Stage Ventures	
ENTR 6211	Entrepreneurship: Services and Retail Business Creation	
ENTR 6212	Business Planning for New Ventures	
ENTR 6216	Global Social Entrepreneurship and Innovation	
FINA 6225	Entrepreneurial Finance for High Tech Companies	
MKTG 6214	New Product Development	

CONCENTRATION IN INTERNATIONAL MANAGEMENT

Code	Title	Hours
Choose 9 semester hours from the following:		9
ENTR 6216	Global Social Entrepreneurship and Innovation	
INTB 6212	Cultural Aspects of International Business	
INTB 6217	Creating Sustainable Competitive Advantage through Global Innovation	
FINA 6204	International Finance Management	
MKTG 6212	International Marketing	
SCHM 6213	Global Supply Chain Strategy	

CONCENTRATION IN MARKETING

Code	Title	Hours
Choose 9 semester hours from the following:		9
MKTG 6210	Marketing Research	
MKTG 6212	International Marketing	
MKTG 6214	New Product Development	
MKTG 6216	Market Focused Strategy	
MKTG 6218	Marketing in Service Sector	
MKTG 6222	Digital Marketing	
MKTG 6223	Brand and Advertising Management	

CONCENTRATION IN OPERATIONS AND SUPPLY CHAIN MANAGEMENT

Code	Title	Hours
Choose 9 semester hours from the following:		9
SCHM 6211	Logistics and Transportation Management	
SCHM 6213	Global Supply Chain Strategy	
SCHM 6214	Sourcing and Procurement	

| SCHM 6221 | Sustainability and Supply Chain Management | |

CONCENTRATION IN SUSTAINABILITY

Code	Title	Hours
Choose 9 semester hours from the following:		9
MECN 6205	Sustainability and the Economics of Markets	
MGMT 6225	Sustainability and Leadership	
MGMT 6226	Sustainability and the Business Environment	
SCHM 6221	Sustainability and Supply Chain Management	

Program Credit/GPA Requirements

50 total semester hours required
Minimum 3.000 GPA required

Dual Degrees

If your interests and goals include multiple areas of expertise, customize your career path by combining the rigorous graduate coursework of the D'Amore-McKim MBA with a specialized master's degree. You'll have the opportunity to double your expertise and maximize your network. Not to mention, you'll leave with two degrees from one of the world's leading research institutions.

Programs

MS/MBA—Nursing and Business Administration

As a partnership between the Bouvé College of Health Sciences and the D'Amore-McKim School of Business, our Ms in Nursing/MBA dual-degree program is a powerful combination that positions candidates to operate with equal facility in the increasingly interdependent health and business spheres.

See Bouvé College of Health Sciences Nursing MS/MBA program (p. 267) for curriculum information.

MSA/MBA—Accounting and Business Administration

Nonaccounting majors get on the fast track to a career in accounting with our Master of Science in Accounting/Master of Business Administration dual-degree program (http://www.damore-mckim.northeastern.edu/academic-programs/graduate-programs/dual-degrees/accounting-mba?utm_source=neu-course-catalog&utm_medium=referral&utm_campaign=msamba-mofu). In just 15 months you will earn two degrees while gaining the skills, expertise, and confidence to walk right in and start working at a top accounting firm.

Code	Title	Hours
MECN 6200	Global Competition and Market Dominance	3
MKTG 6200	Creating and Sustaining Customer Markets	3

Co-op Requirement

Code	Title	Hours
BUSN 6964	Co-op Work Experience	0

Program Credit/GPA Requirements

72 total semester hours required
Minimum 3.000 GPA required

Plan of Study

Term 1

	Summer 1	Hours	Summer 2	Hours
	Corporate Reporting 1		Corporate Reporting 2	
	ACCT 6220	3	ACCT 6221	6
	Management		Global Competition	
	HRMG 6200	3	MECN 6200	3
			Information Analysis	
			MGSC 6200	3
		6		12

Term 2

Fall	Hours
Corporate Government	
ACCT 6217	3
ACCT 6222	6
Audit	
ACCT 6223	6
Taxation	
ACCT 6224	6
Information Systems	
MGSC 6201	3
	24

Term 3

	Spring	Hours
	Internship	
	BUSN 6964	0
	Cost Management	
	ACCT 6226	3
	Service and Manufacturing Operations	
	SCHM 6210	3
		6

Term 4

	Summer 1	Hours	Summer 2	Hours
	Accounting		Accounting	

Your 15-month experience begins with a curriculum that has been designed in partnership with some of the region's leading accounting firms. This relevant industry-focused education maintains a sharp focus on business and accounting insights that you will put to work every day in your new career. In addition, you will be immersed in contemporary issues related to audit and tax, giving you a valuable perspective that is always fresh and topical.

You will put your new skills and insights to work during the busiest time of the year in a three-month, paid accounting internship at one of the top accounting firms in the business. In this role, you will have the one-on-one guidance of a seasoned mentor, where your exchange of ideas and insights will be mutually beneficial.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

MASTER OF SCIENCE IN ACCOUNTING REQUIREMENTS

Code	Title	Hours
Required Core		
ACCT 6223	Audit and Other Assurance Services	6
ACCT 6224	Taxation of Individuals and Business Entities	6
ACCT 6226	Strategic Cost Management	3
ACCT 6227	Accounting for Business Combinations	3
ACCT 6228	Contemporary Issues in Accounting Theory	3
Financial Reporting		
ACCT 6217	Corporate Governance, Ethics, and Financial Reporting	3
ACCT 6220	Corporate Financial Reporting and Decision Making 1	3
ACCT 6221	Corporate Financial Reporting and Decision Making 2	6
ACCT 6222	Corporate and Governmental/Nonprofit Financial Reporting and Decision Making	6

MASTER OF BUSINESS ADMINISTRATION REQUIREMENTS

Code	Title	Hours
Entrepreneurship		
ENTR 6211	Entrepreneurship: Services and Retail Business Creation	3
Analysis		
FINA 6200	Value Creation through Financial Decision Making	3
MGSC 6200	Information Analysis	3
MGSC 6201	Information Systems and Technology	3
STRT 6200	Strategic Decision Making in a Changing Environment	3
Management		
HRMG 6200	Managing People and Organizations	3
INTB 6200	Managing the Global Enterprise	3
MGMT 6211	Business Law and Professional Ethics	3
SCHM 6210	Supply Chain Management	3
Marketing		

	ACCT 6227	3	ACCT 6228	3
	Entrepreneurship		Business Law and Ethics	
	ENTR 6211	3	MGMT 6211	3
	Financial Decision Making		Global Enterprise	
	FINA 6200	3	INTB 6200	3
	Customer Markets		Strategic Decision Making	
	MKTG 6200	3	STRT 6200	3
		12		12

Total Hours: 72

MSF/MBA—Finance and Business Administration—Full-Time

PENDING - NEW FULL TIME MBA MAY IMPACT THIS PROGRAM - PLEASE SPEAK TO DMSB

As the business world undergoes more and more complex changes, you need the expertise and insight to keep up—and keep ahead. Through our Full-Time Master of Science in Finance/Master of Business A (http://www.damore-mckim.northeastern.edu/academic-programs/graduate-programs/dual-degrees/finance-mba-full-time?utm_source=neu-course-catalog&utm_medium=referral&utm_campaign=ftmsfmba-mofu)dministration dual-degree program, you'll gain the knowledge and proficiency you need to accelerate your career.

The MS in finance/MBA will develop your managerial potential and your practical finance skills in key areas such as valuation, mergers and acquisitions, risk management, insurance, and investments. Gain knowledge and experience through courses taught by leading professors in their fields and your corporate residency.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

MASTER OF SCIENCE IN FINANCE

Code	Title	Hours
Required Core		
FINA 6203	Investment Analysis	3
FINA 6204	International Finance Management	3
FINA 6205	Financial Strategy	3
FINA 6206	Finance Seminar	3
FINA 6208	Financial Management for Value Creation	4
Electives		
Complete 12 semester hours of FINA courses.		12

MASTER OF BUSINESS ADMINISTRATION

Code	Title	Hours
Required Core		
ACCT 6208	Financial Reporting and Managerial Decision Making	4
BUSN 6200	Career Management	0
BUSN 6950	MBA Skills Workshop	0
ENTR 6208	Innovation and Enterprise Growth	2
HRMG 6208	Effective Organizational and Human Behavior	3
INTB 6208	Global Management	3
INTB 6238	Global Project	3
MGSC 6205	Management of Information Resources	2
MGSC 6207	Data Analysis for Decision Making	2
MECN 6208	Economics for Managerial Decision Making	2
MKTG 6208	Marketing and Customer Value	4
SCHM 6200	Supply Chain and Operations Management	4
STRT 6208	Strategic Decisions for Growth	3
Electives		
Complete 12 semester hours in the following subject areas. Note that these courses may be finance courses:		12
ACCT, ENTR, FINA, HRMG, INTB, MECN, MKTG, MGMT, SCHM, STRT, and TECE		

Program Credit/GPA Requirements

72 total semester hours required
Minimum 3.000 GPA required

MSF/MBA—Finance and Business Administration—Part-Time

You know where you want to go. Our Part-Time MS in Finance/MBA (http://www.damore-mckim.northeastern.edu/academic-programs/graduate-programs/dual-degrees/finance-mba-part-time?utm_source=neu-course-catalog&utm_medium=referral&utm_campaign=ptmsfmba-mofu) dual-degree program will help you get there. Gain the vital knowledge, skills, and expertise you need to accelerate your career while you build a strong personal portfolio of core business skills and specialized financial expertise.

Our Part-Time MS in Finance/MBA program is made for motivated professionals like you. It allows you to complete your degree on your own timetable, set your schedule, and specialize in an area that meets your career goals. Learn from our faculty thought leaders who apply their unique practice-oriented approach that has established Northeastern University as a leader in experiential education.

Become an agile leader with the confidence to make a meaningful impact. Grow to be a resilient agent of change, prepared to tackle modern business challenges in your current role and beyond.

The D'Amore-McKim Part-Time MS in Finance/MBA is the catalyst you need to reach new professional destinations.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Accounting		
ACCT 6200	Financial Reporting and Managerial Decision Making 1	3
ACCT 6201	Financial Reporting and Managerial Decision Making 2	1.5

Management

Code	Title	Hours
HRMG 6200	Managing People and Organizations	3
INTB 6200	Managing the Global Enterprise	3
MGSC 6204	Managing Information Resources	1.5
SCHM 6201	Operations and Supply Chain Management	3

Marketing

MKTG 6200	Creating and Sustaining Customer Markets	3
MECN 6200	Global Competition and Market Dominance	3

Analysis

FINA 6200	Value Creation through Financial Decision Making	3
MGSC 6200	Information Analysis	3
STRT 6200	Strategic Decision Making in a Changing Environment	3

Entrepreneurship

ENTR 6200	Enterprise Growth and Innovation	3

Additional Required Finance Courses

FINA 6203	Investment Analysis	3
FINA 6204	International Finance Management	3
FINA 6205	Financial Strategy	3
FINA 6206	Finance Seminar	3

Electives

Code	Title	Hours
Finance Electives		
Complete 12 semester hours of FINA courses.		12
Business Electives		
Complete 15 semester hours of courses from the following subject areas. Note that these courses may include finance courses:		15
ACCT, ENTR, FINA, HRMG, INTB, MECN, MKTG, MGMT, SCHM, and STRT		

Program Credit/GPA Requirements

72 total semester hours required
Minimum 3.000 GPA required

MSF/MBA—Finance and Business Administration—Online

Our online Master of Science in Finance/Master of Business Administration dual-degree program is designed to help you develop your managerial potential and practical finance skills in key areas such as valuation, mergers and acquisitions, risk management, insurance, and investments. The online MS in finance/MBA can be completed in as little as three years.

All interested candidates will start by enrolling in the online MBA and may apply to move into the dual program at any point during their second year. Our 100 percent online dual-degree program is available to second-year online MBA students who have achieved a minimum of a 3.000 grade-point average and a B grade in Financial Statement Preparation and Analysis (ACCT 6272), Identifying Strategic Implications in Accounting Data (ACCT 6273), and Value Creation through Financial Decision Making (FINA 6200).

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
ACCT 6272	Financial Statement Preparation and Analysis	2.25
ACCT 6273	Identifying Strategic Implications in Accounting Data	2.25
HRMG 6200	Managing People and Organizations	3
INTB 6200	Managing the Global Enterprise	3
MGMT 6213	Managing Ethics in the Workplace and Marketplace	2
MGSC 6204	Managing Information Resources	1.5
SCHM 6201	Operations and Supply Chain Management	3
MKTG 6200	Creating and Sustaining Customer Markets	3
MECN 6200	Global Competition and Market Dominance	3
ENTR 6200	Enterprise Growth and Innovation	3
STRT 6200	Strategic Decision Making in a Changing Environment	3
MGSC 6200	Information Analysis	3
FINA 6200	Value Creation through Financial Decision Making	3
FINA 6203	Investment Analysis	3
FINA 6204	International Finance Management	3
FINA 6205	Financial Strategy	3
FINA 6206	Finance Seminar	3

Electives

Code	Title	Hours
Finance Electives		
Complete 9 semester hours of finance electives.		9
Business Electives		
Complete 6 semester hours in the following subject areas. Note that these courses may include finance courses:		6
MGSC, ENTR, FINA, HRMG, MKTG, MGMT, SCHM, SUST		

Program Credit/GPA Requirements

62 total semester hours required
Minimum 3.000 GPA required

JD/MBA—Juris Doctorate and MBA

As a partnership between the School of Law and the D'Amore-McKim School of Business, our JD/MBA dual-degree program is a powerful combination that positions candidates to operate with equal facility in the increasingly interdependent legal and business spheres.

The JD/MBA program is a full-time, four-year course of study that includes four one-quarter co-op work experiences at the intersection of law and business arranged through the law school co-op office. Starting in the fall term, JD/MBA candidates complete three years of law school, taking a break after either year one or year two to complete one year of business school. Within the business school, candidates will take the

first two semesters of the full-time MBA program and 13 credits of MBA electives. Information detailing the three years of JD course work and co-op is available at the School of Law (http://www.northeastern.edu/law/academics/curriculum/dual-degrees/jdmba.html) website.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Concurrent degree candidates follow a set schedule for the MBA requirements, as follows:

Code	Title	Hours
Management		
ENTR 6208	Innovation and Enterprise Growth	2,3
FINA 6208	Financial Management for Value Creation	4
INTB 6200	Managing the Global Enterprise	3
MGSC 6205	Management of Information Resources	2
SCHM 6200	Supply Chain and Operations Management	4
Financial Reporting		
ACCT 6208	Financial Reporting and Managerial Decision Making	4
Marketing		
MKTG 6208	Marketing and Customer Value	4
Economics		
MECN 6208	Economics for Managerial Decision Making	2
Human Resources		
HRMG 6208	Effective Organizational and Human Behavior	3
Analysis		
MGSC 6207	Data Analysis for Decision Making	2
STRT 6208	Strategic Decisions for Growth	3

Electives

Code	Title	Hours
Complete 16 semester hours from the following subject areas:		16
ACCT, ENTR, FINA, HRMG, INTB, MECN, MKTG, MGMT, SCHM, STRT, and TECE		

Program Credit/GPA Requirements

49 total semester hours required
Minimum 3.000 GPA required

Plan of Study

Year 1

Fall	Hours	Spring	Hours	Summer Full Semester	Hours
MGSC 6205	2	MGSC 6207	2	INTB 6200	3
ACCT 6208	4	STRT 6208	3	Electives	
MKTG 6208	4	ENTR 6208	2-3	Complete 13 semester hours from the following subject areas:	13
MECN 6208	2	FINA 6208	4	ACCT, ENTR, FINA, HRMG, INTB, MECN, MKTG, MGMT, SCHM, STRT, and TECE	
HRMG 6208	3	SCHM 6200	4		
		Elective			
		Complete 3 semester hours of course work from the following subject areas:	3		
		ACCT, ENTR, FINA, HRMG, INTB, MECN, MKTG, MGMT, SCHM, STRT, and TECE			
15		18-19		16	

Total Hours: 49-50

Graduate Certificate Programs

Business professionals are much like businesses themselves—as opportunities emerge and the marketplace evolves, their needs change. Designed for working professionals, our graduate certificates are a way to quickly gain specialized knowledge and a professional credential in order to advance your career. Our certificates require 12 to 15 credits that you may accelerate and take in as little as one semester, or spread out and take up to three years to complete. With three start dates each year and no GMAT required for admission, you can quickly gain the skills you need most in your career—now!

Just-in-Time Learning. Our graduate certificate programs are designed to give you training that you can use immediately. The skills you learn in an evening class will be useful to you the next morning at work. At D'Amore-McKim School of Business, you won't just find theoretical training for a theoretical future—you'll also have the opportunity to gain practical, real-world knowledge rooted in the realities of working life.

Shape your own experience. When you pursue a graduate certificate, you have the opportunity to focus your studies and specialize in the area of business that provides you with the best career opportunities.

Study on your own terms. Our graduate certificate programs are designed with working professionals in mind. Courses are offered on weeknights and Saturdays. You may even take one of our courses online. You can choose to come to campus just one night a week or accelerate the program by taking a heavier course load each semester. Start your graduate certificate at a time that works for you. You can enter your program in January, May, or September.

Build toward something more. Our graduate certificate programs are a unique opportunity to quickly gain fundamental business knowledge and earn a graduate-level credential from a top 40 U.S. research university, as ranked by *U.S. News & World Report*. And that's just the beginning. When you are ready to pursue a full graduate degree at D'Amore-McKim—now or in the future—the credits you earn during the certificate program may be applied to eligible master's programs, including the part-time MBA. This is a valuable opportunity to turn your career-enhancing graduate certificate into a more advanced professional credential.

Learn more about graduate certificates (http://www.damore-mckim.northeastern.edu/academic-programs/graduate-programs/certificates) on the D'Amore-McKim website.

Programs

- Accounting and Financial Decision Making (p. 89)
- Accounting and Financial Decision Making—Online (p. 89)
- Business Administration (p. 90)
- Business Administration—Online (p. 91)
- Corporate Finance (p. 92)
- Corporate Finance—Online (p. 92)
- Corporate Renewal (p. 92)
- Corporate Renewal—Online (p. 93)
- Healthcare Administration and Policy (p. 93)
- Innovation Management (p. 94)
- International Business (p. 94)
- International Business—Online (p. 95)
- Investments (p. 95)
- Leadership and Human Capital (p. 96)
- Marketing (p. 96)
- Marketing—Online (p. 96)
- Mutual Fund Management (p. 97)
- Supply Chain Management (p. 97)
- Supply Chain Management—Online (p. 98)
- Technological Entrepreneurship (p. 98)

Accounting and Financial Decision Making, Graduate Certificate

Sharpen your insight into how businesses succeed. Accounting and financial decision-making skills are the foundation of any successful business venture. Individuals with the knowledge and experience to make informed financial decisions are highly valued contributors in businesses across the globe.

In the Graduate Certificate in Accounting and Financial Decision Making, you will have the opportunity to explore topics such as financial risk management, value creation, and information analysis. Exposure to decision-making theory will assist your conceptual understanding of how investors, money managers, and corporate managers make economic and financial decisions.

Once you have completed your D'Amore-McKim Graduate Certificate in Accounting and Financial Decision Making, endless opportunities lie ahead. Apply to a master's degree program and the credits you have already earned may be applied toward an eligible program, or explore new opportunities for career growth.

Learn more about this program (http://www.damore-mckim.northeastern.edu/academic-programs/certificates/accounting?utm_source=neu-course-catalog&utm_medium=referral&utm_campaign=gcafdm-mofu) on the D'Amore-McKim website.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
ACCT 6200 and ACCT 6201	Financial Reporting and Managerial Decision Making 1 and Financial Reporting and Managerial Decision Making 2	4.5
MGSC 6200	Information Analysis	3
FINA 6200	Value Creation through Financial Decision Making	3

Elective

Code	Title	Hours
	Complete one of the following:	1.5-3
MGSC 6204	Managing Information Resources	
	Any MBA core course titled 6200 (see below):	
ENTR 6200	Enterprise Growth and Innovation	
HRMG 6200	Managing People and Organizations	
INTB 6200	Managing the Global Enterprise	
MKTG 6200	Creating and Sustaining Customer Markets	
MECN 6200	Global Competition and Market Dominance	
STRT 6200	Strategic Decision Making in a Changing Environment	

Program Credit/GPA Requirements

12 total semester hours required, may complete a maximum of 15 semester hours
Minimum 3.000 GPA required

Accounting and Financial Decision Making—Online Program, Graduate Certificate

Sharpen your insight into how businesses succeed. Accounting and financial decision-making skills are the foundation of any successful business venture. Individuals with the knowledge and experience to make informed financial decisions are highly valued contributors in businesses across the globe.

In the Graduate Certificate in Accounting and Financial Decision Making, you will have the opportunity to explore topics such as financial statement preparation, value creation, and information analysis. Exposure to decision-making theory will assist your conceptual understanding

of how investors, money managers, and corporate managers make economic and financial decisions.

Once you have completed your D'Amore-McKim Graduate Certificate in Accounting and Financial Decision Making, endless opportunities lie ahead. Apply to an eligible master's degree program and the credits you have already earned may be applied toward that program, or explore new opportunities for career growth.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
ACCT 6272	Financial Statement Preparation and Analysis	2.25
ACCT 6273	Identifying Strategic Implications in Accounting Data	2.25
FINA 6200	Value Creation through Financial Decision Making	3
MGSC 6200	Information Analysis	3
MGSC 6204	Managing Information Resources	1.5

Program Credit/GPA Requirements

12 total semester hours required
Minimum 3.000 GPA required

Business Administration, Graduate Certificate

Northeastern University's Graduate Certificates in Business Administration can help you quickly gain specialized knowledge and a professional credential to advance your career. The Graduate Certificate in Business Administration at the D'Amore-McKim School of Business is designed to help you learn the skills you need to excel today, while earning credits to drive you toward tomorrow's goals.

Your program will consist of four to six essential business courses. You may accelerate the curriculum and complete in as little as eight months, or spread out and take up to three years to complete. You may choose to focus on one area of specialty or gain fundamental business knowledge around financial reporting and managerial decision making, managing people and organizations, information analysis, and managing information resources.

You can gain this specialized knowledge in four ways:

PART-TIME MBA PATH
Have you considered pursuing your MBA, but a full-time commitment isn't the right fit for your life? Do you want to gain experience in graduate-level classes before committing to a full degree? Our Part-Time MBA Path (http://www.damore-mckim.northeastern.edu/academic-programs/certificates/business-administration/academics/part-time-mba-path?utm_source=neu-course-catalog&utm_medium=referral&utm_campaign=gcba-mofu) has been designed for you. This program offers six foundational classes (15 credits) from the D'Amore-McKim MBA curriculum to prepare you now for emerging opportunities in your field.

Once you have completed your Graduate Certificate in Business Administration through the Part-Time MBA Path and you have applied and been accepted to our part-time MBA, then the credits you've earned during your certificate program will apply. Not only that, but your

performance in the courses can make you eligible to waive the GMAT requirement.

BUILD YOUR OWN CURRICULUM
Do you need specialized knowledge in a particular area of business? Building your own (http://www.damore-mckim.northeastern.edu/academic-programs/certificates/business-administration/academics/build-your-own?utm_source=neu-course-catalog&utm_medium=referral&utm_campaign=gcba-mofu) Graduate Certificate in Business Administration gives you the power to create the business curriculum you need. Custom select any five courses (15 credits) from our MBA program—just the courses you need to propel you toward your career goals and personal aspirations.

EIGHT-MONTH INTERNATIONAL STUDENT COHORT
Are you ready to study in the United States.? This full-time, eight-month program is tailored to meet the needs of international students. You'll complete this rigorous course work as part of a small, intimate cohort. The International Student Cohort (http://www.damore-mckim.northeastern.edu/academic-programs/certificates/business-administration/academics/international-cohort?utm_source=neu-course-catalog&utm_medium=referral&utm_campaign=gcba-mofu) is designed to help you build your knowledge of essential business practices like financial decision making, innovation, and management. You will have the opportunity to gain relevant, in-demand skills that will help you to tackle today's business challenges.

ACCELERATED FOUR-MONTH CURRICULUM
Where do you want to be four months from now? With our Accelerated Four-Month Curriculum (http://www.damore-mckim.northeastern.edu/academic-programs/certificates/business-administration/academics/accelerated?utm_source=neu-course-catalog&utm_medium=referral&utm_campaign=gcba-mofu), you can learn meaningful business skills in just one semester. Open to both U.S. and international students, this option is perfect for professionals with the ability to dedicate four months to an intensive, condensed educational experience. If you are an international student returning to your home country after your semester at D'Amore-McKim, you may be able to transfer credits back to your home program.

Through successful completion of the Graduate Certificate in Business Administration, you will earn credits that may be applied to eligible master's programs, both within D'Amore-McKim School of Business or in the College of Professional Studies. Upon acceptance to one of the eligible degree programs, you may be able to apply the credits you have already earned toward the completion of your degree.

Learn more about this program (http://www.damore-mckim.northeastern.edu/academic-programs/certificates/business-administration?utm_source=neu-course-catalog&utm_medium=referral&utm_campaign=gcba-mofu) on the D'Amore-McKim website.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Tracks

Complete one of the following three tracks. *Note:* The part-time MBA track and the international student track require an additional 3 semester hours.

PART-TIME MBA TRACK

Code	Title	Hours
ACCT 6200	Financial Reporting and Managerial Decision Making 1	3
ACCT 6201	Financial Reporting and Managerial Decision Making 2	1.5
FINA 6200	Value Creation through Financial Decision Making	3
HRMG 6200	Managing People and Organizations	3
MGSC 6200	Information Analysis	3
MGSC 6204	Managing Information Resources	1.5

INTERNATIONAL STUDENT TRACK

Code	Title	Hours
ACCT 6200	Financial Reporting and Managerial Decision Making 1	3
ENTR 6200	Enterprise Growth and Innovation	3
HRMG 6200	Managing People and Organizations	3
INTB 6200	Managing the Global Enterprise	3
MKTG 6200	Creating and Sustaining Customer Markets	3

BUILD YOUR OWN TRACK

Customize your schedule by taking any 12 credits within the part-time MBA program assuming you meet prerequisites per course.

Program Credit/GPA Requirements

12 total semester hours required
Minimum 3.000 GPA required

Business Administration—Online Program, Graduate Certificate

Our 100 percent online Graduate Certificate in Business Administration can help you quickly gain specialized knowledge and a professional credential to advance your career. The Graduate Certificate in Business Administration at the D'Amore-McKim School of Business is designed to help you learn the skills you need to excel today, while earning credits to drive you toward tomorrow's goals.

Your program will consist of four essential business courses. You may accelerate the curriculum and complete it in as little as eight months, or spread it out and take up to three years to complete. You may choose to focus on one area of specialty or gain fundamental business knowledge in topics such as financial reporting and managerial decision making, managing people and organizations, and marketing.

Once you have completed your D'Amore-McKim Graduate Certificate in Business Administration, endless opportunities lie ahead. Apply to an eligible master's degree program, including the online MBA, and the credits you have already earned may be applied to that program, or you may opt to explore new opportunities for career growth.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Complete 12 semester hours from the following:		12
MGSC 6200	Information Analysis	
MGSC 6204	Managing Information Resources	
HRMG 6200	Managing People and Organizations	
FINA 6200	Value Creation through Financial Decision Making	
ACCT 6272	Financial Statement Preparation and Analysis	
ACCT 6273	Identifying Strategic Implications in Accounting Data	
FINA 6203	Investment Analysis	
FINA 6204	International Finance Management	
FINA 6205	Financial Strategy	
FINA 6211	Financial Risk Management	
FINA 6213	Investment Banking	
FINA 6214	Mergers and Acquisitions	
FINA 6215	Business Turnarounds	
FINA 6216	Valuation and Value Creation	
FINA 6217	Real Estate Finance and Investment	
MECN 6205	Sustainability and the Economics of Markets	
ENTR 6211	Entrepreneurship: Services and Retail Business Creation	
ENTR 6216	Global Social Entrepreneurship and Innovation	
ENTR 6200	Enterprise Growth and Innovation	
ENTR 6212	Business Planning for New Ventures	
ENTR 6210	Managing Operations in Early Stage Ventures	
MKTG 6212	International Marketing	
MECN 6200	Global Competition and Market Dominance	
MKTG 6200	Creating and Sustaining Customer Markets	
MKTG 6210	Marketing Research	
MKTG 6214	New Product Development	
MKTG 6216	Market Focused Strategy	
MKTG 6218	Marketing in Service Sector	
MKTG 6222	Digital Marketing	
MKTG 6223	Brand and Advertising Management	
MKTG 6212	International Marketing	
MGMT 6222	Healthcare Industry	
MGMT 6223	Strategic Decision Making for Healthcare Professionals	
MGMT 6225	Sustainability and Leadership	
MGMT 6226	Sustainability and the Business Environment	
MGMT 6283	Business Law, Corporate Governance, and Intellectual Property Strategies	
MGSC 6221	Introduction to Health Informatics and Health Information Systems	
INTB 6200	Managing the Global Enterprise	
INTB 6212	Cultural Aspects of International Business	
INTB 6217	Creating Sustainable Competitive Advantage through Global Innovation	
HRMG 6217	Virtual, Vicious Teams: Building and Leading High-Performance Teams	
SCHM 6213	Global Supply Chain Strategy	

SCHM 6211	Logistics and Transportation Management
SCHM 6201	Operations and Supply Chain Management
SCHM 6214	Sourcing and Procurement
SCHM 6221	Sustainability and Supply Chain Management

Program Credit/GPA Requirements

12 total semester hours required
Minimum 3.000 GPA required

Corporate Finance, Graduate Certificate

Sharpen your financial perspective. Financial acumen is the foundation of any successful business venture. Now you can explore this essential business knowledge through a flexible, part-time program and gain insight into strategies needed for tackling real-world financial challenges.

Through the Graduate Certificate in Corporate Finance, you will develop foundational financial knowledge through the study of global markets. Your course work will introduce methods of implementing financial strategy by stressing the impact of ethical and legal considerations. You may also choose to examine the financial, managerial, accounting, and legal factors affecting corporate mergers or explore advanced financial risk management.

Once you have completed your D'Amore-McKim Graduate Certificate in Corporate Finance and apply to an eligible master's degree program, the credits you have already earned may be applied.

Learn more about this program (http://www.damore-mckim.northeastern.edu/academic-programs/certificates/corporate-finance?utm_source=neu-course-catalog&utm_medium=referral&utm_campaign=gccf-mofu) on the D'Amore-McKim website.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirement

Code	Title	Hours
FINA 6205	Financial Strategy	3

Electives

Code	Title	Hours
Complete 9 semester hours from the following:		9
FINA 6211	Financial Risk Management	
FINA 6213	Investment Banking	
FINA 6214	Mergers and Acquisitions	
FINA 6215	Business Turnarounds	
FINA 6216	Valuation and Value Creation	
FINA 6260	Entrepreneurial Finance, Innovation Valuation, and Private Equity	
Any MBA core course titled 6200 (see below):		
ACCT 6200	Financial Reporting and Managerial Decision Making 1	
HRMG 6200	Managing People and Organizations	
INTB 6200	Managing the Global Enterprise	

MKTG 6200	Creating and Sustaining Customer Markets
MECN 6200	Global Competition and Market Dominance
STRT 6200	Strategic Decision Making in a Changing Environment

Program Credit/GPA Requirements

12 total semester hours required, may complete a maximum of 15 semester hours
Minimum 3.000 GPA required

Corporate Finance—Online Program, Graduate Certificate

Sharpen your financial perspective. Financial acumen is the foundation of any successful business venture. Now you can explore this essential business knowledge through a flexible, 100 percent online program and gain insight into strategies needed for tackling real-world financial challenges.

Through the online Graduate Certificate in Corporate Finance, you will develop foundational financial knowledge through the study of global markets. Your course work will introduce methods of implementing financial strategy by stressing the impact of ethical and legal considerations. You may also choose to examine the financial, managerial, accounting, and legal factors affecting corporate mergers or explore advanced financial risk management.

Once you have completed your D'Amore-McKim online Graduate Certificate in Corporate Finance, endless opportunities lie ahead. Apply to an eligible master's degree program—including the online MBA—and the credits you have already earned may be applied toward that program, or explore new opportunities for career growth.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirement

Code	Title	Hours
FINA 6205	Financial Strategy	3

Electives

Code	Title	Hours
Complete 9 semester hours from the following:		9
FINA 6211	Financial Risk Management	
FINA 6213	Investment Banking	
FINA 6214	Mergers and Acquisitions	
FINA 6215	Business Turnarounds	
FINA 6216	Valuation and Value Creation	

Program Credit/GPA Requirements

12 total semester hours required
Minimum 3.000 GPA required

Corporate Renewal, Graduate Certificate

Are you looking for a short course of study to help you enhance your understanding of the analysis and planning required to help struggling companies transform a successful future? The Graduate Certificate in

Corporate Renewal at Northeastern University's D'Amore-McKim School of Business is for you.

Through the Graduate Certificate in Corporate Renewal, you will have the opportunity to build your knowledge of business turnarounds, value creation, negotiations, and more to help you propel your success in this exciting and challenging field.

Once you have completed your D'Amore-McKim Graduate Certificate in Corporate Renewal, endless opportunities lie ahead. Apply to a master's degree program and the credits you have already earned may be applied toward an eligible program, or explore new opportunities for career growth.

Learn more about this program (http://www.damore-mckim.northeastern.edu/academic-programs/certificates/corporate-renewal?utm_source=neu-course-catalog&utm_medium=referral&utm_campaign=gccr-mofu) on the D'Amore-McKim website.

Program Requirements
Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Complete 12 semester hours from the following:		12
ENTR 6214	Social Enterprise	
FINA 6215	Business Turnarounds	
FINA 6216	Valuation and Value Creation	
HRMG 6212	Creating an Innovative Organization	
MKTG 6214	New Product Development	
MKTG 6216	Market Focused Strategy	
MGMT 6214	Negotiations	

Program Credit/GPA Requirements
12 total semester hours required, may complete a maximum of 15 semester hours
Minimum 3.000 GPA required

Corporate Renewal—Online Program, Graduate Certificate

Are you looking for a short course of study to help you enhance your understanding of the analysis and planning required to help struggling companies transform for a successful future? Our 100 percent online Graduate Certificate in Corporate Renewal is for you.

Through the online Graduate Certificate in Corporate Renewal, you will have the opportunity to build your knowledge of business turnarounds, value creation, negotiations, and more to help you propel your success in this exciting and challenging field.

Once you have completed your D'Amore-McKim Graduate Certificate in Corporate Renewal, endless opportunities lie ahead. Apply to an eligible master's degree program—including the online MBA—and the credits you have already earned may be applied toward that program, or you may opt to explore new opportunities for career growth.

Program Requirements
Core Requirement

Code	Title	Hours
Complete one of the following:		3
FINA 6200	Value Creation through Financial Decision Making	
MKTG 6200	Creating and Sustaining Customer Markets	
HRMG 6200	Managing People and Organizations	

Electives

Code	Title	Hours
Complete 9 semester hours from the following:		9
FINA 6215	Business Turnarounds	
FINA 6216	Valuation and Value Creation	
MKTG 6214	New Product Development	
MKTG 6216	Market Focused Strategy	

Program Credit/GPA Requirements
12 total semester hours required
Minimum 3.000 GPA required

Healthcare Administration and Policy, Graduate Certificate

Through Northeastern University's Graduate Certificate in Healthcare Administration and Policy, you will have the opportunity to explore fundamental business strategy concepts as they apply to the healthcare industry.

The D'Amore-McKim School of Business at Northeastern University creates a rich learning environment where theories and concepts are applied to real-world business issues. In a dynamic classroom environment, you will have the opportunity to gain exposure to the fundamental principles of health organization management. You may choose to study topics such as the impact of global economics on the American healthcare system or management of supply chain operations in the healthcare sector.

Through successful completion of your Graduate Certificate in Healthcare Administration and Policy, you will earn credits that may be applied to eligible master's programs, both within D'Amore-McKim School of Business or in the College of Professional Studies. Upon acceptance to one of the eligible degree programs, you may be able to apply the credits you have already earned toward the completion of your degree.

Learn more about this program (http://www.damore-mckim.northeastern.edu/academic-programs/certificates/healthcare?utm_source=neu-course-catalog&utm_medium=referral&utm_campaign=gchap-mofu) on the D'Amore-McKim website.

Program Requirements
Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
HINF 5105	The American Healthcare System	3
STRT 6220	Strategic Management for Healthcare Organizations	3
HRMG 6220	Health Organization Management	3

Elective

Code	Title	Hours
Complete 3 semester hours from the following:		3
HINF 5101	Introduction to Health Informatics and Health Information Systems	
LAW 7617	Economic Perspectives on Health Policy	
PHTH 5232	Evaluating Healthcare Quality	
SCHM 6223	Managing Healthcare Supply Chain Operations	

Program Credit/GPA Requirements

12 total semester hours required
Minimum 3.000 GPA required

Innovation Management, Graduate Certificate

Creative thinkers bring new ideas to life. They embrace critical thinking and seek continuous improvement. However, with any business venture, there are challenges that must be overcome to establish sustainable growth.

Are you interested in learning about the techniques required to manage an innovative business environment? In our Graduate Certificate in Innovation Management, you will have the opportunity to build a strong conceptual understanding of the processes behind developing a business plan, the legal environment for innovation, the new product development process, and much more. This targeted curriculum will help you learn to introduce an innovative culture and mindset to your business to develop and sustain its growth.

Once you have completed your D'Amore-McKim Graduate Certificate in Innovation Management, endless opportunities lie ahead. Apply to a master's degree program and the credits you have already earned may be applied toward an eligible program, or explore new opportunities for career growth.

Learn more about this program (http://www.damore-mckim.northeastern.edu/academic-programs/certificates/innovation-management?utm_source=neu-course-catalog&utm_medium=referral&utm_campaign=gcim-mofu) on the D'Amore-McKim website.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirement

Code	Title	Hours
ENTR 6200	Enterprise Growth and Innovation	3

Electives

Code	Title	Hours
Complete 9 semester hours from the following:		9
ENTR 6212	Business Planning for New Ventures	
ENTR 6214	Social Enterprise	
ENTR 6218	Business Model Design and Innovation	
ENTR 6220	Family Business Leadership and Governance	
ENTR 6222	Competing in Dynamic, Innovation-Driven Markets	
ENTR 6224	Intellectual Property and Other Legal Aspects of Business and Innovation	
ENTR 6225	Corporate Entrepreneurship through Global Growth, Acquisitions, and Alliances	
MGMT 6210	Law for Managers and Entrepreneurs	
MKTG 6214	New Product Development	
TECE 6222	Emerging and Disruptive Technologies	
TECE 6230	Entrepreneurial Marketing and Selling	
TECE 6250	Lean Design and Development	
TECE 6300	Managing a Technology-Based Business	
TECE 6340	The Technical Entrepreneur as Leader	

Program Credit/GPA Requirements

12 total semester hours required
Minimum 3.000 GPA required

International Business, Graduate Certificate

Delve into the driving forces behind today's global business landscape with our Graduate Certificate in International Business. Benefit from the expertise of international business professionals and earn valuable business perspective to accelerate your career and impact your current job, while still working full-time.

In this targeted curriculum, you will have the opportunity to understand what influences multinational corporations and what are key considerations when entering business partnerships with foreign companies. You can analyze why and how firms internationalize their operations, key features of successful global partnerships, and study areas of international business operations, such as manufacturing, marketing, and organizational management. You may also choose to develop your understanding of emerging markets and how emerging market companies compete with developed companies to support future viability and success.

Once you have completed your D'Amore-McKim Graduate Certificate in International Business, endless opportunities lie ahead. Apply to a master's degree program and the credits you have already earned may be applied toward an eligible program, or explore new opportunities for career growth.

Learn more about this program (http://www.damore-mckim.northeastern.edu/academic-programs/certificates/international-business?utm_source=neu-course-catalog&utm_medium=referral&utm_campaign=gcib-mofu) on the D'Amore-McKim website.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
INTB 6200	Managing the Global Enterprise	3
INTB 6212	Cultural Aspects of International Business	3

Electives

Code	Title	Hours
Complete 6 semester hours from the following:		6
ENTR 6200	Enterprise Growth and Innovation	
FINA 6204	International Finance Management	
INTB 6224	Competing to Win in Emerging Markets	
INTB 6230	International Field Study	
MECN 6200	Global Competition and Market Dominance	
MKTG 6212	International Marketing	
SCHM 6213	Global Supply Chain Strategy	

Program Credit/GPA Requirements

12 total semester hours required, may take a maximum of 15 credits
Minimum 3.000 GPA required

International Business—Online Program, Graduate Certificate

Delve into the driving forces behind today's global business landscape with our 100 percent online Graduate Certificate in International Business. Benefit from the expertise of international business professionals and earn valuable business perspective to accelerate your career and impact your current job, while still working full time.

In this targeted curriculum, you will have the opportunity to understand what influences multinational corporations and how corporate cultures evolve in the context of national cultures. You can analyze why and how firms internationalize their operations or explore key features of successful global partnerships. You may also choose to develop your understanding of emerging markets and how emerging market companies compete with developed companies to support future viability and success.

Once you have completed your online Graduate Certificate in International Business, endless opportunities lie ahead. Apply to an eligible master's degree program—including the online MBA—and the credits you have already earned may be applied toward that program, or you may opt to explore new opportunities for career growth.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
INTB 6200	Managing the Global Enterprise	3
INTB 6212	Cultural Aspects of International Business	3

Electives

Code	Title	Hours
Complete 6 semester hours from the following:		6
ENTR 6200	Enterprise Growth and Innovation	
FINA 6204	International Finance Management	
MECN 6200	Global Competition and Market Dominance	
MKTG 6212	International Marketing	
SCHM 6213	Global Supply Chain Strategy	

Program Credit/GPA Requirements

12 total semester hours required
Minimum 3.000 GPA required

Investments, Graduate Certificate

Investment skills are a foundation of any successful business venture. Individuals with the knowledge and experience to make informed investment decisions are highly valued contributors in businesses across the globe.

Through our Graduate Certificate in Investments, you will have the opportunity to analyze concepts like market efficiency, intrinsic value, and risk and learn how to build unique valuation models to suit particular investment alternatives.

Through successful completion of your Graduate Certificate in Investments, you will earn credits that may be applied to eligible master's programs, both within D'Amore-McKim School of Business or in the College of Professional Studies. Upon acceptance to one of the eligible degree programs, you may be able to apply the credits you have already earned toward the completion of your degree.

Learn more about this program (http://www.damore-mckim.northeastern.edu/academic-programs/certificates/investments?utm_source=neu-course-catalog&utm_medium=referral&utm_campaign=gci-mofu) on the D'Amore-McKim website.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirement

Code	Title	Hours
FINA 6203	Investment Analysis	3

Electives

Code	Title	Hours
Complete 9 semester hours from the following:		9
FINA 6211	Financial Risk Management	
FINA 6212	Fixed Income Securities and Risk	
FINA 6213	Investment Banking	
FINA 6217	Real Estate Finance and Investment	
FINA 6218	Personal Financial Planning	
FINA 6219	Portfolio Management	

Program Credit/GPA Requirements

12 total semester hours required, may take a maximum of 15 credits

Minimum 3.000 GPA required

Leadership and Human Capital, Graduate Certificate

Are you ready to lead in a changing world? As our world continues to change and grow, new business leaders are emerging with the skills and insight to push the forefront of workforce management. Will you be among them?

Northeastern University's Graduate Certificate in Leadership and Human Capital will help you enhance your potential to grow into leadership positions, while exploring topics like managing high-performance teams, workforce analytics, developing great company culture, and more.

Once you have completed your Graduate Certificate in Leadership and Human Capital, endless opportunities lie ahead. Apply to a master's degree program and the credits you have already earned may be applied toward an eligible program, or explore new opportunities for career growth.

Learn more about this program (http://www.damore-mckim.northeastern.edu/academic-programs/certificates/leadership?utm_source=neu-course-catalog&utm_medium=referral&utm_campaign=gclhc-mofu) on the D'Amore-McKim website.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirement

Code	Title	Hours
HRMG 6200	Managing People and Organizations	3

Electives

Code	Title	Hours
Complete 9 semester hours from the following:		9
HRMG 6210	Managing Professionals and High Performance Teams	
HRMG 6212	Creating an Innovative Organization	
HRMG 6213	Leadership	
HRMG 6214	A Management Perspective of Human Resource Management	
HRMG 6219	Leadership for Environmental Sustainability	
HRMG 6220	Health Organization Management	
MGMT 6214	Negotiations	
STRT 6210	Workforce Metrics and Analytics	

Program Credit/GPA Requirements

12 total semester hours required, may take a maximum of 15 credits
Minimum 3.000 GPA required

Marketing, Graduate Certificate

Through Northeastern University's Graduate Certificate in Marketing, you will have the opportunity to gain the core knowledge and skills necessary to carry out essential marketing functions—from branding new products to advertising services and exploring new consumer audiences.

This program will help you enhance your understanding of marketing fundamentals to build customer connections through targeted messaging and advertising. Your course work will introduce theories and case studies, exploring ways to influence behavior and drive customers to make purchase decisions. You may explore the latest trends in technology and new media, their effect on marketing goods and services, and how to deliver value using the latest technologies. You may also expand your knowledge of mobile platforms, branding, social networks, and technology adoption in emerging markets.

Once you have completed your D'Amore-McKim Graduate Certificate in Marketing, endless opportunities lie ahead. Apply to a master's degree program and the credits you have already earned may be applied toward an eligible program, or explore new opportunities for career growth.

Learn more about this program (http://www.damore-mckim.northeastern.edu/academic-programs/certificates/marketing?utm_source=neu-course-catalog&utm_medium=referral&utm_campaign=gcm-mofu) on the D'Amore-McKim website.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirement

Code	Title	Hours
MKTG 6200	Creating and Sustaining Customer Markets	3

Electives

Code	Title	Hours
Complete 9 semester hours from the following:		9
MKTG 6212	International Marketing	
MKTG 6214	New Product Development	
or TECE 6250	Lean Design and Development	
MKTG 6216	Market Focused Strategy	
MKTG 6218	Marketing in Service Sector	
MKTG 6222	Digital Marketing	
MKTG 6223	Brand and Advertising Management	
MKTG 6224	B2B and Strategic Sales	
MKTG 6226	Consumer Behavior	
MKTG 6260	Special Topics in Marketing	

Program Credit/GPA Requirements

12 total semester hours required, may take a maximum of 15 credits
Minimum 3.000 GPA required

Marketing—Online Program, Graduate Certificate

Through our 100 percent online Graduate Certificate in Marketing, you will have the opportunity to gain the core knowledge and skills necessary to carry out essential marketing functions—from branding new products to advertising services and exploring new consumer audiences.

This program is designed to help you enhance your understanding of marketing fundamentals to build customer connections through targeted messaging and advertising. Your course work will introduce theories and case studies, exploring ways to influence behavior and drive customers to make purchase decisions. You may explore the latest trends in technology and new media, their effect on marketing goods

and services, and how to deliver value using the latest technologies. You may also expand your knowledge of mobile platforms, branding, social networks, and technology adoption in emerging markets.

Once you have completed your online Graduate Certificate in Marketing, endless opportunities lie ahead. The credits you have already earned may be applied toward an eligible master's degree program, including the online MBA, or you may opt to explore new opportunities for career growth.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirement

Code	Title	Hours
MKTG 6200	Creating and Sustaining Customer Markets	3

Electives

Code	Title	Hours
Complete 9 semester hours from the following:		9
MKTG 6212	International Marketing	
MKTG 6214	New Product Development	
MKTG 6216	Market Focused Strategy	
MKTG 6218	Marketing in Service Sector	
MKTG 6222	Digital Marketing	
MKTG 6223	Brand and Advertising Management	

Program Credit/GPA Requirements

12 total semester hours required
Minimum 3.000 GPA required

Mutual Fund Management, Graduate Certificate

Accelerate your career with a Graduate Certificate in Mutual Fund Management.

With our Graduate Certificate in Mutual Fund Management, you will have a chance to further your analytical knowledge and lay the groundwork to perform managerial tasks related to the management and operations of mutual funds. You may choose to explore topics like reconsideration of the fund's investment policy statement and asset allocation plan, preparation of accounting statements, compliance issues, ethical concerns, or measuring and managing risk.

Through successful completion of your Graduate Certificate in Mutual Fund Management, you will earn credits that may be applied to eligible master's programs, both within D'Amore-McKim School of Business or in the College of Professional Studies. Upon acceptance to one of the eligible degree programs, you may be able to apply the credits you have already earned toward the completion of your degree.

Learn more about this program (http://www.damore-mckim.northeastern.edu/academic-programs/certificates/mutual-fund-management?utm_source=neu-course-catalog&utm_medium=referral&utm_campaign=gcmfm-mofu) on the D'Amore-McKim website.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Complete 12 semester hours from the following:		12
FINA 6200	Value Creation through Financial Decision Making	3
FINA 6202	Analysis of Financial Institutions and Markets	3
FINA 6203	Investment Analysis	3
FINA 6212	Fixed Income Securities and Risk	3
FINA 6219	Portfolio Management	3
FINA 6360	Fund Management for Analysts	1
or FINA 6361	Fund Management for Managers	

Program Credit/GPA Requirements

12 total semester hours required, may take a maximum of 15 credits
Minimum 3.000 GPA required

Supply Chain Management, Graduate Certificate

Are you ready to develop effective strategies to help differentiate a company through efficient and effective supply chain management?

Understanding the most reliable, cost-effective ways to source materials, assemble products, manage inventory, and deliver products to customers has always been essential to business success. As all businesses have become increasingly global and advances in information technology continue to reshape manufacturing, transportation, inventory control, and customer relationship management, supply chain management has become an even more fascinating and rewarding field. Through this program, you will take four or five classes to assist you in developing your career knowledge and potential.

Once you have completed your D'Amore-McKim Graduate Certificate in Supply Chain Management, endless opportunities lie ahead. Apply to a full master's degree program and the credits you have already earned may be applied toward an eligible program, or explore new opportunities for career growth.

Learn more about this program (http://www.damore-mckim.northeastern.edu/academic-programs/certificates/supply-chain-management?utm_source=neu-course-catalog&utm_medium=referral&utm_campaign=gcscm-mofu) on the D'Amore-McKim website.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
SCHM 6201	Operations and Supply Chain Management	3
SCHM 6213	Global Supply Chain Strategy	3

Electives

Code	Title	Hours
Complete 6 semester hours from the following:		6
SCHM 6211	Logistics and Transportation Management	
SCHM 6214	Sourcing and Procurement	
SCHM 6215	Supply Chain Analytics	
SCHM 6221	Sustainability and Supply Chain Management	
SCHM 6223	Managing Healthcare Supply Chain Operations	

Program Credit/GPA Requirements

12 total semester hours required
Minimum 3.000 GPA required

Supply Chain Management—Online Program, Graduate Certificate

Are you ready to develop effective strategies to help differentiate a company through efficient and effective supply chain management?

Understanding the most reliable, cost-effective ways to source materials, assemble products, manage inventory, and deliver products to customers has always been essential to business success. As all businesses have become increasingly global and advances in information technology continue to reshape manufacturing, transportation, inventory control, and customer relationship management, supply chain management has become an even more fascinating and rewarding field. Through this 100 percent online program, you will take four or five classes to assist you in developing your career knowledge and potential.

Once you have completed your online Graduate Certificate in Supply Chain Management, endless opportunities lie ahead. Apply to an eligible master's degree program, including the online MBA, and the credits you have already earned may be applied to that program, or you may opt to explore new opportunities for career growth.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
SCHM 6201	Operations and Supply Chain Management	3
SCHM 6213	Global Supply Chain Strategy	3

Electives

Code	Title	Hours
Complete two of the following:		6
SCHM 6211	Logistics and Transportation Management	
SCHM 6214	Sourcing and Procurement	
SCHM 6221	Sustainability and Supply Chain Management	

Program Credit/GPA Requirements

12 total semester hours required

Minimum 3.000 GPA required

Technological Entrepreneurship, Graduate Certificate

Are you interested in developing a startup?

This specialized program will help you build the foundational business knowledge required to commercialize theories you have or products you are developing and bring your innovative ideas to the next level. Through this program, you will take four or five classes to assist you in developing your knowledge and entrepreneurial potential.

Through successful completion of the Graduate Certificate in Technological Entrepreneurship, you will earn credits that may be applied to eligible master's programs. Once you have applied and been accepted to the Master of Science in Technological Entrepreneurship, then the credits you've earned during your certificate program will apply. Not only that, but your performance in the courses can make you eligible to waive the GRE/GMAT requirement. Upon successful completion of a graduate certificate on campus, international students may even apply for up to 12 months of OPT work authorization in the United States.

Learn more about this program (http://www.damore-mckim.northeastern.edu/academic-programs/certificates/technological-entrepreneurship?utm_source=neu-course-catalog&utm_medium=referral&utm_campaign=gcte-mofu) on the D'Amore-McKim website.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
ENTR 6200	Enterprise Growth and Innovation	3
ENTR 6212	Business Planning for New Ventures	3

Electives

Code	Title	Hours
Complete 6 semester hours from the following:		6
ENTR 6218	Business Model Design and Innovation	
ENTR 6219	Financing Ventures from Early Stage to Exit	
ENTR 6222	Competing in Dynamic, Innovation-Driven Markets	
TECE 6222	Emerging and Disruptive Technologies	
TECE 6230	Entrepreneurial Marketing and Selling	
TECE 6250	Lean Design and Development	
TECE 6300	Managing a Technology-Based Business	
TECE 6340	The Technical Entrepreneur as Leader	

Program Credit/GPA Requirements

12 total semester hours required, may take a maximum of 15 credits
Minimum 3.000 GPA required

College of Computer and Information Science

Website (http://www.ccis.northeastern.edu)

Carla E. Brodley, PhD, Dean

Bryan Lackaye, EdD, Associate Dean for Graduate School Administration
Rajmohan Rajaraman, PhD, Associate Dean and Director of Graduate Studies
Karen Rosen, MEd, Director of Graduate Co-op Program

202 West Village H
617.373.6840
gradschool@ccs.neu.edu

At the College of Computer and Information Science (CCIS), we are inspired by our information-driven world and strive to make it a better place. Our students engage in rigorous learning and real-world co-op experiences. Our renowned faculty shapes minds, sparks innovation, and inspires ideas. Our interdisciplinary research breaks new ground to solve everyday problems.

CCIS maintains a strong research program with significant funding from the major federal research agencies and private industry. With a substantial increase in faculty strength and research funding in recent years, we are actively seeking highly motivated, bright, hardworking students who are interested in pursuing a PhD degree in computer science or in the interdisciplinary field of information assurance, network science, or personal health informatics. Graduate students and faculty members are involved in exciting projects in a wide range of research areas, including programming languages, software engineering, distributed and parallel computing, cryptography, network security, health informatics, network science, databases, information retrieval, and artificial intelligence. Colloquia and weekly research seminars contribute to the vibrant research atmosphere in the college.

Our curriculum encompasses both the breadth and depth needed for graduate school. Specialized, advanced courses for PhD students in computer science, information assurance, and personal health informatics are designed to prepare all students for research early in their doctoral education.

The MS curriculum in computer science combines the study of basic algorithms and theoretical computer science principles with advanced programming and software design methods. It offers students the opportunity to develop the analytical and problem-solving skills needed to pursue challenging professional careers.

In addition, we offer five interdisciplinary master's degree programs: the Master of Science in Health Informatics program, which seeks to prepare graduates to use information technology to improve healthcare delivery and outcomes; the Master of Science in Information Assurance program, which focuses on information technology and incorporates the understanding of the social sciences, law, criminology, and management needed to prevent and combat cyberattacks; the Master of Science in Data Science program, which is designed to give students a comprehensive framework for processing, modeling, analyzing, and reasoning about data; the Master of Science in Health Data Analytics program, which prepares students to succeed in an emerging field at the intersection of health informatics, data science, and computational modeling; and the Master of Science in Game Science and Design, which gives students a comprehensive understanding of how successful game products are created in a player-centric environment.

The Align program enables intellectually curious students to earn a Master of Science in Computer Science without a background in the field. Regardless of undergraduate major or current experience, Align's custom curricula prepares students for high-demand industries.

Three student laboratories house a mix of Linux and Windows workstations and separate research lab facilities. In addition, the Information Assurance Laboratory provides students with hands-on experience in information assurance exercises in an isolated network environment.

Our college is a tightly knit community, and the faculty, staff, and students interact regularly through yearly town hall meetings, weekly teas, and seminars. A diverse, multicultural graduate student body and faculty members encourage rich extracurricular interaction. The student chapter of the Association for Computing Machinery organizes a number of social events to promote friendship and camaraderie within the CCIS community.

Academic Policies and Procedures

- Absenteeism (p. 99)
- Academic Integrity (p. 99)
- Academic Probation and Dismissal (p. 100)
- Transfer of Credit (p. 100)

Absenteeism

Students are expected to attend all classes and lab sections for their registered courses. Any student who anticipates missing a class due to illness or emergency situations is expected to contact their professor as soon as possible.

While students are welcome to travel over winter and summer breaks, the College of Computer and Information Science expects students to return to campus in a timely manner and to be present for the first week of classes each term. Students who do not arrive back to campus on time may be dropped from their classes until they return to campus. The Office of the Registrar posts current and future academic calendars (https://registrar.northeastern.edu/article/calendar-2017-2018) on their website so travel plans can be made accordingly.

Further, students who are hired as teaching assistants will forfeit their position if they are not present on campus for TA training, which takes place in the first week of classes.

ACADEMIC INTEGRITY

College Academic Integrity Committee and Policy

The college has formed academic integrity committees for each of the doctoral and master's programs in order to assess violations in light of the unique nature of each program. It is necessary that academic integrity violations be considered at the program level given the distinctive requirements of each level of student.

The overriding goal of the committee is to enforce the university's academic integrity policy utilizing the highest level of content expertise necessary to make the most informed decision. Much like the Office of

Student Conduct and Conflict Resolution (OSCCR), the academic integrity committee will consider all cases submitted by CCIS faculty, conduct interviews with students and faculty, as well as gather all relevant academic information to evaluate the situation in question.

The committee will issue decisions on graduate student standing. Judgments will include but not be limited to written warnings, program suspension, co-op and/or internship removal, and program dismissal. The committee reserves the right to act in the best interest of the college, academic program, faculty, and student. As such, decisions on student standing will be made in full consideration of the evidence and may be more lenient or severe than those issued by university bodies, such as OSCCR.

In accordance with university policy, the college has final discretion over academic performance decisions.

Academic Probation and Dismissal

A student whose overall GPA falls below 3.000 will be automatically placed on academic probation and will be notified by the college. Once on probation, a student has one academic semester (summer excluded) to achieve a 3.000 GPA. If the GPA is still unsatisfactory at the end of that semester, the student will be eligible for dismissal from the graduate program.

Students should refer to their program's requirements page regarding the core GPA requirement.

Transfer of Credit

A maximum of 9 semester hours of credit obtained at another institution may be accepted toward the degree, provided the credits meet the following criteria:

- Work is completed at the graduate level for graduate credit
- Student received a grade of 3.000 or better
- Credits were earned at an accredited institution
- Credits have not been used toward any other degree

Transfer credit will be offered only for courses that match a course offered at Northeastern University and that have been approved by the graduate committee. However, no transfer credit will be given for courses listed as Interdisciplinary courses.

Students can submit a request for transfer of credit after they have begun taking courses in the College of Computer and Information Science (CCIS). Please see your academic advisor for the procedure to submit a request.

Computer Science

At the College of Computer and Information Science (CCIS), we are inspired by an increasingly interconnected society, informed by a rapidly changing job market, and focused on addressing the challenges of a complex world. Our goal is to equip students with knowledge as diverse as it is deep. Our programs provide a strong technical foundation and an essential understanding of computing concepts while integrating computer, data, and information sciences across disciplines and industries.

Our master's degrees are advanced programs that are designed to prepare students to be job ready through a rigorous curriculum,

innovative research, experiential learning, and a collaborative environment rich in faculty expertise.

Our research-driven doctoral programs offer students an opportunity to engage in exciting projects, a vibrant community, and a challenging curriculum that offers breadth and depth in areas both within computer science and across disciplines throughout Northeastern.

Graduate education in computer science also features the top-ranked Northeastern co-op program, enabling students to supplement their classroom education with real-world experience in the field. We have consistently placed more than 95 percent of our students in co-op positions. The college partners with several high-profile companies, including:

- Amazon
- Bloomberg
- EMC Corporation
- Fidelity Investments
- IBM Corporation
- Intuit
- Kronos
- MathWorks
- Microsoft
- Nokia
- Phase Forward
- SeaChange International
- Verizon Communications

Programs
Doctor of Philosophy (PhD)

Master of Science (MS)

Master of Science in Computer Science (MSCS)

Graduate Certificate

Computer Science, PhD

Academic Requirements for PhD in Computer Science
A minimum of 48 semester hours of course work beyond the BS/BA degree is required of all students.

Admission to Candidacy
All students must demonstrate sufficient knowledge in the fundamentals of computer science, as well as the ability to carry out research in an area of computer science.

The student must maintain a minimum grade-point average (GPA) of 3.500 among the six core courses satisfying the above course requirements and receive a grade of B or better in each of these courses.

Students who have taken equivalent courses in other institutions may petition to be exempted from the course(s) (subject to the approval of the PhD CS curriculum committee). Each student may repeat a course once for no more than three out of the six courses if they do not receive a B or better in the course. Students with an Master of Science in Computer Science may petition to the PhD CS curriculum committee for an exemption from these courses. Petition forms are available on the college website.

The fields listed do not necessarily represent areas of specialization or separate tracks within the PhD program. Rather, they attempt to delineate areas on which the student must be examined in order to measure his or her ability to complete the degree. Therefore, they may be adjusted in the future to reflect changes in the discipline of computer science and in faculty interests within the College of Computer and Information Science (CCIS). Similarly, these fields do not represent the only areas in which a student may write his or her dissertation. They are, however, intended to serve as a basis for performing fundamental research in computer science.

Paper Requirement

To demonstrate research ability, the student is required to submit to the PhD committee a research or a survey paper in an area of specialty under the supervision of a faculty advisor. A submitted paper from a student is considered to have fulfilled the paper requirement if:

1. The paper has been submitted to a selective conference.
2. The student has made a substantial contribution to the paper.
3. The advisor has endorsed the paper with a written statement indicating the student's contribution.
4. The PhD CS curriculum committee has voted on a positive recommendation. The committee may require a presentation from the student before making a recommendation.

Upon completion of the course and the research paper requirements, the student is admitted to candidacy for the PhD degree. It is highly recommended that the student complete the candidacy requirement by the end of his or her second year but no later than the third year.

Residency

One year of continuous full-time study is required after admission to the PhD candidacy. It is expected that during this period the student will make substantial progress in preparing for the comprehensive examination.

Teaching Requirement

All computer science PhD students must satisfy the teaching requirement in order to graduate. This requirement is fulfilled when the student works as a teaching assistant (TA) or instructor of record (IoR) for one semester and during this semester:

- Teaches at least 3 hours of classes
- Prepares at least one assignment, or quiz, or equivalent

PhD students are expected to satisfy the teaching requirement some time after completing their first year and at least one semester prior to scheduling their PhD defense.

Comprehensive Examination/Dissertation Proposal

The examination is taken after the student has achieved sufficient depth in a field of study in order to prepare a prospectus for the PhD dissertation. This process should take place no later than the end of the fifth year in residence. Prior to taking the examination, the student prepares a dissertation proposal, which describes the proposed research,

including the relevant background materials from the literature. The proposal should clearly specify the research problems to be attacked, the techniques to be used, and a schedule of milestones toward completion.

The dissertation proposal must be approved by the dissertation committee. With the help of the advisor, a student selects the committee, consisting of at least four members, to be approved by the PhD CS curriculum committee. The four members must include the advisor, two internal members, and an external examiner.

Upon approval of the written proposal, the student has to present the proposed work orally in a public forum, followed by a closed-door oral examination from the dissertation committee. The student may take the dissertation proposal examination twice, at most.

Doctoral Dissertation

Upon successful completion of solving the research proposed in the dissertation proposal, the candidate has an opportunity to prepare the dissertation for approval by the dissertation committee. The dissertation must contain results of extensive research and make an original contribution to the field of computer science. The work should give evidence of the candidate's ability to carry out independent research. It is expected that the dissertation should be of sufficient quality to merit publication in a reputable journal in computer science.

DOCTORAL COMMITTEE

With the help of the advisor, a student selects the committee, consisting of at least four members, to be approved by the PhD CS curriculum committee. The four members must include the advisor, two internal members, and an external examiner.

DISSERTATION DEFENSE

The dissertation defense is held in accordance with the regulations of the University Graduate Council. It consists of a lecture given by the candidate on the subject matter of the dissertation. This is followed by questions from the dissertation committee and others in attendance concerning the results of the dissertation as well as any related matters. The examination is chaired by the PhD advisor.

TIME AND TIME LIMITATION

After the establishment of degree candidacy, a maximum of five years will be allowed for the completion of the degree requirements, unless an extension is granted by the college graduate committee.

LEARNING OUTCOMES

Students graduating with a PhD in Computer Science must:

- Gain a broad understanding of computer science fundamentals, spanning a substantial portion of the following core areas: artificial intelligence and data science, human-centered computing, software, systems, and theory.
- Gain significant expertise in at least one research area in computer science.
- Produce and defend original research in an area of computer science.
- Be able to communicate research results effectively in both oral and written forms.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Milestones

Course requirements
Paper requirement
Dissertation proposal

Dissertation defense

Core Requirements

A grade of B or higher is required in each course. A cumulative 3.500 GPA is required for the core requirement.

Code	Title	Hours
Breadth Areas		
Complete one course from four of the five following breadth areas:		16
Artificial Intelligence and Data Science		
CS 6140	Machine Learning	
Human-Centered Computing		
CS 7340	Theory and Methods in Human Computer Interaction	
CS 7250	Information Visualization: Theory and Applications	
Software		
CS 7400	Intensive Principles of Programming Languages	
CS 6410	Compilers	
Systems		
CS 7600	Intensive Computer Systems	
Theory		
CS 7800	Advanced Algorithms	
CS 7805	Theory of Computation	
Specialization Courses		
Complete 8 semester hours from the specialization course lists. (p. 102)		8

Electives

Code	Title	Hours
Complete 24 semester hours in the following:		24
Note: Consult faculty advisor for the other acceptable courses.		
CS 5100 to CS 5850, except CS 5340		
CS 6110 to CS 6810		
CS 7340	Theory and Methods in Human Computer Interaction	
CS 8982	Readings	

Dissertation

Code	Title	Hours
Upon achieving PhD candidacy, complete the following (repeatable) courses for two consecutive semesters:		
CS 9990	Dissertation	
CS 8982	Readings	
For remaining semester(s), complete the following (repeatable) course until graduation:		
CS 9996	Dissertation Continuation	

Specialization Course Lists

Code	Title	Hours
Artificial Intelligence		
CS 5100	Foundations of Artificial Intelligence	
CS 5335	Robotic Science and Systems	
CS 6120	Natural Language Processing	
CS 6140	Machine Learning	
CS 7140	Advanced Machine Learning	
CS 7180	Special Topics in Artificial Intelligence	
Computer-Human Interface		
CS 5520	Mobile Application Development	
CS 6350	Empirical Research Methods	
CS 7260	Visualization for Network Science	
CS 7295	Special Topics in Data Visualization	
CS 7340	Theory and Methods in Human Computer Interaction	
Data Science		
CS 5200	Database Management Systems	
CS 6140	Machine Learning	
CS 6200	Information Retrieval	
CS 6220	Data Mining Techniques	
CS 6240	Large-Scale Parallel Data Processing	
CS 7140	Advanced Machine Learning	
CS 7280	Special Topics in Database Management	
CS 7290	Special Topics in Data Science	
Graphics		
CS 5310	Computer Graphics	
CS 5330	Pattern Recognition and Computer Vision	
Information Security		
CS 5770	Software Vulnerabilities and Security	
CS 6740	Network Security	
CS 6750	Cryptography and Communications Security	
CS 6760	Privacy, Security, and Usability	
CS 7580	Special Topics in Software Engineering	
CS 7810	Foundations of Cryptography	
Networks		
CS 5700	Fundamentals of Computer Networking	
CS 6710	Wireless Network	
CS 6740	Network Security	
CS 6750	Cryptography and Communications Security	
CS 6760	Privacy, Security, and Usability	
CS 7775	Seminar in Computer Security	
CS 7780	Special Topics in Networks	
Programming Languages		
CS 5400	Principles of Programming Language	
CS 6410	Compilers	
CS 6510	Advanced Software Development	
CS 7400	Intensive Principles of Programming Languages	
CS 7480	Special Topics in Programming Language	
CS 7485	Special Topics in Formal Methods	
Software Engineering		
CS 5610	Web Development	
CS 6510	Advanced Software Development	
CS 7580	Special Topics in Software Engineering	
Systems		

CS 6620	Fundamentals of Cloud Computing
CS 6650	Building Scalable Distributed Systems
CS 6740	Network Security
CS 7600	Intensive Computer Systems
CS 7610	Foundations of Distributed Systems
CS 7680	Special Topics in Computer Systems
Theory	
CS 6750	Cryptography and Communications Security
CS 6800	Application of Information Theory
CS 7485	Special Topics in Formal Methods
CS 7800	Advanced Algorithms
CS 7805	Theory of Computation
CS 7880	Special Topics in Theoretical Computer Science
Game Design	
CS 5150	Game Artificial Intelligence
CS 5310	Computer Graphics
CS 5340	Computer/Human Interaction
CS 5850	Building Game Engines
CS 7140	Advanced Machine Learning

Program Credit/GPA Requirements

48 total semester hours required
Minimum overall 3.000 GPA required

Plan of Study
Sample Curriculum

Year 1

Fall	Hours	Spring	Hours
Breadth course	4	Breadth course	4
Core elective	4	Core elective	4
	8		8

Year 2

Fall	Hours	Spring	Hours
Breadth course	4	Breadth course	4
Open elective	4	Open elective	4
	8		8

Year 3

Fall	Hours	Spring	Hours
CS 9990	4	CS 9990	4
CS 8982	4	CS 8982	4
	8		8

Year 4

Fall	Hours	Spring	Hours
CS 9996	0	CS 9996	0
	0		0

Year 5

Fall	Hours	Spring	Hours
CS 9996	0	CS 9996	0
	0		0

Year 6

Fall	Hours	Spring	Hours
CS 9996	0	CS 9996	0
	0		0

Total Hours: 48

<div style="background:red;color:white;">

Computer Science, PhD—Advanced Entry

</div>

Academic Requirements for Advanced-Entry PhD in Computer Science

A minimum of 16 semester hours of course work beyond the master's degree (excluding the six required core courses) is required of all students.

Admission to Candidacy

Refer to the Computer Science, PhD, overview for admission to candidacy requirements.

Paper Requirement

Refer to the Computer Science, PhD, overview, for research/survey paper requirements.

Residency

Refer to the Computer Science, PhD, overview, for residency requirements.

Comprehensive Examination/Dissertation Proposal

Refer to the Computer Science, PhD, overview, for comprehensive examination requirements.

Doctoral Dissertation

Refer to the Computer Science, PhD, overview, for doctoral dissertation and completion requirements.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Milestones

Course requirements
Paper requirement
Comprehensive exam/dissertation proposal
Dissertation Defense

Core Requirements

Complete 16 semester hours of approved course work. Consult your faculty advisor for acceptable courses. Students must maintain a minimum GPA of 3.500 as well as earn a grade of B or better in each course.

Dissertation

Code	Title	Hours
Upon achieving PhD candidacy, complete the following (repeatable) courses for two consecutive semesters:		
CS 9990	Dissertation	
CS 8982	Readings	
For remaining semester(s), complete the following (repeatable) course until graduation:		
CS 9996	Dissertation Continuation	

Program Credit/GPA Requirements

16 total semester hours required
Minimum overall 3.000 GPA required

Data Science, MS

The College of Computer and Information Science (CCIS) and the Department of Electrical and Computer Engineering (ECE) jointly offer a new interdisciplinary Master of Science program in data science. This program is designed to give students a comprehensive framework for processing, analyzing, modeling, and reasoning about data. Students will engage in an extensive course work intended to develop depth in data collection, storage, retrieval, processing, modeling, and visualization. Students will also be able to choose elective courses from a variety of offerings in CCIS, the College of Engineering (COE), and throughout the campus to explore areas that generate data, or specialized data science applications. Successful program graduates will be well positioned to attain data scientist and data engineer positions in a fast-growing field or to progress into doctoral degrees in related disciplines.

Course Requirements

The Master of Science in Data Science curriculum requires five core courses that jointly represent the essential technical skills in data science. Two courses in algorithms and data processing examine foundational concepts and languages, focusing on data representation, storage, manipulation, and query, as well as large-scale computing and optimization. Two core courses in machine learning and data mining introduce concepts on data modeling, representation, uncovering associations, and making predictions. The capstone course presents a holistic view of data science. Through experiential learning, students are exposed to the real-world challenges of implementing data science techniques to solve meaningful problems and effectively communicate with data. The courses are tailored toward technically or mathematically trained students.

The five core courses include:

- Two core courses in algorithms and data processing
- Two core courses in machine learning and data mining
- One core course in information visualization

Three elective courses are drawn from a selection of courses across Northeastern.

Learning Outcomes

Students who complete the MS degree will be able to:

- Collect data from numerous sources (databases, files, XML, JSON, CSV, and Web APIs) and integrate them into a form in which the data is fit for analysis
- Use R and Python to explore data, produce summary statistics, perform statistical analyses; use standard data mining and machine-learning models for effective analysis
- Select, plan, and implement storage, search, and retrieval components of large-scale structure and unstructured repositories
- Retrieve data for analysis, which requires knowledge of standard retrieval mechanisms such as SQL and XPath, but also retrieval of unstructured information such as text, image, and a variety of alternate formats
- Match the methodological principles and limitations of machine learning and data mining methods to specific applied problems and communicate the applicability and the advantages/disadvantages of the methods in the specific problem to nondata experts
- Carry out the full data analysis workflow, including unsupervised class discovery, supervised class comparison, and supervised class prediction; Summarize, interpret, and communicate the analysis of results
- Organize visualization of data for analysis, understanding, and communication; choose appropriate visualization method for a given data type using effective design and human perception principle
- Develop methods for modeling, analyzing, and reasoning about data arising in one or more application domains such as social science, health informatics, web and social media, climate informatics, urban informatics, geographical information systems, business analytics, bioinformatics, complex networks, public health, and game design
- Manage, process, analyze, and visualize data at scale. This outcome allows students to handle data where the conventional information technology fail.

Placement Exams

Each incoming masters student, regardless of his or her background, takes two placement exams administered one week prior to the beginning of the semester. The two exams cover fundamentals of computer science and programming skills and basic statistics, probability, and linear algebra. If the student does not get a B or above in a part of the placement exam, then the student must take the corresponding introductory course.

- Introduction to Programming for Data Science (DS 5010) The introductory course on fundamentals of programming and data structures covers data structures (lists, arrays, trees, hash tables, etc.), program design, programming practices, testing, debugging, maintainability, data collection techniques, and data cleaning and preprocessing. This course will have a class project where the students will use the concepts they learn to collect data from the web, clean, and preprocess and ready for analysis.
- Introduction to Linear Algebra and Probability for Data Science (DS 5020) The introductory course on basics of statistics, probability, and linear algebra covers random variables, frequency distributions, measures of central tendency, measures of dispersion, moments of a distribution, discrete and continuous probability distributions, chain rule, Bayes' rule, correlation theory, basic sampling, matrix operations, trace of a matrix, norms, linear independence and ranks, inverse of a matrix, orthogonal matrices, range and null space of a matrix, the determinant of a matrix, positive semidefinite matrices, eigenvalues and eigenvectors.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

A cumulative GPA of 3.000 or higher is required in the following core courses:

Code	Title	Hours
Algorithms		
Complete 4 semester hours from the following:		4
CS 5800	Algorithms	
EECE 7205	Fundamentals of Computer Engineering	
Data Management and Processing		

DS 5110	Introduction to Data Management and Processing	4

Machine Learning and Data Mining

DS 5220	Supervised Machine Learning and Learning Theory	4
DS 5230	Unsupervised Machine Learning and Data Mining	4

Presentation and Visualization

DS 5500	Information Visualization: Applications in Data Science	4

Electives

Code	Title	Hours
Complete 12 semester hours from the following:		12

College of Computer and Information Science

CS 5100	Foundations of Artificial Intelligence
CS 6120	Natural Language Processing
CS 6200	Information Retrieval
CS 6350	Empirical Research Methods
CS 7180	Special Topics in Artificial Intelligence
CS 7280	Special Topics in Database Management

College of Engineering

CIVE 7388	Special Topics in Civil Engineering
EECE 5639	Computer Vision
EECE 5640	High-Performance Computing
EECE 7337	Information Theory
EECE 7360	Combinatorial Optimization
EECE 7370	Advanced Computer Vision
EECE 7397	Advanced Machine Learning
IE 5640	Data Mining for Engineering Applications
IE 7275	Data Mining in Engineering
IE 7280	Statistical Methods in Engineering

College of Social Sciences and Humanities

PPUA 5261	Dynamic Modeling for Environmental Decision Making
PPUA 5262	Big Data for Cities
PPUA 5263	Geographic Information Systems for Urban and Regional Policy
PPUA 5266	Urban Theory and Science
PPUA 7237	Advanced Spatial Analysis of Urban Systems
POLS 7200	Perspectives on Social Science Inquiry
POLS 7201	Research Design
POLS 7202	Quantitative Techniques

D'Amore-McKim School of Business

BUSN 6320	Business Analytics Fundamentals
BUSN 6324	Predictive Analytics for Managers

College of Science

MATH 7340	Statistics for Bioinformatics
PHYS 5116	Complex Networks and Applications
PHYS 7305	Statistical Physics
PHYS 7321	Computational Physics
PHYS 7331	Network Science Data

Bouvé College of Health Sciences

NRSG 5121	Epidemiology and Population Health
PHTH 5202	Introduction to Epidemiology
PHTH 5210	Biostatistics in Public Health
PHTH 5224	Social Epidemiology

College of Arts, Media and Design

GSND 5110	Game Design and Analysis
GSND 6350	Data-Driven Player Modeling

Note: Students that take electives worth less than 4 credits (i.e., Bouvé, CSSH courses) will register for an accompanying data science project course in the same semester to bring the cumulative credits to 4. In order to earn this additional credit, students will be expected to work with faculty to design an additional project in line with the curricular aims of their chosen elective and the data science core learning outcomes.

Program Credit/GPA Requirements

32 total semester hours required
Minimum 3.000 GPA required

Health Data Analytics, MS

The digitization of healthcare systems in clinical settings, in combination with the explosion of personal data collection devices, provides the opportunity of using data for revolutionizing approaches to care at all levels with an emphasis on precision medicine and person-centered care. The ability to take advantage of this "Big Data" opportunity, however, requires expertise at the intersection of health informatics, data science, and computational modeling. The Master of Science in Health Data Analytics is designed to prepare students to succeed in this emerging field. This program offers a strong, competency-based curriculum that addresses data analytics ranging from data acquisition from traditional and emerging data streams, data aggregation methods, data mining algorithms, predictive computational modeling, and visualization techniques. Students can expect to amass a broad and deep understanding of the various methods, software tools, and topical expertise needed to discover meaningful patterns in health-related data and effectively communicate their implications to a number of diverse stakeholders. Successful graduates of the Master of Science in Health Data Analytics will be effective practitioners and leaders in the rapidly developing domain of data analytics with a focus on health and healthcare.

The interdisciplinary Master of Science in Health Data Analytics consists of 12 courses, drawn from the College of Computer and Information Science and the Bouvé College of Health Science; a capstone project; and an ongoing series of seminars on topics in health data analytics. Two tracks will be available to matriculating students: standard and research based.

LEARNING OUTCOMES

- Proficiency in the health and healthcare ecosystem, including stakeholder roles such as payers, providers, and government; social determinants of health; wellness promotion; acute vs.chronic care
- Ability to acquire, store, and validate data; familiarity with common health-related data sources and formats
- Proficiency in analyzing data using statistical, epidemiological, and data-mining methods along with appropriate software tools and programming languages
- Ability to interpret and present analytical results to nontechnical stakeholders using visualization and accessible narrative structures

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Analytics/Modeling/Statistics		
DA 5020	Collecting, Storing, and Retrieving Data	4
DA 5030	Introduction to Data Mining/Machine Learning	4
HINF 6400	Introduction to Health Data Analytics	3
PPUA 5301	Introduction to Computational Statistics	4
PPUA 5302	Information Design and Visual Analytics	4
Healthcare		
HINF 5102	Data Management in Healthcare	3
HINF 5105	The American Healthcare System	3
HINF Predictive Analy (TBA)		3

[1]   Please see college administrator for course information.

Thesis/Capstone

Code	Title	Hours
Complete either Thesis or Capstone:		3
Thesis		
HINF Health Informatics (TBA) Thesis		
Capstone		
HINF 7701	Health Informatics Capstone Project	

Electives

At least one course must be chosen from the methods list.

Code	Title	Hours
Methods		
Complete 3–6 semester hours from the following:		3-6
PHTH 6202	Intermediate Epidemiology	
PHTH 6210	Applied Regression Analysis	
PHTH 6440	Advanced Methods in Biostatistics	
CS 6350	Empirical Research Methods	
CAEP 7712	Intermediate Statistical Data Analysis Techniques	
CAEP 7716	Advanced Research and Data Analyses 2	
Other Electives		
Complete 0–4 semester hours from the following:		0-4
ARTG 5330	Visualization Technologies 1	
ARTG 6320	Design of Information-Rich Environments	
HINF 5200	Theoretical Foundations in Personal Health Informatics	
HINF 5300	Personal Health Interface Design and Development	
HINF 6215	Project Management	
HINF 6220	Database Design, Access, Modeling, and Security	

PHTH 5226	Strategic Management and Leadership in Healthcare	
PHTH 5232	Evaluating Healthcare Quality	
PHTH 5234	Economic Perspectives on Health Policy	

Program Credit/GPA Requirements

37 total semester hours required
Minimum 3.000 GPA required

Computer Science, MSCS

Northeastern University's Master of Science in Computer Science is designed to prepare students for a variety of careers in computer science. The program combines both computing and important application domains—enabling you to increase your broad-based knowledge in the field while focusing on one curricular concentration selected from a range of options including artificial intelligence, computer human interaction, graphics, programming languages, software engineering, data science, networks, theory, game design, systems, and information security.

Learning Outcomes

- Exhibit proficiency in the design and maintenance of large application software
- Develop the ability to maintain network infrastructure
- Build familiarity with basic algorithms and theoretical computer science principles
- Demonstrate ability in advanced programming and software design materials

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

A cumulative 3.000 GPA is required for the three core courses:

Code	Title	Hours
Programming		
CS 5010	Programming Design Paradigm	4
Development		
CS 5500	Managing Software Development	4
or CS 5600	Computer Systems	
Algorithms		
CS 5800	Algorithms	4

Electives

Code	Title	Hours
Complete 20 semester hours from the following. A minimum of 8 semester hours must be taken from the same specialization.		20
CS 5100 to CS 5850		
CS 6110 to CS 6810		
CS 7140 to CS 7380		
CS 7470 to CS 7580		
CS 7670 to CS 7785		
CS 7810 to CS 7880		
CS 8674	Master's Project	

| CS 8982 | Readings |
| CS 7990 | Thesis |

Specializations

Artificial Intelligence

CS 5100	Foundations of Artificial Intelligence
CS 5335	Robotic Science and Systems
CS 6120	Natural Language Processing
CS 6140	Machine Learning
CS 7140	Advanced Machine Learning
CS 7180	Special Topics in Artificial Intelligence

Computer-Human Interface

CS 5340	Computer/Human Interaction
CS 6350	Empirical Research Methods
CS 7140	Advanced Machine Learning

Data Science

CS 5200	Database Management Systems
CS 6140	Machine Learning
CS 6200	Information Retrieval
CS 6220	Data Mining Techniques
CS 6240	Large-Scale Parallel Data Processing
CS 7280	Special Topics in Database Management
CS 7290	Special Topics in Data Science
CS 7295	Special Topics in Data Visualization

Game Design

CS 5150	Game Artificial Intelligence
CS 5310	Computer Graphics
CS 5340	Computer/Human Interaction
CS 5850	Building Game Engines
CS 7140	Advanced Machine Learning

Graphics

CS 5310	Computer Graphics
CS 5330	Pattern Recognition and Computer Vision
CS 5520	Mobile Application Development

Information Security

CS 5770	Software Vulnerabilities and Security
CS 6740	Network Security
CS 6750	Cryptography and Communications Security
CS 6760	Privacy, Security, and Usability
CS 7485	Special Topics in Formal Methods
CS 7580	Special Topics in Software Engineering
CS 7810	Foundations of Cryptography

Networks

CS 5700	Fundamentals of Computer Networking
CS 6710	Wireless Network
CS 6740	Network Security
CS 6750	Cryptography and Communications Security
CS 6760	Privacy, Security, and Usability
CS 7775	Seminar in Computer Security
CS 7780	Special Topics in Networks

Programming Languages

CS 5400	Principles of Programming Language
CS 6410	Compilers
CS 6510	Advanced Software Development
CS 7480	Special Topics in Programming Language

Software Engineering

CS 5610	Web Development
CS 6510	Advanced Software Development
CS 6650	Building Scalable Distributed Systems
CS 7580	Special Topics in Software Engineering

Systems

| CS 6740 | Network Security |
| CS 7680 | Special Topics in Computer Systems |

Theory

CS 6750	Cryptography and Communications Security
CS 6800	Application of Information Theory
CS 7805	Theory of Computation
CS 7880	Special Topics in Theoretical Computer Science

Program Credit/GPA Requirements

32 total semester hours required
Minimum 3.000 GPA required

Computer Science, MSCS—ALIGN Program

MSCS-Align students come from a wide variety of backgrounds—with undergraduate majors ranging from math, biology, history, engineering, and classics. In this program, students have an opportunity to acquire both the knowledge needed to transition into a new career and the practical skills to build the next great app. In this program, students may learn to:

- Develop the ability to recognize and solve problems arising in modern computing
- Assimilate ideas and concepts from theoretical studies and hands-on design and programming
- Acquire skills in software and application design, network infrastructure, and other dynamic and emerging computer science areas

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

A grade of B or higher is required in each course.

Code	Title	Hours
ALIGN Course Work		
Fundamentals		
CS 5001 and CS 5003	Intensive Foundations of Computer Science and Recitation for CS 5001	4
Discrete Structures		
CS 5002	Discrete and Data Structures	4
Object-Oriented Design		

CS 5004 and CS 5005	Object-Oriented Design and Recitation for CS 5004	4
Addtional ALIGN courses		
CS 5006	Algorithms	2
CS 5007	Computer Systems	2
Development		
CS 5500	Managing Software Development	4
or CS 5600	Computer Systems	
Algorithms		
CS 5800	Algorithms	4

Electives

Code	Title	Hours
Complete 20 semester hours from the following. A minimum of 8 semester hours must be taken from the same specialization.		20
CS 5100 to CS 5850		
CS 6110 to CS 6810		
CS 8674	Master's Project	
CS 8982	Readings	
CS 7990	Thesis	
Specializations		
Artificial Intelligence		
CS 5100	Foundations of Artificial Intelligence	
CS 5335	Robotic Science and Systems	
CS 6120	Natural Language Processing	
CS 6140	Machine Learning	
CS 7140	Advanced Machine Learning	
CS 7180	Special Topics in Artificial Intelligence	
Computer-Human Interface		
CS 5340	Computer/Human Interaction	
CS 6350	Empirical Research Methods	
CS 7140	Advanced Machine Learning	
Database Management		
CS 5200	Database Management Systems	
CS 6140	Machine Learning	
CS 6200	Information Retrieval	
CS 6220	Data Mining Techniques	
CS 6240	Large-Scale Parallel Data Processing	
CS 7280	Special Topics in Database Management	
Game Design		
CS 5150	Game Artificial Intelligence	
CS 5310	Computer Graphics	
CS 5340	Computer/Human Interaction	
CS 5850	Building Game Engines	
CS 7140	Advanced Machine Learning	
Graphics		
CS 5310	Computer Graphics	
CS 5330	Pattern Recognition and Computer Vision	
CS 5520	Mobile Application Development	
Information Security		
CS 5770	Software Vulnerabilities and Security	
CS 6740	Network Security	

CS 6750	Cryptography and Communications Security	
CS 6760	Privacy, Security, and Usability	
CS 7580	Special Topics in Software Engineering	
Networks		
CS 5700	Fundamentals of Computer Networking	
CS 6710	Wireless Network	
CS 6740	Network Security	
CS 6750	Cryptography and Communications Security	
CS 6760	Privacy, Security, and Usability	
CS 7775	Seminar in Computer Security	
CS 7780	Special Topics in Networks	
Programming Languages		
CS 5400	Principles of Programming Language	
CS 6410	Compilers	
CS 6510	Advanced Software Development	
CS 7480	Special Topics in Programming Language	
Software Engineering		
CS 5610	Web Development	
CS 6510	Advanced Software Development	
CS 6650	Building Scalable Distributed Systems	
CS 7580	Special Topics in Software Engineering	
Systems		
CS 6740	Network Security	
CS 7680	Special Topics in Computer Systems	
Theory		
CS 6750	Cryptography and Communications Security	
CS 6800	Application of Information Theory	
CS 7805	Theory of Computation	
CS 7880	Special Topics in Theoretical Computer Science	

Program Credit/GPA Requirements

44 total semester hours required
Minimum 3.000 GPA required

Computer Science, Graduate Certificate

The postbaccalaureate certificate is designed to give students a solid foundation in the mathematical and theoretical underpinnings of computer science, including the areas of discrete mathematics, basic programming, data structures, object-oriented programming, algorithms, and computer systems. The goal of the certificate is to provide foundational knowledge in computer science that is valuable in both the workplace for career advancement, as well as to those looking to move into graduate programs within the discipline.

The Postbaccalaureate Certificate in Computer Science will serve as the foundational premasters' courses in the ALIGN program. Students that successfully complete the five certificate courses with a B in each course or better will be eligible to matriculate into the Master of Science in Computer Science program.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
CS 5001 and CS 5003	Intensive Foundations of Computer Science and Recitation for CS 5001	4
CS 5002	Discrete and Data Structures	4
CS 5004 and CS 5005	Object-Oriented Design and Recitation for CS 5004	4
CS 5006	Algorithms	2
CS 5007	Computer Systems	2

Program Credit/GPA Requirements

16 total semester hours required
Minimum 3.000 GPA required

Data Analytics, Graduate Certificate

The interdisciplinary Graduate Certificate in Data Analytics is offered through a collaboration between the College of Computer and Information Sciences and the College of Social Sciences and Humanities. The certificate curriculum emphasizes the skills needed to bridge between emerging technological capacities and traditional policymaking processes. The program is designed to provide students with foundational knowledge in data science—including data management, machine learning, data mining, statistics, and visualizing and communicating data—that can be applied to data-driven decision making in any discipline.

For more information on the certificate, refer to the program's website (http://www.northeastern.edu/datascience).

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
DA 5020	Collecting, Storing, and Retrieving Data	4
DA 5030	Introduction to Data Mining/Machine Learning	4
PPUA 5301	Introduction to Computational Statistics	4
PPUA 5302	Information Design and Visual Analytics	4

Program Credit/GPA Requirements

16 total semester hours required
Minimum 3.000 GPA required

Health Informatics

Meet the demand for health informatics professionals

Professionals who understand the relationship between information technology, people, health, and the healthcare system are in short supply. With Northeastern University's interdisciplinary graduate programs in health informatics, you have an opportunity to gain the knowledge and skills needed to use information technology to improve healthcare delivery and outcomes—and to advance your career in this growing field.

Northeastern's health informatics master's degree and certificate programs seek to provide:

- The expertise of both the College of Computer and Information Science (http://www.ccs.neu.edu/about) and Bouvé College of Health Sciences (http://www.northeastern.edu/bouve)
- Faculty (http://www.ccs.neu.edu/graduate/degree-programs/m-s-in-health-informatics/faculty) who are senior leaders in the field
- The ability to communicate effectively with clinicians, administrators, and IT professionals and to understand each of their needs and constraints
- Strong industry connections
- The opportunity to learn from students with backgrounds in healthcare or technology—nurses, pharmacists, physicians, programmers, project managers, analysts, and others
- Flexible course schedules and formats designed to meet the needs of both working professionals and full-time students
- Research opportunities and an academic lead-in to the PhD in Personal Health Informatics (http://phi.ccs.neu.edu)

Whether you want to take on new responsibilities in your current workplace or to launch a new career, Northeastern's graduate degree and certificate programs in health informatics prepare you for leadership and specialist roles in a variety of health-related organizations. And you're ready to make an immediate impact on healthcare.

Learning Outcomes
In the program, students will learn data management and analysis; business implementation and management; and how to apply the technical and business knowledge to improving the health care system.

Programs
Doctor of Philosophy (PhD)
- Personal Health Informatics (p. 109)

Master of Science (MS)
- Health Data Analytics (p. 105)
- Health Informatics (p. 112)

Graduate Certificate
- Health Informatics Management and Exchange (p. 294)
- Health Informatics Privacy and Security (p. 294)
- Health Informatics Software Engineering (p. 294)

Personal Health Informatics, PhD

Northeastern's Doctor of Philosophy (PhD) in Personal Health Informatics (PHI) is a transdisciplinary doctoral program focused on educating top researchers in the theoretical underpinnings, design, evaluation, and dissemination of consumer- and patient-focused health systems. Personal health technologies are those that non−health professionals interact with *directly*, both in and out of a clinical setting and in various life stages of illness and wellness.

Examples include:

- Assistive technologies that aid persons with disabilities
- Consumer wellness promotion technologies

- Patient education and counseling systems
- Interfaces for reviewing personal health records
- Advanced ambulatory monitoring for supporting health
- Automated elder care systems that monitor health and support independent living
- Social networking systems connecting families and their social and medical support networks

Developing personal health interface technologies requires that professionals have skills and experience designing systems for individual patients and consumers with a wide range of backgrounds in different contexts using a variety of media, while ensuring that fielded technologies are effective, reliable, and responsive to the needs of at-risk and patient populations. Critical skills and knowledge include needs assessment, theories of interface design and health behavior, rapid prototyping and implementation, experimental design with human subjects in challenging settings, and statistical data analysis and validation. Moreover, these skills must be deployed while working with, or leading, transdisciplinary teams.

The interdisciplinary nature of the program targets students who are interested in improving health and wellness using novel technologies that directly impact the lives of consumers and patients. This is a program for students who are not only technically strong but also socially conscious, design oriented, and interested in rigorously evaluating the technologies they imagine and build. The program provides a path for technical students to acquire more experience in the deployment and evaluation of health technologies in the field but also a path for students with health backgrounds to develop the technical skills needed to prototype and assess creative ideas they envision for improving care. The expected length of study is five years after the bachelor's degree.

Admission Requirements

Students will be accepted with either of the following:

- A bachelor's or higher degree in a technical discipline (e.g., computer science or information science, computer systems engineering) with either academic or work experience demonstrating a commitment to working in health.
- A bachelor's or higher degree in a health science discipline (e.g., nursing, medicine, physical therapy, pharmacy, public health) with either some academic course work in technology, such as a course in programming or design, or work experience where the applicant participated in the development, adaptation, or evaluation of consumer- or patient-facing health technology. (Otherwise outstanding applicants without programming skills may be advised to take an introductory programming course prior to entry, and otherwise outstanding applicants without any formal experience working in health settings may be advised to spend some time volunteering in a medical or community health setting prior to entry.)

Applicants will be expected to have:

- A minimum 3.000 undergraduate grade-point average (GPA)
- A minimum total GRE score of 300 or equivalent
- A minimum GRE academic writing score of 3.5
- For international applicants, a minimum TOEFL score of 105

Minimum Academic Standards and Requirements

RESIDENCY REQUIREMENT
The residency requirement will follow the University Graduate Council By-Law policy.

DISSERTATION ADVISING
Each student will have one primary advisor from the personal health informatics doctoral program faculty.

DISSERTATION COMMITTEE
The committee will consist of at least three members: the dissertation advisor, one additional personal health informatics doctoral program faculty member, and one member external to Northeastern who is an expert in the specific personal health informatics topic of research. The dissertation committee shall include experts with both health and technology backgrounds. The dissertation advisor must be a full-time member of the Northeastern University faculty.

QUALIFYING EXAMINATION
The qualifying examination consists of a three-part exam conducted by a committee of three personal health informatics doctoral program faculty members, each overseeing one part of the exam. The research core of the exam is fulfilled with submission of a high-quality paper to a strong peer-reviewed conference or journal. The health component of the exam is fulfilled when the student passes a written exam developed by a faculty member with a health sciences background, and the technical component of the exam is fulfilled when the student passes an exam developed by a faculty member with a technical background. The content of the written exams and the paper topic are developed in consultation with each faculty member.

DEGREE CANDIDACY
A student is considered a PhD degree candidate upon meeting these conditions:

- Completion of core courses with a minimum GPA of 3.000 overall on the core courses
- Completion of the qualifying examination

COMPREHENSIVE EXAM
A PhD student must submit a written dissertation proposal to the dissertation committee. The proposal should identify the research problem, the research plan, and its potential impact on the field. A presentation of the proposal will be made in an open forum, and the student must successfully defend it before the dissertation committee.

DISSERTATION DEFENSE
A PhD student must complete and defend a dissertation that involves original research in personal health informatics.

Curriculum Requirements
REQUIRED AND ELECTIVE COURSES
The curriculum is designed to provide all PhD students with a strong foundation in principles critical to the design and evaluation of personal health interfaces. All students take six core courses (24 semester hours) and the user-interface practicum (1 semester hour). All students must also fulfill the programming fundamentals requirement (4 semester hours) and the statistics fundamentals requirement (4 semester hours), where some flexibility in course selection allows tailoring based on background and experience. Two additional research electives (8 semester hours) are selected based on research interests from the personal health informatics electives list. Students are also expected to participate in the personal health informatics seminar series each semester.

Program Assessment
LEARNING OUTCOMES
This program seeks to produce graduates who are capable of leading and performing independent, new research projects related to personal health informatics and who are well prepared to enter into a number of potential

career paths, including industrial research positions, government consultants, or postdoctoral or junior faculty positions in academic institutions in either technology programs or schools of health science, public health, or medicine.

DEGREE OUTCOMES

The dissertation committee evaluates whether the student has produced a significant contribution to personal health informatics research. The process used by the dissertation committee is based on an assessment of the goals and objectives described in the written PhD proposal. Student success can also be measured in the number and quality of publications generated by the research.

IMPROVING EFFECTIVENESS

Publication venues will provide a means to assess the quality of the program, as well as the research projects. External research funding and incoming student quality will be used to measure program strength. In addition, graduates will be asked for feedback concerning their training and program preparation.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Milestones

Qualifying examinations (3)
Annual review
Dissertation proposal
Dissertation committee
Dissertation defense

Core Requirements

Code	Title	Hours
Foundations		
HINF 5200	Theoretical Foundations in Personal Health Informatics	4
Program Design and Development		
CS 5010	Programming Design Paradigm	4
CS 5340	Computer/Human Interaction	4
HINF 5300	Personal Health Interface Design and Development	4
Methods and Statistics		
CS 6350	Empirical Research Methods	4
PHTH 5210	Biostatistics in Public Health	3
Evaluation		
HINF 8982	Readings	1-8
HINF 5301	Personal Health Technologies: Field Deployment and System Evaluation	4

Electives

Code	Title	Hours
Complete 6 to 8 semester hours in the following subject area:		6-8
(Note: Please see faculty advisor for other acceptable elective courses.)		
HINF		

Dissertation

Code	Title	Hours
Complete the following (repeatable) course twice:		
CS 9990	Dissertation	

Program Credit/GPA Requirements

48 total semester hours required
Minimum 3.000 GPA required

Plan of Study
Sample Curriculum

Year 1

Fall	Hours	Spring	Hours
HINF 5200	4	CS 5010 or 5520	4
CS 5340	4	CS 6350	4
		Additionally, students should participate in the Personal Health Informatics Usability Evaluation Practicum	1
	8		9

Year 2

Fall	Hours	Spring	Hours
HINF 5300	4	HINF 5301	4
PHTH 5210 (or PHTH 6210 or CAEP 7712 or CAEP 7716)	3	PHI elective	3-4
	7		7-8

Year 3

Fall	Hours	Spring	Hours
HINF 9990	2-4	HINF 9990	2-4
HINF 8982	1-8	PHI elective	3-4
	3-12		5-8

Year 4

Fall	Hours	Spring	Hours
HINF 9996	0	HINF 9996	0
	0		0

Year 5

Fall	Hours	Spring	Hours
HINF 9996	0	HINF 9996	0
	0		0

Total Hours: 39-52

Health Data Analytics, MS

The digitization of healthcare systems in clinical settings, in combination with the explosion of personal data collection devices, provides the opportunity of using data for revolutionizing approaches to care at all levels with an emphasis on precision medicine and person-centered care. The ability to take advantage of this "Big Data" opportunity, however, requires expertise at the intersection of health informatics, data science, and computational modeling. The Master of Science in Health Data Analytics is designed to prepare students to succeed in this emerging field. This program offers a strong, competency-based curriculum that addresses data analytics ranging from data acquisition from traditional and emerging data streams, data aggregation methods, data mining algorithms, predictive computational modeling, and visualization techniques. Students can expect to amass a broad and deep understanding of the various methods, software tools, and

topical expertise needed to discover meaningful patterns in health-related data and effectively communicate their implications to a number of diverse stakeholders. Successful graduates of the Master of Science in Health Data Analytics will be effective practitioners and leaders in the rapidly developing domain of data analytics with a focus on health and healthcare.

The interdisciplinary Master of Science in Health Data Analytics consists of 12 courses, drawn from the College of Computer and Information Science and the Bouvé College of Health Science; a capstone project; and an ongoing series of seminars on topics in health data analytics. Two tracks will be available to matriculating students: standard and research based.

LEARNING OUTCOMES
- Proficiency in the health and healthcare ecosystem, including stakeholder roles such as payers, providers, and government; social determinants of health; wellness promotion; acute vs.chronic care
- Ability to acquire, store, and validate data; familiarity with common health-related data sources and formats
- Proficiency in analyzing data using statistical, epidemiological, and data-mining methods along with appropriate software tools and programming languages
- Ability to interpret and present analytical results to nontechnical stakeholders using visualization and accessible narrative structures

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Analytics/Modeling/Statistics		
DA 5020	Collecting, Storing, and Retrieving Data	4
DA 5030	Introduction to Data Mining/Machine Learning	4
HINF 6400	Introduction to Health Data Analytics	3
PPUA 5301	Introduction to Computational Statistics	4
PPUA 5302	Information Design and Visual Analytics	4
Healthcare		
HINF 5102	Data Management in Healthcare	3
HINF 5105	The American Healthcare System	3
HINF Predictive Analy (TBA)		3

1   Please see college administrator for course information.

Thesis/Capstone

Code	Title	Hours
Complete either Thesis or Capstone:		3
Thesis		
HINF Health Informatics Thesis (TBA)		
Capstone		
HINF 7701	Health Informatics Capstone Project	

Electives

At least one course must be chosen from the methods list.

Code	Title	Hours
Methods		
Complete 3–6 semester hours from the following:		3-6
PHTH 6202	Intermediate Epidemiology	
PHTH 6210	Applied Regression Analysis	
PHTH 6440	Advanced Methods in Biostatistics	
CS 6350	Empirical Research Methods	
CAEP 7712	Intermediate Statistical Data Analysis Techniques	
CAEP 7716	Advanced Research and Data Analyses 2	
Other Electives		
Complete 0–4 semester hours from the following:		0-4
ARTG 5330	Visualization Technologies 1	
ARTG 6320	Design of Information-Rich Environments	
HINF 5200	Theoretical Foundations in Personal Health Informatics	
HINF 5300	Personal Health Interface Design and Development	
HINF 6215	Project Management	
HINF 6220	Database Design, Access, Modeling, and Security	
PHTH 5226	Strategic Management and Leadership in Healthcare	
PHTH 5232	Evaluating Healthcare Quality	
PHTH 5234	Economic Perspectives on Health Policy	

Program Credit/GPA Requirements

37 total semester hours required
Minimum 3.000 GPA required

Health Informatics, MS

Northeastern's interdisciplinary Master of Science in Health Informatics was the first MS in the field. The program seeks to prepare students to address the combined clinical, technical, and business needs of health-related professionals. Successful students graduate with the knowledge of how technology, people, health, and the healthcare system interrelate; the ability to use technology and information management to improve healthcare delivery and outcomes; and the skills to communicate effectively among healthcare practitioners, administrators, and information technology professionals.

With approval from the health informatics program director, selected students can substitute one course from the Graduate Certificate in Data Analytics for a technical core requirement in the MS in Health Informatics degree, and up to two more courses from the Graduate Certificate in Data Analytics can be counted as electives for the MS in Health Informatics degree.

Northeastern also offers graduate certificate programs in health informatics. Three certificate programs enable you to choose the one that addresses your specific goals. These programs are listed separately in this catalog:

- Graduate Certificate in Health Informatics Management and Exchange

- Graduate Certificate in Health Informatics Privacy and Security

- Graduate Certificate in Health Informatics Software Engineering

Courses in the certificate program also apply toward master's degree requirements. This gives you the flexibility to complete a certificate and be well on your way to earning a degree if you decide later to continue your education.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

A grade of B− or higher is required in each course.

Code	Title	Hours
Required Core		
HINF 5101	Introduction to Health Informatics and Health Information Systems	3
HINF 5105	The American Healthcare System	3
HINF 7701	Health Informatics Capstone Project	3
Business Management		
Complete two courses from the following:		6
HINF 6201	Organizational Behavior, Work Flow Design, and Change Management	
HINF 6202	Business of Healthcare Informatics	
HINF 6215	Project Management	
HINF 6335	Management Issues in Healthcare Information Technology	
HINF 6240	Improving the Patient Experience through Informatics	
PHTH 5226	Strategic Management and Leadership in Healthcare	
Health Informatics		
Complete two courses from the following:		6
HINF 5102	Data Management in Healthcare	
HINF 5110	Global Health Information Management	
HINF 5200	Theoretical Foundations in Personal Health Informatics	
HINF 6205	Creation and Application of Medical Knowledge	
HINF 6350	Public Health Surveillance and Informatics	
HINF 6404	Patient Engagement Informatics and Analytics	
HINF 6405	Quantifying the Value of Informatics	
PHTH 5232	Evaluating Healthcare Quality	
Technical		
Complete two courses from the following:		6
HINF 6220	Database Design, Access, Modeling, and Security	
HINF 6355	Key Standards in Health Informatics Systems	
HINF 6400	Introduction to Health Data Analytics	
PHTH 5202	Introduction to Epidemiology	
PHTH 5210	Biostatistics in Public Health	
PHTH 6210	Applied Regression Analysis	
PHTH 6400	Principles of Population Health 1	
PHTH 6440	Advanced Methods in Biostatistics	

One course from the following may count toward the technical core requirement:

Code	Title	Hours
DA 5020	Collecting, Storing, and Retrieving Data	
DA 5030	Introduction to Data Mining/Machine Learning	
PPUA 5301	Introduction to Computational Statistics	
PPUA 5302	Information Design and Visual Analytics	

Electives

Code	Title	Hours
Complete two courses from the following. Any course not taken to complete a core requirement may be taken as an elective.		6
HINF 6345	Design for Usability in Healthcare	
DA 5020	Collecting, Storing, and Retrieving Data	
DA 5030	Introduction to Data Mining/Machine Learning	
PPUA 5301	Introduction to Computational Statistics	
PPUA 5302	Information Design and Visual Analytics	

Program Credit/GPA Requirements

Minimum 33 total semester hours required
Minimum 3.000 GPA required

Information Assurance & Cybersecurity

Students can apply for admission to two distinct degree programs:

Doctor of Philosophy (PhD) in Information Assurance degree. A research-based, interdisciplinary PhD in information assurance combines a strong security technical foundation with a security policy and social sciences perspective. It seeks to prepare graduates to advance the state-of-the-art of security in systems, networks, and the internet in industry, academia, and government. The interdisciplinary nature of the program distinguishes it from traditional doctoral degree programs in computer science, engineering, or social sciences and makes it unique in the Boston area.

Master of Science (MS) in Cybersecurity degree. An industry-focused, interdisciplinary Master of Science in Cybersecurity combines knowledge of information security technology and cybersecurity tools with relevant knowledge from law, the social sciences, criminology, and management. The Master of Science in Cybersecurity is designed for students focused on cybersecurity careers in companies or government agencies, thus applying their knowledge to their workplaces to assess security threats and manage information security risks and technical and policy controls.

> **MSIA-Align.** Students who have a strong desire to pursue a career in cybersecurity but lack a technical background are advised to apply to MSIA-Align. MSIA-Align students enter the Align program with backgrounds in social sciences, business, economics, sciences, and other disciplines. The MSIA-Align courses prepare MSIA-Align students to gain admission to the Master of Science in Cybersecurity.

Northeastern University designations by the National Security Agency (NSA) and the Department of Homeland Security (DHS):

- Center of Academic Excellence in Information Assurance/Cyber Defense Education, with focus area in Cyber Investigations

- Center of Academic Excellence in Information Assurance Research

- Center of Academic Excellence in Cyber Operations

Programs
Doctor of Philosophy (PhD)
- Information Assurance (p. 114)
- Information Assurance—Advanced Entry (p. 115)

Master of Science
- Cybersecurity (p. 116)

Graduate Certificate
- Cybersecurity (p. 117)

Information Assurance, PhD

A research-based, interdisciplinary Doctor of Philosophy (PhD) in Information Assurance combines a strong security technical foundation with a security policy and social sciences perspective. It seeks to prepare graduates to advance the state-of-the-art of security in systems, networks, and the internet in industry, academia, and government. The interdisciplinary nature of the program distinguishes it from traditional doctoral degree programs in computer science, engineering, or social sciences and makes it unique in the Boston area.

Students who choose the PhD in information assurance program have a strong desire to pursue academic research solving critical cybersecurity challenges facing today's society. The PhD program is a natural path for students in the college's Master of Science in Information Assurance and Cybersecurity (http://www.ccs.neu.edu/graduate/degree-programs/m-s-in-information-assurance)program who want to pursue research and students with bachelor's degrees and an interest in research-focused careers. Students who pursue careers in advancing the state-of-the art of cybersecurity have an opportunity to gain:

- A strong technical foundation in cybersecurity and an interdisciplinary perspective based on policy and social science
- A path to a research-focused career coupled with depth in information assurance research at a leading institution, one of the earliest designees by NSA/DHS as a National Center of Academic Excellence (http://www.nsa.gov/ia/academic_outreach/nat_cae/index.shtml) in Information Assurance Research, Information Assurance/Cyber Defense, and Cyber Operations

- The opportunity to work with and learn from faculty who are recognized internationally for their expertise and contributions in information assurance from Northeastern's College of Computer and Information Science, the Department of Electrical and Computer Engineering, and the College of Social Sciences and Humanities

- Access to research projects at Northeastern's research centers focused on security:

  - The Cybersecurity and Privacy Institute (https://cyber.ccis.northeastern.edu/about): The mission of Northeastern's Cybersecurity and Privacy Institute is to safeguard critical technology. Forging partnerships with experts in industry,

government, and academia worldwide, the Institute's faculty and students develop, protect, and enhance technologies on which the world relies—from mobile devices and "smart" IoT applications to tomorrow's self-driving cars and delivery drones. Their expertise spans algorithm auditing, cloud security, cryptography, differential privacy, embedded device security, Internet-scale security measurements, machine learning, big data, and security, malware and advanced threats, network protocols and security, Web and mobile security, wireless network security.

  - The International Secure Systems Lab (http://www.iseclab.org), affiliated with Northeastern, a collaborative effort of European and U.S. researchers focused on web security, malware and vulnerability analysis, intrusion detection, and other computer security issues

  - The ALERT Center (http://www.northeastern.edu/alert), where Northeastern is the lead institution, a multiuniversity Department of Homeland Security Center of Excellence involved in research, education, and technology related to threats from explosives

The benefits of the Boston area:

- World-renowned for academic and research excellence, the Boston area is also home to some of the nation's largest Department of Defense contractors and government and independent labs such as MIT Lincoln Lab, MITRE, and Draper Lab

Degree Requirements

The PhD in information assurance degree requires completion of at least 48 semester credit hours beyond a bachelor's degree. Students who enter with an undergraduate degree will typically need four to five years to complete the program, and they will be awarded a master's degree en route to the PhD.

Doctoral Degree Candidacy

A student is considered a PhD degree candidate after completing the core courses with at least a 3.400 grade-point average (GPA) and either publishing a paper in a strong conference or journal or passing an oral exam that is conducted by a committee of three information assurance faculty members and based on paper(s) written by the student.

RESIDENCY
One year of continuous full-time study is required after admission to the PhD candidacy. During this period, the student will be expected to make substantial progress in preparing for the comprehensive examination.

DISSERTATION ADVISING
The doctoral dissertation advising team for each student consists of two information assurance faculty members, one in a technical area. When appropriate, the second faculty advisor will be from the policy/social science area.

DISSERTATION COMMITTEE
A PhD student's dissertation committee consists of the two members of the dissertation advising team plus two others: One is a member of the information assurance faculty, and the other is an external examiner who is knowledgeable about the student's research topic.

COMPREHENSIVE EXAMINATION
A PhD student must submit a written dissertation proposal and present it to the dissertation committee. The proposal should identify the research problem, the research plan, and the potential impact of the research on the field. The presentation of the proposal will be made in an open forum,

and the student must successfully defend it before the dissertation committee after the public presentation.

DISSERTATION DEFENSE

A PhD student must complete and defend a dissertation that involves original research in information assurance.

AWARDING OF MASTER'S DEGREES

Students who enter the PhD in information assurance program with a bachelor's degree have the option of obtaining a master's degree from one of the departments participating in the program. To do so, they must meet all of the department's degree requirements.

Program Requirements
Bachelor's Degree Entrance

Complete all courses and requirements listed below unless otherwise indicated.

Milestones

Qualifying exam and area exam
Annual review
Dissertation proposal
Dissertation committee
Dissertation defense

Core Requirements

A cumulative 3.400 GPA is required for the core requirement.

Code	Title	Hours
Fundamentals		
CS 5700	Fundamentals of Computer Networking	4
or EECE 7336	Digital Communications	
Software		
CS 5770	Software Vulnerabilities and Security	4
Security and Cyberlaw		
CS 6740	Network Security	4
or CS 6750	Cryptography and Communications Security	
IA 5200	Security Risk Management and Assessment	4
IA 5240	Cyberlaw: Privacy, Ethics, and Digital Rights	4

Electives and Specializations

Code	Title	Hours
Complete 28 semester hours from the following:		28
Consult faculty advisor for other acceptable courses.		
Track 1: Network/Communication Security		
CS 6710	Wireless Network	
EECE 5666	Digital Signal Processing	
Track 2: System Security		
CS 5600	Computer Systems	
or EECE 7352	Computer Architecture	
IA 6120	Software Security Practices	
Track 3 Policy/Society		
CRIM 7246	Security Management	
POLS 7341	Security and Resilience Policy	
General Electives		
CS 5500	Managing Software Development	
CS 6140	Machine Learning	

CS 6200	Information Retrieval	
EECE 7204	Applied Probability and Stochastic Processes	
EECE 7205	Fundamentals of Computer Engineering	
EECE 7337	Information Theory	
SOCL 7211	Research Methods	
or CS 6350	Empirical Research Methods	

Dissertation

Code	Title	Hours
Complete the following (repeatable) course twice:		
IA 9990	Dissertation	
Complete the following (repeatable) course until graduation:		
IA 9996	Dissertation Continuation	

Program Credit/GPA Requirements

48 total semester hours required
Minimum 3.000 GPA required

Information Assurance, PhD—Advanced Entry

A research-based, interdisciplinary Doctor of Philosophy (PhD) in Information Assurance combines a strong security technical foundation with a security policy and social sciences perspective. It seeks to prepare graduates to advance the state-of-the-art of security in systems networks and the internet in industry, academia, and government. The interdisciplinary nature of the program distinguishes it from traditional doctoral degree programs in computer science, engineering, or social sciences and makes it unique in the Boston area.

Students who choose the PhD in information assurance program have a strong desire to purse academic research solving critical cybersecurity challenges facing today's society. The PhD program is a natural path for students in the college's Master of Science in Information Assurance and Cybersecurity program who want to pursue research and students with bachelor's degrees and an interest in research-focused careers. Students who pursue careers in advancing the state-of-the art of cybersecurity have an opportunity to gain:

- A strong technical foundation in cybersecurity and an interdisciplinary perspective based on policy and social science

- A path to a research-focused career coupled with depth in information assurance research at a leading institution, one of the earliest designees by NSA/DHS as a National Center of Academic Excellence in Information Assurance Research, Information Assurance/Cyber Defense, and Cyber Operations

- The opportunity to work with and learn from faculty who are recognized internationally for their expertise and contributions in information assurance from Northeastern's College of Computer and Information Science, the Department of Electrical and Computer Engineering, and the College of Social Sciences and Humanities

- Access to research projects at Northeastern's research centers focused on security:

  - The Institute of Information Assurance (IIA), an interdisciplinary research center overseen by both the College of Computer and Information Science and the department of Electrical and Computer Engineering in the College of Engineering, and the

recipient of a National Science Foundation grant to train the country's next generation of cybercorps

- The International Secure Systems Lab, affiliated with Northeastern, a collaborative effort of European and U.S. researchers focused on web security, malware and vulnerability analysis, intrusion detection, and other computer security issues

- The ALERT Center, where Northeastern is the lead institution, a multiuniversity Department of Homeland Security Center of Excellence involved in research, education, and technology related to threats from explosives

The benefits of the Boston area:

- World renowned for academic and research excellence, the Boston area is also home to some of the nation's largest Department of Defense contractors and government and independent labs such as MIT Lincoln Lab, MITRE, and Draper Lab

Degree Requirements

The PhD in information assurance master entry degree requires completion of at least 16 semester credit hours beyond a bachelor's degree. Students also must complete the required core courses.

Doctoral Degree Candidacy

Refer to the information assurance, PhD, overview for admission to candidacy requirements.

RESIDENCY
Refer to the information assurance, PhD, overview for residency requirements.

DISSERTATION ADVISING
Refer to the information assurance, PhD, overview for dissertation advising requirements.

DISSERTATION COMMITTEE
Refer to the information assurance, PhD, overview for dissertation committee requirements.

COMPREHENSIVE EXAMINATION
Refer to the information assurance, PhD, overview for comprehensive examination requirements.

DISSERTATION DEFENSE
Refer to the information assurance, PhD, overview for dissertation defense and completion requirements.

Program Requirements
Complete all courses and requirements listed below unless otherwise indicated.

Milestones
Qualifying exam and area exam
Annual review
Dissertation proposal
Dissertation committee
Dissertation defense

Core Requirement
Complete 16 semester hours of approved course work. A cumulative 3.400 GPA is required for the core requirement. Consult your faculty advisor for acceptable courses.

Dissertation

Code	Title	Hours
Complete the following (repeatable) course twice:		
IA 9990	Dissertation	
Complete the following (repeatable) course until graduation:		
IA 9996	Dissertation Continuation	

Program Credit/GPA Requirements
16 total semester hours required
Minimum 3.000 GPA required

Cybersecurity, MS

Our Master of Science in Cybersecurity combines an understanding of information security technology with relevant knowledge from law, the social sciences, criminology, and management. The MS program is designed for working professionals and recent graduates who want knowledge they can apply in their workplaces to assess and manage information security risks effectively.

Learning Outcomes:
- Building core knowledge surrounding computer system security and network security theory, processes, and practices
- Planning and implementing security strategies to reduce risk and enhance protection of information assets and systems
- Identifying and addressing legal and ethical issues associated with information security, privacy, and digital rights and identifying how they inform specific IA plan/decisions
- Communicating effectively, verbally and in writing, with corporate management on IA-related issues

GORDON INSTITUTE OF ENGINEERING LEADERSHIP
Master's Degree in Cybersecurity with Graduate Certificate in Engineering Leadership

Students may complete a Master of Science in Cybersecurity in addition to earning a Graduate Certificate in Engineering Leadership. Students must apply and be admitted to the Gordon Engineering Leadership Program in order to pursue this option. The certificate program requires fulfillment of the 16-semester-hour curriculum required to earn the Graduate Certificate in Engineering Leadership, which includes an industry-based challenge project with multiple mentors. The integrated 40-semester-hour master's degree and certificate require 24 hours of information assurance course work.

Engineering Leadership (p. 222)

Program Requirements
Core Requirement

Code	Title	Hours
Foundations		
IA 5010	Foundations of Information Assurance	4
Technical Track		
Complete 8 semester hours from the following:		8
IA 5120	Applied Cryptography	
IA 5130	Computer System Security	
IA 5150	Network Security Practices	
IA 6120	Software Security Practices	
Contextual Track		
Complete 8 semester hours from the following:		8

IA 5200	Security Risk Management and Assessment	
IA 5210	Information System Forensics	
IA 5240	Cyberlaw: Privacy, Ethics, and Digital Rights	
IA 5250	Decision Making for Critical Infrastructure	
Capstone		
IA 7900	Capstone Project/Seminar	4

Electives

Code	Title	Hours
Complete 8 semester hours from the following:		8
IA 5040	Introduction to Cyberspace Programming	
IA 5120	Applied Cryptography	
IA 5130	Computer System Security	
IA 5150	Network Security Practices	
IA 5200	Security Risk Management and Assessment	
IA 5210	Information System Forensics	
IA 5240	Cyberlaw: Privacy, Ethics, and Digital Rights	
IA 6120	Software Security Practices	
CS 5200	Database Management Systems	
CS 5500	Managing Software Development	
CS 5600	Computer Systems	
CS 5700	Fundamentals of Computer Networking	
CS 5770	Software Vulnerabilities and Security	
CS 6710	Wireless Network	
CS 6740	Network Security [1]	
CS 6750	Cryptography and Communications Security	
CS 7805	Theory of Computation	
CRIM 7312	Special Topics in Criminology and Public Policy	
PPUA 6503	Public Personnel Administration	
PPUA 6505	Public Budgeting and Financial Management	
PPUA 6507	Institutional Leadership and the Public Manager	
POLS 7341	Security and Resilience Policy	

Program Credit/GPA Requirements

32 total semester hours required
Minimum 3.000 GPA required

[1] Students who took Network Security Practices (IA 5150) (technical track) and are interested in taking Network Security (CS 6740) (approved elective, non–IA course) should inform the network security instructor and the director/associate director of IA.

Cybersecurity, Graduate Certificate

The certificate is designed to give students a solid foundation in cybersecurity. In the course work, students have the opportunity to be exposed to the basic principles and security concepts related to information systems, to explore issues involved in the security of computer systems, and to explore the techniques used in computer forensic examination. The goal of the certificate is to provide prospective cybersecurity professionals with an entry point to industry positions within eight months from admission and with reduced financial investment.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
IA 5010	Foundations of Information Assurance	4
IA 5130	Computer System Security	4
IA 5210	Information System Forensics	4

Elective

Code	Title	Hours
Complete one of the following:		4
IA 5200	Security Risk Management and Assessment	
IA 5150	Network Security Practices	
IA 5240	Cyberlaw: Privacy, Ethics, and Digital Rights	

Program Credit/GPA Requirements

16 total semester hours required
Minimum 3.000 GPA required

Interdisciplinary

The College of Computer and Information Science features two additional interdisciplinary programs. We partner with the College of Arts, Media and Design to offer the Master of Science in Game Science and Design. We also partner with the College of Social Sciences and Humanities to offer the Graduate Certificate in Data Analytics.

Programs
Master of Science

Graduate Certificate

Game Science and Design, MS

The **Master of Science (MS) in Game Science and Design** is a program that seeks to give students a comprehensive understanding of how successful game products are created in a player-centric environment. Focusing on the science of game development, students have an opportunity to learn the design and technological skills needed to build a game and develop a deep understanding of playability and analytics that make products successful in an increasingly competitive marketplace.

The game industry has expanded to include social and mobile gaming; games in health, education, and training; and innovations in play psychology, middleware, graphics tools, game mechanics, game evaluation methods, and advanced artificial intelligence and narrative techniques. It has become an increasingly competitive space.

The selectiveness of the industry and the diversity of the skills required mean that students seeking entry need both broad and deep skills. As an emergent industry using diverse technology and collaborative practices, the game industry needs professionals with interdisciplinary skill sets who can meld knowledge about development with knowledge about evaluation methods and players' behavior and psychology.

Jointly offered by Northeastern's Colleges of Arts, Media and Design and Computer and Information Science (http://www.ccs.neu.edu), the **Master in Science in Game Science and Design** is a one-of-a-kind interdisciplinary program that seeks to prepare students to meet this need by weaving together science and design. This is a two-year, 34-credit-hour program.

The degree offers three concentrations:

- Game analytics: focusing on data analysis of gameplay and other game data to make the game successful
- Game user research: focusing on gauging the user experience to enable designers to develop an enjoyable game experience
- Game design and development: focusing on the design or technical side of game development

All admitted students will be assigned to an advisor who will help them select a pathway with a coherent set of electives depending on their career goals. The advisor will also monitor their progress through the master's degree.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Required Core		
GSND 5110	Game Design and Analysis	4
GSND 5111	Seminar for GSND 5110	1
GSND 5122	Business Models in the Game Industry	1
GSND 5130	Mixed Research Methods for Games	4
or PPUA 5301	Introduction to Computational Statistics	
Thesis		
GSND 7990	Thesis	4

Specializations

In consultation with your faculty advisor, declare one specialization option by spring of your first year.
Complete one of the following specializations:

GAME ANALYTICS

Code	Title	Hours
Complete three of the following:		12
DA 5020	Collecting, Storing, and Retrieving Data	
DA 5030	Introduction to Data Mining/Machine Learning	
GSND 6350	Data-Driven Player Modeling	
PPUA 5302	Information Design and Visual Analytics	

GAME USER RESEARCH

Code	Title	Hours
Complete three of the following:		12
CS 5340	Computer/Human Interaction	

GSND 6320	Psychology of Play	
GSND 6330	Player Experience	
GSND 6340	Biometrics for Design	

GAME DESIGN AND DEVELOPMENT

Code	Title	Hours
Complete three of the following:		12
CS 5150	Game Artificial Intelligence	
CS 5850	Building Game Engines	
GSND 6240	Exploratory Concept Design	
GSND 6250	Spatial and Temporal Design	

Electives

Note: In consultation with your faculty advisor, you may complete two other related courses offered by all options.

Code	Title	Hours
Complete two of the following:		8
CS 5150	Game Artificial Intelligence	
CS 5340	Computer/Human Interaction	
CS 5850	Building Game Engines	
DA 5020	Collecting, Storing, and Retrieving Data	
DA 5030	Introduction to Data Mining/Machine Learning	
GSND 6240	Exploratory Concept Design	
GSND 6250	Spatial and Temporal Design	
GSND 6320	Psychology of Play	
GSND 6330	Player Experience	
GSND 6340	Biometrics for Design	
GSND 6350	Data-Driven Player Modeling	
PPUA 5302	Information Design and Visual Analytics	

Program Credit/GPA Requirements

34 total semester hours required
Minimum 3.000 GPA required

Plan of Study

Sample Two Years, One Co-op (Optional) Plan of Study

Year 1

Fall	Hours	Spring	Hours	Summer Full Semester	Hours
GSND 5110	4	Concentration elective	4	Co-op (Optional)	0
GSND 5111	1	Concentration elective	4		
GSND 5130 or PPUA 5301	4				
	9		8		0

Year 2

Fall	Hours	Spring	Hours
GSND 5122	1	General elective	4
Concentration elective	4	GSND 7990	4

General elective	4				
		9		8	

Total Hours: 34

Sample Two Years, No Co-op Plan of Study

Year 1

Fall	Hours	Spring	Hours	Summer Full Semester	Hours
GSND 5110	4	Concentration elective	4	Vacation	0
GSND 5111	1	Concentration elective	4		
GSND 5130 or PPUA 5301	4				
	9		8		0

Year 2

Fall	Hours	Spring	Hours
GSND 5122	1	General elective	4
Concentration elective	4	GSND 7990	4
General elective	4		
	9		8

Total Hours: 34

Data Analytics, Graduate Certificate

The interdisciplinary Graduate Certificate in Data Analytics is offered through a collaboration between the College of Computer and Information Sciences and the College of Social Sciences and Humanities. The certificate curriculum emphasizes the skills needed to bridge between emerging technological capacities and traditional policymaking processes. The program is designed to provide students with foundational knowledge in data science—including data management, machine learning, data mining, statistics, and visualizing and communicating data—that can be applied to data-driven decision making in any discipline.

For more information on the certificate, refer to the program's website (http://www.northeastern.edu/datascience).

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
DA 5020	Collecting, Storing, and Retrieving Data	4
DA 5030	Introduction to Data Mining/Machine Learning	4
PPUA 5301	Introduction to Computational Statistics	4
PPUA 5302	Information Design and Visual Analytics	4

Program Credit/GPA Requirements

16 total semester hours required
Minimum 3.000 GPA required

College of Engineering

Website (http://www.coe.neu.edu/academics/graduate-school-engineering)

Nadine Aubry, PhD, Dean

Thomas C. Sheahan, ScD, Senior Associate Dean for Academic Affairs

130 Snell Engineering Center
617.373.2711

The Graduate School of Engineering (GSE) offers research and professional degree programs organized around a core curriculum that equips students with a solid foundation for technical and leadership positions in industry organizations, government laboratories, research laboratories, and educational institutions. By involving students in many levels of research, encouraging collaboration across departments, and partnering with outside institutions and organizations globally, Northeastern engineering graduate students have the opportunity to gain a rich and experiential education in their chosen discipline.

Master of Science and doctoral degree programs are offered, as well as numerous graduate certificate programs that can be applied toward master's degree programs for lifelong learning. GSE offers traditional full-time day and part-time evening master's and doctoral degree programs and part-time evening certificate programs. Programs are offered in Boston and at regional campuses. A number of courses and degree programs are also available in a flexible online or hybrid format, which are well suited for distance learners. Innovative programs, such as interdisciplinary degrees, business/entrepreneurship pathways, and the Academic Link (AL) program for students without an undergraduate engineering degree (or who need additional preparatory course work), enable students to personalize their learning experience.

Academic Policies and Procedures

- Learning Outcomes (p. 120)
- Admission Requirements (p. 120)
- Cooperative Education Policies (p. 120)
- Online and Video Streaming Examination Policy (p. 122)
- Course Registration and Withdrawal (p. 122)
- Academic Standards and Degree Requirements (p. 123)
- Administrative Procedures (p. 125)
- Petitions (p. 125)
- Re-enrollment Policy for Full-time Students (p. 126)

Learning Outcomes

Doctor of Philosophy

The PhD programs' student learning outcomes are:

- Ability to use basic engineering concepts flexibly in a variety of contexts
- Ability to formulate a research plan
- Ability to communicate orally a research plan
- Ability to conduct independent research

Master of Science

The MS programs' student learning outcome is:

- Ability to use basic engineering concepts flexibly in a variety of contexts.

Admission Requirements

To be minimally qualified to pursue admission, a candidate must have successfully completed or be in the process of completing an appropriate undergraduate bachelor's degree from a regionally accredited U.S. college or university or its equivalent from a foreign college or university. Any offer of acceptance is contingent upon a candidate's successful completion of an undergraduate bachelor's degree from a regionally accredited U.S. college or university or its equivalent from a foreign college or university.

Application requirements:

- Online application.
- Statement of purpose.
- Professional resumé.
- Transcript(s) from any and all colleges or universities attended evidencing all courses, grades, and credits, as well as any diploma(s) or provisional certificate(s) evidencing that degree(s) have been conferred.
- Two letters of recommendation.
- GRE scores are required of most applicants. For complete information on this requirement, visit the Graduate Admissions website. (http://www.coe.neu.edu/degrees/graduate-admissions)
- TOEFL or IELTS scores are required of most applicants whose native language is not English. For complete information on this requirement, visit the Graduate Admissions website (http://www.coe.neu.edu/degrees/graduate-admissions).

Cooperative Education Policies

The College of Engineering Graduate Cooperative Education Program (co-op) is one option for experiential learning and is available to selected students enrolled full-time at Northeastern University in a degree-granting program. Students registered only in a graduate certificate program are not eligible.

The goals of cooperative education are to:

- Apply knowledge and skills in new, authentic contexts
- Develop new knowledge and skills
- Integrate and use the deepened knowledge and skills in your academic programs
- Reflect on and articulate how you used your knowledge and skills, how you gained new knowledge and skills, and how "theory and practice" work together

Students who wish to participate in co-op must meet the eligibility requirements and follow the guidelines that follow. Co-op is not guaranteed for any student; students must compete and be selected for

a limited number of co-op opportunities. These guidelines apply to all graduate students in the College of Engineering.

Eligibility Requirements

1. Students must successfully complete Career Management for Engineers (ENCP 6000) or Introduction to Cooperative Education (ENCP 6100) or Introduction to Cooperative Education (EECE 6000) (depending on their major). Students MUST meet all co-op eligibility requirements to enroll in Career Management for Engineers (ENCP 6000) or Introduction to Cooperative Education (ENCP 6100). A complete list of requirements is found on the Graduate School of Engineering website (http://www.coe.neu.edu/co-op-advantage/graduate-co-op).

2. To be eligible for co-op, College of Engineering graduate students must be:
   - Enrolled full-time at Northeastern University
   - Meet the minimum GPA and minimum semester-hour requirements for their program described in the table below, as applicable
   - Meet all English-language requirements described in the table below, as applicable
   - Have no disciplinary or academic probation issues and no incomplete courses (i.e., no I grade in their records)
   - Have at least one term left in their program after completing co-op (i.e., students must return to Northeastern to take courses for at least one term prior to graduating)
   - Have a valid I-20 (for international students)

3. Co-op performance standards encourage professional and ethical behaviors throughout the co-op process and clarify procedures required for continued success of our students and the co-op program. The College of Engineering Co-op Performance Standards are communicated to all students in the Career Management for Engineers (ENCP 6000) / Introduction to Cooperative Education (ENCP 6100) / Introduction to Cooperative Education (EECE 6000) course as part of their preparation for the first co-op experience. The standards establish co-op professional expectations of the student throughout the co-op search process and during the co-op term and address co-op related issues that may involve performance. In the event that a situation arises that requires special consideration, the College of Engineering Co-op Standing Committee may be consulted.

4. Students who are dismissed from or resign from a co-op job for circumstances under their control will receive a U (unsatisfactory) grade for co-op work experience and be ineligible for other future co-op experiences.

5. Students must receive academic and co-op advisor approval prior to accepting a placement.

Code	Title	Hours
Electrical and Computer Engineering		
GPA >		3.2
Minimum TOEFL requirement		90
Minimum IELTS requirement		7

Note: If below TOEFL/IELTS requirement at matriculation, a new TOEFL/IELTS meeting requirement is needed.

Required preparation courses	ENCP 6100 or EECE 6000
Minimum number of semester hours completed	16 SH

Code	Title	Hours
Bioengineering, Chemical Engineering, Civil Engineering, Data Analytics, Engineering and Public Policy, Environmental Engineering, Industrial Engineering, Mechanical Engineering, Operations Research, and Sustainable Building Systems		
GPA >		3.2
Minimum TOEFL requirement		95
Minimum IELTS requirement		7

Note: If below TOEFL/IELTS requirement at matriculation, a new TOEFL/IELTS meeting requirement is needed.

Required preparation course	ENCP 6100
Minimum number of semester hours completed	16 SH

Code	Title	Hours
Computer Systems Engineering, Energy Systems, Engineering Management, Information Systems, and Telecommunication Networks		
GPA		Student must be in good academic standing
Minimum TOEFL requirement		Student must be in good academic standing
Minimum IELTS requirement		Student must be in good academic standing
Required preparation course		ENCP 6000
Minimum number of semester hours completed		16 SH

Guidelines

1. For the purposes of these guidelines, internships, practicums, clinicals, cooperative education, residencies, or similar programs, are all treated as a co-op and are not considered separate experiences in the Graduate School of Engineering. See below for a special note for international PhD student internships only (NOT part of the co-op program).

2. Students may not hold a graduate stipend assistantship at the university during the semesters planned for co-op.

3. Students may participate in co-op activities with a single company for a four-, six-, or eight-month period. The total duration of co-op cannot exceed eight months or be shorter than four months. Co-ops are aligned with academic terms (fall, spring, and full summer or summer 1 and summer 2). For purposes of determining the length of a co-op, it is based on the terms participated in—a co-op in any one term is a four-month co-op (full summer, fall, or spring); six-month co-ops are spring and summer 1 or summer 2 and fall; eight-month

co-ops are two consecutive terms (spring and full summer or full summer and fall); fall and spring co-op is not allowed.

4. Students on four-month co-op assignments are allowed to have their co-op extended to a maximum of eight months (aligning with terms as stated above (fall and spring co-op is not allowed), provided they have approval from their academic and co-op advisor.

5. Co-ops are required to be full-time (35+ hours per week) and, thus, students are allowed to take at most one course during the fall and spring semesters while participating in co-op activities; students are required to seek approval from their co-op coordinator prior to registering for a course during a fall or spring co-op term. Students participating in co-op during the full summer are only allowed to take a single course over the entire summer (i.e., a full summer, summer 1, or summer 2, not one in each period); students are required to seek approval from their co-op coordinator prior to registering for a course during a summer co-op term.

6. Students are permitted to participate in one co-op experience as a graduate student. A student who in the process of seeking a cooperative education experience and is disqualified because of violation of co-op performance standards described in guideline number 3 above is ineligible to seek a future cooperative education experience. In other words, the student forfeits the opportunity to participate in co-op.

7. Students who wish are allowed to create their own co-op placement outside of NUcareers but must meet all the requirements and follow all the guidelines.

8. Final decision regarding any exceptions to the above requirements needs to be approved by the co-op faculty of the appropriate program.

Seattle and Silicon Valley Campus MSIS Students Only

Seattle and Silicon Valley multidisciplinary graduate engineering students only are permitted to participate in a second co-op experience. In addition to the collegewide graduate co-op eligibility requirements and guidelines, the supplemental second co-op must additionally meet the following requirements:

1. The student must obtain the second co-op on their own, without use of the NUcareers co-op database.

2. Total co-op length for the two co-op experiences combined cannot exceed eight months.

3. The first and second co-op experiences may not occur in consecutive fall and spring terms.

4. Students must receive academic advisor and faculty co-op coordinator approval prior to initiating a search for a second co-op position and also before accepting a second co-op position.

International PhD Student Internships

An internship at Northeastern is a special case of experiential learning that applies only to international PhD students. Like co-op, it is classified as Curricular Practical Training (CPT) for F-1 visa holders or pre-Academic Training (pre-AT) for J-1 visa holders. An internship must be integral to a student's research or dissertation. As such, the student's research or dissertation would suffer greatly without this experience. Generally, because of the close relationship to the student's research or dissertation, internships are arranged by the student's faculty advisor. Further, it is incumbent upon the faculty advisor to sign and verify that this experience is integral to the student's dissertation or research as part of the CPT approval process, allowing the student to have this experience. Paid or unpaid internships have the same requirements. Internships are never authorized in a student's final semester. CPT internship requests must be approved by the student's

academic advisor, department chair, and the Graduate School of Engineering.

Internships, Co-op, and Pre-OPT

A position that a student finds on their own in a field related to their program of study, to provide funding during the summer, or to supplement their income does not qualify for internship CPT authorization, though the position might qualify as a co-op or Pre-OPT experience—provided the student meets all the qualifications for the relevant authorization. Like co-op, internships are not part of a jobs program, even if they do provide experience that would be beneficial to employment after graduation. The key is that any internship must have a very direct and strong relationship to the student's research or dissertation.

Online and Video Streaming Examination Policy

Exam Administration

Students who are enrolled in online and video-streaming sections may be required to have their exams proctored. If a proctor is required, it is the student's responsibility to find a proctor and then have the proctor approved by the Graduate School of Engineering. Students must make arrangements for an exam proctor following the proctor application guidelines. The Graduate School of Engineering reserves the right to reject any proctor application if the guidelines are not followed.

Video-streaming students living within 30 miles of their home campus (Boston, Charlotte, Silicon Valley, or Seattle) and who are enrolled in video-streamed sections may be strongly encouraged by the faculty to take exams at their home campus if there is a campus designee to provide proctoring services. In cases where a student is unable to travel to campus for exams, a proctor can be used.

For successful proctoring, the following responsibilities are delineated.

Student Responsibilities

Students must make arrangements for a proctor. Students are required to complete and submit a Proctor Application form to the Graduate School of Engineering office by the end of the third week of class.

Proctor Responsibilities

The proctor is responsible for administering exams to the students per the instructor's directions and in accordance with the Academic Honesty and Integrity Policy in order to maintain the security and integrity of the exam process.

Faculty Responsibilities

To administer each exam, the instructor will make arrangements for the exchange of exam materials with the proctor.Once a proctor is approved, the faculty is in charge of coordinating and interacting with the proctor.

Course Registration and Withdrawal

Overview

Students must follow their program of study curriculum as published in this University Graduate Catalog (2012 and beyond), or the Graduate School of Engineering Student Guide and Catalog (prior to 2012), for the year in which they matriculate. Any change in the course work or program requirements must be approved by the student's program advisor and/or the department. Additionally, students must complete any preparatory courses stipulated at the time of admission within the stated time frame.

Registration in classes is mandatory to maintain an active status with the university. Students must be registered in all courses for a given term prior to the university course add deadline. Students should not register for an excessive number of courses or for multiple sections of the same course with the intention of dropping half or more of the courses during the first week of classes.

Students must be registered in their last semester of study. Students finishing their requirements in the summer semester must be registered either in the full summer, summer 1, or summer 2 term.

Any student who is financially withdrawn by Student Accounts prior to the start of any given semester will not be permitted to register for that semester until he or she rectifies the outstanding financial obligation.

Due to last-minute scheduling changes, the Graduate School of Engineering must occasionally substitute faculty or change class schedules after the registration period has begun. Any student registered for the original course will automatically be registered for the updated section should no major schedule conflicts be apparent. Otherwise, the graduate school or the department will contact all affected students for alternatives.

Northeastern University reserves the right to cancel, postpone, combine, or modify any class.

Course Selection

Full-time students (domestic and international) in the Graduate School of Engineering must register for classes on an ongoing basis and carry a minimum of 8 semester hours of course work per semester. Any student who is appointed to a stipended graduate assistantship (SGA) is considered full-time for the term(s) of appointment if enrolled for a minimum of 6 semester hours.

All graduate students who are registered for Dissertation, Dissertation Continuation, Thesis Continuation, PhD Candidacy Preparation, PhD Exam Preparation, or a zero-semester-hour Research course are considered full-time. Registration in these courses is restricted to students who qualify for registration in these courses.

The graduate school does not require part-time students to be enrolled for a certain minimum number of semester hours in any term. However, part-time students who are not enrolled for more than one term (excluding summer terms) should take a leave of absence from the university to maintain active student status to keep their student account active.

The maximum number of semester hours approved for a student in each term varies by the degree program. However, a student can petition his or her program advisor to request permission to register for more than the allowed maximum number of semester hours for a given term. Normally, no more than 9 semester hours (inclusive of transfer credits and advanced standing for MS programs) may be taken outside the College of Engineering.

Students should formulate a program of study in consultation with their assigned program advisor at the beginning of their program, during fall or spring orientation. Students should preselect courses whenever possible and plan to take them when offered, maintaining flexibility with alternate courses in mind. Courses other than the required courses are offered based on demand and are subject to faculty availability. Not all courses are offered every year; however, the graduate school will do everything possible to assure continuity of programs and permit students to make continuous progress toward earning their degrees.

Students who need assistance with course selection, course sequencing, waivers, and/or transfer credits should contact their academic advisor or Graduate Student Services in the Graduate School of Engineering.

MS Thesis and Thesis Continuation

Master's degree students who are completing a thesis must register for a total of 8 semester hours of Thesis. Students who have not completed their thesis but have already registered for the required number of thesis hours, and have no remaining course work to complete the degree, may register for Thesis Continuation in their last semester (including summer term) to maintain full-time status. There is a 1-semester-hour tuition charge for Thesis Continuation. Thesis Continuation may be taken only once.

During graduation clearance, the Graduate School of Engineering will retroactively register students who fail to register correctly for Thesis Continuation. Once these retroactive registrations are posted on a student's record, Student Accounts will send a tuition bill to the student.

Dissertation and Dissertation Continuation

Once program requirements are met for the PhD candidacy, PhD candidates must register for two consecutive semesters (may include the summer term) of Dissertation (XXXX 9990). Candidates must then register for Dissertation Continuation in each subsequent semester (excluding the summer term) until the dissertation is complete and approved by the Graduate School of Engineering. Students completing their dissertation in the summer term must register for Dissertation Continuation in the summer term. There is a 1-semester-hour tuition charge for Dissertation Continuation.

During graduation clearance, the Graduate School of Engineering will retroactively register students who fail to register for the correct sequence of Dissertation and/or Dissertation Continuation. If tuition is owed by the student once these retroactive registrations are posted on a student's record, Student Accounts will send a tuition bill to the student.

Attendance Policy

In each term, continuing students are expected to be on campus by the first day of classes and online students are expected to log-in and stay attentive starting from the first class of each term. Course instructors are not expected to make accommodations for students who arrive after the first day of classes. Students who do not attend their class during the first week of a semester risk being dropped from the course. Students should not expect that they will be added to the classes after the university course add deadline.

Academic Standards and Degree Requirements

Academic Requirements

In order to earn a degree in the graduate program in which a student is enrolled, he or she must complete all program and departmental requirements in a satisfactory manner.

A student must attain a cumulative grade-point average (GPA) of 3.000 or higher with no more than 8 semester hours below the grade of B− in all courses applied toward that degree and exclusive of any prerequisite courses required of students admitted provisionally to their program. A student must also earn a grade of C or higher in all required core courses. Please note that individual programs may have additional requirements.

Prerequisite Courses/Undergraduate Courses

Students are not awarded credit toward graduate degree requirements for prerequisite courses unless expressly stated by the student's academic

department. Students may occasionally be permitted by their advisor to take undergraduate courses. However, undergraduate courses do not count toward a graduate degree and may affect a student's eligibility to receive federal financial aid. Undergraduate courses do not count toward the graduate-level course load requirement for full-time students.

Pass/Fail Grading Policy

The Graduate School of Engineering does not allow College of Engineering (COE) graduate students to elect a pass/fail grading scheme for courses normally letter graded.

Degree Conferral

A degree is awarded at the end of the term (fall, spring, or summer) in which the final requirement for the degree is satisfied.

Academic Probation (Full-Time Students)

STUDENT'S ACADEMIC STANDING

Academic standing at Northeastern University is determined by a student's cumulative GPA. All graduate students are expected to maintain a cumulative GPA of 3.000 or higher each term to remain in good academic standing and to progress toward graduation. Students falling below a cumulative GPA of 3.000 are placed on academic probation for each academic term in which the cumulative GPA is below 3.000. This will be noted on the student's unofficial transcript.

ACADEMIC PROBATION POLICY

Academic probation is a period of time when a student must address and remediate academic deficiencies.

A student placed on academic probation will receive a written notification by the Graduate School of Engineering (hereafter referred to as the graduate school). The student's academic advisor will also receive notification of the student's probationary status. An academic probation action plan to clear the deficiency must be developed by the student and the student's academic advisor. It is the student's responsibility to complete an action plan (with input from the advisor) that documents how the deficiency will be remediated. This action plan must be signed by the academic advisor and the student, and a copy must be submitted to the graduate school as soon as possible and no later than seven business days from the start of the next academic term. If the action plan is not received by this deadline, the graduate school will cancel the student's course registration(s). **Failure to file a complete and meaningful action plan may be cause for dismissal from the program**. The graduate school reserves the right to reject or change the action plan.

DISMISSAL FROM PROGRAM

A student (part-time or full-time) placed on academic probation for a cumulative GPA of less than 3.000 will have one academic term to raise the cumulative GPA greater than or equal to 3.000. Students whose cumulative GPA is below 3.000 for **two consecutive** terms in which they took courses for credit (excluding Career Management for Engineers (ENCP 6000) or Introduction to Cooperative Education (ENCP 6100), if taken) will automatically be dismissed from their degree program at the end of the second term. Students in this situation may submit an academic dismissal appeal plan to the graduate school to request a final one-term extension. In this case, the student may submit an appeal to the associate dean of the graduate school as per the university appeals process.

Students being dismissed from their program will receive a written notification from the Graduate School of Engineering.

APPEALS PROCESS

A student may appeal a dismissal from his or her program of study due to failure to achieve academic standards set forth in this academic probation policy. To initiate an appeal, the student must send a written request to the associate dean of the graduate school detailing the reasons the student is appealing the dismissal. The written request must be signed by the student, and the appeal must be received by the Graduate School of Engineering within 30 business days from the day the student received written notification of dismissal. The graduate school will respond to the appeal within 10 business days of the date of receipt.

Academic Probation (Part-Time Students)

Students in official part-time status with the University are considered on academic probation if the cumulative GPA is below 3.000 after completion of 8 semester hours. Part-time students must raise the cumulative GPA to 3.000 or higher after completion of 8 additional semester hours to regain good academic standing status.

If the student's cumulative GPA remains below 3.000 after completion of 16 semester hours, the student will be dismissed from the degree program. The student may appeal to attempt an additional final 8 semester hours to raise the cumulative GPA to 3.000 or higher. The appeal is reviewed by the academic probation appeals committee for the student's degree program. If denied, the academic dismissal stands.

Course Repeat/Course Substitution Policy for Students on Academic Probation

The Graduate School of Engineering allows students to repeat (or substitute) a total of up to 8 semester hours of course work beyond stated minimum degree requirements in order to attain the required cumulative 3.000 GPA for good academic standing.

COURSE REPEAT

When the appropriate course is available, courses may be repeated once in order to earn a better grade. In all cases, the most recent grade earned in a course is the one used in calculating the overall GPA; however, previous grades remain on the transcript with a note that the grade is "excluded." This means that the course is excluded from the GPA and earned credit calculation. Students must obtain approval from their academic advisor and the Graduate School of Engineering prior to repeating a course. Students are required to pay normal tuition charges for all repeated course work.

Within the above limitations for extra or repeated courses, a student must repeat any required core course in which he or she earns a grade below C. Individual programs may have additional requirements.

COURSE SUBSTITUTION

In cases where repeating a course is not possible, a student may petition to substitute one course for another they have already taken, as long as the course content is significantly similar and is not a core required course.

The student's academic advisor, graduate school, and in some cases the graduate director of the student's department must approve of the substitution. If approved, the grade in the new course taken will be included in the GPA calculation, and the first course taken will remain on the transcript with a note that the grade is "excluded" from the GPA and earned credit calculation. Students are required to pay normal tuition charges for all substituted course work.

Course Repeat Policy for Students in Good Academic Standing

Students who are in good academic standing may repeat up to 8 semester hours of course work in order to earn a better grade. A course may only be repeated once.

In all cases, the most recent grade earned in a course is the one used in calculating the overall GPA; however, previous grades remain on the transcript with a note that the grade is "excluded." This means that the course is excluded from the GPA and earned credit calculation. Students must obtain approval from their academic advisor and the Graduate School of Engineering prior to repeating a course. Students are required to pay normal tuition charges for all repeated course work.

Course substitution is not an option for students in good academic standing.

Administrative Procedures

Husky Email

University communications will always be sent to the student's Husky email address. Students are responsible for checking their Husky email account email regularly.

Petitions

Overview

Petition procedures described below are required in all cases so that the Graduate School of Engineering may maintain a complete and accurate record for all students. All petitions, unless otherwise noted, must be formally made on a Graduate School of Engineering petition form and approved by a student's academic advisor, department graduate director (if applicable), and by the Graduate School of Engineering. Other approvals may be required as stipulated by the graduate school upon petition review. Students should refer to the Graduate School of Engineering (http://www.coe.neu.edu/academics/graduate-school-engineering) website for additional instructions.

Elective Outside of the Approved Program Curriculum

Courses approved for each degree program are found in the Northeastern University *Graduate Catalog.* Students must follow the curriculum of their program of study published in the year in which they matriculate. If a student wishes to take a course that is not on the list of approved courses for his or her program, the student must request permission from the academic advisor to take the course **prior to** registering for that course. Failure to obtain permission to take a course that is not part of the approved curriculum, as listed in the catalog, may result in that course not counting toward the student's graduate degree. The petition must be submitted to the Graduate School of Engineering for review. Final decision on all the requests made by a petition form rests with the Graduate School of Engineering.

Note: Students enrolled in a PhD program are not subject to this requirement. Course selection is considered a matter among the student, academic advisor, and department.

Course Waiver

A student may petition to waive any core course (also known as a required course) when he or she has completed equivalent or similar course work elsewhere. The student must submit a completed petition form along with a course description and an official transcript from the institution where he or she completed the course.

Note: Course waivers **do not** decrease the number of required semester hours in any program of study. Submission of a waiver petition does not guarantee a waiver. All waiver petitions are subject to review by the academic advisor, department graduate director (in applicable cases),

and the Graduate School of Engineering. The waived course must be replaced by an advisor-approved course.

Extension of Time Limit to Complete Program

All Northeastern University graduate course credits earned in a program of study, or accepted for transfer credit, are valid for a maximum of seven years. To request an extension, students may submit a petition to their academic advisor, including the reason(s) for the request, an intended course of action, and length of time needed to complete degree requirements.

In the case of the Doctor of Philosophy degree, after the establishment of degree candidacy, a maximum of five years is allowed for the completion of degree requirements. To request an extension, students may submit a petition to their academic advisor, including the reason(s) for the request, an intended course of action, and length of time needed to complete degree requirements.

Change in Status (Full-Time, Part-Time)

Students may petition to change their student status from full-time to part-time study within the same program by filing a petition form, signed by their program advisor, graduate program director (in some departments), and submitted to the Graduate School of Engineering. In all cases, students who hold an assistantship, or whose department requires full-time students to complete a project or thesis, must have departmental approval to change status.

Students who wish to change status from part-time to full-time study within the same program must have completed a minimum of 8 semester hours of course work with a minimum 3.000 grade-point average (GPA). Students in this case must submit a petition to change status to their advisor or departmental graduate officer for approval.

Students should discuss the financial implications of changing their student status with the Office of Student Financial Services.

International students are subject to the rules governing their immigration status and should consult with an advisor in the Office of Global Services before filing a status change petition.

Change in Degree Concentration

A student who wishes to change degree concentration within the same program must submit a completed Change of Degree Program/Concentration form to the program advisor of the new concentration —and, in some cases, to the chair of the graduate committee of their department—for approval. The form must then be forwarded to the Graduate School of Engineering for final review and processing. Students should refer to the Graduate School of Engineering (http://www.coe.neu.edu/academics/graduate-school-engineering) website for additional instructions.

Change in Degree Program

A student who wishes to change his or her degree program must apply for admission to the desired program. This means a new online admission application must be submitted. The application fee is waived. If admitted, the student must submit a completed Change of Degree Program form to the advisor of the new program. The form must then be forwarded to the Graduate School of Engineering for final review and processing. Students should refer to the Graduate School of Engineering (http://www.coe.neu.edu/academics/graduate-school-engineering) website for additional instructions.

Change in Degree Level

A student who wishes to change the degree level from MS to PhD must apply for admission to the PhD program. This means a new online admission application must be submitted. The application fee is waived. If admitted, the student must submit a completed Graduate School of Engineering Change of Degree Level form to the director of the PhD program. The form must then be forwarded to the Graduate School of Engineering for final review and processing. Students should refer to the Graduate School of Engineering (http://www.coe.neu.edu/academics/graduate-school-engineering) website for additional instructions.

A student who wishes to change the degree level from PhD to MS within the same degree program need not submit a new online application but must submit a Change of Degree Level form to the academic advisor —and, in some departments, to the chair of the graduate committee —for approval. If approved, the Change of Degree Level form must then be submitted to the Graduate School of Engineering for final review and processing. Students should refer to the Graduate School of Engineering (http://www.coe.neu.edu/academics/graduate-school-engineering) website for additional instructions.

Reenrollment Policy for Full-time Students

Students who enroll and complete at least one graduate engineering course can apply to their academic department to take an official leave of absence from the time they complete said course(s) and be automatically readmitted without department review. Automatic readmission applies only to the original program and concentration (if applicable), and only for students who took an official approved leave of absence. Catalog year of entry does not change and students must complete the curriculum requirements outlined in the *University Graduate Catalog* for their original academic year of admission.

If a student without official leave of absence approval does not enroll in classes for two consecutive fall/spring semesters, they will be declared inactive. To return from inactive status, a student must submit an updated application to refresh their student record, and this application will be approved provided the student was in good standing at the time their absence started.

If a student without official leave of absence approval does not enroll in classes for three consecutive fall/spring semesters, or does not indicate their intent in writing to the Graduate School of Engineering by the end of the third consecutive semester, they will be withdrawn from the program. In the case of withdrawal, a student will be required to submit a new admission application for graduate studies without guarantee of readmission. If the student is admitted after being withdrawn, they will be admitted into the current catalog year and must meet the curriculum requirements in the current *University Graduate Catalog.*

In cases where the student has seven or more years of nonenrollment, the student's previous course work completed at the university will first undergo departmental review for technical content and relevance to current degree, followed by institutional review mapping courses completed to the current degree program requirements. The institutional review will determine how many credits, if any, completed more than seven years prior will be applied to the current degree.

Bioengineering

Website (http://www.bioe.neu.edu)

Lee Makowski, PhD

Professor and Chair

206 Interdisciplinary Science and Engineering Complex
617.373.7805
l.makowski@northeastern.edu

Jeffrey Ruberti, PhD
Professor and Graduate Director

206 Interdisciplinary Science and Engineering Complex
617-373-3984
j.ruberti@northeastern.edu

Shiaoming Shi, PhD
Assistant Teaching Professor and Master of Science Advisor

563 Holmes Hall
617-373-8743
s.shi@northeastern.edu

The Department of Bioengineering is driven by the conviction that the interface of engineering and medicine will be one of the great intellectual adventures of the 21st century and strives to create an atmosphere of innovation and creativity that fosters excellence in instruction and research and provides a foundation for programs that drive forward the cutting edge of knowledge while establishing translational collaborations with clinical and industrial researchers.

Bioengineering is a relatively new field built on the recognition that engineering of biological systems or systems that interface with living systems requires a multidisciplinary approach that takes into account the mechanical, electrical, chemical, and materials properties of the biological system. Students with backgrounds from biochemistry to computer science and many fields in between are attracted to bioengineering as a field with the potential to make a great impact on human health. The MS and PhD programs are designed to integrate students with very different backgrounds and provide them with the course work and research experience that will take advantage of their unique backgrounds and, where appropriate, fill in gaps in their backgrounds to help them grow into a more broadly informed student.

Recognizing the breadth of disciplines that contribute to bioengineering projects, the MS program allows students to choose one of four concentrations (bioimaging and signal processing, cell and tissue engineering, biomechanics, or biomedical devices) to develop deep expertise in an area of particular interest and encourages individual research through a one-semester master's project or two-semester master's thesis.

The PhD program is organized into eight tracks, spanning the breadth of bioengineering research: bioimaging and signal processing; biomechanics and mechanobiology; bioMEMs/bioNANO; biochemical and bioenvironmental engineering; motor control; biocomputing; cell and tissue engineering; general bioengineering studies. Course work during the first year is designed to strengthen student backgrounds in those areas most relevant to the interests of each student.

Mission of the Department

The mission of the Department of Bioengineering is the education of students in the fundamental principles and practice of bioengineering and, through basic and applied research, the creation of new knowledge at the interface of engineering and medicine to support development of new technologies for improvement of human health and healthcare.

Overview of Programs Offered

The Department of Bioengineering offers a Master of Science (MS) and a Doctor of Philosophy (PhD) in Bioengineering. The MS and PhD degree programs are only offered as full-time programs.

Candidates pursuing an MS or PhD are able to select thesis topics from a diverse range of faculty research. New graduate students may learn about ongoing research topics from individual faculty members, faculty websites, and bioengineering seminars.

Graduate Certificate Options

Students enrolled in a master's degree have the opportunity to also pursue one of the many engineering graduate certificate options in addition to or in combination with the MS degree. Students should consult their faculty advisor regarding these options (p. 229).

GORDON INSTITUTE OF ENGINEERING LEADERSHIP OPTION

Students have the opportunity to pursue the Gordon Engineering Leadership Program (p. 221) in combination with the MS degree.

Programs

Doctor of Philosophy (PhD)

- Bioengineering (p. 127)
- Bioengineering—Advanced Entry (p. 133)

Master of Science in Bioengineering (MSBioE)

- Bioengineering (p. 135)

Bioengineering, PhD

Our interdisciplinary Doctor of Philosophy (PhD) program in bioengineering draws on faculty across the university and reflects the significant strengths of bioengineering research in multiple areas. Students accepted to the bioengineering program will undertake a rigorous core curriculum in basic bioengineering science followed by an immersion track curriculum. There are currently eight tracks from which to choose:

> Track 1: Biomedical Imaging and Signal Processing
> Track 2: Biomechanics and Mechanobiology
> Track 3: BioMEMs/BioNANO
> Track 4: Biochemical and Bioenvironmental Engineering
> Track 5: Motor Control
> Track 6: Biocomputing
> Track 7: Cell and Tissue Engineering
> Track 8: General Bioengineering Studies

Biology can inspire engineering. Increasingly, discoveries in the life sciences reveal processes, complexity, and control without analogy in the limited world of traditional engineering. Current methods of producing nanoscale control over molecules cannot reproduce the organization found in even the simplest organisms. Energy capture, robust control, remediation, and self-assembly are all employed with efficiency unparalleled by anything in today's laboratories. At the same time, traditional engineering disciplines struggle to find new and complex challenges. The last 50 years of basic life science research have gradually peeled the layers of complexity from biological processes, unmasking the fundamental underpinnings on which biological systems are constructed. Bioinspired engineering has the potential to transform the technological landscape of the 21st century. Astonishingly, it represents merely one of the myriad opportunities presented at the interface of biology and engineering.

The field of bioengineering is broad and includes all research at the interface of engineering and biology—this includes bioprocesses, environmental microbiology, biomaterials and tissue engineering, bioelectricity, biomechanics, biomedical and biological imaging, nanotechnology in medicine and the environment, and engineering design for human interfacing. At Northeastern, bioengineering PhD students have an opportunity to be trained to appreciate advances in bioengineering across a wide range of disciplines while they perform highly focused and cutting-edge bioengineering research with one of our many core or affiliated faculty members.

DEGREE REQUIREMENTS

Completion of the PhD degree requires students to successfully complete the following requirements:

- **Curriculum:** The curriculum comprises a strong fundamental, broad core of courses that is then coupled with one of a series of available tracks for depth in a particular field of study. The detailed course requirements are outlined below.
- **Qualifying exam (written and oral):** To qualify to continue in the PhD program, students must pass the bioengineering comprehensive qualifying examination, which comprises the synthesis of knowledge derived from the core curriculum and current literature presented in the form of an R21 NIH-style proposal. Successful oral defense of the proposal is required to pass the exam as well as satisfactory research progress and satisfactory academic standing. Details of the formal qualification exam procedure and timing are available in the bioengineering office and may be requested electronically from the graduate director. The qualifying examinations (written and oral) must be successfully completed within three years of entry.
- **Qualifying examination committee:** The qualifying examination committee is composed of a minimum of three members, two of whom must be selected from the list of bioengineering-affiliated faculty. In addition, one of the two affiliated faculty must have a primary appointment in the College of Engineering. The student's primary advisor may not sit on the qualifying exam committee.
- **Dissertation committee:** The dissertation committee is composed of a minimum of three members, two of whom must be selected from the list of bioengineering-affiliated faculty. In addition, one of the two affiliated faculty must have a primary appointment in the College of Engineering. The student's primary advisor should be a member of and chair the dissertation committee.
- **Area exam (dissertation prospectus/proposal):** PhD students must submit a "dissertation proposal" to their dissertation committee in the form of an R-21 NIH-style research plan and successfully defend the research plan in the form of an open presentation to their dissertation committee. The area exam should be completed as soon as is practical after successful completion of course work and qualifying exams.
- **Dissertation:** PhD candidates must satisfactorily complete and defend a dissertation describing original research in bioengineering in an open presentation to their dissertation committee.
- **Dissertation course requirements:** After achieving PhD candidacy, the doctoral candidate, in consultation with his or her research advisor, must register in two consecutive semesters (may include full summer term) for Dissertation (BIOE 9990) . Upon completion of this sequence, the student must then register for Dissertation Continuation (BIOE 9996) in every semester (in each fall and spring term and also in the summer term if summer is the student's last semester) until the dissertation is completed. Students may not register for Dissertation Continuation (BIOE 9996) until they fulfill the two-semester sequence of Dissertation (BIOE 9990) .

To meet the full-time registration requirement for PhD students who have completed the majority of their course work and not yet reached PhD candidacy, a zero-credit course, Exam Preparation—Doctoral (BIOE 8960) , can be taken if needed to fulfill the full-time course registration requirement. Exam Preparation—Doctoral (BIOE 8960) is an individual instruction course, billed at one semester hour, and graded S or U. Exam Preparation—Doctoral (BIOE 8960) does not have any course content, and students must register in a section for which their research advisor is listed as the "instructor."

For students possessing a baccalaureate in a suitable quantitative or technical field, the required course distribution is shown in the table below.

Requirements	Credits
Required core courses	24 SH
Required and elective track courses	24 SH
Advanced seminar (register and complete four semesters)	0 SH
Dissertation	0 SH
Minimum semester hours required	**48 SH**

The core emphasizes the breadth of topics that our graduates must appreciate as internationally competitive bioengineers. It utilizes existing courses within the College of Engineering as well as introducing new/external courses that are necessary and will be developed.

TRACK 1: BIOMEDICAL IMAGING AND SIGNAL PROCESSING

The biomedical imaging and signal processing track reflects Northeastern University's outstanding research profile in various aspects of biological and biomedical imaging and image processing and signal processing. This is evidenced by the Gordon Center for Subsurface Sensing and Imaging Systems, the Center for Communications and Digital Signal Processing Research, and the strong externally funded active research groups and faculty whose interests lie at the intersection of imaging, signal processing technologies, and biological and medical applications.

The courses listed under program requirements concentrate largely on general mathematical methods for signal and image processing and image formation and on image acquisition modalities and applications. Research in this area takes place at the intersection of these technical streams, and students completing the track will have a sufficiently strong background in the component areas to be able to carry out high-quality research efforts. Bioengineering PhD candidates may complete this track by taking at least two of the restricted electives and sufficient unrestricted electives to meet course requirements as specified by their degree program in addition to their core bioengineering curriculum.

TRACK 2: BIOMECHANICS AND MECHANOBIOLOGY

Biomechanics and mechanobiology are linked by the biological response to applied forces and strains. To understand the overall effect of load on biological systems, it is important to consider not only the deformation and shear rates that result from force application but also the short- and long-term biological responses. The biomechanics and mechanobiology track reflects this understanding and leverages the strong faculty research at Northeastern, which is attempting to tie biomechanics to biological responses at multiple scales.

The biomechanics track is designed to capitalize on the substantial expertise in the mechanical and industrial engineering department, which has a strong fundamental research program in biomechanics. Faculty in the department perform investigations that comprise theoretical, computational, and experimental investigations. Students who select

this track must take all of the restricted electives in addition to the bioengineering core curriculum and sufficient unrestricted electives to meet course requirements as specified by their degree program.

TRACK 3: BIOMEMS/BIONANO

The bioMEMs/bioNANO track reflects Northeastern University's strength as indicated by the NSF Center for High Rate Nanomanufacturing, the NSF/NCI Nanomedicine IGERT training grant, and the strong pharmaceutical sciences department. In addition, Northeastern also has a research presence in MEMs that, when combined with the bioengineering curriculum, presents significant interdisciplinary opportunities for students in the program. Students may choose to complete this track by taking three of the restricted electives in addition to their core bioengineering curriculum and sufficient unrestricted electives to meet course requirements of their degree program.

TRACK 4: BIOCHEMICAL AND BIOENVIRONMENTAL ENGINEERING

The track reflects strengths in biochemical engineering and bioenvironmental engineering by active research programs focused in pharmaceutical bioprocessing, biomaterials, tissue engineering, drug delivery, environmental microbiology, biotreatment/bioremediation, and environmental modeling. Students wishing to pursue this track should take two of the restricted electives listed below in addition to the bioengineering core curriculum and sufficient unrestricted electives to meet the course requirements of their degree program.

TRACK 5: MOTOR CONTROL

The motor control track is designed to capitalize on the collective expertise of cross-disciplinary collaborations between existing Northeastern faculty whose research lies at the intersection of sensorimotor control systems, neuroscience, and dynamical systems. Insights into learning and coordination of functional motor behavior provide the basis for a better understanding of neurological diseases of motor function such as stroke, Parkinson's disease, and cerebral palsy. Insights will be the foundation for designing better therapy and rehabilitation.

Students who select this track must take four out of five restricted electives in addition to the bioengineering core curriculum and unrestricted elective courses to meet requirements of the track program.

TRACK 6: BIOCOMPUTING

The biocomputing track draws on strengths in computer engineering and computation applied to bioengineering applications. Bioengineering MS or PhD candidates may complete this track by taking both of the restricted electives and sufficient unrestricted electives to meet course requirements as specified by their degree program.

TRACK 7: CELL AND TISSUE ENGINEERING

Cell and tissue engineering is a major strength at Northeastern University with several research labs focused on understanding and engineering living cells and tissues. These labs are elucidating the quantitative principles that govern cell fate decisions and are developing design strategies to promote the assembly and patterning of multicellular systems into viable, functional tissues. Cells are remarkable physicochemical systems that sense, respond, and actively reshape their rich microenvironment. Parsing the dialogue between the microenvironment and cells and elucidating design strategies to engineer the dynamic cellular milieu has far-reaching implications for biomedicine, including applications such as tissue engineering and the development of novel therapeutic strategies.

This pioneering, multidisciplinary research is enabled by strengths at Northeastern in key foundational areas, such as biomolecular engineering, computational modeling, developmental biology, imaging,

materials science, micro- and nanofluidics, mechanobiology, molecular cell biology, and systems biology.

Cell and tissue engineering is widely recognized as a core subfield of bioengineering. A formal track in this area offers our students a program of study that capitalizes on a major strength at Northeastern.

TRACK 8: GENERAL BIOENGINEERING STUDIES

The general bioengineering studies track provides students with the flexibility to create a custom course plan depending on their individual interests, under the strong advisement of the bioengineering graduate director.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Milestones

Annual review
Qualifying examination (within three years of entry)
Dissertation committee
Area examination (dissertation prospectus/proposal)
Dissertation defense

Core Requirements

Code	Title	Hours
Seminar		
BIOE 7390	Seminar (Register and complete four semesters)	0
Required Core		
BIOE 6100	Medical Physiology	4
BIOE 7000	Principles of Bioengineering	4
Additional Course Work		
Complete 12 semester hours from the following:		12
BIOE 5430	Principles and Applications of Tissue Engineering	
BIOE 5650	Multiscale Biomechanics	
BIOE 5820	Biomaterials	
CHME 5630	Biochemical Engineering	
EECE 5664	Biomedical Signal Processing	

Dissertation

Code	Title	Hours
Complete the following (repeatable) course twice:		
BIOE 9990	Dissertation	

Track Options

Complete one of the following tracks:

- Biomedical Imaging and Signal Processing Track (p.   )

- Biomechanics and Mechanobiology Track (p. 129)

- BioMEMs/BioNANO Track (p. 130)

- Biochemical and Bioenvironmental Engineering Track (p. 130)

- Motor Control Track (p.   )

- Biocomputing Track (p. 131)

- Cell and Tissue Engineering Track (p.   )

BIOMEDICAL IMAGING AND SIGNAL PROCESSING TRACK

Code	Title	Hours
Required Course work		
EECE 7200	Linear Systems Analysis	4
EECE 7203	Complex Variable Theory and Differential Equations	4
EECE 7204	Applied Probability and Stochastic Processes	4
Mathematical Methods		
Complete 4 semester hours from the following:		
CHME 7320	Chemical Engineering Mathematics	
EECE 7200	Linear Systems Analysis	
EECE 7203	Complex Variable Theory and Differential Equations	
ME 7205	Advanced Mathematical Methods for Mechanical Engineers	
Electives		
Complete 16 semester hours from the following:		16
BIOE 5235	Biomedical Imaging	
BIOE 5320	Advanced Biomedical Measurements and Instrumentation	
BIOE 7100	Special Topics in Biomedical Imaging and Signal Processing	
BIOL 5581	Biological Imaging	
BIOL 5587	Comparative Neurobiology	
CHEM 5612	Principles of Mass Spectrometry	
CHEM 5613	Optical Methods of Analysis	
EECE 5648	Biomedical Optics	
EECE 7202	Electromagnetic Theory 1	
EECE 7271	Computational Methods in Electromagnetics	
EECE 7293	Modern Imaging	
EECE 7310	Modern Signal Processing	
EECE 7311	Two Dimensional Signal and Image Processing	
EECE 7312	Statistical and Adaptive Signal Processing	
EECE 7323	Numerical Optimization Methods	
EECE 7337	Information Theory	
PHYS 7741	Biological Physics 2	
PSYC 5120	Proseminar in Sensation	
PSYC 5130	Proseminar in Perception	
PSYC 7300	Advanced Quantitative Analysis	
PT 5138 and PT 5139	Neuroscience and Lab for PT 5138	
SLPA 5111	Anatomy and Physiology of the Auditory System	
SLPA 6301	Speech Science	

BIOMECHANICS AND MECHANOBIOLOGY TRACK

Code	Title	Hours
Required Course work		
BIOE 5630	Physiological Fluid Mechanics	4
ME 5665	Musculoskeletal Biomechanics	4

ME 5667	Solid Mechanics of Cells and Tissues	4
Mathematical Methods		
Complete 4 semester hours from the following:		4
CHME 7320	Chemical Engineering Mathematics	
EECE 7200	Linear Systems Analysis	
EECE 7203	Complex Variable Theory and Differential Equations	
ME 7205	Advanced Mathematical Methods for Mechanical Engineers	
Electives		
Complete 12 semester hours from the following:		12
BIOE 5380	Advanced Biomolecular Dynamics and Control	
BIOE 5410	Molecular Bioengineering	
BIOE 5630	Physiological Fluid Mechanics	
BIOE 7300	Special Topics in Biomechanics	
BIOL 5601	Multidisciplinary Approaches in Motor Control	
ME 5650	Advanced Mechanics of Materials	
ME 5655	Dynamics and Mechanical Vibration	
ME 5657	Finite Element Method	
ME 5659	Control Systems Engineering	
ME 5667	Solid Mechanics of Cells and Tissues	
ME 7210	Elasticity and Plasticity	
ME 7238	Advanced Finite Element Method	
ME 7245	Fracture Mechanics and Failure Analysis	
ME 7255	Continuum Mechanics	
ME 7275	Essentials of Fluid Dynamics	
ME 7280	Statistical Thermodynamics	
PT 5133 and PT 5134	Kinesiology and Lab for PT 5133	
PT 6215 and PT 6216	Assistive Technology and Lab for PT 6215	

BIOMEMS/BIONANO TRACK

Code	Title	Hours
Required Course Work		
EECE 5606	Micro- and Nanofabrication	4
ME 6260	Introduction to Microelectromechanical Systems (MEMS)	4
PHYS 5260	Introduction to Nanoscience and Nanotechnology	4
Mathematical Methods		
Complete 4 semester hours from the following:		4
CHME 7320	Chemical Engineering Mathematics	
EECE 7200	Linear Systems Analysis	
EECE 7203	Complex Variable Theory and Differential Equations	
ME 7205	Advanced Mathematical Methods for Mechanical Engineers	
Electives		
Complete 12 semester hours from the following:		12
CHEM 5613	Optical Methods of Analysis	
CHEM 5638	Molecular Modeling	
CHEM 7247	Advances in Nanomaterials	

CHME 5699	Special Topics in Chemical Engineering	
EECE 5606	Micro- and Nanofabrication	
NNMD 5470	Nano/Biomedical Commercialization: Concept to Market	
PHSC 5100	Concepts in Pharmaceutical Science	
PHSC 6210	Drug Design, Evaluation, and Development	
PHYS 7731	Biological Physics 1	
PMST 6250	Advanced Physical Pharmacy	
PMST 6252	Pharmacokinetics and Drug Metabolism	
PMST 6254	Advanced Drug Delivery System	

BIOCHEMICAL AND BIOENVIRONMENTAL TRACK

Code	Title	Hours
Required Course Work		
Complete 8 semester hours from the following:		8
BIOL 6300	Biochemistry	
CHME 5630	Biochemical Engineering	
CHME 7340	Chemical Engineering Kinetics	
CHME 7350	Transport Phenomena	
CIVE 7251	Environmental Biological Processes	
Mathematical Methods		
Complete 4 semester hours from the following:		4
CHME 7320	Chemical Engineering Mathematics	
EECE 7200	Linear Systems Analysis	
EECE 7203	Complex Variable Theory and Differential Equations	
ME 7205	Advanced Mathematical Methods for Mechanical Engineers	
Electives		
Complete 16 semester hours from the following:		16
BIOL 5581	Biological Imaging	
BIOL 6301	Molecular Cell Biology	
CHEM 5612	Principles of Mass Spectrometry	
CHEM 5613	Optical Methods of Analysis	
CHEM 5620	Protein Chemistry	
CHEM 5621	Principles of Chemical Biology for Chemists	
CHEM 5660	Analytical Biochemistry	
CHEM 7317	Analytical Biotechnology	
PHSC 5100	Concepts in Pharmaceutical Science	
PHSC 6218	Biomedical Chemical Analysis	
PHSC 6290	Biophysical Methods in Drug Discovery	
PHYS 7731	Biological Physics 1	
PMST 6252	Pharmacokinetics and Drug Metabolism	
PMST 6254	Advanced Drug Delivery System	

MOTOR CONTROL TRACK

Code	Title	Hours
Required Course Work		
BIOL 5601	Multidisciplinary Approaches in Motor Control	4
ME 5659	Control Systems Engineering	4
ME 5665	Musculoskeletal Biomechanics	4

Mathematical Methods

Complete 4 semester hours from the following:		4
CHME 7320	Chemical Engineering Mathematics	
EECE 7200	Linear Systems Analysis	
EECE 7203	Complex Variable Theory and Differential Equations	
ME 7205	Advanced Mathematical Methods for Mechanical Engineers	

Electives

Complete 12 semester hours from the following:		12
BIOL 5587	Comparative Neurobiology	
CS 5335	Robotic Science and Systems	
EECE 7200	Linear Systems Analysis	
EECE 7204	Applied Probability and Stochastic Processes	
EECE 7213	System Identification and Adaptive Control	
EECE 7214	Optimal and Robust Control	
EECE 7310	Modern Signal Processing	
IE 7280	Statistical Methods in Engineering	
IE 7315	Human Factors Engineering	
ME 5655	Dynamics and Mechanical Vibration	
ME 6200	Mathematical Methods for Mechanical Engineers 1	
ME 6201	Mathematical Methods for Mechanical Engineers 2	
PHYS 7301	Classical Mechanics/Math Methods	
PHYS 7321	Computational Physics	
PHYS 7741	Biological Physics 2	
PSYC 5180	Quantitative Methods 1	
PSYC 5181	Quantitative Methods 2	
PT 5138 and PT 5139	Neuroscience and Lab for PT 5138	
PT 5150 and PT 5151	Motor Control, Development, and Learning and Lab for PT 5150	

BIOCOMPUTING TRACK

Code	Title	Hours
Required Course Work		
EECE 7205	Fundamentals of Computer Engineering	4
EECE 7360	Combinatorial Optimization	4
Mathematical Methods		
Complete 4 semester hours from the following:		4
CHME 7320	Chemical Engineering Mathematics	
EECE 7200	Linear Systems Analysis	
EECE 7203	Complex Variable Theory and Differential Equations	
ME 7205	Advanced Mathematical Methods for Mechanical Engineers	
Electives		
Complete 16 semester hours from the following:		16
BIOL 5581	Biological Imaging	
BIOL 5587	Comparative Neurobiology	
CS 5100	Foundations of Artificial Intelligence	
CS 5200	Database Management Systems	

CS 5310	Computer Graphics	
CS 5330	Pattern Recognition and Computer Vision	
CS 5400	Principles of Programming Language	
CS 5600	Computer Systems	
CS 5800	Algorithms	
CS 6140	Machine Learning	
CS 6200	Information Retrieval	
CS 6410	Compilers	
EECE 7200	Linear Systems Analysis	
EECE 7203	Complex Variable Theory and Differential Equations	
EECE 7204	Applied Probability and Stochastic Processes	
EECE 7352	Computer Architecture	
EECE 7353	VLSI Design	
EECE 7364	Mobile and Wireless Networking	
EECE 7368	High-Level Design of Hardware-Software Systems	
OR 6205	Deterministic Operations Research	
OR 7230	Probabilistic Operation Research	

CELL AND TISSUE TRACK

Code	Title	Hours
Required Course work		
BIOE 5420	Cellular Engineering	4
BIOE 5430	Principles and Applications of Tissue Engineering	4
BIOL 6401	Research Methods and Critical Analysis in Molecular Cell Biology	4
Mathematical Methods		
Complete 4 semester hours from the following:		4
CHME 7320	Chemical Engineering Mathematics	
EECE 7200	Linear Systems Analysis	
EECE 7203	Complex Variable Theory and Differential Equations	
ME 7205	Advanced Mathematical Methods for Mechanical Engineers	
Electives		
Complete 12 semester hours from the following:		12
BIOE 5380	Advanced Biomolecular Dynamics and Control	
BIOE 5410	Molecular Bioengineering	
BIOE 5630	Physiological Fluid Mechanics	
BIOE 7200	Special Topics in Cell and Tissue Engineering	
BIOL 5307	Biological Electron Microscopy	
BIOL 5543	Stem Cells and Regeneration	
BIOL 5581	Biological Imaging	
CHME 5699	Special Topics in Chemical Engineering	
CHME 7340	Chemical Engineering Kinetics	
CHME 7350	Transport Phenomena	
EECE 5648	Biomedical Optics	
ME 5667	Solid Mechanics of Cells and Tissues	

NNMD 5470	Nano/Biomedical Commercialization: Concept to Market	
PHYS 7741	Biological Physics 2	

GENERAL BIOENGINEERING STUDIES TRACK

Code	Title	Hours
Mathematical Methods		
Complete one of the following:		4
CHME 7320	Chemical Engineering Mathematics	
EECE 7200	Linear Systems Analysis	
EECE 7203	Complex Variable Theory and Differential Equations	
Electives		
Complete 24 semester hours from the following:		24
BIOE 5250	Design, Manufacture, and Evaluation of Medical Devices	
BIOE 5380	Advanced Biomolecular Dynamics and Control	
BIOE 5420	Cellular Engineering	
BIOE 5430	Principles and Applications of Tissue Engineering	
BIOE 5630	Physiological Fluid Mechanics	
BIOE 5650	Multiscale Biomechanics	
BIOE 7100	Special Topics in Biomedical Imaging and Signal Processing	
BIOE 7300	Special Topics in Biomechanics	
BIOL 5307	Biological Electron Microscopy	
BIOL 5543	Stem Cells and Regeneration	
BIOL 5581	Biological Imaging	
BIOL 5587	Comparative Neurobiology	
BIOL 5601	Multidisciplinary Approaches in Motor Control	
BIOL 6300	Biochemistry	
BIOL 6301	Molecular Cell Biology	
BIOL 6401	Research Methods and Critical Analysis in Molecular Cell Biology	
BINF 6200	Bioinformatics Programming	
BINF 6308	Bioinformatics Computational Methods 1	
BINF 6309	Bioinformatics Computational Methods 2	
CAEP 6202	Research, Evaluation, and Data Analysis	
CHEM 5612	Principles of Mass Spectrometry	
CHEM 5613	Optical Methods of Analysis	
CHEM 5620	Protein Chemistry	
CHEM 5621	Principles of Chemical Biology for Chemists	
CHEM 5638	Molecular Modeling	
CHEM 5660	Analytical Biochemistry	
CHEM 7247	Advances in Nanomaterials	
CHEM 7317	Analytical Biotechnology	
CHME 5630	Biochemical Engineering	
CHME 5699	Special Topics in Chemical Engineering	
CHME 7260	Special Topics in Chemical Engineering	
CHME 7330	Chemical Engineering Thermodynamics	
CHME 7340	Chemical Engineering Kinetics	

CHME 7350	Transport Phenomena	
CIVE 7251	Environmental Biological Processes	
CS 5100	Foundations of Artificial Intelligence	
CS 5200	Database Management Systems	
CS 5310	Computer Graphics	
CS 5330	Pattern Recognition and Computer Vision	
CS 5335	Robotic Science and Systems	
CS 5600	Computer Systems	
CS 5800	Algorithms	
CS 6140	Machine Learning	
CS 6200	Information Retrieval	
CS 6410	Compilers	
EECE 5606	Micro- and Nanofabrication	
EECE 5648	Biomedical Optics	
EECE 7200	Linear Systems Analysis	
EECE 7202	Electromagnetic Theory 1	
EECE 7203	Complex Variable Theory and Differential Equations	
EECE 7204	Applied Probability and Stochastic Processes	
EECE 7205	Fundamentals of Computer Engineering	
EECE 7211	Nonlinear Control	
EECE 7213	System Identification and Adaptive Control	
EECE 7214	Optimal and Robust Control	
EECE 7271	Computational Methods in Electromagnetics	
EECE 7293	Modern Imaging	
EECE 7310	Modern Signal Processing	
EECE 7311	Two Dimensional Signal and Image Processing	
EECE 7312	Statistical and Adaptive Signal Processing	
EECE 7323	Numerical Optimization Methods	
EECE 7337	Information Theory	
EECE 7352	Computer Architecture	
EECE 7353	VLSI Design	
EECE 7360	Combinatorial Optimization	
EECE 7364	Mobile and Wireless Networking	
EECE 7368	High-Level Design of Hardware-Software Systems	
IE 7280	Statistical Methods in Engineering	
IE 7315	Human Factors Engineering	
ME 5650	Advanced Mechanics of Materials	
ME 5655	Dynamics and Mechanical Vibration	
ME 5657	Finite Element Method	
ME 5659	Control Systems Engineering	
ME 5665	Musculoskeletal Biomechanics	
ME 5667	Solid Mechanics of Cells and Tissues	
ME 6200	Mathematical Methods for Mechanical Engineers 1	
ME 6201	Mathematical Methods for Mechanical Engineers 2	

ME 6260	Introduction to Microelectromechanical Systems (MEMS)
ME 7210	Elasticity and Plasticity
ME 7238	Advanced Finite Element Method
ME 7245	Fracture Mechanics and Failure Analysis
ME 7255	Continuum Mechanics
ME 7275	Essentials of Fluid Dynamics
ME 7280	Statistical Thermodynamics
OR 6205	Deterministic Operations Research
OR 7230	Probabilistic Operation Research
NNMD 5470	Nano/Biomedical Commercialization: Concept to Market
PHSC 5100	Concepts in Pharmaceutical Science
PHSC 6210	Drug Design, Evaluation, and Development
PHSC 6218	Biomedical Chemical Analysis
PHSC 6290	Biophysical Methods in Drug Discovery
PHYS 5260	Introduction to Nanoscience and Nanotechnology
PHYS 7301	Classical Mechanics/Math Methods
PHYS 7321	Computational Physics
PHYS 7731	Biological Physics 1
PHYS 7741	Biological Physics 2
PMST 6250	Advanced Physical Pharmacy
PMST 6252	Pharmacokinetics and Drug Metabolism
PMST 6254	Advanced Drug Delivery System
PSYC 5120	Proseminar in Sensation
PSYC 5130	Proseminar in Perception
PSYC 5180	Quantitative Methods 1
PSYC 5181	Quantitative Methods 2
PSYC 7300	Advanced Quantitative Analysis
PT 5133	Kinesiology
PT 5134	Lab for PT 5133
PT 5138	Neuroscience
PT 5139	Lab for PT 5138
PT 5150	Motor Control, Development, and Learning
PT 5151	Lab for PT 5150
PT 6215	Assistive Technology
SLPA 5111	Anatomy and Physiology of the Auditory System
SLPA 6301	Speech Science

Program Credit/GPA Requirements

48 total semester hours required
Minimum 3.000 GPA required

Bioengineering, PhD—Advanced Entry

Our interdisciplinary Doctor of Philosophy program in bioengineering draws on faculty across the university and reflects the significant strengths of bioengineering research in multiple areas. Students accepted to the bioengineering program will undertake a rigorous core curriculum in basic bioengineering science followed by an immersion track curriculum. There are currently eight tracks from which to choose:

> Track 1: Biomedical Imaging and Signal Processing
> Track 2: Biomechanics and Mechanobiology
> Track 3: BioMEMs/BioNANO
> Track 4: Biochemical and Bioenvironmental Engineering
> Track 5: Motor Control
> Track 6: Biocomputing
> Track 7: Cell and Tissue Engineering
> Track 8: General Bioengineering Studies

Biology can inspire engineering. Increasingly, discoveries in the life sciences reveal processes, complexity, and control without analogy in the limited world of traditional engineering. Current methods of producing nanoscale control over molecules cannot reproduce the organization found in even the simplest organisms. Energy capture, robust control, remediation, and self-assembly are all employed with efficiency unparalleled by anything in today's laboratories. At the same time, traditional engineering disciplines struggle to find new and complex challenges. The last fifty years of basic life science research have gradually peeled the layers of complexity from biological processes, unmasking the fundamental underpinnings on which biological systems are constructed. Bioinspired engineering has the potential to transform the technological landscape of the twenty-first century. Astonishingly, it represents merely one of the myriad opportunities presented at the interface of biology and engineering.

The field of bioengineering is broad and includes all research at the interface of engineering and biology—this includes bioprocesses, environmental microbiology, biomaterials and tissue engineering, bioelectricity, biomechanics, biomedical and biological imaging, nanotechnology in medicine and the environment, and engineering design for human interfacing. At Northeastern, bioengineering PhD students have an opportunity to be trained to appreciate advances in bioengineering across a wide range of disciplines while they perform highly focused and cutting-edge bioengineering research with one of our many core or affiliated faculty members.

DEGREE REQUIREMENTS

Completion of the PhD degree requires students to successfully complete the following requirements:

- **Curriculum:** The curriculum comprises a strong fundamental, broad core of courses that is then coupled with one of a series of available tracks for depth in a particular field of study.
- **Qualifying examination (written and oral):** To qualify to continue in the PhD program, students must pass the bioengineering comprehensive qualifying examination, which comprises the synthesis of knowledge derived from the core curriculum and current literature presented in the form of an R21 NIH-style proposal. Oral defense of the proposal is required to pass the exam as well as satisfactory research progress and satisfactory academic standing. Details of the formal qualification exam procedure and timing are available in the bioengineering office and may be requested electronically at any time from the graduate director. Advanced Entry PhD students must successfully complete the qualifying examination (written and oral) within two years of entry.
- **Qualifying examination committee:** The qualifying examination committee is composed of a minimum of three members, two of whom must be selected from the list of bioengineering-affiliated faculty. In addition, one of the two affiliated faculty must have a primary appointment in the College of Engineering. The student's primary advisor may not sit on the qualifying examination committee.

- **Dissertation committee:** The dissertation committee is composed of a minimum of three members, two of whom must be selected from the list of bioengineering-affiliated faculty. In addition, one of the two affiliated faculty must have a primary appointment in the College of Engineering.
- **Area exam (dissertation prospectus/proposal):** PhD students must submit a "prospectus" to their dissertation committee in the form of an R21 NIH-style research plan and successfully defend the research plan in the form of an open presentation to their dissertation committee. The area exam should be completed as soon as is practical after successful completion of course work and qualifying exams.
- **Dissertation:** PhD candidates must satisfactorily complete and defend a dissertation describing original research in bioengineering in an open presentation to their dissertation committee.
- **Dissertation Course Requirements:** After achieving PhD candidacy, the doctoral candidate, in consultation with his or her research advisor, must register in two consecutive semesters (may include full summer term) forDissertation (BIOE 9990). Upon completion of this sequence, the student must then register for Dissertation Continuation (BIOE 9996) in every semester (in each fall and spring term and also in the summer term if summer is the student's last semester) until the dissertation is completed. Students may not register for Dissertation Continuation (BIOE 9996) until they fulfill the two-semester sequence of Dissertation (BIOE 9990) .

To meet the full-time registration requirement for PhD students who have completed the majority of their course work and not yet reached PhD candidacy, a zero-credit course, Exam Preparation—Doctoral (BIOE 8960) , can be taken if needed to fulfill the full-time course registration requirement. Exam Preparation—Doctoral (BIOE 8960)   is an individual instruction course, billed at 1 semester hour, and graded S or U. Exam Preparation—Doctoral (BIOE 8960) does not have any course content, and students must register in a section for which their research advisor is listed as the "instructor."

The curriculum for PhD students with advanced standing will be selected from the available core and elective courses under the guidance of the program director and the student's primary advisor. The advanced standing PhD degree requires a minimum of 16 semester hours of course work to be approved by the graduate director and a completed PhD dissertation. Advanced standing constitutes receipt of a relevant and accepted master's degree at a qualified institution.

The core emphasizes the breadth of topics that our graduates must appreciate as internationally competitive bioengineers. It utilizes existing courses within the College of Engineering as well as introducing new/external courses that are necessary and will be developed.

Track electives may be replaced with up to 12 semester hours of relevant independent studies Independent Study (BIOE 7978).

Requirements	Credits
Advisor-approved course work	16 SH (minimum)
Advanced seminar (register and complete four semesters)	0 SH
Dissertation	0 SH
Minimum semester hours required	**16 SH**

TRACK 1: BIOMEDICAL IMAGING AND SIGNAL PROCESSING

The biomedical imaging and signal processing track reflects Northeastern University's outstanding research profile in various aspects of biological and biomedical imaging and image processing and signal processing. This is evidenced by the Gordon Center for Subsurface Sensing and Imaging Systems, the Center for Communications and Digital Signal Processing Research, and the strong externally funded active research groups and faculty whose interests lie at the intersection of imaging, signal processing technologies, and biological and medical applications.

The courses in this track concentrate largely on general mathematical methods for signal and image processing and image formation and on image acquisition modalities and applications. Research in this area takes place at the intersection of these technical streams, and students completing the track will have a sufficiently strong background in the component areas to be able to carry out high-quality research efforts.

TRACK 2: BIOMECHANICS AND MECHANOBIOLOGY

Biomechanics and mechanobiology are linked by the biological response to applied forces and strains. To understand the overall effect of load on biological systems, it is important to consider not only the deformation and shear rates that result from force application but also the short- and long-term biological responses. The biomechanics and mechanobiology track reflects this understanding and leverages the strong faculty research at Northeastern, which is attempting to tie biomechanics to biological responses at multiple scales.

The biomechanics track is designed to capitalize on the substantial expertise in the mechanical and industrial engineering department, which has a strong fundamental research program in biomechanics. Faculty in the department perform investigations that comprise theoretical, computational, and experimental investigations.

TRACK 3: BIOMEMS/BIONANO

The bioMEMs/bioNANO track reflects Northeastern University's strength as indicated by the NSF Center for High Rate Nanomanufacturing, the NSF/NCI Nanomedicine IGERT training grant, and the strong pharmaceutical sciences department. In addition, Northeastern also has a research presence in MEMs that, when combined with the bioengineering curriculum, presents significant interdisciplinary opportunities for students in the program.

TRACK 4: BIOCHEMICAL AND BIOENVIRONMENTAL

The track reflects strengths in biochemical engineering and bioenvironmental engineering by active research programs focused in pharmaceutical bioprocessing, biomaterials, tissue engineering, drug delivery, environmental microbiology, biotreatment/bioremediation, and environmental modeling.

TRACK 5: MOTOR CONTROL

The motor control track is designed to capitalize on the collective expertise of cross-disciplinary collaborations between existing Northeastern faculty whose research lies at the intersection of sensorimotor control systems, neuroscience, and dynamical systems. Insights into learning and coordination of functional motor behavior provide the basis for a better understanding of neurological diseases of motor function such as stroke, Parkinson's disease, and cerebral palsy. Insights will be the foundation for designing better therapy and rehabilitation.

TRACK 6: BIOCOMPUTING

The biocomputing track draws on strengths in computer engineering and computation applied to bioengineering applications.

TRACK 7: CELL AND TISSUE ENGINEERING

Cell and tissue engineering is a major strength at Northeastern University with several research labs focused on understanding and engineering living cells and tissues. These labs are elucidating the quantitative principles that govern cell fate decisions and are developing design strategies to promote the assembly and patterning

of multicellular systems into viable, functional tissues. Cells are remarkable physicochemical systems that sense, respond, and actively reshape their rich microenvironment. Parsing the dialogue between the microenvironment and cells and elucidating design strategies to engineer the dynamic cellular milieu has far-reaching implications for biomedicine, including applications such as tissue engineering and the development of novel therapeutic strategies.

This pioneering, multidisciplinary research is enabled by strengths at Northeastern in key foundational areas, such as biomolecular engineering, computational modeling, developmental biology, imaging, materials science, micro- and nanofluidics, mechanobiology, molecular cell biology, and systems biology.

Cell and tissue engineering is widely recognized as a core subfield of bioengineering. A formal track in this area offers our students a program of study that capitalizes on a major strength at Northeastern.

TRACK 8: GENERAL BIOENGINEERING STUDIES

The general bioengineering studies track provides students with the flexibility to create a custom course plan depending on their individual interests, under the strong advisement of the graduate director.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Milestones

Annual review
Qualifying examination (within two years of entry)
Dissertation committee
Area examination (dissertation prospectus/proposal)
Dissertation defense

Core Requirements

Code	Title	Hours
Seminar		
BIOE 7390	Seminar (Register and complete four semesters)	0
Approved Course Work		
Select courses in consultation with faculty advisor.		16

Dissertation

Code	Title	Hours
Complete the following (repeatable) course twice:		
BIOE 9990	Dissertation	

Program Credit/GPA Requirements

16 total semester hours required
Minimum 3.000 GPA required

Bioengineering, MSBioE

Students accepted to the Master of Science in Bioengineering program have four concentrations from which to choose:

- Concentration 1: Bioimaging and Signal Processing
- Concentration 2: Cell and Tissue Engineering
- Concentration 3: Biomechanics
- Concentration 4: Biomedical Devices

Concentrations

A concentration is required. Each concentration has two required courses and a list of technical electives from which the student should select three to five courses, depending on whether he or she selects the thesis option, project option, or course-only option.

CONCENTRATION IN BIOIMAGING AND SIGNAL PROCESSING

This concentration is appropriate for students interested in biomedical imaging and processing of a wide array of signals from biological systems and biomedical instruments. Two courses (Linear Systems Analysis (EECE 7200) and Applied Probability and Stochastic Processes (EECE 7204) are required of all students choosing this option. Extensive additional options are available as approved technical electives.

CONCENTRATION IN CELL AND TISSUE ENGINEERING

The cell and tissue engineering concentration is appropriate for students interested in molecular, cell, and tissue engineering. Two courses (Molecular Bioengineering (BIOE 5410) and Cellular Engineering (BIOE 5420) are required of all cell and tissue engineering students. There is an extensive list of approved technical electives to choose from to complete the degree.

CONCENTRATION IN BIOMECHANICS

Students who join the biomechanics concentration will cover multiscale mechanics, including whole-body movement, mechanical properties of biomaterials, and fluid mechanics of physiological fluids. The two courses required of all biomechanics concentration students are Multiscale Biomechanics (BIOE 5650) and Musculoskeletal Biomechanics (ME 5665).

CONCENTRATION IN BIOMEDICAL DEVICES

The biomedical devices concentration is appropriate for students interested in the design and implementation of biological devices and implants. Two core courses, Design of Biomedical Instrumentation (BIOE 5810) andDesign, Manufacture, and Evaluation of Medical Devices (BIOE 5250), are required for all students in this concentration.

Graduate Certificate Options

Students enrolled in a master's degree have the opportunity to also pursue one of the many engineering graduate certificate options in addition to or in combination with the MS degree. Students should consult their faculty advisor regarding these options (p. 229).

GORDON INSTITUTE OF ENGINEERING LEADERSHIP

Master's Degree in Bioengineering with Graduate Certificate in Engineering Leadership

Students may complete a Master of Science in Bioengineering in addition to earning a Graduate Certificate in Engineering Leadership. Students must apply and be admitted to the Gordon Engineering Leadership Program in order to pursue this option. The program requires fulfillment of the 16-semester-hour-curriculum required to earn the Graduate Certificate in Engineering Leadership, which includes an industry-based challenge project with multiple mentors. The integrated 33-semester-hour degree and certificate will require 17 hours of advisor-approved bioengineering technical courses.

Engineering Leadership (p. 222)

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated. Note: This major requires a concentration: biomechanics, biomedical devices, bioimaging and signal processing, or cell and tissue engineering. Consult your college administrator.

Core Requirements

Code	Title	Hours
Seminar		
BIOE 7390	Seminar	0
Required Core		
A grade of C or higher is required in each course:		
BIOE 5100	Medical Physiology	4
BIOE 6000	Principles of Bioengineering	1

Concentrations

Complete one of the following four concentrations:

- Bioimaging and Signal Processing (p. 136)
- Cell and Tissue Engineering (p. 136)
- Biomechanics (p. 136)
- Biomedical Devices (p. 137)

BIOIMAGING AND SIGNAL PROCESSING

Code	Title	Hours
Required Course Work		
A grade of C or higher is required.		
EECE 7200	Linear Systems Analysis	4
EECE 7204	Applied Probability and Stochastic Processes	4
Course Work Option		
Complete 20 semester hours from the course list.		20
Project Option		
BIOE 7890	Master's Project	4
Electives		
Complete 16 semester hours from the course list.		16
Thesis Option		
Complete the following (repeatable) course twice:		8
BIOE 7990	Thesis	
Electives		
Complete 12 semester hours from the course list.		12
Course List		
BIOE 5320	Advanced Biomedical Measurements and Instrumentation	
BIOE 5235	Biomedical Imaging	
BIOE 7100	Special Topics in Biomedical Imaging and Signal Processing	
BIOL 5581	Biological Imaging	
EECE 5639	Computer Vision	
EECE 5648	Biomedical Optics	
EECE 7203	Complex Variable Theory and Differential Equations	
EECE 7204	Applied Probability and Stochastic Processes	
PHSC 6226	Imaging in Medicine and Drug Discovery	

CELL AND TISSUE ENGINEERING

Code	Title	Hours
Required Course Work		
A grade of C or higher is required.		
BIOE 5410	Molecular Bioengineering	4
BIOE 5420	Cellular Engineering	4

Code	Title	Hours
Course Work Option		
Complete 20 semester hours from the course list.		20
Project Option		
BIOE 7890	Master's Project	4
Electives		
Complete 16 semester hours from the course list.		16
Thesis Option		
Complete the following (repeatable) course twice:		8
BIOE 7990	Thesis	
Electives		
Complete 12 semester hours from the course list.		12
Course List		
BIOE 5250	Design, Manufacture, and Evaluation of Medical Devices	
BIOE 5430	Principles and Applications of Tissue Engineering	
BIOE 5820	Biomaterials	
BIOL 5543	Stem Cells and Regeneration	
BIOL 6301	Molecular Cell Biology	
ME 5667	Solid Mechanics of Cells and Tissues	
NNMD 5370	Nanomedicine Research Techniques	
NNMD 5470	Nano/Biomedical Commercialization: Concept to Market	

BIOMECHANICS

Code	Title	Hours
Required Course Work		
A grade of C or higher is required.		
ME 5665	Musculoskeletal Biomechanics	4
BIOE 5650	Multiscale Biomechanics	4
Course Work Option		
Complete 20 semester hours from the course list.		20
Project Option		
BIOE 7890	Master's Project	4
Electives		
Complete 16 semester hours from the course list.		16
Thesis Option		
Complete the following (repeatable) course twice:		8
BIOE 7990	Thesis	
Electives		
Complete 12 semester hours from the course list.		12
Course List		
BIOE 5630	Physiological Fluid Mechanics	
BIOE 7300	Special Topics in Biomechanics	
BIOL 5601	Multidisciplinary Approaches in Motor Control	
EECE 7200	Linear Systems Analysis	
EECE 7203	Complex Variable Theory and Differential Equations	
ME 5650	Advanced Mechanics of Materials	
ME 5655	Dynamics and Mechanical Vibration	
ME 5657	Finite Element Method	
ME 5659	Control Systems Engineering	
ME 5667	Solid Mechanics of Cells and Tissues	
ME 7210	Elasticity and Plasticity	

Code	Title	
ME 7238	Advanced Finite Element Method	
ME 7245	Fracture Mechanics and Failure Analysis	
ME 7255	Continuum Mechanics	

BIOMEDICAL DEVICES

Code	Title	Hours
Required Course Work		
A grade of C or higher is required.		
BIOE 5810	Design of Biomedical Instrumentation	4
BIOE 5250	Design, Manufacture, and Evaluation of Medical Devices	4
Course Work Option		
Complete 20 semester hours from the course list.		20
Project Option		
BIOE 7890	Master's Project	4
Electives		
Complete 16 semester hours from the course list.		16
Thesis Option		
Complete the following (repeatable) course twice:		8
BIOE 7990	Thesis	
Electives		
Complete 12 semester hours from the course list.		12
Course List		
BIOL 5587	Comparative Neurobiology	
BIOE 5850	Design of Implants	
BIOE 7400	Special Topics in Biomedical Devices	
CHEM 7247	Advances in Nanomaterials	
EECE 5606	Micro- and Nanofabrication	
ME 5659	Control Systems Engineering	
ME 5665	Musculoskeletal Biomechanics	
ME 5667	Solid Mechanics of Cells and Tissues	
NNMD 5470	Nano/Biomedical Commercialization: Concept to Market	
NNMD 5370	Nanomedicine Research Techniques	
PHSC 6226	Imaging in Medicine and Drug Discovery	

Program Credit/GPA Requirements

32 total semester hours required
Minimum 3.000 GPA required

Chemical Engineering

Website (http://www.che.neu.edu)

Thomas J. Webster, PhD
Professor and Chair
Art Zafiropoulo Chair in Engineering
th.webster@northeastern.edu

Richard West, PhD
Associate Professor and Associate Chair for Graduate Studies
r.west@northeastern.edu

313 Snell Engineering Center
617.373.2989
617.373.2209 (fax)

The department offers a Master of Science and a Doctor of Philosophy in Chemical Engineering. The MS degree is offered as either a thesis MS or a course work (nonthesis) MS degree. Most courses are in the late afternoon or early evening to make them accessible to part-time students with full-time industrial careers. A full-time MS student may apply for participation in the cooperative (co-op) education plan. MS students pursuing the thesis MS option should first gain the consent of their advisors prior to participating in the co-op plan. The course work MS may be taken part-time, but the thesis MS and PhD degrees are only offered as a full-time program. Any deviations from the curriculum must be addressed by petition to the graduate committee and will be considered on a case-by-case basis.

Candidates pursuing a thesis MS or a PhD can select thesis topics from a diverse range of faculty research interests. New graduate students can learn about ongoing research from individual faculty members, faculty websites, and graduate student seminars. Graduate student seminars are held on a regular basis and provide an interactive forum for learning and exchanging research ideas.

Graduate Certificate Options

Students enrolled in a master's degree have the opportunity to also pursue one of the many engineering graduate certificate options in addition to or in combination with the MS degree. Students should consult their faculty advisor regarding these options (p. 229).

GORDON INSTITUTE OF ENGINEERING LEADERSHIP OPTION

Students have the opportunity to pursue the Gordon Engineering Leadership Program (p. 221) in combination with the MS degree.

Programs

Doctor of Philosophy (PhD)

- Chemical Engineering (p. 137)
- Chemical Engineering—Advanced Entry (p. 139)

Master of Science in Chemical Engineering (MSCHE)

- Chemical Engineering (p. 141)

Graduate Certificate

- Process Safety Engineering (p. 142)

Chemical Engineering, PhD

Each student admitted to the PhD program in chemical engineering will initially be designated a doctoral student. Upon successful completion of the requirements for doctoral candidacy as described below, a student is reclassified as a doctoral candidate. After establishing candidacy, a student must complete a program of academic course work and a dissertation under the direction of a dissertation advisor. All doctoral candidates must also pass a final oral examination.

Qualifying for Doctoral Candidacy

To qualify for doctoral candidacy, the student must demonstrate mastery of the four core courses of chemical engineering (thermodynamics, kinetics, transport, and mathematics). To become a doctoral candidate, students must maintain a grade-point average (GPA) of 3.500 or above in the four core courses and have no individual grade below a B in the four core courses.

In addition, each student must also demonstrate critical thinking, analysis, and experimental planning skills related to their dissertation research topic through a written candidacy proposal and an oral defense of this proposal. The student must pass, as determined by the student's

dissertation committee, this oral candidacy proposal defense in order to advance to doctoral candidacy. The oral presentation will be open to students, faculty, and the student's dissertation committee. The student earns the classification of doctoral candidate upon successful completion of these requirements.

Course Requirements

A minimum of 24 semester hours (SH) of academic course work, **not including any independent study credits,** beyond the bachelor's degree is required. The 24 SH must include at least 16 SH of academic course work (exclusive of thesis or dissertation) taken at Northeastern University. All four of the core courses (see table under Program Requirements) must be included in the student's academic graduate course work.

To meet the full-time registration requirement for PhD students who have completed the majority of their course work and not yet reached PhD candidacy, a zero-credit course, Candidacy Preparation—Doctoral (CHME 8960), can be taken if needed to fulfill full-time course registration. The course is an individual instruction course, billed at 1 SH, and graded S or U. There is no course content, and students must register in a section with their research or academic advisor as the "instructor."

After obtaining PhD candidacy, students are required to register for Dissertation (CHME 9990) for two consecutive semesters. This is then followed by registration for Dissertation Continuation (CHME 9996) in each semester thereafter until the dissertation has been completed and defended. **Note: No course credits are awarded for Dissertation (CHME 9990) or Dissertation Continuation (CHME 9996) ; however, a student is considered full-time if registered for either of these courses.**

All students pursuing a doctoral degree must enroll in the department's seminar course for each semester they are working toward their degree.

Students will be advised on their courses for the first semester by the associate chair for graduate studies. After the first semester, students will work with their dissertation advisor to determine appropriate courses and course schedule to meet their educational needs and aspirations. Upon consultation with the dissertation advisor, a student may take up to 44 SH of course credit without additional financial penalty. Students and dissertation advisors should keep in mind that the university residency requirement requires two semesters of academic studies after becoming a doctoral candidate.

Language Requirement

There is no foreign language requirement for the PhD degree. However, each candidate must be proficient in technical writing and oral presentation in the English language. The graduate committee may require additional course work to improve language proficiency, if necessary.

Residence Requirement

A student satisfies the residence requirement by completing one academic year of full-time graduate studies during two consecutive academic semesters after qualifying for doctoral candidacy. Additional required course work (exclusive of seminars) may be completed during this period. Students are required to be continually enrolled while pursuing the completion of the dissertation.

Dissertation

After a student establishes doctoral candidacy, they must complete a dissertation that embodies the results of extended original research and includes material suitable for publication. The student is responsible for proposing a dissertation committee to be approved by the dissertation advisor at least one month prior to the dissertation defense. The

committee must have a minimum of four members, in addition to the primary advisor. The primary dissertation advisor and at least one other committee member must be faculty members in the Department of Chemical Engineering. Additionally, one of the committee members must be external to the Department of Chemical Engineering. Committee membership is not limited to faculty at Northeastern University, nor to engineering faculty. The student is encouraged to consider experts in the dissertation topic and to work with the dissertation advisor to create a meaningful and helpful committee. The dissertation committee will approve the dissertation in its final form. The graduate school requirements for dissertation formatting and electronic submittal instructions can be found on the College of Engineering's webpage (http://www.coe.neu.edu/student-services/dissertation/thesis-instructions). Students are responsible for contacting the Graduate School of Engineering for any updates to dissertation requirements and appropriate deadlines.

Dissertation Defense and Final Oral Examination

This comprehensive examination includes the public dissertation defense as well as a final oral examination to include the subject matter of the doctoral dissertation and significant developments in the field of the dissertation work. The oral presentation will be open to the public, including students, faculty, and the student's committee.

Departure Prior to Dissertation Completion

Occasionally, students have to leave the Department of Chemical Engineering prior to completion of all degree requirements. In such instances, a student cannot submit a dissertation for credit beyond three years after he or she stops actively pursuing the research. Exceptions may be granted upon petition to the departmental graduate committee. Petitions must demonstrate extenuating circumstances and prove that the research is still of value to the profession.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Milestones

Biannual review: at the end of fall and spring semesters
Dissertation proposal: within a year of completing all core courses
Dissertation defense: required before graduation

Core Requirements

A minimum of 24 semester hours of academic course work is required. Independent study credits do not count toward the 24 required semester hours.

Code	Title	Hours
Core Courses		
A cumulative 3.500 GPA is required for the 4 core classes.		
CHME 7320	Chemical Engineering Mathematics	4
CHME 7330	Chemical Engineering Thermodynamics (Statistical Thermodynamics may be taken in the place of Thermodynamics)	4
or CHME 7235	Introduction to Statistical Thermodynamics	
CHME 7340	Chemical Engineering Kinetics	4
CHME 7350	Transport Phenomena	4
Seminar		
Must be taken each semester:		
CHME 7390	Seminar	

Electives

Code	Title	Hours

Complete 8 semester hours. Consult your faculty advisor for acceptable courses:

Code	Title
CHME 5101	Fundamentals of Chemical Engineering Analysis
CHME 5137	Computational Modeling in Chemical Engineering
CHME 5160	Drug Delivery: Engineering Analysis
CHME 5240	Introduction to Polymer Science
CHME 5510	Fundamentals in Process Safety Engineering
CHME 5520	Process Safety Engineering—Chemical Reactivity, Reliefs, and Hazards Analysis
CHME 5621	Electrochemical Engineering
CHME 5630	Biochemical Engineering
CHME 5631	Biomaterials Principles and Applications
CHME 5632	Advanced Topics in Biomaterials
CHME 5699	Special Topics in Chemical Engineering
CHME 6610	Computational Programs in Process Safety for Relief and Scenario Modeling
CHME 7235	Introduction to Statistical Thermodynamics
CHME 7240	Polymer Science
CHME 7260	Special Topics in Chemical Engineering
CHME 7262	Special Topics in Process Safety
CHME 7978	Independent Study
ENGR 5670	Sustainable Energy: Materials, Conversion, Storage, and Usage
EMGT 5220	Engineering Project Management
EMGT 6225	Economic Decision Making
EMGT 6305	Financial Management for Engineers
ME 5374	Special Topics in Mechanical Engineering
BIOE 5410	Molecular Bioengineering

Dissertation

Code	Title	Hours

Complete the following (repeatable) course twice:

Code	Title
CHME 9990	Dissertation

Program Credit/GPA Requirements

24 total semester hours required
Minimum 3.000 GPA required

Chemical Engineering, PhD—Advanced Entry

Each student admitted to the PhD program in chemical engineering will initially be designated a doctoral student. Upon successful completion of the requirements for doctoral candidacy as described below, a student is reclassified as a doctoral candidate. After establishing candidacy, a student must complete a program of academic course work and a dissertation under the direction of a dissertation advisor. All doctoral candidates must also pass a final oral examination.

Qualifying for Doctoral Candidacy

To qualify for doctoral candidacy, the student must demonstrate mastery of the four core areas of chemical engineering (thermodynamics, kinetics, transport, and mathematics) through course performance. To become a doctoral candidate, students must have no grades below a B and must maintain a grade-point average (GPA) of 3.500 or above, typically at the end of the first year, as an average considering all four core courses.

In addition, each student must also demonstrate critical thinking, analysis, and experimental planning skills related to their dissertation research topic through a written candidacy proposal and an oral defense of this proposal. The student must pass, as determined by the student's dissertation committee, this oral candidacy proposal defense in order to advance to doctoral candidacy. The oral presentation will be open to students, faculty, and the student's committee. The student earns the classification of *doctoral candidate* upon successful completion of these requirements.

Course Requirements

A minimum of 24 semester hours (SH) of academic course work, **not including any independent study credits,** beyond the master's degree is required. The 24 SH must include at least 16 SH of academic course work (exclusive of thesis or dissertation) taken at Northeastern University. All four of the core courses (see table under Program Requirements tab) must be included in the student's academic graduate course work.

To meet the full-time registration requirement for PhD students who have completed the majority of their course work and not yet reached PhD candidacy, a zero-credit course, Candidacy Preparation—Doctoral (CHME 8960), can be taken if needed to fulfill full-time course registration. The course is an individual instruction course, billed at 1 SH, and graded S or U. There is no course content, and students must register in a section with their research or academic advisor as the "instructor."

After reaching PhD candidacy, students are required to register for Dissertation (CHME 9990) for two consecutive semesters. This is then followed by registration for Dissertation Continuation (CHME 9996) in each semester thereafter until the dissertation has been completed and defended.

Note: No course credits are awarded for Dissertation (CHME 9990) or Dissertation Continuation (CHME 9996); however, a student is considered full-time if registered for either of these courses. All students pursuing a doctoral degree must enroll in the department's seminar course for each semester they are matriculating toward their degree.

Students will be advised on their courses for the first semester by the associate chair of the Department of Chemical Engineering. After the first semester, students will work with their dissertation advisor to determine appropriate courses and course schedule to meet their educational needs and aspirations. Upon consultation with the dissertation advisor, a student may take up to 44 SH of course credit without additional financial penalty. Students and dissertation advisors should keep in mind that the requirements for doctoral candidacy include all four core courses and the proposal defense and that the university residency requirement requires two semesters of academic studies after becoming a doctoral candidate.

Language Requirement

There is no foreign language requirement for the PhD degree. However, each candidate must be proficient in technical writing and oral presentation in the English language. The graduate committee may require additional course work to improve language proficiency, if necessary.

Residence Requirement

A student satisfies the residence requirement by completing one academic year of full-time graduate studies during two consecutive academic semesters after qualifying for doctoral candidacy. Additional required course work (exclusive of seminars) may be completed during this period. Students are required to be continually enrolled while pursuing the completion of the dissertation.

Dissertation

After a student establishes doctoral candidacy, they must complete a dissertation that embodies the results of extended original research and includes material suitable for publication. The student is responsible for proposing a dissertation committee to be approved by the dissertation advisor at least one month prior to the dissertation defense. The committee must have a minimum of four members, in addition to the primary advisor. The primary dissertation advisor must be a faculty member in the Department of Chemical Engineering. Additionally, one of these committee members must be external to the Department of Chemical Engineering. Committee membership is not limited to faculty at Northeastern University, nor to engineering faculty. The student is encouraged to consider experts in the dissertation topic and to work with the dissertation advisor to create a meaningful and helpful committee. The dissertation committee will approve the dissertation in its final form. Required dissertation format is the same as for the MS thesis, and the graduate school requirements and electronic submittal instructions can be found on the College of Engineering website (http://www.coe.neu.edu/student-services/dissertation/thesis-instructions). Students are responsible for contacting the Graduate School of Engineering for any updates to dissertation requirements and appropriate deadlines.

Dissertation Defense and Final Oral Examination

This comprehensive examination includes the public dissertation defense as well as a final oral examination to include the subject matter of the doctoral dissertation and significant developments in the field of the dissertation work. The oral presentation will be open to the public, including students, faculty, and the student's committee.

Departure Prior to Dissertation Completion

Occasionally, students have left the Department of Chemical Engineering prior to completion of all degree requirements. In such instances, a student cannot submit a dissertation for credit beyond three years after he or she stops actively pursuing the research. Exceptions may be granted upon petition to the departmental graduate committee. Petitions must demonstrate extenuating circumstances and prove that the research is still of value to the profession.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Milestones

Biannual review: at the end of fall and spring semesters
Dissertation proposal: within a year of completing all core courses
Dissertation defense: required before graduation

Core Requirements

A minimum of 24 semester hours of academic course work is required. Independent study credits do not apply to the 24 required semester hours.

Code	Title	Hours
Seminar		
Must be taken each semester:		
CHME 7390	Seminar	
Core Courses		
A cumulative 3.500 GPA is required for the 4 core classes.		
CHME 7320	Chemical Engineering Mathematics	4
CHME 7330	Chemical Engineering Thermodynamics (Statistical Thermodynamics may be taken in place of Thermodynamics)	4
or CHME 7235	Introduction to Statistical Thermodynamics	
CHME 7340	Chemical Engineering Kinetics	4
CHME 7350	Transport Phenomena	4

Electives

Code	Title	Hours
CHME 5101	Fundamentals of Chemical Engineering Analysis	4
CHME 5137	Computational Modeling in Chemical Engineering	4
CHME 5160	Drug Delivery: Engineering Analysis	4
CHME 5240	Introduction to Polymer Science	4
CHME 5510	Fundamentals in Process Safety Engineering	4
CHME 5520	Process Safety Engineering—Chemical Reactivity, Reliefs, and Hazards Analysis	4
CHME 5621	Electrochemical Engineering	4
CHME 5630	Biochemical Engineering	4
CHME 5631	Biomaterials Principles and Applications	4
CHME 5632	Advanced Topics in Biomaterials	4
CHME 5699	Special Topics in Chemical Engineering	4
CHME 6610	Computational Programs in Process Safety for Relief and Scenario Modeling	4
CHME 7235	Introduction to Statistical Thermodynamics	4
CHME 7240	Polymer Science	4
CHME 7260	Special Topics in Chemical Engineering	4
CHME 7262	Special Topics in Process Safety	4
CHME 7978	Independent Study	1-4
ENGR 5670	Sustainable Energy: Materials, Conversion, Storage, and Usage	4
EMGT 5220	Engineering Project Management	4
EMGT 6225	Economic Decision Making	4
EMGT 6305	Financial Management for Engineers	4
ME 5374	Special Topics in Mechanical Engineering	4
BIOE 5410	Molecular Bioengineering	4

Dissertation

Code	Title	Hours
Complete the following (repeatable) course twice:		
CHME 9990	Dissertation	

Program Credit/GPA Requirements

24 total semester hours required
Minimum 3.000 GPA required

Chemical Engineering, MSCHE

The Master of Science in Chemical Engineering is normally pursued by students with a Bachelor of Science in Chemical Engineering or closely allied fields. Students wishing to pursue the master's degree but with undergraduate educational backgrounds other than chemical engineering may be required to complete supplementary undergraduate course work. These courses are in addition to the minimum course requirements. Students enrolled in the program are encouraged to seek guidance from their instructors and advisor regarding additional course work that may supplement the graduate curriculum.

Students originally admitted to the master's degree program who wish to switch to the PhD program must petition the associate chair for graduate studies and follow the procedure detailed under the administrative procedure section (p. 125) for the College of Engineering. If admission is granted, then the student must satisfy all the requirements of the doctoral degree program, including the requirements for doctoral candidacy.

Course Requirements

A minimum of 32 semester hours of academic work is required to qualify for the Master of Science degree in chemical engineering.

If pursuing a thesis option, at least 8 semester hours of thesis credit must be included as part of these 32 semester hours of credits. In addition, each student pursuing a thesis option must enroll in the department's seminar course for each semester they are matriculating toward their degree. Students enrolled in the department's seminar course are encouraged to participate in the seminar by providing a research presentation regarding their research project under the guidance of their advisor. The faculty advisor and the student establish the sequence of courses that students take to pursue the Master of Science in Chemical Engineering.

If pursuing a nonthesis option, students must complete a minimum of 32 semester hours of course work and no enrollment in the seminar course is required. See required core courses and example elective courses for all graduate students (p. 141).

Degree Requirements	Thesis Option	Nonthesis Option
Required core courses	16 SH	16 SH
Master of Science proposal	Required	N/A
Master of Science thesis	8 SH	N/A
Seminar	0 SH	N/A
Elective courses [1]	8 SH	16 SH
Minimum semester hours required [2]	**32 SH**	**32 SH**

[1]   Students may complete a maximum of 8 semester hours (thesis option) or 12 semester hours (nonthesis options) of course work for credit outside the Department of Chemical Engineering under the guidance of their advisor and approval of the chemical engineering graduate program director.

[2]   Exclusive of any preparatory undergraduate courses.

Thesis Requirements

Students pursuing a Master of Science in Chemical Engineering with thesis must submit to the Graduate School of Engineering a written thesis that is approved by the thesis committee and department chair. See the graduate school requirements and electronic submittal instructions (http://www.coe.neu.edu/student-services/dissertation/thesis-instructions). MS with thesis students must also complete an oral master's thesis defense in order to successfully complete the program. The student will be expected to form a master's thesis committee, composed of a minimum of three members—one who is the advisor, one other faculty member from the chemical engineering department, and one member from outside the department. The oral presentation will be open to the public, including students, faculty, and the candidate's committee.

Part-time Students

Part-time students may progress according to their plans and time constraints but within the seven-year time limit. A minimum of 32 semester hours of academic course work is required for part-time students. The thesis and seminar course are not required for part-time students pursuing a master's degree.

Master of Science students wishing to change their status from part-time to full-time must notify the chemical engineering department and make a formal petition to the Graduate School of Engineering. Refer to the regulations of the Graduate School of Engineering for further information on academic administrative policies.

Departure Prior to Thesis Completion

Occasionally, students have to leave the chemical engineering department prior to completion of all degree requirements. In such instances, longtime intervals have often elapsed before thesis or manuscript submission. Accordingly, the department has adopted the guideline that a student cannot submit a thesis for credit beyond three years after the student stops actively pursuing the research. Exceptions may be granted upon petition to the departmental graduate committee. Petitions must demonstrate extenuating circumstances and prove that the research is still of value to the profession.

Graduate Certificate Options

Students enrolled in a master's degree have the opportunity to also pursue one of the many engineering graduate certificate options in addition to or in combination with the MS degree. Students should consult their faculty advisor regarding these options (p. 229).

GORDON INSTITUTE OF ENGINEERING LEADERSHIP

Master's Degree in Chemical Engineering with Graduate Certificate in Engineering Leadership

Students may complete a Master of Science in Chemical Engineering in addition to earning a Graduate Certificate in Engineering Leadership. Students must apply and be admitted to the Gordon Engineering Leadership Program in order to pursue this option. The program requires fulfillment of the 16-semester-hour curriculum required to earn the Graduate Certificate in Engineering Leadership, which includes an industry-based challenge project with multiple mentors and 16 semester hours of required chemical engineering course work.

Engineering Leadership (p. 222)

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
CHME 7320	Chemical Engineering Mathematics	4
CHME 7330	Chemical Engineering Thermodynamics (Statistical Thermodynamics can be substituted for Thermodynamics)	4
or CHME 7235	Introduction to Statistical Thermodynamics	
CHME 7340	Chemical Engineering Kinetics	4
CHME 7350	Transport Phenomena	4

Options

Complete one of the following options:

COURSE WORK OPTION

Code	Title	Hours
Complete 16 semester hours from the course list below. (p. 142)		16

THESIS OPTION

Code	Title	Hours
Thesis		
Complete 8 semester hours from the following (CHME 7990 is repeatable):		8
CHME 7390	Seminar	
CHME 7990	Thesis	
Electives		
Complete 8 semester hours from the course list below. (p. 142)		8

Course List

Code	Title	Hours
CHME 5101	Fundamentals of Chemical Engineering Analysis	4
CHME 5137	Computational Modeling in Chemical Engineering	4
CHME 5160	Drug Delivery: Engineering Analysis	4
CHME 5240	Introduction to Polymer Science	4
CHME 5510	Fundamentals in Process Safety Engineering	4
CHME 5520	Process Safety Engineering—Chemical Reactivity, Reliefs, and Hazards Analysis	4
CHME 5630	Biochemical Engineering	4
CHME 5631	Biomaterials Principles and Applications	4
CHME 5632	Advanced Topics in Biomaterials	4
CHME 5699	Special Topics in Chemical Engineering	4
CHME 6610	Computational Programs in Process Safety for Relief and Scenario Modeling	4
CHME 7235	Introduction to Statistical Thermodynamics	4
CHME 7240	Polymer Science	4
CHME 7260	Special Topics in Chemical Engineering	4
CHME 7262	Special Topics in Process Safety	4
CHME 7978	Independent Study	1-4
ENGR 5670	Sustainable Energy: Materials, Conversion, Storage, and Usage	4
EMGT 5220	Engineering Project Management	4
EMGT 6225	Economic Decision Making	4
EMGT 6305	Financial Management for Engineers	4
ME 5374	Special Topics in Mechanical Engineering	4
BIOE 5410	Molecular Bioengineering	4

Program Credit/GPA Requirements

32 total semester hours required
Minimum 3.000 GPA required

Process Safety Engineering, Graduate Certificate

The Graduate Certificate in Process Safety Engineering focuses on the integration of chemical engineering skills with the knowledge of process safety and regulation with specific attention on designing and developing solutions for industrial firms with the goal of creating environments that are safer and in compliance with regulatory rules and regulations.

This four-course graduate certificate seeks to provide students with opportunities to apply the fundamentals of chemical engineering knowledge and skills to lead efforts within companies to plan and implement process safety designs that assist in meeting the regulatory requirements and confirming code compliance within an industrial firm in order to maintain the safety, health, and welfare of their employees and the public as well as making industrial firms safer and profitable.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Process Safety		
CHME 5510	Fundamentals in Process Safety Engineering	4
CHME 5520	Process Safety Engineering—Chemical Reactivity, Reliefs, and Hazards Analysis	4
Relief and Scenario Modeling		
CHME 6610	Computational Programs in Process Safety for Relief and Scenario Modeling	4
Special Topics		
CHME 7262	Special Topics in Process Safety	4

Program Credit/GPA Requirements

16 total semester hours required
Minimum 3.000 GPA required

Civil and Environmental Engineering

Website (http://www.civ.neu.edu)

Jerome F. Hajjar, PhD, PE
CDM Smith Professor and Chair

Haris N. Koutsopoulos, PhD
Professor and Associate Chair for Graduate Studies

400 Snell Engineering Center
617.373.2444

617.373.4419 (fax)

Overview

With a strategic focus in urban engineering, and through a range of teaching and research strengths, anchored by several multidisciplinary, multi-institutional centers and programs, the Department of Civil and Environmental Engineering at Northeastern University prepares future master's and PhD graduates to address the global, complex, and ever-evolving engineering challenges of our time by building on the department's current strengths and expanding into vital areas. Three overarching themes are emphasized: environmental health, civil infrastructure security, and sustainable resource engineering. These themes are aligned with the department's premier strengths in simulation (both computational and experimental), smart sensing, data and network science, and urban informatics.

The department's strategic focus on urban engineering gives our graduates the opportunity to make real-world impact on and long-lasting contributions to the well-being and development of society. Within our graduate programs, students work alongside world-class faculty on advanced research and courses, developing a solid base for their careers.

Mission of the Department

The mission for the Department of Civil and Environmental Engineering is to provide a premier undergraduate and graduate education to help prepare globally oriented civil and environmental engineering leaders; to conduct world-class, use-inspired disciplinary and interdisciplinary research; and to serve a diverse constituency through public service and outreach.

Academic Programs

MASTER OF SCIENCE DEGREE

The department offers four MS degree programs and concentration options. Students in all MS programs must complete a minimum of 32 semester hours of approved course work with a minimum grade-point average (GPA) of 3.000. Options for a master's thesis or report in place of course work are available. All civil and environmental engineering master's programs are available on a full-time or part-time basis. At the master's level, the following degrees are offered:

1. Master of Science in Civil Engineering with a concentration in:

   - Construction management

   - Environmental and water systems

   - Geotechnical/geoenvironmental engineering

   - Structural engineering

   - Transportation engineering

2. Master of Science in Environmental Engineering

3. Master of Science in Engineering and Public Policy with a concentration in:

   - Energy and environment

   - Infrastructure resilience

4. Master of Science in Sustainable Building Systems

DOCTOR OF PHILOSOPHY (PHD) DEGREE

The department offers the following PhD degrees: PhD in Civil Engineering and Interdisciplinary PhD. Applicants are admitted to the PhD program either directly after earning a suitable bachelor's degree or after earning a master's degree (advanced entry).

The doctoral program is designed to be flexible with respect to subject area and may be adapted to any subject area in civil and environmental engineering, including interdisciplinary options within the department or across departments or colleges. The PhD is awarded to students who demonstrate high academic achievement and research competence in the field of civil engineering. Students must pursue the PhD program on a basis consistent with the residence requirements for the degree that may be found under the Degree Requirements tab.

Graduate Certificate Options

Students enrolled in a master's degree have the opportunity to also pursue one of the many engineering graduate certificate options in addition to or in combination with the MS degree. Students should consult their faculty advisor regarding these options (p. 229).

GORDON INSTITUTE OF ENGINEERING LEADERSHIP OPTION

Students have the opportunity to pursue the Gordon Engineering Leadership Program (p. 221) in combination with the MS degree.

Programs

Doctor of Philosophy (PhD)

- Civil Engineering (p. 143)

- Civil Engineering—Advanced Entry (p. 145)

Master of Science (MS)

- Engineering and Public Policy with Concentration in Energy and Environment (p. 146)

- Engineering and Public Policy with Concentration in Infrastructure Resilience (p. 147)

Master of Science in Civil Engineering (MSCivE)

- Civil Engineering with Concentration in Construction Management (p. 148)
- Civil Engineering with Concentration in Environmental and Water Systems (p. 149)
- Civil Engineering with Concentration in Geotechnical/ Geoenvironmental Engineering (p. 150)
- Civil Engineering with Concentration in Structural Engineering (p. 151)
- Civil Engineering with Concentration in Transportation (p. 152)

Master of Science in Environmental Engineering (MSENVE)

- Environmental Engineering (p. 154)

Master of Science in Sustainable Building Systems (MSSBS)

- Sustainable Building Systems (p. 155)

Civil Engineering, PhD

Awarding of the Doctor of Philosophy degree is based on exceptional performance in course work as well as evidence of ability to formulate and execute original research. The PhD program has two components:

1. An academic program of graduate-level courses that provides depth in a specific area of civil engineering (the major field) as well as other course work that provides additional exposure at an advanced level to one or more disciplines

2. The dissertation, an extended independent research effort on a relevant technical problem resulting in an original contribution to the field

Upon acceptance into the program, an applicant is designated as a doctoral student. This designation is changed to doctoral candidate upon successful completion of the doctoral qualifying examinations (both written and oral area exams) and all the required course work.

Each student's mastery of subject matter is measured by a qualifying examination covering a subset of topics selected from the major field. A doctoral dissertation committee periodically monitors research progress, and the candidate is required to present and defend his or her research results before the doctoral dissertation committee upon completion of the work.

Course Work Requirement

The academic program must include at least 52 semester hours of graduate-level course work beyond the bachelor's degree. Students with a master's degree in civil engineering must complete a minimum of 20 semester hours of course work at Northeastern University. A student may count no more than 4 semester hours of independent study (such as special project in civil engineering) toward the minimum course requirements. A minimum of 40 semester hours must be related to the major field but may include courses from other departments when appropriate.

To meet the full-time registration requirement for PhD students who have completed the majority of their course work and not yet reached PhD candidacy, a zero-credit course, Exam Preparation—Doctoral (CIVE 8960), can be taken if needed to fulfill full-time course registration. The course is an individual instruction course, billed at 1 semester hour, and graded S or U. There is no course content, and students must register in a section with their research or academic advisor as the "instructor."

Upon successful completion of the qualifying exam and the majority of required course work, each doctoral candidate must register in two consecutive semesters for Dissertation (CIVE 9990). Upon completion of this sequence, the candidate must register for Dissertation Continuation (CIVE 9996) in every semester until the dissertation is complete. Students may not register for Continuation until they fulfill the two-semester dissertation sequence.

Qualifying Examination and Degree Candidacy

The qualifying exam includes written and oral components. Its content depends upon the educational background and objectives of the student. In general, the written component covers subject matter at the master's degree level selected from the major field and includes basic engineering and science disciplines, as well as civil engineering application areas. The oral component measures general comprehension and aptitude for research. If a student fails the exam, he or she may retake it one more time with the permission of the qualifying examination committee.

PhD students who start their graduate program at Northeastern with a BS degree shall take the qualifying exam within the first 30 months after entering the program. Upon successful completion of the exam and all required course work, the student is classified as a doctoral candidate.

Comprehensive Examination

The comprehensive exam is a defense of the doctoral research work and an examination on subject matter related to the dissertation area.

Dissertation

Once degree candidacy is established, a doctoral candidate may proceed with his or her dissertation. The candidate must write a dissertation proposal and name a civil and environmental engineering (CEE) faculty member as the dissertation advisor. A doctoral dissertation committee formed by the student and his or her dissertation advisor will monitor progress and approve the final document. The doctoral dissertation committee shall have no fewer than four members, at least two of whom must be full-time faculty from the CEE department.

Each student, along with a faculty advisor, must jointly develop a proposal defining the content of the academic program, subject to review by the dissertation committee. Intellectual rigor, connectivity of subject matter, and compatibility with departmental interests are critical issues. The doctoral dissertation committee's approval of the proposal represents a mutual agreement between the student and the committee. The CEE department encourages flexibility in program definition, especially in areas where complementary courses exist in other departments or where expertise resides outside the department and where the objective is to introduce new technology in civil engineering practice.

Each doctoral candidate must defend his or her dissertation within seven years from the start of the PhD program.

Residence Requirement

After achieving PhD candidacy, students must complete at least two successive semesters of full-time study on campus to establish residence. The total effort for a PhD program involves a minimum of three years of full-time work beyond the bachelor's degree. Students who enter the doctoral program with a Master of Science degree may complete the requirements in less time but should anticipate at least two years of full-time effort.

Language Requirement

Each doctoral candidate must be proficient in technical writing and oral presentation in the English language. The qualifying examination committee may require additional course work in the case of any deficiency in these areas.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Milestones

Qualifying examination and comprehensive examination
Annual review
Dissertation proposal
Dissertation committee
Dissertation defense

Core Requirements

Complete 52 semester hours of approved course work. Consult your faculty advisor for acceptable courses. Please note that a maximum of 4 semester hours of Independent Study (CIVE 7978) will be accepted toward the 52-semester-hour requirement.

Dissertation

Code	Title	Hours
Complete the following (repeatable) course twice:		
CIVE 9990	Dissertation	

Program Credit/GPA Requirements

52 total semester hours required
Minimum 3.000 GPA required

Civil Engineering, PhD—Advanced Entry

Awarding of the Doctor of Philosophy degree is based on exceptional performance in course work as well as evidence of ability to formulate and execute original research. The PhD program has two components:

1. An academic program of graduate-level courses that provides depth in a specific area of civil engineering (the major field) as well as other course work that provides additional exposure at an advanced level to one or more disciplines
2. The dissertation, an extended independent research effort on a relevant technical problem resulting in an original contribution to the field

Upon acceptance into the program, an applicant is designated as a doctoral student. This designation is changed to doctoral candidate upon successful completion of the doctoral qualifying examinations (both written and oral area exams) and all the required course work.

Each student's mastery of subject matter is measured by a qualifying examination covering a subset of topics selected from the major field. A doctoral dissertation committee periodically monitors research progress, and the candidate is required to present and defend his or her research results before the doctoral dissertation committee upon completion of the work.

Course Work Requirement

The academic program must include at least 52 semester hours of graduate-level course work beyond the bachelor's degree. Students with a master's degree in civil engineering must complete a minimum of 20 semester hours of course work at Northeastern University. A student may count no more than 4 semester hours of independent study (such as special project in civil engineering) toward the minimum course requirements. A minimum of 40 semester hours must be related to the major field but may include courses from other departments when appropriate.

To meet the full-time registration requirement for PhD students who have completed the majority of their course work and not yet reached PhD candidacy, a zero-credit course, Exam Preparation—Doctoral (CIVE 8960), can be taken if needed to fulfill full-time course registration. The course is an individual instruction course, billed at 1 semester hour, and graded S or U. There is no course content, and students must register in a section with their research or academic advisor as the "instructor."

Upon successful completion of the qualifying exam and the majority of required course work, each doctoral candidate must register in two consecutive semesters for Dissertation (CIVE 9990). Upon completion of this sequence, the candidate must register forDissertation Continuation (CIVE 9996) in every semester until the dissertation is complete. Students may not register for Continuation until they fulfill the two-semester dissertation sequence.

Qualifying Examination and Degree Candidacy

The qualifying exam includes written and oral components. Its content depends upon the educational background and objectives of the student. In general, the written component covers subject matter at the master's degree level selected from the major field and includes basic engineering and science disciplines, as well as civil engineering application areas. The oral component measures general comprehension and aptitude for research. If a student fails the exam, he or she may retake it one more time with the permission of the qualifying examination committee.

Students must take the qualifying exam during the first 18 months of their PhD program. Upon successful completion of the exam and all required course work, the student is classified as a doctoral candidate.

Comprehensive Examination

The comprehensive exam is a defense of the doctoral research work and an examination on subject matter related to the dissertation area.

Dissertation

Once degree candidacy is established, a doctoral candidate may proceed with his or her dissertation. The candidate must write a dissertation proposal and name a civil and environmental engineering faculty member as the dissertation advisor. A doctoral dissertation committee formed by the student and his or her dissertation advisor will monitor progress and approve the final document. The doctoral dissertation committee shall have no fewer than four members, at least two of whom must be full-time faculty from the Department of Civil and Environmental Engineering (CEE).

Each student, along with a faculty advisor, must jointly develop a proposal defining the content of the academic program, subject to review by the dissertation committee. Intellectual rigor, connectivity of subject matter, and compatibility with departmental interests are critical issues. The doctoral dissertation committee's approval of the proposal represents a mutual agreement between the student and the committee. The CEE department encourages flexibility in program definition, especially in areas where complementary courses exist in other departments or where expertise resides outside the department and where the objective is to introduce new technology in civil engineering practice.

Each doctoral candidate must defend his or her dissertation within seven years from the start of the PhD program.

Residence Requirement

After achieving PhD candidacy, students must complete at least two successive semesters of full-time study on campus to establish residence. The total effort for a PhD program involves a minimum of three years of full-time work beyond the bachelor's degree. Students who enter the doctoral program with a Master of Science degree may complete the requirements in less time but should anticipate at least two years of full-time effort.

Language Requirement

Each doctoral candidate must be proficient in technical writing and oral presentation in the English language. The qualifying examination committee may require additional course work in the case of any deficiency in these areas.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Milestones

Qualifying examination and comprehensive examination
Annual review
Dissertation proposal
Dissertation committee
Dissertation defense

Core Requirements

Complete 20 semester hours of approved course work. Consult your faculty advisor for acceptable courses. Please note that a maximum of 4 semester

hours of Independent Study (CIVE 7978) will be accepted toward the 20-semester-hour requirement.

Dissertation

Code	Title	Hours
Complete the following (repeatable) course twice:		
CIVE 9990	Dissertation	

Program Credit/GPA Requirements

20 total semester hours required
Minimum 3.000 GPA required

Engineering and Public Policy with Concentration in Energy & Environment, MS

The purpose of this degree is to provide students with a background in engineering with the tools necessary to conduct robust policy analysis. It includes required core courses from the Department of Civil and Environmental Engineering and the School of Public Policy, complemented by electives in engineering and public policy, which can be met by two courses and a master's report (recommended), or by one course and a thesis, or by three courses. A minimum of 16 semester hours must be taken in the College of Engineering.

Degree Requirements	With Report	With Thesis	Course Work Only
Required core courses	20 SH	20 SH	20 SH
Other electives	8 SH	4 SH	12 SH
Master of Science report/ thesis	4 SH	8 SH	
Minimum semester hours required	32 SH	32 SH	32 SH

Graduate Certificate Options

Students enrolled in a master's degree have the opportunity to also pursue one of the many engineering graduate certificate options in addition to or in combination with the MS degree. Students should consult their faculty advisor regarding these options (p. 229).

GORDON INSTITUTE OF ENGINEERING LEADERSHIP

Master's Degree in Engineering and Public Policy with Concentration in Energy and Environment with Graduate Certificate in Engineering Leadership

Students may complete a Master of Science in Engineering and Public Policy with Concentration in Energy and Environment in addition to earning a Graduate Certificate in Engineering Leadership. Students must apply and be admitted to the Gordon Engineering Leadership Program in order to pursue this option. The program requires fulfillment of the 16 semester-hour curriculum required to earn the Graduate Certificate in Engineering Leadership, which includes an industry-based challenge project with multiple mentors. The integrated 36-semester-hour degree and certificate will require 20 hours of advisor-approved energy and environment technical courses.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Energy and Environment		
CIVE 7272	Air Quality Management	4
or ENGR 5670	Sustainable Energy: Materials, Conversion, Storage, and Usage	
Environmental Systems Modeling		
Complete 4 semester hours from the following:		4
CIVE 5261	Dynamic Modeling for Environmental Investment and Policymaking	
CIVE 5275	Life Cycle Assessment of Materials, Products, and Infrastructure	
CIVE 5699	Special Topics in Civil Engineering (Climate Science and Technology Adaptation and Policy)	
CIVE 7388	Special Topics in Civil Engineering (Agent-Based Modeling)	
Economics		
Complete 4 semester hours from the following:		4
PPUA 5260	Ecological Economics	
ECON 7210	Applied Microeconomic Policy Analysis	
LPSC 6313	Economic Analysis for Law, Policy, and Planning	
Public Policy and Analysis		
Complete 4 semester hours from the following:		4
LPSC 7311	Strategizing Public Policy	
PPUA 6506	Techniques of Policy Analysis	
PPUA 6509	Techniques of Program Evaluation	
Statistics		
Complete 4 semester hours from the following:		4
CIVE 7100	Time Series and Geospatial Data Sciences	
IE 6200	Engineering Probability and Statistics	
IE 7280	Statistical Methods in Engineering	
LPSC 7215	Advanced Quantitative Techniques	

Options

Complete one of the following options:

COURSE WORK OPTION

Code	Title	Hours
Complete 12 semester hours from the Energy and Environment Course List below.		12

REPORT OPTION

Code	Title	Hours
CIVE 8674	Master's Report	4
Complete 8 semester hours from the Energy and Environment Course List below.		8

THESIS OPTION

Code	Title	Hours
CIVE 7990	Thesis	8
Complete 4 semester hours from the Energy and Environment Course List below.		4

Energy and Environment Course List

Any required core course not used to meet the required core course requirement can be taken as a restricted elective.

Code	Title	Hours
CIVE 5271	Solid and Hazardous Waste Management	
CIVE 5280	Remote Sensing of the Environment	
CIVE 5300	Environmental Engineering Laboratory	
CIVE 7252	Water Engineering, Resources, and Energy Recovery	
CIVE 7261	Surface Water Quality Modeling	
CIVE 7388	Special Topics in Civil Engineering (Informatics in Civil Engineering)	
CIVE 7392	Special Topics in Environmental Engineering (Hydraulic Modeling)	
EMGT 6225	Economic Decision Making	
ENVR 5210	Environmental Planning	
ENVR 5260	Geographical Information Systems	
ME 5645	Environmental Issues in Manufacturing and Product Use	
IE 5500	Systems Engineering in Public Programs	
IE 5640	Data Mining for Engineering Applications	
PPUA 5262	Big Data for Cities	
PPUA 5263	Geographic Information Systems for Urban and Regional Policy	
PPUA 7237	Advanced Spatial Analysis of Urban Systems	

Program Credit/GPA Requirements

32 total semester hours required
Minimum 3.000 GPA required

Engineering and Public Policy with Concentration in Infrastructure Resilience, MS

The purpose of this degree is to provide students with a background in engineering with the tools necessary to conduct robust policy analysis. It includes required core courses from the Department of Civil and Environmental Engineering and the School of Public Policy, complemented by electives in engineering and public policy, which can be met by two courses and a master's report (recommended), or by one course and a thesis, or by three courses. A minimum of 16 semester hours must be taken in the College of Engineering.

Degree Requirements	With Report	With Thesis	Course Work Only
Required core courses	20 SH	20 SH	20 SH
Other electives	8 SH	4 SH	12 SH
Master of Science report/ thesis	4 SH	8 SH	
Minimum semester hours required	32 SH	32 SH	32 SH

Graduate Certificate Options

Students enrolled in a master's degree have the opportunity to also pursue one of the many engineering graduate certificate options in addition to or in combination with the MS degree. Students should consult their faculty advisor regarding these options (p. 229).

GORDON INSTITUTE OF ENGINEERING LEADERSHIP

Master's Degree in Engineering and Public Policy with Concentration in Infrastructure Resilience with Graduate Certificate in Engineering Leadership

Students may complete a Master of Science in Engineering and Public Policy with Concentration in Infrastructure Resilience in addition to earning a Graduate Certificate in Engineering Leadership. Students must apply and be admitted to the Gordon Engineering Leadership Program in order to pursue this option. The program requires fulfillment of the 16 semester-hour curriculum required to earn the Graduate Certificate in Engineering Leadership, which includes an industry-based challenge project with multiple mentors. The integrated 36-semester-hour degree and certificate will require 20 hours of advisor-approved infrastructure resilience technical courses.

Engineering Leadership (p. 222)

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Infrastructure Resilience		
CIVE 7110	Critical Infrastructure Resilience	4
Environmental Systems Modeling		
Complete 4 semester hours from the following:		4
CIVE 5261	Dynamic Modeling for Environmental Investment and Policymaking	
CIVE 5275	Life Cycle Assessment of Materials, Products, and Infrastructure	
CIVE 5280	Remote Sensing of the Environment	
CIVE 5699	Special Topics in Civil Engineering (Climate Science and Technology Adaptation and Policy)	
CIVE 7388	Special Topics in Civil Engineering (Informatics in Civil Engineering)	
CIVE 7392	Special Topics in Environmental Engineering (Agent-based Modeling)	
Economics		
Complete 4 semester hours from the following:		4
ECON 7210	Applied Microeconomic Policy Analysis	
LPSC 6313	Economic Analysis for Law, Policy, and Planning	
Public Policy and Analysis		
Complete 4 semester hours from the following:		4
LPSC 7311	Strategizing Public Policy	

PPUA 6506	Techniques of Policy Analysis	
PPUA 6509	Techniques of Program Evaluation	
Statistics		
Complete 4 semester hours from the following:		4
CIVE 7100	Time Series and Geospatial Data Sciences	
IE 6200	Engineering Probability and Statistics	
IE 7280	Statistical Methods in Engineering	
LPSC 7215	Advanced Quantitative Techniques	

Options

Complete one of the following options:

COURSE WORK OPTION

Code	Title	Hours
Complete 12 semester hours from the infrastructure course list below.		12

REPORT OPTION

Code	Title	Hours
CIVE 8674	Master's Report	4
Complete 8 semester hours from the Infrastructure course list below.		8

THESIS OPTION

Code	Title	Hours
CIVE 7990	Thesis	8
Complete 4 semester hours from the Infrastructure course list below.		4

Infrastructure Course List

Any required core course not used to meet the required core course requirement can be taken as a restricted elective.

Code	Title	Hours
EMGT 6225	Economic Decision Making	
ENVR 5260	Geographical Information Systems	
IA 5250	Decision Making for Critical Infrastructure	
IE 5500	Systems Engineering in Public Programs	
IE 5640	Data Mining for Engineering Applications	
IE 7290	Reliability Analysis and Risk Assessment	
ME 5645	Environmental Issues in Manufacturing and Product Use	
PPUA 5260	Ecological Economics	
PPUA 5262	Big Data for Cities	
PPUA 5263	Geographic Information Systems for Urban and Regional Policy	
PPUA 7230	Housing Policy	
PPUA 7231	Transportation Policy	
PPUA 7234	Land Use and Urban Growth Policy	
PPUA 7237	Advanced Spatial Analysis of Urban Systems	
PPUA 7239	Problems in Metropolitan Policymaking	
PPUA 7240	Health Policy and Politics	

Program Credit/GPA Requirements

32 total semester hours required
Minimum 3.000 GPA required

Civil Engineering with Concentration in Construction Management, MSCivE

This program is intended for students interested in construction management and engineering or a closely related field. It includes required core courses primarily from the Department of Civil and Environmental Engineering, complemented by electives in civil and environmental engineering and other departments such as mechanical and industrial engineering and business administration. Based on proven proficiency in given areas, students may waive certain core courses and replace them with alternate elective courses.

Degree Requirements	With Report	With Thesis	Course Work Only
Required core courses	18 SH	18 SH	18 SH
Elective courses	10 SH	6 SH	14 SH
Master of Science report/thesis	4 SH	8 SH	
Minimum semester hours required	**32 SH**	**32 SH**	**32 SH**

Graduate Certificate Options

Students enrolled in a master's degree have the opportunity to also pursue one of the many engineering graduate certificate options in addition to or in combination with the MS degree. Students should consult their faculty advisor regarding these options (p. 229).

GORDON INSTITUTE OF ENGINEERING LEADERSHIP

Master's Degree in Civil Engineering with a Concentration in Construction Management with Graduate Certificate in Engineering Leadership

Students may complete a Master of Science in Civil Engineering with a Concentration in Construction Management in addition to earning a Graduate Certificate in Engineering Leadership. Students must apply and be admitted to the Gordon Engineering Leadership Program in order to pursue this option. The program requires fulfillment of the 16-semester-hour curriculum required to earn the Graduate Certificate in Engineering Leadership, which includes an industry-based challenge project with multiple mentors. The integrated 33-semester-hour degree and certificate will require 17 hours of advisor-approved construction management technical courses.

Engineering Leadership (p. 222)

ENGINEERING BUSINESS

Master's Degree in Civil Engineering with Concentration in Construction Management with Graduate Certificate in Engineering Business

Students may complete a Master of Science in Civil Engineering with Concentration in Construction Management in addition to earning a Graduate Certificate in Engineering Business. Students must apply and be admitted to the Galante Engineering Business Program in order to pursue this option. The program requires the applicant to have earned or be in a program to earn a Bachelor of Science in Engineering from Northeastern University. The integrated 32-semester-hour degree and certificate will require 16 semester hours of the core courses and 16

semester hours from the outlined business-skill curriculum. The course work, along with participation in cocurricular professional development elements, earn the Graduate Certificate in Engineering Business.

Engineering Business (http://catalog.northeastern.edu/graduate/engineering/multidisciplinary/engineering-business-graduate-certificate)

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
CIVE 5221	Construction Project Control and Organization	2
CIVE 7220	Construction Management	4
CIVE 7230	Legal Aspects of Civil Engineering	4
EMGT 6305	Financial Management for Engineers	4
IE 6200	Engineering Probability and Statistics	4

Options

Complete one of the following options:

COURSE WORK OPTION

Code	Title	Hours
Complete 14 semester hours from the course list below.		14

REPORT OPTION

Code	Title	Hours
CIVE 8674	Master's Report	4
Complete 10 semester hours from the course list below.		10

THESIS OPTION

Code	Title	Hours
CIVE 7990	Thesis	8
Complete 6 semester hours from the course list below.		6

Course List

Code	Title	Hours
OR 6205	Deterministic Operations Research	
ACCT 6200	Financial Reporting and Managerial Decision Making 1	
ACCT 6201	Financial Reporting and Managerial Decision Making 2	
CIVE 5231	Alternative Project Delivery Systems in Construction	
CIVE 7240	Construction Equipment and Modeling	
CIVE 7301	Advanced Soil Mechanics	
CIVE 7302	Advanced Foundation Engineering	
EMGT 5300	Engineering/Organizational Psychology	
GE 5010	Customer-Driven Technical Innovation for Engineers	
GE 5100	Product Development for Engineers	
IE 5617	Lean Concepts and Applications	
IE 5640	Data Mining for Engineering Applications	
or IE 7275	Data Mining in Engineering	
IE 7215	Simulation Analysis	

Code	Title	Hours
IE 7290	Reliability Analysis and Risk Assessment	
INFO 6210	Data Management and Database Design	
INFO 6215	Business Analysis and Information Engineering	
INFO 6245	Planning and Managing Information Systems Development	
SBSY 5300	Information Systems for Integrated Project Delivery	

Program Credit/GPA Requirements

32 total semester hours required
Minimum 3.000 GPA required

Civil Engineering with Concentration in Environmental and Water Systems, MSCIVE

This program integrates the study of infrastructure; hydrology; hydraulics; numerical modeling; remote sensing; spatial and temporal data analysis; and physical, chemical, and biological processes that impact the water and air quality to provide students with the knowledge and tools for developing and managing sustainable, resilient water resources and infrastructure. It includes required core courses from the Department of Civil and Environmental Engineering, complemented by electives in electrical and computer engineering, mechanical and industrial engineering, and earth and environmental sciences.

Degree Requirements	With Report	With Thesis	Course Work Only
Required core courses	8 SH	8 SH	8 SH
Restricted electives	12 SH	12 SH	12 SH
Other electives	8 SH	4 SH	12 SH
Master of Science report/thesis	4 SH	8 SH	
Minimum semester hours required	**32 SH**	**32 SH**	**32 SH**

Graduate Certificate Options

Students enrolled in a master's degree have the opportunity to also pursue one of the many engineering graduate certificate options in addition to or in combination with the MS degree. Students should consult their faculty advisor regarding these options .

GORDON INSTITUTE OF ENGINEERING LEADERSHIP

Master's Degree in Civil Engineering with Concentration in Environmental and Water Systems with Graduate Certificate in Engineering Leadership

Students may complete a Master of Science in Civil Engineering with Concentration in Environmental and Water Systems in addition to earning a Graduate Certificate in Engineering Leadership. Students must apply and be admitted to the Gordon Engineering Leadership Program in order to pursue this option. The program requires fulfillment of the 16-semester-hour curriculum required to earn the Graduate Certificate in Engineering Leadership, which includes an industry-based challenge project with multiple mentors. The integrated 32-semester-hour degree

and certificate will require 16 hours of advisor-approved environmental and water systems technical courses.

Engineering Leadership (p. 222)

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Complete 8 semester hours of the following:		8
CIVE 7250	Environmental Chemistry	
CIVE 7251	Environmental Biological Processes	
CIVE 7260	Hydrologic Modeling	
CIVE 7261	Surface Water Quality Modeling	
CIVE 7272	Air Quality Management	
CIVE 7392	Special Topics in Environmental Engineering (Hydraulic Modeling)	

Options

Complete one of the following options:

COURSE WORK OPTION

Code	Title	Hours
Complete 12 semester hours from the Restricted Elective List below.		12
Complete 12 semester hours from the Other Elective List below.		12

REPORT OPTION

Code	Title	Hours
CIVE 8674	Master's Report	4
Complete 12 semester hours from the Restricted Elective List below.		12
Complete 8 semester hours from the Other Elective List below.		8

THESIS OPTION

Code	Title	Hours
CIVE 7990	Thesis	8
Complete 12 semester hours from the Restricted Elective List below.		12
Complete 4 semester hours from the Other Elective List below.		4

Course Lists

RESTRICTED ELECTIVE LIST

Any required core course not used to meet the required core course requirement can be taken as a restricted elective.

Code	Title	Hours
CIVE 5250	Organic Pollutants in the Environment	
CIVE 5260	Environmental Fluid Mechanics	
CIVE 5261	Dynamic Modeling for Environmental Investment and Policymaking	
CIVE 5271	Solid and Hazardous Waste Management	
CIVE 5275	Life Cycle Assessment of Materials, Products, and Infrastructure	
CIVE 5280	Remote Sensing of the Environment	
CIVE 5300	Environmental Engineering Laboratory	
CIVE 5536	Hydrologic Engineering	
CIVE 5699	Special Topics in Civil Engineering (Climate Science and Technology Adaptation and Policy)	
CIVE 6777	Climate Hazards and Resilient Cities Abroad	
CIVE 6778	Climate Adaptation and Policy Abroad	
CIVE 7100	Time Series and Geospatial Data Sciences	
CIVE 7110	Critical Infrastructure Resilience	
CIVE 7252	Water Engineering, Resources, and Energy Recovery	
CIVE 7255	Environmental Physical/Chemical Processes	
CIVE 7392	Special Topics in Environmental Engineering (Agent Based Modeling)	

OTHER ELECTIVE LIST

Any required core course not used to meet the required core course or restricted elective requirements can be taken as another elective. Any restricted elective not used to meet the restricted elective requirement can be taken as another elective.

Code	Title	Hours
EECE 7204	Applied Probability and Stochastic Processes	
ENVR 5260	Geographical Information Systems	
EEMB 5516	Oceanography	
IE 6200	Engineering Probability and Statistics	
IE 7280	Statistical Methods in Engineering	
IE 7290	Reliability Analysis and Risk Assessment	
MATH 7341	Probability 2	
MATH 7343	Applied Statistics	
MATH 7344	Regression, ANOVA, and Design	

Program Credit/GPA Requirements

32 total semester hours required
Minimum 3.000 GPA required

Civil Engineering with Concentration in Geotechnical/Geoenvironmental Engineering, MSCivE

This program includes study in the areas of soil mechanics/foundations and geoenvironmental engineering. It includes studies of soil and related earth materials for problems related to the protection of human health and the environment. Related areas include soil mechanics, fate/transport in subsurfaces, subsurface remediation, and others. The degree requirements include core courses from the Department of Civil and Environmental Engineering, complemented by electives in civil and environmental engineering, as well as electives from other departments such as mechanical and industrial engineering.

Degree Requirements	With Report	With Thesis	Course Work Only
Required core courses	8 SH	8 SH	8 SH

Elective courses	20 SH	16 SH	24 SH
Master of Science report/ thesis	4 SH	8 SH	
Minimum semester hours required	**32 SH**	**32 SH**	**32 SH**

Graduate Certificate Options

Students enrolled in a master's degree have the opportunity to also pursue one of the many engineering graduate certificate options in addition to or in combination with the MS degree. Students should consult their faculty advisor regarding these options (p. 229).

GORDON INSTITUTE OF ENGINEERING LEADERSHIP

Master's Degree in Civil Engineering with a Concentration in Geotechnical/Geoenvironmental Engineering with Graduate Certificate in Engineering Leadership

Students may complete a Master of Science in Civil Engineering with a Concentration in Geotechnical/Geoenvironmental Engineering in addition to earning a Graduate Certificate in Engineering Leadership. Students must apply and be admitted to the Gordon Engineering Leadership Program in order to pursue this option. The program requires fulfillment of the 16-semester-hour curriculum required to earn the Graduate Certificate in Engineering Leadership, which includes an industry-based challenge project with multiple mentors. The integrated 32-semester-hour degree and certificate will require 16 hours of advisor-approved geotechnical/geoenvironmental engineering technical courses.

Engineering Leadership (p. 222)

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
CIVE 7301	Advanced Soil Mechanics	4
CIVE 7302	Advanced Foundation Engineering	4

Options

Complete one of the following options:

COURSE WORK OPTION

Code	Title	Hours
Complete 24 semester hours from the Elective Course List below.		24

REPORT OPTION

Code	Title	Hours
CIVE 8674	Master's Report	4
Complete 20 semester hours from the Elective Course List below.		20

THESIS OPTION

Code	Title	Hours
CIVE 7990	Thesis	8
Complete 16 semester hours from the Elective Course List below.		16

Elective Course List

Code	Title	Hours
CIVE 5271	Solid and Hazardous Waste Management	
CIVE 5536	Hydrologic Engineering	
CIVE 7230	Legal Aspects of Civil Engineering	
CIVE 7240	Construction Equipment and Modeling	
CIVE 7250	Environmental Chemistry	
CIVE 7251	Environmental Biological Processes	
CIVE 7260	Hydrologic Modeling	
CIVE 7311	Soil and Foundation Dynamics	
CIVE 7312	Earthquake Engineering	
CIVE 7330	Advanced Structural Analysis	
CIVE 7331	Structural Dynamics	
IE 6200	Engineering Probability and Statistics	
IE 7290	Reliability Analysis and Risk Assessment	
ME 5657	Finite Element Method	
ME 7205	Advanced Mathematical Methods for Mechanical Engineers	

Program Credit/GPA Requirements

32 total semester hours required
Minimum 3.000 GPA required

Civil Engineering with Concentration in Structural Engineering, MSCivE

This program is designed for students with career goals in structural engineering and structural design. The program includes courses in structural analysis and design, structural mechanics, dynamics of structures, earthquake engineering, wind engineering, and structural health monitoring. The degree requirements include core courses from the Department of Civil and Environmental Engineering, complemented by electives in civil and environmental engineering, as well as electives from other departments such as mechanical and industrial engineering and mathematics.

Degree Requirements	With Report	With Thesis	Course Work Only
Required core courses	8 SH	8 SH	8 SH
Restricted electives	12 SH	12 SH	12 SH
Other electives	8 SH	4 SH	12 SH
Master of Science report/ thesis	4 SH	8 SH	
Minimum semester hours required	**32 SH**	**32 SH**	**32 SH**

Graduate Certificate Options

Students enrolled in a master's degree have the opportunity to also pursue one of the many engineering graduate certificate options in addition to or in combination with the MS degree. Students should consult their faculty advisor regarding these options (p. 229).

GORDON INSTITUTE OF ENGINEERING LEADERSHIP

Master's Degree in Civil Engineering with Concentration in Structural Engineering with Graduate Certificate in Engineering Leadership

Students may complete a Master of Science in Civil Engineering with Concentration in Structural Engineering in addition to earning a Graduate Certificate in Engineering Leadership. Students must apply and be admitted to the Gordon Engineering Leadership Program in order to pursue this option. The program requires fulfillment of the 16-semester-hour curriculum required to earn the Graduate Certificate in Engineering Leadership, which includes an industry-based challenge project with multiple mentors. The integrated 32-semester-hour degree and certificate will require 16 hours of advisor-approved structural engineering technical courses.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
CIVE 7330	Advanced Structural Analysis	4
CIVE 7331	Structural Dynamics	4

Options

Complete one of the following options:

COURSE WORK OPTION

Code	Title	Hours
Complete 12 semester hours from the Restricted Elective List below.		12
Complete 12 semester hours from the Other Elective List below.		12

REPORT OPTION

Code	Title	Hours
CIVE 8674	Master's Report	4
Complete 12 semester hours from the Restricted Elective List below.		12
Complete 8 semester hours from the Other Elective List below.		8

THESIS OPTION

Code	Title	Hours
CIVE 7990	Thesis	8
Complete 12 semester hours from the Restricted Elective List below.		12
Complete 4 semester hours from the Other Elective List below.		4

Course Lists

RESTRICTED ELECTIVE LIST

Code	Title	Hours
CIVE 5522	Structural Analysis 2	
CIVE 5525	Prestressed Concrete Design	
CIVE 5699	Special Topics in Civil Engineering (Structural Systems)	
CIVE 5699	Special Topics in Civil Engineering (Vibration-based Structural Health Monitoring)	
CIVE 7340	Seismic Analysis and Design	
CIVE 7341	Structural Reliability	
CIVE 7342	System Identification	
CIVE 7350	Behavior of Concrete Structures	
CIVE 7351	Behavior of Steel Structures	
CIVE 7354	Wind Engineering	
CIVE 7355	Advanced Bridge Design	
CIVE 7357	Advanced Structural Mechanics	

OTHER ELECTIVE LIST

Any restricted elective not used to meet the restricted elective requirement can be taken as another elective.

Code	Title	Hours
CIVE 7301	Advanced Soil Mechanics	
CIVE 7302	Advanced Foundation Engineering	
CIVE 7311	Soil and Foundation Dynamics	
CIVE 7312	Earthquake Engineering	
MATH 7241	Probability 1	
MATH 7342	Mathematical Statistics	
MATH 7343	Applied Statistics	
MATL 7365	Properties and Processing of Electronic Materials	
ME 5240	Computer Aided Design and Manufacturing	
ME 5650	Advanced Mechanics of Materials	
ME 5655	Dynamics and Mechanical Vibration	
ME 5657	Finite Element Method	
ME 5659	Control Systems Engineering	
ME 6200	Mathematical Methods for Mechanical Engineers 1	
ME 6201	Mathematical Methods for Mechanical Engineers 2	
ME 7205	Advanced Mathematical Methods for Mechanical Engineers	
ME 7210	Elasticity and Plasticity	
ME 7232	Theory of Plates and Shells	
ME 7238	Advanced Finite Element Method	
ME 7245	Fracture Mechanics and Failure Analysis	
ME 7255	Continuum Mechanics	

Program Credit/GPA Requirements

32 total semester hours required
Minimum 3.000 GPA required

Civil Engineering with Concentration in Transportation, MSCivE

This program is designed for students with career goals in transportation engineering and transportation planning. The degree requirements include core courses from the Department of Civil and Environmental Engineering, complemented by electives in civil and environmental engineering and by related courses in applied mathematics, engineering, economics, policy, and management.

Degree Requirements	With Report	With Thesis	Course Work Only
Required core courses	12 SH	12 SH	12 SH
Restricted electives	8 SH	8 SH	12 SH
Other electives	8 SH	4 SH	8 SH
Master of Science report/thesis	4 SH	8 SH	
Minimum semester hours required	**32 SH**	**32 SH**	**32 SH**

Graduate Certificate Options

Students enrolled in a master's degree have the opportunity to also pursue one of the many engineering graduate certificate options in addition to or in combination with the MS degree. Students should consult their faculty advisor regarding these options (p. 229).

GORDON INSTITUTE OF ENGINEERING LEADERSHIP
Master's Degree in Civil Engineering with Concentration in Transportation with Graduate Certificate in Engineering Leadership

Students may complete a Master of Science in Civil Engineering with Concentration in Transportation in addition to earning a Graduate Certificate in Engineering Leadership. Students must apply and be admitted to the Gordon Engineering Leadership Program in order to pursue this option. The program requires fulfillment of the 16-semester-hour curriculum required to earn the Graduate Certificate in Engineering Leadership, which includes an industry-based challenge project with multiple mentors. The integrated 32-semester-hour degree and certificate will require 16 hours of advisor-approved transportation engineering technical courses.

Engineering Leadership (p. 222)

Program Requirements
Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
CIVE 5373	Transportation Systems: Analysis and Planning	4
CIVE 5376	Traffic Engineering and Sustainable Urban Street Design	4
IE 6200	Engineering Probability and Statistics	4

Options
Complete one of the following options:

COURSE WORK OPTION

Code	Title	Hours
Complete 12 semester hours from the Restricted Elective List below.		12
Complete 8 semester hours from the Other Elective List below.		8

REPORT OPTION

Code	Title	Hours
CIVE 8674	Master's Report	4
Complete 8 semester hours from the Restricted Elective List below.		8
Complete 8 semester hours from the Other Elective List below.		8

THESIS OPTION

Code	Title	Hours
CIVE 7990	Thesis	8
Complete 8 semester hours from the Restricted Elective List below.		8
Complete 4 semester hours from the Other Elective List below.		4

Course Lists
RESTRICTED ELECTIVE LIST

Code	Title	Hours
CIVE 6566	Sustainable Urban Transportation: Netherlands	
CIVE 7380	Performance Models and Simulation of Transportation Networks	
CIVE 7381	Transportation Demand Forecasting and Model Estimation	
CIVE 7385	Public Transportation	
CIVE 7387	Design Aspects of Roadway Safety	
CIVE 7388	Special Topics in Civil Engineering (Informatics in Civil Engineering)	
IE 7215	Simulation Analysis	
IE 7280	Statistical Methods in Engineering	

OTHER ELECTIVE LIST
Any restricted elective not used to meet the restricted elective requirement can be used as another elective. Courses outside this list may be taken as electives with advisor approval.

Code	Title	Hours
IE 7275	Data Mining in Engineering	
IE 7290	Reliability Analysis and Risk Assessment	
INFO 6210	Data Management and Database Design	
MATH 7343	Applied Statistics	
OR 6205	Deterministic Operations Research	
OR 7230	Probabilistic Operation Research	
OR 7245	Network Analysis and Advanced Optimization	
PPUA 5263	Geographic Information Systems for Urban and Regional Policy	
PPUA 7231	Transportation Policy	
PPUA 7234	Land Use and Urban Growth Policy	

Program Credit/GPA Requirements
32 total semester hours required
Minimum 3.000 GPA required

Environmental Engineering, MSENVE

This program integrates the study of physical, chemical, and biological processes and fundamental principles for water and wastewater treatment and disposal, hazardous waste management, surface water and groundwater quality, water resources management, and air quality management. Successful graduates will have the ability to develop and implement technologies for various environmental applications with the goal to improve and protect the environment and human health. It includes required core courses from the Department of Civil and Environmental Engineering (CEE), complemented by electives in civil and environmental engineering, mechanical and industrial engineering, earth and environmental sciences, and mathematics.

Degree Requirements	With Report	With Thesis	Course Work Only
Required core electives	12 SH	12 SH	12 SH
Restricted electives	8 SH	8 SH	12 SH
Other electives	8 SH	4 SH	8 SH
Master of Science report/thesis	4 SH	8 SH	

Graduate Certificate Options

Students enrolled in a master's degree have the opportunity to also pursue one of the many engineering graduate certificate options in addition to or in combination with the MS degree. Students should consult their faculty advisor regarding these options (p. 229).

GORDON INSTITUTE OF ENGINEERING LEADERSHIP

Master's Degree in Environmental Engineering with Graduate Certificate in Engineering Leadership

Students may complete a Master of Science in Environmental Engineering in addition to earning a Graduate Certificate in Engineering Leadership. Students must apply and be admitted to the Gordon Engineering Leadership Program in order to pursue this option. The program requires fulfillment of the 16 semester-hour curriculum required to earn the Graduate Certificate in Engineering Leadership, which includes an industry-based challenge project with multiple mentors. The integrated 36-semester-hour degree and certificate will require 20 hours of advisor-approved environmental engineering technical courses.

Engineering Leadership (p. 222)

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Complete three of the following:		12
CIVE 7250	Environmental Chemistry	
CIVE 7251	Environmental Biological Processes	
CIVE 7252	Water Engineering, Resources, and Energy Recovery	
CIVE 7255	Environmental Physical/Chemical Processes	
CIVE 7260	Hydrologic Modeling	

Options

Complete one of the following options:

COURSE WORK OPTION

Code	Title	Hours
Complete 12 semester hours from the Restricted Electives List below.		12
Complete 8 semester hours from the Other Electives List below.		8

REPORT OPTION

Code	Title	Hours
CIVE 8674	Master's Report	4
Complete 8 semester hours from the Restricted Electives List below.		8
Complete 8 semester hours from the Other Electives List below.		8

THESIS OPTION

Code	Title	Hours
CIVE 7990	Thesis	8
Complete 8 semester hours from the Restricted Electives List below.		8
Complete 4 semester hours from the Other Electives List below.		4

Course Lists

RESTRICTED ELECTIVES LIST

Any required core course not used to meet the required core course requirement can be taken as a restricted elective.

Code	Title	Hours
CIVE 5250	Organic Pollutants in the Environment	
CIVE 5260	Environmental Fluid Mechanics	
CIVE 5261	Dynamic Modeling for Environmental Investment and Policymaking	
CIVE 5271	Solid and Hazardous Waste Management	
CIVE 5275	Life Cycle Assessment of Materials, Products, and Infrastructure	
CIVE 5280	Remote Sensing of the Environment	
CIVE 5300	Environmental Engineering Laboratory	
CIVE 5536	Hydrologic Engineering	
CIVE 5699	Special Topics in Civil Engineering (Climate Science and Technology Adaptation and Policy)	
CIVE 6777	Climate Hazards and Resilient Cities Abroad	
CIVE 6778	Climate Adaptation and Policy Abroad	
CIVE 7261	Surface Water Quality Modeling	
CIVE 7272	Air Quality Management	
CIVE 7392	Special Topics in Environmental Engineering (Hydraulic Modeling)	

OTHER ELECTIVES LIST

Any required core course not used to meet the required core course requirement can be taken as another elective. Any restricted elective not used to meet the restricted elective requirement can be taken as another elective.

Code	Title	Hours
EECE 7204	Applied Probability and Stochastic Processes	
ENVR 5190	Soil Science	
ENVR 5250	Geology and Land-Use Planning	
ENVR 5260	Geographical Information Systems	
EEMB 5516	Oceanography	
IE 6200	Engineering Probability and Statistics	
IE 7280	Statistical Methods in Engineering	
IE 7290	Reliability Analysis and Risk Assessment	
MATH 7241	Probability 1	
MATH 7343	Applied Statistics	
MATH 7344	Regression, ANOVA, and Design	

Program Credit/GPA Requirements

32 total semester hours required
Minimum 3.000 GPA required

Sustainable Building Systems, MSSBS

The sustainable building systems program focuses on the design and operation of buildings to provide a comfortable, healthy, and productive indoor environment with minimal energy and environmental impact. Students have an opportunity to develop leadership and decision-making skills to implement sustainable building practices in either the private or public sectors in the global market.

The graduates of the **Master of Science in Sustainable Building Systems** program should display a high level of engineering knowledge in a broad range of architectural engineering, civil engineering, and construction management while embracing the concepts of engineering sustainability as related to energy and materials usage and the effects on the environment. Graduates will have the base training necessary to lead efforts within companies to plan and implement sustainable practices for the design and operation of buildings, realize energy and materials efficiency improvements, and minimize environmental impact. Upon graduation, students will have a theoretical background to the concepts behind the LEED (Leadership in Energy and Environmental Design) Green Associate examination.

Below is a typical course sequence for graduation in two semesters. The program is flexible to accommodate full-time students—who wish to proceed over a period of two to four semesters—and part-time students—who can complete the program requirements by taking one to two courses per semester, finishing the program in approximately four years.

Degree Requirements	Full-Time Study	Part-Time Study
Core courses	12	12
Restricted electives	8	8
Open elective	12	12

Graduate Certificate Options

Students enrolled in a master's degree have the opportunity to also pursue one of the many engineering graduate certificate options in addition to or in combination with the MS degree. Students should consult their faculty advisor regarding these options (p. 229).

GORDON INSTITUTE OF ENGINEERING LEADERSHIP
Master's Degree in Sustainable Building Systems with Graduate Certificate in Engineering Leadership

Students may complete a Master of Science in Sustainable Building Systems in addition to earning a Graduate Certificate in Engineering Leadership. Students must apply and be admitted to the Gordon Engineering Leadership Program in order to pursue this option. The program requires fulfillment of the 16-semester-hour curriculum required to earn the Graduate Certificate in Engineering Leadership, which includes an industry-based challenge project with multiple mentors. The integrated 32-semester-hour degree and certificate will require 16 hours of advisor-approved sustainable building systems technical courses.

Engineering Leadership (p. 222)

Program Requirements
Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
ARCH 5210 and ARCH 5211	Environmental Systems and Recitation for ARCH 5210	4
SBSY 5100	Sustainable Design and Technologies in Construction	4
SBSY 5200	Sustainable Engineering Systems for Buildings	4

Electives
RESTRICTED ELECTIVE LIST

Code	Title	Hours
Complete 8 semester hours from the following:		8
ARCH 5220	Integrated Building Systems	
CIVE 5221	Construction Project Control and Organization	
CIVE 5231	Alternative Project Delivery Systems in Construction	
CIVE 5275	Life Cycle Assessment of Materials, Products, and Infrastructure	
CIVE 7220 or EMGT 5220	Construction Management Engineering Project Management	
CIVE 7230	Legal Aspects of Civil Engineering	
EMGT 6305	Financial Management for Engineers	
SBSY 5300	Information Systems for Integrated Project Delivery	

OTHER ELECTIVE LIST
Any restricted elective not used to meet the restricted elective requirement can be taken as another elective.

Code	Title	Hours
Complete 12 semester hours from the following:		12
ACCT 6200	Financial Reporting and Managerial Decision Making 1	
ACCT 6201	Financial Reporting and Managerial Decision Making 2	
CIVE 7350	Behavior of Concrete Structures	
CIVE 7351	Behavior of Steel Structures	
FINA 6200	Value Creation through Financial Decision Making	

FINA 6216	Valuation and Value Creation
FINA 6217	Real Estate Finance and Investment
LPSC 7312	Cities, Sustainability, and Climate Change
ME 5645	Environmental Issues in Manufacturing and Product Use

Program Credit/GPA Requirements

32 total semester hours required
Minimum 3.000 GPA required

Electrical and Computer Engineering

Website (http://www.ece.neu.edu)

Srinivas Tadigadapa, PhD
Professor and Chair

Waleed Meleis, PhD
Associate Professor and Associate Chair

Masoud Salehi, PhD
Associate Professor and Director of Graduate Studies

409 Dana Research Center
617.373.7529
617.373.4431 (fax)

The Department of Electrical and Computer Engineering (ECE) graduate program offers a Master of Science in Electrical and Computer Engineering, a Master of Science in Electrical and Computer Engineering Leadership, a Doctor of Philosophy in Electrical Engineering, and a Doctor of Philosophy in Computer Engineering.

ECE's graduate program is a dynamic and thriving center of world-recognized research in a wide range of areas. The department has strong ties to local industry and the world-famous hospitals and medical centers of Boston and is involved in many joint research projects with them. With four NSF- and DHS-funded research centers and over 20 industrial partners, faculty and students are actively conducting cutting-edge research in areas such as computer vision; pattern recognition and machine learning; brain-computer interface; power systems and power electronics; underwater communication networks and signal processing; robotics; information theory; communications, control, and signal processing; RF, electromagnetics, optics, and magnetic materials; micro/nanomechanical structures and advanced nanomaterials; power-first system/computer architecture; internet-of-things; ultra-low power biomedical and neural circuits and systems.

ECE's graduate program educates MS and PhD students with deep fundamental and practical knowledge in the various disciplines of electrical and computer engineering by offering a strong curriculum and providing opportunities for research in these disciplines. The department educates the next generation of highly skilled engineers and researchers with necessary skills to address the future needs of industry, government, and humanity.

Mission of the Department

The primary educational missions of the electrical and computer engineering department are to educate undergraduate students so they have the opportunity to obtain successful careers in electrical and computer engineering and related disciplines, and pursue advanced study such as graduate study in engineering or related disciplines, and to educate graduate students so they can make meaningful contributions to research and industry.

Overview of Programs Offered

ECE offers the following graduate degree programs:

- Master of Science in Electrical and Computer Engineering (MSECE)
- Master of Science in Electrical and Computer Engineering Leadership (MSECEL)
- Doctor of Philosophy in Computer Engineering (PhD)
- Doctor of Philosophy in Electrical Engineering (PhD)

All degrees can be pursued on either a full- or part-time basis consistent with residency requirements for the PhD degrees. The master's curriculum includes areas of concentration in the following:

1. Communications, Control, and Signal Processing (CCSP)
2. Computer Networks and Security (CNWS)
3. Computer Systems and Software (CSYS)
4. Computer Vision, Machine Learning, and Algorithms (CVLA)
5. Electromagnetics, Plasma, and Optics (ELPO)
6. Microsystems, Materials, and Devices (MSMD)
7. Power Systems (POWR)

MSECE students pursue their degree by selecting one of the two tracks—MSECE with thesis and course track (MST) or MSECE course-only track (MSC).

Electrical and Computer Engineering PhD Course Requirements

The student and his or her dissertation committee determine the program of study. A typical program comprises 24 semester hours of course work beyond the Master of Science degree. Students who enter the program with a bachelor's degree complete the curriculum for a Master of Science degree with an area of concentration. After that, as a minimum, the PhD program must include at least 16 semester hours of graduate course work beyond the Master of Science degree, at least 8 semester hours of which must be graduate-level ECE courses. Students who enter the program with a relevant and approved Master of Science degree complete a minimum of 16 semester hours of graduate course work, at least 8 semester hours of which must be graduate-level ECE courses. All students must achieve a minimum cumulative GPA of 3.000.

Master of Science Degree Requirements

Students must complete a minimum of 32 semester hours of approved course work with a minimum GPA of 3.000. MST track students must complete an 8-semester-hour thesis as part of their program of study. Full- and part-time students should follow the same curriculum requirements.

Students who select the MST track must form a thesis committee comprised of at least three members. The thesis committee must include the thesis advisor, and at least two members must be tenured or tenure-track ECE faculty. The student shall present the thesis to this committee and to the ECE department at-large in the form of a seminar before final approval of the thesis.

The ECE department requires the master's degree students who hold research assistantships to register full-time.

COURSE REQUIREMENTS FOR MSC STUDENTS

The program requires 32 semester hours of graduate-level courses. At least five of these courses must be from the list of "depth" courses in the student's concentration and at least two must be outside this list; these courses are known as "breadth" courses. None of these courses

can be from the list of "excluded courses." For students in the computer-engineering-related concentrations— computer systems and software; computer networks and security; and computer vision, machine learning, and algorithms—at least 20 semester hours of the 32 required semester hours must be graduate-level ECE courses. For other concentrations, at least 24 semester hours of the 32 required semester hours must be graduate-level ECE courses. More details on MSC requirements can be found in the *Graduate Program Guide* (http://www.ece.neu.edu/sites/default/files/pdfs/ece/ecegraduateprogramguide-2018-19.pdf).

COURSE REQUIREMENTS FOR MST STUDENTS

The program requires 24 semester hours of graduate-level courses. At least three of these courses must be from the list of "depth" courses in the student's concentration and at least one must be outside this list; these courses are known as "breadth" courses. None of these courses can be from the list of "excluded courses." At least 12 semester hours of the required 24 semester hours must be graduate-level ECE courses. In addition, the program requires 8 semester hours of Thesis (EECE 7990). More details on MST requirements can be found in the *Graduate Program Guide* (http://www.ece.neu.edu/sites/default/files/pdfs/ece/ecegraduateprogramguide-2018-19.pdf)*.

Graduate Certificate Options

Students enrolled in a master's degree have the opportunity to also pursue one of the many engineering graduate certificate options in addition to or in combination with the MS degree. Students should consult their faculty advisor regarding these options (p. 229).

GORDON INSTITUTE OF ENGINEERING LEADERSHIP OPTION

Students have the opportunity to pursue the Master of Science in Electrical and Computer Engineering Leadership (MSECEL) (p. 180) along with the Graduate Certificate in Engineering Leadership.

In addition, students have the opportunity to pursue the Gordon Engineering Leadership Program (p. 221) in combination with the Master of Science in Electrical and Computer Engineering. This option results in an increase in total hours beyond that required for the master's degree only.

Programs
Doctor of Philosophy (PhD)

Master of Science (MS)

Master of Science in Electrical and Computer Engineering (MSECE)

Master of Science in Electrical and Computer Engineering Leadership (MSECEL)

Computer Engineering, PhD

The Doctor of Philosophy in Computer Engineering offers students an opportunity for study in a broad range of areas in computer engineering. Details on PhD requirements can be found in the *Graduate Program Guide* (http://www.ece.neu.edu/sites/default/files/pdfs/ece/ecegraduateprogramguide-2018-19.pdf). A summary of requirements is given below.

Qualifying Exam and Degree Candidacy

The PhD qualifying exam is the examination for admissions to the doctoral programs in electrical engineering and in computer engineering. It is a written exam in the student's major area, and some concentrations include an oral exam. The exam has the dual purposes of serving as an indicator of the student's capability for successful completion of the PhD in electrical engineering or in computer engineering and of serving as a guide to the student's advisor in developing a suitable plan of study, tailored to the individual needs of the student. Students are tested on graduate course material as specified by the faculty in the chosen area.

A student who has matriculated in the PhD program is considered a predoctoral student. Upon successful completion of the qualifying exam, the student is designated a PhD candidate. All predoctoral students who hold a master's degree or its equivalent and who matriculate in a fall semester must take this exam in the spring semester of their first academic year of study. A student who fails the qualifying exam will be permitted to retake the exam only one more time.

Annual Review

PhD students are reviewed annually starting with their second year in the ECE department. Students complete a form and submit a one-page report of their progress during the past year. Each student is evaluated and receives a grade of satisfactory or unsatisfactory. Students who receive an unsatisfactory grade will meet with their advisor and the ECE department chair in order to receive feedback and set goals for the next year. Students who receive unsatisfactory grades in two consecutive years are terminated from the PhD program.

Residence Requirement

After reaching PhD candidacy, one year of full-time graduate work or two consecutive years of part-time graduate work satisfy the university residence requirement. In the latter case, the student's advisor must approve a detailed schedule in order to ensure that the student devotes at least half of the time to the requirements of the Graduate School of Engineering.

Dissertation

Within one year of passing the PhD qualifying exam, the PhD candidate must form a dissertation committee. A dissertation committee must have at least three members. At least two of the committee members must be tenured or tenure-track Department of Electrical and Computer Engineering (ECE) faculty, and the committee must include the student's advisor. The chair of the committee must be a tenured or tenure-track faculty member in the ECE department.

The dissertation committee must design an appropriate program of study that prepares the student to be a successful doctoral-level engineer as

well as direct the candidate's dissertation research. The dissertation committee will approve the dissertation in final form.

DISSERTATION AND DISSERTATION CONTINUATION REGISTRATION
Upon successful completion of the PhD qualifying exam and the required course work, the PhD candidate must register in two consecutive semesters for Dissertation (EECE 9990) . Upon completion of this sequence, the student must register for Dissertation Continuation (EECE 9996) in every semester until the dissertation is completed. A student may not register for Continuation until he or she fulfills the two-semester sequence of Dissertation.

REGISTRATION REQUIREMENTS FOR PREDOCTORAL AND PHD CANDIDATE GRADUATE ASSISTANTS
The ECE department requires that predoctoral students and PhD candidates who hold research or teaching assistantships be registered full-time. Predoctoral PhD students may register for Research (EECE 9986) (zero credit, full-time equivalent) *if needed* to fulfill the registration requirement.

PHD PROPOSAL REVIEW
Each PhD candidate must demonstrate, by means of the proposal review, subject matter knowledge satisfactory for the award of the degree.

The proposal review is an oral presentation followed by a question-and-answer session administered by the student's dissertation advisor/committee. The proposal review will be given at the time the student submits his or her dissertation proposal to the dissertation advisor/committee for approval. As part of this exam, the dissertation advisor/committee will review the student's doctoral program and his or her performance in graduate courses, as well as examine the student on subject matter related to his or her graduate course work and dissertation subject area.

FINAL DISSERTATION DEFENSE
The final dissertation defense will include the subject matter of the dissertation and significant developments in the field of the dissertation work. Other related fields may be included if recommended by the examining faculty. The dissertation defense must be scheduled at least six months after the PhD proposal review.

Program Requirements
Complete all courses and requirements listed below unless otherwise indicated.

Milestones
Annual departmental review (each fall semester after the student has been in the program for at least one year)
Qualifying examination
Dissertation committee
Proposal stage review
Dissertation defense

Core Requirements
Complete 32 semester hours of approved course work—equivalent of MSECE degree. Then complete 16 semester hours, of which 8 must be graduate-level EECE courses. Consult faculty research advisor for acceptable courses.

Dissertation

Code	Title	Hours
Complete the following (repeatable) course twice:		
EECE 9990	Dissertation	

Program Credit/GPA Requirements
48 total semester hours required
Minimum 3.000 GPA required

Computer Engineering, PhD—Advanced Entry

The PhD program in computer engineering offers students an opportunity for study in a broad range of areas in computer engineering. Details on PhD requirements can be found in the *Graduate Program Guide* (http://www.ece.neu.edu/sites/default/files/pdfs/ece/ecegraduateprogramguide-2018-19.pdf)*.* A summary of requirements is given below.

Qualifying Exam and Degree Candidacy
The PhD qualifying exam is the examination for admissions to the doctoral programs in electrical engineering and in computer engineering. It is a written exam in the student's major area, and some concentrations include an oral exam. The exam has the dual purposes of serving as an indicator of the student's capability for successful completion of the PhD in electrical engineering or in computer engineering and of serving as a guide to the student's advisor in developing a suitable plan of study, tailored to the individual needs of the student. Students are tested on graduate course material as specified by the faculty in the chosen area.

A student who has matriculated in the PhD program is considered a predoctoral student. Upon successful completion of the qualifying exam, the student is designated a PhD candidate. All predoctoral students who hold a master's degree or its equivalent and who matriculate in a fall semester must take this exam in the spring semester of their first academic year of study. A student who fails the qualifying exam will be permitted to retake the exam only one more time.

Annual Review
PhD students are reviewed annually starting with their second year in the ECE department. Students complete a form and submit a one-page report of their progress during the past year. Each student is evaluated and receives a grade of satisfactory or unsatisfactory. Students who receive an unsatisfactory grade will meet with their advisor and the ECE department chair in order to receive feedback and set goals for the next year. Students who receive unsatisfactory grades in two consecutive years are terminated from the PhD program.

Residence Requirement
After reaching PhD candidacy, one year of full-time graduate work or two consecutive years of part-time graduate work satisfy the university residence requirement. In the latter case, the student's advisor must approve a detailed schedule in order to ensure that the student devotes at least half of the time to the requirements of the Graduate School of Engineering.

Dissertation
Within one year of passing the PhD qualifying exam, the PhD candidate must form a dissertation committee. A dissertation committee must have at least three members. At least two of the committee members must be tenured or tenure-track Department of Electrical and Computer Engineering (ECE) faculty and the committee must include the student's advisor. The chair of the committee must be a tenured or tenure-track faculty member in the ECE department.

The dissertation committee must design an appropriate program of study that prepares the student to be a successful doctoral-level engineer as

well as direct the candidate's dissertation research. The dissertation committee will approve the dissertation in final form.

DISSERTATION AND DISSERTATION CONTINUATION REGISTRATION

Upon successful completion of the PhD qualifying exam and the required course work, the PhD candidate must register in two consecutive semesters for Dissertation (EECE 9990) . Upon completion of this sequence, the student must register for Dissertation Continuation (EECE 9996) in every semester until the dissertation is completed.. A student may not register for Continuation until he or she fulfills the two-semester sequence of Dissertation.

REGISTRATION REQUIREMENTS FOR PREDOCTORAL AND PHD CANDIDATE GRADUATE ASSISTANTS

The ECE department requires that predoctoral students and PhD candidates who hold research or teaching assistantships be registered full-time. Predoctoral PhD students may register for Research (EECE 9986) (zero credit, full-time equivalent) *if needed* to fulfill the registration requirement.

PHD PROPOSAL REVIEW

Each PhD candidate must demonstrate, by means of the proposal review, subject matter knowledge satisfactory for the award of the degree.

The proposal review is an oral presentation followed by a question-and-answer session administered by the student's dissertation advisor/committee. The proposal review will be given at the time the student submits his or her dissertation proposal to the dissertation advisor/committee for approval. As part of this exam, the dissertation advisor/committee will review the student's doctoral program and his or her performance in graduate courses, as well as examine the student on subject matter related to his or her graduate course work and dissertation subject area.

FINAL DISSERTATION DEFENSE

The final dissertation defense will include the subject matter of the dissertation and significant developments in the field of the dissertation work. Other related fields may be included if recommended by the examining faculty. The dissertation defense must be scheduled at least six months after the PhD proposal review.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Milestones

Annual review (each fall semester after the student has been in the program for at least one year)
Qualifying examination
Dissertation committee
Proposal stage review
Dissertation defense

Core Requirements

Complete 16 semester hours of approved course work. At least 8 semester hours must be graduate-level EECE courses. Consult your faculty advisor for acceptable courses.

Dissertation

Code	Title	Hours
Complete the following (repeatable) course twice:		
EECE 9990	Dissertation	

Program Credit/GPA Requirements

16 total semester hours required

Minimum 3.000 GPA required

Electrical Engineering, PhD

The PhD program in electrical engineering offers students an opportunity for study in a broad range of areas in electrical engineering. Details on PhD requirements can be found in the *Graduate Program Guide* (http://www.ece.neu.edu/sites/default/files/pdfs/ece/ecegraduateprogramguide-2018-19.pdf). A summary of requirements is given below.

Qualifying Exam and Degree Candidacy

The PhD qualifying exam is the examination for admissions to the doctoral programs in electrical engineering and in computer engineering. It is a written exam in the student's major area, and some concentrations include an oral exam. The exam has the dual purposes of serving as an indicator of the student's capability for successful completion of the PhD in electrical engineering or in computer engineering and of serving as a guide to the student's advisor in developing a suitable plan of study, tailored to the individual needs of the student. Students are tested on graduate course material as specified by the faculty in the chosen area.

A student who has matriculated in the PhD program is considered a predoctoral student. Upon successful completion of the qualifying exam, the student is designated a PhD candidate. All predoctoral students who hold a master's degree or its equivalent and who matriculate in a fall semester must take this exam in the spring semester of their first academic year of study. A student who fails the qualifying exam will be permitted to retake the exam only one more time.

Annual Review

PhD students are reviewed annually starting with their second year in the ECE department. Students complete a form and submit a one-page report of their progress during the past year. Each student is evaluated and receives a grade of satisfactory or unsatisfactory. Students who receive an unsatisfactory grade will meet with their advisor and the ECE department chair in order to receive feedback and set goals for the next year. Students who receive unsatisfactory grades in two consecutive years are terminated from the PhD program.

Residence Requirement

After reaching PhD candidacy, one year of full-time graduate work or two consecutive years of part-time graduate work satisfy the university residence requirement. In the latter case, the student's advisor must approve a detailed schedule in order to ensure that the student devotes at least half of the time to the requirements of the Graduate School of Engineering.

Dissertation

Within one year of passing the PhD qualifying exam, the PhD candidate must form a dissertation committee. A dissertation committee must have at least three members. At least two of the committee members must be tenured or tenure-track Department of Electrical and Computer Engineering (ECE) faculty and the committee must include the student's advisor. The chair of the committee must be a tenured or tenure-track faculty member in the ECE department.

The dissertation committee must design an appropriate program of study that prepares the student to be a successful doctoral-level engineer as well as direct the candidate's dissertation research. The dissertation committee will approve the dissertation in final form.

DISSERTATION AND DISSERTATION CONTINUATION REGISTRATION

Upon successful completion of the PhD qualifying exam and the required course work, the PhD candidate must register in two consecutive semesters for Dissertation (EECE 9990). Upon completion of this sequence, the student must register for Dissertation (EECE 9990) in every semester until the dissertation is completed. A student may not register for Continuation until he or she fulfills the two-semester sequence of Dissertation.

REGISTRATION REQUIREMENTS FOR PREDOCTORAL AND PHD CANDIDATE GRADUATE ASSISTANTS

The ECE department requires that predoctoral students and PhD candidates who hold research or teaching assistantships be registered full-time. Predoctoral PhD students may register for Research (EECE 9986) (zero credit, full-time equivalent) if needed to fulfill the registration requirement.

PHD PROPOSAL REVIEW

Each PhD candidate must demonstrate, by means of the proposal review, subject matter knowledge satisfactory for the award of the degree.

The proposal review is an oral presentation followed by a question-and-answer session administered by the student's dissertation advisor/committee. The proposal review will be given at the time the student submits his or her dissertation proposal to the dissertation advisor/committee for approval. As part of this exam, the dissertation advisor/committee will review the student's doctoral program and his or her performance in graduate courses, as well as examine the student on subject matter related to his or her graduate course work and dissertation subject area.

FINAL DISSERTATION DEFENSE

The final dissertation defense will include the subject matter of the dissertation and significant developments in the field of the dissertation work. Other related fields may be included if recommended by the examining faculty. The dissertation defense must be scheduled at least six months after the PhD proposal review.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Milestones

Annual review (each fall semester after the student has been in the program for at least one year)
Qualifying examination
Dissertation committee
Proposal stage review
Dissertation defense

Core Requirements

Complete 32 semester hours of approved course work—equivalent of MSECE degree. Then complete 16 semester hours, of which 8 must be graduate-level EECE courses. Consult your faculty research advisor for acceptable courses.

Dissertation

Code	Title	Hours
Complete the following (repeatable) course twice:		
EECE 9990	Dissertation	

Program Credit/GPA Requirements

48 total semester hours required
Minimum 3.000 GPA required

The PhD program in electrical engineering offers students the opportunity for study in a broad range of areas in electrical engineering. Details on PhD requirements can be found in the *Graduate Program Guide* (http://www.ece.neu.edu/sites/default/files/pdfs/ece/ecegraduateprogramguide-2018-19.pdf). A summary of requirements is given below.

Qualifying Exam and Degree Candidacy

The PhD qualifying exam is the examination for admissions to the doctoral programs in electrical engineering and in computer engineering. It is a written exam in the student's major area, and some concentrations include an oral exam. The exam has the dual purposes of serving as an indicator of the student's capability for successful completion of the PhD in electrical engineering or in computer engineering and of serving as a guide to the student's advisor in developing a suitable plan of study, tailored to the individual needs of the student. Students are tested on graduate course material as specified by the faculty in the chosen area.

A student who has matriculated in the PhD program is considered a predoctoral student. Upon successful completion of the qualifying exam, the student is designated a PhD candidate. All predoctoral students who hold a master's degree or its equivalent and who matriculate in a fall semester must take this exam in the spring semester of their first academic year of study. A student who fails the qualifying exam will be permitted to retake the exam only one more time.

Annual Review

PhD students are reviewed annually starting with their second year in the ECE department. Students complete a form and submit a one-page report of their progress during the past year. Each student is evaluated and receives a grade of satisfactory or unsatisfactory. Students who receive an unsatisfactory grade will meet with their advisor and the ECE department chair in order to receive feedback and set goals for the next year. Students who receive unsatisfactory grades in two consecutive years are terminated from the PhD program.

Residence Requirement

After reaching PhD candidacy, one year of full-time graduate work or two consecutive years of part-time graduate work satisfy the university residence requirement. In the latter case, the student's advisor must approve a detailed schedule in order to ensure that the student devotes at least half of the time to the requirements of the Graduate School of Engineering.

Dissertation

Within one year of passing the PhD qualifying exam, the PhD candidate must form a dissertation committee. A dissertation committee must have at least three members. At least two of the committee members must be tenured or tenure-track Department of Electrical and Computer Engineering (ECE) faculty and the committee must include the student's advisor. The chair of the committee must be a tenured or tenure-track faculty member in the ECE department.

The dissertation committee must design an appropriate program of study that prepares the student to be a successful doctoral-level engineer as well as direct the candidate's dissertation research. The dissertation committee will approve the dissertation in final form.

DISSERTATION AND DISSERTATION CONTINUATION REGISTRATION

Upon successful completion of the PhD qualifying exam and the required course work, the PhD candidate must register in two consecutive

semesters for Dissertation (EECE 9990). Upon completion of this sequence, the student must register for Dissertation Continuation (EECE 9996) in every semester until the dissertation is completed. A student may not register for Continuation until he or she fulfills the two-semester sequence of Dissertation.

REGISTRATION REQUIREMENTS FOR PREDOCTORAL AND PHD CANDIDATE GRADUATE ASSISTANTS

The ECE department requires that predoctoral students and PhD candidates who hold research or teaching assistantships be registered full-time. Predoctoral PhD students may register for Research (EECE 9986) (zero credit, full-time equivalent) if needed to fulfill the registration requirement.

PHD PROPOSAL REVIEW

Each PhD candidate must demonstrate, by means of the proposal review, subject matter knowledge satisfactory for the award of the degree.

The proposal review is an oral presentation followed by a question-and-answer session administered by the student's dissertation advisor/committee. The proposal review will be given at the time the student submits his or her dissertation proposal to the dissertation advisor/committee for approval. As part of this exam, the dissertation advisor/committee will review the student's doctoral program and his or her performance in graduate courses, as well as examine the student on subject matter related to his or her graduate course work and dissertation subject area.

FINAL DISSERTATION DEFENSE

The final dissertation defense will include the subject matter of the dissertation and significant developments in the field of the dissertation work. Other related fields may be included if recommended by the examining faculty. The dissertation defense must be scheduled at least six months after the PhD proposal review.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Milestones

Annual review (each fall semester after the student has been in the program for at least one year)
Qualifying examination
Dissertation committee
Proposal stage review
Dissertation defense

Core Requirements

Complete 16 semester hours of approved course work. At least 8 semester hours must be graduate-level EECE courses. Consult your faculty advisor for acceptable courses.

Dissertation

Code	Title	Hours
Complete the following (repeatable) course twice:		
EECE 9990	Dissertation	

Program Credit/GPA Requirements

16 total semester hours required
Minimum 3.000 GPA required

Applied Physics and Engineering, MS

The combined MS program in applied physics and engineering allows graduate students to receive training in one of three concentrations of the electrical and computer engineering department while also receiving fundamental graduate-level physics training that is relevant to that area.

Thesis Option

A student may complete an additional 8 semester hours of thesis. Students may register for an additional two semesters of thesis work, Thesis (EECE 7990) (4 semester hours) or Thesis (PHYS 7990) (4 semester hours), depending on the affiliation of the thesis advisor. A thesis committee is composed of an advisor and two faculty members from physics or electrical engineering.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Concentrations

Complete one of the following concentrations:

- Microsystems, Materials, and Devices (p. 161)
- Electromagnetics, Plasma, and Optics (p. 162)
- Analysis, Modeling, and Computation (p. 162)

MICROSYSTEMS, MATERIALS, AND DEVICES

Code	Title	Hours
Core Courses		
EECE 7201	Solid State Devices	4
PHYS 7324	Condensed Matter Physics	4
Engineering Course Work		
Complete 12 semester hours from the following:		12
EECE 5606	Micro- and Nanofabrication	
EECE 5680	Electric Drives	
EECE 7204	Applied Probability and Stochastic Processes	
EECE 7240	Analog Integrated Circuit Design	
EECE 7242	Integrated Circuits for Mixed Signals and Data Communication	
EECE 7244	Introduction to Microelectromechanical Systems (MEMS)	
EECE 7245	Microwave Circuit Design for Wireless Communication	
EECE 7353	VLSI Design	
EECE 7398	Special Topics	
Physics Course Work		
Complete 12 semester hours from the following:		12
PHYS 5318	Principles of Experimental Physics	
PHYS 7301	Classical Mechanics/Math Methods	
PHYS 7302	Electromagnetic Theory	
PHYS 7305	Statistical Physics	
PHYS 7315	Quantum Theory 1	
PHYS 7316	Quantum Theory 2	
PHYS 7321	Computational Physics	

| PHYS 7331 | Network Science Data | |
| PHYS 7734 | Topics: Condensed Matter Physics | |

ELECTROMAGNETICS, PLASMA, AND OPTICS

Code	Title	Hours
Core Courses		
EECE 7203	Complex Variable Theory and Differential Equations	4
PHYS 7302	Electromagnetic Theory	4
Engineering Course Work		
Complete 12 semester hours from the following:		12
EECE 5648	Biomedical Optics	
EECE 5698	Special Topics in Electrical and Computer Engineering (Subsurface Imaging)	
EECE 7105	Optics for Engineers	
EECE 7202	Electromagnetic Theory 1	
EECE 7245	Microwave Circuit Design for Wireless Communication	
EECE 7270	Electromagnetic Theory 2	
EECE 7271	Computational Methods in Electromagnetics	
EECE 7275	Antennas and Radiation	
EECE 7293	Modern Imaging	
Physics Course Work		
Complete 12 semester hours from the following:		12
PHYS 5318	Principles of Experimental Physics	
PHYS 7305	Statistical Physics	
PHYS 7315	Quantum Theory 1	
PHYS 7316	Quantum Theory 2	
PHYS 7321	Computational Physics	
PHYS 7324	Condensed Matter Physics	
PHYS 7731	Biological Physics 1	

ANALYSIS, MODELING, AND COMPUTATION

Code	Title	Hours
Core Courses		
EECE 7205	Fundamentals of Computer Engineering	4
PHYS 7321	Computational Physics	4
Engineering Course Work		
Complete 12 semester hours from the following:		12
EECE 5639	Computer Vision	
EECE 5640	High-Performance Computing	
EECE 5642	Data Visualization	
EECE 5643	Simulation and Performance Evaluation	
EECE 5644	Introduction to Machine Learning and Pattern Recognition	
EECE 7205	Fundamentals of Computer Engineering	
EECE 7271	Computational Methods in Electromagnetics	
EECE 7352	Computer Architecture	
EECE 7353	VLSI Design	
EECE 7360	Combinatorial Optimization	
EECE 7374	Fundamentals of Computer Networks	
EECE 7376	Operating Systems: Interface and Implementation	

Physics Course Work

Complete 12 semester hours from the following:		12
PHYS 5116	Complex Networks and Applications	
PHYS 5318	Principles of Experimental Physics	
PHYS 7301	Classical Mechanics/Math Methods	
PHYS 7305	Statistical Physics	
PHYS 7331	Network Science Data	
PHYS 7335	Dynamical Processes in Complex Networks	

Thesis Option

Students may register for an additional two semesters of thesis work, Thesis (EECE 7990) or Thesis (PHYS 7990) , depending on the affiliation of the thesis advisor. Thesis credits cannot be substituted for any of the course work listed above. This option requires a total of 40 semester hours for the master's degree.

Program Credit/GPA Requirements

32–40 total semester hours required
Minimum 3.000 GPA required

Data Science, MS

The College of Computer and Information Science (CCIS) and the Department of Electrical and Computer Engineering (ECE) jointly offer a new interdisciplinary Master of Science program in data science. This program is designed to give students a comprehensive framework for processing, analyzing, modeling, and reasoning about data. Students will engage in an extensive course work intended to develop depth in data collection, storage, retrieval, processing, modeling, and visualization. Students will also be able to choose elective courses from a variety of offerings in CCIS, the College of Engineering (COE), and throughout the campus to explore areas that generate data, or specialized data science applications. Successful program graduates will be well positioned to attain data scientist and data engineer positions in a fast-growing field or to progress into doctoral degrees in related disciplines.

Course Requirements

The Master of Science in Data Science curriculum requires five core courses that jointly represent the essential technical skills in data science. Two courses in algorithms and data processing examine foundational concepts and languages, focusing on data representation, storage, manipulation, and query, as well as large-scale computing and optimization. Two core courses in machine learning and data mining introduce concepts on data modeling, representation, uncovering associations, and making predictions. The capstone course presents a holistic view of data science. Through experiential learning, students are exposed to the real-world challenges of implementing data science techniques to solve meaningful problems and effectively communicate with data. The courses are tailored toward technically or mathematically trained students.

The five core courses include:

- Two core courses in algorithms and data processing
- Two core courses in machine learning and data mining
- One core course in information visualization

Three elective courses are drawn from a selection of courses across Northeastern.

Learning Outcomes

Students who complete the MS degree will be able to:

- Collect data from numerous sources (databases, files, XML, JSON, CSV, and Web APIs) and integrate them into a form in which the data is fit for analysis
- Use R and Python to explore data, produce summary statistics, perform statistical analyses; use standard data mining and machine-learning models for effective analysis
- Select, plan, and implement storage, search, and retrieval components of large-scale structure and unstructured repositories
- Retrieve data for analysis, which requires knowledge of standard retrieval mechanisms such as SQL and XPath, but also retrieval of unstructured information such as text, image, and a variety of alternate formats
- Match the methodological principles and limitations of machine learning and data mining methods to specific applied problems and communicate the applicability and the advantages/disadvantages of the methods in the specific problem to nondata experts
- Carry out the full data analysis workflow, including unsupervised class discovery, supervised class comparison, and supervised class prediction; Summarize, interpret, and communicate the analysis of results
- Organize visualization of data for analysis, understanding, and communication; choose appropriate visualization method for a given data type using effective design and human perception principle
- Develop methods for modeling, analyzing, and reasoning about data arising in one or more application domains such as social science, health informatics, web and social media, climate informatics, urban informatics, geographical information systems, business analytics, bioinformatics, complex networks, public health, and game design
- Manage, process, analyze, and visualize data at scale. This outcome allows students to handle data where the conventional information technology fail.

Placement Exams

Each incoming masters student, regardless of his or her background, takes two placement exams administered one week prior to the beginning of the semester. The two exams cover fundamentals of computer science and programming skills and basic statistics, probability, and linear algebra. If the student does not get a B or above in a part of the placement exam, then the student must take the corresponding introductory course.

- Introduction to Programming for Data Science (DS 5010) The introductory course on fundamentals of programming and data structures covers data structures (lists, arrays, trees, hash tables, etc.), program design, programming practices, testing, debugging, maintainability, data collection techniques, and data cleaning and preprocessing. This course will have a class project where the students will use the concepts they learn to collect data from the web, clean, and preprocess and ready for analysis.
- Introduction to Linear Algebra and Probability for Data Science (DS 5020) The introductory course on basics of statistics, probability, and linear algebra covers random variables, frequency distributions, measures of central tendency, measures of dispersion, moments of a distribution, discrete and continuous probability distributions, chain rule, Bayes' rule, correlation theory, basic sampling, matrix operations, trace of a matrix, norms, linear independence and ranks, inverse of a matrix, orthogonal matrices, range and null space of a matrix, the

determinant of a matrix, positive semidefinite matrices, eigenvalues and eigenvectors.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

A cumulative GPA of 3.000 or higher is required in the following core courses:

Code	Title	Hours
Algorithms		
Complete 4 semester hours from the following:		4
CS 5800	Algorithms	
EECE 7205	Fundamentals of Computer Engineering	
Data Management and Processing		
DS 5110	Introduction to Data Management and Processing	4
Machine Learning and Data Mining		
DS 5220	Supervised Machine Learning and Learning Theory	4
DS 5230	Unsupervised Machine Learning and Data Mining	4
Presentation and Visualization		
DS 5500	Information Visualization: Applications in Data Science	4

Electives

Code	Title	Hours
Complete 12 semester hours from the following:		12
College of Computer and Information Science		
CS 5100	Foundations of Artificial Intelligence	
CS 6120	Natural Language Processing	
CS 6200	Information Retrieval	
CS 6350	Empirical Research Methods	
CS 7180	Special Topics in Artificial Intelligence	
CS 7280	Special Topics in Database Management	
College of Engineering		
CIVE 7388	Special Topics in Civil Engineering	
EECE 5639	Computer Vision	
EECE 5640	High-Performance Computing	
EECE 7337	Information Theory	
EECE 7360	Combinatorial Optimization	
EECE 7370	Advanced Computer Vision	
EECE 7397	Advanced Machine Learning	
IE 5640	Data Mining for Engineering Applications	
IE 7275	Data Mining in Engineering	
IE 7280	Statistical Methods in Engineering	
College of Social Sciences and Humanities		
PPUA 5261	Dynamic Modeling for Environmental Decision Making	
PPUA 5262	Big Data for Cities	
PPUA 5263	Geographic Information Systems for Urban and Regional Policy	

PPUA 5266	Urban Theory and Science
PPUA 7237	Advanced Spatial Analysis of Urban Systems
POLS 7200	Perspectives on Social Science Inquiry
POLS 7201	Research Design
POLS 7202	Quantitative Techniques
D'Amore-McKim School of Business	
BUSN 6320	Business Analytics Fundamentals
BUSN 6324	Predictive Analytics for Managers
College of Science	
MATH 7340	Statistics for Bioinformatics
PHYS 5116	Complex Networks and Applications
PHYS 7305	Statistical Physics
PHYS 7321	Computational Physics
PHYS 7331	Network Science Data
Bouvé College of Health Sciences	
NRSG 5121	Epidemiology and Population Health
PHTH 5202	Introduction to Epidemiology
PHTH 5210	Biostatistics in Public Health
PHTH 5224	Social Epidemiology
College of Arts, Media and Design	
GSND 5110	Game Design and Analysis
GSND 6350	Data-Driven Player Modeling

Note: Students that take electives worth less than 4 credits (i.e., Bouvé, CSSH courses) will register for an accompanying data science project course in the same semester to bring the cumulative credits to 4. In order to earn this additional credit, students will be expected to work with faculty to design an additional project in line with the curricular aims of their chosen elective and the data science core learning outcomes.

Program Credit/GPA Requirements

32 total semester hours required
Minimum 3.000 GPA required

Electrical and Computer Engineering with Concentration in Communications, Control, and Signal Processing, MSECE

The master's degree program in electrical and computer engineering offers in-depth course work within the concentration-choice-related areas. The curriculum is integrated and intensive and is built on state-of-the-art research, taught by faculty who are experts in their areas.

Excluded Courses for All MSECE Concentrations

You **cannot take excluded courses as part of your MSECE program**. Please do not petition to take these courses, as any petition to take these courses will be automatically rejected. Courses from the following subject areas may not count toward any concentration within the MSECE program: CSYE, ENSY, EMGT, INFO, SBSY, TELE. Select CS courses are also excluded from all MSECE concentrations. Please see the program requirements tab and your college administrator for more information.

Graduate Certificate Options

Students enrolled in a master's degree have the opportunity to also pursue one of the many engineering graduate certificate options in addition to or in combination with the MS degree. Students should consult their faculty advisor regarding these options (p. 229).

GORDON INSTITUTE OF ENGINEERING LEADERSHIP

Master's Degree in Electrical and Computer Engineering with a Concentration in Communications, Control, and Signal Processing with Graduate Certificate in Engineering Leadership

Students may complete a Master of Science in Electrical and Computer Engineering with a Concentration in Communications, Control, and Signal Processing in addition to earning a Graduate Certificate in Engineering Leadership. Students must apply and be admitted to the Gordon Engineering Leadership Program in order to pursue this option. The program requires fulfillment of the 16-semester-hour curriculum required to earn the Graduate Certificate in Engineering Leadership, which includes an industry-based challenge project with multiple mentors. The integrated 48-semester-hour degree and certificate will require 32 semester hours of advisor-approved communications, control, and signal processing technical courses.

Engineering Leadership (p. 222)

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Options

Complete one of the following options:

COURSE WORK OPTION

Code	Title	Hours
Depth Courses		
Complete 20 semester hours from the depth course list below. (p. 164)		20
Breadth Courses		
Complete 8 semester hours from the breadth course list below. (p. 165)		8
Note: Depth courses cannot be taken for breadth.		
Elective		
Complete 4 additional semester hours from either the depth or breadth course lists below.		4

THESIS OPTION

Code	Title	Hours
Thesis		
EECE 7990	Thesis	8
Depth Courses		
Complete 12 semester hours from the depth course list below. (p. 164)		12
Breadth Courses		
Complete 4 semester hours from the breadth course list below. (p. 165)		4
Note: Depth courses cannot be taken for breadth.		
Elective		
Complete 8 additional semester hours from either the depth or breadth course lists below.		8

Course Lists

DEPTH COURSES

Code	Title	Hours
EECE 5550	Mobile Robotics	
EECE 5552	Assistive Robotics	
EECE 5576	Wireless Communication Systems	
EECE 5580	Classical Control Systems	

EECE 5610	Digital Control Systems	
EECE 5664	Biomedical Signal Processing	
EECE 5666	Digital Signal Processing	
EECE 5698	Special Topics in Electrical and Computer Engineering (GNSS Signal Processing)	
EECE 5698	Special Topics in Electrical and Computer Engineering (Introduction to Molecular Systems Biology Dynamic Modeling)	
EECE 7200	Linear Systems Analysis	
EECE 7204	Applied Probability and Stochastic Processes	
EECE 7211	Nonlinear Control	
EECE 7213	System Identification and Adaptive Control	
EECE 7214	Optimal and Robust Control	
EECE 7263	Humanoid Robotics	
EECE 7310	Modern Signal Processing	
EECE 7311	Two Dimensional Signal and Image Processing	
EECE 7312	Statistical and Adaptive Signal Processing	
EECE 7323	Numerical Optimization Methods	
EECE 7336	Digital Communications	
EECE 7337	Information Theory	
EECE 7345	Big Data and Sparsity in Control, Machine Learning, and Optimization	
EECE 7346	Probabilistic System Modeling and Analysis	
EECE 7400	Special Problems in Electrical Engineering	

BREADTH COURSES

Code	Title	Hours
EECE 5155	Wireless Sensor Networks and the Internet of Things	
EECE 5161	Thin Film Technologies	
EECE 5170	Introduction to Multiferroics Materials and Systems	
EECE 5554	Robotics Sensing and Navigation (Robotics Sensing and Navigation)	
EECE 5606	Micro- and Nanofabrication	
EECE 5627	Arithmetic and Circuit Design for Inexact Computing with Nanoscaled CMOS	
EECE 5639	Computer Vision	
EECE 5640	High-Performance Computing	
EECE 5642	Data Visualization	
EECE 5643	Simulation and Performance Evaluation	
EECE 5644	Introduction to Machine Learning and Pattern Recognition	
EECE 5647	Nanophotonics	
EECE 5648	Biomedical Optics	
EECE 5649	Design of Analog Integrated Circuits with Complementary Metal-Oxide-Semiconductor Technology	

EECE 5652	Microwave Circuits and Networks	
EECE 5680 and EECE 5681	Electric Drives and Lab for EECE 5680	
EECE 5682	Power Systems Analysis 1	
EECE 5684 and EECE 5685	Power Electronics and Lab for EECE 5684	
EECE 5686	Electrical Machines	
EECE 5688	Analysis of Unbalanced Power Grids	
EECE 5697	Acoustics and Sensing	
EECE 5698	Special Topics in Electrical and Computer Engineering (Networks: Technology, Economics, Social Interactions)	
EECE 5698	Special Topics in Electrical and Computer Engineering (Software Security)	
EECE 5698	Special Topics in Electrical and Computer Engineering (Advanced Network Management)	
EECE 5698	Special Topics in Electrical and Computer Engineering (Parallel Processing for Data Analytics)	
EECE 7105	Optics for Engineers	
EECE 7150	Autonomous Field Robotics	
EECE 7201	Solid State Devices	
EECE 7202	Electromagnetic Theory 1	
EECE 7203	Complex Variable Theory and Differential Equations	
EECE 7205	Fundamentals of Computer Engineering	
EECE 7224	Power Systems State Estimation	
EECE 7226	Modeling and Simulation of Power System Transients	
EECE 7228	Advanced Power Electronics (Advanced Power Electronics)	
EECE 7237	Special Topics in Power Electronics	
EECE 7240	Analog Integrated Circuit Design	
EECE 7242	Integrated Circuits for Mixed Signals and Data Communication	
EECE 7244	Introduction to Microelectromechanical Systems (MEMS)	
EECE 7245	Microwave Circuit Design for Wireless Communication	
EECE 7250	Power Management Integrated Circuits	
EECE 7258	Human Sensing and Recognition (Human Centered Computing -- former Special Topics)	
EECE 7270	Electromagnetic Theory 2	
EECE 7271	Computational Methods in Electromagnetics	
EECE 7275	Antennas and Radiation	
EECE 7293	Modern Imaging	
EECE 7296	Electronic Materials	
EECE 7297	Advanced Magnetic Materials—Magnetic Devices	
EECE 7298	Magnetic Materials—Fundamentals and Measurements	
EECE 7352	Computer Architecture	

EECE 7353	VLSI Design
EECE 7360	Combinatorial Optimization
EECE 7364	Mobile and Wireless Networking
EECE 7368	High-Level Design of Hardware-Software Systems
EECE 7370	Advanced Computer Vision
EECE 7374	Fundamentals of Computer Networks
EECE 7376	Operating Systems: Interface and Implementation
EECE 7377	Scalable and Sustainable System Design (Scalable and Sustainable System Design)
EECE 7390	Computer Hardware Security
EECE 7397	Advanced Machine Learning
EECE 7398	Special Topics (Compilers)
EECE 7398	Special Topics (Advanced Computer Architecture)
EECE 7398	Special Topics (Power System Constrained Optimization)
EECE 7399	Preparing High-Stakes Written and Oral Materials
ENGR 5670	Sustainable Energy: Materials, Conversion, Storage, and Usage
MATH 7233	Graph Theory
CS 5100	Foundations of Artificial Intelligence
CS 5200	Database Management Systems
CS 5600	Computer Systems
CS 5770	Software Vulnerabilities and Security
CS 6200	Information Retrieval
CS 6220	Data Mining Techniques
CS 6410	Compilers
CS 6510	Advanced Software Development
CS 6740	Network Security
CS 6750	Cryptography and Communications Security
CS 6760	Privacy, Security, and Usability
CS 7800	Advanced Algorithms

EXCLUDED COURSES FOR ALL MSECE CONCENTRATIONS

Please see your college administrator for more information.

Code	Title	Hours

Courses from the following subject areas may not count toward any concentration within the MSECE program:

| CSYE, ENSY, EMGT, INFO, SBSY, TELE | | |

The following CS courses may not count toward any concentration within the MSECE program:

CS 5010	Programming Design Paradigm
CS 5320	
CS 5330	Pattern Recognition and Computer Vision
CS 5340	Computer/Human Interaction
CS 5520	Mobile Application Development
CS 5610	Web Development
CS 5700	Fundamentals of Computer Networking
CS 5800	Algorithms

| CS 6350 | Empirical Research Methods |
| CS 6710 | Wireless Network |

Program Credit/GPA Requirements

32 total semester hours required
Minimum 3.000 GPA required

The master's degree programs in electrical and computer engineering offer in-depth course work within the concentration-choice-related areas. The curriculum is integrated and intensive and is built on groundbreaking research, taught by faculty who are experts in their areas.

Excluded Courses for All MSECE Concentrations

You **cannot take excluded courses as part of your MSECE program**. Please **do not** petition to take these courses, as any petition to take these courses will be automatically rejected. Courses from the following subject areas may not count toward any concentration within the MSECE program: CSYE, ENSY, EMGT, INFO, SBSY, TELE. Select CS courses are also excluded from all MSECE concentrations. Please see the program requirements tab and your college administrator for more information.

Graduate Certificate Options

Students enrolled in a master's degree have the opportunity to also pursue one of the many engineering graduate certificate options in addition to or in combination with the MS degree. Students should consult their faculty advisor regarding these options (p. 229).

GORDON INSTITUTE OF ENGINEERING LEADERSHIP

Master's Degree in Electrical and Computer Engineering with Concentration in Computer Systems and Software with Graduate Certificate in Engineering Leadership

Students may complete a Master of Science degree in Electrical and Computer Engineering with Concentration in Computer Systems and Software in addition to earning a Graduate Certificate in Engineering Leadership. Students must apply and be admitted to the Gordon Engineering Leadership Program in order to pursue this option. The program requires fulfillment of the 16-semester-hour curriculum required to earn the Graduate Certificate in Engineering Leadership, which includes an industry-based challenge project with multiple mentors. The integrated 48-semester-hour degree and certificate will require 32 semester hours of advisor-approved computer systems and software technical courses.

Engineering Leadership (p. 222)

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Options

Complete one of the following options:

COURSE WORK OPTION

Code	Title	Hours
Depth Courses		
Complete 20 semester hours from the depth course list below. (p. 167)		20
Breadth Courses		

Complete 8 semester hours from the breadth course list below or other EECE courses chosen in consultation with a faculty advisor. (p. 167)	8
Note: Depth courses cannot be taken for breadth.	

Elective

Complete 4 semester hours of either depth or breadth courses.	4

THESIS OPTION

Code	Title	Hours
Depth Courses		
Complete 12 semester hours from the depth course list below. (p. 167)		12
Breadth Courses		
Complete 8 semester hours from the breadth course list below or other EECE courses chosen in consultation with a faculty advisor. (p. 167)		8
Note: Depth courses cannot be taken for breadth.		
Elective		
Complete 4 additional semester hours from either depth or breadth courses.		4
Thesis		
EECE 7990	Thesis	8

Course Lists

DEPTH COURSES

Code	Title	Hours
EECE 5552	Assistive Robotics (Principles of Assistive Robotics)	
EECE 5627	Arithmetic and Circuit Design for Inexact Computing with Nanoscaled CMOS	
EECE 5640	High-Performance Computing	
EECE 5643	Simulation and Performance Evaluation	
EECE 7205	Fundamentals of Computer Engineering	
EECE 7352	Computer Architecture	
EECE 7353	VLSI Design	
EECE 7368	High-Level Design of Hardware-Software Systems	
EECE 7376	Operating Systems: Interface and Implementation	
EECE 7377	Scalable and Sustainable System Design (Scalable and Sustainable System Design)	
EECE 7390	Computer Hardware Security	
EECE 7398	Special Topics (Compilers)	
EECE 7398	Special Topics (Advanced Computer Architecture)	
EECE 7400	Special Problems in Electrical Engineering	
CS 5200	Database Management Systems	
CS 5600	Computer Systems	
CS 6410	Compilers	
CS 6510	Advanced Software Development	

BREADTH COURSES

Code	Title	Hours
EECE 5155	Wireless Sensor Networks and the Internet of Things	
EECE 5161	Thin Film Technologies	
EECE 5170	Introduction to Multiferroics Materials and Systems	
EECE 5550	Mobile Robotics	
EECE 5554	Robotics Sensing and Navigation	
EECE 5576	Wireless Communication Systems	
EECE 5580	Classical Control Systems	
EECE 5606	Micro- and Nanofabrication	
EECE 5610	Digital Control Systems	
EECE 5639	Computer Vision	
EECE 5642	Data Visualization	
EECE 5644	Introduction to Machine Learning and Pattern Recognition	
EECE 5647	Nanophotonics	
EECE 5648	Biomedical Optics	
EECE 5649	Design of Analog Integrated Circuits with Complementary Metal-Oxide-Semiconductor Technology	
EECE 5652	Microwave Circuits and Networks	
EECE 5664	Biomedical Signal Processing	
EECE 5666	Digital Signal Processing	
EECE 5680 and EECE 5681	Electric Drives and Lab for EECE 5680	
EECE 5682	Power Systems Analysis 1	
EECE 5684 and EECE 5685	Power Electronics and Lab for EECE 5684	
EECE 5686	Electrical Machines	
EECE 5688	Analysis of Unbalanced Power Grids	
EECE 5697	Acoustics and Sensing	
EECE 5698	Special Topics in Electrical and Computer Engineering (Networks: Technology, Economics, Social Interactions)	
EECE 5698	Special Topics in Electrical and Computer Engineering (GNSS Signal Processing)	
EECE 5698	Special Topics in Electrical and Computer Engineering (Introduction to Molecular Systems Biology Dynamic Modeling)	
EECE 5698	Special Topics in Electrical and Computer Engineering (Software Security)	
EECE 5698	Special Topics in Electrical and Computer Engineering (Advanced Network Management)	
EECE 5698	Special Topics in Electrical and Computer Engineering (Parallel Processing for Data Analytics)	
EECE 7105	Optics for Engineers	
EECE 7150	Autonomous Field Robotics	
EECE 7200	Linear Systems Analysis	
EECE 7201	Solid State Devices	

EECE 7202	Electromagnetic Theory 1
EECE 7203	Complex Variable Theory and Differential Equations
EECE 7204	Applied Probability and Stochastic Processes
EECE 7211	Nonlinear Control
EECE 7213	System Identification and Adaptive Control
EECE 7214	Optimal and Robust Control
EECE 7224	Power Systems State Estimation
EECE 7226	Modeling and Simulation of Power System Transients
EECE 7228	Advanced Power Electronics
EECE 7237	Special Topics in Power Electronics
EECE 7240	Analog Integrated Circuit Design
EECE 7242	Integrated Circuits for Mixed Signals and Data Communication
EECE 7244	Introduction to Microelectromechanical Systems (MEMS)
EECE 7245	Microwave Circuit Design for Wireless Communication
EECE 7250	Power Management Integrated Circuits
EECE 7258	Human Sensing and Recognition
EECE 7263	Humanoid Robotics
EECE 7270	Electromagnetic Theory 2
EECE 7271	Computational Methods in Electromagnetics
EECE 7275	Antennas and Radiation
EECE 7293	Modern Imaging
EECE 7296	Electronic Materials
EECE 7297	Advanced Magnetic Materials—Magnetic Devices
EECE 7298	Magnetic Materials—Fundamentals and Measurements
EECE 7310	Modern Signal Processing
EECE 7311	Two Dimensional Signal and Image Processing
EECE 7312	Statistical and Adaptive Signal Processing
EECE 7323	Numerical Optimization Methods
EECE 7336	Digital Communications
EECE 7337	Information Theory
EECE 7345	Big Data and Sparsity in Control, Machine Learning, and Optimization
EECE 7346	Probabilistic System Modeling and Analysis
EECE 7360	Combinatorial Optimization
EECE 7364	Mobile and Wireless Networking
EECE 7370	Advanced Computer Vision
EECE 7374	Fundamentals of Computer Networks
EECE 7397	Advanced Machine Learning
EECE 7398	Special Topics (Power System Constrained Optimization)
EECE 7399	Preparing High-Stakes Written and Oral Materials

ENGR 5670	Sustainable Energy: Materials, Conversion, Storage, and Usage
MATH 7233	Graph Theory
CS 5100	Foundations of Artificial Intelligence
CS 5770	Software Vulnerabilities and Security
CS 6200	Information Retrieval
CS 6220	Data Mining Techniques
CS 6740	Network Security
CS 6750	Cryptography and Communications Security
CS 6760	Privacy, Security, and Usability
CS 7800	Advanced Algorithms

EXCLUDED COURSES FOR ALL MSECE CONCENTRATIONS

Please see your college administrator for more information.

Code	Title	Hours
Courses from the following subject areas may not count toward any concentration within the MSECE program:		
CSYE, ENSY, EMGT, INFO, SBSY, TELE		
The following CS courses may not count toward any concentration within the MSECE program:		
CS 5010	Programming Design Paradigm	
CS 5320		
CS 5330	Pattern Recognition and Computer Vision	
CS 5340	Computer/Human Interaction	
CS 5520	Mobile Application Development	
CS 5610	Web Development	
CS 5700	Fundamentals of Computer Networking	
CS 5800	Algorithms	
CS 6350	Empirical Research Methods	
CS 6710	Wireless Network	

Program Credit/GPA Requirements

32 total semester hours required
Minimum 3.000 GPA required

Electrical and Computer Engineering with Concentration in Computer Networks and Security, MSECE

The master's degree program in electrical and computer engineering offers in-depth course work within the concentration-choice-related areas. The curriculum is integrated and intensive and is built on state-of-the-art research, taught by faculty who are experts in their areas.

Excluded Courses for All MSECE Concentrations

You **cannot take excluded courses as part of your MSECE program**. Please **do not** petition to take these courses, as any petition to take these courses will be automatically rejected. Courses from the following subject areas may not count toward any concentration within the MSECE program: CSYE, ENSY, EMGT, INFO, SBSY, TELE. Select CS courses are also excluded from all MSECE concentrations. Please see the program requirements tab and your college administrator for more information.

Graduate Certificate Options

Students enrolled in a master's degree have the opportunity to also pursue one of the many engineering graduate certificate options in

addition to or in combination with the MS degree. Students should consult their faculty advisor regarding these options (p. 229).

GORDON INSTITUTE OF ENGINEERING LEADERSHIP

Master's Degree in Electrical and Computer Engineering with Concentration in Computer Networks and Security with Graduate Certificate in Engineering Leadership

Students may complete a Master of Science in Electrical and Computer Engineering with Concentration in Computer Networks and Security in addition to earning a Graduate Certificate in Engineering Leadership. Students must apply and be admitted to the Gordon Engineering Leadership Program in order to pursue this option. The program requires fulfillment of the 16-semester-hour curriculum required to earn the Graduate Certificate in Engineering Leadership, which includes an industry-based challenge project with multiple mentors. The integrated 48-semester-hour degree and certificate will require 32 semester hours of advisor-approved computer networks and security technical courses.

Engineering Leadership (p. 222)

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Options

Complete one of the following options:

COURSE WORK OPTION

Code	Title	Hours
Depth Courses		
Complete 20 semester hours from the depth course list below. (p. 169)		20
Breadth Courses		
Complete 8 semester hours from the breadth course list below or other EECE courses chosen in consultation with a faculty advisor. (p. 169)		8
Note: Depth courses cannot be taken for breadth.		
Elective		
Complete 4 semester hours of either depth or breadth courses.		4

THESIS OPTION

Code	Title	Hours
Depth Courses		
Complete 12 semester hours from the depth course list below. (p. 169)		12
Breadth Courses		
Complete 8 semester hours from the breadth course list below or other EECE courses chosen in consultation with a faculty advisor. (p. 169)		8
Note: Depth courses cannot be taken for breadth.		
Elective		
Complete 4 additional semester hours of either depth or breadth courses.		4
Thesis		
EECE 7990	Thesis	8

Course Lists

DEPTH COURSES

Code	Title	Hours
EECE 5155	Wireless Sensor Networks and the Internet of Things	
EECE 5576	Wireless Communication Systems	
EECE 5640	High-Performance Computing	
EECE 5698	Special Topics in Electrical and Computer Engineering (Networks: Technology, Economics, Social Interactions)	
EECE 5698	Special Topics in Electrical and Computer Engineering (Software Security)	
EECE 5698	Special Topics in Electrical and Computer Engineering (Advanced Network Management)	
EECE 7204	Applied Probability and Stochastic Processes	
EECE 7205	Fundamentals of Computer Engineering	
EECE 7346	Probabilistic System Modeling and Analysis	
EECE 7364	Mobile and Wireless Networking	
EECE 7374	Fundamentals of Computer Networks	
EECE 7390	Computer Hardware Security	
EECE 7393		
EECE 7400	Special Problems in Electrical Engineering	
CS 5770	Software Vulnerabilities and Security	
CS 6740	Network Security	
CS 6750	Cryptography and Communications Security	
CS 6760	Privacy, Security, and Usability	

BREADTH COURSES

Code	Title	Hours
EECE 5170	Introduction to Multiferroics Materials and Systems	
EECE 5552	Assistive Robotics	
EECE 5554	Robotics Sensing and Navigation	
EECE 5580	Classical Control Systems	
EECE 5606	Micro- and Nanofabrication	
EECE 5610	Digital Control Systems	
EECE 5627	Arithmetic and Circuit Design for Inexact Computing with Nanoscaled CMOS	
EECE 5639	Computer Vision	
EECE 5642	Data Visualization	
EECE 5643	Simulation and Performance Evaluation	
EECE 5644	Introduction to Machine Learning and Pattern Recognition	
EECE 5647	Nanophotonics	
EECE 5648	Biomedical Optics	
EECE 5649	Design of Analog Integrated Circuits with Complementary Metal-Oxide-Semiconductor Technology	
EECE 5664	Biomedical Signal Processing	

EECE 5666	Digital Signal Processing
EECE 5680 and EECE 5681	Electric Drives and Lab for EECE 5680
EECE 5682	Power Systems Analysis 1
EECE 5684 and EECE 5685	Power Electronics and Lab for EECE 5684
EECE 5686	Electrical Machines
EECE 5688	Analysis of Unbalanced Power Grids
EECE 5697	Acoustics and Sensing
EECE 5698	Special Topics in Electrical and Computer Engineering (Parallel Processing for Data Analytics)
EECE 5698	Special Topics in Electrical and Computer Engineering (GNSS Signal Processing)
EECE 5698	Special Topics in Electrical and Computer Engineering (Introduction to Molecular Systems Biology Dynamic Modeling)
EECE 7105	Optics for Engineers
EECE 7150	Autonomous Field Robotics
EECE 7200	Linear Systems Analysis
EECE 7263	Humanoid Robotics
EECE 7201	Solid State Devices
EECE 7202	Electromagnetic Theory 1
EECE 7203	Complex Variable Theory and Differential Equations
EECE 7211	Nonlinear Control
EECE 7213	System Identification and Adaptive Control
EECE 7214	Optimal and Robust Control
EECE 7224	Power Systems State Estimation
EECE 7226	Modeling and Simulation of Power System Transients
EECE 7228	Advanced Power Electronics
EECE 7237	Special Topics in Power Electronics
EECE 7240	Analog Integrated Circuit Design
EECE 7242	Integrated Circuits for Mixed Signals and Data Communication
EECE 7244	Introduction to Microelectromechanical Systems (MEMS)
EECE 7245	Microwave Circuit Design for Wireless Communication
EECE 7258	Human Sensing and Recognition
EECE 7270	Electromagnetic Theory 2
EECE 7271	Computational Methods in Electromagnetics
EECE 7275	Antennas and Radiation
EECE 7293	Modern Imaging
EECE 7296	Electronic Materials
EECE 7297	Advanced Magnetic Materials— Magnetic Devices
EECE 7298	Magnetic Materials—Fundamentals and Measurements
EECE 7310	Modern Signal Processing

EECE 7311	Two Dimensional Signal and Image Processing
EECE 7312	Statistical and Adaptive Signal Processing
EECE 7323	Numerical Optimization Methods
EECE 7336	Digital Communications
EECE 7337	Information Theory
EECE 7345	Big Data and Sparsity in Control, Machine Learning, and Optimization
EECE 7352	Computer Architecture
EECE 7353	VLSI Design
EECE 7360	Combinatorial Optimization
EECE 7368	High-Level Design of Hardware-Software Systems
EECE 7370	Advanced Computer Vision
EECE 7376	Operating Systems: Interface and Implementation
EECE 7377	Scalable and Sustainable System Design
EECE 7397	Advanced Machine Learning
EECE 7398	Special Topics (Compilers)
EECE 7398	Special Topics (Advanced Computer Architecture)
EECE 7398	Special Topics (Power System Constrained Optimization)
EECE 7399	Preparing High-Stakes Written and Oral Materials
ENGR 5670	Sustainable Energy: Materials, Conversion, Storage, and Usage
MATH 7233	Graph Theory
CS 5100	Foundations of Artificial Intelligence
CS 5200	Database Management Systems
CS 5600	Computer Systems
CS 6200	Information Retrieval
CS 6220	Data Mining Techniques
CS 6410	Compilers
CS 6510	Advanced Software Development
CS 7800	Advanced Algorithms

EXCLUDED COURSES FOR ALL MSECE CONCENTRATIONS
Please see your college administrator for more information.

Code	Title	Hours
Courses from the following subject areas may not count toward any concentration within the MSECE program:		
CSYE, ENSY, EMGT, INFO, SBSY, TELE		
The following CS courses may not count toward any concentration within the MSECE program:		
CS 5010	Programming Design Paradigm	
CS 5320		
CS 5330	Pattern Recognition and Computer Vision	
CS 5340	Computer/Human Interaction	
CS 5520	Mobile Application Development	
CS 5610	Web Development	
CS 5700	Fundamentals of Computer Networking	
CS 5800	Algorithms	

CS 6350	Empirical Research Methods	
CS 6710	Wireless Network	

Program Credit/GPA Requirements

32 total semester hours required
Minimum 3.000 GPA required

<div style="background:red;color:white">

Electrical and Computer Engineering with Concentration in Computer Vision, Machine Learning, and Algorithms, MSECE

</div>

The master's degree program in electrical and computer engineering offers in-depth course work within the concentration-choice-related areas. The curriculum is integrated and intensive and is built on state-of-the-art research, taught by faculty who are experts in their areas.

Excluded Courses for All MSECE Concentrations

You **cannot take excluded courses as part of your MSECE program**. Please **do not** petition to take these courses, as any petition to take these courses will be automatically rejected. Courses from the following subject areas may not count toward any concentration within the MSECE program: CSYE, ENSY, EMGT, INFO, SBSY, TELE. Select CS courses are also excluded from all MSECE concentrations. Please see the program requirements tab and your college administrator for more information.

Graduate Certificate Options

Students enrolled in a master's degree have the opportunity to also pursue one of the many engineering graduate certificate options in addition to or in combination with the MS degree. Students should consult their faculty advisor regarding these options (p. 229).

GORDON INSTITUTE OF ENGINEERING LEADERSHIP
Master's Degree in Electrical and Computer Engineering with Concentration in Computer Vision, Machine Learning, and Algorithms with Graduate Certificate in Engineering Leadership

Students may complete a Master of Science in Electrical and Computer Engineering with Concentration in Computer Vision, Machine Learning, and Algorithms in addition to earning a Graduate Certificate in Engineering Leadership. Students must apply and be admitted to the Gordon Engineering Leadership Program in order to pursue this option. The program requires fulfillment of the 16-semester-hour curriculum required to earn the Graduate Certificate in Engineering Leadership, which includes an industry-based challenge project with multiple mentors. The integrated 48-semester-hour degree and certificate will require 32 semester hours of advisor-approved computer vision, machine learning, and algorithms technical courses.

Engineering Leadership (p. 222)

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Options

Complete one of the following options:

COURSE WORK OPTION

Code	Title	Hours
Depth Courses		
Complete 20 semester hours from the depth course list below. (p. 171)		20
Breadth Courses		
Complete 8 semester hours from the breadth course list below or other EECE courses chosen in consultation with a faculty advisor. (p. 172)		8
Note: Depth courses cannot be taken for breadth.		
Elective		
Complete 4 semester hours of either depth or breadth courses.		4

THESIS OPTION

Code	Title	Hours
Depth Courses		
Complete 12 semester hours from the depth course list below. (p. 171)		12
Breadth Courses		
Complete 8 semester hours from the breadth course list below or other EECE courses chosen in consultation with a faculty advisor. (p. 172)		8
Note: Depth courses cannot be taken for breadth.		
Elective		
Complete 4 additional semester hours from either depth or breadth courses.		4
Thesis		
EECE 7990	Thesis	8

Course Lists

DEPTH COURSES

Code	Title	Hours
EECE 5550	Mobile Robotics	
EECE 5554	Robotics Sensing and Navigation	
EECE 5639	Computer Vision	
EECE 5640	High-Performance Computing	
EECE 5642	Data Visualization	
EECE 5644	Introduction to Machine Learning and Pattern Recognition	
EECE 5698	Special Topics in Electrical and Computer Engineering (Parallel Processing for Data Analytics)	
EECE 7150	Autonomous Field Robotics	
EECE 7204	Applied Probability and Stochastic Processes	
EECE 7205	Fundamentals of Computer Engineering	
EECE 7258	Human Sensing and Recognition	
EECE 7323	Numerical Optimization Methods	
EECE 7345	Big Data and Sparsity in Control, Machine Learning, and Optimization	
EECE 7352	Computer Architecture	
EECE 7360	Combinatorial Optimization	
EECE 7370	Advanced Computer Vision	
EECE 7397	Advanced Machine Learning	
EECE 7398	Special Topics (Big Data and Sparsity in Control, Machine Learning and Signal Processing)	
EECE 7400	Special Problems in Electrical Engineering	
CS 5100	Foundations of Artificial Intelligence	
CS 6200	Information Retrieval	
CS 6220	Data Mining Techniques	

CS 7800	Advanced Algorithms
MATH 7233	Graph Theory

BREADTH COURSES

Code	Title	Hours
EECE 5155	Wireless Sensor Networks and the Internet of Things (Wireless Sensor Networks and the Internet of Things -- former special topics course)	
EECE 5161	Thin Film Technologies (Thin Film Technologies -- former special topics course)	
EECE 5170	Introduction to Multiferroics Materials and Systems	
EECE 5552	Assistive Robotics (Principles of Assistive Robotics)	
EECE 5576	Wireless Communication Systems	
EECE 5580	Classical Control Systems	
EECE 5606	Micro- and Nanofabrication	
EECE 5610	Digital Control Systems	
EECE 5627	Arithmetic and Circuit Design for Inexact Computing with Nanoscaled CMOS	
EECE 5643	Simulation and Performance Evaluation	
EECE 5647	Nanophotonics	
EECE 5648	Biomedical Optics	
EECE 5649	Design of Analog Integrated Circuits with Complementary Metal-Oxide-Semiconductor Technology	
EECE 5664	Biomedical Signal Processing	
EECE 5666	Digital Signal Processing	
EECE 5680 and EECE 5681	Electric Drives and Lab for EECE 5680	
EECE 5682	Power Systems Analysis 1	
EECE 5684 and EECE 5685	Power Electronics and Lab for EECE 5684	
EECE 5686	Electrical Machines	
EECE 5688	Analysis of Unbalanced Power Grids	
EECE 5697	Acoustics and Sensing	
EECE 5698	Special Topics in Electrical and Computer Engineering (Software Security)	
EECE 5698	Special Topics in Electrical and Computer Engineering (GNSS Signal Processing)	
EECE 5698	Special Topics in Electrical and Computer Engineering (Networks: Technology, Economics, Social Interactions)	
EECE 5698	Special Topics in Electrical and Computer Engineering (Introduction to Molecular Systems Biology Dynamic Modeling)	
EECE 5698	Special Topics in Electrical and Computer Engineering (Advanced Network Management)	
EECE 5698	Special Topics in Electrical and Computer Engineering (Principles of Assistive Robotics)	
EECE 7105	Optics for Engineers	
EECE 7200	Linear Systems Analysis	
EECE 7201	Solid State Devices	
EECE 7202	Electromagnetic Theory 1	
EECE 7203	Complex Variable Theory and Differential Equations	
EECE 7211	Nonlinear Control	
EECE 7213	System Identification and Adaptive Control	
EECE 7214	Optimal and Robust Control	
EECE 7224	Power Systems State Estimation	
EECE 7226	Modeling and Simulation of Power System Transients	
EECE 7228	Advanced Power Electronics (Advanced Power Electronics -- former special topics course)	
EECE 7237	Special Topics in Power Electronics	
EECE 7240	Analog Integrated Circuit Design	
EECE 7242	Integrated Circuits for Mixed Signals and Data Communication	
EECE 7244	Introduction to Microelectromechanical Systems (MEMS)	
EECE 7245	Microwave Circuit Design for Wireless Communication	
EECE 7250	Power Management Integrated Circuits (Power Management Integrated Circuits -- former special topics course)	
EECE 7263	Humanoid Robotics (Humanoid Robotics -- former special topics course)	
EECE 7270	Electromagnetic Theory 2	
EECE 7271	Computational Methods in Electromagnetics	
EECE 7275	Antennas and Radiation	
EECE 7293	Modern Imaging	
EECE 7296	Electronic Materials	
EECE 7297	Advanced Magnetic Materials—Magnetic Devices	
EECE 7298	Magnetic Materials—Fundamentals and Measurements	
EECE 7310	Modern Signal Processing	
EECE 7311	Two Dimensional Signal and Image Processing	
EECE 7312	Statistical and Adaptive Signal Processing	
EECE 7336	Digital Communications	
EECE 7337	Information Theory	
EECE 7345	Big Data and Sparsity in Control, Machine Learning, and Optimization	
EECE 7346	Probabilistic System Modeling and Analysis	
EECE 7353	VLSI Design	
EECE 7364	Mobile and Wireless Networking	

EECE 7368	High-Level Design of Hardware-Software Systems
EECE 7374	Fundamentals of Computer Networks
EECE 7376	Operating Systems: Interface and Implementation
EECE 7377	Scalable and Sustainable System Design (Scalable and Sustainable System Design)
EECE 7390	Computer Hardware Security
EECE 7398	Special Topics (Compilers)
EECE 7398	Special Topics (Advanced Computer Architecture)
EECE 7398	Special Topics (Power System Constrained Optimization)
EECE 7399	Preparing High-Stakes Written and Oral Materials
ENGR 5670	Sustainable Energy: Materials, Conversion, Storage, and Usage
CS 5200	Database Management Systems
CS 5600	Computer Systems
CS 5770	Software Vulnerabilities and Security
CS 6410	Compilers
CS 6510	Advanced Software Development
CS 6740	Network Security
CS 6750	Cryptography and Communications Security
CS 6760	Privacy, Security, and Usability

EXCLUDED COURSES FOR ALL MSECE CONCENTRATIONS

Please see your college administrator for more information.

Code	Title	Hours
Courses from the following subject areas may not count toward any concentration within the MSECE program:		
CSYE, ENSY, EMGT, INFO, SBSY, TELE		
The following CS courses may not count toward any concentration within the MSECE program:		
CS 5010	Programming Design Paradigm	
CS 5320		
CS 5330	Pattern Recognition and Computer Vision	
CS 5340	Computer/Human Interaction	
CS 5520	Mobile Application Development	
CS 5610	Web Development	
CS 5700	Fundamentals of Computer Networking	
CS 5800	Algorithms	
CS 6350	Empirical Research Methods	
CS 6710	Wireless Network	

Program Credit/GPA Requirements

32 total semester hours required
Minimum 3.000 GPA required

The master's degree program in electrical and computer engineering offers in-depth course work within the concentration-choice-related areas. The curriculum is integrated and intensive and is built on state-of-the-art research, taught by faculty who are experts in their areas.

Excluded Courses for All MSECE Concentrations

You **cannot take excluded courses as part of your MSECE program**. Please **do not** petition to take these courses, as any petition to take these courses will be automatically rejected. Courses from the following subject areas may not count toward any concentration within the MSECE program: CSYE, ENSY, EMGT, INFO, SBSY, TELE. Select CS courses are also excluded from all MSECE concentrations. Please see the program requirements tab and your college administrator for more information.

Graduate Certificate Options

Students enrolled in a master's degree have the opportunity to also pursue one of the many engineering graduate certificate options in addition to or in combination with the MS degree. Students should consult their faculty advisor regarding these options (p. 229).

GORDON INSTITUTE OF ENGINEERING LEADERSHIP

Master's Degree in Electrical and Computer Engineering with Concentration in Electromagnetics, Plasma, and Optics with Graduate Certificate in Engineering Leadership

Students may complete a Master of Science in Electrical and Computer Engineering with Concentration in Electromagnetics, Plasma, and Optics in addition to earning a Graduate Certificate in Engineering Leadership. Students must apply and be admitted to the Gordon Engineering Leadership Program in order to pursue this option. The program requires fulfillment of the 16 semester-hour curriculum required to earn the Graduate Certificate in Engineering Leadership, which includes an industry-based challenge project with multiple mentors. The integrated 48-semester-hour degree and certificate will require 32 semester hours of advisor-approved electromagnetics, plasma, and optics technical courses.

Engineering Leadership (p. 222)

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Options

Complete one of the following options:

COURSE WORK OPTION

Code	Title	Hours
Depth Courses		
Complete 20 semester hours from the depth course list below. (p. 174)		20
Breadth Courses		
Complete 8 semester hours from the breadth course list below. (p. 174)		8
Note: Depth courses cannot be taken for breadth.		
Elective		
Complete 4 additional semester hours from either depth or breadth courses.		4

THESIS OPTION

Code	Title	Hours
Depth Courses		
Complete 12 semester hours from the depth course list below. (p. 174)		12
Breadth Courses		
Complete 8 semester hours from the breadth course list below. (p. 174)		8
Note: Depth courses cannot be taken for breadth.		
Elective		
Complete 4 additional semester hours from either depth or breadth courses.		4
Thesis		
EECE 7990	Thesis	8

Course Lists

DEPTH COURSES

Code	Title	Hours
EECE 5170	Introduction to Multiferroics Materials and Systems	
EECE 5648	Biomedical Optics	
EECE 5697	Acoustics and Sensing	
EECE 7105	Optics for Engineers	
EECE 7202	Electromagnetic Theory 1	
EECE 7203	Complex Variable Theory and Differential Equations	
EECE 7270	Electromagnetic Theory 2	
EECE 7271	Computational Methods in Electromagnetics	
EECE 7275	Antennas and Radiation	
EECE 7293	Modern Imaging	
EECE 7296	Electronic Materials	
EECE 7297	Advanced Magnetic Materials—Magnetic Devices	
EECE 7298	Magnetic Materials—Fundamentals and Measurements	
EECE 7400	Special Problems in Electrical Engineering	

BREADTH COURSES

Code	Title	Hours
EECE 5155	Wireless Sensor Networks and the Internet of Things	
EECE 5161	Thin Film Technologies	
EECE 5550	Mobile Robotics	
EECE 5552	Assistive Robotics (Principles of Assistive Robotics)	
EECE 5554	Robotics Sensing and Navigation (Robotics Sensing and Navigation)	
EECE 5576	Wireless Communication Systems	
EECE 5580	Classical Control Systems	
EECE 5606	Micro- and Nanofabrication	
EECE 5610	Digital Control Systems	
EECE 5627	Arithmetic and Circuit Design for Inexact Computing with Nanoscaled CMOS	
EECE 5639	Computer Vision	
EECE 5640	High-Performance Computing	
EECE 5642	Data Visualization	
EECE 5643	Simulation and Performance Evaluation	
EECE 5644	Introduction to Machine Learning and Pattern Recognition	
EECE 5647	Nanophotonics	
EECE 5649	Design of Analog Integrated Circuits with Complementary Metal-Oxide-Semiconductor Technology	
EECE 5664	Biomedical Signal Processing	
EECE 5666	Digital Signal Processing	
EECE 5680 and EECE 5681	Electric Drives and Lab for EECE 5680	
EECE 5682	Power Systems Analysis 1	
EECE 5684 and EECE 5685	Power Electronics and Lab for EECE 5684	
EECE 5686	Electrical Machines	
EECE 5688	Analysis of Unbalanced Power Grids	
EECE 5698	Special Topics in Electrical and Computer Engineering (GNSS Signal Processing)	
EECE 5698	Special Topics in Electrical and Computer Engineering (Introduction to Molecular Systems Biology Dynamic Modeling)	
EECE 5698	Special Topics in Electrical and Computer Engineering (Networks: Technology, Economics, Social Interactions)	
EECE 5698	Special Topics in Electrical and Computer Engineering (Software Security)	
EECE 5698	Special Topics in Electrical and Computer Engineering (Advanced Network Management)	
EECE 5698	Special Topics in Electrical and Computer Engineering (Parallel Processing for Data Analytics)	
EECE 7150	Autonomous Field Robotics	
EECE 7200	Linear Systems Analysis	
EECE 7201	Solid State Devices	
EECE 7204	Applied Probability and Stochastic Processes	
EECE 7205	Fundamentals of Computer Engineering	
EECE 7211	Nonlinear Control	
EECE 7213	System Identification and Adaptive Control	
EECE 7214	Optimal and Robust Control	
EECE 7224	Power Systems State Estimation	
EECE 7226	Modeling and Simulation of Power System Transients	
EECE 7228	Advanced Power Electronics	
EECE 7237	Special Topics in Power Electronics	
EECE 7240	Analog Integrated Circuit Design	
EECE 7242	Integrated Circuits for Mixed Signals and Data Communication	

EECE 7244	Introduction to Microelectromechanical Systems (MEMS)
EECE 7245	Microwave Circuit Design for Wireless Communication
EECE 7250	Power Management Integrated Circuits
EECE 7258	Human Sensing and Recognition
EECE 7263	Humanoid Robotics
EECE 7296	Electronic Materials
EECE 7297	Advanced Magnetic Materials— Magnetic Devices
EECE 7298	Magnetic Materials—Fundamentals and Measurements
EECE 7310	Modern Signal Processing
EECE 7311	Two Dimensional Signal and Image Processing
EECE 7312	Statistical and Adaptive Signal Processing
EECE 7323	Numerical Optimization Methods
EECE 7336	Digital Communications
EECE 7337	Information Theory
EECE 7345	Big Data and Sparsity in Control, Machine Learning, and Optimization
EECE 7346	Probabilistic System Modeling and Analysis
EECE 7352	Computer Architecture
EECE 7353	VLSI Design
EECE 7360	Combinatorial Optimization
EECE 7364	Mobile and Wireless Networking
EECE 7368	High-Level Design of Hardware-Software Systems
EECE 7370	Advanced Computer Vision
EECE 7374	Fundamentals of Computer Networks
EECE 7376	Operating Systems: Interface and Implementation
EECE 7377	Scalable and Sustainable System Design (Scalable and Sustainable System Design)
EECE 7390	Computer Hardware Security
EECE 7397	Advanced Machine Learning
EECE 7398	Special Topics (Compilers)
EECE 7398	Special Topics (Advanced Computer Architecture)
EECE 7398	Special Topics (Power System Constrained Optimization)
EECE 7399	Preparing High-Stakes Written and Oral Materials
ENGR 5670	Sustainable Energy: Materials, Conversion, Storage, and Usage
MATH 7233	Graph Theory
CS 5100	Foundations of Artificial Intelligence
CS 5200	Database Management Systems
CS 5600	Computer Systems
CS 5770	Software Vulnerabilities and Security
CS 6200	Information Retrieval
CS 6220	Data Mining Techniques
CS 6410	Compilers

CS 6510	Advanced Software Development
CS 6740	Network Security
CS 6750	Cryptography and Communications Security
CS 6760	Privacy, Security, and Usability
CS 7800	Advanced Algorithms

EXCLUDED COURSES FOR ALL MSECE CONCENTRATIONS

Please see your college administrator for more information.

Code	Title	Hours
Courses from the following subject areas may not count toward any concentration within the MSECE program:		
CSYE, ENSY, EMGT, INFO, SBSY, TELE		
The following CS courses may not count toward any concentration within the MSECE program:		
CS 5010	Programming Design Paradigm	
CS 5320		
CS 5330	Pattern Recognition and Computer Vision	
CS 5340	Computer/Human Interaction	
CS 5520	Mobile Application Development	
CS 5610	Web Development	
CS 5700	Fundamentals of Computer Networking	
CS 5800	Algorithms	
CS 6350	Empirical Research Methods	
CS 6710	Wireless Network	

Program Credit/GPA Requirements

32 total semester hours required
Minimum 3.000 GPA required

Electrical and Computer Engineering with Concentration in Microsystems, Materials, and Devices, MSECE

The master's degree program in electrical and computer engineering offers in-depth course work within the concentration-choice-related areas. The curriculum is integrated and intensive and is built on state-of-the-art research, taught by faculty who are experts in their areas.

Excluded Courses for All MSECE Concentrations

You **cannot take excluded courses as part of your MSECE program**. Please **do not** petition to take these courses, as any petition to take these courses will be automatically rejected. Courses from the following subject areas may not count toward any concentration within the MSECE program: CSYE, ENSY, EMGT, INFO, SBSY, TELE. Select CS courses are also excluded from all MSECE concentrations. Please see the program requirements tab and your college administrator for more information.

Graduate Certificate Options

Students enrolled in a master's degree have the opportunity to also pursue one of the many engineering graduate certificate options in addition to or in combination with the MS degree. Students should consult their faculty advisor regarding these options (p. 229).

GORDON INSTITUTE OF ENGINEERING LEADERSHIP
Master's Degree in Electrical and Computer Engineering with Concentration in Microsystems, Materials, and Devices with Graduate Certificate in Engineering Leadership

Students may complete a Master of Science in Electrical and Computer Engineering with Concentration in Microsystems, Materials, and Devices in addition to earning a Graduate Certificate in Engineering Leadership. Students must apply and be admitted to the Gordon Engineering Leadership Program in order to pursue this option. The program requires fulfillment of the 16-semester-hour curriculum required to earn the Graduate Certificate in Engineering Leadership, which includes an industry-based challenge project with multiple mentors. The integrated 48-semester-hour degree and certificate will require 32 semester hours of advisor-approved microsystems, materials, and devices technical courses.

Engineering Leadership (p. 222)

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Options

Complete one of the following options:

COURSE WORK OPTION

Code	Title	Hours
Depth Courses		
Complete 20 semester hours from the depth course list below. (p. 176)		20
Breadth Courses		
Complete 8 semester hours from the breadth course list below. (p. 176)		8
Note: Depth courses cannot be taken for breadth.		
Elective		
Complete 4 additional semester hours from either depth or breadth courses.		4

THESIS OPTION

Code	Title	Hours
Depth Courses		
Complete 12 semester hours from the depth course list below. (p. 176)		12
Breadth Courses		
Complete 8 semester hours from the breadth course list below. (p. 176)		8
Note: Depth courses cannot be taken for breadth.		
Elective		
Complete 4 additional semester hours from either depth or breadth courses.		4
Thesis		
EECE 7990	Thesis	8

Course Lists

DEPTH COURSES

Code	Title	Hours
EECE 5161	Thin Film Technologies	
EECE 5606	Micro- and Nanofabrication	
EECE 5647	Nanophotonics	
EECE 5649	Design of Analog Integrated Circuits with Complementary Metal-Oxide-Semiconductor Technology	
EECE 5652	Microwave Circuits and Networks	
EECE 7201	Solid State Devices	
EECE 7240	Analog Integrated Circuit Design	
EECE 7242	Integrated Circuits for Mixed Signals and Data Communication	
EECE 7244	Introduction to Microelectromechanical Systems (MEMS)	
EECE 7245	Microwave Circuit Design for Wireless Communication	
EECE 7250	Power Management Integrated Circuits	
EECE 7296	Electronic Materials	
EECE 7297	Advanced Magnetic Materials—Magnetic Devices	
EECE 7298	Magnetic Materials—Fundamentals and Measurements	
EECE 7353	VLSI Design	
EECE 7400	Special Problems in Electrical Engineering	

BREADTH COURSES

Code	Title	Hours
EECE 5155	Wireless Sensor Networks and the Internet of Things	
EECE 5170	Introduction to Multiferroics Materials and Systems	
EECE 5550	Mobile Robotics	
EECE 5552	Assistive Robotics	
EECE 5554	Robotics Sensing and Navigation	
EECE 5576	Wireless Communication Systems	
EECE 5580	Classical Control Systems	
EECE 5610	Digital Control Systems	
EECE 5627	Arithmetic and Circuit Design for Inexact Computing with Nanoscaled CMOS	
EECE 5639	Computer Vision	
EECE 5640	High-Performance Computing	
EECE 5642	Data Visualization	
EECE 5643	Simulation and Performance Evaluation	
EECE 5648	Biomedical Optics	
EECE 5644	Introduction to Machine Learning and Pattern Recognition	
EECE 5664	Biomedical Signal Processing	
EECE 5666	Digital Signal Processing	
EECE 5680 and EECE 5681	Electric Drives and Lab for EECE 5680	
EECE 5682	Power Systems Analysis 1	
EECE 5684 and EECE 5685	Power Electronics and Lab for EECE 5684	
EECE 5686	Electrical Machines	
EECE 5688	Analysis of Unbalanced Power Grids	
EECE 5697	Acoustics and Sensing	
EECE 5698	Special Topics in Electrical and Computer Engineering (Networks: Technology, Economics, Social Interactions)	
EECE 5698	Special Topics in Electrical and Computer Engineering (Software Security)	

EECE 5698	Special Topics in Electrical and Computer Engineering (Advanced Network Management)
EECE 5698	Special Topics in Electrical and Computer Engineering (Parallel Processing for Data Analytics)
EECE 7105	Optics for Engineers
EECE 7150	Autonomous Field Robotics
EECE 7200	Linear Systems Analysis
EECE 7202	Electromagnetic Theory 1
EECE 7203	Complex Variable Theory and Differential Equations
EECE 7204	Applied Probability and Stochastic Processes
EECE 7205	Fundamentals of Computer Engineering
EECE 7211	Nonlinear Control
EECE 7213	System Identification and Adaptive Control
EECE 7214	Optimal and Robust Control
EECE 7224	Power Systems State Estimation
EECE 7226	Modeling and Simulation of Power System Transients
EECE 7228	Advanced Power Electronics
EECE 7237	Special Topics in Power Electronics
EECE 7258	Human Sensing and Recognition
EECE 7263	Humanoid Robotics
EECE 7270	Electromagnetic Theory 2
EECE 7271	Computational Methods in Electromagnetics
EECE 7275	Antennas and Radiation
EECE 7310	Modern Signal Processing
EECE 7311	Two Dimensional Signal and Image Processing
EECE 7312	Statistical and Adaptive Signal Processing
EECE 7323	Numerical Optimization Methods
EECE 7336	Digital Communications
EECE 7337	Information Theory
EECE 7345	Big Data and Sparsity in Control, Machine Learning, and Optimization
EECE 7346	Probabilistic System Modeling and Analysis
EECE 7352	Computer Architecture
EECE 7360	Combinatorial Optimization
EECE 7364	Mobile and Wireless Networking
EECE 7368	High-Level Design of Hardware-Software Systems
EECE 7370	Advanced Computer Vision
EECE 7374	Fundamentals of Computer Networks
EECE 7376	Operating Systems: Interface and Implementation
EECE 7377	Scalable and Sustainable System Design (Scalable and Sustainable System Design)
EECE 7390	Computer Hardware Security
EECE 7397	Advanced Machine Learning

EECE 7398	Special Topics (Compilers)
EECE 7398	Special Topics (Advanced Computer Architecture)
EECE 7398	Special Topics (Power System Constrained Optimization)
EECE 7399	Preparing High-Stakes Written and Oral Materials
ENGR 5670	Sustainable Energy: Materials, Conversion, Storage, and Usage
MATH 7233	Graph Theory
CS 5100	Foundations of Artificial Intelligence
CS 5200	Database Management Systems
CS 5600	Computer Systems
CS 5770	Software Vulnerabilities and Security
CS 6200	Information Retrieval
CS 6220	Data Mining Techniques
CS 6410	Compilers
CS 6510	Advanced Software Development
CS 6740	Network Security
CS 6750	Cryptography and Communications Security
CS 6760	Privacy, Security, and Usability
CS 7800	Advanced Algorithms

EXCLUDED COURSES FOR ALL MSECE CONCENTRATIONS

Please see your college administrator for more information.

Code	Title	Hours
Courses from the following subject areas may not count toward any concentration within the MSECE program:		
CSYE, ENSY, EMGT, INFO, SBSY, TELE		
The following CS courses may not count toward any concentration within the MSECE program:		
CS 5010	Programming Design Paradigm	
CS 5320		
CS 5330	Pattern Recognition and Computer Vision	
CS 5340	Computer/Human Interaction	
CS 5520	Mobile Application Development	
CS 5610	Web Development	
CS 5700	Fundamentals of Computer Networking	
CS 5800	Algorithms	
CS 6350	Empirical Research Methods	
CS 6710	Wireless Network	

Program Credit/GPA Requirements

32 total semester hours required
Minimum 3.000 GPA required

Electrical and Computer Engineering with Concentration in Power Systems, MSECE

The master's degree program in electrical and computer engineering offers in-depth course work within the concentration-choice-related areas. The curriculum is integrated and intensive and is built on state-of-the-art research, taught by faculty who are experts in their areas.

Excluded Courses for All MSECE Concentrations

You **cannot take excluded courses as part of your MSECE program**. Please **do not** petition to take these courses, as any petition to take these courses will be automatically rejected. Courses from the following subject areas may not count toward any concentration within the MSECE program: CSYE, ENSY, EMGT, INFO, SBSY, TELE. Select CS courses are also excluded from all MSECE concentrations. Please see the program requirements tab and your college administrator for more information.

Graduate Certificate Options

Students enrolled in a master's degree have the opportunity to also pursue one of the many engineering graduate certificate options in addition to or in combination with the MS degree. Students should consult their faculty advisor regarding these options (p. 229).

GORDON INSTITUTE OF ENGINEERING LEADERSHIP

Master's Degree in Electrical and Computer Engineering with Concentration in Power Systems with Graduate Certificate in Engineering Leadership

Students may complete a Master of Science in Electrical and Computer Engineering with Concentration in Power Systems in addition to earning a Graduate Certificate in Engineering Leadership. Students must apply and be admitted to the Gordon Engineering Leadership Program in order to pursue this option. The program requires fulfillment of the 16-semester-hour curriculum required to earn the Graduate Certificate in Engineering Leadership, which includes an industry-based challenge project with multiple mentors. The integrated 48-semester-hour degree and certificate will require 32 semester hours of advisor-approved power systems technical courses.

Engineering Leadership (p. 222)

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Options

Complete one of the following options:

COURSE WORK OPTION

Code	Title	Hours
Depth Courses		
Complete 20 semester hours from the depth course list below. (p. 178)		20
Breadth Courses		
Complete 8 semester hours from the breadth course list below. (p. 178)		8
Note: Depth courses cannot be taken for breadth.		
Elective		
Complete 4 additional semester hours from either depth or breadth courses.		4

THESIS OPTION

Code	Title	Hours
Depth Courses		
Complete 12 semester hours from the depth course list below. (p. 178)		12
Breadth Courses		
Complete 8 semester hours from the breadth course list below. (p. 178)		8
Note: Depth courses cannot be taken for breadth.		

Elective		
Complete 4 additional semester hours from either the depth or breadth courses.		4
Thesis		
EECE 7990	Thesis	8

Course Lists

DEPTH COURSES

Code	Title	Hours
EECE 5580	Classical Control Systems	
EECE 5610	Digital Control Systems	
EECE 5680 and EECE 5681	Electric Drives and Lab for EECE 5680	
EECE 5682	Power Systems Analysis 1	
EECE 5684 and EECE 5685	Power Electronics and Lab for EECE 5684	
EECE 5686	Electrical Machines	
EECE 5688	Analysis of Unbalanced Power Grids	
EECE 7200	Linear Systems Analysis	
EECE 7211	Nonlinear Control	
EECE 7213	System Identification and Adaptive Control	
EECE 7214	Optimal and Robust Control	
EECE 7224	Power Systems State Estimation	
EECE 7226	Modeling and Simulation of Power System Transients	
EECE 7228	Advanced Power Electronics	
EECE 7237	Special Topics in Power Electronics	
EECE 7250	Power Management Integrated Circuits	
EECE 7323	Numerical Optimization Methods	
EECE 7398	Special Topics (Power System Constrained Optimization)	
EECE 7400	Special Problems in Electrical Engineering	
ENGR 5670	Sustainable Energy: Materials, Conversion, Storage, and Usage	

BREADTH COURSES

Code	Title	Hours
EECE 5155	Wireless Sensor Networks and the Internet of Things	
EECE 5161	Thin Film Technologies	
EECE 5170	Introduction to Multiferroics Materials and Systems	
EECE 5552	Assistive Robotics	
EECE 5554	Robotics Sensing and Navigation	
EECE 5576	Wireless Communication Systems	
EECE 5606	Micro- and Nanofabrication	
EECE 5627	Arithmetic and Circuit Design for Inexact Computing with Nanoscaled CMOS	
EECE 5639	Computer Vision	
EECE 5640	High-Performance Computing	
EECE 5642	Data Visualization	
EECE 5643	Simulation and Performance Evaluation	
EECE 5644	Introduction to Machine Learning and Pattern Recognition	

EECE 5647	Nanophotonics
EECE 5648	Biomedical Optics
EECE 5649	Design of Analog Integrated Circuits with Complementary Metal-Oxide-Semiconductor Technology
EECE 5664	Biomedical Signal Processing
EECE 5666	Digital Signal Processing
EECE 5697	Acoustics and Sensing
EECE 5698	Special Topics in Electrical and Computer Engineering (GNSS Signal Processing)
EECE 5698	Special Topics in Electrical and Computer Engineering (Introduction to Molecular Systems Biology Dynamic Modeling)
EECE 5698	Special Topics in Electrical and Computer Engineering (Networks: Technology, Economics, Social Interactions)
EECE 5698	Special Topics in Electrical and Computer Engineering (Software Security)
EECE 5698	Special Topics in Electrical and Computer Engineering (Advanced Network Management)
EECE 5698	Special Topics in Electrical and Computer Engineering (Parallel Processing for Data Analytics)
EECE 7105	Optics for Engineers
EECE 7150	Autonomous Field Robotics
EECE 7201	Solid State Devices
EECE 7202	Electromagnetic Theory 1
EECE 7203	Complex Variable Theory and Differential Equations
EECE 7204	Applied Probability and Stochastic Processes
EECE 7205	Fundamentals of Computer Engineering
EECE 7240	Analog Integrated Circuit Design
EECE 7242	Integrated Circuits for Mixed Signals and Data Communication
EECE 7244	Introduction to Microelectromechanical Systems (MEMS)
EECE 7245	Microwave Circuit Design for Wireless Communication
EECE 7258	Human Sensing and Recognition
EECE 7263	Humanoid Robotics
EECE 7270	Electromagnetic Theory 2
EECE 7271	Computational Methods in Electromagnetics
EECE 7275	Antennas and Radiation
EECE 7293	Modern Imaging
EECE 7296	Electronic Materials
EECE 7297	Advanced Magnetic Materials—Magnetic Devices
EECE 7298	Magnetic Materials—Fundamentals and Measurements
EECE 7310	Modern Signal Processing

EECE 7311	Two Dimensional Signal and Image Processing
EECE 7312	Statistical and Adaptive Signal Processing
EECE 7323	Numerical Optimization Methods
EECE 7336	Digital Communications
EECE 7337	Information Theory
EECE 7345	Big Data and Sparsity in Control, Machine Learning, and Optimization
EECE 7346	Probabilistic System Modeling and Analysis
EECE 7352	Computer Architecture
EECE 7353	VLSI Design
EECE 7360	Combinatorial Optimization
EECE 7364	Mobile and Wireless Networking
EECE 7368	High-Level Design of Hardware-Software Systems
EECE 7370	Advanced Computer Vision
EECE 7374	Fundamentals of Computer Networks
EECE 7376	Operating Systems: Interface and Implementation
EECE 7377	Scalable and Sustainable System Design
EECE 7390	Computer Hardware Security
EECE 7397	Advanced Machine Learning
EECE 7398	Special Topics (Compilers)
EECE 7398	Special Topics (Advanced Computer Architecture)
EECE 7399	Preparing High-Stakes Written and Oral Materials
MATH 7233	Graph Theory
CS 5100	Foundations of Artificial Intelligence
CS 5200	Database Management Systems
CS 5600	Computer Systems
CS 5770	Software Vulnerabilities and Security
CS 6200	Information Retrieval
CS 6220	Data Mining Techniques
CS 6410	Compilers
CS 6510	Advanced Software Development
CS 6740	Network Security
CS 6750	Cryptography and Communications Security
CS 6760	Privacy, Security, and Usability
CS 7800	Advanced Algorithms

EXCLUDED COURSES FOR ALL MSECE CONCENTRATIONS

Please see your college administrator for more information.

Code	Title	Hours
Courses from the following subject areas may not count toward any concentration within the MSECE program:		
CSYE, ENSY, EMGT, INFO, SBSY, TELE		
The following CS courses may not count toward any concentration within the MSECE program:		
CS 5010	Programming Design Paradigm	
CS 5320		

CS 5330	Pattern Recognition and Computer Vision
CS 5340	Computer/Human Interaction
CS 5520	Mobile Application Development
CS 5610	Web Development
CS 5700	Fundamentals of Computer Networking
CS 5800	Algorithms
CS 6350	Empirical Research Methods
CS 6710	Wireless Network

Program Credit/GPA Requirements

32 total semester hours required
Minimum 3.000 GPA required

Electrical and Computer Engineering Leadership, MSECEL

The Gordon Engineering Leadership Program is a transformational, technical, and challenging graduate-level learning experience targeted for engineering professionals.

The Gordon Institute, in collaboration with the College of Engineering, offers the **Master of Science in Electrical and Computer Engineering Leadership (MSECEL)** along with the **Graduate Certificate in Engineering Leadership** as formal recognition of the combined focus in electrical and computer engineering technical skills and midlevel engineers' leadership acumen and broadened cross-functional capabilities.

Pursuing the MSECEL and the graduate certificate allows participants to:

- Enhance technical knowledge in electrical and computer engineering
- Take part in a hands-on curriculum (http://www.northeastern.edu/gordonleadership/about-the-institute/curriculum) taught by industry-experienced professors
- Work with peers from across engineering fields on leadership skills development
- Receive one-on-one mentoring from industry experts and faculty

The Gordon Engineering Leadership Program anchors around an intense, market-worthy challenge project based on your organization's strategic needs. This is a unique opportunity to apply your classroom experience to a professional setting, potentially further accelerating your career.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Leadership		
ENLR 5121	Engineering Leadership 1	2
ENLR 5122	Engineering Leadership 2	2
Foundations		
ENLR 5131	Scientific Foundations of Engineering 1	2
ENLR 5132	Scientific Foundations of Engineering 2	2
Project		
ENLR 7440	Engineering Leadership Challenge Project 1	4
ENLR 7442	Engineering Leadership Challenge Project 2	4
Concentration Courses		

Complete 16 semester hours from any of the approved depth/breadth course lists within any of the seven EECE concentrations. Students are encouraged to take at least three courses within the same concentration.	16

Program Credit/GPA Requirements

32 total semester hours required
Minimum 3.000 GPA required

Mechanical and Industrial Engineering

Website (http://www.mie.neu.edu/mie/degrees-programs/graduate-studies)

Hanchen Huang, PhD
Professor and Chair

Nader Jalili, PhD
Professor and Associate Chair for Graduate Studies and Research

334 Snell Engineering Center
617.373.2740
617.373.2921 (fax)

The Department of Mechanical and Industrial Engineering (MIE) offers comprehensive research and educational programs for both Master of Science (MS) and Doctor of Philosophy (PhD) students in both traditional mechanical and industrial engineering, operations research, data analytics engineering, as well as applied programs. Our cutting-edge and vibrant doctoral programs include PhDs in industrial engineering, mechanical engineering, and an interdisciplinary PhD (housed in the College of Engineering); while our MS degree programs consist of industrial engineering, operations research, data analytics engineering, as well as mechanical engineering with concentrations in materials science, mechanics and design, mechatronics, thermofluids, and general mechanical engineering. These extensive programs and concentrations allow for the selection of a degree that meets a wide variety of personal and professional goals. Graduate students work with our world-renowned faculty to achieve research experience and their career goals and have opportunities to participate in the graduate cooperative education program.

Mission of the Department

In accordance with the missions of Northeastern University and the College of Engineering, the primary mission of the MIE department is the education of PhD and MS students in the fundamental principles and practice of mechanical and industrial engineering as well as operations research. Furthermore, the MIE department will, through the basic and applied research done by its faculty and students, contribute to the advancement of the body of knowledge useful to industry and governments.

Master of Science Degree

The MIE department offers MS degrees in industrial engineering, operations research, and data analytics engineering. The MIE department also offers an MS degree in mechanical engineering with one of the following five concentrations:

- General mechanical engineering
- Materials science
- Mechanics and design

- Mechatronics
- Thermofluids

Doctor of Philosophy Degree

The MIE department admits applicants to the PhD program either directly after earning a suitable bachelor's degree (direct entry) or after earning a master's degree (advanced entry). Upon acceptance into the program, an applicant is designated as a doctoral student. This designation is changed to doctoral candidate upon successful completion of the doctoral qualifying examinations (both written and oral exams) and all the required course work. The PhD is awarded to students who demonstrate high academic achievement and research competence in the fields of mechanical or industrial engineering. The MIE department expects all successful doctoral candidates to show depth of knowledge and research innovation in their chosen field of specialization.

Graduate Certificate Options

Students enrolled in a master's degree have the opportunity to also pursue one of the many engineering graduate certificate options in addition to or in combination with the MS degree. Students should consult their faculty advisor regarding these options (p. 229).

GORDON INSTITUTE OF ENGINEERING LEADERSHIP OPTION

Students have the opportunity to pursue the Gordon Engineering Leadership Program (p. 221) in combination with the MS degree.

Programs
Doctor of Philosophy (PhD)

- Industrial Engineering (p. 181)
- Industrial Engineering—Advanced Entry (p. 184)

- Mechanical Engineering (p. 186)
- Mechanical Engineering—Advanced Entry (p. 189)

Master of Science (MS)

- Data Analytics Engineering (p. 192)
- Robotics (p. 195)

Master of Science in Industrial Engineering (MSIE)

- Industrial Engineering (p. 196)

Master of Science in Mechanical Engineering (MSME)

- Mechanical Engineering with Concentration in General Mechanical Engineering (p. 198)
- Mechanical Engineering with Concentration in Mechanics and Design (p. 202)
- Mechanical Engineering with Concentration in Materials Science (p. 200)
- Mechanical Engineering with Concentration in Mechatronics (p. 203)
- Mechanical Engineering with Concentration in Thermofluids (p. 205)

Master of Science in Operations Research (MSOR)

- Operations Research (p. 207)

Graduate Certificate

- Data Analytics Engineering (p. 209)
- Data Mining Engineering (p. 210)

Industrial Engineering, PhD

Requirements

The Doctor of Philosophy (PhD) is awarded to students who demonstrate high academic achievement and research competence in the field of industrial engineering. To earn a PhD, a student must complete approved and advanced course work and submit and defend an original dissertation of independent research. The Department of Mechanical and Industrial Engineering (MIE) expects all successful doctoral candidates to show depth of knowledge and research innovation in their chosen field of specialization.

The MIE department admits applicants to the PhD program either directly after earning a suitable bachelor's degree (i.e., bachelor's entry) or after earning a master's degree (i.e., advanced entry). Upon acceptance into the program, an applicant is designated as a doctoral student. This designation is changed to doctoral candidate upon successful completion of the doctoral qualifying examinations (both written and oral exams) as well as all the required course work.

Academic and Research Advisors

PhD students must find a research advisor within their first year of study. The research advisor must be a full-time or jointly appointed faculty or affiliated member of the MIE department; otherwise, a petition must be filed and approved by the MIE Graduate Affairs Committee. If the research advisor is outside the MIE department, a faculty member with 50 percent or more appointments in the MIE department must be chosen as the co-advisor. Students are advised by the academic advisor of their discipline before they select their research advisor(s).

Change of Research Advisor

Students who want to change their research advisors need to use the MIE petition form. The petition form needs to be signed both by the student and the student's current and future research advisors. The signed form then needs to be submitted to the MIE department for further processing.

Course Requirements and Plan of Study

A typical program of study includes at least 40 semester hours of course work beyond a bachelor's degree. Students who choose to get a master's degree along the way to PhD must complete a total of 52 semester hours (32 semester hours to earn a master's degree and an additional 20 semester hours in order to earn a PhD). The 32 semester hours of course work that apply toward the master's degree may include up to 8 semester hours of thesis or 4 semester hours of project or approved independent study course work. Students may petition the MIE Graduate Affairs Committee to substitute up to 4 semester hours of Independent Study (IE 7978) as part of their required course work. An independent study must be approved by the research advisor. When thesis or project is selected, an independent study course cannot be taken.

Each doctoral student, together with his or her research advisor, should develop an initial program during the first semester of study. The final program is also subject to the approval of the dissertation committee, who will add the program of study to the student's record upon admission to doctoral candidacy.

Special Ethics Requirement

All MIE graduate students are required to complete a brief online session on Responsible Conduct of Research and Plagiarism during their first semester of full-time study. All enrolled students will be sent proper instructions on how to complete this assignment and satisfy this

important requirement. The outcome of the online session will be filed with the student's records.

PhD Students Annual Review

All PhD students in the MIE department must complete the PhD Students Annual Review form and submit the required documents by no later than January 31st of their third year of study (second year for PhD advanced entry) and all subsequent years thereafter.

PhD Candidacy

To qualify as a doctoral candidate, a doctoral student must successfully complete the doctoral qualifying examinations (both a written comprehensive exam and an oral exam—see below) as well as all the required course work.

Doctoral Qualifying Examinations

Background and motivation: To demonstrate breadth and depth in each of the subject exams, crossover and merging exams are necessary in an effort to provide students with an opportunity to master the core disciplines in mechanical or industrial engineering (at both undergraduate and graduate levels) along with a focus area of importance to their specialization. These exams also provide an assessment as to whether students have adequate knowledge to pursue advanced study and possess attributes of a doctoral candidate by demonstrating understanding of and the ability to apply fundamental principles. Also, an oral exam tied to the written exams is necessary in an effort to evaluate a student's potential to perform independent research in the chosen field of specialization for the doctoral program.

Doctoral qualifying examinations framework: The doctoral qualifying examinations consist of the following two parts:

1. Two **written comprehensive** exams, which are respectively referred to as exam A and exam B
2. An **oral** exam to be administered no later than the end of the semester in which the written exams are taken and passed

WRITTEN COMPREHENSIVE EXAMINATIONS

All doctoral students admitted directly with a bachelor's degree must take the written comprehensive exams no later than the first time that it is offered after their first two years of study. The written comprehensive exams include two exams, **exam A** and **exam B,** and are given on Thursday and Friday of the first week of classes during regular semesters. A complete list of these exams along with topical coverage and details are provided on the MIE department graduate website (http://www.mie.neu.edu/mie/degrees-programs/graduate-studies). Students should also consult extensively with their research advisor regarding all aspects of the qualifying exams.

Written Comprehensive Exams Rules

Exam A, about four to six hours in length, should be selected from the list of major exams based on the student's concentration (i.e., industrial engineering—IND), see below. No deviation from this rule will be permitted. As listed below, exam B, about one to two hours in length, should be selected from the list of exams B for PhD degree program in industrial engineering (see below). Only one exam from this list should be selected. All students are required to have their research advisor's approval on selection of exam B prior to registering to take the written comprehensive exams. Note that exam B cannot be similar or close to one of the topics covered in exam A.

List of exams A and B based on student's research concentration:

Exams A for Industrial Engineering PhD Students:

- **Industrial Engineering (IND):** Probability (IND1), Statistics and Probabilistic OR (IND2), and Deterministic OR (IND3)

Sample Exams B for Industrial Engineering PhD Students (select one Exam B):

- Data Mining (DMN)
- Human-Machine Systems (HMS)
- Manufacturing Systems (MFS)
- Networks and Advanced Optimization (NAO)
- Reliability and Quality Assurance (RQA)
- Supply Chain Engineering (SCE)

ORAL EXAMINATION

The objective of the oral exam is to assess a student's potential to perform independent research in the chosen field of specialization. This exam shall be administered no later than the end of the semester in which the written exams are taken and passed. The exam shall be publicly advertised at least one week in advance and all faculty members and students may attend and participate.

Oral examination procedure: The student's research advisor convenes and chairs an oral examination committee comprised of a minimum of three faculty members deemed appropriate by the research advisor. This committee provides a set of technical papers pertinent to the student's research area at least one month before the examination. The oral examination committee will then conduct the exam that comprises the following two parts (both completed in a one-hour session):

1. A 30-minute oral presentation on a selected number of papers out of the assigned technical papers
2. A 30-minute oral exam by committee members' questions and evaluation of the student covering topics specifically related to the student's research area

GRADING PROCEDURE

Grading procedure and results of the written comprehensive examination: The MIE Graduate Affairs Committee will review all students' performance in the written comprehensive exams. Depending on the results of both major and minor exams and in consultation with the student's research advisor, the Graduate Affairs Committee will recommend one of the following three possible options:

1. No invitation to oral exam: The student will be dismissed from the program. He or she may be granted a master's degree if the requirements are already met; otherwise, the student may continue to fulfill the requirements for a master's degree in industrial engineering (IE), mechanical engineering (ME), or operations research (OR).
2. No invitation to oral exam yet: The student will be asked to retake the written exam(s) again in the next offering and/or take additional courses.
3. Student is invited to oral exam.

The Graduate Affairs Committee makes its final recommendation considering all aspects of the exam including, but not limited to, examiners' reports and results and the student's research performance and course work. The Graduate Affairs Committee reserves the right to recommend option 1 above for students who register for the exams but do not show up.

Grading procedure and results of the oral examination: If the student's performance in the oral exam is not satisfactory, the student will be dismissed from the program. He or she may be granted a master's degree if the requirements are met; otherwise, the student may continue to fulfill

the requirements for a master's degree in industrial engineering (IE), mechanical engineering (ME), or operations research (OR).

Upon successfully passing the oral exam, the student continues in the PhD program. Upon passing all the required course work, he or she will become a PhD candidate. The results of written and oral exams and any recommended course work will become part of the student's record.

APPEAL PROCEDURE

The preliminary qualifying examination process provides means for reevaluation for students who fail one or more exams to appeal the Graduate Affairs Committee decision. All communications related to these examinations should be coordinated through the student's research advisor. Only the student's research advisor may request the MIE Graduate Affairs Committee to reevaluate the student's failed exams using the appeal form found at the link (http://www.coe.neu.edu/sites/default/files/pdfs/coe/gse/miepetitionform.pdf).

PhD Students Changing Their Program

PhD students who, for any reason, decide to change their program (i.e., from PhD in ME to PhD in IE or vice versa) must take (or retake) the doctoral qualifying examinations (both written comprehensive exams and oral exam) based on the student's new major research area (i.e., industrial engineering, materials, mechanics, mechatronics, or thermofluids).

Interdisciplinary PhD Students with MIE as the Home Department

Students pursuing the College of Engineering (COE) interdisciplinary PhD program with the MIE department as their home department must take one of the major written comprehensive exams (exam A) of the MIE doctoral qualifying examinations. The minor exam (exam B) can be substituted with appropriate exam(s) from other department(s) involved with the student's interdisciplinary PhD program. Students dismissed from the ME or IE PhD programs in the MIE department cannot enroll in the PhD Interdisciplinary Engineering program with MIE as the primary affiliation.

Dissertation Proposal Preparation and Presentation Timing

Students must present their dissertation proposal no more than 12 months after successfully completing the oral exam. In addition, the presentation of the dissertation proposal and the actual dissertation defense (see below) shall be no less than 6 months apart. The student's dissertation committee will invite any additional faculty deemed appropriate to that field; this dissertation committee will then conduct the dissertation proposal session. Each student's dissertation committee must be comprised of at least three members, including the research advisor. At least two of those three members must be full-time MIE faculty members.

Dissertation Course Requirements

Upon successful completion of the doctoral qualifying examinations (both written preliminary and oral exams) as well as all the required course work, the doctoral candidate, in consultation with his or her research advisor, must register in two consecutive semesters (may include full summer term) for Dissertation (IE 9990). Upon completion of this sequence, the student must then register for Dissertation Continuation (IE 9996) in every semester (in each fall and spring semester and also in the summer term if summer is the student's last semester) until the dissertation is completed. Students may not register for Dissertation Continuation (IE 9996) until they complete the two-semester registration sequence for Dissertation (IE 9990).

To meet the full-time registration requirement for PhD students who have completed the majority of their course work and not yet reached

PhD candidacy, a zero-credit course, Candidacy Preparation—Doctoral (IE 8960), can be taken if needed to meet the full-time course registration requirement. Candidacy Preparation—Doctoral (IE 8960) is an individual instruction course, billed as one semester hour, and graded as S or U. This course does not have any course content, and students must register in a section for which their research or academic advisor is listed as the "instructor" in the online registration system.

Final Oral (Dissertation Defense) Examination

All doctoral candidates must pass a final oral exam. This exam will be scheduled once the dissertation committee agrees that the candidate's research has reached a stage where it is appropriate for a formal presentation and after completion of all other requirements for the PhD, including all course work approved in the final program of study. The objective of the exam is for the candidate to present and defend the results of the dissertation research and to demonstrate depth of knowledge and significant expertise in the area of that research under questioning from the dissertation committee and other attendees.

The exam shall be publicly advertised at least one week in advance and all faculty members may attend and participate. At the conclusion of the presentation and subsequent questions period, the dissertation committee will convene to determine the outcome. The committee may recommend that the candidate be awarded the PhD or may require additional research and/or modifications of the dissertation. In some cases, candidates may be asked to present an additional final oral dissertation defense.

Residency Requirement

After achieving PhD candidacy, the university residency requirement is satisfied by two semesters of full-time graduate registration or four semesters of part-time graduate registration. Students must be continually enrolled during the pursuit of their dissertation.

Program Requirements
Bachelor's Degree Entrance

Complete all courses and requirements listed below unless otherwise indicated.

Milestones

Doctoral qualifying exams (both written comprehensive and oral area exams)
Annual review
Dissertation committee formation
Dissertation proposal
Dissertation defense

Core Requirements

Code	Title	Hours
Recommended Courses (semester hours can be counted towards course work component with advisor approval)		
MEIE 6830 Graduate Traineeship I (Technical Writing and Communications) (2 SHs)		
MEIE 6860 Graduate Traineeship II (Research Ethics and Professional Development) (2 SHs)		
Approved Course Work		

Requires 40 semester hours of course work, including up to 4 semester hours of Independent Study (IE 7978). Students who choose to get a master's degree along the way to PhD must complete a total of 52 semester hours (32 semester hours toward the sought master's degree and 20 semester hours beyond the earned master's degree). The 32 semester hours applied toward the master's degree may include up to 8 semester hours of MS Thesis or 4 semester hours of MS Project or approved independent study course work. Please consult your faculty advisor for acceptable courses.   40

Dissertation

Code	Title	Hours

Complete the following (repeatable) course twice. Must register in two consecutive semesters (may include full summer term).

| ME 9990 | Dissertation | |

Program Credit/GPA Requirements

40 total semester hours required
Minimum 3.000 GPA required

Industrial Engineering, PhD—Advanced Entry

Requirements

The Doctor of Philosophy (PhD) is awarded to students who demonstrate high academic achievement and research competence in the field of industrial engineering. To earn a PhD, a student must complete approved and advanced course work and submit and defend an original dissertation of independent research. The Department of Mechanical and Industrial Engineering (MIE) expects all successful doctoral candidates to show depth of knowledge and research innovation in their chosen field of specialization.

The MIE department admits applicants to the PhD program either directly after earning a suitable bachelor's degree (i.e., direct entry) or after earning a master's degree (i.e., advanced entry). Upon acceptance into the program, an applicant is designated as a doctoral student. This designation is changed to doctoral candidate upon successful completion of the doctoral qualifying examinations (both written and oral exams) and all the required course work.

Academic and Research Advisors

PhD students must find a research advisor within their first year of study. The research advisor must be a full-time or jointly appointed faculty or affiliated member of the MIE department; otherwise, a petition must be filed and approved by the MIE Graduate Affairs Committee. If the research advisor is outside the MIE department, a faculty member with 50 percent or more appointments in the MIE department must be chosen as the co-advisor. Students are advised by the academic advisor of their discipline before they select their research advisor(s).

Change of Research Advisor

Students who want to change their research advisors need to use the MIE petition form. The petition form needs to be signed both by the student and the student's current and future research advisors. The signed form needs to be submitted to the MIE department for further processing.

Course Requirements and Plan of Study

A typical program of study includes at least 20 semester hours of course work beyond a master's degree. Students may petition the MIE Graduate Affairs Committee to substitute up to 4 semester hours of Independent Study (IE 7978) as part of their required course work. An independent study must be approved by the research advisor.

Each doctoral student, together with his or her research advisor, should develop an initial program during the first semester of study. The final program is also subject to the approval of the dissertation committee, who will add the program of study to the student's record upon admission to doctoral candidacy.

Special Ethics Requirement

All MIE graduate students are required to complete a brief online session on Responsible Conduct of Research and Plagiarism during their first semester of full-time study. All enrolled students will be sent proper instructions on how to complete this assignment and satisfy this important requirement. The outcome of the online session will be filed with the student's records.

PhD Students Annual Review

All PhD students in the MIE department must complete the PhD Students Annual Review form and submit the required documents by no later than January 31st of their second year of study (third year for PhD direct entry) and all subsequent years thereafter.

PhD Candidacy

To qualify as a doctoral candidate, a doctoral student must successfully complete the doctoral qualifying examinations (both a written comprehensive exam and an oral exam—see below) as well as all the required course work.

Doctoral Qualifying Examinations

Background and motivation: To demonstrate breadth and depth in each of the subject exams, crossover and merging exams are necessary in an effort to provide students with an opportunity to master the core disciplines in mechanical or industrial engineering (at both undergraduate and graduate levels) along with a focus area of importance to their specialization. These exams also provide an assessment as to whether students have adequate knowledge to pursue advanced study and possess attributes of a doctoral candidate by demonstrating understanding of and the ability to apply fundamental principles. Also, an oral exam tied to the written exams is necessary in an effort to evaluate the student's potential to perform independent research in the chosen field of specialization for the doctoral program.

Doctoral qualifying examinations framework: The doctoral qualifying examinations consist of the following two parts:

1. Two **written comprehensive** exams, which are respectively referred to as exam A and exam B
2. An **oral** exam to be administered no later than the end of the semester in which the written exams are taken and passed

WRITTEN COMPREHENSIVE EXAMINATIONS

All doctoral students admitted directly with a bachelor's degree must take the written comprehensive exams no later than the first time that it is offered after their first two years of study. The written comprehensive exams include two exams, **exam A** and **exam B,** and are given on Thursday and Friday of the first week of classes during regular semesters. A complete list of these exams along with topical coverage and details are provided on the MIE department graduate website (http://www.mie.neu.edu/mie/degrees-programs/graduate-studies). Students should also consult extensively with their research advisor regarding all aspects of the qualifying exams.

Written Comprehensive Exams Rules

Exam A, about four to six hours in length, should be selected from the list of major exams based on the student's concentration (i.e., industrial engineering—IND), see below. No deviation from this rule will be permitted. As listed below, exam B, about one to two hours in length, should be selected from the list of exams B for PhD degree program in industrial engineering (see below). Only one exam from this list should be selected. All students are required to have their research advisor's approval on selection of exam B prior to registering to take the written comprehensive exams. Note that exam B cannot be similar or close to one of the topics covered in exam A.

List of exams A and B based on student's research concentration:

Exams A for Industrial Engineering PhD Students:

- **Industrial Engineering (IND):** Probability (IND1), Statistics and Probabilistic OR (IND2), and Deterministic OR (IND3)

Sample Exams B for Industrial Engineering PhD Students (select one Exam B):

- Data Mining (DMN)
- Human-Machine Systems (HMS)
- Manufacturing Systems (MFS)
- Networks and Advanced Optimization (NAO)
- Reliability and Quality Assurance (RQA)
- Supply Chain Engineering (SCE)

ORAL EXAMINATION

The objective of the oral exam is to assess a student's potential to perform independent research in the chosen field of specialization. This exam shall be administered no later than the end of the semester in which the written exams are taken and passed. The exam shall be publicly advertised at least one week in advance and all faculty members and students may attend and participate.

Oral examination procedure: The student's research advisor convenes and chairs an oral examination committee comprised of a minimum of three faculty members deemed appropriate by the research advisor. This committee provides a set of technical papers pertinent to the student's research area at least one month before the examination. The oral examination committee will then conduct the exam that comprises the following two parts (both completed in a one-hour session):

1. A 30-minute oral presentation on a selected number of papers out of the assigned technical papers
2. A 30-minute oral exam by committee members' questions and evaluation of the student covering topics specifically related to the student's research area

GRADING PROCEDURE

Grading procedure and results of the written comprehensive examination: The MIE Graduate Affairs Committee will review all students' performance in the written comprehensive exams. Depending on the results of both major and minor exams and in consultation with the student's research advisor, the Graduate Affairs Committee will recommend one of the following three possible options:

1. No invitation to oral exam: The student will be dismissed from the program. He or she may be granted a master's degree if the requirements are already met; otherwise, the student may continue to fulfill the requirements for a master's degree in industrial engineering (IE), mechanical engineering (ME), or operations research (OR).

2. No invitation to oral exam yet: The student will be asked to retake the written exam(s) again in the next offering and/or take additional courses.
3. Student is invited to oral exam.

The Graduate Affairs Committee makes its final recommendation considering all aspects of the exam including, but not limited to, examiners' reports and results and student's research performance and course work. The Graduate Affairs Committee reserves the rights to recommend option 1 above for students who register for the exams but do not show up.

Grading procedure and results of the oral examination: If the student's performance in the oral exam is not satisfactory, the student will be dismissed from the program. He or she may be granted a master's degree if the requirements are met; otherwise, the student may continue to fulfill the requirements for a master's degree in industrial engineering (IE), mechanical engineering (ME), or operations research (OR).

Upon successfully passing the oral exam, the student continues in the PhD program. Upon passing all the required course work, he or she will become a PhD candidate. The results of written and oral exams and any recommended course work will become part of the student's record.

APPEAL PROCEDURE

The preliminary qualifying examination process provides means for reevaluation for students who fail one or more exams to appeal the Graduate Affairs Committee decision. All communications related to these examinations should be coordinated through the student's research advisor. Only the student's research advisor may request the MIE Graduate Affairs Committee to reevaluate the student's failed exams using the appeal form found at the link (http://www.coe.neu.edu/sites/default/files/pdfs/coe/gse/miepetitionform.pdf).

PhD Students Changing Their Program

PhD students who, for any reason, decide to change their program (i.e., from PhD in ME to PhD in IE or vice versa) must take (or retake) the doctoral qualifying examinations (both written comprehensive exams and oral exam) based on the student's new major research area (i.e., industrial engineering, materials, mechanics, mechatronics, or thermofluids).

Interdisciplinary PhD Students with MIE as the Home Department

Students pursuing the College of Engineering (COE) interdisciplinary PhD program with the MIE department as their home department must take one of the major written comprehensive exams (exam A) of the MIE doctoral qualifying examinations. The minor exam (exam B) can be substituted with appropriate exam(s) from other department(s) involved with the student's interdisciplinary PhD program. Students dismissed from the ME or IE PhD programs in the MIE department cannot enroll in the PhD Interdisciplinary Engineering program with MIE as the primary affiliation.

Dissertation Proposal Preparation and Presentation Timing

Students must present their dissertation proposal no more than 12 months after successfully completing the oral exam. In addition, the presentation of the dissertation proposal and the actual dissertation defense (see below) shall be no less than 6 months apart. The student's dissertation committee will invite any additional faculty deemed appropriate to that field; this dissertation committee will then conduct the dissertation proposal session. Each student's dissertation committee must be comprised of at least three members, including the research

advisor. At least two of those three members must be full-time MIE faculty members.

Dissertation Course Requirements

Upon successful completion of the doctoral qualifying examinations (both written preliminary and oral exams) as well as all the required course work, the doctoral candidate, in consultation with his or her research advisor, must register in two consecutive semesters (may include full summer term) for Dissertation (IE 9990). Upon completion of this sequence, the student must then register for Dissertation Continuation (IE 9996) in every semester (in each fall and spring term and also in the summer term if summer is the student's last semester) until the dissertation is completed. Students may not register for Dissertation Continuation (IE 9996) until they fulfill the two-semester registration sequence for Dissertation (IE 9990)

To meet the full-time registration requirement for PhD students who have completed the majority of their course work and not yet reached PhD candidacy, a zero-credit course, Candidacy Preparation—Doctoral (IE 8960), can be taken if needed to fulfill the full-time course registration requirement. Candidacy Preparation—Doctoral (IE 8960) is an individual instruction course, billed as one semester hour, and graded as S or U. Candidacy Preparation—Doctoral (IE 8960) does not have any course content, and students must register in a section for which their research or academic advisor is listed as the "instructor" in the online course registration system.

Final Oral (Dissertation Defense) Examination

All doctoral candidates must pass a final oral exam. This exam will be scheduled once the dissertation committee agrees that the candidate's research has reached a stage where it is appropriate for a formal presentation and after completion of all other requirements for the PhD, including all course work approved in the final program of study. The objective of the exam is for the candidate to present and defend the results of the dissertation research and to demonstrate depth of knowledge and significant expertise in the area of that research under questioning from the dissertation committee and other attendees.

The exam shall be publicly advertised at least one week in advance and all faculty members may attend and participate. At the conclusion of the presentation and subsequent questions period, the dissertation committee will convene to determine the outcome. The committee may recommend that the candidate be awarded the PhD or may require additional research and/or modifications of the dissertation. In some cases, candidates may be asked to present an additional final oral dissertation defense.

Residency Requirement

After achieving PhD candidacy, the university residency requirement is satisfied by two semesters of full-time graduate registration or four semesters of part-time graduate registration. Students must be continually enrolled during the pursuit of their dissertation.

Program Requirements
Master's Degree Entrance

Complete all courses and requirements listed below unless otherwise indicated.

Milestones

Doctoral qualifying exams (both written comprehensive and oral area exams)
Annual review
Dissertation committee formation
Dissertation proposal

Dissertation defense

General Requirements

Code	Title	Hours
Recommended Courses (semester hours can be counted toward course work component with advisor approval)		
MEIE 6830 Graduate Traineeship I (Technical Writing and Communications) (2 SHs)		
MEIE 6860 Graduate Traineeship II (Research Ethics and Professional Development) (2 SHs)		
Approved Course Work		
Requires 20 semester hours of course work, including up to 4 semester hours of Independent Study (IE 7978). Please consult your faculty advisor for acceptable courses.		20

Dissertation Courses

Code	Title	Hours
Complete the following (repeatable) course twice. Must register in two consecutive semesters (may include full summer term):		
ME 9990	Dissertation	

Program Credit/GPA Requirements

20 total semester hours required
Minimum 3.000 GPA required

Mechanical Engineering, PhD

Requirements

The PhD is awarded to students who demonstrate high academic achievement and research competence in the fields of mechanical engineering. To earn a PhD, a student must complete an approved, rigorous program of advanced course work and submit and defend an original dissertation of independent research. The Department of Mechanical and Industrial Engineering (MIE) expects all successful doctoral candidates to show depth of knowledge and research innovation in their chosen field of specialization.

The MIE department admits applicants to the PhD program either directly after earning a suitable bachelor's degree (i.e., direct entry) or after earning a master's degree (i.e., advanced entry). Upon acceptance into the program, an applicant is designated as a doctoral student. This designation is changed to doctoral candidate upon successful completion of the doctoral qualifying examinations (both written and oral exams) as well as all the required course work.

Academic and Research Advisors

PhD students must find a research advisor within their first year of study. The research advisor must be a full-time or jointly appointed faculty or affiliated member of the MIE department; otherwise, a petition must be filed and approved by the MIE Graduate Affairs Committee. If the research advisor is outside the MIE department, a faculty member with 50 percent or more appointments in the MIE department must be chosen as the co-advisor. Students are advised by the academic advisor of their discipline before they select their research advisor(s).

Change of Research Advisor

Students who wish to change their research advisor need to use the MIE petition form to make that request. The petition form must be signed by the student and by the student's current and future research advisor. The

signed petition form should then be submitted to the MIE department for further processing.

Course Requirements and Plan of Study

A typical program of study includes at least 40 semester hours of course work beyond a bachelor's degree. Students who choose to get a master's degree along the way to a PhD must complete a total of 52 semester hours (32 semester hours to earn a master's degree and an additional 20 semester hours in order to earn a PhD). The 32 semester hours of course work that apply toward the master's degree may include up to 8 semester hours of thesis or 4 semester hours of project or approved independent study course work. Students may petition the MIE Graduate Affairs Committee to substitute up to 4 semester hours of Independent Study (ME 7978) as part of their required course work. An independent study must be approved by the research advisor. When thesis or project is selected, an independent study course cannot be taken.

Each doctoral student, together with his or her research advisor, should develop an initial program during the first semester of study. The final program is also subject to the approval of the dissertation committee, who will add the program of study to the student's record upon admission to doctoral candidacy.

Special Ethics Requirement

All MIE graduate students are required to complete a brief online session on Responsible Conduct of Research and Plagiarism during their first semester of full-time study. All enrolled students will be sent proper instructions on how to complete this assignment and satisfy this important requirement. The outcome of the online session will be filed with the student's records.

PhD Students Annual Review

All PhD students in the MIE department must complete the PhD Students Annual Review form and submit the required documents by no later than January 31st of their third year of study (second year for PhD advanced entry) and all subsequent years thereafter.

PhD Candidacy

To qualify as a doctoral candidate, a doctoral student must successfully complete the doctoral qualifying examinations (both a written comprehensive exam and an oral exam—see below) as well as all the required course work.

Doctoral Qualifying Examinations

Background and motivation: To demonstrate breadth and depth in each of the subject exams, crossover and merging exams are necessary in an effort to provide students with an opportunity to master the core disciplines in mechanical or industrial engineering (at both undergraduate and graduate levels) along with a focus area of importance to their specialization. These exams also provide an assessment as to whether students have adequate knowledge to pursue advanced study and possess attributes of a doctoral candidate by demonstrating understanding of and the ability to apply fundamental principles. Also, an oral exam tied to the written exams is necessary in an effort to evaluate a student's potential to perform independent research in the chosen field of specialization for the doctoral program.

Doctoral qualifying examinations framework: The doctoral qualifying examinations consist of the following two parts:

1. Two **written comprehensive** exams, which are respectively referred to as exam A and exam B

2. An **oral** exam to be administered no later than the end of the semester in which the written exams are taken and passed

WRITTEN COMPREHENSIVE EXAMINATIONS

All doctoral students admitted directly with a bachelor's degree must take the written comprehensive exams no later than the first time that it is offered after their first two years of study. The written comprehensive exams include two exams, **exam A** and **exam B,** and are given on Thursday and Friday of the first week of classes during regular semesters. A complete list of these exams along with topical coverage and details are provided on the MIE department graduate website (http://www.mie.neu.edu/mie/degrees-programs/graduate-studies). Students should also consult extensively with their research advisor regarding all aspects of the qualifying exams.

Written Comprehensive Exams Rules

Exam A, about four to six hours in length, should be selected from the list of major exams based on the student's concentration (i.e., materials, mechanics, mechatronics, or thermofluids, see below). No deviation from this rule will be permitted. As listed below, exam B, about one to two hours in length, should be selected from the list of exams B for PhD degree program in industrial engineering (see below). Only one exam from this list should be selected. All students are required to have their research advisor's approval on selection of exam B prior to registering to take the written comprehensive exams. Note that exam B cannot be similar or close to one of the topics covered in exam A.

List of exams A and B based on student's research concentration:

Exams A for Mechanical Engineering PhD Students (select one Exam A):

- **Materials Science Engineering (MSE):** Kinetics of Materials (MSE1), Thermodynamics of Materials (MSE2); and Process, Structure, Property, and Performance of Materials (MSE3)
- **Mechanics (MEC)**: Mechanics of Deformable Media (MEC1), Dynamics and Vibration (MEC2), and Finite Element Method (MEC3)
- **Dynamic Systems and Control (DSC):** Dynamic Systems (DSC1); Mechanical Vibrations (DSC2); and Control Systems (DSC3)
- **Thermofluids Science (TFS):** Thermodynamics (TFS1); Fluid Mechanics (TFS2); and Heat Transfer (TFS3)

Sample Exams B for Mechanical Engineering PhD Students (select one Exam B):

- Control Systems (DSC3)
- Dynamic Systems (DSC1)
- Dynamics and Vibration (MEC2)
- Engineering Mathematics (MTH)
- Finite Element Method (MEC3)
- Fluid Mechanics (TFS2)
- Heat Transfer (TFS3)
- Kinetics of Materials (MSE1)
- Mechanics of Deformable Media (MEC1)
- Process, Structure, Property, and Performance of Materials (MSE3)
- Thermodynamics (TFS1)
- Thermodynamics of Materials (MSE2)

ORAL EXAMINATION

The objective of the oral exam is to assess a student's potential to perform independent research in the chosen field of specialization. This exam shall be administered no later than the end of the semester in which the written exams are taken and passed. The exam shall be

publicly advertised at least one week in advance and all faculty members and students may attend and participate.

Oral examination procedure: The student's research advisor convenes and chairs an oral examination committee comprised of a minimum of three faculty members deemed appropriate by the research advisor. This committee provides a set of technical papers pertinent to the student's research area at least one month before the examination. The oral examination committee will then conduct the exam that comprises the following two parts (both completed in a one-hour session):

1. A 30-minute oral presentation on a selected number of papers out of the assigned technical papers
2. A 30-minute oral exam by committee members' questions and evaluation of the student covering topics specifically related to the student's research area

GRADING PROCEDURE

Grading procedure and results of the written comprehensive examination: The MIE Graduate Affairs Committee will review all students' performance in the written comprehensive exams. Depending on the results of both major and minor exams and in consultation with the student's research advisor, the Graduate Affairs Committee will recommend one of the following three possible options:

1. No invitation to oral exam: The student will be dismissed from the program. He or she may be granted a master' degree if the requirements are already met; otherwise, the student may continue to fulfill the requirements for a master's degree in industrial engineering (IE), mechanical engineering (ME), or operations research (OR).
2. No invitation to oral exam yet: The student will be asked to retake the written exam(s) again in the next offering and/or take additional courses.
3. Student is invited to oral exam.

The Graduate Affairs Committee makes its final recommendation considering all aspects of the exam including, but not limited to, examiners' reports and results, student's research performance, and course work. The Graduate Affairs Committee reserves the right to recommend option 1 above for students who register for the exams but do not show up.

Grading procedure and results of the oral examination: If the student's performance in the oral exam is not satisfactory, the student will be dismissed from the program. He or she may be granted a master's degree if the requirements are met; otherwise, the student may continue to fulfill the requirements for a master's degree in industrial engineering (IE), mechanical engineering (ME), or operations research (OR).

Upon successfully passing the oral exam, the student continues in the PhD program. Upon passing all the required course work, he or she will become a PhD candidate. The results of written and oral exams and any recommended course work will become part of the student's record.

APPEAL PROCEDURE

The preliminary qualifying examination process provides means for reevaluation for students who fail one or more exams to appeal the Graduate Affairs Committee decision. All communications related to these examinations should be coordinated through the student's research advisor. Only the student's research advisor may request the MIE Graduate Affairs Committee to reevaluate the student's failed exams using the appeal form found at the link (http://www.coe.neu.edu/sites/default/files/pdfs/coe/gse/miepetitionform.pdf).

PhD Students Changing Their Program

PhD students who, for any reason, decide to change their degree program (i.e., from PhD in ME to PhD in IE or vice versa) must take (or retake) the doctoral qualifying examinations (both written comprehensive exams and oral exam) based on the student's new major research area (i.e., industrial engineering, materials, mechanics, mechatronics, or thermofluids).

Interdisciplinary PhD Students with MIE as the Home Department

Students pursuing the College of Engineering (COE) interdisciplinary PhD program with the MIE department as their home department must take one of the major written comprehensive exams (exam A) of the MIE doctoral qualifying examinations. The minor exam (exam B) can be substituted with appropriate exam(s) from other department(s) involved with the student's interdisciplinary PhD program. Students dismissed from the ME or IE PhD programs in the MIE department cannot enroll in the PhD Interdisciplinary Engineering program with MIE as the primary affiliation.

Dissertation Proposal Preparation and Presentation Timing

Students must present their dissertation proposal no more than 12 months after successfully completing the oral exam. In addition, the presentation of the dissertation proposal and the actual dissertation defense (see below) shall be no less than 6 months apart. The student's dissertation committee will invite any additional faculty deemed appropriate to that field; this dissertation committee will then conduct the dissertation proposal session. Each student's dissertation committee must be comprised of at least three members, including the research advisor. At least two of those three members must be full-time MIE faculty members.

Dissertation Course Requirements

Upon successful completion of the doctoral qualifying examinations (both written preliminary and oral exams) as well as all the required course work, the doctoral candidate, in consultation with his or her research advisor, must register in two consecutive semesters (may include full summer term) for Dissertation (ME 9990). Upon completion of this sequence, the student must then register for Dissertation Continuation (ME 9996) in every semester (in each fall and spring term and also in the summer term if summer is the student's last semester) until the dissertation is completed. Students may not register for Dissertation Continuation (ME 9996) until they fulfill the two-semester sequence of Dissertation (ME 9990).

To meet the full-time registration requirement for PhD students who have completed the majority of their course work and not yet reached PhD candidacy, a zero-credit course, Candidacy Preparation—Doctoral (ME 8960), can be taken if needed to fulfill the full-time course registration requirement. Candidacy Preparation—Doctoral (ME 8960) is an individual instruction course, billed as one semester hour, and graded S or U. Candidacy Preparation—Doctoral (ME 8960) does not have any course content, and students must register in a section for which their research or academic advisor is listed as the "instructor."

Final Oral (Dissertation Defense) Examination

All doctoral candidates must pass a final oral exam. This exam will be scheduled once the dissertation committee agrees that the candidate's research is at a stage where it is appropriate for formal presentation and after completion of all other PhD requirements, including all the course work approved in the final program of study. The objective of the exam is for the candidate to present and defend the results of the dissertation research and to demonstrate depth of knowledge and

significant expertise in the area of that research under questioning from the dissertation committee and other attendees.

The exam shall be publicly advertised at least one week in advance and all faculty members may attend and participate. At the conclusion of the presentation and subsequent questions period, the dissertation committee will convene to determine the outcome. The committee may recommend that the candidate be awarded the PhD or may require additional research and/or modifications of the dissertation. In some cases, candidates may be asked to present an additional final oral dissertation defense.

Residency Requirement

After achieving PhD candidacy, the university residency requirement is satisfied by two semesters of full-time graduate registration or four semesters of part-time graduate registration. Students must be continually enrolled during the pursuit of dissertation.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Milestones

Doctoral qualifying exams (both written comprehensive and oral area exams)
Annual review
Dissertation committee formation
Dissertation proposal
Dissertation defense

Core Requirements

Code	Title	Hours
Recommended Courses (semester hours can be counted toward course work component with advisor approval)		
MEIE 6830	Graduate Traineeship I (Technical Writing and Communications) (2 SHs)	
MEIE 6860	Graduate Traineeship II (Research Ethics and Professional Development) (2 SHs)	
Approved Course Work		
Requires 40 semester hours of course work, including up to 4 semester hours of Independent Study (ME 7978). Students who choose to get an MS degree along the way to a PhD must complete a total of 52 semester hours (32 semester hours toward the sought MS degree and 20 semester hours beyond the earned MS degree). The 32 semester hours applied toward the master's degree may include up to 8 semester hours of MS Thesis or 4 semester hours of MS Project or approved independent study course work. Please consult your faculty advisor for acceptable courses.		40

Dissertation

Code	Title	Hours
Complete the following (repeatable) course twice. Must register in two consecutive semesters (may include full summer term):		
ME 9990	Dissertation	

Program Credit/GPA Requirements

40 total semester hours required
Minimum 3.000 GPA required

Mechanical Engineering, PhD—Advanced Entry

Requirements

The PhD is awarded to students who demonstrate high academic achievement and research competence in the fields of mechanical engineering. To earn a PhD, a student must complete an approved, rigorous program of advanced course work and submit and defend an original dissertation of independent research. The Department of Mechanical and Industrial Engineering (MIE) expects all successful doctoral candidates to show depth of knowledge and research innovation in their chosen field of specialization.

The MIE department admits applicants to the PhD program either directly after earning a suitable bachelor's degree (i.e., direct entry) or after earning a master's degree (i.e., advanced entry). Upon acceptance into the program, an applicant is designated as a doctoral student. This designation is changed to doctoral candidate upon successful completion of the doctoral qualifying examinations (both written and oral exams) as well as all the required course work.

Academic and Research Advisors

PhD students must find a research advisor within their first year of study. The research advisor must be a full-time or jointly appointed faculty or affiliated member of the MIE department; otherwise, a petition must be filed and approved by the MIE Graduate Affairs Committee. If the research advisor is outside the MIE department, a faculty member with 50 percent or more appointments in the MIE department must be chosen as the co-advisor. Students are advised by the academic advisor of their discipline before they select their research advisor(s).

Change of Research Advisor

Students who wish to change their research advisor need to use the MIE petition form to make that request. The petition form must be signed by the student and by the student's current and future research advisor. The signed petition form should then be submitted to the MIE department for further processing.

Course Requirements and Plan of Study

A typical program of study includes at least 20 semester hours of course work beyond a master's degree. Students may petition the MIE Graduate Affairs Committee to substitute up to 4 semester hours of Independent Study (ME 7978) as part of their required course work. An independent study must be approved by the research advisor.

Each doctoral student, together with his or her research advisor, should develop an initial program during the first semester of study. The final program is also subject to the approval of the dissertation committee, who will add the program of study to the student's record upon admission to doctoral candidacy.

Special Ethics Requirement

All MIE graduate students are required to complete a brief online session on Responsible Conduct of Research and Plagiarism during their first semester of full-time study. All enrolled students will be sent proper instructions on how to complete this assignment and satisfy this important requirement. The outcome of the online session will be filed with the student's records.

PhD Students Annual Review

All PhD students in MIE department must complete the PhD Students Annual Review form and submit the required documents by no later than

January 31st of their second year of study (third year for PhD direct entry) and all subsequent years thereafter.

PhD Candidacy

To qualify as a doctoral candidate, a doctoral student must successfully complete the doctoral qualifying examinations (both a written comprehensive exam and an oral exam—see below) as well as all the required course work.

Doctoral Qualifying Examinations

Background and motivation: To demonstrate breadth and depth in each of the subject exams, crossover and merging exams are necessary in an effort to provide students with an opportunity to master the core disciplines in mechanical or industrial engineering (at both undergraduate and graduate levels) along with a focus area of importance to their specialization. These exams also provide an assessment as to whether students have adequate knowledge to pursue advanced study and possess attributes of a doctoral candidate by demonstrating understanding of and the ability to apply fundamental principles. Also, an oral exam tied to the written exams is necessary in an effort to evaluate a student's potential to perform independent research in the chosen field of specialization for the doctoral program.

Doctoral qualifying examinations framework: The doctoral qualifying examinations consist of the following two parts:

1. Two **written comprehensive** exams, which are respectively referred to as exam A and exam B
2. An **oral** exam to be administered no later than the end of the semester in which the written exams are taken and passed

WRITTEN COMPREHENSIVE EXAMINATIONS

All doctoral students admitted directly with a bachelor's degree must take the written comprehensive exams no later than the first time that it is offered after their first two years of study. The written comprehensive exams include two exams, **exam A** and **exam B,** and are given on Thursday and Friday of the first week of classes during regular semesters. A complete list of these exams along with topical coverage and details are provided on the MIE department graduate website (http://www.mie.neu.edu/mie/degrees-programs/graduate-studies). Students should also consult extensively with their research advisor regarding all aspects of the qualifying exams.

Written Comprehensive Exams Rules
Exam A, about four to six hours in length, should be selected from the list of major exams based on the student's concentration (i.e., materials, mechanics, mechatronics, or thermofluids, see below). No deviation from this rule will be permitted. As listed below, exam B, about one to two hours in length, should be selected from the list of exams B for PhD degree program in industrial engineering (see below). Only one exam from this list should be selected. All students are required to have their research advisor's approval on selection of exam B prior to registering to take the written comprehensive exams. Note that exam B cannot be similar or close to one of the topics covered in exam A.

List of exams A and B based on student's research concentration:

Exams A for Mechanical Engineering PhD Students (select one Exam A):

- **Materials Science Engineering (MSE):** Kinetics of Materials (MSE1), Thermodynamics of Materials (MSE2); and Process, Structure, Property, and Performance of Materials (MSE3)
- **Mechanics (MEC)**: Mechanics of Deformable Media (MEC1), Dynamics and Vibration (MEC2), and Finite Element Method (MEC3)

- **Dynamic Systems and Control (DSC):** Dynamic Systems (DSC1); Mechanical Vibrations (DSC2); and Control Systems (DSC3)
- **Thermofluids Science (TFS):** Thermodynamics (TFS1); Fluid Mechanics (TFS2); and Heat Transfer (TFS3)

Sample Exams B for Mechanical Engineering PhD Students (select one Exam B):

- Control Systems (DSC3)
- Dynamic Systems (DSC1)
- Dynamics and Vibration (MEC2)
- Engineering Mathematics (MTH)
- Finite Element Method (MEC3)
- Fluid Mechanics (TFS2)
- Heat Transfer (TFS3)
- Kinetics of Materials (MSE1)
- Mechanics of Deformable Media (MEC1)
- Process, Structure, Property, and Performance of Materials (MSE3)
- Thermodynamics (TFS1)
- Thermodynamics of Materials (MSE2)

ORAL EXAMINATION

The objective of the oral exam is to assess a student's potential to perform independent research in the chosen field of specialization. This exam shall be administered no later than the end of the semester in which the written exams are taken and passed. The exam shall be publicly advertised at least one week in advance and all faculty members and students may attend and participate.

Oral examination procedure: The student's research advisor convenes and chairs an oral examination committee comprised of a minimum of three faculty members deemed appropriate by the research advisor. This committee provides a set of technical papers pertinent to the student's research area at least one month before the examination. The oral examination committee will then conduct the exam that comprises the following two parts (both completed in a one-hour session):

1. A 30-minute oral presentation on a selected number of papers out of the assigned technical papers
2. A 30-minute oral exam by committee members' questions and evaluation of the student covering topics specifically related to the student's research area

GRADING PROCEDURE

Grading procedure and results of the written comprehensive examination: The MIE Graduate Affairs Committee will review all students' performance in the written comprehensive exams. Depending on the results of both major and minor exams and in consultation with the student's research advisor, the Graduate Affairs Committee will recommend one of the following three possible options:

1. No invitation to oral exam: The student will be dismissed from the program. He or she may be granted a master's degree if the requirements are already met; otherwise, the student may continue to fulfill the requirements for a master's degree in industrial engineering (IE), mechanical engineering (ME), or operations research (OR).
2. No invitation to oral exam yet: The student will be asked to retake the written exam(s) again in the next offering and/or take additional courses.
3. Student is invited to oral exam.

The Graduate Affairs Committee makes its final recommendation considering all aspects of the exam including, but not limited to,

examiners' reports and results, student's research performance, and course work. The Graduate Affairs committee reserves the right to recommend option 1 above for students who register for the exams but do not show up.

Grading procedure and results of the oral examination: If the student's performance in the oral exam is not satisfactory, the student will be dismissed from the program. He or she may be granted a master's degree if the requirements are met; otherwise, the student may continue to fulfill the requirements for a master's degree in industrial engineering (IE), mechanical engineering (ME), or operations research (OR).

Upon successfully passing the oral exam, the student continues in the PhD program and upon passing all the required course work, he or she will become a PhD candidate. The results of written and oral exams and any recommended course work will become part of the student's record.

APPEAL PROCEDURE

The preliminary qualifying examination process provides means for reevaluation for students who fail one or more exams to appeal the Graduate Affairs Committee decision. All communications related to these examinations should be coordinated through the student's research advisor. Only the student's research advisor may request the MIE Graduate Affairs Committee to reevaluate the student's failed exams using the appeal form found at the link (http://www.coe.neu.edu/sites/default/files/pdfs/coe/gse/miepetitionform.pdf).

PhD Students Changing Their Program

PhD students who, for any reason, decide to change their program (i.e., from PhD in ME to PhD in IE or vice versa) must take (or retake) the doctoral qualifying examinations (both written comprehensive exams and oral exam) based on the student's new major research area (i.e., industrial engineering, materials, mechanics, mechatronics, or thermofluids).

Interdisciplinary PhD Students with MIE as the Home Department

Students pursuing the College of Engineering (COE) interdisciplinary PhD program with the MIE department as their home department must take one of the major written comprehensive exams (exam A) of the MIE doctoral qualifying examinations. The minor exam (exam B) can be substituted with appropriate exam(s) from other department(s) involved with the student's interdisciplinary PhD program. Students dismissed from the ME or IE PhD programs in the MIE department cannot enroll in the PhD Interdisciplinary Engineering program with MIE as the primary affiliation.

Dissertation Proposal Preparation and Presentation Timing

Students must present their dissertation proposal no more than 12 months after successfully completing the oral exam. In addition, the presentation of the dissertation proposal and the actual dissertation defense (see below) shall be no less than 6 months apart. The student's dissertation committee will invite any additional faculty deemed appropriate to that field; this dissertation committee will then conduct the dissertation proposal session. Each student's dissertation committee must be comprised of at least three members, including the research advisor. At least two of those three members must be full-time MIE faculty members.

Dissertation Course Requirements

Upon successful completion of the doctoral qualifying examinations (both written preliminary and oral exams) as well as all the required course work, the doctoral candidate, in consultation with his or her research advisor, must register in two consecutive semesters (may include full summer term) for Dissertation (ME 9990). Upon completion

of this sequence, the student must then register for Dissertation Continuation (ME 9996) in every semester (in each fall and spring term and also in the summer term if summer is the student's last semester) until the dissertation is completed. Students may not register for Dissertation Continuation (ME 9996) until they fulfill the two-semester Dissertation (ME 9990) registration sequence.

To meet the full-time registration requirement for PhD students who have completed the majority of their course work and not yet reached PhD candidacy, a zero-credit course, Candidacy Preparation—Doctoral (ME 8960), can be taken if needed to meet full-time course registration requirements. This course is an individual instruction course, billed at 1 semester hour, and graded as S or U. Candidacy Preparation—Doctoral (ME 8960) does not have any course content, and students must register in a section for which their research or academic advisor is listed as the "instructor" in the online course registration system.

Final Oral (Dissertation Defense) Examination

All doctoral candidates must pass a final oral exam. This exam will be scheduled once the dissertation committee agrees that the candidate's research is at a stage where it is appropriate for formal presentation and after completion of all other requirements for the PhD, including all course work approved in the final program of study. The objective of the exam is for the candidate to present and defend the results of the dissertation research and to demonstrate depth of knowledge and significant expertise in the area of that research under questioning from the dissertation committee and other attendees.

The exam shall be publicly advertised at least one week in advance and all faculty members may attend and participate. At the conclusion of the presentation and subsequent questions period, the dissertation committee will convene to determine the outcome. The committee may recommend that the candidate be awarded the PhD or may require additional research and/or modifications of the dissertation. In some cases, candidates may be asked to present an additional final oral dissertation defense.

Residency Requirement

After achieving PhD candidacy, the university residency requirement is satisfied by two semesters of full-time graduate registration or four semesters of part-time graduate registration. Students must be continually enrolled during the pursuit of their dissertation.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Milestones

Doctoral qualifying exams (both written comprehensive and oral area exams)
Annual review
Dissertation committee formation
Dissertation proposal
Dissertation defense

Core Requirements

Code	Title	Hours
Recommended Courses (semester hours can be counted toward course work component with advisor approval)		
MEIE 6830	Graduate Traineeship I (Technical Writing and Communications) (2 SHs)	
MEIE 6860	Graduate Traineeship II (Research Ethics and Professional Development) (2 SHs)	

Approved Course Work	
Requires 20 semester hours of course work, including up to 4 semester hours of Independent Study (ME 7978). Please consult your faculty advisor for acceptable courses.	20

Dissertation

Code	Title	Hours
Complete the following (repeatable) course twice. Must register in two consecutive semesters (may include full summer term):		
ME 9990	Dissertation	

Program Credit/GPA Requirements

20 total semester hours required
Minimum 3.000 GPA required

Data Analytics Engineering, MS

The Department of Mechanical and Industrial Engineering (MIE) offers the Master of Science in Data Analytics Engineering in order to meet the current and projected demand for a workforce trained in analytics. This degree program offers students an opportunity to train for industry jobs or to acquire rigorous analytical skills and research experience to prepare for a doctoral program in health, security, and sustainability at Northeastern University. While the core courses for this program are offered by the College of Engineering, elective courses can be chosen from diverse disciplines spread across various colleges at Northeastern. The MS degree in data analytics engineering is designed to enable the graduating students to address the growing need for professionals who are trained in advanced data analytics and can transform large streams of data into understandable and actionable information for the purpose of making decisions. The key sectors that require analytics professionals include healthcare, smart manufacturing, supply chain and logistics, national security, defense, banking, finance, marketing, and human resources.

The Master of Science in Data Analytics Engineering is designed to help students acquire knowledge and skills to:

- Discover opportunities to improve systems, processes, and enterprises through data analytics
- Apply optimization, statistical, and machine-learning methods to solve complex problems involving large data from multiple sources
- Collect and store data from a variety of sources, including Internet of Things (IoT), an integrated network of devices and sensors, customer touch points, processes, social media, and people
- Work with technology teams to design and build large and complex SQL databases
- Use tools and methods for data mining, big-data algorithms, and data visualization to generate reports for analysis and decision making
- Create integrated views of data collected from multiple sources of an enterprise
- Understand and explain results of data analytics to decision makers
- Design and develop analytics projects

This degree program seeks to prepare students for a comprehensive list of tasks including collecting, storing, processing, and analyzing data; reporting statistics and patterns; drawing conclusions and insights; and making actionable recommendations.

General Degree Requirements

To be eligible for admission to any of the MS degree programs, a prospective student must hold a Bachelor of Science degree in engineering, science, mathematics, or an equivalent field. Students in all master's degree programs must complete a minimum of 32 semester hours of approved course work (exclusive of any preparatory courses) with a minimum grade-point average (GPA) of 3.000. Students can complete a master's degree by pursuing one of the three tracks: course work option, project option, and thesis option. Specific degree requirements for each of these tracks can be found under the Program Requirements tab. Students may pursue any master's program either on a full-time or part-time basis; however, certain restrictions may apply.

Specific Degree Requirements

Core courses for the MS in data analytics engineering provide students with a foundation in operations research, statistics, data and knowledge engineering, and visualization. Students can select electives from a wide range of fields including business, engineering, healthcare, manufacturing, and urban communities/cities. These courses are designed to provide students with a strong understanding of probability and statistics, optimization methods, data mining, database design, and visualization. Elective courses provide students with the knowledge and understanding of descriptive, prescriptive, diagnostic, and predictive analytics as applied to a specific field of interest such as business, healthcare, manufacturing, and urban communities/cities. Alternatively, students can select their electives so that they can prepare for a doctoral program by taking advanced courses in mathematics, statistics, machine learning, and pattern recognition.

Special Ethics Requirement

All MIE graduate students are required to complete a brief online session on Responsible Conduct of Research and Plagiarism during their first semester of full-time study. All enrolled students will be sent proper instructions on how to complete this assignment and satisfy this important requirement. The outcome of the online session will be filed with the student's records.

Academic and Research Advisors

All nonthesis students are advised by the academic advisor designated for their respective concentration or program. Students doing thesis option must find a research advisor within their first year of study and may have thesis reader(s) at the discretion of their research advisor. The research advisor must be a full-time or jointly appointed faculty or affiliated member of the MIE department; otherwise, a petition must be filed and approved by the MIE graduate affairs committee. If the research advisor is outside the MIE department, a faculty member with 50 percent or more appointments in the MIE department must be chosen as the co-advisor. Thesis option students are advised by the academic advisor designated for their concentration before they select their research advisor(s).

Plan of Study and Course Selection

It is recommended that all new students attend orientation sessions held by the MIE department and the Graduate School of Engineering to acquaint themselves with the course work requirements and research activities of the department as well as with the general policies, procedures, and expectations.

In order to receive proper guidance with their course work needs, all MS students are strongly encouraged to complete and submit a fully signed Plan of Study (PS) to the department before enrolling in second-semester courses. This form helps the students manage their course work as well as helps the department to plan for requested course offerings. The

PS may be modified at any time as students progress in their degree programs. However, requests for changes in the PS must be processed before the requested change actually takes place. A revised PS form must also be approved and signed.

Each student's academic advisor must approve all courses prior to registration. Students may only use courses taken with the approval of the academic advisor toward the 32-semester-hour minimum requirement. However, students may petition the MIE graduate affairs committee to substitute graduate-level courses from outside the approved list of electives.

Students pursuing study or research under the guidance of a faculty member can choose the project option by taking Master's Project (ME 7945) or Master's Project (IE 7945). An MS project must be petitioned to the MIE graduate affairs committee and approved by both the faculty member (instructor for Master's Project) and the student's academic advisor. The petition must clearly state the reason for taking the course; a brief description of the goals; as well as the expected outcomes, deliverables, and grading scheme.

Students doing the course work option may petition the MIE graduate affairs committee to substitute up to a 4-semester-hour Independent Study (ME 7978) or Independent Study (IE 7978). An independent study must be approved by the academic advisor. The petition must clearly state the reason for taking the course; a brief description of the goals; as well as the expected outcomes, deliverables, and grading scheme. Students in other options (i.e., thesis or project) are not eligible to take independent study. When taking thesis or project options, the independent study course cannot be taken.

Options for MS Students (course work only, project, or thesis)

Students accepted into any of the MS programs in the MIE department can choose one of the three options: course work only, project, research project or MS thesis. Moreover, students who receive financial support from the university in the form of a research, teaching, or tuition assistantship must complete an 8-semester-hour thesis.

Students who complete the thesis option must make a presentation of their thesis before approval by the department. The MS thesis presentation shall be publicly advertised at least one week in advance, and all faculty members and students may attend and participate. If deemed appropriate by the research advisor, other faculty members may be invited to serve as "thesis readers" to provide technical opinions and judge the quality of the thesis and presentation.

Change of Program/Concentration

Students enrolled in any of the MIE department programs or concentrations may change their current program or concentration no sooner than the beginning of their second full-time semester of study. In order for the program or concentration change request to be considered by the MIE graduate affairs committee, the student must be in good academic standing and have completed at least 8 semester hours of required course work in their sought program at Northeastern. See here (p. 125) for instructions on how to request a program or concentration change.

Graduate Certificate Options

Students enrolled in a graduate degree program in the College of Engineering have the opportunity to pursue an engineering graduate certificate in addition to or in combination with the MS degree. For more information please refer to Graduate Certificate Programs (p. 229). Please note that students pursuing the Master of Science in Data

Analytics Engineering are not eligible for the Graduate Certificate in Data Mining.

GORDON INSTITUTE OF ENGINEERING LEADERSHIP
Master's Degree in Data Analytics Engineering with Graduate Certificate in Engineering Leadership

Students may complete a Master of Science in Data Analytics Engineering in addition to earning a Graduate Certificate in Engineering Leadership. Students must apply and be admitted to the Gordon Engineering Leadership Program in order to pursue this option. The program requires fulfillment of the 16-semester-hour curriculum required to earn the Graduate Certificate in Engineering Leadership, which includes an industry-based challenge project with multiple mentors. The integrated 40-semester-hour degree and certificate will require 24 hours of advisor-approved data analytics technical courses.

Engineering Leadership (p. 222)

ENGINEERING BUSINESS
Master's Degree in Data Analytics Engineering with Graduate Certificate in Engineering Business

Students may complete a Master of Science in Data Analytics Engineering in addition to earning a Graduate Certificate in Engineering Business. Students must apply and be admitted to the Galante Engineering Business Program in order to pursue this option. The program requires the applicant to have earned or be in a program to earn a Bachelor of Science in Engineering from Northeastern University. The integrated 32-semester-hour degree and certificate will require 16 semester hours of the data analytics engineering core courses and 16 semester hours from the outlined business-skill curriculum. The course work, along with participation in cocurricular professional development elements, earn the Graduate Certificate in Engineering Business.

Engineering Business (http://catalog.northeastern.edu/graduate/engineering/multidisciplinary/engineering-business-graduate-certificate)

Program Requirements
Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
IE 5374	Special Topics in Industrial Engineering (Data Visualization Engineering)	4
IE 6200	Engineering Probability and Statistics	4
IE 7275	Data Mining in Engineering	4
IE 7280	Statistical Methods in Engineering	4
INFO 6210	Data Management and Database Design	4
OR 6205	Deterministic Operations Research	4

Options
Complete one of the following options:

COURSE WORK OPTION

Code	Title	Hours
Complete 8 semester hours from the course list below.		8

PROJECT OPTION

Code	Title	Hours
ME 7945	Master's Project	4
Complete 4 semester hours from the course list below.		4

THESIS OPTION

Code	Title	Hours
ME 7990	Thesis [1]	8

Course List

Code	Title	Hours
Business Administration		
BUSN 6320	Business Analytics Fundamentals	1
BUSN 6324	Predictive Analytics for Managers	1
BUSN 6336	Data Mining for Managers	1
BUSN 6340	Modeling for Business Analytics for Managers	1
Civil Engineering and Environmental Engineering		
CIVE 7100	Time Series and Geospatial Data Sciences	4
CIVE 7342	System Identification	4
Computer Science		
CS 5002	Discrete and Data Structures	4
CS 5004	Object-Oriented Design	4
CS 5006	Algorithms	2
CS 5100	Foundations of Artificial Intelligence	4
CS 5150	Game Artificial Intelligence	4
CS 5200	Database Management Systems	4
CS 5310	Computer Graphics	4
CS 5335	Robotic Science and Systems	4
CS 5330	Pattern Recognition and Computer Vision	4
CS 5800	Algorithms	4
CS 6120	Natural Language Processing	4
CS 6140	Machine Learning	4
CS 6200	Information Retrieval	4
CS 6220	Data Mining Techniques	4
Computer Systems Engineering		
CSYE 7250	Big Data Architecture and Governance	4
Criminal Justice		
CRIM 7718	Advanced Data Analysis	4
Data Science		
DS 5010	Introduction to Programming for Data Science	4
DS 5020	Introduction to Linear Algebra and Probability for Data Science	4
DS 5110	Introduction to Data Management and Processing	4
DS 5220	Supervised Machine Learning and Learning Theory	4
DS 5230	Unsupervised Machine Learning and Data Mining	4
Electrical and Computer Engineering		
EECE 5155	Wireless Sensor Networks and the Internet of Things	4
EECE 5639	Computer Vision	4
EECE 5644	Introduction to Machine Learning and Pattern Recognition	4
EECE 7204	Applied Probability and Stochastic Processes	4
EECE 7312	Statistical and Adaptive Signal Processing	4
EECE 7397	Advanced Machine Learning	4
Engineering Management		
EMGT 5220	Engineering Project Management	4
EMGT 6225	Economic Decision Making	4
EMGT 6305	Financial Management for Engineers	4
Health Informatics		
HINF 5101	Introduction to Health Informatics and Health Information Systems	3
HINF 5102	Data Management in Healthcare	3
HINF 5200	Theoretical Foundations in Personal Health Informatics	4
HINF 5301	Personal Health Technologies: Field Deployment and System Evaluation	4
HINF 6202	Business of Healthcare Informatics	3
HINF 6240	Improving the Patient Experience through Informatics	3
HINF 6335	Management Issues in Healthcare Information Technology	3
HINF 6400	Introduction to Health Data Analytics	3
Industrial Engineering		
IE 5374	Special Topics in Industrial Engineering (Spreadsheet Modeling for industrial Engineering)	4
IE 5400	Healthcare Systems Modeling and Analysis	4
IE 5630	Biosensor and Human Behavior Measurement	4
IE 6300	Manufacturing Methods and Processes	4
IE 7200	Supply Chain Engineering	4
IE 7215	Simulation Analysis	4
IE 7285	Statistical Quality Control	4
IE 7290	Reliability Analysis and Risk Assessment	4
Information Systems		
INFO 6101	Data Science Engineering with Python	4
INFO 6205	Program Structure and Algorithms	4
INFO 6215	Business Analysis and Information Engineering	4
INFO 7275	Advanced Database Management Systems	4
INFO 7290	Data Warehousing and Business Intelligence	4
INFO 7330	Information Systems for Healthcare-Services Delivery	4
INFO 7390	Advances in Data Sciences and Architecture	4
INFO 7610	Special Topics in Natural Language Engineering Methods and Tools	4
Mathematics		
MATH 5131	Introduction to Mathematical Methods and Modeling	4

MATH 7234	Optimization and Complexity	4
MATH 7241	Probability 1	4
MATH 7340	Statistics for Bioinformatics	4
MATH 7341	Probability 2	4
MATH 7342	Mathematical Statistics	4
MATH 7343	Applied Statistics	4
MATH 7344	Regression, ANOVA, and Design	4
MATH 7345	Nonparametric Methods in Statistics	4
MATH 7346	Time Series	4
Mechanical Engineering		
ME 6201	Mathematical Methods for Mechanical Engineers 2	4
ME 7205	Advanced Mathematical Methods for Mechanical Engineers	4
Operations Research		
OR 6205	Deterministic Operations Research	4
OR 7230	Probabilistic Operation Research	4
OR 7235	Inventory Theory	4
OR 7240	Integer and Nonlinear Optimization	4
OR 7245	Network Analysis and Advanced Optimization	4
OR 7310	Logistics, Warehousing, and Scheduling	4
OR 7440	Operations Research Engineering Leadership Challenge Project 1	4
Physics		
PHYS 5116	Complex Networks and Applications	4
PHYS 7331	Network Science Data	4
PHYS 7332	Network Science Data 2	4
Public Policy and Urban Affairs		
PPUA 5261	Dynamic Modeling for Environmental Decision Making	4
PPUA 5262	Big Data for Cities	4
PPUA 5263	Geographic Information Systems for Urban and Regional Policy	4
PPUA 5301	Introduction to Computational Statistics	4
PPUA 5302	Information Design and Visual Analytics	4
PPUA 7237	Advanced Spatial Analysis of Urban Systems	4

Program Credit/GPA Requirements

32 total semester hours required
Minimum 3.000 GPA required

[1] A thesis is required for all students who receive financial support from the university in the form of a research, teaching, or tuition assistantship. The thesis topic should cover one or more of the areas from statistics, mathematics, optimization, data mining, machine learning, database design, big data, visualization tools, or forecasting methods. The thesis should train students for research in data and operations analytics and/or prepare them for a doctoral program.

Robotics, MS

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Mechanical Engineering		
Complete one of the following:		4
ME 5659	Control Systems Engineering	
ME 5250	Robot Mechanics and Control	
Electrical and Computer Engineering		
Complete one of the following:		4
EECE 5698	Special Topics in Electrical and Computer Engineering	
EECE 5698	Special Topics in Electrical and Computer Engineering	
Computer Science		
Complete one of the following:		4
CS 5335	Robotic Science and Systems	
CS	(TBA)	

Concentrations

Complete one of the following concentrations:

MECHANICAL ENGINEERING

Code	Title	Hours
Required Course		
Complete additional ME course not used to fulfill the core requirements:		4
ME 5659	Control Systems Engineering	
ME 5250	Robot Mechanics and Control	
Options		
Complete one of the following options:		16
Course Work Option		
Complete four of the following from the mechanical engineering course list. (p. 196)		
Thesis Option		
ME 7990	Thesis	
Complete two of the following from the mechanical engineering course list. (p. 196)		
Project Option		
ME 7945	Master's Project	
Complete three of the following from the mechanical engineering course list. (p. 196)		

ELECTRICAL AND COMPUTER ENGINEERING

Code	Title	Hours
Required Course		
Complete additional EECE course not used to fulfill the core requirements:		4

EECE 5698	Special Topics in Electrical and Computer Engineering	
EECE 5698	Special Topics in Electrical and Computer Engineering	

Options

Complete one of the following options:	16

Course Work Option

Complete four of the following from the electrical and computer engineering course list. (p. 196)

Thesis Option

EECE 7990	Thesis

Complete two of the following from the electrical and computer engineering course list. (p. 196)

Project Option

EECE 7674	Master's Project

Complete three of the following from the electrical and computer engineering course list. (p. 196)

COMPUTER SCIENCE

Code	Title	Hours
Required Course		
Complete additional CS course not used to fulfill the core requirements:		4
CS 5335	Robotic Science and Systems	
CS	(TBA)	

Options

Complete one of the following options:	16

Course Work Option

Complete four of the following from the computer science course list. (p. 196)

Thesis Option

CS 7990	Thesis (complete twice for a total of 8 credits)

Complete three of the following from the computer science course list. (p. 196)

Project Option

CS 8674	Master's Project

Complete three of the following from the computer science course list. (p. 196)

Program Credit/GPA Requirements

32 total semester hours required
Minimum 3.000 GPA required

Course Lists

MECHANICAL ENGINEERING COURSE LIST

Code	Title	Hours
ME 5240	Computer Aided Design and Manufacturing	
ME 5245	Mechatronic Systems	
ME 5250	Robot Mechanics and Control	
ME 5655	Dynamics and Mechanical Vibration	
ME 5659	Control Systems Engineering	
ME 6200	Mathematical Methods for Mechanical Engineers 1	
ME 6201	Mathematical Methods for Mechanical Engineers 2	
ME 7210	Elasticity and Plasticity	
ME 7247	Advanced Control Engineering	
ME 7253	Advanced Vibrations	
IE 5630	Biosensor and Human Behavior Measurement	
IE 7280	Statistical Methods in Engineering	
IE 7315	Human Factors Engineering	

ELECTRICAL AND COMPUTER ENGINEERING COURSE LIST

Code	Title	Hours
EECE 5580	Classical Control Systems	
EECE 5639	Computer Vision	
EECE 5642	Data Visualization	
EECE 5644	Introduction to Machine Learning and Pattern Recognition	
EECE 5698	Special Topics in Electrical and Computer Engineering	
EECE 7323	Numerical Optimization Methods	
EECE 7337	Information Theory	
EECE 7360	Combinatorial Optimization	
EECE 7370	Advanced Computer Vision	
EECE 7397	Advanced Machine Learning	

COMPUTER SCIENCE COURSE LIST

Code	Title	Hours
CS 5006	Algorithms	
CS 5100	Foundations of Artificial Intelligence	
CS 5330	Pattern Recognition and Computer Vision	
CS 5340	Computer/Human Interaction	
CS 6120	Natural Language Processing	
CS 6140	Machine Learning	
CS 6350	Empirical Research Methods	
CS 7140	Advanced Machine Learning	
DS 5220	Supervised Machine Learning and Learning Theory	

Industrial Engineering, MSIE

The Department of Mechanical and Industrial Engineering (MIE) offers comprehensive research and educational programs for students pursuing the Master of Science (MS) in Industrial Engineering. Industrial engineering (IE) applies mathematical modeling and analytical tools to make better decisions for designing and managing efficient and effective systems. IE is applied in many areas, including healthcare systems, supply chains, logistics and transportation engineering, manufacturing, sustainability, resilient systems, energy systems, and human-in-the loop systems. We partner with organizations ranging from startups to well-established corporations, to government and nongovernment organizations. For example, our supply chain resilience research is trying to understand and mitigate persistent drug shortages in the United States. Our research in healthcare systems engineering uses methods from lean six-sigma tools to advanced mathematical models to improve system and product reliability and optimize healthcare process quality, delays, cost, efficiency, and effectiveness—national priorities. Recent healthcare applications include improvements in

scheduling, readmissions, cost reductions, cancer care, and health services planning. We use stochastic and simulation modeling to study environmental issues related to green manufacturing, product recovery, and end-of-life management. We use data analytics for designing prognostics and preventive strategies for manufacturing operations. Our research and teaching together are designed to develop IE practitioners who can work, innovate, and excel in a variety of businesses. These extensive programs and course work allow for the selection of a degree that meets a wide variety of personal and professional goals.

General Degree Requirements

To be eligible for admission to any of the MS degree programs, a prospective student must hold a Bachelor of Science degree in engineering, science, mathematics, or an equivalent field. Students in all master's degree programs must complete a minimum of 32 semester hours of approved course work (exclusive of any preparatory courses) with a minimum grade-point average (GPA) of 3.000. Students can complete a master's degree by pursuing one of the three tracks: course work option, project option, and thesis option. Specific degree requirements for each of these tracks can be found under the Program Requirements tab. Also, students can complete their master's degree either on a full-time or part-time basis; however, certain restrictions may apply.

Special Ethics Requirement

All MIE graduate students are required to complete a brief online session on Responsible Conduct of Research and Plagiarism during their first semester of full-time study. All enrolled students will be sent proper instructions on how to complete this assignment and satisfy this important requirement. The outcome of the online session will be filed with the student's records.

Academic and Research Advisors

All nonthesis students (students doing course work or project options) are advised by the academic advisor designated for their respective concentration or program. Thesis option students must find a research advisor within their first year of study and may have thesis reader(s) at the discretion of their research advisor. The research advisor must be a full-time or jointly appointed faculty or affiliated member of the MIE department; otherwise, a petition must be filed and approved by the MIE Graduate Affairs Committee. If the research advisor is outside the MIE department, a faculty member with 50 percent or more appointments in the MIE department must be chosen as the co-advisor. Thesis option students are advised by the academic advisor designated for their concentration before they select their research advisor(s).

Plan of Study and Course Selection

It is recommended that all new students attend orientation sessions held by the MIE department and the Graduate School of Engineering to acquaint themselves with the course work requirements and research activities of the department as well as with the general policies, procedures, and expectations.

In order to receive proper guidance with their course work needs, all MS students are strongly encouraged to complete and submit a fully signed Plan of Study (PS) to the department before enrolling in second-semester courses. This form helps the students manage their course work as well as helps the department to plan for requested course offerings. The PS can be modified at any time as students progress in their degree programs. However, requests for changes in the PS must be processed before the requested change actually takes place. A revised PS form must also be approved and signed.

Each student's academic advisor must approve all courses prior to registration. Students may only use courses taken with the approval of the academic advisor toward the 32-semester-hour minimum requirement. However, students may petition the MIE Graduate Affairs Committee to substitute graduate-level courses from outside the approved list of electives.

Students pursuing study or research under the guidance of a faculty member can elect the project option by taking Master's Project (IE 7945). An MS project must be petitioned to the MIE Graduate Affairs Committee and approved by both the faculty member (instructor for MS Project) and the student's academic advisor. The petition must clearly state the reason for taking the course; a brief description of the goals; as well as the expected outcomes, deliverables, and grading scheme.

Students doing the course work option may petition the MIE Graduate Affairs Committee to substitute up to a 4-semester-hour Independent Study (IE 7978). An independent study must be approved by the academic advisor. The petition must clearly state the reason for taking the course; a brief description of goals; as well as the expected outcomes, deliverables, and grading scheme. Students in other options (i.e., thesis or project) are not eligible to take independent study.

Options for MS Students (course work only, project, or thesis)

Students accepted into any of the MS programs in the MIE department can choose one of the three options: course work only, project, or thesis. Please see the "Program Requirements" tab on the top menu of this page for more information. MS students who want to pursue project or thesis options must find within their first year of study a faculty member or a research advisor who will be willing to direct and supervise a mutually agreed research project or MS thesis. Moreover, students who receive financial support from the university in the form of a research, teaching, or tuition assistantship must complete an 8-semester-hour thesis.

Students who complete the thesis option must make a presentation of their thesis before approval by the department. The MS thesis presentation shall be publicly advertised at least one week in advance and all faculty members and students may attend and participate. If deemed appropriate by the research advisor, other faculty members may be invited to serve as "thesis readers" to provide technical opinions and judge the quality of the thesis and presentation.

Change of Program/Concentration

Students enrolled in any of the MIE department programs or concentrations may change their current program or concentration no sooner than the beginning of their second full-time semester of study. In order for the program or concentration change request to be considered by the MIE graduate affairs committee, the student must be in good academic standing and have completed at least 8 semester hours of required course work in their sought program at Northeastern. for instructions on how to request a program or concentration change.

Graduate Certificate Options

Students enrolled in a graduate degree program in the College of Engineering have the opportunity to pursue an engineering graduate certificate in addition to or in combination with the MS degree. For more information please refer to .

GORDON INSTITUTE OF ENGINEERING LEADERSHIP

Master's Degree in Industrial Engineering with Graduate Certificate in Engineering Leadership

Students may complete a Master of Science in Industrial Engineering in addition to earning a Graduate Certificate in Engineering Leadership. Students must apply and be admitted to the Gordon Engineering Leadership Program in order to pursue this option. The program requires fulfillment of the 16-semester-hour curriculum required to earn the Graduate Certificate in Engineering Leadership, which includes an industry-based challenge project with multiple mentors. The integrated 32-semester-hour degree and certificate will require 16 hours of advisor-approved industrial engineering technical courses.

Engineering Leadership (p. 222)

ENGINEERING BUSINESS
Master's Degree in Industrial Engineering with Graduate Certificate in Engineering Business

Students may complete a Master of Science in Industrial Engineering in addition to earning a Graduate Certificate in Engineering Business. Students must apply and be admitted to the Galante Engineering Business Program in order to pursue this option. The program requires the applicant to have earned or be in a program to earn a Bachelor of Science in Engineering from Northeastern University. The integrated 32-semester-hour degree and certificate will require 16 semester hours of the industrial engineering core courses and 16 semester hours from the outlined business-skill curriculum. The course work, along with participation in cocurricular professional development elements, earn the Graduate Certificate in Engineering Business.

Engineering Business (http://catalog.northeastern.edu/graduate/engineering/multidisciplinary/engineering-business-graduate-certificate)

Program Requirements
Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
IE 6200	Engineering Probability and Statistics	4
OR 6205	Deterministic Operations Research	4
Complete 8 semester hours from the following:		8
IE 5400	Healthcare Systems Modeling and Analysis	
IE 7200	Supply Chain Engineering	
IE 7215	Simulation Analysis	
IE 7315	Human Factors Engineering	
IE 7275	Data Mining in Engineering	

Options
Complete one of the following options:

COURSE WORK OPTION

Code	Title	Hours
Complete 16 semester hours from the course list below.		16

Note: Other approved courses may be chosen in consultation with a faculty advisor.

PROJECT OPTION

Code	Title	Hours
IE 7945	Master's Project	4
Complete 12 semester hours from the course list below.		12

Note: Other approved courses may be chosen in consultation with a faculty advisor.

THESIS OPTION

Code	Title	Hours
IE 7990	Thesis (required for all students who receive financial support from the university in the form of a research, teaching, or tuition assistantship)	8
Complete 8 semester hours from the course list below.		8

Note: Other approved courses may be chosen in consultation with a faculty advisor.

Course List

Code	Title	Hours
Computer Systems Engineering		
CSYE 7280	User Experience Design and Testing	
Information Systems		
INFO 6101	Data Science Engineering with Python	
General Engineering		
GE 5010	Customer-Driven Technical Innovation for Engineers	
GE 5100	Product Development for Engineers	
Engineering Management		
EMGT 5220	Engineering Project Management	
EMGT 5300	Engineering/Organizational Psychology	
EMGT 6225	Economic Decision Making	
EMGT 6305	Financial Management for Engineers	
Industrial Engineering		
IE 5617	Lean Concepts and Applications	
IE 5630	Biosensor and Human Behavior Measurement	
IE 6300	Manufacturing Methods and Processes	
IE 7275	Data Mining in Engineering	
IE 7280	Statistical Methods in Engineering	
IE 7285	Statistical Quality Control	
IE 7290	Reliability Analysis and Risk Assessment	
IE 7315	Human Factors Engineering	
Operations Research		
OR 7230	Probabilistic Operation Research	
OR 7235	Inventory Theory	
OR 7240	Integer and Nonlinear Optimization	
OR 7245	Network Analysis and Advanced Optimization	
OR 7310	Logistics, Warehousing, and Scheduling	

Program Credit/GPA Requirements
32 total semester hours required
Minimum 3.000 GPA required

Mechanical Engineering with Concentration in General Mechanical Engineering, MSME

While pursuing a Master of Science (MS) in Mechanical Engineering, students may choose no concentration or what is referred to as general mechanical engineering.

General Degree Requirements

To be eligible for admission to any of the MS degree programs, a prospective student must hold a Bachelor of Science degree in engineering, science, mathematics, or an equivalent field. Students in all master's degree programs must complete a minimum of 32 semester hours of approved course work (exclusive of any preparatory courses) with a minimum grade-point average (GPA) of 3.000. Students can complete a master's degree by pursuing any of one of the three tracks: course work option, project option, and thesis option. Specific degree requirements for each of these tracks can be found under the "Program Requirements" tab. Students may pursue any program either on a full-time or part-time basis; however, certain restrictions may apply.

Special Ethics Requirement

All MIE graduate students are required to complete a brief online session on Responsible Conduct of Research and Plagiarism during their first semester of full-time study. All enrolled students will be sent proper instructions on how to complete this assignment and satisfy this important requirement. The outcome of the online session will be filed with the student's records.

Academic and Research Advisors

All nonthesis students are advised by the academic advisor designated for their respective concentration or program. MS students doing thesis option must find a research advisor within their first year of study and may have thesis reader(s) at the discretion of their research advisor. The research advisor must be a full-time or jointly appointed faculty or affiliated member of the MIE department; otherwise, a petition must be filed and approved by the MIE Graduate Affairs Committee. If the research advisor is outside the MIE department, a faculty member with 50 percent or more appointments in the MIE department must be chosen as co-advisor. Thesis option students are advised by the academic advisor of their concentration before they select their research advisor(s).

Plan of Study and Course Selection

It is recommended that all new students attend orientation sessions held by the MIE department and the Graduate School of Engineering to acquaint themselves with the course work requirements and research activities of the department as well as with the general policies, procedures, and expectations.

In order to receive proper guidance with their course work needs, all MS students are strongly encouraged to complete and submit a fully signed Plan of Study (PS) to the department before enrolling in second-semester courses. This form helps the students manage their course work as well as helps the department to plan for requested course offerings. The PS form may be modified at any time as the students progress in their degree programs. However, requests for changes in the PS must be processed before the requested change actually takes place. A revised PS form must also be approved and signed.

Each student's academic advisor must approve all courses prior to registration. Students may only use courses taken with the approval of their academic advisor toward the 32-semester-hour minimum requirement. However, students may petition the MIE Graduate Affairs Committee to substitute graduate-level courses from outside the approved list of electives.

Students pursuing study or research under the guidance of a faculty member can choose project option by taking Master's Project (ME 7945). An MS project must be petitioned to the MIE Graduate Affairs Committee and approved by both the faculty member (instructor for Master's Project) and the student's academic advisor. The petition must clearly state the reason for taking the course; a brief description of the goals; as well as the expected outcomes, deliverables, and grading scheme.

Students doing course work option may petition the MIE Graduate Affairs Committee to substitute up to a 4-semester-hour Independent Study (ME 7978). An independent study must be approved by the academic advisor. The petition must clearly state the reason for taking the course; a brief description of the goals; as well as the expected outcomes, deliverables, and grading scheme. Students in other options (i.e., thesis or project) are not eligible to take independent study.

Options for MS Students (course work only, project, or thesis)

Students accepted into any of the MS programs in the MIE department can choose one of the three options: coursework only, project, or thesis. Please see the "Program Requirements" tab on the top menu of this page for more information. MS students who want to pursue project or thesis options must find, within the first year of their study, a faculty member or a research advisor who will be willing to direct and supervise a mutually agreed research project or MS thesis. Moreover, students who receive financial support from the university in the form of a research, teaching, or tuition assistantship must complete an 8-semester-hour thesis.

Students who complete the thesis option must make a presentation of their thesis before approval by the department. The MS thesis presentation shall be publicly advertised at least one week in advance and all faculty members and students may attend and participate. If deemed appropriate by the research advisor, other faculty members may be invited to serve as thesis readers to provide technical opinions and judge the quality of the thesis and presentation.

Change of Program/Concentration

Students enrolled in any of the MIE department programs or concentrations may change their current program or concentration no sooner than the beginning of their second full-time semester of study. In order for the program or concentration change request to be considered by the MIE graduate affairs committee, the student must be in good academic standing and have completed at least 8 semester hours of required course work in their sought program at Northeastern. See here for instructions on how to request a program or concentration change.

Graduate Certificate Options

Students enrolled in a master's degree have the opportunity to also pursue one of the many engineering graduate certificate options in addition to or in combination with the MS degree. Students should consult their faculty advisor regarding these options .

GORDON INSTITUTE OF ENGINEERING LEADERSHIP

Master's Degree in Mechanical Engineering with Concentration in General Mechanical Engineering with Graduate Certificate in Engineering Leadership

Students may complete a Master of Science in Mechanical Engineering with Concentration in General Mechanical Engineering in addition to earning a Graduate Certificate in Engineering Leadership. Students must apply and be admitted to the Gordon Engineering Leadership Program in order to pursue this option. The program requires fulfillment of the 16-semester-hour curriculum required to earn the Graduate Certificate in Engineering Leadership, which includes an industry-based challenge project with multiple mentors. The integrated 32-semester-hour degree and certificate will require 16 hours of advisor-approved mechanical engineering technical courses.

Engineering Leadership (p. 222)

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Mathematics Competency		
Complete 4 semester hours from the following:		4
ME 6200	Mathematical Methods for Mechanical Engineers 1	
ME 6201	Mathematical Methods for Mechanical Engineers 2	
Thermofluids Competency		
Complete 4 semester hours from the following:		4
ME 5685	Solar Thermal Engineering	
ME 5690	Gas Turbine Combustion	
ME 5695	Aerodynamics	
ME 7280	Statistical Thermodynamics	
ME 7295	Multiscale Flow and Transport Phenomena	
ME 7300	Combustion and Air Pollution	
ME 7305	Fundamentals of Combustion	
ME 7310	Computational Fluid Dynamics with Heat Transfer	
Mechanics/Mechatronics Combined Competency		
Complete 4 semester hours from the following:		4
EECE 5610	Digital Control Systems	
EECE 5666	Digital Signal Processing	
ME 5245	Mechatronic Systems	
ME 5250	Robot Mechanics and Control	
ME 5650	Advanced Mechanics of Materials	
ME 5655	Dynamics and Mechanical Vibration	
ME 5657	Finite Element Method	
ME 5659	Control Systems Engineering	
ME 7210	Elasticity and Plasticity	
ME 7238	Advanced Finite Element Method	
ME 7253	Advanced Vibrations	
Materials Competency		
Complete 4 semester hours from the following:		4
ME 5600	Materials Processing and Process Selection	
ME 5645	Environmental Issues in Manufacturing and Product Use	
or any MATL courses		

Options

Complete one of the following options:

COURSE WORK OPTION

Code	Title	Hours
Complete 16 semester hours in the following subject areas:		16
ME, MATL, or other graduate engineering courses		

PROJECT OPTION

Code	Title	Hours
ME 7945	Master's Project	4
Electives		
Complete 12 semester hours in the following subject areas:		12
ME, MATL, or other graduate engineering courses		

THESIS OPTION

Code	Title	Hours
ME 7990	Thesis (required for all students who receive financial support from the university in the form of a research, teaching, or tuition assistantship)	8
Electives		
Complete 8 semester hours in the following subject areas:		8
ME, MATL, or other graduate engineering courses		

Program Credit/GPA Requirements

32 total semester hours required
Minimum 3.000 GPA required

Mechanical Engineering with Concentration in Materials Science, MSME

While pursuing a Master of Science (MS) in Mechanical Engineering, students may choose materials science as a concentration. Materials science has been the key enabler in virtually all engineering breakthroughs that have occurred from early metal ages to the present nano age. In step with the scientific development and discovery of materials, members of the mechanical and industrial engineering (MIE) faculty are involved in interdisciplinary research to further materials processing, synthesis, and design. Research areas are aligned with Northeastern University's broad initiatives of sustainability, security, and health, as well as national initiatives in manufacturing and nanotechnology. Investigations in the areas of metals/alloys, polymers, biomaterials (including biomimetics), and composites incorporating nanoscale materials make use of experimental, theoretical, and computational techniques to tailor structure-processing-property relationships in materials for specific applications. Current areas of research include controlling synthesis and assembly processes to produce well-defined atomic structures; defect engineering; manipulating atomic/microstructures and the chemistry of materials to optimize properties for next-generation structural, electronic, and energy applications; solidification and deformation processing; and life-cycle assessments for nanocomposites/materials. Northeastern faculty and students are committed to creative thinking and engineering innovation to propel materials development to the forefront of scientific research.

General Degree Requirements

To be eligible for admission to any of the MS degree programs, a prospective student must hold a Bachelor of Science degree in engineering, science, mathematics, or an equivalent field. Students in all master's degree programs must complete a minimum of 32 semester hours of approved course work (exclusive of any preparatory courses) with a minimum grade-point average (GPA) of 3.000. Students can complete a master's degree by pursuing one of the three tracks: course work option, project option, and thesis option. Specific degree requirements for each of these tracks can be found under the "Program Requirements" tab. Students may pursue any program either on a full-time or part-time basis; however, certain restrictions may apply.

Special Ethics Requirement

All MIE graduate students are required to complete a brief online session on Responsible Conduct of Research and Plagiarism during their first semester of full-time study. All enrolled students will be sent proper instructions on how to complete this assignment and satisfy this important requirement. The outcome of the online session will be filed with the student's records.

Academic and Research Advisors

All nonthesis students (students doing project or course work options) are advised by the academic advisor designated for their respective concentration or program. MS students doing a thesis option must find a research advisor within their first year of study and may have thesis reader(s) at the discretion of their research advisor. The research advisor must be a full-time or jointly appointed faculty or affiliated member of the MIE department; otherwise, a petition must be filed and approved by the MIE Graduate Affairs Committee. If the research advisor is outside the MIE department, a faculty member with 50 percent or more appointments in the MIE department must be chosen as the co-advisor. Thesis option students are advised by the academic advisor designated for their specific concentration before they select their research advisor(s).

Plan of Study and Course Selection

It is recommended that all new students attend orientation sessions held by the MIE department and the Graduate School of Engineering to acquaint themselves with the course work requirements and research activities of the department as well as with the general policies, procedures, and expectations.

In order to receive proper guidance with their course work needs, all MS students are strongly encouraged to complete and submit a fully signed Plan of Study (PS) to the department before enrolling in second-semester courses. This form helps the students manage their course work as well as helps the department to plan for requested course offerings. The PS may be modified at any time as students progress in their degree programs. However, requests for changes in the PS must be processed before the requested change actually takes place. A revised PS form must also be approved and signed.

Each student's academic advisor must approve all courses prior to registration. Students may only use courses taken with the approval of their academic advisor toward the 32-semester-hour minimum requirement. However, students may petition the MIE Graduate Affairs Committee to substitute graduate-level courses from outside the approved list of electives.

Students pursuing study or research under the guidance of a faculty member can elect for project option by taking Master's Project (MATL 7945). An MS project must be petitioned to the MIE Graduate Affairs Committee and approved by both faculty member (instructor) and the academic (concentration) advisor. The petition must clearly state the reason for taking the course; a brief description of the goals; as well as the expected outcomes, deliverables, and grading scheme.

Students doing course work option may petition the MIE Graduate Affairs Committee to substitute up to a 4-semester-hour Independent Study (MATL 7978). An independent study must be approved by the academic advisor. The petition must clearly state the reason for taking the course; a brief description of the goals; as well as the expected outcomes, deliverables, and grading scheme. Students in other options (i.e., thesis or project) are not eligible to take independent study.

Options for MS Students (course work only, project, or thesis)

Students accepted into any of the MS programs in the MIE department can choose one of the three options: course work only, project, or thesis. Please see the "Program Requirements" tab on the top menu of this page for more information. MS students who want to pursue project or thesis options must find, within their first year of study, a faculty member or a research advisor who will be willing to direct and supervise a mutually agreed research project or MS thesis. Moreover, students who receive financial support from the university in the form of a research, teaching, or tuition assistantship must complete an 8-semester-hour thesis.

Students who complete the thesis option must make a presentation of their thesis before approval by the department. The MS thesis presentation shall be publicly advertised at least one week in advance and all faculty members and students may attend and participate. If deemed appropriate by the research advisor, other faculty members may be invited to serve as thesis readers to provide technical opinions and judge the quality of the thesis and presentation.

Change of Program/Concentration

Students enrolled in any of the MIE department programs or concentrations may change their current program or concentration no sooner than the beginning of their second full-time semester of study. In order for the program or concentration change request to be considered by the MIE graduate affairs committee, the student must be in good academic standing and have completed at least 8 semester hours of required course work in their sought program at Northeastern. See here (p. 125) for instructions on how to request a program or concentration change.

Graduate Certificate Options

Students enrolled in a master's degree have the opportunity to also pursue one of the many engineering graduate certificate options in addition to or in combination with the MS degree. Students should consult their faculty advisor regarding these options (p. 229).

GORDON INSTITUTE OF ENGINEERING LEADERSHIP

Master's Degree in Mechanical Engineering with Concentration in Materials Science with Graduate Certificate in Engineering Leadership

Students may complete a Master of Science in Mechanical Engineering with Concentration in Materials Science in addition to earning a Graduate Certificate in Engineering Leadership. Students must apply and be admitted to the Gordon Engineering Leadership Program in order to pursue this option. The program requires fulfillment of the 16-semester-hour curriculum required to earn the Graduate Certificate in Engineering Leadership, which includes an industry-based challenge project with multiple mentors. The integrated 32-semester-hour degree and certificate will require 16 hours of advisor-approved materials science technical courses.

Engineering Leadership (p. 222)

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Complete 16 semester hours from the following:		16
MATL 6250	Soft Matter	

Code	Title
MATL 6285	Structure, Properties, and Processing of Polymeric Materials
MATL 7350	Mechanical Behavior and Strengthening Mechanisms
MATL 7355	Thermodynamics of Materials
MATL 7360	Kinetics of Phase Transformations
ME 5600	Materials Processing and Process Selection
ME 5645	Environmental Issues in Manufacturing and Product Use

Options

Complete one of the following options:

COURSE WORK OPTION

Code	Title	Hours
Electives		
Complete 16 semester hours in the following subject areas:		16
ME, MATL, or other graduate engineering courses		

PROJECT OPTION

Code	Title	Hours
MATL 7945	Master's Project	4
Electives		
Complete 12 semester hours in the following subject areas:		12
ME, MATL, or other graduate engineering courses		

THESIS OPTION

Code	Title	Hours
ME 7990	Thesis [1]	8
Electives		
Complete 8 semester hours in the following subject areas:		8
ME, MATL, or other graduate engineering courses		

Program Credit/GPA Requirements

32 total semester hours required

[1] Required for all students who receive financial support from the university in the form of a research, teaching, or tuition assistantship.

Mechanical Engineering with Concentration in Mechanics and Design, MSME

While pursuing a Master of Science (MS) in Mechanical Engineering with Concentration in Mechanics and Design, the students will study the motion, deformation, and failure of solid materials in response to the action of direct forces and external fields. The students will also get a chance to conduct research with faculty and observe how these studies will lead to key engineering innovations and designs. Using complementary analytical, computational, experimental, and design tools, the M&D faculty members conduct research in the design and analysis of engineered functional materials/structures, in mechanics of adhesion and contact, and in biomechanics and mechanobiology. For example, in our biomechanics research, we strive to close the gap between function, form, and disease in the bone by using experimental and computational techniques; also, we explore the mechanics of lipid-based drug delivery vesicles. At the small length scales, we are creating a new understanding of nanomechanics, contact mechanics, tribology, MEMS, and the application of nanomaterials for energy storage systems. Our research and teaching together are designed to prepare students to understand and exploit mechanics to enable their future engineering innovations.

General Degree Requirements

To be eligible for admission to any of the MS degree programs, a prospective student must hold a Bachelor of Science in engineering, science, mathematics, or an equivalent field. Students in all master's degree programs must complete a minimum of 32 semester hours of approved course work (exclusive of any preparatory courses) with a minimum grade-point average (GPA) of 3.000. Students can complete a master's degree by pursuing one of the three tracks: course work option, project option, and thesis option. Specific degree requirements for each of these tracks can be found under the "Program Requirements" tab. Students may pursue any program either on a full-time or part-time basis; however, certain restrictions may apply.

Special Ethics Requirement

All MIE graduate students are required to complete a brief online session on Responsible Conduct of Research and Plagiarism during their first semester of full-time study. All enrolled students will be sent proper instructions on how to complete this assignment and satisfy this important requirement. The outcome of the online session will be filed with the student's records.

Academic and Research Advisors

All nonthesis students (students doing course work or project options) are advised by the academic advisor designated for their respective concentration or program. MS students doing a thesis option must find a research advisor within their first year of study and may have thesis reader(s) at the discretion of their research advisor. The research advisor must be a full-time or jointly appointed faculty or affiliated member of the MIE department; otherwise, a petition must be filed and approved by the MIE Graduate Affairs Committee. If the research advisor is outside the MIE department, a faculty member with 50 percent or more appointments in the MIE department must be chosen as the co-advisor. Thesis option students are advised by the academic advisor designated for their specific concentration before they select their research advisor(s).

Plan of Study and Course Selection

It is recommended that all new students attend orientation sessions held by the MIE department and the Graduate School of Engineering to acquaint themselves with the course work requirements and research activities of the department as well as with the general policies, procedures, and expectations.

In order to receive proper guidance with their course work needs, all MS students are strongly encouraged to complete and submit a fully signed Plan of Study (PS) to the department before enrolling in second-semester courses. This form helps the students manage their course work as well as helps the department to plan for requested course offerings. The PS may be modified at any time as students progress in their degree programs. However, requests for changes in the PS must be processed before the requested change actually takes place. A revised PS form must also be approved and signed.

Each student's academic advisor must approve all courses prior to registration. Students may only use courses taken with the approval of the academic advisor toward the 32-semester-hour minimum requirement. However, students may petition the MIE Graduate Affairs Committee to substitute graduate-level courses from outside the approved list of electives.

Students pursuing study or research under the guidance of a faculty member can elect for the project option by taking Master's Project

(ME 7945). A MS project must be petitioned to the MIE Graduate Affairs Committee and approved by both the faculty member (instructor for Master's Project) and the student's academic advisor. The petition must clearly state the reason for taking the course; a brief description of the goals; as well as the expected outcomes, deliverables, and grading scheme.

Students doing course work option may petition the MIE Graduate Affairs Committee to substitute up to a 4-semester-hour Independent Study (ME 7978). An independent study must be approved by the academic advisor. The petition must clearly state the reason for taking the course; a brief description of the goals; as well as the expected outcomes, deliverables, and grading scheme. Students in other options (i.e., thesis or project) are not eligible to take independent study.

Options for MS Students (course work only, project, or thesis)

Students accepted into any of the MS programs in the MIE department can choose one of the three options; course work only, project, or thesis. Please see the "Program Requirements" tab on the top menu of this page for more information. MS students who want to pursue project or thesis options must find, within their first year of study, a faculty member or a research advisor who will be willing to direct and supervise a mutually agreed research project or MS thesis. Moreover, students who receive financial support from the university in the form of a research, teaching, or tuition assistantship must complete an 8-semester-hour thesis.

Students who complete thesis option must make a presentation of their thesis before approval by the department. The MS thesis presentation shall be publicly advertised at least one week in advance and all faculty members and students may attend and participate. If deemed appropriate by the research advisor, other faculty members may be invited to serve as thesis readers to provide technical opinions and judge the quality of the thesis and presentation.

Change of Program/Concentration

Students enrolled in any of the MIE department programs or concentrations may change their current program or concentration no sooner than the beginning of their second full-time semester of study. In order for the program or concentration change request to be considered by the MIE Graduate Affairs Committee, the student must be in good academic standing and have completed at least 8 semester hours of required course work in their sought program at Northeastern. See here (p. 125) for instructions on how to request a program or concentration change.

Graduate Certificate Options

Students enrolled in a master's degree have the opportunity to also pursue one of the many engineering graduate certificate options in addition to or in combination with the MS degree. Students should consult their faculty advisor regarding these options (p. 229).

GORDON INSTITUTE OF ENGINEERING LEADERSHIP

Master's Degree in Mechanical Engineering with a Concentration in Mechanics and Design with Graduate Certificate in Engineering Leadership

Students may complete a Master of Science in Mechanical Engineering with a Concentration in Mechanics and Design in addition to earning a Graduate Certificate in Engineering Leadership. Students must apply and be admitted to the Gordon Engineering Leadership Program in order to pursue this option. The program requires fulfillment of the 16 semester-hour curriculum required to earn the Graduate Certificate in Engineering Leadership, which includes an industry-based challenge project with

multiple mentors. The integrated 32-semester-hour degree and certificate will require 16 hours of advisor-approved mechanics and design technical courses.

Engineering Leadership (p. 222)

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Mathematics Competency		
Complete 4 semester hours from the following:		4
ME 6200	Mathematical Methods for Mechanical Engineers 1	
ME 6201	Mathematical Methods for Mechanical Engineers 2	
Mechanics Competency		
Complete 12 semester hours from the following:		12
ME 5650	Advanced Mechanics of Materials	
ME 5655	Dynamics and Mechanical Vibration	
ME 5657	Finite Element Method	
ME 5659	Control Systems Engineering	
ME 7210	Elasticity and Plasticity	

Options

Complete one of the following options:

COURSE WORK OPTION

Code	Title	Hours
Complete 16 semester hours in the following subject areas:		16
ME, MATL, or other graduate engineering courses		

PROJECT OPTION

Code	Title	Hours
ME 7945	Master's Project	4
Electives		
Complete 12 semester hours in the following subject areas:		12
ME, MATL, or other graduate engineering courses		

THESIS OPTION

Code	Title	Hours
ME 7990	Thesis [1]	8
Electives		
Complete 8 semester hours in the following subject areas:		8
ME, MATL, or other graduate engineering courses		

Program Credit/GPA Requirements

32 total semester hours required
Minimum 3.000 GPA required

[1] Required for all students who receive financial support from the university in the form of a research, teaching, or tuition assistantship.

Mechanical Engineering with Concentration in Mechatronics, MSME

While pursuing a Master of Science (MS) in Mechanical Engineering, students may choose mechatronics as a concentration. The term

mechatronics is a combination of the words mechanics and electronics. Mechatronics is a multidisciplinary approach to product design and development, merging the principles of electrical, mechanical, computer, material, chemical, and industrial engineering. The mechatronics and systems research cluster in the MIE department is concerned with systems that are typically composed of traditional mechanical and electrical components but are rendered "intelligent" by the incorporation of sensors, actuators, and computer control systems. Our primary focus in mechatronics and systems is on intelligent and integrated systems and machines along with their practical applications ranging from manufacturing systems and robotic platforms to biological systems. Our research and teaching together are designed to prepare students to understand and exploit mechatronics to enable their future engineering innovations.

General Degree Requirements

To be eligible for admission to any of the MS degree programs, a prospective student must hold a Bachelor of Science in engineering, science, mathematics, or an equivalent field. Students in all master's degree programs must complete a minimum of 32 semester hours of approved course work (exclusive of any preparatory courses) with a minimum grade-point average (GPA) of 3.000. Students can complete a master's degree by pursuing one of the three tracks: course work option, project option, and thesis option. Specific degree requirements for each of these tracks can be found under the "Program Requirements" tab. Students may pursue any master's program either on a full-time or part-time basis; however, certain restrictions may apply.

Special Ethics Requirement

All MIE graduate students are required to complete a brief online session on Responsible Conduct of Research and Plagiarism during their first semester of full-time study. All enrolled students will be sent proper instructions on how to complete this assignment and satisfy this important requirement. The outcome of the online session will be filed with the student's records.

Academic and Research Advisors

All nonthesis students are advised by the academic advisor designated for their respective concentration or program. Students doing thesis option must find a research advisor within their first year of study and may have thesis reader(s) at the discretion of their research advisor. The research advisor must be a full-time or jointly appointed faculty or affiliated member of the MIE department; otherwise, a petition must be filed and approved by the MIE Graduate Affairs Committee. If the research advisor is outside the MIE department, a faculty member with 50 percent or more appointments in the MIE department must be chosen as the co-advisor.Thesis-option students are advised by the academic advisor designated for their specific concentration before they select their research advisor(s).

Plan of Study and Course Selection

It is recommended that all new students attend orientation sessions held by the MIE department and the Graduate School of Engineering to acquaint themselves with the course work requirements and research activities of the department as well as with the general policies, procedures, and expectations.

In order to receive proper guidance with their course work needs, all MS students are strongly encouraged to complete and submit a fully signed Plan of Study (PS) to the department before enrolling in second-semester courses. This form helps the students manage their course work as well as helps the department to plan for requested course offerings. The PS may be modified at any time as students progress in their degree programs. However, requests for changes in the PS must be processed before the requested change actually takes place. A revised PS form must also be approved and signed.

Each student's academic advisor must approve all courses prior to registration. Students may only use courses taken with the approval of the academic advisor toward the 32-semester-hour minimum requirement. However, students may petition the MIE Graduate Affairs Committee to substitute graduate-level courses from outside the approved list of electives.

Students pursuing study or research under the guidance of a faculty member can choose the project option by taking Master's Project (ME 7945). An MS project must be petitioned to the MIE Graduate Affairs Committee and approved by both faculty member (instructor) and the academic (concentration) advisor. The petition must clearly state the reason for taking the course; a brief description of the goals; as well as the expected outcomes, deliverables, and grading scheme.

Students doing the course work option may petition the MIE Graduate Affairs Committee to substitute up to a 4-semester-hour Independent Study (ME 7978). An independent study must be approved by the academic advisor. The petition must clearly state the reason for taking the course; a brief description of the goals; as well as the expected outcomes, deliverables, and grading scheme. Students in other options (i.e. thesis or project) are not eligible to take independent study.

Options for MS Students (course work only, project, or thesis)

Students accepted into any of the MS programs in the MIE department can choose one of the three options; course work only, project, or thesis. Please see the "Program Requirements" tab on the top menu of this page for more information. MS students who want to pursue project or thesis options must find, within their first year of study, a faculty member or a research advisor who will be willing to direct and supervise a mutually agreed research project or MS thesis. Moreover, students who receive financial support from the university in the form of a research, teaching, or tuition assistantship must complete an 8-semester-hour thesis.

Students who complete thesis option must make a presentation of their thesis before approval by the department. The MS thesis presentation shall be publicly advertised at least one week in advance and all faculty members and students may attend and participate. If deemed appropriate by the research advisor, other faculty members may be invited to serve as thesis readers to provide technical opinions and judge the quality of the thesis and presentation.

Change of Program/Concentration

Students enrolled in any of the MIE department programs or concentrations may change their current program or concentration no sooner than the beginning of their second full-time semester of study. In order for the program or concentration change request to be considered by the MIE Graduate Affairs Committee, the student must be in good academic standing and have completed at least 8 semester hours of required course work in their sought program at Northeastern.S ee here (p. 125) for instructions on how to request a program or concentration change.

Graduate Certificate Options

Students enrolled in a master's degree have the opportunity to also pursue one of the many engineering graduate certificate options in addition to or in combination with the MS degree. Students should consult their faculty advisor regarding these options (p. 229).

GORDON INSTITUTE OF ENGINEERING LEADERSHIP

Master's Degree in Mechanical Engineering with a Concentration in Mechatronics with Graduate Certificate in Engineering Leadership

Students may complete a Master of Science in Mechanical Engineering with a Concentration in Mechatronics in addition to earning a Graduate Certificate in Engineering Leadership. Students must apply and be admitted to the Gordon Engineering Leadership Program in order to pursue this option. The program requires fulfillment of the 16-semester-hour curriculum required to earn the Graduate Certificate in Engineering Leadership, which includes an industry-based challenge project with multiple mentors. The integrated 36-semester-hour degree and certificate will require 20 hours of advisor-approved mechatronics technical courses.

Engineering Leadership (p. 222)

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Mathematics Competency		
Complete 4 semester hours from the following:		4
ME 6200	Mathematical Methods for Mechanical Engineers 1	
ME 6201	Mathematical Methods for Mechanical Engineers 2	
ME 7205	Advanced Mathematical Methods for Mechanical Engineers	
Mechanics Competency		
Complete 4 semester hours from the following or other advisor-approved courses:		4
ME 5650	Advanced Mechanics of Materials	
ME 5655	Dynamics and Mechanical Vibration	
ME 5657	Finite Element Method	
ME 5250	Robot Mechanics and Control	
		8
Mechatronics Concentration		
ME 5245	Mechatronic Systems	
ME 5659	Control Systems Engineering	
Electrical Competency		
Complete 4 semester hours from the following or other advisor-approved courses:		4
EECE 5610	Digital Control Systems	
EECE 5666	Digital Signal Processing	
EECE 5680	Electric Drives	
EECE 5686	Electrical Machines	
EECE 7244	Introduction to Microelectromechanical Systems (MEMS)	

Options

Complete one of the following options:

COURSE WORK OPTION

Code	Title	Hours
Complete 12 semester hours from the course list.		12

PROJECT OPTION

Code	Title	Hours
ME 7945	Master's Project	4
Complete 8 semester hours from the course list.		8

THESIS OPTION

Code	Title	Hours
ME 7990	Thesis [1]	8
Complete 4 semester hours from the course list.		4

Course List

Code	Title	Hours
EECE 5606	Micro- and Nanofabrication	
EECE 5576	Wireless Communication Systems	
EECE 5686	Electrical Machines	
EECE 7242	Integrated Circuits for Mixed Signals and Data Communication	
IE 5630	Biosensor and Human Behavior Measurement	
ME 5250	Robot Mechanics and Control	
ME 6260	Introduction to Microelectromechanical Systems (MEMS)	
ME 7247	Advanced Control Engineering	
ME 7253	Advanced Vibrations	
Or any other ME, MATL, or other graduate engineering course		

Program Credit/GPA Requirements

32 total semester hours required
36 total semester hours required for students completing the Gordon Engineering Leadership Program in combination with the MSME degree
Minimum 3.000 GPA required

[1] Required for all students who receive financial support from the university in the form of a research, teaching, or tuition assistantship.

Mechanical Engineering with Concentration in Thermofluids, MSME

While pursuing a Master of Science (MS) in Mechanical Engineering, students may choose thermofluids as a concentration. Some of the representative research areas under this concentration may include thermodynamics, fluid dynamics, kinetic theory of gases, and thermophoresis of aerosols; microscale heat transfer phenomena and its effects on laser beam propagation; fundamentals of combustion such as burning speed and onset of auto-ignition measurement and flame stability analysis; development of chemistry reduction such as rate-controlled constrained-equilibrium method; formation and control of combustion-generated pollutants and greenhouse gases; chemistry, transport, and abatement of air pollution; alternative energy sources; combustion-based synthesis of materials; fire propagation, containment, and extinction; nonequilibrium thermodynamics; energy and gas turbine cooling technology; turbine blade cooling; and energy-related and calorimeter studies related to pharmaceutical developments. Our research and teaching together seek to prepare students to understand and exploit thermofluids to enable their future engineering innovations.

General Degree Requirements

To be eligible for admission to any of the MS degree programs, a prospective student must hold a Bachelor of Science in engineering,

science, mathematics, or an equivalent field. Students in all master's degree programs must complete a minimum of 32 semester hours of approved course work (exclusive of any preparatory courses) with a minimum grade-point average (GPA) of 3.000. Students can complete a master's degree by pursuing one of the three tracks: course work option, project option, and thesis option. Specific degree requirements for each of these tracks can be found under the "Program Requirements" tab. Students may pursue any program either on a full-time or part-time basis; however, certain restrictions may apply.

Special Ethics Requirement

All MIE graduate students are required to complete a brief online session on Responsible Conduct of Research and Plagiarism during their first semester of full-time study.All enrolled students will be sent proper instructions on how to complete this assignment and satisfy this important requirement. The outcome of the online session will be filed with the student's records.

Academic and Research Advisors

All nonthesis students are advised by the academic advisor designated for their respective concentration or program. Students doing thesis option must find a research advisor within their first year of study and may have thesis reader(s) at the discretion of their research advisor. The research advisor must be a full-time or jointly appointed faculty or affiliated member of the MIE department; otherwise, a petition must be filed and approved by the MIE Graduate Affairs Committee. If the research advisor is outside the MIE department, a faculty member with 50 percent or more appointments in the MIE department must be chosen as the co-advisor. Thesis-option students are advised by the academic advisor designated for their concentration before they select their research advisor(s).

Plan of Study and Course Selection

It is recommended that all new students attend orientation sessions held by the MIE department and the Graduate School of Engineering to acquaint themselves with the course work requirements and research activities of the department as well as with the general policies, procedures, and expectations.

In order to receive proper guidance with their course work needs, all MS students are strongly encouraged to complete and submit a fully signed Plan of Study (PS) to the department before enrolling in second-semester courses. This form helps the students manage their course work as well as helps the department to plan for requested course offerings. The PS may be modified at any time as students progress in their degree programs. However, requests for changes in PS must be processed before the requested change actually takes place. A revised PS form must also be approved and signed.

Each student's academic advisor must approve all courses prior to registration. Students may only use courses taken with the approval of the academic advisor toward the 32-semester-hour minimum requirement. However, students may petition the MIE Graduate Affairs Committee to substitute graduate-level courses from outside the approved list of electives.

Students pursuing study or research under the guidance of a faculty member can choose project option by taking Master's Project (ME 7945). An MS project must be petitioned to the MIE Graduate Affairs Committee and approved by both the faculty member (instructor for Master's Project) and the student's academic advisor. The petition must clearly state the reason for taking the course; a brief description of the goals; as well as the expected outcomes, deliverables, and grading scheme.

Students doing course work option may petition the MIE Graduate Affairs Committee to substitute up to a 4-semester-hour Independent Study (ME 7978). An independent study must be approved by the academic advisor. The petition must clearly state the reason for taking the course; a brief description of the goals; as well as the expected outcomes, deliverables, and grading scheme. Students in other options (i.e. thesis or project) are not eligible to take independent study.

Options for MS Students (course work only, project, or thesis)

Students accepted into any of the MS programs in the MIE department can choose one of the three options; course work only, project, or thesis. Please see the "Program Requirements" tab on the top menu of this page for more information. MS students who want to pursue project or thesis options must find, within the first year of their study, a faculty member or a research advisor who will be willing to direct and supervise a mutually agreed research project or MS thesis. Moreover, students who receive financial support from the university in the form of a research, teaching, or tuition assistantship must complete an 8-semester-hour thesis.

Students who complete the thesis option must make a presentation of their thesis before approval by the department. The MS thesis presentation shall be publicly advertised at least one week in advance and all faculty members and students may attend and participate. If deemed appropriate by the research advisor, other faculty members may be invited to serve as thesis readers to provide technical opinions and judge the quality of the thesis and presentation.

Change of Program/Concentration

Students enrolled in any of the MIE department programs or concentrations may change their current program or concentration no sooner than the beginning of their second full-time semester of study. In order for the program or concentration change request to be considered by the MIE Graduate Affairs Committee, the student must be in good academic standing and have completed at least 8 semester hours of required course work in their sought program at Northeastern. See here (p. 125) for instructions on how to request a program or concentration change.

Graduate Certificate Options

Students enrolled in a master's degree have the opportunity to also pursue one of the many engineering graduate certificate options in addition to or in combination with the MS degree. Students should consult their faculty advisor regarding these options (p. 229).

GORDON INSTITUTE OF ENGINEERING LEADERSHIP

Master's Degree in Mechanical Engineering with a Concentration in Thermofluids with Graduate Certificate in Engineering Leadership

Students may complete a Master of Science in Mechanical Engineering with a Concentration in Thermofluids in addition to earning a Graduate Certificate in Engineering Leadership. Students must apply and be admitted to the Gordon Engineering Leadership Program in order to pursue this option. The program requires fulfillment of the 16-semester-hour curriculum required to earn the Graduate Certificate in Engineering Leadership, which includes an industry-based challenge project with multiple mentors. The integrated 36-semester-hour degree and certificate will require 20 hours of advisor-approved thermofluids technical courses.

Engineering Leadership (p. 222)

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

General Requirements

Code	Title	Hours
Required Core Courses		
ME 6200	Mathematical Methods for Mechanical Engineers 1	4
or ME 6201	Mathematical Methods for Mechanical Engineers 2	
ME 7270	General Thermodynamics	4
ME 7275	Essentials of Fluid Dynamics	4
ME 7285	Heat Conduction and Thermal Radiation	4
or ME 7290	Convective Heat Transfer	
Thermofluids Concentration Course		
Complete 4 semester hours from the following:		4
ME 5685	Solar Thermal Engineering	
ME 5690	Gas Turbine Combustion	
ME 5695	Aerodynamics	
ME 7280	Statistical Thermodynamics	
ME 7295	Multiscale Flow and Transport Phenomena	
ME 7300	Combustion and Air Pollution	
ME 7305	Fundamentals of Combustion	
ME 7310	Computational Fluid Dynamics with Heat Transfer	

Options

Complete one of the following options:

COURSE WORK OPTION

Code	Title	Hours
Complete 12 semester hours from the following:		12
ME 5685	Solar Thermal Engineering	
ME 5690	Gas Turbine Combustion	
ME 5695	Aerodynamics	
ME 7280	Statistical Thermodynamics	
ME 7295	Multiscale Flow and Transport Phenomena	
ME 7300	Combustion and Air Pollution	
ME 7305	Fundamentals of Combustion	
ME 7310	Computational Fluid Dynamics with Heat Transfer	
Or any ME, MATL, or other graduate engineering course		

PROJECT OPTION

Code	Title	Hours
ME 7945	Master's Project	4
Complete 8 semester hours from the following:		8
ME 5685	Solar Thermal Engineering	
ME 5690	Gas Turbine Combustion	
ME 5695	Aerodynamics	
ME 7280	Statistical Thermodynamics	
ME 7295	Multiscale Flow and Transport Phenomena	
ME 7300	Combustion and Air Pollution	
ME 7305	Fundamentals of Combustion	
ME 7310	Computational Fluid Dynamics with Heat Transfer	

Or any ME, MATL, or other graduate engineering course

THESIS OPTION

Code	Title	Hours
ME 7990	Thesis [1]	8
Complete 4 semester hours from the following:		4
ME 5685	Solar Thermal Engineering	
ME 5690	Gas Turbine Combustion	
ME 5695	Aerodynamics	
ME 7280	Statistical Thermodynamics	
ME 7295	Multiscale Flow and Transport Phenomena	
ME 7300	Combustion and Air Pollution	
ME 7305	Fundamentals of Combustion	
ME 7310	Computational Fluid Dynamics with Heat Transfer	

Or any ME, MATL, or other graduate engineering course

Program Credit/GPA Requirements

32 total semester hours required
36 total semester hours required for students completing the Gordon Engineering Leadership Program in combination with the MSME degree
Minimum 3.000 GPA required

[1] Required for all students who receive financial support from the university in the form of a research, teaching, or tuition assistantship.

Operations Research, MSOR

The Department of Mechanical and Industrial Engineering (MIE) offers comprehensive research and educational programs for students pursuing the Master of Science (MS) in Operations Research (OR). OR deals with the application of scientific method to decision making. Its practitioners develop and solve mathematical and computer models of systems using optimization and statistical methods. OR methodologies are being used to improve efficiency, reduce costs, and increase profitability in all organizations whether in manufacturing, transportation, logistics and supply chains, healthcare, or financial institutions. Upon graduation, students who pursue this program may work in industry or may continue their studies by pursuing the PhD in Industrial Engineering. These extensive programs and course work allow for the selection of a degree that meets a wide range of personal and professional goals.

General Degree Requirements

To be eligible for admission to any of the MS degree programs, a prospective student must hold a Bachelor of Science degree in engineering, science, mathematics, or an equivalent field. Students in all master's degree programs must complete a minimum of 32 semester hours of approved course work (exclusive of any preparatory courses) with a minimum grade-point average (GPA) of 3.000. Students can complete a master's degree by pursuing one of the three tracks: course work option, project option, and thesis option. Specific degree requirements for each of these tracks can be found under the "Program Requirements" tab. Also, students can complete their master's degree either on a full-time or part-time basis; however, certain restrictions may apply.

Special Ethics Requirement

All MIE graduate students are required to complete a brief online session on Responsible Conduct of Research and Plagiarism during their first semester of full-time study. All enrolled students will be sent proper instructions on how to complete this assignment and satisfy this important requirement. The outcome of the online session will be filed with the student's records.

Academic and Research Advisors

All nonthesis students (students doing course work or project options) are advised by the academic advisor designated for their respective concentration or program. Students doing an MS thesis must find a research advisor within the first year of their study and may have thesis reader(s) at the discretion of their research advisor. The research advisor must be a full-time or jointly appointed faculty or affiliated member of the MIE department; otherwise, a petition must be filed and approved by the MIE Graduate Affairs Committee. If the research advisor is outside the MIE department, a faculty member with 50 percent or more appointments in the MIE department must be chosen as the co-advisor. Thesis option students are advised by the academic advisor designated for their specific concentration before they select their research advisor(s).

Plan of Study and Course Selection

It is recommended that all new students attend orientation sessions held by the MIE department and the Graduate School of Engineering to acquaint themselves with the course work requirements and research activities of the department as well as with the general policies, procedures, and expectations.

In order to receive proper guidance with their course work needs, all MS students are strongly encouraged to complete and submit a fully signed Plan of Study (PS) to the department before enrolling in second-semester courses. This form helps students manage their course work as well as helps the department to plan for requested course offerings. The PS may be modified at any time as the students progress in their degree programs. However, requests for changes in the PS must be processed before the requested change actually takes place. A revised PS form must also be approved and signed by the student's academic advisor.

Students pursuing study or research under the guidance of a faculty member can elect for project option by taking Master's Project (OR 7945). An MS project must be petitioned to the MIE Graduate Affairs Committee and approved by both the faculty member (instructor for MS Project) and the student's academic advisor. The petition must clearly state the reason for taking the course; a brief description of the goals; as well as expected outcomes, deliverables, and grading scheme.

Students doing course work option may petition the MIE Graduate Affairs Committee to substitute up to a 4-semester-hour Independent Study (OR 7978). An independent study must be approved by the academic advisor. The petition must clearly state the reason for taking the course; a brief description of the goals; as well as expected outcomes, deliverables, and grading scheme. Students in other options (i.e., thesis or project) are not eligible to take independent study.

Options for MS Students (course work only, project, or thesis)

Students accepted into any of the MS programs in the MIE department can choose one of the three options: course work only, project, or thesis. Please see the "Program Requirements" tab on the top menu of this page for more information. MS students who want to pursue project or thesis options must find, within their first year of study, a faculty member or a research advisor who will be willing to direct and supervise a mutually agreed research project or MS thesis. Moreover, students who receive financial support from the university in the form of a research, teaching, or tuition assistantship must complete an 8-semester-hour thesis.

Students who complete the thesis option must make a presentation of their thesis before approval by the department. The MS thesis presentation shall be publicly advertised at least one week in advance and all faculty members and students may attend and participate. If deemed appropriate by the research advisor, other faculty members may be invited to serve as thesis readers to provide technical opinions and judge the quality of the thesis and presentation.

Change of Program/Concentration

Students enrolled in any of the MIE department programs or concentrations may change their current program or concentration no sooner than the beginning of their second full-time semester of study. In order for the program or concentration change request to be considered by the MIE Graduate Affairs Committee, the student must be in good academic standing and have completed at least 8 semester hours of required course work in their sought program at Northeastern. See here (p. 125) for instructions on how to request a program or concentration change.

Graduate Certificate Options

Students enrolled in a graduate degree program in the College of Engineering have the opportunity to pursue an engineering graduate certificate in addition to or in combination with the MS degree. For more information please refer to Graduate Certificate Programs (p. 229).

GORDON INSTITUTE OF ENGINEERING LEADERSHIP
Master's Degree in Operations Research with Graduate Certificate in Engineering Leadership

Students may complete a Master of Science in Operations Research in addition to earning a Graduate Certificate in Engineering Leadership. Students must apply and be admitted to the Gordon Engineering Leadership Program in order to pursue this option. The program requires fulfillment of the 16-semester-hour curriculum required to earn the Graduate Certificate in Engineering Leadership, which includes an industry-based challenge project with multiple mentors. The integrated 32-semester-hour degree and certificate will require 16 hours of advisor-approved operations research technical courses.

Engineering Leadership (p. 222)

ENGINEERING BUSINESS
Master's Degree in Operations Research with Graduate Certificate in Engineering Business

Students may complete a Master of Science in Operations Research in addition to earning a Graduate Certificate in Engineering Business. Students must apply and be admitted to the Galante Engineering Business Program in order to pursue this option. The program requires the applicant to have earned or be in a program to earn a Bachelor of Science in Engineering from Northeastern University. The integrated 32-semester-hour degree and certificate will require 16 semester hours of the operations research core courses and 16 semester hours from the outlined business-skill curriculum. The course work, along with participation in cocurriculum professional development elements, earn the Graduate Certificate in Engineering Business.

Business Engineering (http://catalog.northeastern.edu/graduate/engineering/multidisciplinary/engineering-business-graduate-certificate)

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
IE 6200	Engineering Probability and Statistics	4
or MATH 7241	Probability 1	
OR 7245	Network Analysis and Advanced Optimization	4
or MATH 7234	Optimization and Complexity	
OR 7230	Probabilistic Operation Research	4
or MATH 7341	Probability 2	
OR 6205	Deterministic Operations Research	4

Options

Select one of the following options:

COURSE WORK OPTION

Code	Title	Hours
Complete 16 semester hours from the course list below.		16

PROJECT OPTION

Code	Title	Hours
OR 7945	Master's Project	4
Complete 12 semester hours from the course list below.		12

THESIS OPTION

Code	Title	Hours
OR 7990	Thesis (required for all students who receive financial support from the university in the form of a research, teaching, or tuition assistantship)	8
Complete 8 semester hours from the course list below.		8

Course List

Code	Title	Hours
Civil Engineering and Environmental Engineering		
CIVE 7100	Time Series and Geospatial Data Sciences	
Computer Science		
CS 5800	Algorithms	
CS 6140	Machine Learning	
CS 7805	Theory of Computation	
Computer Systems Engineering		
CSYE 7280	User Experience Design and Testing	
Data Science		
DS 5220	Supervised Machine Learning and Learning Theory	
DS 5230	Unsupervised Machine Learning and Data Mining	
General Engineering		
GE 5010	Customer-Driven Technical Innovation for Engineers	
GE 5100	Product Development for Engineers	
Electrical and Computer Engineering		
EECE 5644	Introduction to Machine Learning and Pattern Recognition	
EECE 7360	Combinatorial Optimization	
Engineering Management		
EMGT 5220	Engineering Project Management	
EMGT 5300	Engineering/Organizational Psychology	
EMGT 6225	Economic Decision Making	
EMGT 6305	Financial Management for Engineers	
Industrial Engineering		
IE 5374	Special Topics in Industrial Engineering (Data Visualization Engineering)	
IE 5374	Special Topics in Industrial Engineering (Human Performance in Sociotechnical Systems)	
IE 5400	Healthcare Systems Modeling and Analysis	
IE 5500	Systems Engineering in Public Programs	
IE 5617	Lean Concepts and Applications	
IE 5630	Biosensor and Human Behavior Measurement	
IE 6300	Manufacturing Methods and Processes	
IE 7200	Supply Chain Engineering	
IE 7215	Simulation Analysis	
IE 7275	Data Mining in Engineering	
IE 7280	Statistical Methods in Engineering	
IE 7285	Statistical Quality Control	
IE 7290	Reliability Analysis and Risk Assessment	
IE 7315	Human Factors Engineering	
Information Systems		
INFO 6101	Data Science Engineering with Python	
INFO 6210	Data Management and Database Design	
Mathematics		
MATH 7233	Graph Theory	
MATH 7342	Mathematical Statistics	
MATH 7346	Time Series	
MATH 7349	Stochastic Calculus and Introduction to No-Arbitrage Finance	
Operations Research		
OR 7235	Inventory Theory	
OR 7240	Integer and Nonlinear Optimization	
OR 7310	Logistics, Warehousing, and Scheduling	
Or any other IE, OR, MATH, CS, and graduate engineering courses		

Program Credit/GPA Requirements

32 total semester hours required
Minimum 3.000 GPA required

Data Analytics Engineering, Graduate Certificate

The Data Analytics Engineering Graduate Certificate program focuses on fundamental concepts, tools and techniques to extract information from large data sets in order to support effective decision making. This program is designed to provide opportunities for students to master high-

demand data intelligence skills through hands-on experience on data storage, data retrieval, data visualization and prediction.

This four-course graduate certificate enables the students to apply the fundamentals of engineering knowledge and skills to database design, data pre- and post-processing for further analysis, data visualization for impactful infographics, statistical concepts for quantitative analysis and data mining techniques and algorithms for knowledge discovery.

Note: MS in Data Analytics students are not eligible for this graduate certificate.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Required Courses		
IE 5650		4
IE 7275	Data Mining in Engineering	4
IE 7280	Statistical Methods in Engineering	4
INFO 6210	Data Management and Database Design	4

Program Credit/GPA Requirements

16 total semester hours required
Minimum 3.000 GPA required

Data Mining Engineering, Graduate Certificate

The Graduate Certificate in Data Mining Engineering focuses on the creation of statistical and predictive models and algorithms to analyze large data sets with attention on extracting information from data sets and transforming data into structures for further analysis.

This four-course graduate certificate seeks to provide students with opportunities to apply the fundamentals of engineering knowledge and skills to data warehousing, data management, data pre- and postprocessing, development of statistical models, structures discovery, and data visualization.

Note: Master of Science in Data Analytics students are not eligible for this graduate certificate.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Complete three of the following:		12
IE 5640	Data Mining for Engineering Applications	
or IE 7275	Data Mining in Engineering	
INFO 5100	Application Engineering and Development	
or CSYE 6200	Concepts of Object-Oriented Design	
INFO 6210	Data Management and Database Design	

Code	Title	Hours
INFO 7390	Advances in Data Sciences and Architecture	
Complete one of the following:		4
IE 7280	Statistical Methods in Engineering	
OR 6500	Metaheuristics and Applications	

Program Credit/GPA Requirements

16 total semester hours required
Minimum 3.000 GPA required

Multidisciplinary Programs

Website (http://www.coe.neu.edu/graduate-school/multidisciplinary)

Tristan E. Johnson, Ph.D.
Assistant Dean of Multidisciplinary Graduate Education and Digital Learning

Suite 500 Dana Research Center
617.373.6775
617-373-2501 (fax)

The multidisciplinary graduate engineering Master of Science (MS) programs integrate engineering with the fields of technology and business by developing technical and engineering skills through advanced course work and complex technical projects. Each program focuses on the application of knowledge and skills to business and industrial settings. The multidisciplinary graduate programs blend academic and corporate experience to enable students to enhance their professional capabilities, thereby facilitating career transformation. Given an applied focus, each program provides learning opportunities to develop the skills needed to create innovative, practical, and effective solutions that can be easily applied to current professional challenges.

Graduate Certificate Options

Students enrolled in a graduate degree program in the College of Engineering have the opportunity to pursue an engineering graduate certificate in addition to or in combination with the MS degree. For more information please refer to Graduate Certificate Programs (p. 229).

GORDON INSTITUTE OF ENGINEERING LEADERSHIP OPTION
Students have the opportunity to pursue the Gordon Engineering Leadership Program (p. 221) in combination with the MS degree.

ENGINEERING BUSINESS
Students have the opportunity to pursue the Galante Engineering Business Certificate (http://catalog.northeastern.edu/graduate/engineering/multidisciplinary/engineering-business-graduate-certificate) in combination with any of several MS degrees.

Programs
Master of Science in Computer Systems Engineering (MSCSE)

- Computer Systems Engineering with Concentration in the Internet of Things (p. 211)
- Computer Systems Engineering with Concentration in Software Design Engineering (p. 212)

Master of Science in Engineering Management (MSEM)

- Engineering Management (p. 213)

Master of Science in Energy Systems (MSENES)

Master of Science in Information Systems (MSIS)

Master of Science in Telecommunication Networks (MS)

Graduate Certificates

- Broadband Wireless Systems (http://catalog.northeastern.edu/graduate/engineering/multidisciplinary/broadband-wireless-systems-graduate-certificate)
- Computer Systems Engineering (http://catalog.northeastern.edu/graduate/engineering/multidisciplinary/computer-systems-graduate-certificate)
- Energy Systems (http://catalog.northeastern.edu/graduate/engineering/multidisciplinary/energy-systems-graduate-certificate)
- Energy Systems Management (http://catalog.northeastern.edu/graduate/engineering/multidisciplinary/energy-systems-management-graduate-certificate)
- Engineering Business (http://catalog.northeastern.edu/graduate/engineering/multidisciplinary/engineering-business-graduate-certificate)
- Engineering Economic Decision Making (http://catalog.northeastern.edu/graduate/engineering/multidisciplinary/engineering-economic-decision-making-graduate-certificate)
- Engineering Management (http://catalog.northeastern.edu/graduate/engineering/multidisciplinary/engineering-management-graduate-certificate)
- IP Telephony Systems (http://catalog.northeastern.edu/graduate/engineering/multidisciplinary/ip-telephony-systems-graduate-certificate)
- Lean Six Sigma (http://catalog.northeastern.edu/graduate/engineering/multidisciplinary/lean-six-sigma-graduate-certificate)
- Renewable Energy (http://catalog.northeastern.edu/graduate/engineering/multidisciplinary/renewable-energy-graduate-certificate)
- Supply Chain Engineering Management (http://catalog.northeastern.edu/graduate/engineering/multidisciplinary/supply-chain-engineering-management-graduate-certificate)
- Sustainable Energy Systems (http://catalog.northeastern.edu/graduate/engineering/multidisciplinary/sustainable-energy-systems-graduate-certificate)
- Technology Systems Management (http://catalog.northeastern.edu/graduate/engineering/multidisciplinary/technology-systems-management-graduate-certificate)

Computer Systems Engineering with Concentration in the Internet of Things, MSCSE

Website (http://www.coe.neu.edu/degrees/ms-cse-iot)

Peter O'Reilly, PhD
Program Director
Dana Hall 5th Floor
617.373.5548
poreilly@coe.neu.edu (p.oreilly@northeastern.edu)

The Master of Science in Computer Systems Engineering with a concentration in the Internet of Things (IoT) prepares our graduates for a world of connected devices. This innovative multidisciplinary program is designed to meet the demand for a new kind of specialist, one who can engineer and develop new interactive services; acquire, fuse, and process the data collected from sensors, actuators, controllers, and other devices; and develop architectures to interconnect these elements as part of larger, more diverse systems. It is expected that careers in this rapidly evolving area will encompass industry sectors ranging from energy, healthcare, transportation, infrastructure, to manufacturing.

This concentration integrates the study of wireless networking, protocols, sensor networks, security, software development, embedded systems, data analytics, and big data to provide students with the knowledge and tools to develop IoT applications, to analyze and design IoT architectures for different application domains, and to develop data analytic tools to analyze the large amounts of data generated by the massive deployment of IoT devices.

Degree Requirements

The program requires that a mix of core required courses and elective courses be taken—16 semester hours of core course work and a minimum of 16 semester hours of elective course work. Although there are some dependencies among the core courses, the program may be started in either the fall or spring semester. The core courses in data networks and/or concepts of object oriented design may be waived only if a student can demonstrate a satisfactory knowledge of either of these topic areas. The other two core courses may not be waived.

Special topics courses, as well as other courses not in the list of electives, may be used as electives with prior approval of the program director. A maximum of two courses from the College of Computer and Information Science (CCIS) may be used as electives. Before taking any CCIS course, prior approval is required from the program director.

Independent Study (CSYE 7978), usually 1 or 2 semester hours, or Software Engineering Project (CSYE 7945) in the Internet of Things must be carried out under the supervision of a professor and must have prior approval of the program director. Proposals for independent study or a software engineering project (IoT) need to be submitted at least one month before the start of the semester.

Graduate Certificate Options

Students enrolled in a master's degree have the opportunity to also pursue one of the many engineering graduate certificate options in addition to or in combination with the MS degree. Students should consult their faculty advisor regarding these options (p. 229).

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated. Students may not register for more than 10 semester hours in the fall and spring terms and 4 semester hours in each of the three summer terms. Any exceptions must be approved by the program director.

Core Requirements

Code	Title	Hours
CSYE 6200	Concepts of Object-Oriented Design	4
CSYE 6510	Fundamentals of the Internet of Things	4
CSYE 6530	Connected Devices	4
TELE 5330	Data Networking	4

Electives

Code	Title	Hours
Complete four of the following. A maximum of 8 semester hours of nontechnical electives may be taken. Students may take elective course work outside these lists only with the prior approval of the program director. A maximum of 9 semester hours may be taken outside of the College of Engineering.		16
Technical Electives		
CSYE 6225	Network Structures and Cloud Computing	
CSYE 6230	Operating Systems	
CSYE 7215	Foundations of Parallel, Concurrent, and Multithreaded Programming	
CSYE 7374	Special Topics in Computer Systems Engineering (Internet of Things)	
CSYE 7945	Software Engineering Project (Internet of Things)	
CSYE 7978	Independent Study (Internet of Things)	
DS 5220	Supervised Machine Learning and Learning Theory	
DS 5230	Unsupervised Machine Learning and Data Mining	
EECE 5155	Wireless Sensor Networks and the Internet of Things	
EECE 7390	Computer Hardware Security	
IE 5640	Data Mining for Engineering Applications	
or IE 7275	Data Mining in Engineering	
INFO 6101	Data Science Engineering with Python	
INFO 6105	Data Science Engineering Methods and Tools	
INFO 6150	Web Design and User Experience Engineering	
INFO 6205	Program Structure and Algorithms	
INFO 7290	Data Warehousing and Business Intelligence	
TELE 5360	Internet Protocols and Architecture	
Nontechnical Electives		
EMGT 5220	Engineering Project Management	
INFO 6660	Business Ethics and Intellectual Property for Engineers	

Program Credit/GPA Requirements

32 total semester hours required
Minimum 3.000 GPA required

Computer Systems Engineering with Concentration in Software Design Engineering, MSCSE

Website (http://www.coe.neu.edu/degrees/ms-cse)

Kal Bugrara, PhD
Senior Program Director
Dana Hall 5th Floor
kmb@coe.neu.edu

Our computer systems engineering program takes a sociotechnical, engineering approach to software. This engineering foundation is designed to enable students to embrace real-world complexity as a golden opportunity, especially for the more technically advanced student. We are committed to shaping our students to be intuitive problem solvers, experienced engineering architects, and result leaders who will have a great impact at the exciting three-way intersection of computer science, engineering, and ethics.

Our program offers a multitude of courses in big-data engineering and analytics in addition to supplementary courses that are required to deliver the data-analytics results in a meaningful way to management. We cover data management, advanced data management, business intelligence, column databases, data science, and big-data engineering. We offer advanced functional programming using the powerful Scala language and a course on advanced data science as well as cloud computing. Multi-thread concurrent computing is also offered as it is important for synchronizing a huge set of servers working in parallel to do large-scale analytics to make things run faster by a hundredfold increase in speed. Due to the high-level mathematical operations required to run these programs, only software engineers have the capacity to work in such complicated areas. Only they can make the necessary mathematical algorithms execute quickly enough to get the finest results.

Our engineers become fluent in data science for the sake of building the actual system. They study how to write machine-learning algorithms on top of statistical packages.

- Students study the fundamentals of logical computing formulation and program construction as well as the mathematical modeling and analysis of algorithms—an essential aspect of data science analytics.
- Students study clustering techniques, along with topic modeling and classification and logical regression techniques, as well as Bayesian statistics.
- Students study how to configure and operate a Hadoop environment (large clusters of commodity hardware) and in the process how to integrate data from diverse sources, to move and manage data through big-data platforms (in-house or in the cloud). Data ingestion, the filtering and firing of millions of operations to run over large clusters of commodity hardware, is a software-engineering technique that we teach our students how to perform through Scala, multi-threading, Spark programming, and "map-reduce" techniques.
- We show students how to make the business case for analytics projects and how to follow an execution road map that involves understanding the architectures underpinning such gigantic platforms as well as the resourcing and cost issues.

Graduate Certificate Options
GORDON INSTITUTE OF ENGINEERING LEADERSHIP
Master's Degree in Computer Systems Engineering with Concentration in Software Design Engineering with Graduate Certificate in Engineering Leadership

Students may complete a Master of Science in Computer Systems Engineering with Concentration in Software Design Engineering in addition to earning a Graduate Certificate in Engineering Leadership. Students must apply and be admitted to the Gordon Engineering Leadership Program in order to pursue this option. The program requires fulfillment of the 16-semester-hour curriculum required to earn the Graduate Certificate in Engineering Leadership, which includes an industry-based challenge project with multiple mentors. The integrated 32-semester-hour degree and certificate will require 16 hours of advisor-approved software design engineering technical courses.

Program Requirements
Core Requirements

Code	Title	Hours
Required Core		
The program does not accept any transfer credit. All 32 credits must be completed from the IS and CSYE program course work specified.		
CSYE 6200	Concepts of Object-Oriented Design	4
INFO 6205	Program Structure and Algorithms	4

Options

Complete one of the following options:

COURSE WORK OPTION

Code	Title	Hours
CSYE Courses		
A minimum of 16 and a maximum of 24 semester hours may be taken from the following list toward the elective requirement:		16 to 24
CSYE (CSYE 6510 and CSYE 6530 excluded)		
INFO Courses		
A maximum of 8 semester hours may be taken from the following list toward the elective requirement:		0 to 8
INFO (INFO 6250 excluded)		

THESIS OPTION [1]

Code	Title	Hours
CSYE 7990	Thesis	8
CSYE Courses		
A minimum of 8 and a maximum of 16 semester hours may be taken from the following list toward the elective requirement:		8 to 16
CSYE (CSYE 6510 and CSYE 6530 excluded)		
INFO Courses		
A maximum of 8 semester hours may be taken from the following list toward the elective requirement:		0 to 8
INFO (INFO 6250 excluded)		

Program Credit/GPA Requirements

32 total semester hours required
Minimum 3.000 GPA required

[1] Students who elect to pursue the thesis option must first propose a topic and advisor for their thesis and receive approval from the program director.

Engineering Management, MSEM

Website (http://www.mie.neu.edu/degrees/ms-em/#_ga=12490377606902590881443725887)

Thomas P. Cullinane, PhD
Professor and Program Director
334 Snell Engineering
617.373.4851
t.cullinane@northeastern.edu

Himlona Palikhe, PhD
Assistant Teaching Professor and Advisor
514 Dana Research Center
617.373.4288
h.palikhe@northeastern.edu

The Master of Science in Engineering Management offers graduate students an opportunity to develop both technical expertise and business competence that is in high demand among prospective technology-based employers. Industry leaders are seeking qualified and talented individuals who are not only able to guide research and design teams but also able to direct and supervise development and production processes. The combination of technical proficiency and business skills fostered in the engineering management program is designed to provide a competitive edge for graduates seeking a wide range of positions in technology-based product or service industries, as well as in comparable local, state, and federal agencies and programs.

The program was designed by experienced high-level managers and academic leaders as an option for engineers and scientists to broaden their skill sets to include management tools and techniques that are applicable to technology-based industries. Graduates of the engineering management program work as project managers or leaders of teams in technology-based industries. Upon completion of the program, students find that their acquired skills are applicable to a wide range of industries, primarily those focused upon the development of technical products and the management of technical projects.

Graduates may assist companies in bringing a product from an idea through its development phases to its introduction to the marketplace. They may also be involved in forming and managing teams for assessing cost-effectiveness, formulating strategies to improve production, or analyzing a company's supply chain. Most of these projects cannot be successfully completed without the skills of those possessing a background in management decision making and engineering expertise; therefore, the engineering management graduate is often a technical liaison to all levels of management. As a result, many of the assignments held by engineering management graduates have actually proven to be a gateway to upper-level management positions.

The current program of study can be taken on a part-time or full-time basis on-ground or online. There are four core courses required of all students, which have been formulated to satisfy the foundation requirements of economic decision making, decision-making mathematics, and project management. In addition to these required courses, the curriculum consists of electives that allow students to choose either a broad-based program of study or one centered on a particular concentration. Some students may elect to refresh or enhance their technical skills in engineering-based subjects such as information systems, computer systems engineering, or graduate courses from the traditional engineering disciplines. Other students may prefer to broaden their knowledge base by selecting course work in management subjects such as engineering organizational psychology, financial management, logistics and warehousing, supply chain engineering, or lean systems design. Additionally, students may also elect to complete the Gordon Engineering Leadership Program as part of their engineering management degree.

One recent graduate has observed that "Northeastern's MSEM is like an MBA for engineers, with high-quality, dedicated professors who are proficient in their field yet are able to convey information in a way that's easy to understand." This graduate also noted, "My courses in project management have been key to understanding the subtleties that affect Project Managers while technical courses provide a strong background in fundamentals as well as specialty topics. My experience with co-op has been outstanding and has truly helped me further my career."

Graduate Certificate Options

Students enrolled in a master's degree have the opportunity to also pursue one of the many engineering graduate certificate options in addition to or in combination with the MS degree. Students should consult their faculty advisor regarding these options (p. 229).

GORDON INSTITUTE OF ENGINEERING LEADERSHIP

Master's Degree in Engineering Management with Graduate Certificate in Engineering Leadership

Students may complete a Master of Science in Engineering Management in addition to earning a Graduate Certificate in Engineering Leadership. Students must apply and be admitted to the Gordon Engineering Leadership Program in order to pursue this option. The program requires fulfillment of the 16-semester-hour curriculum required to earn the Graduate Certificate in Engineering Leadership, which includes an industry-based challenge project with multiple mentors. The integrated 32-semester-hour degree and certificate will require 16 hours of advisor-approved engineering management technical courses.

Engineering Leadership (p. 222)

ENGINEERING BUSINESS

Master's Degree in Engineering Management with Graduate Certificate in Engineering Business

Students may complete a Master of Science in Engineering Management in addition to earning a Graduate Certificate in Engineering Business. Students must apply and be admitted to the Galante Engineering Business Program in order to pursue this option. The program requires the applicant to have earned or be in a program to earn a Bachelor of Science in Engineering from Northeastern University. The integrated 32-semester-hour degree and certificate will require 16 semester hours of the engineering management core courses and 16 semester hours from the outlined business-skill curriculum. The course work, along with participation in cocurricular professional development elements, earn the Graduate Certificate in Engineering Business.

Engineering Business (http://catalog.northeastern.edu/graduate/engineering/multidisciplinary/engineering-business-graduate-certificate)

Program Requirements
Core Requirements

Complete all courses and requirements listed below unless otherwise indicated. Students may not register for more than 9 semester hours in the fall, spring, and summer terms.

Code	Title	Hours
Required Courses		
OR 6205	Deterministic Operations Research	4
EMGT 5220	Engineering Project Management	4
EMGT 6225	Economic Decision Making	4
IE 6200	Engineering Probability and Statistics	4

Options

Complete one of the following options:

COURSE WORK OPTION

Code	Title	Hours
Complete 16 semester hours from the course list below. (p. 214)		16

PROJECT OPTION

Code	Title	Hours
EMGT 7945	Master's Project	4
Complete 12 semester hours from the course list below. (p. 214)		12

THESIS OPTION

Code	Title	Hours
EMGT 7990	Thesis	8
Complete 8 semester hours from the course list below. (p. 214)		8

ONLINE OPTION

Code	Title	Hours
Complete 16 semester hours from the course list below. (p. 214)		16
Courses offered online can be found on the online course list below. (p.)		

Course List

Code	Title	Hours
CSYE 7250	Big Data Architecture and Governance	
CSYE 7280	User Experience Design and Testing	
EMGT 5300	Engineering/Organizational Psychology	
EMGT 6305	Financial Management for Engineers	
EMGT 7978	Independent Study	
ENSY 5000	Fundamentals of Energy System Integration	
GE 5010	Customer-Driven Technical Innovation for Engineers	
GE 5020	Engineering Product Design Methodology	
GE 5030	Iterative Product Prototyping for Engineers	
GE 5100	Product Development for Engineers	
IE 5400	Healthcare Systems Modeling and Analysis	
IE 5500	Systems Engineering in Public Programs	
IE 5617	Lean Concepts and Applications	
IE 5640	Data Mining for Engineering Applications	
IE 6300	Manufacturing Methods and Processes	
IE 7200	Supply Chain Engineering	
IE 7215	Simulation Analysis	
IE 7275	Data Mining in Engineering	
IE 7280	Statistical Methods in Engineering	
IE 7285	Statistical Quality Control	
IE 7290	Reliability Analysis and Risk Assessment	
IE 7315	Human Factors Engineering	
INFO 6101	Data Science Engineering with Python	
INFO 6210	Data Management and Database Design	
INFO 6215	Business Analysis and Information Engineering	
INFO 7245	Agile Software Development	

INFO 7285	Organizational Change and IT
INFO 7290	Data Warehousing and Business Intelligence
INFO 7330	Information Systems for Healthcare-Services Delivery
INFO 7365	Enterprise Architecture Planning and Management
INFO 7385	Managerial Communications for Engineers
ME 5645	Environmental Issues in Manufacturing and Product Use
ME 6200	Mathematical Methods for Mechanical Engineers 1
OR 7230	Probabilistic Operation Research
OR 7235	Inventory Theory
OR 7240	Integer and Nonlinear Optimization
OR 7245	Network Analysis and Advanced Optimization
OR 7310	Logistics, Warehousing, and Scheduling
TELE 5330	Data Networking

Electives outside the College of Engineering

A maximum of 9 semester hours may be taken from the following list toward the elective requirement:

ENTR 6200	Enterprise Growth and Innovation
ENTR 6212	Business Planning for New Ventures
ENTR 6218	Business Model Design and Innovation
ENTR 6219	Financing Ventures from Early Stage to Exit
MGSC 6206	Management of Service and Manufacturing Operations
SCHM 6214	Sourcing and Procurement
SCHM 6215	Supply Chain Analytics
SCHM 6221	Sustainability and Supply Chain Management
SCHM 6223	Managing Healthcare Supply Chain Operations
SCHM 6224	Demand Planning and Forecasting
TECE 6222	Emerging and Disruptive Technologies
TECE 6230	Entrepreneurial Marketing and Selling
TECE 6250	Lean Design and Development
TECE 6300	Managing a Technology-Based Business
TECE 6340	The Technical Entrepreneur as Leader

Online Course List

Code	Title	Hours
EMGT 5300	Engineering/Organizational Psychology	
EMGT 6305	Financial Management for Engineers	
ENSY 5000	Fundamentals of Energy System Integration	
IE 5640	Data Mining for Engineering Applications	
IE 6300	Manufacturing Methods and Processes	
IE 7200	Supply Chain Engineering	
IE 7215	Simulation Analysis	
IE 7280	Statistical Methods in Engineering	

IE 7285	Statistical Quality Control
IE 7290	Reliability Analysis and Risk Assessment
IE 7315	Human Factors Engineering
INFO 6210	Data Management and Database Design
INFO 6215	Business Analysis and Information Engineering
ME 5645	Environmental Issues in Manufacturing and Product Use
ME 6200	Mathematical Methods for Mechanical Engineers 1
OR 7230	Probabilistic Operation Research
OR 7240	Integer and Nonlinear Optimization
OR 7310	Logistics, Warehousing, and Scheduling

Program Credit/GPA Requirements

32 total semester hours required
Minimum 3.000 GPA required

Energy Systems, MSENES

Website (http://www.coe.neu.edu/degrees/ms-es)

Hameed Metghalchi, Sc.D.
Professor and Program Director
Editor-in-Chief, Journal of Energy Resources Technology
319 Snell Engineering
617.373.2973
m.metghalchi@northeastern.edu

The Master of Science in Energy Systems (MSENES) integrates engineering, business, and policy into a high-level signature, multidisciplinary graduate program. Energy systems students have an opportunity to learn how to leverage business skills and public policy knowledge to accomplish their engineering goals. This program is ideal for the engineer or technical business major who is interested in pursuing an industrial or public-planning-based career.

The program's mission is to educate students in current and future energy systems technologies, to integrate energy-related technologies with the economics and financial considerations required to implement them, and to develop leadership and decision-making skills to implement energy systems in either the private or public sectors of the global market. The program will expose students to a combination of academic and corporate experience in energy systems.

The program curriculum features a multidisciplinary range of electives from five different academic colleges at Northeastern. The curriculum is flexibly designed with a set of four core courses in engineering knowledge and finance in addition to four electives. The core courses help relate these electives back to energy-related engineering concepts, including power strategies, energy renewal, sustainable energy solutions, energy storage, energy conversion, and energy efficiency. By integrating concepts across these disciplines, our students learn that implementing energy solutions requires an economic solution as well as an engineering one.

Students are exposed to business educators and practicing professionals and have the opportunity to participate in a six-month co-op experience. Practicing professionals with experience in the industry who have successfully implemented energy systems or devices and policies

are actively involved in the program as adjunct professors and invited speakers. Through this curriculum and interaction with practitioners, students should be prepared to effectively integrate energy system development over a broad spectrum of technologies with the financial requirements to successfully implement them and to compete in the global energy market.

Successful graduates of the program will be involved in the decision making or policy planning that will deliver minimally polluting, energy-efficient systems to the global market. They will have the base training necessary to lead efforts within companies to plan and implement new energy-generation investments, realize energy-efficiency improvements specifically at the system level, and participate in energy and environmental markets such as cap-and-trade systems.

Graduate Certificate Options

Students enrolled in a master's degree have the opportunity to also pursue one of the many engineering graduate certificate options in addition to or in combination with the MS degree. Students should consult their faculty advisor regarding these options (p. 229).

GORDON INSTITUTE OF ENGINEERING LEADERSHIP
Master's Degree in Energy Systems with Graduate Certificate in Engineering Leadership

Students may complete a Master of Science in Energy Systems in addition to earning a Graduate Certificate in Engineering Leadership. Students must apply and be admitted to the Gordon Engineering Leadership Program in order to pursue this option. The program requires fulfillment of the 16-semester-hour curriculum required to earn the Graduate Certificate in Engineering Leadership, which includes an industry-based challenge project with multiple mentors. The integrated 36-semester-hour degree and certificate will require 20 hours of advisor-approved energy systems technical courses.

Engineering Leadership (p. 222)

Program Requirements
Core Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Code	Title	Hours
Required Courses		
EMGT 6225	Economic Decision Making	4
ENSY 5000	Fundamentals of Energy System Integration	4
ME 6200	Mathematical Methods for Mechanical Engineers 1	4
FINA 6309	Foundations of Accounting and Finance	4

Options
Complete one of the following options:

GENERAL OPTION

Code	Title	Hours
Complete 16 semester hours from the course list below. (p.)		16

ONLINE/HYBRID OPTION

Code	Title	Hours
Complete 16 semester hours from the course list below. (p.)		16
Courses offered online can be found on the Online/Hybrid Course List. (p.)		

Course List

Code	Title	Hours
CHEM 5651	Materials Chemistry of Renewable Energy	
CHME 5630	Biochemical Engineering	
EECE 5680	Electric Drives	
EECE 5682	Power Systems Analysis 1	
EECE 5684	Power Electronics	
EECE 5686	Electrical Machines	
EECE 7398	Special Topics	
EMGT 5220	Engineering Project Management	
ENGR 5670	Sustainable Energy: Materials, Conversion, Storage, and Usage	
ENSY 5100	Hydropower	
ENSY 5200	Energy Storage Systems	
ENSY 5300	Electrochemical Energy Storage	
ENSY 5400	Power Plant Design and Analysis	
ENSY 5585	Wind Energy Systems	
ENSY 7374	Special Topics in Energy Systems	
ENSY 7440	Energy Systems Engineering Leadership Challenge Project 1	
ENSY 7442	Energy Systems Engineering Leadership Challenge Project 2	
ENSY 7945	Master's Project	
ENSY 7978	Independent Study	
IE 6200	Engineering Probability and Statistics	
ME 5645	Environmental Issues in Manufacturing and Product Use	
ME 5685	Solar Thermal Engineering	
ME 5690	Gas Turbine Combustion	
ME 7270	General Thermodynamics	
ME 7300	Combustion and Air Pollution	
ME 7305	Fundamentals of Combustion	
OR 6205	Deterministic Operations Research	
SBSY 5200	Sustainable Engineering Systems for Buildings	
Nontechnical Electives		
A maximum of 5 semester hours may be taken from the following list toward the elective requirement:		
ARCH 5210 and ARCH 5211	Environmental Systems and Recitation for ARCH 5210	
FINA 6203	Investment Analysis	
FINA 6205	Financial Strategy	
FINA 6215	Business Turnarounds	

Online/Hybrid Course List

Code	Title	Hours
EECE 5682	Power Systems Analysis 1	
EMGT 5220	Engineering Project Management	

IE 6200	Engineering Probability and Statistics	
ME 5645	Environmental Issues in Manufacturing and Product Use	
ME 5685	Solar Thermal Engineering	
ME 7270	General Thermodynamics	
OR 6205	Deterministic Operations Research	

Program Credit/GPA Requirements

32 total semester hours required
Minimum 3.000 GPA required

Energy Systems, MSENES—Academic Link Program

Website (http://www.coe.neu.edu/degrees/ms-es)

Hameed Metghalchi, Sc.D.
Professor and Program Director
Editor-in-Chief, Journal of Energy Resources Technology
319 Snell Engineering
617.373.2973
m.metghalchi@northeastern.edu

Designing and implementing optimal methods to produce and utilize energy is one of the most pressing global issues today. Finding ways to implement these solutions that are sustainable and marketable is key. The energy systems Academic Link (AL) program is meant to provide students of all—STEM disciplines (such as English, Sociology, Business, etc.) with the foundation skills necessary to gain the skills needed to create and implement energy solutions. Students will begin the program by taking two core courses that cover topics across thermosciences and math along with the general energy systems curriculum.

The Academic Link core courses will provide students with an introduction to the fundamentals that are necessary to be successful in the energy system program. Once students complete the Academic Link courses they will move through our multidisciplinary energy systems curriculum that integrates engineering, business, and policy. Our curriculum is flexibly designed with a set of core courses in engineering and finance complemented by a range of electives across five different academic colleges. Our core and elective courses will help to prepare students to lead the efforts to implement energy systems solutions that have a long-term positive effect on businesses and communities.

Graduate Certificate Options

Students enrolled in a master's degree have the opportunity to also pursue one of the many engineering graduate certificate options in addition to or in combination with the MS degree. Students should consult their faculty advisor regarding these options (p. 229).

Program Requirements
General Requirements

A minimum of 40 semester hours must be earned toward completion of the MSES-AL degree. A minimum grade-point average of 3.000 is required over all courses applied toward the degree.

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
ENSY 5050	Fundamentals of Thermal Science 1	4
ENSY 5060	Fundamentals of Thermal Science 2	4

Code	Title	Hours
EMGT 6225	Economic Decision Making	4
ENSY 5000	Fundamentals of Energy System Integration	4
ME 6200	Mathematical Methods for Mechanical Engineers 1	4
FINA 6309	Foundations of Accounting and Finance	4

Options

Complete one of the following options:

GENERAL OPTION

Code	Title	Hours
Complete 16 semester hours from the course list below. (p.)		16

ONLINE/HYBRID OPTION

Code	Title	Hours
Complete 16 semester hours from the course list below. (p.)		16
Courses offered online can be found on the online/hybrid course list. (p.)		

Course List

Code	Title	Hours
CHEM 5651	Materials Chemistry of Renewable Energy	
CHME 5630	Biochemical Engineering	
EECE 5680	Electric Drives	
EECE 5682	Power Systems Analysis 1	
EECE 5684	Power Electronics	
EECE 5686	Electrical Machines	
EECE 7398	Special Topics	
EMGT 5220	Engineering Project Management	
ENGR 5670	Sustainable Energy: Materials, Conversion, Storage, and Usage	
ENSY 5100	Hydropower	
ENSY 5200	Energy Storage Systems	
ENSY 5300	Electrochemical Energy Storage	
ENSY 5400	Power Plant Design and Analysis	
ENSY 5585	Wind Energy Systems	
ENSY 7374	Special Topics in Energy Systems	
ENSY 7440	Energy Systems Engineering Leadership Challenge Project 1	
ENSY 7442	Energy Systems Engineering Leadership Challenge Project 2	
ENSY 7945	Master's Project	
ENSY 7978	Independent Study	
IE 6200	Engineering Probability and Statistics	
ME 5645	Environmental Issues in Manufacturing and Product Use	
ME 5685	Solar Thermal Engineering	
ME 5690	Gas Turbine Combustion	
ME 7270	General Thermodynamics	
ME 7300	Combustion and Air Pollution	
ME 7305	Fundamentals of Combustion	
OR 6205	Deterministic Operations Research	

SBSY 5200	Sustainable Engineering Systems for Buildings	

Nontechnical Electives

A maximum of 5 semester hours may be taken from the following list toward the elective requirement:		
ARCH 5210 and ARCH 5211	Environmental Systems and Recitation for ARCH 5210	
FINA 6203	Investment Analysis	
FINA 6205	Financial Strategy	
FINA 6215	Business Turnarounds	

Online/Hybrid Course List

Code	Title	Hours
EECE 5682	Power Systems Analysis 1	
EMGT 5220	Engineering Project Management	
IE 6200	Engineering Probability and Statistics	
ME 5645	Environmental Issues in Manufacturing and Product Use	
ME 5685	Solar Thermal Engineering	
ME 7270	General Thermodynamics	
OR 6205	Deterministic Operations Research	

Program Credit/GPA Requirements

40 total semester hours required
Minimum 3.000 GPA required

Information Systems, MSIS

Website (http://www.coe.neu.edu/degrees/ms-is)

Kal Bugrara, PhD
Senior Program Director
Dana Hall 5th Floor
kmb@coe.neu.edu

We offer cutting-edge expertise in a variety of courses that combine technological advances and business practices. We stress creative and inventive approaches to problem solving, which necessitates empowering students so that they can take charge of their own software projects to become originally productive. Our Information Systems program is as much an art as a science. It bypasses mechanical learning and highlights the value and excitement of engineering thinking that gets things done efficiently as well as imaginatively. We balance theory and practice, on the premise that they are always intertwined and interdependent.

We seek to provide a basic foundation for our students and then seek to push them to new heights to advance their information technology skills in a way that keeps up and, better yet, exceeds the necessarily fast pace of this progressive field. It is not for us just a question of not being left behind; we strive to be at the forefront of software innovation in an effort to transform contemporary society even more radically than technology has already done—to take gigantic strides in business, medicine, education, and security.

The program offers a wide range of courses that reflect current and future industry trends:

- Cryptocurrency and Smart Contract Engineering
- Engineering of Big-Data Systems
- Business Intelligence and Data Analytics
- Cyber-Security Engineering and Development
- Digital Business
- Full-Stack Software Engineering
- User Experience Design
- Data Science and Machine Learning Systems Engineering

Program Concentrations

You can complete the MSIS program with one of the following concentrations:

- General information systems
- User experience
- Big data systems and analytics
- Smart contracts
- Intelligent systems

Seattle and Silicon Valley Campuses

Students can complete this degree at our Seattle and Silicon Valley campuses. Students will have the option to choose from a continually expanding list of electives that are offered strategically to meet industry demand in Seattle and Silicon Valley.

Graduate Certificate Options

Students enrolled in the MSIS program in the College of Engineering have the opportunity to pursue the graduate certificate in Engineering Leadership or the Graduate Certificate in Computer Systems Engineering (http://catalog.northeastern.edu/graduate/engineering/multidisciplinary/computer-systems-graduate-certificate) in addition to or in combination with the MS degree.

GORDON INSTITUTE OF ENGINEERING LEADERSHIP
Master's Degree in Information Systems with Graduate Certificate in Engineering Leadership

Students may complete a master's degree in Information Systems in addition to earning a Graduate Certificate in Engineering Leadership. Students must apply and be admitted to the Gordon Engineering Leadership Program in order to pursue this option. The program requires fulfillment of the 16 semester-hour-curriculum required to earn the Graduate Certificate in Engineering Leadership, which includes an industry based challenge project with multiple mentors. The integrated 32 semester hour degree and certificate will require 16 hours of advisor-approved Information Systems technical courses.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated. Students may not register for more than 9 semester hours in the fall, spring, and summer terms. All 32 credits must be completed from the IS and CSYE program course work specified. The MSIS program does not accept any transfer credit.

Core Requirements

Code	Title	Hours
INFO 5100 and INFO 5101	Application Engineering and Development and Lab for INFO 5100	4

Concentrations

Complete one of the following concentrations:

- Big Data Systems and Analytics (p. 219)
- Smart Contracts (p. 219)
- Intelligent Systems (p. 219)

GENERAL INFORMATION SYSTEMS

Code	Title	Hours
Complete 16 semester hours in the following subject area		16
(INFO 7290 and INFO 6101 excluded):		
INFO		

USER EXPERIENCE

Code	Title	Hours
CSYE 7280	User Experience Design and Testing	4
INFO 6150	Web Design and User Experience Engineering	4
INFO 6245	Planning and Managing Information Systems Development	4
INFO 6350	Smartphones-Based Web Development	4

BIG DATA SYSTEMS AND ANALYTICS

Code	Title	Hours
CSYE 6225	Network Structures and Cloud Computing	4
CSYE 7245	Big-Data Systems and Intelligence Analytics	4
INFO 7250	Engineering of Big-Data Systems	4
INFO 7390	Advances in Data Sciences and Architecture	4

SMART CONTRACTS

Code	Title	Hours
Complete four from the following:		16
INFO 7500	Cryptocurrency and Smart Contract Engineering	
INFO 7510	Smart Contract Application Engineering and Development	
INFO 7520	Engineering of Advanced Cryptocurrency Systems	
INFO 7525	Regulatory Aspects of Smart Contract Automation	
INFO 7535	Digital Smart Contracts Product Innovations	

INTELLIGENT SYSTEMS

Code	Title	Hours
CSYE 7245	Big-Data Systems and Intelligence Analytics	4
CSYE 7280	User Experience Design and Testing	4
INFO 7375		
INFO 7610	Special Topics in Natural Language Engineering Methods and Tools	4

Electives

Code	Title	Hours
Complete 12 semester hours from the following subject areas		12
(CSYE 6220, CSYE 6510, and CSYE 6530 excluded):		
INFO		
CSYE		

Seattle Campus Course List

Code	Title	Hours
CSYE 6225	Network Structures and Cloud Computing	
CSYE 7245	Big-Data Systems and Intelligence Analytics	
CSYE 7280	User Experience Design and Testing	
INFO 6150	Web Design and User Experience Engineering	
INFO 6205	Program Structure and Algorithms	
INFO 6210	Data Management and Database Design	
INFO 6215	Business Analysis and Information Engineering	
INFO 6250	Web Development Tools and Methods	
INFO 6350	Smartphones-Based Web Development	
INFO 7250	Engineering of Big-Data Systems	
INFO 7390	Advances in Data Sciences and Architecture	

Silicon Valley Campus Course List

Code	Title	Hours
INFO 7500	Cryptocurrency and Smart Contract Engineering	4
INFO 7510	Smart Contract Application Engineering and Development	4

Program Credit/GPA Requirements

32 total semester hours required
Minimum 3.000 GPA required

Telecommunication Networks, MS

Website (http://www.coe.neu.edu/degrees/ms-tsm)

Peter O'Reilly, PhD
Program Director
Dana Hall 5th Floor
617.373.5548
poreilly@coe.neu.edu (p.oreilly@northeastern.edu)

The Master of Science in Telecommunication Networks is designed for professionals currently in the telecommunications or networking field who either wish to enhance their technical skills and credentials or who wish to make a transition to the business side of telecommunications or networking. We also welcome applications from prospective students with limited industry experience. This program, which may be pursued on a full- or part-time basis, is one of only a very few master's programs in telecommunications and networking in the United States that is truly multidisciplinary, giving students the flexibility to tailor the curriculum to their specific interests, backgrounds, and career goals.

Degree Requirements

The program requires that a mix of core required courses and elective courses be taken—16 semester hours of core course work and a minimum of 16 semester hours of elective course work. Although there are some dependencies among the core courses, the program may be started in either the fall or spring semester.

There are four required core courses and a wide range of technical and business electives available. The core courses each carry 4 semester

hours of credit. A maximum of two of the core courses may be waived only if a student has taken similar course material at another university with a satisfactory grade. If a technical core course is waived, it must be replaced with a technical elective. Similarly, if the business core course is waived, it must be replaced with a business elective.

At least one of the electives must be a business elective and at least one must be a technical elective. The technical electives include courses on network and communications technology and on the development of software systems and applications. The business electives are focused on engineering management and entrepreneurship. Electives come from approved lists of courses supplied by the colleges of engineering, business, and computer and information science. All students must take at least one technical elective and one business elective. These electives must be courses of at least 3 semester hours. Students may take elective course work outside these lists only with the prior approval of the program director.

It is expected that students beginning this program will have an adequate background in the following areas: C, C++, or Java programming languages; probability and statistics; and differential and integral calculus.

Special topics courses, as well as other courses from outside the program, may be used as electives with prior approval of the program director.

Independent Study (TELE 5978), usually 1 or 2 semester hours, or Master's Project (TELE 6945) is sometimes available for students and must be carried out under the supervision of a professor and must have prior approval of the program director. Proposals for Independent Study or a Master's Project need to be submitted at least one month before the start of the semester.

Directed Study (TELE 5976), also for 1 or 2 semester hours, is sometimes available for students. For directed study projects, a student follows a prescribed curriculum, usually with some form of an exam at the end of the semester.

Graduate Certificate Options

Students enrolled in a master's degree have the opportunity to also pursue one of the many engineering graduate certificate options in addition to or in combination with the MS degree. Students should consult their faculty advisor regarding these options (p. 229).

GORDON INSTITUTE OF ENGINEERING LEADERSHIP
Master's Degree in Telecommunication Networks with Graduate Certificate in Engineering Leadership

Students may complete a Master of Science in Telecommunications Networks in addition to earning a Graduate Certificate in Engineering Leadership. Students must apply and be admitted to the Gordon Engineering Leadership Program in order to pursue this option. The program requires fulfillment of the 16-semester-hour curriculum required to earn the Graduate Certificate in Engineering Leadership, which includes an industry-based challenge project with multiple mentors. The integrated 32-semester-hour degree and certificate require 12 hours of technical core courses from the telecommunication networks program and 4 hours from the technical course list provided for this program.

Engineering Leadership (p. 222)

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated. Students may not register for more than 10 semester hours in the fall and spring terms and 4 semester hours in each of the three summer terms. Any exceptions must be approved by the program director.

Core Requirements

Code	Title	Hours
TELE 5330 and TELE 5331	Data Networking and Lab for TELE 5330	4
TELE 5340	Telecommunications Public Policy and Business Management	4
TELE 5350	Telecom and Network Infrastructure	4
TELE 5360	Internet Protocols and Architecture	4

Electives

A grade of C or higher is required in each elective. At least one course must be taken from the business course list and at least one course from the technical course list.

Code	Title	Hours
Complete a minimum of 16 semester hours from the course lists below (p. 220)		16

BUSINESS COURSE LIST

Code	Title	Hours
EMGT 5220	Engineering Project Management	
EMGT 6225	Economic Decision Making	
EMGT 6305	Financial Management for Engineers	
ENTR 6200	Enterprise Growth and Innovation	
ENTR 6212	Business Planning for New Ventures	
ENTR 6218	Business Model Design and Innovation	
ENTR 6219	Financing Ventures from Early Stage to Exit	
HRMG 6200	Managing People and Organizations	
INFO 6245	Planning and Managing Information Systems Development	
MGMT 6214	Negotiations	
MGSC 6206	Management of Service and Manufacturing Operations	
MKTG 6200	Creating and Sustaining Customer Markets	
TECE 6222	Emerging and Disruptive Technologies	
TECE 6230	Entrepreneurial Marketing and Selling	
TECE 6250	Lean Design and Development	
TECE 6300	Managing a Technology-Based Business	

TECHNICAL COURSE LIST

Code	Title	Hours
CS 5520	Mobile Application Development	
CS 6710	Wireless Network	
CS 6740	Network Security	
CSYE 6200	Concepts of Object-Oriented Design	
CSYE 6225	Network Structures and Cloud Computing	
CSYE 6510	Fundamentals of the Internet of Things	
EECE 5155	Wireless Sensor Networks and the Internet of Things	
EECE 5576	Wireless Communication Systems	
EECE 7364	Mobile and Wireless Networking	

IA 5150 and IA 5151	Network Security Practices and Lab for IA 5150
INFO 6101	Data Science Engineering with Python
INFO 6210	Data Management and Database Design
INFO 6350	Smartphones-Based Web Development
TELE 5600	Linux/UNIX Systems Management for Network Engineers
TELE 6100	Mobile Wireless Communications and Networking
TELE 6200	Advanced Data Networking
TELE 6350	IP Telephony
TELE 6360	Operation Support Systems in Telecommunications
TELE 6400	Software-Defined Networking
TELE 6603	Special Topics—Networking

Program Credit/GPA Requirements

Minimum of 32 total semester hours required

Minimum 3.000 GPA required

Gordon Institute of Engineering Leadership

Website (http://www.northeastern.edu/gordonleadership)

Simon Pitts
Institute Director

415 Stearns Center
617.373.6052
617.373.7680 (fax)

Amy Manley, Director of Admissions and Marketing, a.manley@northeastern.edu or gordonleadership@northeastern.edu

The Gordon Engineering Leadership Program (GEL) offered by the Gordon Institute of Engineering Leadership is a transformational graduate program designed to build a future corps of engineering leadership professionals. GEL seeks to accelerate leadership development capability in an engineering context through a concentrated curriculum that inculcates both the psychological skills and capabilities needed to lead engineers in parallel with technical skills to successfully engineer products to customers and markets. The program teaches relevant leadership theory followed by practice in leadership laboratories. Technical product development and scientific principles courses are followed by the completion of a market-worthy challenge project. This learning framework is supplemented with three-way mentoring from industry, faculty, and program mentors. Graduates of the program, known as Gordon Fellows, have an opportunity to gain the knowledge, skills, and attitudes required to successfully lead engineering teams. They stand out from their peers in their ability to invent, innovate, and implement engineering projects from concept to market success. Participation in GEL accelerates Gordon Fellows' careers, making them more valuable to their company.

The Challenge

When relatively unseasoned engineers run teams or projects, most fail to satisfy all of the project's critical requirements—missing the mark in functionality, performance, quality, time-to-market, cost, or other key objectives.

This shortfall exists because engineers enter the workforce without critical skills related to:

- Competitiveness
- Taking responsibility to prevent failure
- Market and customer focus
- Influencing and motivating skills
- Interdisciplinary decision making and teamwork capability
- Simultaneous optimization of all elements of performance, quality, cost, and timing
- Front-loading the engineering process
- Financial acumen
- Big-picture engineering
- Leadership abilities and organizational social awareness
- Enterprise understanding
- Program management tools and processes
- Designing to avoid failure modes
- Designing for lean manufacture

The Mission

GEL's mission is to create an elite cadre of engineering leaders who stand out from their peers in their ability to invent, innovate, and implement engineering projects from concept to market success.

These leaders will demonstrate an exceptional ability to lead engineering teams by providing purpose, direction, and motivation to influence others to achieve their collective goals.

The Method

To close the gaps and realize its mission, GEL concentrates on the knowledge, skills, and abilities that reside at the intersection of engineering and leadership.

At the end of the program, Gordon Fellows emerge with the awareness, confidence, vision, and technical dexterity to drive positive change within their organizations and society.

Admissions

GEL candidates must apply for and be admitted to both the Northeastern Graduate School of Engineering and the Gordon Engineering Leadership Program.

Students pursue GEL as part of a Master of Science degree in the engineering discipline of their choice or as a stand-alone graduate certificate. Upon completion of a Master of Science degree, students earn both the Master of Science degree in the discipline of choice and a Graduate Certificate in Engineering Leadership. Students who already hold a graduate degree in engineering or have greater than three years' engineering work experience can complete the program to earn a Graduate Certificate in Engineering Leadership. The core GEL curriculum takes place during one calendar year (September–July), and additional course work required for the Master of Science degree can be pursued before, after, or in parallel with GEL.

Programs
Graduate Certificate: Stand-Alone or Combined with Existing MS Degree

The Graduate Certificate in Engineering Leadership can be pursued as a stand-alone certificate, or the certificate can be earned in conjunction with existing Master of Science degrees offered by the College of Engineering.

Departments across the College of Engineering have developed graduation requirements that enable students to earn both the MS degree and the engineering leadership graduate certificate. Please contact your faculty mentor for details.

CORE REQUIREMENTS

Complete all courses and requirements listed below unless otherwise indicated.

Code	Title	Hours
ENLR 5121	Engineering Leadership 1	2
ENLR 5122	Engineering Leadership 2	2
ENLR 5131	Scientific Foundations of Engineering 1	2
ENLR 5132	Scientific Foundations of Engineering 2	2
ENLR 7440	Engineering Leadership Challenge Project 1	4
ENLR 7442	Engineering Leadership Challenge Project 2	4

PROGRAM CREDIT/GPA REQUIREMENTS

16 total semester hours required
Minimum 3.000 GPA required

The following MS programs can be taken in conjunction with the Engineering Leadership Graduate Certificate

- Master of Science in Bioengineering (http://www.northeastern.edu/gordonleadership/degree/ms-in-bioengineering)
- Master of Science in Biotechnology (http://www.northeastern.edu/gordonleadership/degree/ms-in-biotechnology)
- Master of Science in Chemical Engineering (http://www.northeastern.edu/gordonleadership/degree/chemical-engineering)
- Master of Science in Civil Engineering—Select Master of Science concentration (http://www.northeastern.edu/gordonleadership/degree/ms-in-civil-engineering-2)
- Master of Science in Computer Systems Engineering (http://www.northeastern.edu/gordonleadership/degree/computer-systems-engineering)
- Master of Science in Data Analytics Engineering (http://www.northeastern.edu/gordonleadership/degree/ms-in-data-analytics-engineering)
- Master of Science in Electrical and Computer Engineering—Select Master of Science concentration (http://www.northeastern.edu/gordonleadership/degree/electrical-and-computer-engineering)
- Master of Science in Electrical and Computer Engineering Leadership (http://www.northeastern.edu/gordonleadership/degree/electrical-and-computer-engineering-leadership)
- Master of Science in Energy Systems (http://www.northeastern.edu/gordonleadership/degree/energy-systems)
- Master of Science in Engineering and Public Policy with a Concentration in Energy and Environment (http://www.northeastern.edu/gordonleadership/degree/ms-in-engineering-and-public-policy-with-a-concentration-in-energy-environment)
- Master of Science in Engineering and Public Policy with a Concentration in Infrastructure Resilience (http://www.northeastern.edu/gordonleadership/degree/ms-in-engineering-and-public-policy-with-a-concentration-in-infrastructure-resilience)
- Master of Science in Environmental Engineering (http://www.northeastern.edu/gordonleadership/degree/ms-in-environmental-engineering)
- Master of Science in Engineering Management (http://www.northeastern.edu/gordonleadership/degree/engineering-management)
- Master of Science in Industrial Engineering (http://www.northeastern.edu/gordonleadership/degree/industrial-engineering)
- Master of Science in Information Systems (http://www.northeastern.edu/gordonleadership/degree/ms-in-information-systems)
- Master of Science in Information Assurance and Cyber Security (http://www.northeastern.edu/gordonleadership/degree/information-assurance-and-cyber-security)
- Master of Science in Mechanical Engineering—Select Master of Science concentration (http://www.northeastern.edu/gordonleadership/degree/mechanical-engineering-2)
- Master of Science in Operations Research (http://www.northeastern.edu/gordonleadership/degree/operationsresearch)
- Master of Science in Sustainable Building Systems (http://www.northeastern.edu/gordonleadership/degree/ms-in-sustainable-building-systems)
- Master of Science in Telecommunication Networks (p. 219)

For engineering leadership certificate and MS combined course requirements, please refer to the Certificate and Degree Options (http://www.northeastern.edu/gordonleadership/prospective-students/degree-options) found on the Gordon Institute of Engineering Leadership website.

Engineering Leadership, Graduate Certificate

The Gordon Engineering Leadership Program is a transformational, technical, and challenging graduate-level learning experience targeted for engineering professionals.

The Gordon Institute offers a **Graduate Certificate in Engineering Leadership** as formal recognition of midlevel engineers' leadership acumen and broadened cross-functional capabilities.

Pursuing the graduate certificate allows participants to:

- Take part in a hands-on curriculum taught by industry-experienced professors
- Work with peers from across engineering fields on leadership skills development
- Receive one-on-one mentoring from industry experts and faculty

The Gordon Engineering Leadership Program anchors around an intense, market-worthy challenge project based on your organization's strategic needs. This is a unique opportunity to apply your classroom experience in a professional setting, potentially further accelerating your career.

How to Earn a Graduate Certificate in Engineering Leadership

If you already have a Master of Science, then you can complete the one-year program to earn a Graduate Certificate in Engineering Leadership.

If you do not have a Master of Science, then you can still be considered for the Graduate Certificate in Engineering Leadership if you have at least three years of engineering work experience.

Additional Information can be found on the Gordon Engineering Leadership Program website. (http://www.northeastern.edu/gordonleadership)

Beyond a Graduate Certificate

Most candidates pursue the Gordon Engineering Leadership Program as part of a Master of Science degree in the engineering discipline of their choice. Upon completion, they earn both the Master of Science degree and a Graduate Certificate in Engineering Leadership.

Additional Information on Master of Science degrees in conjunction with a Graduate Certificate in Engineering Leadership can be found here (p. 221).

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
ENLR 5121	Engineering Leadership 1	2
ENLR 5122	Engineering Leadership 2	2
ENLR 5131	Scientific Foundations of Engineering 1	2
ENLR 5132	Scientific Foundations of Engineering 2	2
ENLR 7440	Engineering Leadership Challenge Project 1	4
ENLR 7442	Engineering Leadership Challenge Project 2	4

The following MS programs can be taken in conjunction with the Engineering Leadership Graduate Certificate

- Master of Science in Bioengineering (http://www.northeastern.edu/gordonleadership/degree/ms-in-bioengineering)
- Master of Science in Biotechnology (http://www.northeastern.edu/gordonleadership/degree/ms-in-biotechnology)
- Master of Science in Chemical Engineering (http://www.northeastern.edu/gordonleadership/degree/chemical-engineering)
- Master of Science in Civil Engineering—Select Master of Science concentration (http://www.northeastern.edu/gordonleadership/degree/ms-in-civil-engineering-2)
- Master of Science in Computer Systems Engineering (http://www.northeastern.edu/gordonleadership/degree/computer-systems-engineering)
- Master of Science in Data Analytics Engineering (http://www.northeastern.edu/gordonleadership/degree/ms-in-data-analytics-engineering)
- Master of Science in Electrical and Computer Engineering—Select Master of Science concentration (http://www.northeastern.edu/gordonleadership/degree/electrical-and-computer-engineering)
- Master of Science in Electrical and Computer Engineering Leadership (http://www.northeastern.edu/gordonleadership/degree/electrical-and-computer-engineering-leadership)
- Master of Science in Energy Systems (http://www.northeastern.edu/gordonleadership/degree/energy-systems)
- Master of Science in Engineering and Public Policy with a Concentration in Energy and Environment (http://www.northeastern.edu/gordonleadership/degree/ms-in-engineering-and-public-policy-with-a-concentration-in-energy-environment)
- Master of Science in Engineering and Public Policy with a Concentration in Infrastructure Resilience (http://www.northeastern.edu/gordonleadership/degree/ms-in-engineering-and-public-policy-with-a-concentration-in-infrastructure-resilience)
- Master of Science in Engineering Management (http://www.northeastern.edu/gordonleadership/degree/engineering-management)
- Master of Science in Environmental Engineering (http://www.northeastern.edu/gordonleadership/degree/ms-in-environmental-engineering)
- Master of Science in Industrial Engineering (http://www.northeastern.edu/gordonleadership/degree/industrial-engineering)
- Master of Science in Information Systems (http://www.northeastern.edu/gordonleadership/degree/ms-in-information-systems)
- Master of Science in Information Assurance and Cyber Security (http://www.northeastern.edu/gordonleadership/degree/information-assurance-and-cyber-security)
- Master of Science in Mechanical Engineering—Select Master of Science concentration (http://www.northeastern.edu/gordonleadership/degree/mechanical-engineering-2)
- Master of Science in Operations Research (http://www.northeastern.edu/gordonleadership/degree/operationsresearch)
- Master of Science in Sustainable Building Systems (http://www.northeastern.edu/gordonleadership/degree/ms-in-sustainable-building-systems)
- Master of Science in Telecommunication Networks (http://www.northeastern.edu/gordonleadership/degree/ms-in-telecommunication-networks)

For the Graduate Certificate in Engineering Leadership and MS combined course requirements please refer to the Certificate and Degree Options (http://www.northeastern.edu/gordonleadership/prospective-students/degree-options) found on the Gordon Institute of Engineering Leadership website.

Program Credit/GPA Requirements

16 total semester hours required
Minimum 3.000 GPA required

Interdisciplinary PhD Programs

Thomas C. Sheahan, ScD
Senior Associate Dean for Academic Affairs
130 Snell Engineering Center
617.373.2711

The Graduate School of Engineering offers an interdisciplinary educational and research approach. PhD students conduct research and collaborate with faculty and students across disciplines to gain both depth and breadth of experience and knowledge in their area of study. Many of the student faculty advisors are jointly appointed across departments and colleges. Additionally, our PhD students have the opportunity to conduct transformative, use-inspired research in one of our multidisciplinary research centers of excellence with the goal of developing novel solutions to solve the engineering grand challenges of the 21st century.

Programs
Doctor of Philosophy (PhD)

Information Assurance, PhD

A research-based, interdisciplinary Doctor of Philosophy (PhD) in Information Assurance combines a strong security technical foundation with a security policy and social sciences perspective. It seeks to prepare graduates to advance the state-of-the-art of security in systems, networks, and the internet in industry, academia, and government. The interdisciplinary nature of the program distinguishes it from traditional doctoral degree programs in computer science, engineering, or social sciences and makes it unique in the Boston area.

Students who choose the PhD in information assurance program have a strong desire to pursue academic research solving critical cybersecurity challenges facing today's society. The PhD program is a natural path for students in the college's Master of Science in Information Assurance and Cybersecurity (http://www.ccs.neu.edu/graduate/degree-programs/m-s-in-information-assurance)program who want to pursue research and students with bachelor's degrees and an interest in research-focused careers. Students who pursue careers in advancing the state-of-the art of cybersecurity have an opportunity to gain:

- A strong technical foundation in cybersecurity and an interdisciplinary perspective based on policy and social science
- A path to a research-focused career coupled with depth in information assurance research at a leading institution, one of the earliest designees by NSA/DHS as a National Center of Academic Excellence (http://www.nsa.gov/ia/academic_outreach/nat_cae/index.shtml) in Information Assurance Research, Information Assurance/Cyber Defense, and Cyber Operations
- The opportunity to work with and learn from faculty who are recognized internationally for their expertise and contributions in information assurance from Northeastern's College of Computer and Information Science, the Department of Electrical and Computer Engineering, and the College of Social Sciences and Humanities
- Access to research projects at Northeastern's research centers focused on security:
  - The Cybersecurity and Privacy Institute (https://cyber.ccis.northeastern.edu/about): The mission of Northeastern's Cybersecurity and Privacy Institute is to safeguard critical technology. Forging partnerships with experts in industry, government, and academia worldwide, the Institute's faculty and students develop, protect, and enhance technologies on which the world relies—from mobile devices and "smart" IoT applications to tomorrow's self-driving cars and delivery drones. Their expertise spans algorithm auditing, cloud security, cryptography, differential privacy, embedded device security, Internet-scale security measurements, machine learning, big data, and security, malware and advanced threats, network protocols and security, Web and mobile security, wireless network security.
  - The International Secure Systems Lab (http://www.iseclab.org), affiliated with Northeastern, a collaborative effort of European

and U.S. researchers focused on web security, malware and vulnerability analysis, intrusion detection, and other computer security issues
- The ALERT Center (http://www.northeastern.edu/alert), where Northeastern is the lead institution, a multiuniversity Department of Homeland Security Center of Excellence involved in research, education, and technology related to threats from explosives

The benefits of the Boston area:

- World-renowned for academic and research excellence, the Boston area is also home to some of the nation's largest Department of Defense contractors and government and independent labs such as MIT Lincoln Lab, MITRE, and Draper Lab

Degree Requirements

The PhD in information assurance degree requires completion of at least 48 semester credit hours beyond a bachelor's degree. Students who enter with an undergraduate degree will typically need four to five years to complete the program, and they will be awarded a master's degree en route to the PhD.

Doctoral Degree Candidacy

A student is considered a PhD degree candidate after completing the core courses with at least a 3.400 grade-point average (GPA) and either publishing a paper in a strong conference or journal or passing an oral exam that is conducted by a committee of three information assurance faculty members and based on paper(s) written by the student.

RESIDENCY
One year of continuous full-time study is required after admission to the PhD candidacy. During this period, the student will be expected to make substantial progress in preparing for the comprehensive examination.

DISSERTATION ADVISING
The doctoral dissertation advising team for each student consists of two information assurance faculty members, one in a technical area. When appropriate, the second faculty advisor will be from the policy/social science area.

DISSERTATION COMMITTEE
A PhD student's dissertation committee consists of the two members of the dissertation advising team plus two others: One is a member of the information assurance faculty, and the other is an external examiner who is knowledgeable about the student's research topic.

COMPREHENSIVE EXAMINATION
A PhD student must submit a written dissertation proposal and present it to the dissertation committee. The proposal should identify the research problem, the research plan, and the potential impact of the research on the field. The presentation of the proposal will be made in an open forum, and the student must successfully defend it before the dissertation committee after the public presentation.

DISSERTATION DEFENSE
A PhD student must complete and defend a dissertation that involves original research in information assurance.

AWARDING OF MASTER'S DEGREES
Students who enter the PhD in information assurance program with a bachelor's degree have the option of obtaining a master's degree from one of the departments participating in the program. To do so, they must meet all of the department's degree requirements.

Program Requirements
Bachelor's Degree Entrance

Complete all courses and requirements listed below unless otherwise indicated.

Milestones

Qualifying exam and area exam
Annual review
Dissertation proposal
Dissertation committee
Dissertation defense

Core Requirements

A cumulative 3.400 GPA is required for the core requirement.

Code	Title	Hours
Fundamentals		
CS 5700	Fundamentals of Computer Networking	4
or EECE 7336	Digital Communications	
Software		
CS 5770	Software Vulnerabilities and Security	4
Security and Cyberlaw		
CS 6740	Network Security	4
or CS 6750	Cryptography and Communications Security	
IA 5200	Security Risk Management and Assessment	4
IA 5240	Cyberlaw: Privacy, Ethics, and Digital Rights	4

Electives and Specializations

Code	Title	Hours
Complete 28 semester hours from the following:		28
Consult faculty advisor for other acceptable courses.		
Track 1: Network/Communication Security		
CS 6710	Wireless Network	
EECE 5666	Digital Signal Processing	
Track 2: System Security		
CS 5600	Computer Systems	
or EECE 7352	Computer Architecture	
IA 6120	Software Security Practices	
Track 3 Policy/Society		
CRIM 7246	Security Management	
POLS 7341	Security and Resilience Policy	
General Electives		
CS 5500	Managing Software Development	
CS 6140	Machine Learning	
CS 6200	Information Retrieval	
EECE 7204	Applied Probability and Stochastic Processes	
EECE 7205	Fundamentals of Computer Engineering	
EECE 7337	Information Theory	
SOCL 7211	Research Methods	
or CS 6350	Empirical Research Methods	

Dissertation

Code	Title	Hours
Complete the following (repeatable) course twice:		
IA 9990	Dissertation	
Complete the following (repeatable) course until graduation:		
IA 9996	Dissertation Continuation	

Program Credit/GPA Requirements

48 total semester hours required
Minimum 3.000 GPA required

Information Assurance, PhD—Advanced Entry

A research-based, interdisciplinary Doctor of Philosophy (PhD) in Information Assurance combines a strong security technical foundation with a security policy and social sciences perspective. It seeks to prepare graduates to advance the state-of-the-art of security in systems networks and the internet in industry, academia, and government. The interdisciplinary nature of the program distinguishes it from traditional doctoral degree programs in computer science, engineering, or social sciences and makes it unique in the Boston area.

Students who choose the PhD in information assurance program have a strong desire to purse academic research solving critical cybersecurity challenges facing today's society. The PhD program is a natural path for students in the college's Master of Science in Information Assurance and Cybersecurity program who want to pursue research and students with bachelor's degrees and an interest in research-focused careers. Students who pursue careers in advancing the state-of-the art of cybersecurity have an opportunity to gain:

- A strong technical foundation in cybersecurity and an interdisciplinary perspective based on policy and social science
- A path to a research-focused career coupled with depth in information assurance research at a leading institution, one of the earliest designees by NSA/DHS as a National Center of Academic Excellence in Information Assurance Research, Information Assurance/Cyber Defense, and Cyber Operations
- The opportunity to work with and learn from faculty who are recognized internationally for their expertise and contributions in information assurance from Northeastern's College of Computer and Information Science, the Department of Electrical and Computer Engineering, and the College of Social Sciences and Humanities
- Access to research projects at Northeastern's research centers focused on security:
  - The Institute of Information Assurance (IIA), an interdisciplinary research center overseen by both the College of Computer and Information Science and the department of Electrical and Computer Engineering in the College of Engineering, and the recipient of a National Science Foundation grant to train the country's next generation of cybercorps
  - The International Secure Systems Lab, affiliated with Northeastern, a collaborative effort of European and U.S. researchers focused on web security, malware and vulnerability analysis, intrusion detection, and other computer security issues
  - The ALERT Center, where Northeastern is the lead institution, a multiuniversity Department of Homeland Security Center of

Excellence involved in research, education, and technology related to threats from explosives

The benefits of the Boston area:

- World renowned for academic and research excellence, the Boston area is also home to some of the nation's largest Department of Defense contractors and government and independent labs such as MIT Lincoln Lab, MITRE, and Draper Lab

Degree Requirements

The PhD in information assurance master entry degree requires completion of at least 16 semester credit hours beyond a bachelor's degree. Students also must complete the required core courses.

Doctoral Degree Candidacy

Refer to the information assurance, PhD, overview for admission to candidacy requirements.

RESIDENCY

Refer to the information assurance, PhD, overview for residency requirements.

DISSERTATION ADVISING

Refer to the information assurance, PhD, overview for dissertation advising requirements.

DISSERTATION COMMITTEE

Refer to the information assurance, PhD, overview for dissertation committee requirements.

COMPREHENSIVE EXAMINATION

Refer to the information assurance, PhD, overview for comprehensive examination requirements.

DISSERTATION DEFENSE

Refer to the information assurance, PhD, overview for dissertation defense and completion requirements.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Milestones

Qualifying exam and area exam
Annual review
Dissertation proposal
Dissertation committee
Dissertation defense

Core Requirement

Complete 16 semester hours of approved course work. A cumulative 3.400 GPA is required for the core requirement. Consult your faculty advisor for acceptable courses.

Dissertation

Code	Title	Hours
Complete the following (repeatable) course twice:		
IA 9990	Dissertation	
Complete the following (repeatable) course until graduation:		
IA 9996	Dissertation Continuation	

Program Credit/GPA Requirements

16 total semester hours required

Minimum 3.000 GPA required

Interdisciplinary Engineering, PhD

Thomas C. Sheahan, ScD
Senior Associate Dean for Academic Affairs
130 Snell Engineering Center
617.373.2711

The Graduate School of Engineering offers an interdisciplinary Doctor of Philosophy degree involving substantial work in two or more academic departments or disciplines. Those interested in this program of study must submit a detailed proposal of the areas of inquiry and research with their application for admission. Interdisciplinary study requires favorable recommendation by a sponsoring doctoral-degree-granting department and approval by authorized representatives of the graduate committees of the departments appropriate to the disciplines covered under the applicant's proposal. The sponsoring department serves as the student's registration department.

Formation of Interdisciplinary Committee

Students admitted for interdisciplinary study must obtain the consent of a faculty advisor who will direct his or her doctoral dissertation. This advisor, who may or may not be a member of the registration department, will chair the student's interdisciplinary committee. The chair of the registration department, or his or her designee, will then appoint a second member to the committee. These two members will invite one or more additional members or request that the director of the Graduate School of Engineering do so. The committee must represent at least two academic departments or programs, and a majority of the committee members must represent doctoral-degree-granting departments. The chair of the registration department, or his or her designee, will notify the director of the Graduate School of Engineering of the membership of the committee as soon as arrangements are finalized.

Duties of Interdisciplinary Committee

A member of the interdisciplinary committee who is also a member of the registration department will serve as the registration officer to approve course registration for the student. The registration officer will file a copy of the approved course registration with the other committee members and with the graduate committee of the registration department. The interdisciplinary committee is responsible for overseeing the completion of all requirements. The committee must also certify to the registration department and to the Graduate School of Engineering the completion of all requirements for the award of the doctoral degree.

The interdisciplinary committee must assure that the student's program represents standards comparable to those of the registration department and that the program is not so broad that it has inadequate depth in any area. The director of the Graduate School of Engineering may review a student's interdisciplinary program at any time to verify that the student meets program objectives.

Network Science, PhD

Website (http://www.networkscienceinstitute.org)

David Lazer, PhD
Distinguished Professor
College of Social Sciences and Humanities and College of Computer and Information Science

Network Science Program

177 Huntington Avenue, 10th Floor
617.373.8856
617.373.5884 (fax)
networkscience@northeastern.edu

The PhD program in network science aims to enhance our understanding of networks arising from the interplay of human behavior, sociotechnical infrastructures, information diffusion, and biological agents. This is an intrinsically multidisciplinary activity, with members of the network science community representing a wide range of fields including computer science, information science, complexity, physics, sociology, communication, organizational behavior, political science, and epidemiology. This is an interdisciplinary doctoral program focused on training students in network science across several colleges—including the College of Science, the College of Computer and Information Science, the College of Social Sciences and Humanities, Bouvé College of Health Sciences, the College of Engineering, and the College of Arts, Media and Design—with several research areas, including computational sciences, information sciences, health and life sciences, social sciences, and theoretical physics. See other collaborating colleges' catalog sections for possible concentration courses.

Course work is dependent on a student's area of research and subject to prior approval by their faculty advisor. Required course work includes the following: three foundational courses in network science —Complex Networks and Applications (PHYS 5116); Network Science Data (PHYS 7331); and Social Networks (POLS 7334)—at least one supplemental course in network science—Network Science Data 2 (PHYS 7332); Social Networks (POLS 7334); or Data Mining Techniques (CS 6220)—12 semester hours of elective course work defined by their area of research; and two research courses with core faculty of the program. A minimum of 32 credit hours of course work is required, though the graduate program committee may recommend additional course work based on student research interests.

Satisfactory progress in the program will be ongoing and formally evaluated at the end of both the first and second years of the program. Students are expected to maintain a cumulative GPA of 3.000 or better in all course work. Students are not allowed to retake courses. A student who does not maintain the 3.000 GPA, or is not making satisfactory progress on their dissertation research, may be recommended for termination by the graduate program committee.

Each student will have one primary research advisor from the network science doctoral program faculty.

Students will be expected to select their research advisor by the end of the spring semester of their second year in the program.

The dissertation committee consists of at least four members: the dissertation advisor, one additional network science doctoral program faculty member, one member expert in the specific topic of research (can be from outside the university), and one additional tenured/tenure-track faculty member from the concentration department/conferring college. The dissertation advisor must be a full-time tenured or tenure-track member of the Northeastern University faculty. Students may repeat the comprehensive examination once if they are unsuccessful.

Degree Candidacy

A student is considered a PhD candidate upon completion of all required course work with a minimum cumulative GPA of 3.000, satisfactory completion of the qualification exam, and satisfactory completion of the comprehensive exam.

Qualifying Examination

The qualification exam will be an oral examination of the material during the students' course work. The exam will be an hour in length and consist of questions selected by network science faculty who comprise the qualifying examination and dissertation committee. Students will receive 50 to 80 potential questions, which they must be prepared to answer, one month before the exam. The exam will consist of a subset of these questions. The qualifying exam will be offered twice annually, in the fall and spring term. All students are required to initially sit for the exam in the fall, typically in their third year of the PhD program. Students who do not pass the qualifying exam on their first attempt are expected to retake the exam in the spring term. Students may sit for the qualifying exam no more than twice.

Students who fail to complete the qualifying examination but who have completed all the PhD program's required course work with a cumulative GPA of 3.000 or better will be awarded a terminal Master of Science in Network Science degree. Note that no students will be admitted directly into the network science program for receipt of a master's degree.

Comprehensive Examination

Students must submit a written dissertation proposal to the qualifying examination and dissertation committee. The proposal should identify relevant literature, the research problem, the research plan, and the potential impact on the field. A presentation of the proposal will be made in an open forum, and the student must successfully defend it before the qualifying examination and dissertation committee. The comprehensive exam must precede the final dissertation defense by at least one year.

Dissertation Defense

A PhD student must complete and defend a dissertation that involves original research in network science. The dissertation defense must adhere to the College of Science policies.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Milestones

Annual review
Qualifying exam
Dissertation committee
Dissertation proposal
Dissertation defense

Core Requirements

Code	Title	Hours
Networks		
PHYS 5116	Complex Networks and Applications	4
PHYS 7331	Network Science Data	4
PHYS 7335	Dynamical Processes in Complex Networks	4
Choose one of the following:		4
PHYS 7332	Network Science Data 2	
CS 6220	Data Mining Techniques	
POLS 7334	Social Networks	
Research		
Complete the following (repeatable) course twice:		
NETS 8984	Research	1-4

Specializations

Choose one of the following specializations or 12 semester hours of elective course work from the electives course list:

- Computer Science (p.   )
- Political Science (p.   )
- Epidemiology (p. 228)
- Physics (p. 228)
- Math (p. 228)
- Electives (p. 228)

COMPUTER SCIENCE

Code	Title	Hours
Choose three from the following:		12
CS 6140	Machine Learning	
CS 6220	Data Mining Techniques	
CS 6240	Large-Scale Parallel Data Processing	
CS 7800	Advanced Algorithms	

POLITICAL SCIENCE

Code	Title	Hours
POLS 7200	Perspectives on Social Science Inquiry	4
POLS 7201	Research Design	4
POLS 7202	Quantitative Techniques	4

EPIDEMIOLOGY

Code	Title	Hours
PHTH 5202	Introduction to Epidemiology	3
PHTH 5224	Social Epidemiology	3
Electives: Choose two from the elective course list below.		6-8

PHYSICS

Code	Title	Hours
Choose three from the following:		12
PHYS 5318	Principles of Experimental Physics	
PHYS 7305	Statistical Physics	
PHYS 7731	Biological Physics 1	
PHYS 7321	Computational Physics	

MATH

Code	Title	Hours
Choose three from the following:		12
MATH 7241	Probability 1	
MATH 7233	Graph Theory	
MATH 7375	Topics in Topology	
MATH 7733	Readings in Graph Theory	

ELECTIVES

Complete a minimum of 12 semester hours of elective course work related to your area of research. Common electives include the following:

Code	Title	Hours
NETS 7341	Network Economics	4
NETS 7345	The Practice of Interdisciplinary Scholarship	4
NETS 7350	Bayesian and Network Statistics	4
NETS 7983	Topics	4
NETS 8941	Network Science Literature Review Seminar	2
MATH 7233	Graph Theory	4
CS 5800	Algorithms	4
CS 6140	Machine Learning	4
CS 7180	Special Topics in Artificial Intelligence	4
CS 7295	Special Topics in Data Visualization	4
PHYS 7337	Statistical Physics of Complex Networks	4
PPUA 5301	Introduction to Computational Statistics	4

Dissertation

Code	Title	Hours
Complete one of the following (repeatable) course twice:		
NETS 9990	Dissertation	

Program Credit/GPA Requirements

32 total semester hours required
Minimum 3.000 GPA required

Population Health, PhD

Beth E. Molnar, ScD, SM
Director of the Population Health Program

This program seeks to train students to become public health researchers and leaders through simultaneous examination of multiple determinations of health, including social, environmental, nutritional, and behavioral risk factors. Our students investigate the underlying causes of adverse health, including disease, disparities, and disability, through training in core population health disciplines—biostatistics, epidemiology, and health services—together with individual-specific and specialized training in topics related to student research. Importantly, our students are mentored by Northeastern's distinguished faculty, who individually and together conduct innovative, solution-focused research in critical population health topics.

Our population health doctoral students have an opportunity to learn to conduct research that addresses five key health determinants:

1. Social and community contexts

2. Environment and neighborhoods

3. Health and healthcare delivery

4. Education

5. Economic stability

Our diverse faculty has expertise in numerous population health disciplines, including health services research, health disparities, environmental and social epidemiology, biostatistics, exercise science, medical sociology, public policy, personal health technologies, and mental health. Students have the opportunity to work side by side with faculty in conducting cutting-edge, transdisciplinary research in these fields.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Milestones

Qualifying examination
Annual review

Dissertation committee
Dissertation proposal
Dissertation defense

Core Requirements

Code	Title	Hours
Health Services		
PHTH 5232	Evaluating Healthcare Quality	3
or PHTH 5234	Economic Perspectives on Health Policy	
Population Health		
PHTH 6400	Principles of Population Health 1	3
PHTH 6410	Principles of Population Health 2	3
Epidemiology		
PHTH 5202	Introduction to Epidemiology	3
PHTH 6202	Intermediate Epidemiology	3
Research Ethics		
BIOL 6381	Ethics in Biological Research	2
or PHSC 6212	Research Skills and Ethics	
Research and Analysis		
PHTH 5210	Biostatistics in Public Health	3
PHTH 6210	Applied Regression Analysis	3

Options

Complete one of the following options:

SOCIAL AND ENVIRONMENTAL DETERMINANTS OF HEALTH OPTION

Code	Title	Hours
PHTH 5224	Social Epidemiology	3
PHTH 6440	Advanced Methods in Biostatistics	3
PHTH 6800	Causal Inference in Public Health Research	3
Electives		2-4

HEALTH SERVICES AND POLICY OPTION

Code	Title	Hours
ECON 5110	Microeconomic Theory	4
PHTH 5234	Economic Perspectives on Health Policy	3
Electives		2-4

Electives

Code	Title	Hours
CS 6220	Data Mining Techniques	
CS 7280	Special Topics in Database Management	
ECON 5110	Microeconomic Theory	
ECON 5140	Applied Econometrics	
ECON 7200	Topics in Applied Economics	
EXSC 5200	Cardiopulmonary Physiology	
EXSC 5220	Advanced Exercise Physiology	
EXSC 5230	Physical Activity and Exercise: Effects on Musculoskeletal Health and Disease	
HINF 5200	Theoretical Foundations in Personal Health Informatics	
HRMG 6220	Health Organization Management	
PHSC 6216	Human Physiology and Pathophysiology	

Code	Title	Hours
PHTH 5212	Public Health Administration and Policy	
PHTH 5214	Environmental Health	
PHTH 5226	Strategic Management and Leadership in Healthcare	
PHTH 5228	Advances in Measuring Behavior	
PHTH 5230	Global Health	
PHTH 5440	Community-Based Participatory Research: Environmental Health	
PHTH 5540	Health Education and Program Planning	
PHTH 6200	Principles and History of Urban Health	
PHTH 6204	Society, Behavior, and Health	
PHTH 6208	Urban Community Health Assessment	
PHTH 6320	Qualitative Methods in Health and Illness	
PPUA 7247	Seminar in U.S. Health Policy and Management	
SOCL 7257	Contemporary Issues in Sociology	
SOCL 7287	Social Movements in Health	
STRT 6220	Strategic Management for Healthcare Organizations	

Dissertation

Code	Title	Hours
Complete the following (repeatable) course twice:		
PHTH 9990	Dissertation	

Program Credit/GPA Requirements

33 total semester hours required
Minimum 3.000 GPA required

<div style="background:red">**Graduate Certificate Programs**</div>

Graduate School of Engineering Certificate Policies and Procedures

This document describes the policies and procedures that apply for graduate certificates offered by the Graduate School of Engineering (GSE).

ADMISSION INTO A GSE GRADUATE CERTIFICATE

Certificate admission requirements for **non-degree-seeking students** include a minimum 3.000 grade-point average (GPA) and completion of a relevant engineering undergraduate degree. Students without an engineering undergraduate degree should apply to the Graduate Certificate in Technology Systems Management.

In order to be considered admissible to an engineering graduate certificate, **current GSE students** must be in good academic standing. Students on academic probation will not be admitted into a graduate certificate program.

Current engineering PhD students will need to get signoff from their PhD advisor in order to be admitted into a certificate program.

Domestic Student
- May take courses at Boston campus or online

International Student
- May take courses at Boston campus
- May take courses online if student does not live in the United States

- SEVIS rules are followed to determine if an F-1 student is eligible to take an online course
- Visa compliance may restrict eligibility for taking online courses
- For GSE degree-seeking students
  - Students must complete the certificate course work before or in the same semester that they complete their degree course work.
  - I-20 may not be extended due to enrollment in a graduate certificate.
  - Students must be enrolled full-time in course work counting toward their degree program each fall and spring term. Certificate course work not counting toward the degree may be taken above and beyond that requirement in fall and spring, if the program allows, and in the summer terms.

CERTIFICATE COURSE WORK MAY BE APPLIED TOWARD A GSE DEGREE

Certificate course work completed by graduate students may be used in some cases toward a Northeastern GSE graduate degree. There are two factors to consider, course eligibility and number of courses allowed to be counted for a certificate program and a degree program, known as "double counting." The number of eligible courses allowed for double counting are specified in the section below.

Course Eligibility

GSE certificate courses may be counted toward an engineering graduate degree if the **degree program** requirements allow for the course. Refer to the specific graduate degree requirements in the university catalog.

Course Double Counting

For most **disciplinary degrees**, students can double count up to two eligible courses for a graduate degree and graduate certificate. For MSIE, MOR, MSME general concentration, and MSChE, students can double count up to four eligible courses (with academic advisor approval for courses).

For all **multidisciplinary degrees**—ES, EM, CSYE, IS, and TNET programs—students can double count up to four eligible courses for a graduate degree and graduate certificate.

Double Counting Across Certificates

Engineering graduate courses may not be double counted across graduate certificates.

BS/MS Students

Engineering graduate courses may not be triple counted for graduate certificate and/or degree programs. Graduate courses that are double counted toward the BS and MS degrees may not be counted toward a graduate certificate.

Graduate Courses Applied to an Undergraduate Degree

Graduate courses that were applied toward an undergraduate degree cannot be double counted for a graduate certificate. Graduate courses completed as an undergraduate that are taken above and beyond the requirements for the undergraduate degree *may* count toward a graduate certificate.

ACADEMIC STANDING

All certificate-seeking students must meet the GSE requirements of a 3.000 GPA to remain in good standing. Only students who complete the required course work and remain in good standing will be eligible to be awarded a certificate.

CO-OP

Non-degree-seeking students are not eligible to participate in co-op.

Co-op eligibility will reside with the graduate degree program of the degree-seeking student. There are no additional considerations allotted by the certificate program.

APPLYING TO GRADUATE

Students must apply to graduate for their certificate programs. At the beginning of the term that students are planning on graduating from their certificate program or certificate and degree program, students must apply to graduate for the certificate. If a student is graduating with both a certificate and degree program, they must apply to graduate to both the degree and the certificate program separately. The certificate and degree are awarded concurrently, even if the certificate course work is completed prior to the degree course work.

CERTIFICATE TRANSCRIPT

Awarding of a certificate will be noted on the official Northeastern University transcript of students who complete a certificate program.

Programs

The College of Engineering offers numerous graduate certificates that may be completed alone or in combination with an MS degree. Please see the Overview tab for Certificate Policies and Procedures (p. 229) for detailed information regarding College of Engineering graduate certificates.

Chemical Engineering

- Process Safety Engineering (p. 142)

Computer Systems Engineering

- Computer Systems Engineering (http://catalog.northeastern.edu/graduate/engineering/multidisciplinary/computer-systems-graduate-certificate)

Energy Systems

- Energy Systems (http://catalog.northeastern.edu/graduate/engineering/multidisciplinary/energy-systems-graduate-certificate)
- Energy Systems Management (http://catalog.northeastern.edu/graduate/engineering/multidisciplinary/energy-systems-management-graduate-certificate)
- Renewable Energy (http://catalog.northeastern.edu/graduate/engineering/multidisciplinary/renewable-energy-graduate-certificate)
- Sustainable Energy Systems (http://catalog.northeastern.edu/graduate/engineering/multidisciplinary/sustainable-energy-systems-graduate-certificate)

Engineering Business

- Engineering Business (http://catalog.northeastern.edu/graduate/engineering/multidisciplinary/engineering-business-graduate-certificate)

Engineering Management

- Engineering Economic Decision Making (http://catalog.northeastern.edu/graduate/engineering/multidisciplinary/engineering-economic-decision-making-graduate-certificate)
- Engineering Management (http://catalog.northeastern.edu/graduate/engineering/multidisciplinary/engineering-management-graduate-certificate)
- Lean Six Sigma (http://catalog.northeastern.edu/graduate/engineering/multidisciplinary/lean-six-sigma-graduate-certificate)
- Supply Chain Engineering Management (http://catalog.northeastern.edu/graduate/engineering/multidisciplinary/supply-chain-engineering-management-graduate-certificate)

- Technology Systems Management (http://catalog.northeastern.edu/graduate/engineering/multidisciplinary/technology-systems-management-graduate-certificate)

Gordon Institute of Engineering Leadership

Industrial Engineering

Telecommunication Networks

- IP Telephony Systems (http://catalog.northeastern.edu/graduate/engineering/multidisciplinary/ip-telephony-systems-graduate-certificate)
- Broadband Wireless Systems (http://catalog.northeastern.edu/graduate/engineering/multidisciplinary/broadband-wireless-systems-graduate-certificate)

Bouvé College of Health Sciences

Susan L. Parish, PhD, MSW, Dean

Dean's Office
215 Behrakis Health Sciences Center
617.373.3323
617.373.3030 (fax)
Bouve_College_of_Health_Sciences@northeastern.edu

Barbara Guthrie, PhD, RN, FAAN
Associate Dean of Graduate Education
617.373.6913

Graduate Admissions and Student Services Office
123 Behrakis Health Sciences Center
617.373.2708
617.373.4701 (fax)
bouvegrad@northeastern.edu

The Bouvé College of Health Sciences (BCHS) strongly supports the mission of Northeastern University as a practice-oriented, student-centered, urban research institution. The college is committed to the goals of the institution, which include excellence in education, research, scholarship, clinical practice, experiential learning, access to educational opportunities, and a strong professional orientation. Each of the programs within the college supports these aims both individually and collectively.

Students in BCHS have the opportunity to interact with faculty, as well as with Boston's world-class healthcare and educational institutions. Study in our comprehensive health sciences college allows you to contribute to research advances and benefit from interdisciplinary approaches to complex issues reflecting professional practice.

BCHS graduate programs in the Schools of Pharmacy, Nursing, and Health Professions include:

School of Pharmacy

Biomedical Nanotechnology, Biomedical Sciences, Doctor of Pharmacy Direct Entry, Medicinal Chemistry, Pharmaceutical Sciences, and Pharmacology

School of Nursing

Adult-Gerontology Acute Care NP, Adult-Gerontology Primary Care NP, Doctor of Nursing Practice, Doctor of Philosophy in Nursing, Family Nurse Practitioner, Neonatal Nurse Practitioner, Nurse Anesthesia, Nursing Administration, Nursing Direct Entry, Pediatric Acute and Primary Care NP, and Psychiatric Mental Health NP

School of Health Professions

Applied Behavior Analysis, Certificate in Disability Studies, College Student Development and Counseling, Doctor of Physical Therapy, Early Intervention, Exercise Science, Health Informatics, Master of Public Health in Urban Health, Occupational Ergonomics and Health, Orthopedic Physical Therapy (CAS), Personal Health Informatics, Physician Assistant, Population Health, School Psychology, Speech Language Pathology, Sports Physical Therapy Clinical Residency Program, and Transitional Doctor of Physical Therapy

At Northeastern, you have an opportunity to acquire the knowledge and capability needed for a lifetime of social contribution and professional achievement.

Academic Policies and Procedures

- Health Certification (p. 232)
- Requirements for Clinical, Internships, and Practicum Courses (p. 232)
- Background Checks (p. 233)
- Liability Insurance (p. 234)
- Advising (p. 234)
- Transfer of Credit (p. 234)
- Course Substitution (p. 234)
- Academic Progression (p. 234)
- Student's Academic Standing (p. 235)
- Academic Probation Policy (p. 236)
- Financial Awards (p. 236)
- Graduation Policies (p. 237)
- Academic Dismissal (p. 237)

Health Certification

All new students must complete the University Health Report form following acceptance to the university. This form may be obtained at the University Health and Counseling Services (UHCS) located at 135 Forsyth Building or downloaded from the UHCS website (http://catalog.northeastern.edu/graduate/health-sciences/academic-policies-procedures/health-certification/%20http://www.northeastern.edu/uhcs/forms).

As a condition of matriculation at Northeastern University, all students are required to submit the completed University Health Report form to UHCS. Graduate students must return the form **no later than one month** prior to entering the university. UHCS will block the registration of those who do not file the correct forms. All documentation must be signed by a medical doctor, nurse practitioner, or physician assistant. Medical documentation and health certification are maintained by UHCS. Please refer to the University Health Report form for further information.

Programs in the Bouvé College of Health Sciences may require additional medical documentation and health certification. This varies among programs; consult your program handbook or your program advisor for more information. Additional requirements may include exam or statement of good health prior to registration, annual proof of physical examination, and/or proof of additional immunities. Additional clinical clearance(s) may be required by some programs prior to being present in any clinical setting. Students should consult their program director or clinical coordinator for more information.

Requirements for Clinical, Internships, and Practicum Courses

- Courses offered at affiliated hospitals, clinics, schools, medical facilities, or other institutions involve contractual agreements with

these agencies. Students assigned to an institution for instruction are expected to adhere to the rules and regulations of that institution. Failure to adhere to these rules may result in dismissal from that institution.

- Evidence of health clearance is required for experiential courses (including clinicals, internships, and practicum) in their field of study. All students, regardless of age, must have a current physical exam, tuberculin test, and documentation of immunity on file at University Health and Counseling Services (UHCS) and provide such documentation to their on-campus clinical coordinator/clinical placement office.

- School of Nursing students must provide evidence of health documentation utilizing an immunization tracker in order to ensure that documents are updated on a yearly basis. International nursing students must have a current U.S. nursing license.

- Students must meet the health clearance requirements of their academic program and any site-specific requirements prior to entering the clinical setting. This means that students must make arrangements for their physical exams and immunizations months before they are scheduled for a clinical course or rotation. Students who do not present the appropriate health certification will be blocked from registering for, or attending, a clinical course or rotation until satisfactory evidence is provided.

- More specific guidelines are available from University Health and Counseling Services in 135 Forsyth, online at UHCS (https:// www.northeastern.edu/uhcs/forms/clinical-clearance), or from the individual program's clinical placement office. Guidelines are updated periodically and students must meet the most current guidelines or they will not be allowed into a clinical area.

- Students completing experiential courses may also be required to submit to and successfully clear criminal history/background checks.

- All students are required by federal and state law to respect the confidentiality of the patients' records to which they may be privy. This includes, but is not limited to, patient identity and identifiers, diagnostic tests performed, medical history, and medications prescribed. For more information, students should contact their program advisor.

- Students should be aware that, while participating in any form of clinical practice, they continue to be under the jurisdiction of the university. Any breaches of conduct committed by a student in a clinical setting that would be a violation of the Code of Student Conduct shall also be considered a cause for disciplinary action against the student.

- Evaluation for clinical courses will be based on established guidelines and policies that students will receive prior to the clinical component. Periodic performance evaluations will take place during the course of the academic term. See specific program clinical policies and procedures handbooks or course syllabi.

- The university is affiliated with numerous clinical sites across the country. Depending on the program, students may be required to travel outside of Massachusetts to complete clinical courses. Students are responsible for any costs associated with transportation and/or housing.

Academic, Professional, or Research Misconduct

Bouvé students are expected to adhere to the highest academic and professional standards. The university's *Code of Student Conduct* sets

forth the university's expectations of behavior that promote the safety and welfare of the Northeastern University community. The *Code of Student Conduct* and policies for implementation can be found on the Office of Student Conduct and Conflict Resolution's (http:// www.northeastern.edu/osccr/code-of-student-conduct) website.

Failure to meet these standards, including misconduct in academic, professional, or research activities, will result in disciplinary action. Such actions may include a lowered or failing grade in the course, probation, suspension, or immediate dismissal from the program. **Students found responsible for academic, professional, or research misconduct will have a letter placed in their permanent file stating the pertinent findings of their case.** No student may withdraw from a course in which they have been notified that they will fail for a specific finding of academic dishonesty.

The university's *Code of Student Conduct* defines various aspects of academic misconduct, such as cheating and plagiarism. **Lack of knowledge of these definitions does not negate the student's responsibility for upholding them.** Academic misconduct is regarded as a serious violation of ethical standards and may result in the student's immediate dismissal from the graduate program.

In addition to maintaining complete honesty in all academic work, students admitted to clinical or professional programs in the Bouvé College of Health Sciences are expected to familiarize themselves with the code of ethical conduct of the professional discipline they are entering and to agree to uphold these principles.

Similarly, students admitted to graduate research programs are expected to familiarize themselves with the code of ethics in research. Such a code is outlined in *Guidelines for the Conduct of* (https://oir.nih.gov/ sourcebook/ethical-conduct/research-ethics/nih-guidelines)*Research.* Ethical codes of conduct for researchers are also presented in the National Academy of Sciences' (http://www.nap.edu/readingroom/ books/obas) *On Being a Scientist, Responsible Conduct in Research* (https://www.nap.edu/catalog/12192/on-being-a-scientist-a-guide-to- responsible-conduct-in). Violations of research ethics can include, but are not limited to, falsification or fabrication of data, plagiarism, malicious allegations of misconduct in science, covering up or failing to report misconduct, obstructing due process in investigations of misconduct, and reprisals against those revealing misconduct.

Background Checks

An increasing number of clinical sites require background checks for employees, as well as for students who come to their facilities. Northeastern University students need to have background checks done if their assigned clinical agency requires it. Some sites may also require drug testing. The college contracts with a national company, CastleBranch, (https://www.castlebranch.com)to perform these checks/ screenings. CastleBranch (https://www.castlebranch.com) charges fees to conduct background checks/screenings, which will vary depending on the type of background check needed. All fees will be paid by the student directly to CastleBranch (https://www.castlebranch.com).

All background check information is confidential. Results are posted to the CastleBranch (https://www.castlebranch.com) website in a secure, tamperproof environment. You will be able to view your own results online using a password. You will be contacted by your on-campus clinical coordinator only if there is a question about your results. Neither you nor CastleBranch (https://www.castlebranch.com) is required to reveal the actual results of your background check to the clinical site or anyone

else at the university. However, you may not be able to be placed at that clinical site based on the site's requirements.

If your assigned clinical site requires students to have a background check, your on-campus clinical coordinator/clinical placement office will inform you of the requirements and provide you with instructions and a deadline for completing the check. To assure adequate processing time prior to the start of your clinical experience, it is crucial that you complete the check by the deadline you are given. Failure to complete the check in a timely manner could jeopardize your progression in your academic program.

Liability Insurance

All students on clinicals, practicum, or internships must register each semester to be covered by Northeastern University's liability insurance, for which students pay an annual fee. This insurance covers injury to third parties by students who are doing work or completing professional studies outside of Northeastern University's premises. These activities must clearly be part of the student's assigned duties. The liability insurance does not cover willful misconduct. Students or the clinical placement coordinator can request the Office of Risk Services to send evidence confirming coverage to their field site. Students should consult their clinical placement officer, program coordinator, and specialization policies for information about further requirements for liability insurance. If you are not sure if your program is covered under this policy, coverage can be verified through the Office of Risk Services (http://www.northeastern.edu/risk_services).

Advising

The unit director or another faculty member will be appointed by the program director to serve as the student's academic advisor throughout their course of study at the Bouvé graduate school.

The advisor will assist the student in understanding program requirements and in defining career goals and objectives of graduate work. The advisor will also monitor the student's progress toward successful completion of the degree.

Student Advisement Responsibilities

Students share responsibility with their advisor for successful matriculation and progression in their graduate program. In many programs, students are required to make appointments for academic advisement at least twice a year and must regularly update their curriculum plan with their advisor. The curriculum plan is kept on file in the respective program's office. Both student and advisor retain a copy of the curriculum plan. Students must contact their academic advisor prior to making changes to their curriculum plan and must seek assistance regarding academic issues in a timely manner.

Transfer of Credit

A maximum of 9 semester/12 quarter hours of credit obtained at another institution may be accepted toward the current degree, provided that the credits:

1. Consist of work taken at the graduate level for graduate credit, with grades of 3.000 or better
2. Have been earned at an accredited institution
3. Have not been used toward any other degree

Further, these courses must have been taken within five years prior to the transfer and may not be taken in the semester of graduation from Northeastern. Transfer credits will only be accepted at the discretion of the academic department and the Bouvé Office of Graduate Student Services. Grades earned in transferred credits are not counted as part of the overall grade-point average earned at Northeastern.

Students who wish to take a course for transfer at another institution while enrolled at Bouvé must first receive preapproval from their academic advisor and the Bouvé Office of Graduate Student Services. First, the student must submit the Graduate Petition to Transfer Credit and the course description to the student's academic advisor for approval. Once the request is approved by the academic advisor, the student must submit the petition to the Bouvé Office of Graduate Student Services. The Graduate Petition to Transfer Credit form can be found on the Office of the University Registrar's (http://www.northeastern.edu/registrar/form-gs-xfer-cred.pdf) website.

Graduate courses from the Northeastern University College of Professional Studies (CPS) can be considered for transfer only with prior approval of the academic advisor. Courses taken at CPS cannot be considered to fulfill full-time requirements for international students. For consideration of financial aid for CPS courses, check with your financial aid officer.

Students may not transfer courses required for the completion of their program in the last semester of their program.

Course Substitution

A student must obtain approval from the student's academic advisor and the Bouvé Office of Graduate Student Services to substitute a graduate course that was completed for a prior degree. The student must provide official transcripts of completed coursework, accompanied of the respective course syllabi, to the advisor in order to verify its equivalency to the proposed course substitution. The student then must submit the signed Course Substitution Form and the official transcript to the Bouvé Office of Graduate Student Services. If the Course Substitution Form is approved, the student must take a course of equivalent number of credits as a replacement for the substituted course, to fulfill the program's academic requirements. The course must be listed in this catalog as either a core or elective course for the program. The Course Substitution Form can be found in the *Bouvé College Graduate Handbook.*

Academic Progression

Program Status and Progression

All degree requirements must be completed within a maximum of seven years of matriculation, although individual academic programs may require completion in a shorter time frame. Each student is responsible for reviewing the requirements for their particular program. A student's failure or inability to register does not extend the amount of time allowed to complete the program. Students should be registered by the first week of each semester (fall, spring, and, where indicated, summer). Course credits earned in programs of graduate study are valid for a maximum of seven years unless an extension is granted by the program director and the Bouvé associate dean of graduate education.

After establishment of candidacy for the PhD degree, a maximum of five years will be allowed for completion of the degree requirements, unless an extension is granted. In order to progress in clinical courses that are sequenced, a student must receive a passing grade in all prior courses in the sequence. In the event that a student fails a clinical course that is

not part of a sequence, progression is at the discretion of the student's academic advisor and/or the program director. When a student fails a clinical course that is part of a sequence of courses, the course instructor must notify the Bouvé Office of Graduate Student Services. Course material related to the student's failure (e.g., examination reports, clinical reports) must be made available to the student for review.

PROVISIONAL AND CONDITIONAL ACCEPTANCES

A student who is accepted *conditionally* to a graduate program at Bouvé College of Health Sciences must meet the conditions set in the acceptance letter *before* they matriculate into the program and prove that they have fulfilled the stated conditions. Examples of conditions include receipt of official verification of previous degree completion, completion of missing prerequisite courses, receipt of a missing recommendation, standardized test scores, and translation of international documents.

A matriculated student who is accepted *provisionally* to a graduate program at Bouvé College of Health Sciences must meet the conditions set forth in the acceptance letter. Examples of provisions include maintainence of a GPA of 3.000 and completion of all prerequisites as outlined in the acceptance letter.

PROGRAM EXTENSION PROCEDURES

Students may seek extension beyond the seven years to complete their program of study only under documented extenuating circumstances. The student must complete the program extension form and an action plan to complete the degree requirements. The program extension form is available in the Bouvé *Graduate Handbook.* The form and the proposed action plan must be submitted to the program director and to the Bouvé Office of Graduate Student Services for approval. After the form is reviewed, a program extension may be granted. The Bouvé Graduate Program Extension form can be found in the *Bouvé Graduate Handbook,* Appendix 8.

LEAVE OF ABSENCE

If a student plans on being absent for more than one semester, the student must notify the Bouvé Office of Graduate Student Services and submit the leave of absence request through MyNortheastern (https://my.northeastern.edu). Students should meet with their academic advisor to discuss their intention to submit a request for a leave of absence. After meeting with their academic advisor, the student should submit the petition through the myNortheastern (https://my.northeastern.edu) portal. Students returning from a leave of absence should notify the Bouvé Office of Graduate Student Services of their intent to return at least one month prior to the start of the semester. Students with an approved leave of absence who do not return at the end of the leave of absence period will be withdrawn by the university. Please refer to the Graduate Schools Academic Policies (p. 27) section of the catalog for more information and policies on leave of absences.

WITHDRAWAL PROCEDURES

Students can withdraw from the university only through the myNortheastern (https://my.northeastern.edu) portal. *Students are responsible for dropping any courses in which they are currently registered and should have an exit interview with their financial aid advisor.* Faculty members are not responsible to notify the university of a student's withdrawal. For information about withdrawal and refund policies, please refer to the Student Financial Services website (http://www.northeastern.edu/financialaid/policies).

GRADING POLICIES

Requirements for fulfillment of a degree in the Bouvé College of Health Sciences graduate school varies by program. Students must consult their individual academic program's requirements, as well as program

directors *(if applicable),* for specific credit and noncredit requirements necessary to achieve a specific degree.

Directed Study Registration

Students who wish to take a directed study course must complete the following process before starting the directed study:

1. Obtain the Graduate Directed Study Registration form from the Office of the University Registrar (https://registrar.northeastern.edu/article/individual-instruction-registration) and the Bouvé College of Health Sciences Graduate Directed Study form found in the *Bouvé Graduate Handbook,* Appendix 1.
2. Meet with the faculty member who will supervise the directed study to determine syllabus, course credits, and criteria for completion. Students should include the description of the proposed directed study focus, activities, learning objectives, and how the directed study will be evaluated using measurable criteria.
3. Present both forms to the program director or department chair for review and approval.
4. Submit both signed forms to the Bouvé Office of Graduate Student Services for review and approval.
5. The Directed Study Registration form will be processed by the Office of the University Registrar after it has been verified and approved by the college.

Directed study courses are not intended to substitute for a required course in the program.

Incompletes

An incomplete (I) grade may be reported by the instructor when a student has failed to complete a major component of a required course. Only the course instructor can make the decision to grant an incomplete grade to a student. The student must complete an Incomplete Grade Contract (https://www.northeastern.edu/registrar/form-inc-grade.pdf), sign the agreement, obtain the instructor's signature, and leave a copy with the instructor, who will seek approval from the academic dean's office before sending it to the Bouvé Office of Graduate Student Services. The student should keep a copy for their record. Any exception to this policy must be recommended by the college's Academic Standing Committee (ASC) and must be forwarded in writing by the ASC to the registrar for implementation. The agreed-upon course work must be completed within one calendar year from the end of the term in which the course was offered.

Advanced Standing (PhD or MD)

Students with a PhD or MD may be eligible for advanced standing, which is determined on a case-by-case basis. To apply for advanced standing, the student must complete the Advanced Standing form and gain approval from the student's academic advisor and the Bouvé Office of Graduate Student Services. If the request is approved, a student may be exempt from a maximum of two courses (not to exceed 6 credits). The Advanced Standing form can be found in the *Bouvé Graduate Handbook*.

Student's Academic Standing

Academic standing in BCHS is determined by the student's cumulative grade-point average (GPA) and performance in academic and clinical courses that are required by the student's program. All BCHS students are expected to maintain a cumulative GPA of 3.000 each semester to remain in good academic standing and to progress toward graduation. Students who do not maintain a cumulative GPA of 3.000 each semester will be placed on probation. Individual programs may have additional requirements; consult the program's requirements page in this catalog for

details. To transfer credit, students must also earn a grade of B (3.000) or better in graduate courses completed at another institution.

Academic Probation Policy

Academic probation is a period of time when a student must address and remediate academic deficiencies. An action plan to clear the deficiency must be developed by the student, the student's academic advisor, and the specific program graduate committee (if applicable). A student placed on probation will receive written notification from the Bouvé Office of Graduate Student Services. The student's program advisor will also receive notification of probationary status. It is the student's responsibility to write an action plan with the student's academic advisor. The plan should document how the deficiency will be remediated. This action plan must be signed by the advisor and the student and placed in the student's file in the Bouvé Office of Graduate Student Services within one month from the date of the written notification of probation. The student's failure to file an action plan may be cause for dismissal from the program. The action plan must specify the date by which the deficiency will be cleared.

A BCHS graduate student may repeat a course only once to achieve a passing grade and may repeat only two courses during his or her entire program of study. A student may be on probation for only two semesters, or until the course is offered again, unless the advisor approves an action plan that specifies a longer (but definite) period. A student may only be placed on probation twice during enrollment in BCHS and must correct all deficiencies, as specified, in each respective action plan during the applicable probationary period. Failure to remediate the deficiency within the agreed time may result in dismissal from the program. During the period of probation, the student must earn a GPA of 3.000 or better each semester, or the student is subject to dismissal from BCHS. Note that individual graduate programs may have additional requirements that must be included in the probation action plan.

A student will be removed from academic probation after they have attained a cumulative GPA of 3.000, earned a passing grade in a repeated course, and/or demonstrated satisfactory performance in a clinical course.

Financial Awards

Northeastern University and the Bouvé College of Health Sciences offer a variety of financial awards to graduate students. For further information about awards, please refer to the "Financial Aid Assistance" section of the *Graduate Catalog* and the Student Financial Services (https://studentfinance.northeastern.edu/applying-for-aid/graduate) website

If a student is offered other grant aid from the university, he or she will only receive the scholarship of higher value.

Stipended Graduate Assistantships (SGAs)

These awards include Research Assistantships and Teaching Assistantships. They provide a stipend and a tuition waiver for up to a maximum of 12 semester hours per term, in exchange for 20 hours of work per week. The maximum number of hours SGAs are permitted to work is 20 hours per week. Students are expected to work through the final exam period, including spring break. Any variation from this schedule is at the discretion of the student's supervisor.

SGAs are generally awarded to PhD students. SGAs must be enrolled in full-time course work (minimum of 6 semester hours per term). In

addition, 100 percent of the student's health insurance will be covered. No fees, including student center fees, are covered by this award.

Graduate Student Scholarships (GSSs)

A limited number of scholarships, up to 9 tuition credits per term, are available for full-time students. These scholarships are awarded by the individual department/school.

Dean's Scholarships

Graduate Dean's Scholarships are awarded to incoming professional master's degree students based on academic achievement. To be eligible for consideration, a student must be in the top one-third of their program's incoming class.

This scholarship provides full-time graduate students with 33 percent of tuition per term to a maximum of 12 credits per term and part-time graduate students with 25 percent of tuition per term.

Yellow Ribbon Awards

Qualifying veterans who enroll at Northeastern will receive grant aid that covers most to all of Northeastern's tuition and fee charges, depending on the selected degree program. Northeastern and the Department of Veterans Affairs cover most to all of the expenses that exceed the cost of attending the University of Massachusetts. Allowances for housing, books, and supplies are included. Learn more (https://www.northeastern.edu/military/fund-your-education/yellow-ribbon-program).

Double Husky Awards

The Double Husky Scholarship, available to alumni who have graduated with a Northeastern University degree, provides a tuition discount of up to 25 percent on eligible graduate degree or certificate programs. Students completing pass-through degrees—such as direct entry nursing, freshman-entry Doctor of Education, or freshman-entry Doctor of Physical Therapy—or a PlusOne accelerated master's program, do not qualify for the Double Husky Scholarship. Learn more (https://www.northeastern.edu/graduate/admissions-information/scholarships/double-husky-scholarship/#_ga=255799787174117978515223351759-21038589381518719785) about the Double Husky Scholarship and eligible programs.

Parent and Family Scholarship

Available to parents and siblings of full-time undergraduate day students, the Parent and Family Scholarship provides a tuition discount of 25 percent on more than 110 eligible graduate programs. Learn more (https://www.northeastern.edu/graduate/admissions-information/scholarships/parent-and-family-scholarship).

Diversity Fellowship

Each year a limited number of fellowships are awarded to graduate students in an effort to help the university achieve a more diverse graduate student body. A variety of factors may be used for the purpose of increasing diversity at the university, including gender, race, ethnicity, national origin, sexual orientation, disability, or other protected classification consistent with the university nondiscrimination policy.

These awards are recommended by the student's college or academic department (http://www.northeastern.edu/provost/academics/colleges-schools). They provide tuition support only and there is no work requirement associated with them.

Martin Luther King, Jr. Graduate Fellowship

The MLK, Jr. Graduate Fellowships are administered through the African-American Institute. These awards are offered annually to African-

American students in full-time graduate programs as long as the student demonstrates satisfactory academic progress and financial need as determined by Student Financial Services. Applicants must complete the financial aid process, as well as an application available from the African-American Institute. Learn more (http://www.northeastern.edu/aai/mlk-fellowship).

<div style="background: #cc0000; color: white; padding: 4px 8px; font-weight: bold;">Graduation Policies</div>

Eligibility to Graduate

Students are eligible for graduation under the following conditions:

- The student is in good academic standing with a cumulative grade-point average of 3.000 or above.
- The student has earned at least the minimum number of credits required to complete the student's program of study.
- The student has fulfilled other program requirements and any outstanding issues.

Apply to Graduate

Students must apply to graduate through myNortheastern (https://my.northeastern.edu) and set up a meeting with their academic advisors for academic clearance.

Issuance of Diplomas and Certificates

Diplomas and certificates are issued three times a year (December, May, and, August), but there is only a spring Commencement ceremony. Please visit the Commencement Office website (https://www.northeastern.edu/commencement) to confirm eligibility to participate in the spring Commencement ceremony.

Completing a Thesis for a Master's Program

Students completing a thesis as part of the program's academic requirements are required to complete the following at least five business days before the final grade submission deadline for the academic term:

- Upon successful defense of the thesis, the student must have the Thesis Approval form signed by the members of the thesis committee. The Thesis Approval form can be found in the *Bouvé Graduate Handbook.*
- The student must submit an electronic copy of the thesis to ProQuest, following the directions outlined in the University Libraries' (http://library.northeastern.edu/get-help/theses-dissertations/submit-your-thesis-or-dissertation) website.
- The student must have the Thesis Approval form signed by a representative from the Bouvé Office of Graduate Student Services.

PhD Program Completion

PhD degree completion has additional requirements.

- The PhD hooding and degree conferral ceremony is only held during the spring semester. PhD students may not be hooded until they have successfully defended their dissertations and completed all academic requirements.
- Students completing a dissertation must complete the following at least five business days before the final grade submission deadline for the academic term:
    - Upon successful defense of the dissertation, the student must have the Dissertation Approval form signed by the dissertation committee members. The Dissertation Approval form can be found in the *Bouvé Graduate Handbook.*

- The student must submit an electronic copy of the dissertation to ProQuest, following the directions outlined in the University Libraries' (http://library.northeastern.edu/get-help/theses-dissertations/submit-your-thesis-or-dissertation) website.
- The student must meet with a representative from the Bouvé Office of Graduate Student Services for the exit interview, at which time the Dissertation Approval form will be signed.
- Students must submit a copy of the Survey of Earned Doctorates Certification of Completion (https://sedsurvey.org) (SED) to the Bouvé Office of Graduate Student Services before graduation. Instructions for submission of the survey will be sent to students prior to end of their last term.

<div style="background: #cc0000; color: white; padding: 4px 8px; font-weight: bold;">Academic Dismissal</div>

A student may be dismissed from a graduate program when he or she has failed to maintain academic requirements or has violated a policy that specifies immediate dismissal. All students shall have an opportunity to correct academic deficiencies during an appropriate probationary period before dismissal is instituted, except when the policy specifies "immediate dismissal."

Students may be subject to dismissal under the following conditions. (Note: Additional requirements that are not included in this list, but are specific to the student's major, may also apply.)

- The student exhibits unethical behavior or misconduct in their academic program, practicum, internship, or research.
- The faculty instructor and/or the clinical supervisor determines that the student has demonstrated unsafe or inappropriate behavior in a clinical setting.
- The student does not register for at least one class for two consecutive semesters and does not have an approved leave of absence.
- The student has a cumulative grade-point average below 3.000 at the end of the probationary period specified by the action plan.
- The student does not demonstrate satisfactory performance in achieving the objectives of a clinical course.
- The student fails to meet all the requirements of the program within the specified time limit mandated by the program and has not been given a formal extension.
- The student in a PhD program fails to successfully complete the PhD qualifying/comprehensive exams as stipulated by the program.
- The student fails to progress satisfactorily in research or fails to identify a committee for their thesis or dissertation within the time specified by the policies of the specific program.
- The student has failed to file an action plan within one month of notification of probation.
- The student has failed to meet the requirements of the action plan, including requirements that are specific to the student's major.
- The student has failed three courses or has failed the same course twice.

Dismissal Procedures

Dismissal of a student is initiated by the program director once the basis for the dismissal is provided to and reviewed by the Bouvé Office of Graduate Student Services. The program director will then notify the

student being dismissed. Students may then appeal the dismissal, using the Appeals Process described below.

ACADEMIC AFFAIRS APPEALS PROCESS

Purpose of the Committee

- Northeastern University affirms that it is essential to provide an appeals mechanism to students who believe that they have been erroneously, capriciously, or otherwise unfairly treated.
- The college Academic Affairs Committee (AAC) acts on matters relating to the academic and professional standing of all Bouvé students in the college who have already appeared before the unit's Academic Standing Committee (ASC) and school dean/ representative.
- Issues pertaining to academic and co-op status and professional behaviors violations, including but not limited to warning, probation, permission to resume studies, changes in requirements, and repeating courses, fall within the jurisdiction of the AAC. The AAC also considers student appeals relative to academic or cooperative education judgments by faculty, coordinators, or others acting on behalf of the university, when such appeals arise from a violation, misinterpretation, or inequitable application of the academic provisions outlined in the *University Catalog, Cooperative Education Handbook,* or student handbooks.
- The Office of Institutional Diversity and Inclusion handles appeals arising from allegations of discrimination on the basis of sex, sexual orientation, race, color, age, religion, national origin, handicap, or marital status. The Office for Gender Equity and Compliance handles issues related to Title IX. If other allegations remain at the conclusion of those inquiries, then the student may refer them to the dean for review by the AAC of the college.

Student Appeals Procedures

It is the policy of the university that all students shall be treated fairly with respect to evaluations made of their academic performance, standing, and progress. The university presumes that academic judgments by its faculty are fair, consistent, and objective. Students must understand that the substitution of a different academic judgment for that of the original evaluator is a serious intrusion upon teaching prerogatives. Nonetheless, the university believes it is essential to provide an appeals mechanism to students who believe that they were erroneously, capriciously, or otherwise unfairly treated in an academic or cooperative education determination. This includes claims of misinterpretation or inequitable application of any academic provision of the student handbook or faculty handbook. Issues concerning admission or readmission into a program by a graduate student cannot be appealed beyond the college level. Before invoking the appeals procedures, students are always encouraged to speak informally to their instructors or academic advisors about any determination or grade about which they have questions. If students choose to pursue an appeal, the process is described in the appeals section that follows.

Scientific or Research Misconduct

Scientific or research misconduct is defined as fabrication, falsification, plagiarism, or other practices that seriously deviate from those that are commonly accepted within the academic and scientific community for proposing, conducting, or reporting research and does not include honest error or honest differences in interpretation or judgments of data. (Further information can be obtained from the U.S. Office of Research Integrity, Department of Health and Human Services). Possible incidences of misconduct are to be reported immediately to the Office of Student Conduct and Conflict Resolution, who will initiate the appropriate procedures. Findings of scientific or research misconduct cannot be appealed through the process below.

Levels of the Appeal Process

Prior to submitting an appeal to the college AAC, the student must attempt to resolve the problem with the faculty member, coordinator, or other individual acting on behalf of the university, according to procedures outlined in the university catalogs and/or student handbooks.

Unit level: Students who feel they have been erroneously, capriciously, or otherwise unfairly treated with the informal communication and decision in the previous step may proceed with an appeal through their unit's AAC. Students must follow the process in accordance with unit policies and procedures. If the timeline is not defined, a student shall submit a request for an appeal within 20 business days. The unit's AAC must provide the student with a written report of the finding(s) and decision within 10 business days.

School level: If the student believes he or she has been erroneously, capriciously, or otherwise unfairly treated with the committee's decision, he or she may pursue a secondary appeal to the school dean. In schools where a dean is not in place, the department chair or equivalent will serve in this role. The student must request, in writing, within 10 business days an appeal hearing. The school dean, or representative, shall provide the student or involved faculty member with a written report of his or her finding(s) and decision within 10 business days.

College level: The college AAC hears cases that have been unsatisfactorily resolved at the prior school and unit levels and that have met the requirements of appeals set forth by the university, which refers to an appeal mechanism for "students who believe that they have been erroneously, capriciously, or otherwise unfairly treated."

University level: If the student believes he or she has been erroneously, capriciously, or otherwise unfairly treated with the college dean's disposition of the matter, he or she may pursue the matter further, if applicable, in accordance with the university's student catalogs and/or student handbooks.

Initiation of Action

- Students wishing to bring an appeal before the college AAC must first consult with their appointed academic advisor, or when the appeal involves the academic advisor, a member of the Bouvé Graduate Office or the Office of Student Services (OSS); from here on called the appeal advisor. The student must submit all appropriate documents to their appeal advisor, including a Bouvé College of Health Sciences General Petition form, all previous appeal decisions, and academic transcripts. The appeal advisor will notify the chair of the college AAC that a student has submitted an appeal for review. The appeal advisor will inform the student of the time and place of the college's AAC meeting.
- The chair of the college AAC will ensure a panel is convened to hear the appeal within 10 business days.
- The Academic Affairs Committee Appeals Panel (the college Appeal Panel) includes three voting members of the AAC that appropriately represent the breadth and depth of programs within the college. At minimum, two schools will be represented on the panel and at least one member teaches within a similar degree-level program. Members of the panel shall have no known conflicts of interest with the student.
- The chair for the college Appeal Panel shall be selected from among three voting members of the AAC that appropriately represent the breadth and depth of programs within the college. At minimum, two schools will be represented on the panel and at least one member teaches within a similar degree-level program. Members of the panel shall have no known conflicts of interest with the student.

- The chair for the college Appeal Panel shall be selected from among the panel members.

Review of Appeals
- The appeal advisor will submit copies of the student's appeal to the chair of the college Appeal Panel prior to the meeting. Documents will be circulated to the panel members.
- The chair of the department or unit's ASC for the student presenting the appeal shall be invited by the chair of the college Appeal Panel to attend the meeting. If the chair is unable to attend, a representative of the department or unit ASC may attend in his or her place.
- The student's appeal advisor shall be invited by the chair of the college Appeal Panel to attend the meeting.
- The student is required to appear before the college Appeal Panel to present or discuss his or her appeal in person but may forfeit this right in writing. Student advocates, as defined by the university, are not permitted to attend a student's appeal meeting.
- Deliberation of the appeal will be made by the college Appeal Panel during the scheduled meeting, assuming that all relevant and appropriate information has been made available to the panel by the parties involved. If more information is needed, the decision may be postponed until a future meeting.
- The chair of the college Appeal Panel will notify the college dean of the findings and recommended decision. The college dean will have the final decision.
- The college dean will notify the student and other relevant parties of the decision in writing no later than 10 business days after the decision.
- If the student believes he or she has been erroneously or capriciously treated with the college dean's disposition of the matter, he or she may pursue the matter further, if applicable, in accordance with the university's student catalogs and/or student handbooks.

Applied Psychology

Website (http://www.northeastern.edu/bouve/ap)

Robert J. Volpe, PhD
Professor & Interim Chair

404 International Village
617.373.7970
617.373.8892 (fax)
caep@northeastern.edu

Graduate programs in the Department of Applied Psychology reflect Northeastern University's tradition of practice-oriented education with an ecological and multicultural focus. Faculty and students come from diverse ethnic and cultural backgrounds, providing an enriching learning experience. The department is a scientist-practitioner-based unit that generates new psychological knowledge through research, and the translation of research, to applications that:

1. Optimize development and learning
2. Promote mental and physical health from birth through the life span

The Bouvé College of Health Sciences emphasizes experiential and field-based learning, interdisciplinary and global knowledge, and integration of science and practice. The Department of Applied Psychology seeks to produce students who are well prepared to become counseling and psychology professionals in a variety of educational, government, community, organizational, and private settings. Our doctoral programs provide excellent educational opportunities for those interested in

professional psychology with specialized training for future careers in academic or practice positions as licensed psychologists. As a Bouvé student, you have an opportunity to acquire knowledge and competency needed for a lifetime of personal fulfillment and professional achievement.

Programs
Doctor of Philosophy (PhD)

Certificate of Advanced Graduate Studies (CAGS)

Master of Science (MS)

Master of Science in Counseling Psychology (MSCP)

Graduate Certificate

Counseling Psychology, PhD

The Doctor of Philosophy in Counseling Psychology program is accredited by the American Psychological Association (APA). It is designed to train the next generation of mental health professionals. The program offers doctoral education and training in psychology and seeks to prepare students for entry-level practice in counseling psychology. Doctoral-level counseling psychologists conduct research, teach at the university level, supervise students and professionals, consult with community agencies, and provide clinical services to people across the developmental life span. Counseling psychologists also enhance the science of health promotion and health psychology and emphasize community-based interventions. It is the mission of the PhD in Counseling Psychology program to train multiculturally competent counseling psychologists who are clinically adept in multiple settings with a variety of psychological and health-related issues and who are able to conceptualize, conduct, and evaluate research across biological, cultural, and relational systems in numerous social contexts, such as families, schools, neighborhoods, and communities.

Program Requirements
Complete all courses and requirements listed below unless otherwise indicated.

Milestones
- Annual review
- Four qualifying examinations completed in the first three years—research, ethics, assessment, and intervention
- Research team during the first year (two consecutive semesters)
- Dissertation proposal
- Dissertation defense

Core Requirements

A grade of B or higher is required in all course work.

Code	Title	Hours
Basic		
CAEP 6390	History and Systems of Psychology	3
CAEP 6394	Advanced Multicultural Psychology	3
CAEP 7750	Biological Bases of Behavior	3
CAEP 7755	Cognitive and Affective Bases of Behavior	3
CAEP 7756	Social Psychology in an Organizational and Ecological Context	3
Fieldwork		
Complete 8 semester hours from the following:		8
CAEP 7741	Advanced Fieldwork 1	
CAEP 7742	Advanced Fieldwork 2	
CAEP 7743	Advanced Fieldwork 3	
CAEP 7744	Advanced Fieldwork 4	
Clinical		
CAEP 6350	Introduction to Cognitive Assessment	3
CAEP 6352	Personality Assessment	3
CAEP 7710	Advanced Clinical Assessment	3
CAEP 7720	Advanced Clinical Interventions	3
CAEP 7758	Doctoral Seminar in Contemporary Theories of Psychotherapy	3
CAEP 7778	Doctoral Seminar: Leadership, Consultation, and Supervision	3
Elective		
Complete 3 semester hours from the following. Other electives or alternatives may be chosen in consultation with faculty advisor:		3
CAEP 5200	Motivational Interviewing in a Healthcare Setting	
CAEP 7771	Research Team Experience 1 (repeatable for up to 3 credits)	
CAEP 7772	Research Team Experience 2 (repeatable for up to 3 credits)	
CAEP 7773	Research Team Experience 3 (repeatable for up to 3 credits)	
CAEP 7774	Research Team Experience 4 (repeatable for up to 3 credits)	
CAEP 7976	Directed Study	
CAEP 8553	Advanced Counseling Practicum	
Professional		
Complete 6 semester hours from the following:		6
CAEP 7701	Doctoral Seminar in Counseling Psychology (repeatable 3 times for 3 credits)	
CAEP 7732	Legal and Ethical Issues in Community and Educational Settings	
Research		
CAEP 7711	Measurement: Advanced Psychometric Principles	3
CAEP 7712	Intermediate Statistical Data Analysis Techniques	3
CAEP 7716	Advanced Research and Data Analyses 2	3

Internship		
Complete 3 semester hours from the following:		3
CAEP 7798	Doctoral Internship 1	
CAEP 7799	Doctoral Internship 2	

Dissertation

Code	Title	Hours
Complete the following (repeatable) course once:		
CAEP 9990	Dissertation	0

Program Credit/GPA Requirements

62 total semester hours required
Minimum 3.000 GPA required

School Psychology, PhD

Northeastern University's Doctor of Philosophy in School Psychology program is accredited by the American Psychological Association (APA) and the National Association of School Psychologists (NASP). The program is designed to prepare the next generation of leaders in school psychology. The ecological perspective and scientist-practitioner training model provide the foundation for the program's educational goals. Students have an opportunity to learn how to conduct research, to use research to inform practice, and to contribute to the scientific foundation of professional practice.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated. Students who enter with a master's degree develop an individualized program of study with their advisor, which requires a minimum of 50 semester hours of credit.

Milestones

Comprehensive examination
Annual review
Mentored research project
Dissertation committee
Dissertation proposal
Dissertation defense

Core Requirements

A grade of B or higher is required in all course work.

Code	Title	Hours
Professional		
CAEP 6365	Seminar in School Psychology	3
CAEP 7732	Legal and Ethical Issues in Community and Educational Settings	3
Basic		
CAEP 6206	Learning Principles	3
CAEP 6218	Infant, Child, and Adolescent Development	3
CAEP 6390	History and Systems of Psychology	3
CAEP 7750	Biological Bases of Behavior	3
CAEP 7755	Cognitive and Affective Bases of Behavior	3
CAEP 7756	Social Psychology in an Organizational and Ecological Context	3
Multicultural Competency		

CAEP 6203	Understanding Culture and Diversity	3
CAEP 6394	Advanced Multicultural Psychology	3

Assessment and Intervention

Course Work

CAEP 6247	Child and Adolesent Psychopathology	3
CAEP 6345	Learning Problems: Educational, Biological, and Ecological Perspectives	3
CAEP 6347	Behavior Management	3
CAEP 6350	Introduction to Cognitive Assessment	3
CAEP 6353	Curriculum-Based Assessment and Instruction	3
CAEP 6354	Social, Emotional, and Behavioral Assessment	3
CAEP 6360	Consultation and Program Evaluation	3
CAEP 6399	Clinical Skills in Counseling Psychology	3
CAEP 6401	Counseling Children and Adolescents in Schools 1	3
CAEP 6402	Counseling Children and Adolescents in Schools 2	3
CAEP 7710	Advanced Clinical Assessment	3
CAEP 7720	Advanced Clinical Interventions	3

Practicum

CAEP 6400	Prepracticum in School Psychology	1
CAEP 8415	Practicum in School Psychology 1	2
CAEP 8416	Practicum in School Psychology 2	2

Fieldwork

CAEP 7741	Advanced Fieldwork 1	1,2
CAEP 7742	Advanced Fieldwork 2	1,2
CAEP 7743	Advanced Fieldwork 3	1,2
CAEP 7744	Advanced Fieldwork 4	1,2

Internship

CAEP 7798	Doctoral Internship 1	1-3
CAEP 7799	Doctoral Internship 2	2

Research

Research Course Work

CAEP 6202	Research, Evaluation, and Data Analysis	3
CAEP 7711	Measurement: Advanced Psychometric Principles	3
CAEP 7712	Intermediate Statistical Data Analysis Techniques	3
CAEP 7715	Advanced Research and Data Analyses 1	3
CAEP 7716	Advanced Research and Data Analyses 2	3
CAEP 7777	Doctoral Seminar: Program Planning and Evaluation	3

Research Teams

CAEP 7771	Research Team Experience 1	1
CAEP 7772	Research Team Experience 2	1
CAEP 7773	Research Team Experience 3	1

Dissertation

Code	Title	Hours
Complete the following (repeatable) course twice:		
CAEP 9990	Dissertation	

Program Credit/GPA Requirements

104 total semester hours required
Minimum 3.000 GPA required

Applied Behavior Analysis, CAGS

The Certificate of Advanced Graduate Study (CAGS) program prepares graduates to assume supervisory behavior analyst roles in schools and agencies and to serve as independent consultants. Additionally, it seeks to give graduates expertise in a specific clinical area related to applied behavior analysis, such as early intervention, public policy, or autism. This program is designed for the student who possesses a graduate degree in either Psychology or Education. The Behavior Analyst Certification Board (BACB) has verified this course sequence as meeting the course requirements for eligibility to take the Board Certified Behavior Analyst (BCBA) examination.

This program includes 6 core courses in behavior analysis that explore the principles and procedures of applied behavior analysis in-depth and address its philosophical underpinnings. The 6 core courses are followed by 4 additional courses in a specific content area related to behavior analysis. These courses, which are related, explore the related clinical issue in-depth. Students may elect to complete their supervised experience hours by taking Intensive Practicum in Applied Behavior Analysis 1 (CAEP 8417) and Intensive Practicum in Applied Behavior Analysis 2 (CAEP 8418), in addition to the 10 required courses.

Courses are delivered in an online format. Students attend lectures virtually and view supplementary material on their own schedules, taking advantage of technological advances that promote student learning and increase student-to-instructor and student-to-student communication.

Students take one or two courses each academic term, and courses are offered during the fall, spring, and summer full semesters. Behavior Assessment (CAEP 6327) and Research and Design Methods (CAEP 6328) serve as prerequisite courses to the remaining courses in the program.

Professional Portfolio

The capstone for the program is the professional portfolio. This portfolio, which is compiled electronically, documents the student's acquisition of critical behavioral procedures and competency in critical clinical skills. These skills, each of which is associated with a specific project, include:

- Preference and reinforcer assessment
- Functional assessment of problem behavior
- Task analysis
- Discrete trial
- Stimulus equivalence
- Consequence reinforcement
- Conditioned reinforcement
- Literature review

Each semester, students complete assignments associated with the above clinical skills, and each assignment culminates in professional documents to be included in the student's professional portfolio. A faculty member reviews and signs each assignment in the professional portfolio. The faculty member's signature indicates that the student has achieved the faculty-established standards for the project. Graduates are encouraged to use their professional portfolio when applying for employment.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

A grade of B or higher is required in each course.

Code	Title	Hours
Basic		
CAEP 6327	Behavior Assessment	3
CAEP 6328	Research and Design Methods	3
CAEP 6329	Service Administration	3
CAEP 6331	Advanced Learning Seminar 1	3
CAEP 6334	Applied Programming Seminar 1	3
CAEP 6336	Systematic Inquiry 1	3
Advanced		
Complete 3 semester hours from the following:		3
CAEP 6324	Programmed Learning	
CAEP 6332	Advanced Learning Seminar 2	
CAEP 6335	Applied Programming Seminar 2	
CAEP 6337	Systematic Inquiry 2	
Specialization Area		
Complete specialization area in consultation with your faculty advisor.		9

Practicum

Note: The intensive practicum is optional. Consult your faculty advisor.

Code	Title	Hours
CAEP 8417	Intensive Practicum in Applied Behavior Analysis 1	2
CAEP 8418	Intensive Practicum in Applied Behavior Analysis 2	2

Program Credit/GPA Requirements

30 total semester hours required
Minimum 3.000 GPA required

Counseling Psychology, CAGS

The Certificate of Advanced Graduate Study (CAGS) in Counseling Psychology is for students with a highly related master's degree seeking to enhance their professional skills. This program does not meet licensure requirements in Massachusetts. It is a 30-semester-hour course of study. This program is individually tailored to fulfill a student's professional focus.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

A grade of B or higher is required in all course work.

Code	Title	Hours
Required Core		
In consultation with faculty advisor, complete 24 semester hours in the following subject area:		24
CAEP		

Internship		
CAEP 8510	Internship in Counseling Psychology 1	3
CAEP 8511	Internship in Counseling Psychology 2	3

Program Credit/GPA Requirements

30 total semester hours required
Minimum 3.000 GPA required

Applied Behavior Analysis, MS

The Master of Science in Applied Behavior Analysis (ABA) program prepares graduates to assume supervisory behavior analyst roles in schools and service agencies and to serve as independent consultants. The Behavior Analyst Certification Board (BACB) has verified this course sequence as meeting the course requirements for eligibility to take the Board Certified Behavior Analyst (BCBA) examination. While retaining a practitioner focus, this program gives students in-depth knowledge of topics such as conditioned reinforcement, motivational influences on behavior, and errorless teaching procedures. Courses explore the principles and procedures of applied behavior analysis in-depth and address its philosophical underpinnings. With this background, graduates are prepared to address the most complex behavior problems and learning challenges. Students complete 6 core courses, plus an additional 4 courses that extend the student's familiarity with clinical procedures and with the research supporting their use. Students may elect to complete their supervised experience hours by taking Intensive Practicum in Applied Behavior Analysis 1 (CAEP 8417) and Intensive Practicum in Applied Behavior Analysis 2 (CAEP 8418), in addition to the 10 required courses.

Courses are delivered in an online format. Students attend lectures virtually and view supplementary material on their own schedules, taking advantage of technological advances that promote student learning and increase student-to-instructor and student-to-student communication.

Students take one or two courses each academic term, and courses are offered during the fall, spring, and summer full semesters. Behavior Assessment (CAEP 6327) and Research and Design Methods (CAEP 6328) serve as prerequisite courses to the remaining courses in the program.

Professional Portfolio

The capstone for the program is the professional portfolio. This portfolio, which is compiled electronically, documents the student's acquisition of critical behavioral procedures. This portfolio documents the student's behavioral competency in critical clinical skills. These skills, each of which is associated with a specific project, include:

- Preference and reinforce assessment
- Functional assessment of problem behavior
- Task analysis
- Discrete trial
- Stimulus equivalence
- Conditioned reinforcement
- Literature review

Each semester, students complete assignments associated with the above clinical skills, and each assignment culminates in professional documents to be included in the student's professional portfolio. A faculty member reviews and signs each assignment in the professional portfolio. The faculty member's signature indicates that the student has achieved the faculty-established standards for the project. Graduates

are encouraged to use their professional portfolio when applying for employment.

Program Requirements
Complete all courses and requirements listed below unless otherwise indicated.

Professional Portfolio
- Preference and reinforce assessment
- Functional assessment of problem behavior
- Task analysis
- Discrete trial
- Stimulus equivalence
- Conditioned reinforcement
- Literature review

Core Requirements
A grade of B or higher is required in each course.

Code	Title	Hours
Basic		
CAEP 6327	Behavior Assessment	3
CAEP 6328	Research and Design Methods	3
CAEP 6329	Service Administration	3
CAEP 6331	Advanced Learning Seminar 1	3
CAEP 6334	Applied Programming Seminar 1	3
CAEP 6336	Systematic Inquiry 1	3
Advanced		
CAEP 6324	Programmed Learning	3
CAEP 6332	Advanced Learning Seminar 2	3
CAEP 6335	Applied Programming Seminar 2	3
CAEP 6337	Systematic Inquiry 2	3

Practicum
Note: The intensive practicum is optional. Consult your faculty advisor.

Code	Title	Hours
CAEP 8417	Intensive Practicum in Applied Behavior Analysis 1	2
CAEP 8418	Intensive Practicum in Applied Behavior Analysis 2	2

Program Credit/GPA Requirements
30 total semester hours required
Minimum 3.000 GPA required

College Student Development and Counseling, MS

The College Student Development and Counseling program (CSDC) at Northeastern University aims to create mindful, action-oriented leaders, specifically in the fields of higher education and student affairs administration. The program focuses on counseling, college student development, the history and philosophy of the student affairs profession, and the organization and administration of the field. The program offers emerging professionals the opportunity to obtain the academic and experiential background that enables them to design, create, and administer student personnel programs that teach leadership, foster student development, value diversity, and contribute to the academic experiences of college students. College Student Development and

Counseling students are also supported with individual research projects. The program offers a global perspective to the practice of student affairs and student services.

Program Requirements
Complete all courses and requirements listed below unless otherwise indicated.

Milestone
Portfolio

Core Requirements
A grade of B or higher is required in each course.

Code	Title	Hours
Student Affairs Administration		
CAEP 6301	Planning and Administering Student Affairs	3
CAEP 6302	Law and Ethics in Higher Education	3
CAEP 6303	Financial Aspects of Higher Education	3
CAEP 6305	Special Topics in Higher Education	3
CAEP 6235	Vocational, Education, and Career Development	3
College Student Development		
CAEP 6200	Introduction to Counseling: Theory and Process in an Ecological Context	3
CAEP 6203	Understanding Culture and Diversity	3
CAEP 6230	Health Issues in Counseling	3
CAEP 6300	Introduction to College Student Development	3
Professional Practice		
CAEP 6215	Groups: Dynamics and Leadership	3
CAEP 8402	College Student Development Practicum 1	3
CAEP 8403	College Student Development Practicum 2	3
Research and Evaluation		
CAEP 6202	Research, Evaluation, and Data Analysis	3
CAEP 6262	Evaluation and Outcomes Assessment of Community, School, and Health-Related Programs	3

Program Credit/GPA Requirements
42 total semester hours required
Minimum 3.000 GPA required

Counseling Psychology, MSCP

The Master of Science in Counseling Psychology (MSCP) program at Northeastern is committed to the development of competent Licensed Mental Health Counselors (LMHC) through the disciplinary studies and contemporary professional practice of counseling psychology. The program complies with licensing regulations for mental health counselors in the Commonwealth of Massachusetts and is unique in its offer of a choice of specific specializations to gain additional depth in selected areas within the general Master of Science program.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

A grade of B or higher is required in all course work.

Code	Title	Hours
Seminar		
CAEP 6380	Seminar in Feminist Psychology	3
Required Core		
CAEP 6200	Introduction to Counseling: Theory and Process in an Ecological Context	3
CAEP 6201	Introduction to Assessment	3
CAEP 6203	Understanding Culture and Diversity	3
CAEP 6220	Development Across the Life Span	3
CAEP 6235	Vocational, Education, and Career Development	3
CAEP 6242	Psychopathology: Diagnosis and Treatment Planning	3
CAEP 6250	Individual Interventions	3
CAEP 6260	Community Counseling Psychology	3
CAEP 6282	Ethics and Professional Development	3
CAEP 6287	Group Counseling	3
CAEP 6375	Substance Use and Treatment	3
CAEP 6399	Clinical Skills in Counseling Psychology	3
Research		
CAEP 6202	Research, Evaluation, and Data Analysis	3
Clinical		
CAEP 6338	Clinical Practice Supervision	1-3
Practicum		
CAEP 8401	Practicum in Counseling Psychology	3
Internship		
CAEP 8510	Internship in Counseling Psychology 1	3
CAEP 8511	Internship in Counseling Psychology 2	3

Electives

Code	Title	Hours
Complete 9 semester hours from the following. Other electives or alternatives may be chosen in consultation with faculty advisor.		9
CAEP 6215	Groups: Dynamics and Leadership	
CAEP 6218	Infant, Child, and Adolescent Development	
CAEP 6222	Human Sexuality	
CAEP 6230	Health Issues in Counseling	
CAEP 6247	Child and Adolesent Psychopathology	
CAEP 6283	Brief Therapies	
CAEP 6286	Family Counseling Interventions	
CAEP 6290	Reality Therapy	
CAEP 6390	History and Systems of Psychology	
CAEP 6394	Advanced Multicultural Psychology	
CAEP 7720	Advanced Clinical Interventions	
CAEP 7758	Doctoral Seminar in Contemporary Theories of Psychotherapy	

PHTH 6320	Qualitative Methods in Health and Illness	

Program Credit/GPA Requirements

60 total semester hours required
Minimum 3.000 GPA required

School Psychology, MS/CAGS

Northeastern University's Master of Science/Certificate of Advanced Graduate Study (CAGS) in School Psychology is approved by the National Association of School Psychologists (NASP) and the Massachusetts Department of Elementary and Secondary Education. The overarching purpose of the program is to develop highly competent school psychologists. Some students also choose to specialize in either early intervention or applied behavior analysis. The early intervention training option is designed to prepare school psychologists to work with infants and toddlers and their families in community and related agencies, on interdisciplinary teams, and on the transition to school. The applied behavior analysis training option is designed to prepare school psychologists to address the learning and behavioral needs of children and adolescents with challenging behaviors in school, home, and community settings, including children with autism spectrum disorders.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

MS Requirements

A grade of B or higher is required in all course work.

Code	Title	Hours
Clinical/Applied		
CAEP 6201	Introduction to Assessment	3
CAEP 6347	Behavior Management	3
CAEP 6350	Introduction to Cognitive Assessment	3
CAEP 6400	Prepracticum in School Psychology	1
Foundations		
CAEP 6202	Research, Evaluation, and Data Analysis	3
CAEP 6203	Understanding Culture and Diversity	3
CAEP 6206	Learning Principles	3
CAEP 6218	Infant, Child, and Adolescent Development	3
CAEP 6247	Child and Adolesent Psychopathology	3
CAEP 6365	Seminar in School Psychology	3
CAEP 7750	Biological Bases of Behavior	3

CAGS Requirements

A grade of B or higher is required in all course work.

Code	Title	Hours
Clinical/Applied		
CAEP 6353	Curriculum-Based Assessment and Instruction	3
CAEP 6354	Social, Emotional, and Behavioral Assessment	3
CAEP 6345	Learning Problems: Educational, Biological, and Ecological Perspectives	3
CAEP 6360	Consultation and Program Evaluation	3

CAEP 6399	Clinical Skills in Counseling Psychology	3
CAEP 6401	Counseling Children and Adolescents in Schools 1	3
CAEP 6402	Counseling Children and Adolescents in Schools 2	3
Practicum		
CAEP 8415	Practicum in School Psychology 1	2
CAEP 8416	Practicum in School Psychology 2	2
Internship		
CAEP 8501	Internship in School Psychology 1	3
CAEP 8502	Internship in School Psychology 2	3

Optional Concentration

APPLIED BEHAVIOR ANALYSIS

Code	Title	Hours
CAEP 6327	Behavior Assessment	3
CAEP 6328	Research and Design Methods	3
CAEP 6329	Service Administration	3
CAEP 6336	Systematic Inquiry 1	3
CAEP 8417	Intensive Practicum in Applied Behavior Analysis 1	2
CAEP 8418	Intensive Practicum in Applied Behavior Analysis 2	2

Optional Specialization

EARLY INTERVENTION

Code	Title	Hours
CAEP 5150	Early Intervention: Family Systems	3
CAEP 8425	Early Intervention Practicum 1	2
SLPA 6335	Early Intervention: Assessment and Intervention	3
CAEP 8426	Early Intervention Practicum 2	2
CAEP 6202	Research, Evaluation, and Data Analysis	3

MS/CAGS Program Credit/GPA Requirements

62 total semester hours required
Minimum 3.000 GPA required

Applied Behavior Analysis, Graduate Certificate

The goal of the Graduate Certificate in Applied Behavior Analysis is to prepare graduates to assume supervisory behavior analyst roles in schools and service agencies and to serve as independent consultants. This program is designed for the student who possesses a graduate degree in either psychology or education. The Behavior Analyst Certification Board (BACB) has verified this course sequence as meeting the course requirements for eligibility to take the Board Certified Behavior Analyst (BCBA) examination.

This program includes six core courses in behavior analysis that explore the principles and procedures of applied behavior analysis in-depth and address its philosophical underpinnings. Students may elect to complete their supervised experience hours by taking Intensive Practicum in Applied Behavior Analysis 1 (CAEP 8417) and Intensive Practicum in Applied Behavior Analysis 2 (CAEP 8418), in addition to the six required courses.

Courses are delivered in an online format. Students attend lectures virtually and view supplementary material on their own schedules, taking advantage of technological advances that promote student learning and increase student-to-instructor and student-to-student communication.

Students take one or two courses each academic term, and courses are offered during the fall, spring, and summer full semesters. Behavior Assessment (CAEP 6327) and Research and Design Methods (CAEP 6328) serve as prerequisite courses to the remaining courses in the program.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

A grade of B or higher is required in each course.

Code	Title	Hours
Basic Core		
CAEP 6327	Behavior Assessment	3
CAEP 6328	Research and Design Methods	3
CAEP 6329	Service Administration	3
CAEP 6331	Advanced Learning Seminar 1	3
CAEP 6334	Applied Programming Seminar 1	3
CAEP 6336	Systematic Inquiry 1	3

Intensive Practicum

Note: The intensive practicum is optional. Consult your faculty advisor.

Code	Title	Hours
CAEP 8417	Intensive Practicum in Applied Behavior Analysis 1	2
CAEP 8418	Intensive Practicum in Applied Behavior Analysis 2	2

Program Credit/GPA Requirements

18 total semester hours required
Minimum 3.000 GPA required

Early Intervention, Graduate Certificate

Northeastern University's Certificate Program in Early Intervention is an interdisciplinary, preservice training program that is designed to fulfill requirements for certification as an early intervention specialist, at the advanced provisional level, as set forth by the Massachusetts Department of Public Health (DPH). The interdisciplinary nature of the program is facilitated by the interaction of graduate students from school psychology, counseling psychology, physical therapy, speech and language pathology, and undergraduate students from human services and psychology.

The goals for the early intervention certificate program are:

- To prepare personnel to provide services to infants and toddlers with disabilities and their families, from linguistically and culturally diverse backgrounds in urban environments
- To prepare personnel who have attained all competencies relative to early intervention, specified by the Massachusetts DPH, and that are consistent with best practice and research
- To prepare personnel in an interdisciplinary manner, drawing from Northeastern University's multidisciplinary resources
- To prepare personnel to function effectively across teams (individualized family service plan teams, community teams,

interagency teams) and to understand the roles of their interdisciplinary teammates

Upon graduation, students are eligible for employment in an early intervention service delivery setting.

The program is delivered in a hybrid format. Classes meet on campus one day each month, and additional course content is delivered through online distance education. The program can be taken alone or integrated with bachelor's, master's, or clinical doctoral degree programs. Personnel who are working in the field may use their work site for field training. Degree-bearing programs incorporate the courses in a variety of arrangements, meaning that some of the program's classes stand in place for others and/or serve as electives. These program plans are worked out with students' advisors.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

A grade of B or higher is required in all courses.

Code	Title	Hours
Required Core		
CAEP 5150	Early Intervention: Family Systems	3
CAEP 5151	Early Intervention: Infant and Toddler Development, Risk, and Disability	3
CAEP 5152	Early Intervention: Planning and Evaluating Services	3
SLPA 6335	Early Intervention: Assessment and Intervention	3
Practicum		
CAEP 8425	Early Intervention Practicum 1	2
CAEP 8426	Early Intervention Practicum 2	2

Program Credit/GPA Requirements

16 total semester hours required
Minimum 3.000 GPA required

<div style="background:red;color:white;">

Communication Sciences and Disorders

</div>

Website (http://www.northeastern.edu/bouve/slpa)

Lorraine Book, PhD, CCC-SLP
Interim Chair and SLP Graduate Program Director

Sandra Cleveland, AuD, CCC-A
Associate Clinical Professor and AuD Program Director

MS in Speech-Language Pathology Program
226 Forsyth Building
617.373.7577
617.373.2239 (fax)
Lorraine Book, SLP Graduate Program Director, l.book@northeastern.edu

Doctor of Audiology Program
226 Forsyth Building
617.373.2496
617.373.8756 (fax)
Sandra Cleveland, AuD Program Director, sa.cleveland@northeastern.edu

We are a learning community in which faculty and students support each other's learning across the life span. Our department mission is to educate students to the highest levels of professionalism, consistent with American Speech-Language-Hearing Association (ASHA) and Northeastern University accreditation standards and Massachusetts licensure requirements; to provide them with an interprofessional and practice-oriented education in our urban university environment; to provide them with research experiences based on the highest standards of scientific knowledge; to provide them with clinical experiences with clients, patients, and families from a diverse population base using an evidence-informed practice approach; to evaluate their progress using both formative and summative assessment measures.

Our faculty engage in continuous learning both inside and outside the department to be current in recent research and to contribute to that knowledge base. They use, develop, and address in their teaching technology that improves the hearing, communication, respiration, and swallowing skills of individuals at a variety of age and skill levels.

Programs
Master of Science (MS)

- Speech-Language Pathology (p. 246)

<div style="background:red;color:white;">

Speech-Language Pathology, MS

</div>

Adhering to the highest professional standards, the speech-language pathology (SLP) graduate program seeks to prepare future speech-language pathologists for the rigors of clinical practice in educational and healthcare settings. Graduates of the program will influence society in profound ways—for example, enabling children with autism to communicate effectively, relieving adolescents' fears of speaking dysfluently in the classroom, and helping stroke survivors resume activities in which they had previously participated. The comprehensive program of study emphasizes teamwork and interdisciplinary approaches to complex service delivery issues. SLP graduate students acquire the knowledge and skills needed for a lifetime of professional achievement and social contribution.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

A grade of B or higher is required in each course.

Code	Title	Hours
Disorders		
Requires 31 semester hours:		
SLPA 5201	Diagnostic Testing in Speech-Language Pathology	1
SLPA 6219	Aural Rehabilitation (or elective)	3-4
SLPA 6303	Stuttering	3
SLPA 6304	Augmentative and Alternative Communication	3
SLPA 6305	Articulation and Phonology	3
SLPA 6306	Speech-Language Disorders in Children	3
SLPA 6307	Voice Disorders	3
SLPA 6308	Dysphagia	3
SLPA 6309	Speech-Language Disorders in Adults	3
SLPA 6321	Motor Speech Disorders	3

SLPA 6330	Language Literacy 1	0.5
SLPA 6337	Language Literacy Experiential Program	0.5
SLPA 6338	Language Literacy 2	2
Science		
SLPA 5109	Neurology of Communication	3
SLPA 6301	Speech Science	3
Research		
SLPA 6211	Research and Evidence-Based Practice	3
SLPA 6420	Practical Statistics for Speech-Language Pathology and Audiology	3
Practicum		
SLPA 6415	Speech-Language Pathology Advanced Clinical Practicum 1	3
SLPA 6416	Speech-Language Pathology Advanced Clinical Practicum 2	2
SLPA 6417	Speech-Language Pathology Advanced Clinical Practicum 3	2
SLPA 6418	Speech-Language Pathology Advanced Clinical Practicum 4	2

Program Credit/GPA Requirements

52 total semester hours required
Minimum 3.000 GPA required

Health Sciences

Website (https://bouve.northeastern.edu/health-sciences)

Shan Mohammed, MD, MPH
Clinical Associate Professor & Interim Chair

316 Robinson Hall
617.373.7729
617.373.2968 (fax)

The Department of Health Sciences at the Bouvé College of Health Sciences at Northeastern University provides a unique, transdisciplinary setting that incorporates academics, research, and practice and seeks to prepare students for a wide range of career paths. We offer engaging undergraduate academic programs that enable students to major or minor in health sciences, as well as several graduate degree programs, including the Master of Public Health with Concentration in Urban Health, the Master of Science in Exercise Science with Concentration in Physical Activity and Public Health, the Doctor of Philosophy in Population Health, and several dual-degree programs offered in conjunction with the School of Pharmacy, the School of Law, the Exercise Science Program, the Health Informatics Program, and the Physician Assistant Program.

Our diverse faculty has expertise in the fields of population health, health disparities, nutritional epidemiology, social epidemiology, exercise science, medical sociology, public policy, personal health technologies, neurodevelopmental disorders, and mental health, among many more. Students have the opportunity to work side by side with faculty in conducting cutting-edge research in these fields. We also have research staff highly skilled in providing unique, specialized dietary assessment services.

In line with Northeastern's commitment to interdisciplinary research and urban engagement, we teach and work closely with many other schools, centers, and departments in the university, including the Institute on Urban Health Research (IUHR), the Center for Community Health Education Research and Service (CCHERS), the Social Science Environmental Health Research Institute (SSEHRI), and the Center for Health Policy and Healthcare Research (CHPHR), as well as community agencies and neighborhood health centers in the local Boston area and beyond.

Programs

Doctor of Philosophy (PhD)

Master of Science (MS)

Master of Public Health (MPH)

Dual Degree

Graduate Certificate

Population Health, PhD

Beth E. Molnar, ScD, SM
Director of the Population Health Program

This program seeks to train students to become public health researchers and leaders through simultaneous examination of multiple determinations of health, including social, environmental, nutritional, and behavioral risk factors. Our students investigate the underlying causes of adverse health, including disease, disparities, and disability, through training in core population health disciplines—biostatistics, epidemiology, and health services—together with individual-specific and specialized training in topics related to student research. Importantly, our students are mentored by Northeastern's distinguished faculty, who individually and together conduct innovative, solution-focused research in critical population health topics.

Our population health doctoral students have an opportunity to learn to conduct research that addresses five key health determinants:

1. Social and community contexts
2. Environment and neighborhoods
3. Health and healthcare delivery
4. Education
5. Economic stability

Our diverse faculty has expertise in numerous population health disciplines, including health services research, health disparities, environmental and social epidemiology, biostatistics, exercise science, medical sociology, public policy, personal health technologies, and mental

health. Students have the opportunity to work side by side with faculty in conducting cutting-edge, transdisciplinary research in these fields.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Milestones

Qualifying examination
Annual review
Dissertation committee
Dissertation proposal
Dissertation defense

Core Requirements

Code	Title	Hours
Health Services		
PHTH 5232	Evaluating Healthcare Quality	3
or PHTH 5234	Economic Perspectives on Health Policy	
Population Health		
PHTH 6400	Principles of Population Health 1	3
PHTH 6410	Principles of Population Health 2	3
Epidemiology		
PHTH 5202	Introduction to Epidemiology	3
PHTH 6202	Intermediate Epidemiology	3
Research Ethics		
BIOL 6381	Ethics in Biological Research	2
or PHSC 6212	Research Skills and Ethics	
Research and Analysis		
PHTH 5210	Biostatistics in Public Health	3
PHTH 6210	Applied Regression Analysis	3

Options

Complete one of the following options:

SOCIAL AND ENVIRONMENTAL DETERMINANTS OF HEALTH OPTION

Code	Title	Hours
PHTH 5224	Social Epidemiology	3
PHTH 6440	Advanced Methods in Biostatistics	3
PHTH 6800	Causal Inference in Public Health Research	3
Electives		2-4

HEALTH SERVICES AND POLICY OPTION

Code	Title	Hours
ECON 5110	Microeconomic Theory	4
PHTH 5234	Economic Perspectives on Health Policy	3
Electives		2-4

Electives

Code	Title	Hours
CS 6220	Data Mining Techniques	
CS 7280	Special Topics in Database Management	
ECON 5110	Microeconomic Theory	
ECON 5140	Applied Econometrics	
ECON 7200	Topics in Applied Economics	
EXSC 5200	Cardiopulmonary Physiology	
EXSC 5220	Advanced Exercise Physiology	
EXSC 5230	Physical Activity and Exercise: Effects on Musculoskeletal Health and Disease	
HINF 5200	Theoretical Foundations in Personal Health Informatics	
HRMG 6220	Health Organization Management	
PHSC 6216	Human Physiology and Pathophysiology	
PHTH 5212	Public Health Administration and Policy	
PHTH 5214	Environmental Health	
PHTH 5226	Strategic Management and Leadership in Healthcare	
PHTH 5228	Advances in Measuring Behavior	
PHTH 5230	Global Health	
PHTH 5440	Community-Based Participatory Research: Environmental Health	
PHTH 5540	Health Education and Program Planning	
PHTH 6200	Principles and History of Urban Health	
PHTH 6204	Society, Behavior, and Health	
PHTH 6208	Urban Community Health Assessment	
PHTH 6320	Qualitative Methods in Health and Illness	
PPUA 7247	Seminar in U.S. Health Policy and Management	
SOCL 7257	Contemporary Issues in Sociology	
SOCL 7287	Social Movements in Health	
STRT 6220	Strategic Management for Healthcare Organizations	

Dissertation

Code	Title	Hours
Complete the following (repeatable) course twice:		
PHTH 9990	Dissertation	

Program Credit/GPA Requirements

33 total semester hours required
Minimum 3.000 GPA required

Public Health, MPH

Website (http://www.northeastern.edu/mph)

Neil Maniar, PhD, MPH
Program Director

316 Robinson Hall
617.373.5925

Through innovation in experiential education, research, and service, the Master of Public Health Program in Urban Health at Northeastern University trains diverse and skilled professionals who promote and protect the health of urban communities.

In order to help prepare the next generation of urban public health leaders and professionals, the MPH offers our diverse graduate students an opportunity to:

- Complete your degree 100 percent online, on-ground, or in a hybrid format (combination of both)
- Participate in learning options that meet the needs of the working professional:
  - On-ground courses are offered in the evening (most classes meet once a week from 5:00 to 7:30 p.m.)
  - Enroll as either a full-time or part-time student
- Take elective courses on a wide range of public health topics, including cross-departmental offerings from Northeastern's other colleges (law, business, social sciences, and more)
- Enjoy a supportive learning environment that includes outstanding student mentoring

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

A grade of B– or higher is required in each required course.

Code	Title	Hours
Required Core		
PHTH 5120	Race, Ethnicity, and Health in the United States	3
PHTH 5202	Introduction to Epidemiology	3
PHTH 5210	Biostatistics in Public Health	3
PHTH 5212	Public Health Administration and Policy	3
PHTH 5214	Environmental Health	3
PHTH 5540	Health Education and Program Planning	3
or PPUA 6509	Techniques of Program Evaluation	
PHTH 6204	Society, Behavior, and Health	3
Urban Health		
PHTH 6200	Principles and History of Urban Health	3
PHTH 6208	Urban Community Health Assessment	3
Practicum		
PHTH 6966	Practicum	3
Capstone		
PHTH 6910	Public Health Capstone	3

Electives

Code	Title	Hours
Complete 9 semester hours from the following. In consultation with your faculty advisor, you may complete electives from another discipline:		9
PHTH 5222	Health Advocacy	
PHTH 5224	Social Epidemiology	
PHTH 5226	Strategic Management and Leadership in Healthcare	
PHTH 5228	Advances in Measuring Behavior	
PHTH 5230	Global Health	
PHTH 5232	Evaluating Healthcare Quality	
PHTH 5234	Economic Perspectives on Health Policy	
PHTH 5236	Public Health Nutrition	
PHTH 5300	Project Management in Public Health	
PHTH 5310	Budget Principles in Public Health	
PHTH 5320	Grant Writing in Public Health	
PHTH 5440	Community-Based Participatory Research: Environmental Health	
PHTH 5540	Health Education and Program Planning	
PHTH 6202	Intermediate Epidemiology	
PHTH 6210	Applied Regression Analysis	
PHTH 6320	Qualitative Methods in Health and Illness	
PHTH 6400	Principles of Population Health 1	
PHTH 6410	Principles of Population Health 2	
PHTH 6440	Advanced Methods in Biostatistics	
PHTH 6460	Analysis of Messy Data	
PHTH 6800	Causal Inference in Public Health Research	
PPUA 6509	Techniques of Program Evaluation	

Program Credit/GPA Requirements

42 total semester hours required
Minimum 3.000 GPA required

Exercise Science with Concentration in Physical Activity and Public Health, MS

Rui Li, PhD
Program Director

520 Behrakis Health Sciences Center
617.373.2526

The Department of Health Sciences currently offers a Master of Science in Exercise Science with a public health emphasis. The concentration in physical activity and public health recognizes that inactivity is a major public health problem and represents a significant risk factor for many chronic diseases, including heart disease, stroke, hypertension, metabolic syndrome, obesity, type 2 diabetes, and some types of cancer. Moreover, this concentration integrates key competencies for a degree in exercise science recommended by the American College of Sports Medicine (ACSM), including knowledge of exercise physiology and the assessment and development of physical activity and exercise programs for the general and clinical populations. Graduate students seeking this degree are members of the Bouvé College of Health Sciences—a leading national model for education and research in the health, psychosocial, and biomedical sciences, which supports the university's mission of educating students for a life of fulfillment and accomplishment and creating and translating knowledge to meet global and societal needs through interdisciplinary research, urban engagement, experiential learning, and the integration of classroom learning with real-world experience. Faculty in the department are exploring a range of research topics, including acute/chronic effects of exercise, community-based exercise and nutrition interventions, nutrition epidemiology, health disparities, urban public health, and application of technology for measuring and motivating behavior change.

Two unique features of the program are:

- The program offers three pathways of study based on student interests: research, public health, and practice-based pathways. Students take two electives to enhance their knowledge in their selected pathway. These pathways are designed to train students to pursue a terminal degree in exercise science/opportunities in a

research setting, federal/private/nonprofit institutions, and clinical setting.

- We offer students internship, practicum, and research opportunities at both on- and off-campus sites. Experiential education is a key component of the program because application of classroom knowledge provides valuable preparation for a career in exercise science.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

A grade of B or higher is required in all course work.

Code	Title	Hours
Exercise Science		
EXSC 5200	Cardiopulmonary Physiology	3
EXSC 5210	Physical Activity and Exercise: Prescription, Measurement, and Testing	3
EXSC 5220	Advanced Exercise Physiology	3
EXSC 5230	Physical Activity and Exercise: Effects on Musculoskeletal Health and Disease	3
EXSC 6202	Electrocardiography, Clinical Assessment, and Prescription	3
Public Health		
PHTH 5540	Health Education and Program Planning	3
PHTH 6208	Urban Community Health Assessment	3
Research		
PHTH 5202	Introduction to Epidemiology	3
PHTH 5210	Biostatistics in Public Health	3
EXSC 6400	Applied Research Methods	3

Electives

Code	Title	Hours
Complete 6 semester hours from the following: [1]		6
HSCI 5230	Clinical Nutrition Applications in Health and Disease	
EXSC 5000 to EXSC 6402		
PHTH 5000 to PHTH 6800		

Program Credit/GPA Requirement

36 total semester hours required

Minimum 3.000 GPA required

[1]   Students may choose two courses within one of three areas (public health, practice-based, and research-based) to deepen their knowledge and competency within that area.

Health Data Analytics, MS

The digitization of healthcare systems in clinical settings, in combination with the explosion of personal data collection devices, provides the opportunity of using data for revolutionizing approaches to care at all levels with an emphasis on precision medicine and person-centered care. The ability to take advantage of this "Big Data" opportunity, however, requires expertise at the intersection of health informatics, data science, and computational modeling. The Master of Science

in Health Data Analytics is designed to prepare students to succeed in this emerging field. This program offers a strong, competency-based curriculum that addresses data analytics ranging from data acquisition from traditional and emerging data streams, data aggregation methods, data mining algorithms, predictive computational modeling, and visualization techniques. Students can expect to amass a broad and deep understanding of the various methods, software tools, and topical expertise needed to discover meaningful patterns in health-related data and effectively communicate their implications to a number of diverse stakeholders. Successful graduates of the Master of Science in Health Data Analytics will be effective practitioners and leaders in the rapidly developing domain of data analytics with a focus on health and healthcare.

The interdisciplinary Master of Science in Health Data Analytics consists of 12 courses, drawn from the College of Computer and Information Science and the Bouvé College of Health Science; a capstone project; and an ongoing series of seminars on topics in health data analytics. Two tracks will be available to matriculating students: standard and research based.

LEARNING OUTCOMES

- Proficiency in the health and healthcare ecosystem, including stakeholder roles such as payers, providers, and government; social determinants of health; wellness promotion; acute vs.chronic care
- Ability to acquire, store, and validate data; familiarity with common health-related data sources and formats
- Proficiency in analyzing data using statistical, epidemiological, and data-mining methods along with appropriate software tools and programming languages
- Ability to interpret and present analytical results to nontechnical stakeholders using visualization and accessible narrative structures

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Analytics/Modeling/Statistics		
DA 5020	Collecting, Storing, and Retrieving Data	4
DA 5030	Introduction to Data Mining/Machine Learning	4
HINF 6400	Introduction to Health Data Analytics	3
PPUA 5301	Introduction to Computational Statistics	4
PPUA 5302	Information Design and Visual Analytics	4
Healthcare		
HINF 5102	Data Management in Healthcare	3
HINF 5105	The American Healthcare System	3
HINF Predictive Analy (TBA)		3

[1]   Please see college administrator for course information.

Thesis/Capstone

Code	Title	Hours
Complete either Thesis or Capstone:		3
Thesis		
HINF Health Informatics (TBA) Thesis		

Capstone		
HINF 7701	Health Informatics Capstone Project	

Electives

At least one course must be chosen from the methods list.

Code	Title	Hours
Methods		
Complete 3–6 semester hours from the following:		3-6
PHTH 6202	Intermediate Epidemiology	
PHTH 6210	Applied Regression Analysis	
PHTH 6440	Advanced Methods in Biostatistics	
CS 6350	Empirical Research Methods	
CAEP 7712	Intermediate Statistical Data Analysis Techniques	
CAEP 7716	Advanced Research and Data Analyses 2	
Other Electives		
Complete 0–4 semester hours from the following:		0-4
ARTG 5330	Visualization Technologies 1	
ARTG 6320	Design of Information-Rich Environments	
HINF 5200	Theoretical Foundations in Personal Health Informatics	
HINF 5300	Personal Health Interface Design and Development	
HINF 6215	Project Management	
HINF 6220	Database Design, Access, Modeling, and Security	
PHTH 5226	Strategic Management and Leadership in Healthcare	
PHTH 5232	Evaluating Healthcare Quality	
PHTH 5234	Economic Perspectives on Health Policy	

Program Credit/GPA Requirements

37 total semester hours required
Minimum 3.000 GPA required

Health Informatics, MS

See Bouvé College of Health Sciences interdisciplinary programs (p. 112) for curriculum information.

Pharmacy and Public Health, PharmD/MPH

The School of Pharmacy and the Department of Health Sciences offer a combined Doctor of Pharmacy (PharmD) and Master in Public Health (MPH) program.

The combined PharmD/MPH program recognizes and reinforces the importance of public health in pharmacy practice. Central to addressing urban public health concerns, and in particular those associated with racial and ethnic health disparities, the program is committed to building a strong, diverse, and activist public health workforce. The goal of the program is to graduate professionals who are well educated in the complex issues associated with disparate health status and healthcare access. The combined PharmD/MPH program allows qualified and interested students an opportunity to achieve their goal of obtaining a more robust understanding of public health through an MPH degree while also completing their PharmD.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

DOCTOR OF PHARMACY REQUIREMENTS

Code	Title	Hours
Required Core		
PHMD 2350	Healthcare Systems	3
PHMD 5223	Evidence-Based Medicine	2
PHMD 5250	Pharmacy Care Management	3
PHMD 5330	Jurisprudence	3
Pharmaceutics		
PHSC 2330	Immunology	3
PHSC 3411	Pharmaceutics 1	4
PHSC 3412	Pharmaceutics 2	4
PHSC 3419	Pharmaceutics Laboratory	1
PHSC 3430	Pharmacokinetics and Biopharmaceutics	3
PHSC 5360	Anti-Infectives	4
Pharmacology/Medicinal Chemistry		
PHSC 4501	Pharmacology/Medicinal Chemistry 1	5
PHSC 4502	Pharmacology/Medicinal Chemistry 2	5
Disease Management		
PHMD 4611	Comprehensive Disease Management 1	6
PHMD 4612	Comprehensive Disease Management 1 Seminar	1
PHMD 4621	Comprehensive Disease Management 2	6
PHMD 4622	Comprehensive Disease Management 2 Seminar	1
PHMD 4623	Comprehensive Disease Management 2 Skills Lab	0.5
PHMD 4631	Comprehensive Disease Management 3	6
PHMD 4632	Comprehensive Disease Management 3 Seminar	1
PHMD 4633	Comprehensive Disease Management 3 Skills Lab	0.5
PHMD 4641	Comprehensive Disease Management 4	6
PHMD 4642	Comprehensive Disease Management 4 Seminar	1
PHMD 4643	Comprehensive Disease Management 4 Skills Lab	0.5
Practice		
PHMD 1201	Introduction to Pharmacy Practice	2.5
PHMD 1202	Lab for PHMD 1201	0.5
PHMD 2310	Educational and Behavioral Interventions in Pharmacy Practice	2
PHMD 2311	Lab for PHMD 2310	0.5
PHMD 5270	Economic Evaluation of Pharmaceuticals and Pharmacy Practice	2
PHMD 5450	Advanced Pharmacy Practice Experience Preparatory Seminar	1
Required Practice Experience		

Complete 36 semester hours of required practice experience:		36
PHMD 6440-PHMD 6474		

MASTER OF PUBLIC HEALTH REQUIREMENTS

Code	Title	Hours
Required Core		
PHTH 5120	Race, Ethnicity, and Health in the United States	3
PHTH 5202	Introduction to Epidemiology	3
PHTH 5210	Biostatistics in Public Health	3
PHTH 5212	Public Health Administration and Policy	3
PHTH 5214	Environmental Health	3
PHTH 5540	Health Education and Program Planning	3
PHTH 6204	Society, Behavior, and Health	3
Urban Health		
PHTH 6200	Principles and History of Urban Health	3
PHTH 6208	Urban Community Health Assessment	3
Practicum		
PHTH 6966	Practicum	3
Capstone		
PHTH 6910	Public Health Capstone	3
Electives		
Complete 9 semester hours in the following subject area:		9
PHTH or approved electives in other subject areas		

Program Credit/GPA Requirements

156 total semester hours required
Minimum 3.000 GPA required

Physician Assistant Studies and Public Health, MS/MPH

The Northeastern University Physician Assistant (PA) program and Department of Health Sciences offer a combined Master of Science in Physician Assistant Studies (MS)/Master in Public Health Program (MPH) program. The combined PA/MPH program allows qualified and interested students an opportunity to achieve their goal of obtaining a more robust understanding of public health through an MPH degree while also completing their Master of Science in Physician Assistant Studies.

Since its inception in 2008, the Northeastern MPH program has distinguished itself from other MPH programs in the area through its unique focus on urban public health. The program's overarching goal is to address urban public health concerns, particularly those associated with racial and ethnic health disparities, in order to build a diverse and activist-oriented public health workforce. The MPH program has a strong commitment to providing a flexible course of study for working professionals. This flexibility allows for easy incorporation into a dual-degree program.

The combined degree that incorporates both programs is designed to help diversify the public health workforce and improve graduates' ability to approach clinical situations with cultural sensitivity and awareness. Successful graduates of the program benefit from having a greater understanding of public health issues in clinical practice, including the racial and ethnic health disparities prevalent in the U.S. healthcare system, as well as a strong grounding in epidemiology, quantitative and qualitative research methods, and the use of scientific evidence, skills critical to many fields of healthcare practice.

This dual degree takes a total of three years to complete (as opposed to four, if each degree were pursued separately), and a total number of 12 credits are shared between both degrees.

For more information, including the application and admissions process, please visit the PA/MPH website here (https://bouve.northeastern.edu/health-sciences/programs/pa-mph).

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Physician Assistant Requirements

A grade of C or higher is required in each course.

Code	Title	Hours
Required Core		
PA 6208	Professional Issues for Physician Assistants	2
PA 6326	Aspects of Primary Care	4
PA 6327	Emergency Medicine and Critical Care	2
PA 6328	Aging and Rehabilitation Medicine	2
Anatomy & Physiology		
PA 6200	Anatomy and Physiology 1	3
PA 6201	Anatomy and Physiology 2	3
Diagnosis & Evaluation		
PA 6203	Physical Diagnosis and Patient Evaluation 1	3
PA 6204	Physical Diagnosis and Patient Evaluation 2	3
PA 6207	Clinical Laboratory and Diagnostic Methods	4
PA 6323	Clinical Neurology	2
Pharmacology		
PA 6205	Pharmacology 1	2
PA 6206	Pharmacology 2	2
Principles		
PA 6311	Principles of Medicine 1	4
PA 6312	Principles of Medicine 2	4
PA 6313	Principles of Medicine 3	4
PA 6320	Principles of Obstetrics and Gynecology	2
PA 6321	Principles of Surgery	2
PA 6322	Principles of Orthopedics	2
PA 6324	Principles of Pediatrics	2
PA 6325	Principles of Psychiatry	2
Clinical		
PA 6400	Applied Study in Medicine	5
PA 6401	Applied Study in Ambulatory Medicine	5
PA 6402	Applied Study in Family Practice	5
PA 6403	Applied Study in Emergency Medicine	5
PA 6404	Applied Study in Obstetrics and Gynecology	5
PA 6405	Applied Study in Pediatrics	5
PA 6406	Applied Study in Surgery	5
PA 6407	Applied Study in Mental Health	5

Master's of Public Health Requirements

A grade of B− or higher is required in each course.

Code	Title	Hours
Required Core		
PHTH 5120	Race, Ethnicity, and Health in the United States	3
PHTH 5202	Introduction to Epidemiology	3
PHTH 5210	Biostatistics in Public Health	3
PHTH 5212	Public Health Administration and Policy	3
PHTH 5214	Environmental Health	3
PHTH 5232	Evaluating Healthcare Quality	3
PHTH 5540	Health Education and Program Planning	3
PHTH 6204	Society, Behavior, and Health	3
Urban Health		
PHTH 6200	Principles and History of Urban Health	3
PHTH 6208	Urban Community Health Assessment	3
Practicum		
PHTH 6966	Practicum	3
Capstone		
PHTH 6910	Public Health Capstone	3
Elective		
Complete 3 semester hours of approved elective course work.		3

Program Credit/GPA Requirements

133 total semester hours required
Minimum 3.000 GPA required

<div style="background:#c8102e;color:#fff;padding:8px">

Public Health and Exercise Science with a concentration in Physical Activity and Public Health, MPH/MS

</div>

Website (https://bouve.northeastern.edu/health-sciences/programs/ms-exercise-science-mph)

Rui Li, PhD
Director of Exercise Science Program

520 Behrakis Health Sciences Center
617.373.2526

Neil Maniar, PhD, MPH
Director of Master of Public Health Program

316 Robinson Hall
617.373.5925

The Department of Health Sciences at Northeastern University offers a combined Master in Public Health program (MPH)/Master of Science in Exercise Science (EXSC) program. This dual-degree program allows qualified students to achieve their goal of obtaining a more robust understanding of public health through an MPH degree while also completing their master's in exercise science. Course work consists of advanced physiology such as musculoskeletal and cardiopulmonary systems and the assessment and prescription of exercise and physical activity in the context of the social determinants of health. Graduates of the program will benefit from having a greater understanding of public health issues in the fields of exercise and physical activity in order to better design exercise prescription programs in the healthcare industry that aim to improve the health of individuals and communities.

Program Requirements
Public Health Requirements

A grade of B− or higher is required in all course work.

Code	Title	Hours
Public Health		
PHTH 5120	Race, Ethnicity, and Health in the United States	3
PHTH 5202	Introduction to Epidemiology	3
PHTH 5210	Biostatistics in Public Health	3
PHTH 5212	Public Health Administration and Policy	3
PHTH 5214	Environmental Health	3
PHTH 5540	Health Education and Program Planning	3
PHTH 6204	Society, Behavior, and Health	3
Urban Health		
PHTH 6200	Principles and History of Urban Health	3
PHTH 6208	Urban Community Health Assessment	3
Practicum		
PHTH 6966	Practicum	3
Capstone		
PHTH 6910	Public Health Capstone	3

Exercise Science Requirements

A grade of B or higher is required in all course work.

Code	Title	Hours
Physiology		
EXSC 5200	Cardiopulmonary Physiology	3
EXSC 5220	Advanced Exercise Physiology	3
EXSC 5230	Physical Activity and Exercise: Effects on Musculoskeletal Health and Disease	3
Assessment & Prescription		
EXSC 5210	Physical Activity and Exercise: Prescription, Measurement, and Testing	3
EXSC 6202	Electrocardiography, Clinical Assessment, and Prescription	3
Research		
EXSC 6400	Applied Research Methods	3

Elective

Code	Title	Hours
Complete one of the following:		3
HSCI 5230	Clinical Nutrition Applications in Health and Disease	
PHTH 5230	Global Health	
PHTH 6320	Qualitative Methods in Health and Illness	
PHTH 6350	Social Survey Research Methods	
HINF 6240	Improving the Patient Experience through Informatics	

Program Credit/GPA Requirement

54 total semester hours required
Minimum 3.000 GPA required

Plan of Study

Year 1

Fall	Hours	Spring	Hours	Summer 1	Hours
EXSC 5210	3	EXSC 5220	3	PHTH 5540	3-4
PHTH 5210	3	EXSC 6202	3	PHTH 6208	3
PHTH 5212	3	PHTH 5120	3		
PHTH 6204	3	PHTH 5202	3		
	12		12		6-7

Year 2

Fall	Hours	Spring	Hours
EXSC 5200	3	EXSC 6400	3
EXSC 5230	3	PHTH 5214	3
PHTH 6200	3	PHTH 6910	3
PHTH 6966	3	Approved MPH or EXSC elective	3
	12		12

Total Hours: 54-55

Public Health and Health Informatics, MPH/MS

The Master of Public Health (MPH) and Master of Science in Health Informatics (MSHI) combined program allows qualified and interested students to prepare to lead healthcare at the nexus between public health and health informatics. Graduates of this program will be well-educated in the complex issues associated with improvements in information technology, as well as changes to the public health and healthcare delivery systems. Recognizing the increasing overlap between health informatics and public health with a focus on urban health, this program incorporates course work from both the MPH and MSHI curricula for both degrees, reducing tuition costs and saving one year of study compared to obtaining both degrees individually.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

A grade of B− or higher is required in each course.

Public Health Requirements

Code	Title	Hours
Required Core		
PHTH 5120	Race, Ethnicity, and Health in the United States	3
PHTH 5202	Introduction to Epidemiology	3
PHTH 5210	Biostatistics in Public Health	3
PHTH 5212	Public Health Administration and Policy	3
PHTH 5214	Environmental Health	3
PHTH 5540	Health Education and Program Planning	3
or PPUA 6509	Techniques of Program Evaluation	
PHTH 6204	Society, Behavior, and Health	3
Urban Health		
PHTH 6200	Principles and History of Urban Health	3
PHTH 6208	Urban Community Health Assessment	3

Health Informatics Requirements

Code	Title	Hours
Required Core		
HINF 5101	Introduction to Health Informatics and Health Information Systems	3
HINF 6220	Database Design, Access, Modeling, and Security	3
HINF 6240	Improving the Patient Experience through Informatics	3
HINF 6355	Key Standards in Health Informatics Systems	3
HINF 6405	Quantifying the Value of Informatics	3

Capstone and Practicum

Code	Title	Hours
PHTH 6910	Public Health Capstone	3
PHTH 6966	Practicum	3

Electives

Code	Title	Hours
Complete three of the following, with at least one course completed from each group:		9
Group 1		
HINF 6201	Organizational Behavior, Work Flow Design, and Change Management	
HINF 6202	Business of Healthcare Informatics	
HINF 6215	Project Management	
Group 2		
PHTH 5226	Strategic Management and Leadership in Healthcare	
PHTH 5232	Evaluating Healthcare Quality	
HINF 6404	Patient Engagement Informatics and Analytics	

Program Credit/GPA Requirements

57 total semester hours required

Minimum 3.000 GPA required

Exercise Science for Clinicians, Graduate Certificate

The Department of Health Sciences offers a Graduate Certificate of Exercise Science for Clinicians. Exercise training has been shown to be of therapeutic benefit to patients who have chronic diseases, including but not limited to cardiovascular disease, pulmonary disease, and metabolic disorders. Supervised exercises are commonly performed in a variety of settings including hospitals, outpatient clinics, physician's offices, university laboratories, or hospital-based research facilities. Exercise physiologists work in the above settings to create, implement, and evaluate exercise programs. Clinicians, such as physicians and nurses, work with exercise physiologists to prescribe individualized exercise to meet the specific clinical needs of their patients. Understanding the benefits of exercise, and how exercise plays a role in health promotion and disease prevention/intervention, is only a small part of traditional training of physicians and nurses. This Graduate Certificate of Exercise Science for Clinicians will help bridge the knowledge gap between the medical field and the exercise field. Additionally, it will help clinicians understand the role of exercise as a proven powerful medicine and a readily available therapy that has

demonstrated a high therapeutic effect in a number of chronic disease states with little to no side effects.

Two important features:

- The curriculum includes course work and experiential learning opportunities for students to develop well-rounded knowledge of the role of physical activity and exercise on health and disease prevention/intervention. It covers knowledge of exercise physiology and exercise testing, assessment, and prescription, all of which are major domains of job tasks for a clinical exercise physiologist required by the American College of Sports Medicine (ACSM).
- Upon successful completion of the curriculum, students will be granted an exercise science for clinicians certificate. Students may also choose to take additional courses and fulfill the program requirements to complete a Master of Science in Exercise Science, which will prepare them for ACSM certification to become a certified clinical exercise physiologist.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Advanced Physiology		
EXSC 5200	Cardiopulmonary Physiology	3
EXSC 5220	Advanced Exercise Physiology	3
Assessment and Prescription		
EXSC 5210	Physical Activity and Exercise: Prescription, Measurement, and Testing	3
EXSC 6202	Electrocardiography, Clinical Assessment, and Prescription	3
Internship		
Complete the following (repeatable) course twice:		6
EXSC 6300	Internship in Exercise Science	

Elective

Code	Title	Hours
Complete 3 semester hours of electives with approval of program director.		3

Program Credit/GPA Requirements

21 total semester hours required
Minimum 3.000 GPA required

School of Nursing

Website (http://www.northeastern.edu/bouve/nursing)

Rhonda M. Board, PhD, RN, CCRN
Interim Dean and Associate Professor, School of Nursing
Associate Dean, Bouvé College of Health Sciences

Janet Rico, MBA, NP-BC, PhD
Associate Clinical Professor and Assistant Dean of Graduate Nursing Programs

211 Robinson Hall
617.373.3521
617.373.2985 (fax)

Susan McDonald, Administrative Coordinator, Academic Programs, s.mcdonald@northeastern.edu

This is an exciting time in healthcare and nursing in particular. According to a recent Gallup Poll, the public ranks nursing as the "most ethical" profession. In contemporary models of healthcare, nurses are considered the critical backbone and life force of the delivery system. What does that mean for those considering nursing as a profession? It means that as a nurse you will carry an awesome responsibility—to improve the health outcomes of patients and their families. It also means that you must be among the best prepared of health professionals. Excellent preparation is just what we seek to offer.

If you are coming to the School of Nursing to earn a master's, PhD, or DNP, your learning will be guided by our senior faculty, nursing leaders who are expert advance practice nurses in their respective specialty areas. Our affiliation with over 100 institutions means that you and the faculty can select the best place for your clinical rotations.

You want to change career pathways? We have the Certificate of Advanced Graduate Study (CAGS) that facilitates attainment of a specialty track if you already have an advanced nursing degree. You want research? We have excellent nurse researchers who are working to improve patient care and advance nursing knowledge. Come join nursing at its finest. Northeastern University is a school on the move.

Further information about the specializations can be found under the program name.

Admission Requirement

Admissions requirements (http://www.northeastern.edu/bouve/grad/chart.html) are specific to the program.

Programs
Doctor of Philosophy (PhD)

- Nursing (Post-BSN) (p. 256)
- Nursing—Advanced Entry (Post-MSN) (p. 257)

Doctor of Nursing Practice (DNP)

- Doctor of Nursing Practice (Post-Master's) (p. 257)
- Nursing Practice with Concentration in Nurse Anesthesia (p. 258)

Certificate of Advanced Graduate Study (CAGS)

Master of Science (MS)

Dual Degree

Graduate Certificate

Nursing, PhD (Post-BSN)

Overview
Research

The (post–BSN) PhD program in nursing prepares research scientists, educators, and leaders who seek to improve health and healthcare across the life span with an emphasis on urban, vulnerable, and underserved populations. Graduates are expected to lead research initiatives that advance nursing science through knowledge development and interdisciplinary scholarly inquiry.

Students will study with nursing faculty whose research addresses questions that extend across a broad health spectrum, including health promotion, risk prevention, and self-management of chronic conditions. Collectively, the faculty have a variety of expertise and interests, such as health issues of women, children, and families; HIV; cancer; mental health; depression; and substance use.

In addition, students will have an opportunity to study with faculty from other Northeastern departments as well as with other Boston-area researchers. This collaboration allows students to work across disciplines and to access populations and sites essential for completing a dissertation. Visit the Northeastern University Faculty Research site (http://www.northeastern.edu/research/faculty-research) for more information.

Program Requirements
Bachelor's Degree Entrance

A bachelor's degree in nursing is preferred. Complete all courses and requirements listed below unless otherwise indicated.

Milestones

Annual reviews
Comprehensive examination
Dissertation proposal
Dissertation defense

Core Requirements

A grade of B or higher is required in all course work.

Code	Title	Hours
Required Core		
NRSG 7104	Foundations in Nursing Research	3
NRSG 7700	The Science of Nursing	3
NRSG 7705	Theoretical and Conceptual Foundations in Nursing Science	3
NRSG 7715	Measurement in Clinical Research	3
NRSG 7750	Healthcare of Urban Populations	3
Statistics		
PHTH 5210	Biostatistics in Public Health	3
NRSG 5121	Epidemiology and Population Health	3
PHTH 6210	Applied Regression Analysis	3
Research		
NRSG 7709	Qualitative Research Methods	3
NRSG 7712	Quantitative Research Methods	3
NRSG 7755	Intervention Research: Development, Implementation, and Evaluation	3
NRSG 7770	Research Colloquium	1
Complete the following (repeatable) course twice:		6
NRSG 9984	Research	
Cognate Courses [1]		
Complete two cognate courses in consultation with your faculty advisor.		6

Electives

Code	Title	Hours
Complete two elective courses in consultation with your faculty advisor.		6

Dissertation

Code	Title	Hours
NRSG 9845	Dissertation Seminar 1	3
NRSG 9846	Dissertation Seminar 2	3
Complete the following (repeatable) course twice:		2
NRSG 9990	Dissertation	

Program Credit/GPA Requirements

60 total semester hours required
Minimum 3.000 GPA required

---

[1] Cognates are graduate-level courses that are taken outside of nursing. These courses should provide depth and breadth to the student's dissertation research.

[2] Electives may be taken in nursing or in an area related to the student's dissertation research, including appropriate methodology and statistics courses.

Nursing, PhD—Advanced Entry (Post-MSN)

The advanced entry (Post-MSN) PhD program in nursing prepares research scientists, educators, and leaders who seek to improve health and healthcare across the life span with an emphasis on urban, vulnerable, and underserved populations. Graduates are expected to lead research initiatives that advance nursing science through knowledge development and interdisciplinary scholarly inquiry.

Students will study with nursing faculty whose research addresses questions that extend across a broad health spectrum, including health promotion, risk prevention, and self-management of chronic conditions. Collectively, the faculty have a variety of expertise and interests, such as health issues of women, children, and families; HIV; cancer; mental health; depression; and substance use.

In addition, students will have an opportunity to study with faculty from other Northeastern departments, as well as with other Boston-area researchers. This collaboration allows students to work across disciplines and to access populations and sites essential for completing a dissertation. Visit the Northeastern University Faculty Research site (http://www.northeastern.edu/research/faculty-research) for more information.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Milestones

Annual reviews
Comprehensive examination
Dissertation proposal
Dissertation defense

Core Requirements

A grade of B or higher is required in all course work.

Code	Title	Hours
Required Core		
NRSG 7700	The Science of Nursing	3
NRSG 7705	Theoretical and Conceptual Foundations in Nursing Science	3
NRSG 7750	Healthcare of Urban Populations	3
Statistics		
PHTH 5210	Biostatistics in Public Health	3
PHTH 6210	Applied Regression Analysis	3
Cognate Courses [1]		
Complete two cognate courses in consultation with your faculty advisor.		6
Research		
NRSG 7709	Qualitative Research Methods	3
NRSG 7712	Quantitative Research Methods	3
NRSG 7715	Measurement in Clinical Research	3
NRSG 7755	Intervention Research: Development, Implementation, and Evaluation	3
NRSG 7770	Research Colloquium	1
Complete the following (repeatable) course twice:		6
NRSG 9984	Research	

Dissertation Courses

Code	Title	Hours
NRSG 9845	Dissertation Seminar 1	3
NRSG 9846	Dissertation Seminar 2	3
Complete the following (repeatable) course twice:		2
NRSG 9990	Dissertation	

Program Credit/GPA Requirements

48 total semester hours required
Minimum 3.000 GPA required

[1] Cognates are graduate-level courses that are taken outside of nursing and should provide depth and breadth to the student's area of interest.

Nursing Practice, DNP (Post-Master's)

The Doctor of Nursing Practice (DNP) is a practice-oriented degree designed to prepare advanced nurses at the highest level of scholarly practice. Keeping pace with the demands of today's changing healthcare environment requires clinical experts who have the knowledge and skills to be effective change agents. Graduates of our post-master's DNP program assume clinical and leadership positions as advanced nurses in a variety of roles including clinical experts, nurse executives, community leaders, and professional organization leaders.

The Northeastern University post-master's DNP program includes advanced course work in leadership, practice inquiry, population health, informatics, and health policy. Our goal is to prepare the next generation of nurse leaders with a greater breadth of expertise so they can collaborate more effectively with interprofessional partners and provide leadership to enhance quality and safety. The DNP program curriculum is delivered online in an executive model hybrid format.

If you are a registered nurse with at least two years of active advanced nursing experience, you may enter the DNP program after completing a master's degree in nursing or, in some cases, a related health field. A DNP Scholarly Project and 1,000 scholarly practice hours are required for program completion. A gap analysis upon admission will determine how many, if any, practice hours from a previously completed Master of Science in Nursing practicum qualify toward this practice hour requirement. An ePortfolio is used to document all scholarly practice hours and DNP program achievements.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

A grade of B or higher is required in each course.

Code	Title	Hours
Required Core		
NRSG 6300	Healthcare Finance and Marketing	3
NRSG 6306	Health Informatics	3
NRSG 7100	Leadership in Advanced Practice Nursing	3
NRSG 7924	Applied Epidemiology for Advanced Nursing	3

Code	Title	Hours
NRSG 7925	Health Policy and Advocacy	3
Project		
NRSG 7920	The Steps to Practice Inquiry: Analyze, Evaluate, Synthesize, and Apply the Evidence	3
NRSG 7921	DNP Scholarly Project 1: Design and Ethical Consideration of Practice Application	3
NRSG 7922	DNP Scholarly Project 2: Applying Practice Knowledge—Implementation/ Outcomes	3
NRSG 7923	DNP Scholarly Project 3: Dissemination of Practice Inquiry	3

Elective

Code	Title	Hours
Complete 3 semester hours, selected in consultation with faculty program advisor.		3

Program Credit/GPA Requirements

30 total semester hours required
Minimum 3.000 GPA required

Nursing Practice with Concentration in Nurse Anesthesia, DNP

The Doctor of Nursing Practice with Concentration in Nurse Anesthesia is a practice-oriented degree designed to prepare nurse anesthetists at the highest level of clinical scholarly practice. Keeping pace with the demands of today's changing healthcare environment requires clinical experts who have the knowledge and skills to be effective change agents. The program prepares graduates to question practice, search for and critically appraise the best evidence to guide practice, and implement and evaluate the application of best evidence in practice.

A successful graduate from the program will gain the requisite skill set and leadership expertise to be a critical member of the healthcare team and provide anesthetics to patients throughout the life cycle in diverse settings such as small local hospitals, regional centers, and rural or urban settings for all types of surgery or procedures.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

A grade of B or higher is required in all course work.

Core Requirements

Code	Title	Hours
Required Core		
NRSG 5117	Advanced Pharmacology	2
NRSG 5121	Epidemiology and Population Health	3
NRSG 5126	Pathophysiology for Advanced Practice	3
NRSG 6115	Health Assessment	3
NRSG 6300	Healthcare Finance and Marketing	3
NRSG 6302	Health Policy and Law	3
NRSG 6306	Health Informatics	3
NRSG 7100	Leadership in Advanced Practice Nursing	3
Didactic		

Code	Title	Hours
NRSG 7500	Role/Practice Issues in Nurse Anesthesia	3
NRSG 7503	Pharmacotherapeutics in Anesthesia and Critical Care Nursing	3
NRSG 7506	Applied Chemistry, Physics, and Cardiopulmonary Physiology of Anesthesia	3
NRSG 7509	Advanced Concepts in Nurse Anesthesia Practice	3
NRSG 7511	Applied Gross Anatomy and Physiology of Anesthesia	3
NRSG 7520	Conceptual Basis of Nurse Anesthesia Practice 1	3
NRSG 7523	Conceptual Basis of Nurse Anesthesia Practice 2	3
NRSG 7526	Conceptual Basis of Nurse Anesthesia Practice 3	3
Practicum		
NRSG 7530	Nurse Anesthesia Practicum 1	2
NRSG 7533	Nurse Anesthesia Practicum 2	4
NRSG 7536	Nurse Anesthesia Practicum 3	4
Research		
NRSG 7105	Translating Research Evidence into Practice	3
NRSG 7920	The Steps to Practice Inquiry: Analyze, Evaluate, Synthesize, and Apply the Evidence	3
Project		
NRSG 7921	DNP Scholarly Project 1: Design and Ethical Consideration of Practice Application	3
NRSG 7922	DNP Scholarly Project 2: Applying Practice Knowledge—Implementation/ Outcomes	3
NRSG 7923	DNP Scholarly Project 3: Dissemination of Practice Inquiry	3
Clinical		
NRSG 7540	Advanced Clinical Experiences in Nurse Anesthesia 1	1
NRSG 7543	Advanced Clinical Experiences in Nurse Anesthesia 2	1
NRSG 7546	Advanced Clinical Experiences in Nurse Anesthesia 3	2

Program Credit/GPA Requirements

77 total semester hours required
Minimum 3.000 GPA required

Nursing—Adult-Gerontology Nurse Practitioner, Acute Care, CAGS

The adult-gerontology acute-care nurse practitioner program is designed to prepare nurses for advanced-practice roles as clinical experts, managers, educators, and consultants. The program offers advanced study with a major focus on clinical experience and culminates with the Master of Science with a specialization in Nursing. Students may pursue either full-time or part-time study. Nurses who possess a Master

of Science are eligible for the Certificate of Advanced Graduate Study (CAGS) in this specialization.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

A grade of B or higher is required in each course.

Code	Title	Hours
Theory		
NRSG 6220	Nursing Management: Acute Episodic Illness	3
NRSG 6221	Nursing Management: Critical and Chronic Illness	3
NRSG 6241	Acute-Care Concepts in Nursing Practice	3
Practicum		
NRSG 6420	Adult-Gerontology Acute-Care Nursing Practicum 1	2
NRSG 6421	Adult-Gerontology Acute-Care Nursing Practicum 2	4
NRSG 6422	Adult-Gerontology Acute-Care Nursing Practicum 3	4

Electives

Code	Title	Hours
Complete 5 semester hours in the following subject area:		5
NRSG		

Program Credit/GPA Requirements

24 total semester hours required
Minimum 3.000 GPA required

Nursing—Adult-Gerontology Nurse Practitioner, Primary Care, CAGS

This specialization offers nurse practitioners (NPs) with certification in a different specialty the opportunity to prepare for practice providing high-quality adult primary care services as an adult-gerontology nurse practitioner. Adult-gerontology NPs provide services to individuals across most of the life span in clinics, private practices, home care, long-term care, and day programs. Upon completion of the primary care program, graduates are eligible to sit for the adult-gerontology certification exam.

Program Requirements
Core Requirements

A grade of B or higher is required in each course.

Code	Title	Hours
Required Core		
NRSG 6249	Health Promotion of Adult/Older Adult	3
NRSG 6253	Primary Care of Adult/Older Adult Health Problems	4
NRSG 6254	Primary Care of Adult/Older Adult Complex Patients	4
Clinical		
NRSG 5117	Advanced Pharmacology	2

Code	Title	Hours
NRSG 5126	Pathophysiology for Advanced Practice	3
NRSG 6115	Health Assessment	3
NRSG 6222	Pharmacology of Adults and Older Adults	2
Practicum		
NRSG 6449	Health Promotion of Adult/Older Adult Practicum	1
NRSG 6450	Adult/Older Adult Practicum 1	4
NRSG 6451	Adult/Older Adult Practicum 2	4

Program Credit/GPA Requirements

30 total semester hours required
Minimum 3.000 GPA required

Nursing—Family Psychiatric Nurse Practitioner, CAGS

We offer specialized and flexible program options in psychiatric mental health nursing for nurse practitioners (NPs) with certification in another specialty. Classes are offered during the late afternoon and early evening hours to accommodate the multiple responsibilities of adult learners. This is a 24-semester-hour program of study. Upon completion of the psychiatric mental health advanced practice Certificate of Advanced Graduate Study (CAGS) program, graduates are eligible to sit for available national certification exams in their area of practice.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

A grade of B or higher is required in each course.

Code	Title	Hours
Required Core		
NRSG 6281	Dimensions of Clinical Practice	3
NRSG 6282	Clinical Psychopharmacology	3
NRSG 6283	Psychobiological Bases of Mental Disorders	3
NRSG 6286	Contemporary Psychotherapies—Theory and Practice	3
Practicum		
NRSG 6480	Psychiatric Practicum across the Life Span 1	5
NRSG 6481	Psychiatric Practicum across the Life Span 2	5

Elective

Code	Title	Hours
Complete 2 semester hours in the following subject area:		2
NRSG		

Program Credit/GPA Requirements

24 total semester hours required
Minimum 3.000 GPA required

Nursing—Neonatal Nurse Practitioner, CAGS

We offer a certificate of advanced study for experienced nurses who have a master's degree in nursing and want to specialize in neonatal

critical care. Applicants are required to have at least two years of level 3 or greater of neonatal intensive care unit (NICU) experience before entering our program; most applicants have greater amounts of relevant experience. One year of full-time study offers the student an opportunity to increase skills and experience and enable the student to sit for the neonatal nurse practitioner certification exam offered by the National Certification Corporation for the obstetric, gynecologic, and neonatal nursing specialties.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Prerequisites

Code	Title	Hours
NRSG 5117	Advanced Pharmacology	2
NRSG 5126	Pathophysiology for Advanced Practice	3

Core Requirements

A grade of B or higher is required in all course work.

Code	Title	Hours
Clinical		
NRSG 6116	Advanced Health Assessment of the Neonate and Infant	3
NRSG 6230	Nursing Management: Critically Ill Neonatal 1	3
NRSG 6231	Nursing Management: Critically Ill Neonatal 2	3
NRSG 6232	Neonatal Pharmacology	2
Practicum		
NRSG 6430	Neonatal Clinical Practicum 1	4
NRSG 6431	Neonatal Clinical Practicum 2	4
NRSG 6432	Neonatal Clinical Practicum 3	2

Elective

Code	Title	Hours
Select courses in consultation with faculty advisor.		3
NRSG		

Program Credit/GPA Requirements

24 total semester hours required
Minimum 3.000 GPA required

Nurse Anesthesia, CAGS

If you have already earned a master's degree and seek further preparation in a specialization to qualify for national certification, the Certificate of Advanced Graduate Study is designed to meet your goal. The program is available in all of the specializations and areas of concentration offered within the nursing master's program: neonatal nurse practitioner; acute-care nurse practitioner; primary care (pediatric, adult, family); psychiatric/mental health (adult, pediatric); nursing administration; and nurse anesthesia.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Prerequisites

A grade of B or higher is required in each course.

Code	Title	Hours
NRSG 5117	Advanced Pharmacology	2
NRSG 5126	Pathophysiology for Advanced Practice	3
NRSG 6115	Health Assessment	3

Core Requirements

A grade of B or higher is required in each course.

Code	Title	Hours
Didactic		
NRSG 6320	Role/Practice Issues in Nurse Anesthesia	3
NRSG 6321	Conceptual Basis of Nurse Anesthesia Practice 1	3
NRSG 6322	Conceptual Basis of Nurse Anesthesia Practice 2	3
NRSG 6324	Chemistry and Physics in Anesthesia	3
NRSG 6325	Pharmacotherapeutics in Anesthesia and Critical Care Nursing	2
NRSG 6333	Conceptual Basis of Nurse Anesthesia Practice 3	3
NRSG 6336	Advanced Concepts in Nurse Anesthesia Practice	3
Practicum		
NRSG 6530	Nurse Anesthesia Practicum 1	2
NRSG 6534	Nurse Anesthesia Practicum 2	4
NRSG 6535	Nurse Anesthesia Practicum 3	4
Clinical Experiences		
NRSG 6540	Advanced Clinical Experiences in Nurse Anesthesia 1	1
NRSG 6541	Advanced Clinical Experiences in Nurse Anesthesia 2	1
NRSG 6542	Advanced Clinical Experiences in Nurse Anesthesia 3	1

Program Credit/GPA Requirements

33 total semester hours required
Minimum 3.000 GPA required

Nursing—Pediatric Nurse Practitioner, Acute Care, CAGS

The pediatric acute-care Certificate of Advanced Graduate Study (CAGS) is available for pediatric or family nurse practitioners who wish to be prepared for practice in the pediatric acute-care role. Applicants must have a minimum of one year of work experience in an acute-care setting working with the pediatric population. The program requires 24 credits of study.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

A grade of B or higher is required in all course work.

Code	Title	Hours
Required Core		
NRSG 6116	Advanced Health Assessment of the Neonate and Infant	3
NRSG 6262	Pediatric Pharmacology	2
NRSG 6265	Care of Child/Adolescent Health Problems	4
NRSG 6267	Care of the Critically Ill Child	4
Practicum		
NRSG 6461	Child/Adolescent Health Problems Practicum	4
NRSG 6463	Care of the Critically Ill Child Practicum	4

Elective

Code	Title	Hours
Complete 3 semester hours from the following subject area:		3
NRSG		

Program Credit/GPA Requirements

24 total semester hours required
Minimum 3.000 GPA required

Nursing—Pediatric Nurse Practitioner, Acute and Primary Care, CAGS

This specialization is designed to prepare nurse practitioners (NPs) prepared in different specialties with the skills needed to care for children who are at risk across the continuum of care. For nearly two decades, our pediatric nurse practitioner (PNP) program has prepared primary care PNPs to provide community-based, culturally sensitive care. More recently, building on our foundation in evidence-based, interdisciplinary, urban healthcare, we expanded the PNP program into acute care. Students may study either full-time or part-time.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

A grade of B or higher is required in each course.

Code	Title	Hours
Required Core		
NRSG 5117	Advanced Pharmacology	2
NRSG 6116	Advanced Health Assessment of the Neonate and Infant	3
NRSG 6264	Care of Well Child/Adolescent Health Promotion	4
NRSG 6265	Care of Child/Adolescent Health Problems	4
Practicum		
NRSG 6460	Care of Well Child/Adolescent Health Promotion Practicum	4
NRSG 6461	Child/Adolescent Health Problems Practicum	4
NRSG 6463	Care of the Critically Ill Child Practicum	4
Clinical		
NRSG 5126	Pathophysiology for Advanced Practice	3

NRSG 6115	Health Assessment	3
NRSG 6262	Pediatric Pharmacology	2
NRSG 6267	Care of the Critically Ill Child	4
NRSG 6275	Urban Families at Risk: A Primary Care Approach	4

Program Credit/GPA Requirements

41 total semester hours required
Minimum 3.000 GPA required

Nursing—Pediatric Nurse Practitioner, Primary Care, CAGS

This program is designed to prepare nurse practitioners (NPs) certified in a different specialty to provide high-quality primary care to children in a variety of settings. For nearly two decades, our pediatric nurse practitioner (PNP) program has prepared primary care PNPs to provide community-based, culturally sensitive care.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

A grade of B or higher is required in each course.

Code	Title	Hours
Theory		
NRSG 6264	Care of Well Child/Adolescent Health Promotion	4
NRSG 6265	Care of Child/Adolescent Health Problems	4
NRSG 6275	Urban Families at Risk: A Primary Care Approach	4
Practicum		
NRSG 6460	Care of Well Child/Adolescent Health Promotion Practicum	4
NRSG 6461	Child/Adolescent Health Problems Practicum	4

Elective

Code	Title	Hours
Complete 4 semester hours from the following subject area:		4
NRSG		

Program Credit/GPA Requirements

24 total semester hours required
Minimum 3.000 GPA required

Nursing—Adult-Gerontology Nurse Practitioner, Acute Care, MS

The adult-gerontology acute-care program seeks to prepare nurses for advanced-practice roles as clinical experts, educators, and consultants. The program provides advanced study with a major focus on clinical experience and culminates with the Master of Science with a specialization in Nursing. Students may pursue either full-time or part-time study. Nurses who possess an MS are eligible for the Certificate of Advanced Graduate Study (CAGS) in this specialization.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

A grade of B or higher is required in each course.

Code	Title	Hours
Professional		
NRSG 5118	Healthcare System and Professional Role Development	3
NRSG 5121	Epidemiology and Population Health	3
Clinical		
NRSG 5117	Advanced Pharmacology	2
NRSG 5126	Pathophysiology for Advanced Practice	3
NRSG 6115	Health Assessment	3
NRSG 6325	Pharmacotherapeutics in Anesthesia and Critical Care Nursing	2
or NRSG 6222	Pharmacology of Adults and Older Adults	
Theory		
NRSG 6220	Nursing Management: Acute Episodic Illness	3
NRSG 6221	Nursing Management: Critical and Chronic Illness	3
NRSG 6241	Acute-Care Concepts in Nursing Practice	3
Practicum		
NRSG 6420	Adult-Gerontology Acute-Care Nursing Practicum 1	2
NRSG 6421	Adult-Gerontology Acute-Care Nursing Practicum 2	4
NRSG 6422	Adult-Gerontology Acute-Care Nursing Practicum 3	4
Research		
NRSG 7105	Translating Research Evidence into Practice	3
NRSG 7110	Evidence-Based Practice Research Application	2

Elective

Code	Title	Hours
Complete 3 semester hours in the following subject area:		3
NRSG		

Program Credit/GPA Requirements

43 total semester hours required
Minimum 3.000 GPA required

Nursing—Adult-Gerontology Nurse Practitioner, Primary Care, MS

This specialization offers registered nurses with a bachelor's degree the opportunity to prepare for a career providing high-quality adult primary care services as an adult-gerontologic nurse practitioner (NP). Adult-gerontology NPs provide services to individuals across most of the life span in clinics, private practices, home care, long-term care, and day programs. Upon completion of the primary care program, graduates are eligible to sit for the adult-gerontology certification exam.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

A grade of B or higher is required in each course.

Code	Title	Hours
Professional		
NRSG 5118	Healthcare System and Professional Role Development	3
NRSG 5121	Epidemiology and Population Health	3
Required Core		
NRSG 6249	Health Promotion of Adult/Older Adult	3
NRSG 6253	Primary Care of Adult/Older Adult Health Problems	4
NRSG 6254	Primary Care of Adult/Older Adult Complex Patients	4
Clinical		
NRSG 5117	Advanced Pharmacology	2
NRSG 5126	Pathophysiology for Advanced Practice	3
NRSG 6115	Health Assessment	3
NRSG 6222	Pharmacology of Adults and Older Adults	2
Practicum		
NRSG 6449	Health Promotion of Adult/Older Adult Practicum	1
NRSG 6450	Adult/Older Adult Practicum 1	4
NRSG 6451	Adult/Older Adult Practicum 2	4
Research		
NRSG 7105	Translating Research Evidence into Practice	3
NRSG 7110	Evidence-Based Practice Research Application	2

Elective

Code	Title	Hours
Complete 2 semester hours in the following subject area:		2
NRSG		

Program Credit/GPA Requirements

43 total semester hours required
Minimum 3.000 GPA required

Nursing—Family Psychiatric Nurse Practitioner, MS

We offer specialized and flexible program options in psychiatric mental health nursing. Part-time and full-time programs are available. Classes are offered during the late afternoon and early evening hours to accommodate the multiple responsibilities of adult learners.

- For nurses who have a baccalaureate degree in nursing, the Master of Science (MS) option is a 43-semester-hour program.
- For nurses with master's preparation in other nursing specialties, the Certificate of Advanced Graduate Study (CAGS) option is a 24-semester-hour program.

- For those who wish to pursue a career in nursing and possess a baccalaureate degree or higher in a related (non-nursing) field, a direct-entry program is available.

Upon completion of the psychiatric mental health advanced-practice nursing graduate program curriculum, graduates are eligible to sit for available national certification exams in their area of practice.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

A grade of B or higher is required in each course.

Code	Title	Hours
Required Core		
NRSG 6281	Dimensions of Clinical Practice	3
NRSG 6282	Clinical Psychopharmacology	3
NRSG 6283	Psychobiological Bases of Mental Disorders	3
NRSG 6286	Contemporary Psychotherapies—Theory and Practice	3
Professional		
NRSG 5118	Healthcare System and Professional Role Development	3
NRSG 5121	Epidemiology and Population Health	3
Clinical		
NRSG 5117	Advanced Pharmacology	2
NRSG 5126	Pathophysiology for Advanced Practice	3
NRSG 6115	Health Assessment	3
Practicum		
NRSG 6480	Psychiatric Practicum across the Life Span 1	5
NRSG 6481	Psychiatric Practicum across the Life Span 2	5
Research		
NRSG 7105	Translating Research Evidence into Practice	3
NRSG 7110	Evidence-Based Practice Research Application	2

Elective

Code	Title	Hours
Complete 2 semester hours in the following subject area:		2
NRSG		

Program Credit/GPA Requirements

43 total semester hours required
Minimum 3.000 GPA required

Nursing—Family Nurse Practitioner, Primary Care, MS

The family nurse practitioner program is a specialty track focusing on the primary healthcare of individuals and families. The program is offered in a hybrid format with the majority of the classes delivered online, coupled with live presentation sessions. Students are required to be on campus twice per semester.

Upon completion of the primary care program, graduates are eligible to sit for all national certification exams in their area of practice.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

A grade of B or higher is required in each course.

Code	Title	Hours
Professional		
NRSG 5117	Advanced Pharmacology	2
NRSG 5118	Healthcare System and Professional Role Development	3
NRSG 5121	Epidemiology and Population Health	3
NRSG 5126	Pathophysiology for Advanced Practice	3
NRSG 6115	Health Assessment	3
Family		
NRSG 6390	Family Care of the Adult/Older Adult Patient	4
NRSG 6392	Family Theory	2
NRSG 6393	Family Care of the Pediatric and Adolescent Patient	4
NRSG 6395	Healthcare of Women in Family Practice	2
Clinical		
NRSG 6222	Pharmacology of Adults and Older Adults	2
NRSG 6262	Pediatric Pharmacology	2
Practicum		
NRSG 6391	Practicum for NRSG 6390	4
NRSG 6394	Practicum for NRSG 6393	4
NRSG 6396	Practicum for NRSG 6395	4
Research		
NRSG 7105	Translating Research Evidence into Practice	3
NRSG 7110	Evidence-Based Practice Research Application	2

Program Credit/GPA Requirements

47 total semester hours required
720 clinical hours plus 40 research practicum hours
(60 clinical hours/1 semester credit)
Minimum 3.000 GPA required

Nursing—Neonatal Nurse Practitioner, MS

Applicants are required to have at least two years of level 3 or greater of neonatal intensive care unit (NICU) experience before entering this program; most applicants have greater amounts of relevant experience. The neonatal nurse practitioner (NNP) program builds on the applicant's significant base of nursing knowledge and focuses on advanced nursing knowledge and clinical practice. In this program, students:

- Learn advanced diagnostic reasoning
- Carry out independent management of patients and their families
- Develop the expertise necessary to care for high-risk neonates and their families

- Become proficient at delivery room management of high-risk neonates

Successful graduates are prepared to make independent decisions in level 2 and level 3 NICUs, drawing on their experience and diagnostic abilities to affect lives every day.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

A grade of B or higher is required in each course.

Code	Title	Hours
Required Core		
NRSG 5117	Advanced Pharmacology	2
NRSG 5118	Healthcare System and Professional Role Development	3
NRSG 5121	Epidemiology and Population Health	3
NRSG 5126	Pathophysiology for Advanced Practice	3
Clinical		
NRSG 6116	Advanced Health Assessment of the Neonate and Infant	3
NRSG 6230	Nursing Management: Critically Ill Neonatal 1	3
NRSG 6231	Nursing Management: Critically Ill Neonatal 2	3
NRSG 6232	Neonatal Pharmacology	2
Practicum		
NRSG 6430	Neonatal Clinical Practicum 1	4
NRSG 6431	Neonatal Clinical Practicum 2	4
NRSG 6432	Neonatal Clinical Practicum 3	2
Research		
NRSG 7105	Translating Research Evidence into Practice	3
NRSG 7110	Evidence-Based Practice Research Application	2

Elective

Code	Title	Hours
Complete 4 semester hours from the following subject area:		4
NRSG		

Program Credit/GPA Requirements

41 total semester hours required
Minimum 3.000 GPA required

Nursing—Pediatric Nurse Practitioner, Acute and Primary Care, MS

This specialization is designed to prepare nurses with the specialized skills needed to care for children who are at risk across the continuum of care. For nearly two decades, our pediatric nurse practitioner (PNP) program has prepared primary care PNPs to provide community-based, culturally sensitive care. More recently, building on our foundation in evidence-based, interdisciplinary, urban healthcare, we expanded the PNP program into acute care. Students may study either full-time or part-time.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

A grade of B or higher is required in each course.

Code	Title	Hours
Required Core		
NRSG 5117	Advanced Pharmacology	2
NRSG 6116	Advanced Health Assessment of the Neonate and Infant	3
NRSG 6264	Care of Well Child/Adolescent Health Promotion	4
NRSG 6265	Care of Child/Adolescent Health Problems	4
Professional		
NRSG 5118	Healthcare System and Professional Role Development	3
NRSG 5121	Epidemiology and Population Health	3
Clinical		
NRSG 5126	Pathophysiology for Advanced Practice	3
NRSG 6115	Health Assessment	3
NRSG 6262	Pediatric Pharmacology	2
NRSG 6267	Care of the Critically Ill Child	4
NRSG 6275	Urban Families at Risk: A Primary Care Approach	4
Practicum		
NRSG 6460	Care of Well Child/Adolescent Health Promotion Practicum	4
NRSG 6461	Child/Adolescent Health Problems Practicum	4
NRSG 6463	Care of the Critically Ill Child Practicum	4
Research		
NRSG 7105	Translating Research Evidence into Practice	3
NRSG 7110	Evidence-Based Practice Research Application	2

Program Credit/GPA Requirements

52 total semester hours required
Minimum 3.000 GPA required

Nursing—Pediatric Nurse Practitioner, Primary Care, MS

This specialization is designed to prepare nurses with the specialized skills needed to provide high-quality primary care to children in a variety of settings. For nearly two decades, our pediatric nurse practitioner (PNP) program has prepared primary care PNPs to provide community-based, culturally sensitive care.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

A grade of B or higher is required in each course.

Code	Title	Hours
Professional		
NRSG 5118	Healthcare System and Professional Role Development	3
NRSG 5121	Epidemiology and Population Health	3
Theory		
NRSG 6264	Care of Well Child/Adolescent Health Promotion	4
NRSG 6265	Care of Child/Adolescent Health Problems	4
NRSG 6275	Urban Families at Risk: A Primary Care Approach	4
Clinical		
NRSG 5117	Advanced Pharmacology	2
NRSG 5126	Pathophysiology for Advanced Practice	3
NRSG 6115	Health Assessment	3
NRSG 6262	Pediatric Pharmacology	2
Practicum		
NRSG 6460	Care of Well Child/Adolescent Health Promotion Practicum	4
NRSG 6461	Child/Adolescent Health Problems Practicum	4
Research		
NRSG 7105	Translating Research Evidence into Practice	3
NRSG 7110	Evidence-Based Practice Research Application	2

Program Credit/GPA Requirements

41 total semester hours required
Minimum 3.000 GPA required

Nursing—Direct Entry, MS

Part I: Prelicensure

The direct-entry nursing student enters the accelerated master's program as a graduate student. The first 16 months (four semesters) of the program consist of intensive, sequential classes and clinical with combined undergraduate- and graduate-level courses. Students are then prepared to take the National Council Licensure Exam (NCLEX-RN) upon completion of 64 program semester hours. Students earn a Bachelor of Science in Nursing (BSN) after this part of the program. Financial aid will be granted on an undergraduate basis during the prelicensure phase of the program.

RN WORK EXPERIENCE

Once a student becomes a licensed RN, they participate in an online professional practicum for two semesters. The minimum full-time RN experience required for progression into the NP clinical practicums is one to two years, depending on the track. Students may begin core courses such as epidemiology during the required one to two years of RN experience with approval from the program director. Finding RN employment is the responsibility of the student, as it is professional nursing experience. Northeastern will help support the student in preparation for the job search. A leave of absence (LOA) may be granted on an individual basis to gain more nursing experience before returning to the master's portion of the program.

Part II: Return to Master's Specialty Tracks

In the master's specialty track, students are required to take professional and research core classes, clinical core, and specialty clinical courses. Full- or part-time academic study is available to students. Most students return to the master's segment of the program, taking course work as a part-time student while continuing to work and increase the amount of RN professional experience. Full-time study, however, is also an option. Completion of the MSN can take four to six semesters depending on the student's pace and specialty track. Upon completion of the required specialty area credits, the student receives a Master of Science degree and is eligible to take the national certification exam in their area of advanced specialty nursing practice. Financial aid is awarded on a graduate basis during this portion of the program.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

A grade of B or better in the **BSN clinical courses** is highly recommended for progression into the MSN portion of the program. Progression is at the graduate specialty director's discretion.

A grade of B or better is required in **graduate-level courses: Advanced Pharmacology (NRSG 5117), Pathophysiology for Advanced Practice (NRSG 5126), and Health Informatics (NRSG 6306)** .

Code	Title	Hours
Required Core		
NRSG 2210	Influences on Health and Illness: A Nursing Perspective	3
NRSG 4610	Managing and Leading in Healthcare	4
NRSG 5117	Advanced Pharmacology	2
NRSG 5126	Pathophysiology for Advanced Practice	3
NRSG 6306	Health Informatics	3
Assessment		
NRSG 2220 and NRSG 2221	Nursing Interventions, Assessment, and Community Care and Lab for NRSG 2220	5
NRSG 3323 and NRSG 3324	Intermediate Interventions and Assessment and Lab for NRSG 3323	2
Theory and Clinical		
NRSG 3302 and NRSG 3303	Nursing with Women and Families and Clinical for NRSG 3302	5
NRSG 3320 and NRSG 3321	Nursing Care of Adults 1 and Clinical for NRSG 3320	6
NRSG 3400 and NRSG 3401	Nursing and the Promotion of Mental Health and Clinical for NRSG 3400	5
NRSG 3420 and NRSG 3421	Nursing Care of Adults 2 and Clinical for NRSG 3420	6
NRSG 4502 and NRSG 4503	Nursing Care of the Child and Clinical for NRSG 4502	6
NRSG 4604 and NRSG 4605	Public Health Community Nursing and Clinical for NRSG 4604	5
Research		
HLTH 5450	Healthcare Research	4

Practicum

NRSG 4995	Comprehensive Nursing Practicum	5

Program Credit/GPA Requirements

64 total semester hours required
Minimum 3.000 GPA required

Nursing Administration, MS

The graduate program in nursing administration seeks to prepare students for traditional management/administrative careers and emerging leadership roles in quality and safety and health informatics in contemporary healthcare delivery settings. The curriculum offers a strong foundation in complex systems, organizational theory, quality improvement, finance and business, and leadership practice.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

A grade of B or higher is required in all course work.

Code	Title	Hours
Professional		
NRSG 5118	Healthcare System and Professional Role Development	3
NRSG 5121	Epidemiology and Population Health	3
Research		
NRSG 7105	Translating Research Evidence into Practice	3
NRSG 7110	Evidence-Based Practice Research Application	2
Administration		
NRSG 6300	Healthcare Finance and Marketing	3
NRSG 6302	Health Policy and Law	3
NRSG 6306	Health Informatics	3
NRSG 6344	Healthcare Quality Improvement	3
NRSG 6444	Healthcare Systems and Quality Patient Care	3
Practicum		
NRSG 6510	Nursing Leadership Role Practicum 1	3
NRSG 6520	Nursing Leadership Role Practicum 2	3

Electives

Code	Title	Hours
Complete 6 semester hours from the following:		6
NRSG 6301	Human Resources and Operations	
NRSG 6307	Operational Informatics in Healthcare Organizations	
HINF 6220	Database Design, Access, Modeling, and Security	

Program Credit/GPA Requirements

38 total semester hours required
Minimum 3.000 GPA required

Nursing Anesthesia, MS

The nurse anesthesia program is housed in the Bouvé College of Health Sciences, which encourages interdisciplinary collaboration with other healthcare disciplines. This high level of integration is part of what has made us one of the highest nationally ranked programs in the Northeast in the *U.S. News and World Report* ranking.

Northeastern offers a traditional master's degree, an accelerated master's for certified registered nurse anesthetists (CRNAs), and a Certificate of Advanced Graduate Study (CAGS).

Students graduate in May each year and are eligible to sit for the national certification examination for nurse anesthetists, administered by the Council on Certification of Nurse Anesthetists.

Whether in a planned procedure or an emergency, a small local hospital or a regional center, a rural or urban setting, and throughout the life cycle, the nurse anesthetist is a critical member of the healthcare team. In fact, CRNAs administer more than 30 million anesthetics each year in the United States.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

A grade of B or higher is required in all course work.

Code	Title	Hours
Required Core		
NRSG 5118	Healthcare System and Professional Role Development	3
NRSG 5121	Epidemiology and Population Health	3
Didactic		
NRSG 6320	Role/Practice Issues in Nurse Anesthesia	3
NRSG 6321	Conceptual Basis of Nurse Anesthesia Practice 1	3
NRSG 6322	Conceptual Basis of Nurse Anesthesia Practice 2	3
NRSG 6324	Chemistry and Physics in Anesthesia	3
NRSG 6325	Pharmacotherapeutics in Anesthesia and Critical Care Nursing	2
NRSG 6333	Conceptual Basis of Nurse Anesthesia Practice 3	3
NRSG 6336	Advanced Concepts in Nurse Anesthesia Practice	3
Clinical		
Course Work		
NRSG 5117	Advanced Pharmacology	2
NRSG 5126	Pathophysiology for Advanced Practice	3
NRSG 6115	Health Assessment	3
Elective		
Complete a minimum of 2 semester hours of elective course work.		2
Practicum		
NRSG 6530	Nurse Anesthesia Practicum 1	2
NRSG 6534	Nurse Anesthesia Practicum 2	4

| NRSG 6535 | Nurse Anesthesia Practicum 3 | 4 |

Clinical Experiences

NRSG 6540	Advanced Clinical Experiences in Nurse Anesthesia 1	1
NRSG 6541	Advanced Clinical Experiences in Nurse Anesthesia 2	1
NRSG 6542	Advanced Clinical Experiences in Nurse Anesthesia 3	1

Research

| NRSG 7105 | Translating Research Evidence into Practice | 3 |
| NRSG 7110 | Evidence-Based Practice Research Application | 2 |

Program Credit/GPA Requirements

54 total semester hours required
Minimum 3.000 GPA required

Nursing and Business Administration, MS/MBA

To earn the degree, you must complete 12 courses in nursing and 12 in business administration. The nursing curriculum integrates a two-semester practicum with the theory and knowledge base appropriate to advanced roles of the nurse manager; the business courses cover the full complement of functional courses delivered in four years of part-time study, although you can take up to seven years to complete the program. All courses are offered late in the day or evening at the Boston campus.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Business Administration Requirements

Code	Title	Hours
Required Core		
ACCT 6272	Financial Statement Preparation and Analysis	2.25
ACCT 6273	Identifying Strategic Implications in Accounting Data	2.25
ENTR 6200	Enterprise Growth and Innovation	3
FINA 6200	Value Creation through Financial Decision Making	3
INTB 6200	Managing the Global Enterprise	3
MECN 6200	Global Competition and Market Dominance	3
MGSC 6200	Information Analysis	3
MGSC 6206	Management of Service and Manufacturing Operations	3
MKTG 6200	Creating and Sustaining Customer Markets	3
STRT 6200	Strategic Decision Making in a Changing Environment	3
Electives		
Business Specialization I and Business Specialization II		4

Nursing Requirements

A grade of B or higher is required in all course work.

Code	Title	Hours
Professional		
NRSG 5118	Healthcare System and Professional Role Development	3
NRSG 5121	Epidemiology and Population Health	3
Research		
NRSG 7105	Translating Research Evidence into Practice	3
NRSG 7110	Evidence-Based Practice Research Application	2
Theory		
NRSG 6301	Human Resources and Operations	3
NRSG 6302	Health Policy and Law	3
NRSG 6306	Health Informatics	3
NRSG 6344	Healthcare Quality Improvement	3
NRSG 6444	Healthcare Systems and Quality Patient Care	3
Practicum		
NRSG 6510	Nursing Leadership Role Practicum 1 (112 Practicum Hours)	3
NRSG 6520	Nursing Leadership Role Practicum 2 (112 Practicum Hours)	3
Total 224 practicum hours		

Program Credit/GPA Requirements

64.5 total semester hours required
Minimum 3.000 GPA required

Nursing Informatics, Graduate Certificate

Globally connected networks, big data, and innovative decision analytics are rapidly shaping the future of healthcare systems and patient care delivery. This graduate certificate blends nursing science with knowledge and skills in information science, business management, and healthcare to prepare the student to:

- Utilize nursing informatics concepts to support decision making, work flows, and improve healthcare outcomes
- Accelerate the transformation of data into information and knowledge
- Design, implement, and evaluate health information systems
- Employ evidence-based strategies to promote data integrity and security
- Apply business, economic, and entrepreneurial principles to advance strategic business goals
- Become an innovative informatics healthcare leader to participate in efforts to improve human health

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Grade of B or higher is required in all courses.

Core Requirements

Code	Title	Hours
HINF 6202	Business of Healthcare Informatics	3
NRSG 6306	Health Informatics	3

NRSG 6307	Operational Informatics in Healthcare Organizations	3

Elective

Code	Title	Hours
Complete one of the following:		3
HINF 6201	Organizational Behavior, Work Flow Design, and Change Management	
HINF 6240	Improving the Patient Experience through Informatics	
HINF 6404	Patient Engagement Informatics and Analytics	
HINF 6405	Quantifying the Value of Informatics	

Program Credit/GPA Requirements

12 total semester hours required
Minimum 3.000 GPA required

School of Pharmacy

Website (http://www.northeastern.edu/bouve/pharmacy)

John R. Reynolds, PharmD
Professor and Dean

Pharmaceutical Sciences
140 The Fenway
617.373.3406
617.373.8886 (fax)
pharmscigrad@northeastern.edu

Doctor of Pharmacy (PharmD) Program
140 Fenway
617.373.3380
617.373.7655 (fax)
PharmDadmissions@northeastern.edu

The School of Pharmacy is dedicated to excellence in pharmacy-related education, research, and service, including the provision of patient care. We seek to prepare students with knowledge, skills, and values for careers in pharmacy practice and the pharmaceutical sciences. Our programs promote intellectual growth, professionalism, and lifelong learning. Through the generation and dissemination of new knowledge and through scholarship and community service, the school contributes to improved individual and population health.

Programs

Doctor of Philosophy (PhD)

- Biomedical Sciences (p. 268)
- Medicinal Chemistry (p. 269)
- Pharmaceutical Sciences (p. 269)
- Pharmacology (p. 270)

Doctor of Pharmacy (PharmD)

- Doctor of Pharmacy (p. 271)
- Doctor of Pharmacy—Direct Entry (p. 271)

Master of Science (MS)

- Biomedical Nanotechnology (p. 274)
- Biomedical Sciences (p. 275)
- Medicinal Chemistry (p. 275)
- Pharmaceutical Sciences (p. 276)
- Pharmacology (p. 276)

Dual Degree

- Pharmacy and Public Health, PharmD/MPH (p. 251)

Biomedical Sciences, PhD

The department offers a PhD program in biomedical science. Increasingly, scientific work is becoming interdisciplinary. In response to this trend, we allow the student to focus on more than one area in biomedical science. The concept is appropriate for both those entering the field, as well as those currently employed in the field, including research technicians, clinical laboratory workers, science teachers, and science administrators. For those currently employed, the flexibility of our program can enhance their performance in a present position or open up new employment opportunities.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Milestones

Qualifying examination
Annual review
Dissertation committee
Dissertation proposal
Dissertation defense

Core Requirements

A grade of C− or higher is required in each course.

Code	Title	Hours
Seminar		
Complete the following (repeatable) course twice:		2
PHSC 6300	Pharmaceutical Science Seminar	
Colloquium		
PHSC 6810	Pharmaceutical Science Colloquium	1
Required Core		
Complete 13−18 semester hours from the following:		13-18
PHSC 5100	Concepts in Pharmaceutical Science	
PHSC 5102	Concepts in Pharmaceutical Science 2	
PHSC 5300	Pharmaceutical Biochemistry	
or PHSC 7010	Pharmaceutical Sciences Laboratory	
PHSC 5310	Cellular Physiology	
PHSC 6212	Research Skills and Ethics	
or BIOL 6381	Ethics in Biological Research	
PHSC 6214	Experimental Design and Biostatistics	
PHSC 6216	Human Physiology and Pathophysiology	
Pharmaceutics		
PMST 6250	Advanced Physical Pharmacy	2
PMST 6252	Pharmacokinetics and Drug Metabolism	3
PMST 6254	Advanced Drug Delivery System	3

Electives

Code	Title	Hours
Complete 7–12 semester hours in the following subject areas:		7-12
BIOL, BIOT, CHEM, NNMD, PHSC, PMCL, PMST		

Research and Dissertation

Code	Title	Hours
Qualifying Exam		
PHSC 8940	Doctoral Training and Research	1
Proposal Preparation		
PHSC 9681	Doctoral Proposal	2
Dissertation		
Complete the following (repeatable) course twice:		6
PHSC 9990	Dissertation	

Program Credit/GPA Requirements

45 total semester hours required
Minimum 3.000 GPA required

Medicinal Chemistry, PhD

This specialization offered by the Center for Drug Discovery (CDD) trains students in the design and synthesis of novel, biologically active compounds and in the study of their mechanisms of action using biochemical, biophysical, and pharmacological approaches. Specializations are available in synthetic, biochemical/pharmacological, and biophysical medicinal chemistry. These will be targeted to treat drug abuse; addiction; and other indications such as neuropathic pain, obesity, neuropsychiatric disorders (psychoses, ADHD, depression, anxiety, eating disorders); and neurodegenerative disorders.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Milestones

Qualifying examination
Annual review
Dissertation committee
Dissertation proposal
Dissertation defense

Core Requirements

A grade of C− or higher is required in each course.

Code	Title	Hours
Seminar		
Complete the following (repeatable) course twice:		2
PHSC 6300	Pharmaceutical Science Seminar	
Colloquium		
PHSC 6810	Pharmaceutical Science Colloquium	1
Required Core		
PHSC 5100	Concepts in Pharmaceutical Science	2
PHSC 5102	Concepts in Pharmaceutical Science 2	2
PHSC 6212	Research Skills and Ethics	1
or BIOL 6381	Ethics in Biological Research	
Chemistry		
CHEM 5612	Principles of Mass Spectrometry	3

CHEM 5626	Organic Synthesis 1	3
CHEM 5628	Principles of Spectroscopy of Organic Compounds	3
CHEM 5672	Organic Synthesis 2	3
CHEM 5676	Bioorganic Chemistry	3
PHSC 5400	Principles of Drug Design	3
PHSC 6222	The Chemistry and Biology of Drugs of Abuse	2
PHSC 6224	Behavioral Pharmacology and Drug Discovery	2

Electives

Code	Title	Hours
Complete 6–7 semester hours in the following subject areas: BIOL, BIOT, CHEM, NNMD, PHSC, PMCL, PMST		6-7

Research and Dissertation

Code	Title	Hours
Research		
PHSC 8940	Doctoral Training and Research	1
Proposal Preparation		
PHSC 9681	Doctoral Proposal	2
Dissertation		
Complete the following (repeatable) course twice:		
PHSC 9990	Dissertation	3

Program Credit/GPA Requirements

45 total semester hours required
Minimum 3.000 GPA required

Pharmaceutical Sciences, PhD

Pharmaceutics and Drug Delivery Systems

Students studying pharmaceutics and drug delivery will be thoroughly exposed to the fundamentals of physical pharmacy and pharmaceutics in addition to being trained in several more specialized areas such as:

- Novel drug delivery systems
- Nanomedical technologies
- Physical pharmacy
- Biopharmaceutics and pharmacokinetics

With exposure to these various facets of pharmaceutics, successful graduates are poised to understand and assimilate the field of modern pharmaceutics. A PhD degree in pharmaceutics is a research degree. While course work plays an important role, students become a real participant in the science of pharmaceutics in the laboratory. Faculty research covers a broad range of scientific interests, including pharmacokinetic toxicodynamics of anticancer agents, use of biomaterials and synthetic polymeric systems in design of drug delivery systems, passive and active targeting of therapeutic agents, cardiovascular targeting of drugs, novel delivery systems for proteins and peptides, and mathematical modeling of endogenous compounds.

Interdisciplinary Option

The interdisciplinary option is intended to meet the needs of students interested in combining courses and skills from two areas of specialization. At least one of the specialization areas must come from within the college. The second area may come from a department in

another college at Northeastern University, such as biology, chemistry, or engineering. Students electing the interdisciplinary option must fulfill the same requirements as all other PhD candidates.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Milestones

Qualifying examination
Annual review
Dissertation committee
Dissertation proposal
Dissertation defense

Core Requirements

A grade of C− or higher is required in each course.

Code	Title	Hours
Seminar		
Complete the following (repeatable) course twice:		2
PHSC 6300	Pharmaceutical Science Seminar	
Colloquium		
PHSC 6810	Pharmaceutical Science Colloquium	1
Required Core		
Complete 13–18 semester hours from the following:		13-18
PHSC 5100	Concepts in Pharmaceutical Science	
PHSC 5102	Concepts in Pharmaceutical Science 2	
PHSC 5300	Pharmaceutical Biochemistry	
or PHSC 7010	Pharmaceutical Sciences Laboratory	
PHSC 5310	Cellular Physiology	
PHSC 6212	Research Skills and Ethics	
or BIOL 6381	Ethics in Biological Research	
PHSC 6214	Experimental Design and Biostatistics	
PHSC 6216	Human Physiology and Pathophysiology	
Pharmaceutics		
PMST 6250	Advanced Physical Pharmacy	2
PMST 6252	Pharmacokinetics and Drug Metabolism	3
PMST 6254	Advanced Drug Delivery System	3

Electives

Code	Title	Hours
Complete 7–12 semester hours from the following subject areas:		7-12
BIOL, BIOT, CHEM, NNMD, PHSC, PMCL, PMST		

Research and Dissertation

Code	Title	Hours
Qualifying Examination		
PHSC 8940	Doctoral Training and Research	1
Proposal Preparation		
PHSC 9681	Doctoral Proposal	2
Dissertation		
Complete the following (repeatable) course twice:		6
PHSC 9990	Dissertation	

Program Credit/GPA Requirements

45 total semester hours required
Minimum 3.000 GPA required

The PhD in pharmacology specialization allows a student to specialize in the study of the actions of drugs. In addition to developing a sound knowledge base through course work and seminars, the program is designed to strengthen the student's ability to comprehend and to evaluate critically the current literature, allowing the conduct of significant independent research. Recent graduates with a PhD in pharmacology have found employment in academic or industrial research positions.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Milestones

Qualifying examination
Annual review
Dissertation committee
Dissertation proposal
Dissertation defense

Core Requirements

A grade of C− or higher is required in each course.

Code	Title	Hours
Seminar		
Complete the following (repeatable) course twice:		2
PHSC 6300	Pharmaceutical Science Seminar	
Colloquium		
PHSC 6810	Pharmaceutical Science Colloquium	1
Required Core		
Complete 13–18 semester hours from the following:		13-18
PHSC 5100	Concepts in Pharmaceutical Science	
PHSC 5102	Concepts in Pharmaceutical Science 2	
PHSC 5300	Pharmaceutical Biochemistry	
or PHSC 7010	Pharmaceutical Sciences Laboratory	
PHSC 5310	Cellular Physiology	
PHSC 6212	Research Skills and Ethics	
or BIOL 6381	Ethics in Biological Research	
PHSC 6214	Experimental Design and Biostatistics	
PHSC 6216	Human Physiology and Pathophysiology	
Pharmacology		
PMCL 6260	Pharmacology 1	2
PMCL 6261	Pharmacology 2	2
PMCL 6262	Receptor Pharmacology	2

Electives

Code	Title	Hours
Complete 9–14 semester hours from the following subject areas: BIOL, BIOT, CHEM, NNMD, PHSC, PMCL, PMST		9-14

Research and Dissertation

Code	Title	Hours
Research		
PHSC 8940	Doctoral Training and Research	1
Proposal Preparation		
PHSC 9681	Doctoral Proposal	2
Dissertation		
Complete the following (repeatable) course twice:		6
PHSC 9990	Dissertation	

Program Credit/GPA Requirements

45 total semester hours required
Minimum 3.000 GPA required

<div style="background:#c8102e;color:#fff;padding:6px;">Pharmacy, PharmD</div>

Program requirements that follow relate to the final year of the six-year Doctor of Pharmacy (PharmD) program only. For information regarding years one through five of this program, please see the *Undergraduate Catalog* Doctor of Pharmacy (Pharmacy, PharmD) webpage.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Complete 36 semester hours in the following range:		36
PHMD 6440 to PHMD 6474		

Program Credit/GPA Requirements

36 total semester hours required
Minimum 3.000 GPA required

<div style="background:#c8102e;color:#fff;padding:6px;">Pharmacy, PharmD—Direct Entry</div>

The School of Pharmacy (SOP) offers the professional Doctor of Pharmacy degree (PharmD). The direct-entry admission pathway for this program requires that students complete a BS or BA from an accredited institution with a preferred prerequisite grade-point average (GPA) of 3.000. The following prerequisite courses and credits are required:

Requirements	Credits
Chemistry 1 with lab	4
Chemistry 2 with lab	4
General Biology 1 with lab	4
General Biology 2 with lab	4
Calculus	4
Organic Chemistry 1 with lab	4
Organic Chemistry 2 with lab	4
Biochemistry	4
General Psychology	4
English—writing-intensive	4
Human Physiology 1 with lab	4
Human Physiology 2 with lab	4
Physics with lab	4
Arts or humanities electives	4

Direct entry into the first professional year of the PharmD program offers students a four-year graduate course of study that fully integrates campus-based learning with experiential learning, including the university's signature cooperative education (co-op) program, to provide students with the knowledge, skills, and abilities necessary to succeed in the pharmacy profession. Our students promote and ensure the safe and effective use of drugs and provide medication therapy management services. In addition to preparing and dispensing prescribed medications, our students provide information to patients about medications and their uses; advise physicians, other prescribers, and other healthcare practitioners on medication selection, dosages, interactions, and adverse effects; and monitor patient responses to drug therapy.

Our students are well equipped to provide patient care services in a variety of settings. Most of our graduates work in community pharmacies or in healthcare facilities such as hospitals and ambulatory clinics. Additional practice opportunities exist in health maintenance organizations, private practice groups, long-term-care facilities, home healthcare, the Public Health Service, the armed services, and law enforcement agencies such as the Federal Drug Enforcement Administration. Graduates may also find employment in drug development, marketing and research within the pharmaceutical industry, colleges of pharmacy, and professional association management. In addition, many of our graduates go on to pharmacy practice residencies, fellowships, and leading graduate programs.

Doctor of Pharmacy students are admitted with the expectation that by working with faculty, staff, and each other, they will develop the knowledge, skills, and attitudes necessary for academic and professional success. Students follow academic progression plans for their respective years of graduation. Any deviation from the prescribed curriculum will require faculty/staff permission and an approved plan of study from the SOP Academic Standing Committee.

The pharmacy curriculum includes introductory (cooperative education) and advanced pharmacy practice experiences (IPPEs and APPEs). These pharmacy practice experiences are provided primarily under the direct supervision of qualified pharmacist preceptors and occasionally with other qualified healthcare professionals. The school is affiliated with many world-class practice sites throughout the United States, providing students with access to experienced clinicians and scholars. Although every effort is made to accommodate individual circumstances and requests, students should be prepared to travel outside the Boston area to complete some of their pharmacy practice experiences. Availability of a car may be required, as some sites are not accessible by public transportation. All expenses associated with pharmacy practice experiences, including travel and housing, are the responsibility of the student.

IPPEs are competitive placements that are based on job availability in a geographic region. The placements are facilitated by SOP cooperative education coordinators. Students are required to earn a satisfactory (S) grade on one IPPE in a community setting and on one IPPE in an institutional/hospital practice setting.

APPE placements are provided based on site/preceptor availability and the final approval of the SOP Office of Experiential Education (OEE). Students may be able to petition the OEE for out-of-system APPEs; however, availability for such requests is limited.

To be eligible for a PharmD, a student must successfully complete all courses in the curriculum, including the IPPEs (co-op) and APPEs; meet the academic progression standards of the program; meet the technical standards of the program; and satisfy all other requirements as stated in the *Bouvé College of Health Sciences Undergraduate Student*

Information Manual. The pharmacy program, which is fully accredited by the Accreditation Council for Pharmacy Education (ACPE) (info@acpe-accredit.org), subscribes and adheres to the standards established by ACPE.

Pharmacy graduates must meet specific requirements to qualify for professional licensure in the state where they plan to practice as a registered pharmacist. These requirements include graduating from an accredited school of pharmacy, passing national and state board examinations, and completing internship hours. The internship is a period of practical experience conducted under the supervision of a registered pharmacist. Massachusetts requires 1,500 internship hours, all of which are satisfied through IPPEs (co-op) and APPEs.

Professional and/or legal exigencies arise from time to time, which may necessitate changes in a pharmacy course, progression, and/or graduation requirements. Students should review their status with academic advisors on a timely basis and refer to current publications for updated information.

Requirements for the PharmD Pharmacy Practice Experiences (PPEs)

Requirements for the successful completion of the PharmD PPEs include:

1. Evidence of health clearance from University Health and Counseling Services before placements at any PPE site.
2. Satisfactory completion of any additional site-specific requirements including, but not limited to, criminal record information (CORI), urine drug screens, and verification of immunization status. All fees associated with these requirements are the responsibility of the student.

   If the student learns the urine screen (aka test #1) is positive, the student will notify the OEE (pharmacyoee@northeastern.edu) and immediately complete a second urine screen (test #2). A professional concern form will be completed based on test #1 results.

   - If that urine screen (aka test #2) is negative (-), the student will be allowed to continue the PPEs. However, the student will be asked to complete a random urine screen (aka test #3) at a time determined by the OEE. If this urine screen (test #3) is positive (+), the student will be administratively removed from the active PPEs and graduation may be delayed. A second professional concern form will be completed, based on test #3 results. The return to PPEs will occur once a repeat urine test is negative. That repeat negative test will be followed up by a random urine screen at a time determined by the OEE.
   - If the urine screen (aka test #2) is positive (+), the student will be administratively removed from the PPEs and graduation may be delayed. The return to PPEs will occur once a repeat urine screen is negative. That negative screen will be followed up by a random urine screen at a time determined by the OEE. A second professional concern form will be completed based on a positive test #3 result.

3. Adherence to the school's code of professional conduct and university's code of conduct policies while off-campus.
4. Maintenance of an active, pharmacy intern license in every state where the student completes an experience.
5. Compliance with site-specific requirements (via site descriptions) and completion of site requests within specified deadlines. Failure to

complete these requirements as directed will likely result in delay of graduation.

6. Maintenance of a portfolio throughout the professional years and completion of all portfolio submission requirements within specified deadlines.
7. Students are expected to adhere to the policies and standards of their program major as stated to progress through their curriculum as planned. Students seeking any exceptions to the program policies and standards specified for their program major must present a petition before the School of Pharmacy Academic Standing Committee.

Given programmatic requirements, coupled with concerns over the loss of therapeutic knowledge, requests for a general leave of absence:

- Must comply with all stated Northeastern University general policies, regardless of the academic year.
- May be made at any time period during the freshman through P2 years.
- During the P3 academic year, any request for a general leave must be made no later than February 1 of the given academic year. Requests after this date for students in the P3 year will not be permitted.
- During the P4 academic year, requests for a general leave cannot be made at any time.

Technical Standards

The Doctor of Pharmacy program at Northeastern University is a rigorous and challenging academic program that requires students to possess specific characteristics and abilities within the cognitive, affective, and psychomotor domains, referred to here as technical standards. To successfully progress in and ultimately complete the didactic, laboratory, and experiential components of the Doctor of Pharmacy program, students must meet the standards described below.

INTELLECTUAL ABILITIES
Students must have well-developed problem-solving and critical-thinking skills. Cognitive function must be appropriate to integrate, evaluate, and apply information gained through measurement, analysis, calculation, and reasoning. Students must have the capacity to learn efficiently in classroom, laboratory, small group, and experiential settings and through independent study. Students are required to demonstrate the ability to integrate course content knowledge with clinical practice applications to optimize medication therapy management.

COMMUNICATION SKILLS
Students must be able to communicate effectively with colleagues, professors, patients, families, and healthcare providers. This includes efficiently comprehending, speaking, reading, and writing in English. Students must be able to process and use appropriate nonverbal cues and be proficient in the use of electronic communication media.

BEHAVIORAL AND SOCIAL ATTRIBUTES
Students must demonstrate professionalism, maturity, integrity, honesty, compassion, and respect when relating to others. Students must have sufficient mental and emotional health to complete work and responsibilities using good judgment. Students must be able to tolerate and adapt to stressful workloads and situations and modify behavior based on constructive criticism. Students must be able

to function in accordance with the legal, ethical, and professional standards of practice.

OBSERVATION AND MOTOR SKILLS

Students must have functional use of visual, auditory, and tactile senses. Students must be able to observe and perform experiments, physical assessments, patient interviews, and medication order processing. Students must be able to distinguish physical characteristics of medications by inspection. Students must have coordination of gross and fine muscular movements sufficient to perform pharmacy-related tasks including compounding and dispensing medications, administering medications, and using computers and other technology necessary for learning and professional practice.

College Academic Standards—Professional Courses

PharmD students must receive a grade of C or better in professional courses.

- Professional courses are those required courses taught within the major/college as identified by course subject code: PHMD, PHSC.
- Courses in the above-listed subjects that are taken as electives are exempt from the C or better rule, and the university's minimum satisfactory grade will be accepted.
- For PharmD students, failure to earn a satisfactory grade (S) in a co-op will be counted as a professional course failure.

Progression within Bouvé

The requirements for any graduate degree or certificate of advanced study must yield a cumulative GPA of 3.000 or higher as stated in this catalog (p. 235).

- To progress into the subsequent year of professional courses, students must have completed all professional prerequisites with the required minimum passing grade.
- To progress into the subsequent semester of professional courses, students must have completed all professional courses with a grade of C or better.
- Students who incur an incomplete grade in a prerequisite course must obtain approval from their academic advisor, upon consultation with the department faculty, prior to progression into the subsequent course(s).

Academic Dismissal from Major

PharmD students in the Bouvé College of Health Sciences will be dismissed from their major effective the following academic semester for any of the reasons noted below:

- Failure to earn a grade of C or better in three professional courses, regardless of remediation. Lecture and clinical/lab components for the same class are considered as *one* professional course failure. Within the PharmD program, each specific professional course (with separate registration number) will be counted as a separate failure even if content is related.
- Failure to earn the minimum required grade in the same course twice.
- Failure to maintain a GPA of 3.000 after one semester of probation.
- For PharmD students, the expected graduation date may not be changed more than twice.
- The PharmD program monitors and promotes the development of professional behaviors in its students in order to ensure appropriate professionalism in the classroom, local and global communities, and

clinical settings. Breach of adherence to these standards may result in dismissal from the program.

Academic Appeals

Students who believe that they were erroneously, capriciously, or otherwise unfairly treated in an academic or cooperative education decision may petition to appeal the decision. Refer to the *Bouvé Graduate Student Policies and Regulations Manual,* which details the Bouvé College of Health Sciences Appeals Process, and the University Graduate Student Academic Appeals Procedures (p. 33).

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Required Core		
ENGW 3306	Advanced Writing in the Health Professions	4
PHMD 2350	Healthcare Systems	3
PHMD 3450	Research Methodology and Biostatistics	3
PHMD 5223	Evidence-Based Medicine	2
PHMD 5250	Pharmacy Care Management	3
PHMD 5330	Jurisprudence	3
Pharmaceutics		
PHSC 2330	Immunology	3
PHSC 3411	Pharmaceutics 1	4
PHSC 3412	Pharmaceutics 2	4
PHSC 3419	Pharmaceutics Laboratory	1
PHSC 3430	Pharmacokinetics and Biopharmaceutics	3
PHSC 5360	Anti-Infectives	4
Pharmacology/Medicinal Chemistry		
PHSC 4501	Pharmacology/Medicinal Chemistry 1	5
PHSC 4502	Pharmacology/Medicinal Chemistry 2	5
Disease Management		
PHMD 4611 and PHMD 4612	Comprehensive Disease Management 1 and Comprehensive Disease Management 1 Seminar	7
PHMD 4621	Comprehensive Disease Management 2	6
PHMD 4622	Comprehensive Disease Management 2 Seminar	1
PHMD 4623	Comprehensive Disease Management 2 Skills Lab	0.5
PHMD 4631	Comprehensive Disease Management 3	6
PHMD 4632	Comprehensive Disease Management 3 Seminar	1
PHMD 4633	Comprehensive Disease Management 3 Skills Lab	0.5
PHMD 4641	Comprehensive Disease Management 4	6
PHMD 4642	Comprehensive Disease Management 4 Seminar	1
PHMD 4643	Comprehensive Disease Management 4 Skills Lab	0.5
Practice		

PHMD 1201 and PHMD 1202	Introduction to Pharmacy Practice and Lab for PHMD 1201	3
PHMD 2310 and PHMD 2311	Educational and Behavioral Interventions in Pharmacy Practice and Lab for PHMD 2310	2.5
PHMD 5270	Economic Evaluation of Pharmaceuticals and Pharmacy Practice	2
PHMD 5450	Advanced Pharmacy Practice Experience Preparatory Seminar	1
Advanced Practice Experiences		

Electives

Code	Title	Hours
Complete 36 semester hours in the following range:		36
PHMD 6440 to PHMD 6474		

Program Credit/GPA Requirements

132 total semester hours required
Minimum 3.000 GPA required

Plan of Study

Year 1

Fall	Hours	Spring	Hours	Summer Full Semester	Hours
ENGW 3306	4	Advanced Practice Experience	2.5	PHSC 3412	4
PHMD 1201 and PHMD 1202	3			PHSC 3419	1
PHSC 3411	4			PHSC 4502	5
PHSC 4501	5			PHMD 2310 and PHMD 2311	2.5
				PHMD 2350	3
	16		2.5		15.5

Year 2

Fall	Hours	Spring	Hours	Summer Full Semester	Hours
Advanced Practice Experience	2.5	PHMD 3450	3	PHMD 4621	6
		PHMD 4611 and PHMD 4612	7	PHMD 4622	1
		PHSC 2330	3	PHMD 4623	0.5
		PHSC 3430	3	PHMD 5223	2
				PHMD 5330	3
				PHSC 5360	4
	2.5		16		16.5

Year 3

Fall	Hours	Spring	Hours	Summer Full Semester	Hours
PHMD 4631	6	PHMD 4641	6	Complete 12 semester hours in the following range:	12

PHMD 4632	1	PHMD 4642	1	PHMD 6440 to PHMD6474	
PHMD 4633	0.5	PHMD 4643	0.5		
PHMD 5250	3	PHMD 5270	2		
		PHMD 5450	1		
	10.5		10.5		12

Year 4

Fall	Hours	Spring	Hours
Complete 12 semester hours in the following range:	12	Complete 12 semester hours in the following range:	12
PHMD 6440 to PHMD 6474		PHMD 6440 to PHMD 6474	
	12		12

Total Hours: 126

This Master of Science program in biomedical nanotechnology incorporates aspects of the pharmaceutical sciences curriculum with courses in nanotechnology, entrepreneurship, and law. The combination of these fields results in a unique curriculum that offers students an opportunity to obtain skills not only in the relevant science but also in leadership, business, and intellectual property law. Furthermore, the program directly addresses a core mission of the university: the provision of practice-oriented educational programs in major scientific disciplines.

Program Requirements

Prerequisites: calculus, organic chemistry, biochemistry, and physiology.

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

A grade of C− or higher is required in each course.

Code	Title	Hours
Pharmaceutical		
CHME 5699 or PMST 6252	Special Topics in Chemical Engineering Pharmacokinetics and Drug Metabolism	4
PHSC 5100	Concepts in Pharmaceutical Science	2
PHSC 5300	Pharmaceutical Biochemistry	2
PHSC 5305	Professional Development for Pharmaceutical Sciences	1
PHSC 6212 or BIOL 6381	Research Skills and Ethics Ethics in Biological Research	1
PHSC 6300	Pharmaceutical Science Seminar	1
PHSC 7010	Pharmaceutical Sciences Laboratory	4
PMST 6254	Advanced Drug Delivery System	3
Nanomedicine		
NNMD 5270	Introduction to Nanomedicine	3
NNMD 5470	Nano/Biomedical Commercialization: Concept to Market	3
Business and Enterprise		

ENTR 6200	Enterprise Growth and Innovation	3
ENTR 6212	Business Planning for New Ventures	3
LS 6101	Introduction to Legal Studies 1: Law and Legal Reasoning	3
Research and Internship		
Complete 2 semester hours from the following repeatable courses:		2
PHSC 5976	Directed Study	
PHSC 6401	Pharmaceutical Science Internship	
PHSC 6984	Pharmaceutical Science Research	

Program Credit/GPA Requirements

34 total semester hours required
Minimum 3.000 GPA required

Biomedical Sciences, MS

The department offers MS programs in biomedical science. Increasingly, scientific work is becoming interdisciplinary. In response to this trend, we allow the student to focus on more than one area in biomedical science. The concept is appropriate for both those entering, as well as those currently employed in the field, including research technicians, clinical laboratory workers, science teachers, and science administrators. For those currently employed, the flexibility of our program can enhance their performance in a present position or open up new employment opportunities. Graduates of the program will be well prepared to enter related PhD programs at the university.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

A grade of C− or higher is required in each course.

Code	Title	Hours
Required Core		
Complete 13–18 semester hours from the following:		13-18
PHSC 5100	Concepts in Pharmaceutical Science	
PHSC 5102	Concepts in Pharmaceutical Science 2	
PHSC 5300	Pharmaceutical Biochemistry	
or PHSC 7010	Pharmaceutical Sciences Laboratory	
PHSC 5310	Cellular Physiology	
PHSC 6212	Research Skills and Ethics	
or BIOL 6381	Ethics in Biological Research	
PHSC 6214	Experimental Design and Biostatistics	
PHSC 6216	Human Physiology and Pathophysiology	
Pharmaceutics		
PMST 6252	Pharmacokinetics and Drug Metabolism	3
PMST 6250	Advanced Physical Pharmacy	2
PMST 6254	Advanced Drug Delivery System	3

Electives

Code	Title	Hours
Complete 7–12 semester hours in the following subject areas:		7-12
PHSC, PMCL, PMST, BIOL, CHEM, NNMD, BIOT		
Total Hours		7-12

Program Credit/GPA Requirements

33 total semester hours required
Minimum 3.000 GPA required

Medicinal Chemistry, MS

This Master of Science program integrates aspects of contemporary medicinal chemistry and pharmacology, emphasizing topics most relevant to therapeutics design, discovery, and action. The core curriculum is an interdisciplinary combination of synthetic organic chemistry, bioorganic chemistry, analytical chemistry, and pharmaceutical sciences courses. In-depth electives are available in these areas. The program offers students the opportunity to develop knowledge of medicinal chemistry that can be applied to a practice-oriented career in the pharmaceutical industry.

Undergraduate prerequisites are general chemistry, organic chemistry, biochemistry, or cell/molecular biology.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

A grade of C− or higher is required in each course.

Code	Title	Hours
Required Core		
PHSC 5100	Concepts in Pharmaceutical Science	2
PHSC 5102	Concepts in Pharmaceutical Science 2	2
PHSC 6212	Research Skills and Ethics	1
or BIOL 6381	Ethics in Biological Research	
Chemistry		
CHEM 5612	Principles of Mass Spectrometry	3
CHEM 5626	Organic Synthesis 1	3
CHEM 5628	Principles of Spectroscopy of Organic Compounds	3
CHEM 5672	Organic Synthesis 2	3
CHEM 5676	Bioorganic Chemistry	3
PHSC 5400	Principles of Drug Design	3
PHSC 6222	The Chemistry and Biology of Drugs of Abuse	2
PHSC 6224	Behavioral Pharmacology and Drug Discovery	2

Electives

Code	Title	Hours
Complete 6–7 semester hours in the following subject areas:		6-7
BIOL, BIOT, CHEM, NNMD, PHSC, PMCL, PMST		

Program Credit/GPA Requirements

33 total semester hours required

Minimum 3.000 GPA required

Pharmaceutical Sciences, MS

Pharmaceutical science is a problem-solving discipline concerned with the discovery, design, and use of drugs. Pharmaceutical scientists find new targets for drug development; research how drugs work at a molecular level; and determine how drugs' properties, dosages, and delivery systems affect their performance. Northeastern has a well-deserved reputation among students, researchers, and other universities. Our department has five interlinked Centers of Research Excellence that pursue specific areas of pharmaceutical and chemical research: the Center for Drug Discovery, the New England Inflammation and Tissue Protection Institute, the Center for Pharmaceutical Biotechnology and Nanomedicine, the Center for Translational Imaging, and the Environmental Cancer Research Program. Northeastern offers many of its classes in the evening to accommodate the needs of the working community. Many students in the pharmaceutical science MS program complete their degree on a part-time basis. For those interested in discovery, problem solving, and cutting-edge research in one of the world's foremost scientific and medical environments, Northeastern University's School of Pharmacy in the Bouvé College of Health Sciences is the place to study pharmaceutical science.

Pharmaceutical science is inherently interdisciplinary, and this is reflected in the availability of several options at both the MS and PhD levels. The main options are pharmaceutics and drug delivery, pharmacology, and medicinal chemistry. The curriculum for each of these options allows a degree of flexibility in terms of specific courses taken, and the examples below are not absolute but reflect students' most common choices made with the advice of faculty members. Even more flexibility is possible with the Master of Science in Pharmaceutical Sciences (interdisciplinary concentration).

Just as cars are useless without roads, drugs are useless without an effective delivery system. This is especially important in contemporary pharmaceutical research as new chemical entities are either too hydrophobic (e.g., many anticancer drugs) or hydrophilic and highly labile (e.g., nucleic acids). The Bouvé College of Health Sciences' pharmaceutics faculty and students are developing the pathways that bring small-molecule drugs and biological therapies directly to the target cells.

Our comprehensive program in pharmaceutics has specialists in drug development and delivery who use and deliver treatments. Their goal is to better understand how the chemical and physical properties of drugs and their dosage forms affect many approaches to create drug performance in healthy and diseased systems. Graduate students may elect a program concentrating in:

- Novel drug delivery systems
- Biopharmaceutics and pharmacokinetics
- Physical pharmacy and polymeric dosage form development
- Drug metabolism

With a strong focus on nanotechnology-based advanced delivery systems that address contemporary needs, this concentration also gives you the opportunity to study with some of the world's top researchers. Pharmaceutics students have the option of performing industrial internships during the summer in some of the most prestigious pharmaceutical and biotechnology companies in the area.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

A grade of C− or higher is required in each course.

Code	Title	Hours
Required Core		
Complete 13−18 semester hours from the following:		13−18
PHSC 5100	Concepts in Pharmaceutical Science	2
PHSC 5102	Concepts in Pharmaceutical Science 2	2
PHSC 5300	Pharmaceutical Biochemistry	2
or PHSC 7010	Pharmaceutical Sciences Laboratory	
PHSC 5310	Cellular Physiology	2
PHSC 6212	Research Skills and Ethics	1
or BIOL 6381	Ethics in Biological Research	
PHSC 6214	Experimental Design and Biostatistics	2
PHSC 6216	Human Physiology and Pathophysiology	2
Pharmaceutics		
PMST 6250	Advanced Physical Pharmacy	2
PMST 6252	Pharmacokinetics and Drug Metabolism	3
PMST 6254	Advanced Drug Delivery System	3

Electives

Code	Title	Hours
Complete 7−12 semester hours from the following subject areas:		7−12
BIOL, BIOT, CHEM, NNMD, PHSC, PMCL, PMST		

Program Credit/GPA Requirements

33 total semester hours required
Minimum 3.000 GPA required

Pharmacology, MS

Graduate education in pharmacology embodies the principles and mechanisms of drug action on biological systems. Through course work, seminars, and conferences, students gain exposure to both classical and recent approaches that have led to the development of current theories of drug action. Pharmacology should not be confused with pharmacy, which is a professional degree allowing a licensed individual to dispense drugs.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

A grade of C− or higher is required in each course.

Code	Title	Hours
Required Core		
Complete 13−18 semester hours from the following:		13-18
PHSC 5100	Concepts in Pharmaceutical Science	
PHSC 5102	Concepts in Pharmaceutical Science 2	
PHSC 5300	Pharmaceutical Biochemistry	

Code	Title	Hours
or PHSC 7010	Pharmaceutical Sciences Laboratory	
PHSC 5310	Cellular Physiology	
PHSC 6212	Research Skills and Ethics	
or BIOL 6381	Ethics in Biological Research	
PHSC 6214	Experimental Design and Biostatistics	
PHSC 6216	Human Physiology and Pathophysiology	
Pharmacology		
PMCL 6260	Pharmacology 1	2
PMCL 6261	Pharmacology 2	2
PMCL 6262	Receptor Pharmacology	2

Electives

Code	Title	Hours
Complete 9–14 semester hours from the following subject areas:		9-14
BIOL, BIOT, CHEM, NNMD, PHSC, PMCL, PMST		

Program Credit/GPA Requirements

33 total semester hours required
Minimum 3.000 GPA required

Pharmacy and Public Health, PharmD/MPH

The School of Pharmacy and the Department of Health Sciences offer a combined Doctor of Pharmacy (PharmD) and Master in Public Health (MPH) program.

The combined PharmD/MPH program recognizes and reinforces the importance of public health in pharmacy practice. Central to addressing urban public health concerns, and in particular those associated with racial and ethnic health disparities, the program is committed to building a strong, diverse, and activist public health workforce. The goal of the program is to graduate professionals who are well educated in the complex issues associated with disparate health status and healthcare access. The combined PharmD/MPH program allows qualified and interested students an opportunity to achieve their goal of obtaining a more robust understanding of public health through an MPH degree while also completing their PharmD.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

DOCTOR OF PHARMACY REQUIREMENTS

Code	Title	Hours
Required Core		
PHMD 2350	Healthcare Systems	3
PHMD 5223	Evidence-Based Medicine	2
PHMD 5250	Pharmacy Care Management	3
PHMD 5330	Jurisprudence	3
Pharmaceutics		
PHSC 2330	Immunology	3
PHSC 3411	Pharmaceutics 1	4
PHSC 3412	Pharmaceutics 2	4
PHSC 3419	Pharmaceutics Laboratory	1
PHSC 3430	Pharmacokinetics and Biopharmaceutics	3
PHSC 5360	Anti-Infectives	4
Pharmacology/Medicinal Chemistry		
PHSC 4501	Pharmacology/Medicinal Chemistry 1	5
PHSC 4502	Pharmacology/Medicinal Chemistry 2	5
Disease Management		
PHMD 4611	Comprehensive Disease Management 1	6
PHMD 4612	Comprehensive Disease Management 1 Seminar	1
PHMD 4621	Comprehensive Disease Management 2	6
PHMD 4622	Comprehensive Disease Management 2 Seminar	1
PHMD 4623	Comprehensive Disease Management 2 Skills Lab	0.5
PHMD 4631	Comprehensive Disease Management 3	6
PHMD 4632	Comprehensive Disease Management 3 Seminar	1
PHMD 4633	Comprehensive Disease Management 3 Skills Lab	0.5
PHMD 4641	Comprehensive Disease Management 4	6
PHMD 4642	Comprehensive Disease Management 4 Seminar	1
PHMD 4643	Comprehensive Disease Management 4 Skills Lab	0.5
Practice		
PHMD 1201	Introduction to Pharmacy Practice	2.5
PHMD 1202	Lab for PHMD 1201	0.5
PHMD 2310	Educational and Behavioral Interventions in Pharmacy Practice	2
PHMD 2311	Lab for PHMD 2310	0.5
PHMD 5270	Economic Evaluation of Pharmaceuticals and Pharmacy Practice	2
PHMD 5450	Advanced Pharmacy Practice Experience Preparatory Seminar	1
Required Practice Experience		
Complete 36 semester hours of required practice experience:		36
PHMD 6440-PHMD 6474		

MASTER OF PUBLIC HEALTH REQUIREMENTS

Code	Title	Hours
Required Core		
PHTH 5120	Race, Ethnicity, and Health in the United States	3
PHTH 5202	Introduction to Epidemiology	3
PHTH 5210	Biostatistics in Public Health	3
PHTH 5212	Public Health Administration and Policy	3
PHTH 5214	Environmental Health	3
PHTH 5540	Health Education and Program Planning	3
PHTH 6204	Society, Behavior, and Health	3
Urban Health		
PHTH 6200	Principles and History of Urban Health	3
PHTH 6208	Urban Community Health Assessment	3
Practicum		
PHTH 6966	Practicum	3
Capstone		

PHTH 6910	Public Health Capstone	3
Electives		
Complete 9 semester hours in the following subject area:		9
PHTH or approved electives in other subject areas		

Program Credit/GPA Requirements

156 total semester hours required
Minimum 3.000 GPA required

Physical Therapy, Movement, and Rehabilitation Sciences

Website (http://www.northeastern.edu/bouve/pt)

Kristin Curry Greenwood, PT, DPT, EdD, MS
Associate Clinical Professor and Interim Chair

Ann C. Golub-Victor, PT, DPT, MPH
Clinical Professor and Interim Associate Chair

301 Robinson Hall
617.373.3908
617.373.3161 (fax)
physicaltherapy@northeastern.edu

Our programs build on the university's core values of interdisciplinary education, urban engagement, international knowledge, and cutting-edge research. Our exceptional faculty are dedicated to promoting excellence in practice, education, scholarship, and community service. Faculty are engaged in active clinical research and practice. A hallmark of our program is the integration of experiential learning and didactic education whether through use of standardized patients, communication and interaction with community consultants, participation in service-learning, or engagement in research with our faculty.

The Department of Physical Therapy, Movement, and Rehabilitation Sciences graduates are innovative, global leaders who excel in clinical practice, research, worker wellness, ergonomics, disability studies, and community service. With one of the longest accredited physical therapy programs in the United States, and the only program with cooperative education, Northeastern University seeks to graduate students with exceptional clinical decision-making skills and experience in the field of physical therapy. Our Master in Occupational Ergonomics and Health program, open to individuals with various backgrounds, is a unique program combining health promotion and disease prevention. We also offer Certificates of Graduate Studies in the areas of disability studies and ergonomics for both licensed physical therapists and for those with nonclinical backgrounds. The Sports Physical Therapy Clinical Residency program is for licensed practicing physical therapists. Our degree programs incorporate cooperative education, a hallmark of Northeastern University.

Unique Program Features
INTERPROFESSIONAL OPPORTUNITIES
The Bouvé van provides community access to healthcare offered in conjunction with the nursing, pharmacy, speech-language pathology, and public health programs. The Arnold S. Goldstein Laboratory Suite is the keystone of our interprofessional simulation-learning program. Simulations are uniquely designed to engage Bouvé students from more than eight different health professions to learn about, from, and with each other to improve health outcomes. Labs can be set up as a variety of practice environments, including hospital rooms, operating rooms, exam rooms, office space, conference rooms, home care settings, or even a dorm room.

GLOBAL
Beyond the traditional semester abroad, we offer multiple global academic and service-oriented experiences such as international cooperative education and clinical experience, PT academic exchange programs, and global service PT projects to Mexico and Ecuador.

RESEARCH OPPORTUNITIES
The Department of Physical Therapy, Movement, and Rehabilitation Sciences' research mission is to build the evidence for best practices to maintain and improve the health and well-being of the local, national, and global community members. Students have the opportunity to work with faculty to conduct ongoing research in one of the 10 Department of Physical Therapy, Movement, and Rehabilitation Science's labs and centers; including:

- Neuromotor Systems Laboratory
- Laboratory for Locomotion Research
- The ReGameVR Laboratory
- Movement Neuroscience Laboratory
- Rehabilitation and Epidemiology Trainee Program
- Occupational Biomechanics and Ergonomics Laboratory
- Neurophysiology Laboratory
- Teaching and Learning Innovation Laboratory
- Cadaver Lab
- Neuroscience Wet Lab

Programs
Doctor of Physical Therapy (DPT)
- Physical Therapy (p. 278)
- Physical Therapy—Postbaccalaureate Entry (p. 279)

- Transitional Doctor of Physical Therapy (p. 311)

Master of Science (MS)
- Occupational Ergonomics and Health (p. 281)

Graduate Certificate
- Advanced Study in Orthopedics (p. 354)
- Early Intervention (p. 245)
- Occupational Ergonomics and Health (p. 282)

Physical Therapy, DPT

Students who complete their bachelor's degree in rehabilitation sciences at Northeastern automatically matriculate into the final graduate year (year 6) of the Doctorate of Physical Therapy curriculum. Please refer to the undergraduate Physical Therapy program (http://catalog.northeastern.edu/undergraduate/health-sciences/physical-therapy-movement-rehabilitation/dpt) for a complete description of the curriculum and program.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

A grade of C or higher is required in all courses.

Code	Title	Hours
Required Core		
PT 6215 and PT 6216	Assistive Technology and Lab for PT 6215	4
PT 6251	Diagnostic Imaging	3
Advanced Topics		
Complete 2 semester hours from the following range:		2
PT 6231 to PT 6237		
Clinical		
PT 6250	Clinical Integration 2: Evidence and Practice	2
PT 6441	Clinical Education 1	6
PT 6442	Clinical Education 2	6
PT 6448	Clinical Education 3	9

Program Credit/GPA Requirements

32 total semester hours required
Minimum 3.000 GPA required

Plan of Study

Year 1

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
PT 6251	3	PT 6448	9	PT 6441	6	PT 6215 and PT 6216	4
PT 6442	6					PT 6250	2
						Complete 2 semester hours from the following range:	2
						PT 6231 to PT 6237	
	9		9		6		8

Total Hours: 32

Physical Therapy, DPT— Postbaccalaureate Entry

Sonya Larrieux, PT, MA, PhD, C/NDT
Director, DPT Graduate Affairs

Diane Fitzpatrick, PT, DPT, MS, CEEAA
Associate Director, Student Affairs

301 Robinson Hall
617.373.3908
617.373.3161 (fax)
PB_DPT_INQUIRIES@northeastern.edu

Our Postbaccalaureate Doctor of Physical Therapy (DPT) program (http://www.northeastern.edu/bouve/pt/programs/pbdpt.html)is designed for individuals who hold a minimum of a baccalaureate degree in any major other than physical therapy and have satisfied the prerequisite requirements. Over the course of three and one-half years, this rigorous curriculum provides didactic and experiential learning experiences, the cornerstone of our program. These experiences include cooperative education, simulated patient interactions, engagement with consumer clients, service-learning, clinical research, and clinical education experiences.

Emphasis on Experiential Learning

COOPERATIVE EDUCATION

Our DPT program provides students with six months of full-time experiential learning in addition to the required clinical affiliations necessary for licensure. Through cooperative education, the hallmark of Northeastern University, students are able to integrate semesters of academic study with semesters of cooperative education experiences in hospitals and clinics throughout the country and around the globe. Students may be employed as physical therapy co-ops with increasing responsibilities commensurate with their academic studies or perform other health-related duties.

CLINICAL EDUCATION

The curriculum also includes three rotations for a total of 36 weeks of clinical education under the direct supervision of a licensed physical therapist. We are affiliated with world-class medical centers and clinical sites throughout the United States, providing students with access to master clinicians and clinical scholars. Every effort is made to accommodate individual circumstances, but students should be prepared to travel out of state for two of the three clinical placements. Availability of a car may be required, as most sites are not accessible by public transportation. All expenses associated with clinical education, including travel and housing, are the responsibility of the student.

GLOBAL OUTREACH

Students may participate in short cultural immersion experiences abroad whereby they engage in community service projects under the direction of a physical therapy faculty member or on physical therapy academic exchanges with partner academic institutions.

SERVICE-LEARNING

During the curriculum, students participate in service-learning opportunities in the local community in which they learn and apply skills and knowledge related to program objectives. These opportunities start during the first academic year and continue throughout the program in a variety of settings.

ABILITY TO CONCENTRATE

Once in the program, students may have the ability to acquire additional information in two areas of concentration. The **Certificate in Early Intervention** (p. 246) is an interprofessional program that meets the state and national requirements for personnel to work with families, infants and toddlers with disabilities, or those who are at risk for developmental delays. The **Sports Performance Concentration** seeks to prepare the physical therapy student to confidently pursue a sports physical therapy position working with athletes of all ages in a variety of settings. In both areas, students take additional course work and conduct focused research and clinical rotations that expand upon the entry-level physical therapy curriculum.

STUDENT RESEARCH

Physical therapy students participate in research that is integrated into the curriculum. Students have the opportunity to work with faculty to conduct ongoing research in world-renowned medical centers, in one of the 10 Department of Physical Therapy, Movement, and Rehabilitation Science's labs and centers (e.g., Neuromotor Systems Lab, Lab for Locomotion Research, The ReGameVR Lab, Movement Neuroscience Lab, Rehabilitation and Epidemiology Trainee Program, Occupational Biomechanics and Ergonomics Lab, Neurophysiology Lab, Teaching and Learning Innovation Lab, Cadaver Lab, and Neuroscience Wet Lab). The successful outcome is the ability to conduct and present quality research at local and/or national-level conferences.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

A grade of C or higher is required in all courses.

Code	Title	Hours
Required Core		
HLTH 5450 and HLTH 5451	Healthcare Research and Recitation for HLTH 5450	4
PT 5101 and PT 5102	Foundations of Physical Therapy and Lab for PT 5101	4
PT 5145	Introduction to the Healthcare System	2
PT 5160 and PT 5161	Psychosocial Aspects of Healthcare and Psychosocial Aspects of Healthcare Seminar	4
PT 5450 and PT 5504	Introduction to Therapeutic Activities and Lab for PT 5503	3
PT 6215 and PT 6216	Assistive Technology and Lab for PT 6215	4
PT 6243 and PT 6244	Health Education, Promotion, and Wellness and Recitation for PT 6243	3
Medicine and Management		
PT 5140 and PT 5141	Pathology and Recitation for PT 5140	4
PT 5230	Pediatric and Geriatric Aspects of Life Span Management	3
PT 5503 and PT 5504	Cardiovascular and Pulmonary Management and Lab for PT 5503	5
PT 5500	Pharmacology for Physical Therapy	2
PT 6000	Leadership, Administration, and Management	2
PT 6241	Screening for Medical Conditions in Physical Therapy Practice	4
Anatomy and Physiology		
PT 5131 and PT 5132	Gross Anatomy and Lab for PT 5131	5
PT 5133 and PT 5134	Kinesiology and Lab for PT 5133	4
PT 5515 and PT 5516	Integumentary Systems and Advanced Modalities and Lab for PT 5515	3
PT 5505 and PT 5506	Musculoskeletal Management 1 and Lab for PT 5505	5
PT 6223 and PT 6224	Musculoskeletal Management 2 and Lab for PT 6223	5
Neurology		
PT 5138 and PT 5139	Neuroscience and Lab for PT 5138	5
PT 5150 and PT 5151	Motor Control, Development, and Learning and Lab for PT 5150	5
PT 5209 and PT 5210	Neurological Rehabilitation 1 and Lab for PT 5209	5
PT 6221 and PT 6222	Neurological Rehabilitation 2 and Lab for PT 6221	5
Co-op		
PT 5111	Professional Development for Bouvé Graduate Co-op	1
PT 6964	Co-op Work Experience (taken two semesters)	0
Seminar and Advanced Topics		
PT 5226	Physical Therapy Professional Seminar 2	2
Complete 2 semester hours in the following range:		2
PT 6231 to PT 6237		
Project		
PT 5227	Physical Therapy Project 1	3
PT 5229	Physical Therapy Project 2	2
Clinical		
PT 5540	Clinical Integration 1: Evidence and Practice	2
PT 6250	Clinical Integration 2: Evidence and Practice	2
PT 6251	Diagnostic Imaging	3
PT 6441	Clinical Education 1	6
PT 6442	Clinical Education 2	6
PT 6448	Clinical Education 3	9

Optional Concentration

A grade of C or higher is required in all courses.

Code	Title	Hours
Sports Performance Concentration		
PT 5227	Physical Therapy Project 1	3
PT 5229	Physical Therapy Project 2	2
PT 5165	Sports Medicine: Managing the Injured Athlete	4
PT 6237	Advanced Special Topics in Physical Therapy	2
PT 6448 or PT 6442	Clinical Education 3 Clinical Education 2	9

Program Credit/GPA Requirements

123 total semester hours required
Minimum 3.000 GPA required

Plan of Study

Year 1

Spring	Hours	Summer Full Semester	Hours
HLTH 5450 and HLTH 5451	4	PT 5133 and PT 5134	4
PT 5101 and PT 5102	4	PT 5138 and PT 5139	5
PT 5131 and PT 5132	5	PT 5140 and PT 5141	4

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
PT 5160 and PT 5161	4					PT 5500	2
	17						15

Year 2

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
PT 5111	1	PT 6964	0	PT 6964	0	PT 5515 and PT 5516	3
PT 5145	2					PT 5540	2
PT 5150 and PT 5151	5					PT 6243 and PT 6244	3
PT 5450 and PT 5504	3						
PT 5503 and PT 5504	5						
	16		0		0		8

Year 3

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
PT 5209 and PT 5210	5	PT 5226	2	PT 6441	6	PT 6215 and PT 6216	4
PT 5227	3	PT 5229	2			PT 6250	2
PT 5505 and PT 5506	5	PT 5230	3			Complete 2 semester hours in the following range:	2
PT 6000	2	PT 6221 and PT 6222	5			PT 6231 to PT 6237	
PT 6241	4	PT 6223 and PT 6224	5				
	19		17		6		8

Year 4

Fall	Hours	Spring	Hours
PT 6251	3	PT 6448	9
PT 6442	6		
	9		9

Total Hours: 124

Occupational Ergonomics and Health, MS

Lauren A. Murphy, PhD
Assistant Clinical Professor and Graduate Program Director

301 Robinson Hall
617.373.4504
617.373.3161 (fax)
ergonomics@northeastern.edu

Occupational ergonomics and health programs are increasingly important due to the large burden of work-related musculoskeletal disorders (MSDs) and the increased incidence of chronic health conditions of the workforce. These initiatives are especially important with the increase in the aging workforce with their higher incidence of chronic health disorders and the increasing young population entering the workforce with preexisting chronic health issues. In the United States alone, the conservative estimates of direct costs for work-related MSDs are in the magnitude of $50 billion per year. Combined with estimates of indirect costs, these estimates reach $200 billion per year.

The focus of the Master of Science in Occupational Ergonomics and Health program is on primary and secondary prevention approaches for work-related MSDs and injuries. Worker health promotion approaches include workstation configuration and design; modifying work tasks; training workers, supervisors, and caregivers; as well as creating ergonomics management systems, organizational policies and practices, work site wellness programs, and Total Worker Health® efforts.

This master of science program will provide interprofessional training that integrates traditional health protection (ergonomics and safety) and health promotion (wellness) to increase the effectiveness of such workplace programs. Graduates from this unique master's degree program in the United States will be well suited for jobs in industry requiring integration of health and safety programs, thereby fulfilling a need to have well-trained professionals in this domain.

Students who complete the program should be able to:

- Describe the scope and types of workplace programs for ergonomics and health
- Compare fundamental ergonomics approaches to the prevention of work-related injuries, MSDs, and disability
- Develop and administer integrative and innovative approaches to workplace health promotion and wellness programs
- Work collaboratively as part of an interprofessional team
- Analyze factors in the work environment that affect safety and pose risks to workers
- Create worker safety and health prevention programs and apply theory and evidence to support the development of workplace safety and wellness programs

Program Description

The master's degree program requires 36 semester hours divided into 32 semester hours for courses and a 4-semester-hour capstone project. The program can be completed within a year for full-time students and within three years for part-time students. The program is offered in a hybrid format utilizing both online/distance classes when available along with on-campus classroom experiences. Some classes will be fully on-site and the rest will be hybrid (some on-site/online) and others fully online to allow schedule flexibility.

Graduate Student Research

Graduate research opportunities are integrated into the curriculum. Students also have the opportunity to work with faculty to conduct ongoing research in world-renowned companies and in one of the twelve Department of Physical Therapy, Movement, and Rehabilitation Science's labs and centers (e.g., Neuromotor Systems Lab, Lab for Locomotion Research, Cancer Survivorship Center, the ReGameVR Lab, Movement Neuroscience Lab, Rehabilitation and Epidemiology Trainee Program, Occupational Biomechanics and Ergonomics Lab, Neurophysiology Lab, Teaching and Learning Innovation Lab, Musculoskeletal Epidemiology and Biomechanics Lab, Cadaver Lab, and Neuroscience Wet Lab).

Progression in the Program

To progress in the program, students must maintain acceptable standards of scholarship and academic performance as stated in the academic requirements section of this catalog. Students must develop professional behaviors and emotional maturity.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Required Core		
HINF 6201	Organizational Behavior, Work Flow Design, and Change Management	3
PHTH 5214	Environmental Health	3
PT 5600	Ergonomics and the Work Environment	3
PT 5610	Workplace Wellness and Health Promotion	3
PT 6978	Independent Study	4
Research		
PHTH 5202	Introduction to Epidemiology	3
PHTH 5210	Biostatistics in Public Health	3

Electives

Code	Title	Hours
Complete five of the following:		13-14
CAEP 6203	Understanding Culture and Diversity	
CAEP 6220	Development Across the Life Span	
IE 7315	Human Factors Engineering	
PHTH 5224	Social Epidemiology	
PHTH 5228	Advances in Measuring Behavior	
PHTH 6320	Qualitative Methods in Health and Illness	
PT 6243	Health Education, Promotion, and Wellness	
SOCL 7270	Sociology of Work and Employment	

Program Credit/GPA Requirements

36 total semester hours required
Minimum 3.000 GPA required

<div style="background:red;color:white">

Occupational Ergonomics and Health, Graduate Certificate

</div>

Lauren A. Murphy, PhD
Assistant Clinical Professor and Graduate Program Director

301 Robinson Hall
617.373.4504
617.373.3161 (fax)
ergonomics@northeastern.edu

The occupational ergonomics and health graduate certificate focuses on approaches that promote worker well-being and prevent work-related musculoskeletal disorders (MSDs) and injuries. What makes this certificate unique is the emphasis on not just physical ergonomic factors, like the design of tools and equipment, but also the importance of organizational ergonomic factors, like policies, communication, and teamwork. This is important because the management of workplace ergonomics and health programs requires a multidisciplinary set of skills based on understanding the interaction of the work environment, including the physical and organizational factors.

The workplace of the 21st century demands an interprofessional approach that reaches across organizational boundaries, making health and safety a uniform and consistent value within the organization to effectively impact worker health. Add to your professional experience by specializing in workplace approaches that integrate health and safety programs.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

A grade of B or higher is required in each course.

Code	Title	Hours
PT 5600	Ergonomics and the Work Environment	3
PT 5610	Workplace Wellness and Health Promotion	3
PHTH 5202	Introduction to Epidemiology	3
PHTH 5210	Biostatistics in Public Health	3

Elective

Code	Title	Hours
Complete 3 semester hours from the following:		3
HINF 6201	Organizational Behavior, Work Flow Design, and Change Management	
PHTH 5214	Environmental Health	

Program Credit/GPA Requirements

15 total semester hours required
Minimum 3.000 GPA required

<div style="background:red;color:white">

Physician Assistant

</div>

Website (http://www.northeastern.edu/bouve/pa)

Trenton Honda, PhD, MMS, PA-C
Assistant Clinical Professor and Program Director

202 Robinson Hall
617.373.3195
617.373.3338 (fax)
paprogram@northeastern.edu

Established in 1971, the physician assistant (PA) program has a long-standing history of, and expertise in, the education and training of physician assistants. The PA program is located in close proximity to Boston's major academic medical centers and was the first generalist PA training program in the nation to offer a master's degree in 1985.

This rigorous, highly integrated curriculum offers our students the opportunity to obtain broad generalist training that prepares them for successful employment in all fields of clinical practice. Our instructional faculty members are practicing clinicians from throughout New England, and most have been teaching with the program for many years. The clinical year is designed to provide students with experience in diverse healthcare settings in our well-established network of clinical rotation sites.

Northeastern's PA program graduates are employed in positions across the United States, and some have worked internationally. In addition to clinical practice, our graduates are employed in research, administration, and education.

Programs
Master of Science (MS)

Dual Degree

Graduate Certificate

Physician Assistant Studies, MS

Physician assistants (PAs) are healthcare providers who practice medicine with physician supervision. They are highly sought after members of the healthcare team who provide diagnostic and therapeutic patient care. The physician assistant studies (MS) program is a full-time, two-year graduate program that provides an opportunity to earn a Master of Science in Physician Assistant Studies.

Program Requirements
Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements
A grade of C or higher is required in each course.

Code	Title	Hours
Required Core		
PA 6208	Professional Issues for Physician Assistants	2
PA 6326	Aspects of Primary Care	4
PA 6327	Emergency Medicine and Critical Care	2
PA 6328	Aging and Rehabilitation Medicine	2
PA 6329	Healthcare Delivery	2
PA 6330	Research Design	2
Anatomy & Physiology		
PA 6200	Anatomy and Physiology 1	3
PA 6201	Anatomy and Physiology 2	3
Diagnosis & Evaluation		
PA 6203	Physical Diagnosis and Patient Evaluation 1	3
PA 6204	Physical Diagnosis and Patient Evaluation 2	3
Pharmacology		
PA 6205	Pharmacology 1	2
PA 6206	Pharmacology 2	2
PA 6207	Clinical Laboratory and Diagnostic Methods	4
Principles		
PA 6311	Principles of Medicine 1	4
PA 6312	Principles of Medicine 2	4
PA 6313	Principles of Medicine 3	4

Code	Title	Hours
PA 6320	Principles of Obstetrics and Gynecology	2
PA 6321	Principles of Surgery	2
PA 6322	Principles of Orthopedics	2
PA 6323	Clinical Neurology	2
PA 6324	Principles of Pediatrics	2
PA 6325	Principles of Psychiatry	2
Clinical		
PA 6400	Applied Study in Medicine	5
PA 6401	Applied Study in Ambulatory Medicine	5
PA 6402	Applied Study in Family Practice	5
PA 6403	Applied Study in Emergency Medicine	5
PA 6404	Applied Study in Obstetrics and Gynecology	5
PA 6405	Applied Study in Pediatrics	5
PA 6406	Applied Study in Surgery	5
PA 6407	Applied Study in Mental Health	5
PA 6408	Applied Study Elective	5

Program Credit/GPA Requirements
103 total semester hours required
Minimum 3.000 GPA required

Physician Assistant Studies and Health Informatics, MS/MS

The Northeastern University health informatics and physician assistant combined program allows qualified and interested students to achieve their goal of obtaining a more robust understanding of healthcare technology while also completing robust clinical training in the physician assistant program. This prepares a select group of exceptionally qualified clinicians to become leaders in healthcare technology application and development and fosters interdisciplinary collaboration in order to address problems in the healthcare and health information environments both locally and across the globe. The joint program is designed to provide students a greater understanding of technological issues in clinical practice, quantitative methods, and the use of scientific evidence and cutting-edge technology to optimize clinical workflows and improve patient outcomes.

This dual degree takes 34 months to complete (as opposed to 48, if each degree were pursued separately), and a total number of 8 credits are shared between both degrees.

Program Requirements
Complete all courses and requirements listed below unless otherwise indicated.

Physician Assistant Requirements
A grade of C or higher is required in each course.

Code	Title	Hours
Required Core		
PA 6208	Professional Issues for Physician Assistants	2
PA 6326	Aspects of Primary Care	4
PA 6327	Emergency Medicine and Critical Care	2
PA 6328	Aging and Rehabilitation Medicine	2
PA 6329	Healthcare Delivery	2
Anatomy & Physiology		
PA 6200	Anatomy and Physiology 1	3

PA 6201	Anatomy and Physiology 2	3
Diagnosis & Evaluation		
PA 6203	Physical Diagnosis and Patient Evaluation 1	3
PA 6204	Physical Diagnosis and Patient Evaluation 2	3
Pharmacology		
PA 6205	Pharmacology 1	2
PA 6206	Pharmacology 2	2
PA 6207	Clinical Laboratory and Diagnostic Methods	4
Principles		
PA 6311	Principles of Medicine 1	4
PA 6312	Principles of Medicine 2	4
PA 6313	Principles of Medicine 3	4
PA 6320	Principles of Obstetrics and Gynecology	2
PA 6321	Principles of Surgery	2
PA 6322	Principles of Orthopedics	2
PA 6323	Clinical Neurology	2
PA 6324	Principles of Pediatrics	2
PA 6325	Principles of Psychiatry	2
Clinical		
PA 6400	Applied Study in Medicine	5
PA 6401	Applied Study in Ambulatory Medicine	5
PA 6402	Applied Study in Family Practice	5
PA 6403	Applied Study in Emergency Medicine	5
PA 6404	Applied Study in Obstetrics and Gynecology	5
PA 6405	Applied Study in Pediatrics	5
PA 6406	Applied Study in Surgery	5
PA 6407	Applied Study in Mental Health	5
PA 6408	Applied Study Elective	5

Health Informatics Requirements

A grade of B− or higher is required in each course.

Code	Title	Hours
Required Core		
HINF 7701	Health Informatics Capstone Project	3
Business Management		
Complete two courses from the following:		6
HINF 6201	Organizational Behavior, Work Flow Design, and Change Management	
HINF 6202	Business of Healthcare Informatics	
HINF 6215	Project Management	
HINF 6240	Improving the Patient Experience through Informatics	
HINF 6335	Management Issues in Healthcare Information Technology	
PHTH 5226	Strategic Management and Leadership in Healthcare	
Health Informatics		
Complete two courses from the following:		6
HINF 5102	Data Management in Healthcare	
HINF 5110	Global Health Information Management	

HINF 5200	Theoretical Foundations in Personal Health Informatics	
HINF 6205	Creation and Application of Medical Knowledge	
HINF 6350	Public Health Surveillance and Informatics	
HINF 6404	Patient Engagement Informatics and Analytics	
HINF 6405	Quantifying the Value of Informatics	
PHTH 5232	Evaluating Healthcare Quality	
Technical		
PHTH 5202	Introduction to Epidemiology	3
PHTH 5210	Biostatistics in Public Health	3
Electives		
Complete two courses from the following:		6
HINF 6345	Design for Usability in Healthcare	
DA 5020	Collecting, Storing, and Retrieving Data	
DA 5030	Introduction to Data Mining/Machine Learning	
PPUA 5301	Introduction to Computational Statistics	
PPUA 5302	Information Design and Visual Analytics	

Program Credit/GPA Requirements

128 total semester hours required
Minimum 3.000 GPA required

Physician Assistant Studies and Public Health, MS/MPH

The Northeastern University Physician Assistant (PA) program and Department of Health Sciences offer a combined Master of Science in Physician Assistant Studies (MS)/Master in Public Health Program (MPH) program. The combined PA/MPH program allows qualified and interested students an opportunity to achieve their goal of obtaining a more robust understanding of public health through an MPH degree while also completing their Master of Science in Physician Assistant Studies.

Since its inception in 2008, the Northeastern MPH program has distinguished itself from other MPH programs in the area through its unique focus on urban public health. The program's overarching goal is to address urban public health concerns, particularly those associated with racial and ethnic health disparities, in order to build a diverse and activist-oriented public health workforce. The MPH program has a strong commitment to providing a flexible course of study for working professionals. This flexibility allows for easy incorporation into a dual-degree program.

The combined degree that incorporates both programs is designed to help diversify the public health workforce and improve graduates' ability to approach clinical situations with cultural sensitivity and awareness. Successful graduates of the program benefit from having a greater understanding of public health issues in clinical practice, including the racial and ethnic health disparities prevalent in the U.S. healthcare system, as well as a strong grounding in epidemiology, quantitative and qualitative research methods, and the use of scientific evidence, skills critical to many fields of healthcare practice.

This dual degree takes a total of three years to complete (as opposed to four, if each degree were pursued separately), and a total number of 12 credits are shared between both degrees.

For more information, including the application and admissions process, please visit the PA/MPH website here (https://bouve.northeastern.edu/health-sciences/programs/pa-mph).

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Physician Assistant Requirements

A grade of C or higher is required in each course.

Code	Title	Hours
Required Core		
PA 6208	Professional Issues for Physician Assistants	2
PA 6326	Aspects of Primary Care	4
PA 6327	Emergency Medicine and Critical Care	2
PA 6328	Aging and Rehabilitation Medicine	2
Anatomy & Physiology		
PA 6200	Anatomy and Physiology 1	3
PA 6201	Anatomy and Physiology 2	3
Diagnosis & Evaluation		
PA 6203	Physical Diagnosis and Patient Evaluation 1	3
PA 6204	Physical Diagnosis and Patient Evaluation 2	3
PA 6207	Clinical Laboratory and Diagnostic Methods	4
PA 6323	Clinical Neurology	2
Pharmacology		
PA 6205	Pharmacology 1	2
PA 6206	Pharmacology 2	2
Principles		
PA 6311	Principles of Medicine 1	4
PA 6312	Principles of Medicine 2	4
PA 6313	Principles of Medicine 3	4
PA 6320	Principles of Obstetrics and Gynecology	2
PA 6321	Principles of Surgery	2
PA 6322	Principles of Orthopedics	2
PA 6324	Principles of Pediatrics	2
PA 6325	Principles of Psychiatry	2
Clinical		
PA 6400	Applied Study in Medicine	5
PA 6401	Applied Study in Ambulatory Medicine	5
PA 6402	Applied Study in Family Practice	5
PA 6403	Applied Study in Emergency Medicine	5
PA 6404	Applied Study in Obstetrics and Gynecology	5
PA 6405	Applied Study in Pediatrics	5
PA 6406	Applied Study in Surgery	5
PA 6407	Applied Study in Mental Health	5

Master's of Public Health Requirements

A grade of B− or higher is required in each course.

Code	Title	Hours
Required Core		
PHTH 5120	Race, Ethnicity, and Health in the United States	3
PHTH 5202	Introduction to Epidemiology	3
PHTH 5210	Biostatistics in Public Health	3
PHTH 5212	Public Health Administration and Policy	3
PHTH 5214	Environmental Health	3
PHTH 5232	Evaluating Healthcare Quality	3
PHTH 5540	Health Education and Program Planning	3
PHTH 6204	Society, Behavior, and Health	3
Urban Health		
PHTH 6200	Principles and History of Urban Health	3
PHTH 6208	Urban Community Health Assessment	3
Practicum		
PHTH 6966	Practicum	3
Capstone		
PHTH 6910	Public Health Capstone	3
Elective		
Complete 3 semester hours of approved elective course work.		3

Program Credit/GPA Requirements

133 total semester hours required
Minimum 3.000 GPA required

Physician Assistant Leadership and Management, Graduate Certificate

The Northeastern University Physician Assistant (PA) Program and the American Academy of Physician Assistants' Center for Healthcare Leadership and Management jointly sponsor the Graduate Certificate in PA Leadership and Management. The certificate seeks to prepare qualified and interested students to achieve their goal of obtaining a robust understanding of the theory, techniques, and implementation of leadership and management skills essential in the practice and administration of medicine in today's healthcare environment. The curriculum is designed to support PAs and those managing PAs with the necessary skills and competencies to expand their roles in the clinical arena and/or increase their familiarity with and training in leadership/management in order to advance their careers in healthcare administration.

The certificate can be completed in one year and requires a total of 12 credits.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
PA 5100	Principles of Leadership in Healthcare	3
PA 5101	Advocacy in Leadership	3
PA 5102	Medical Billing and Reimbursement for Advanced Practice Providers	3

PA 5103	Metrics: Measuring, Comparing, and Privileging Your PA and NP Workforce	3

Program Credit/GPA Requirements
12 total semester hours required
Minimum 3.000 GPA required

<div style="background:red;color:white">

Interdisciplinary
</div>

Website (http://www.northeastern.edu/bouve/interdisciplinary)

Daniel A. Feinberg, EdD, MBA
Assistant Clinical Instructor and Program Director, Health Informatics Program

Health Informatics Program
248 West Village H
617.373.5005 (fax)
Daniel A. Feinberg, Assistant Clinical Instructor and Program Director, d.feinberg@northeastern.edu

Stephen Intille, PhD
Associate Professor and Program Director, Personal Health Informatics Program

Personal Health Informatics Program
974 West Village H
617.373.3711
Stephen Intille, Associate Professor and Program Director, s.intille@northeastern.edu

With Northeastern University's interdisciplinary graduate programs in health informatics, you have an opportunity to gain the knowledge and skills needed to use information technology to improve healthcare delivery and outcomes—and to advance your career in a growing field. We seek to educate the leaders who use technology to improve healthcare for the future.

Programs
Doctor of Philosophy (PhD)

Master of Science (MS)

Dual Degree

Graduate Certificate

<div style="background:red;color:white">

Personal Health Informatics, PhD
</div>

Northeastern University's interdisciplinary doctoral program in personal health informatics seeks to prepare researchers to design and evaluate technologies that improve health and wellness with the potential to transform healthcare. The joint degree program combines a strong curriculum in human-computer interface technology and experimental design in health sciences. Read additional information (p. 109).

<div style="background:red;color:white">

Biotechnology, MS
</div>

Overview
Northeastern's Master of Science in Biotechnology is a professional master's program, an innovative, nonthesis graduate degree. It combines advanced interdisciplinary training in biotechnology, biology, chemistry, and pharmaceutical sciences with the development of high-value business skills critical to success in today's dynamic workplace. Graduates are prepared to innovate, collaborate, and lead as research, managerial, or technical professionals in a wide range of biotechnology specialties.

Molecular Biotechnology Concentration
The molecular biotechnology concentration provides students with didactic and practical knowledge in molecular biotechnology, protein expression, and structural biology. Students learn how to generate and optimize molecular forms used to express recombinant proteins to be used as biopharmaceuticals. Particular attention is paid to cutting-edge technologies such as RNAi and CRISPR/CAS9. In addition, the students learn how to purify biopharmaceuticals and analyze aggregation and how to prevent it.

Process Sciences Concentration
The process sciences concentration focuses on the production of drug substance of biopharmaceuticals from cell culture process to purification of the biologic molecules. The students learn the principles of development and implementation of biological manufacturing processes through the integration of concepts and fundamentals of engineering and life sciences. The concentration addresses biochemical engineering, mammalian cell culture process development, and protein purification. The learning of the students is reinforced by both lecture courses and project-driven laboratory experience that provides hands-on learning of cell culture and protein separation.

Biopharmaceutical Analytical Sciences Concentration
The biopharmaceutical analytical sciences concentration focuses on structures and activities of biological molecules and their variants formed during the production of biopharmaceuticals. Students learn the diversity of molecular forms derived from the biological products through various biological and chemical mechanisms and the impact of these structural changes on the safety and efficacy of these biopharmaceuticals. The students learn the science and practice applied in the biotechnology industry to analyze and characterize these molecular forms. This is accomplished through both lecture courses of the analytical sciences and project-driven laboratory experience that utilizes analytical techniques such as mass spectrometry and molecular separations.

Pharmaceutical Technologies Concentration
The pharmaceutical technologies concentration focuses on the conversion of purified proteins to biopharmaceutical drug products that are compatible for clinical use. This concentration addresses the design of the product formulation and the development and implementation of the drug product manufacturing processes. Students learn the sciences

BIOL 6299	Molecular Cell Biology for Biotechnology	3
CHEM 5620	Protein Chemistry	3
CHEM 7317	Analytical Biotechnology	3
Co-op		
BIOT 6500	Professional Development for Co-op	0
BIOT 6964	Co-op Work Experience	0

Concentrations

Complete one of the following seven concentrations:

- Molecular Biotechnology Concentration (p. 287)
- Process Sciences Concentration (p.   )
- Biopharmaceutical Analytical Sciences Concentration (p. 287)
- Pharmaceutical Technologies Concentration (p.   )
- Scientific Information Management Concentration (p.   )
- Regulatory (p.   ) Science Concentration (p.   )
- Biotechnology Enterprise Concentration (p. 288)

MOLECULAR BIOTECHNOLOGY CONCENTRATION

Code	Title	Hours
BIOT 5145	Basic Biotechnology Lab Skills	1
BIOT 5810	Cutting-Edge Applications in Molecular Biotechnology	3
BIOT 5850	Higher-Order Structure Analytics	3
BIOT 7245	Biotechnology Applications Laboratory	3
Electives (p. 288)		5

PROCESS SCIENCES CONCENTRATION

Code	Title	Hours
BIOT 5145	Basic Biotechnology Lab Skills	1
BIOT 5560	Bioprocess Fundamentals	3
BIOT 5635	Downstream Processes for Biopharmaceutical Production	3
BIOT 7245	Biotechnology Applications Laboratory	3
Electives (p. 288)		5

BIOPHARMACEUTICAL ANALYTICAL SCIENCES CONCENTRATION

Code	Title	Hours
BIOT 5145	Basic Biotechnology Lab Skills	1
BIOT 7245	Biotechnology Applications Laboratory	3
CHEM 5550	Introduction to Glycobiology and Glycoprotein Analysis	3
CHEM 5616	Protein Mass Spectrometry	3
Electives (p. 288)		5

PHARMACEUTICAL TECHNOLOGIES CONCENTRATION

Code	Title	Hours
BIOT 5145	Basic Biotechnology Lab Skills	1
BIOT 5640	Drug Product Processes for Biopharmaceuticals	3
BIOT 5700	Molecular Interactions of Proteins in Biopharmaceutical Formulations	3
BIOT 7245	Biotechnology Applications Laboratory	3
Electives (p. 288)		5

of the interactions of the biologic molecules in the process conditions and the relevant process technology, such as aseptic operations and freeze-drying, needed for drug product manufacturing. This is accomplished through both lecture courses and project-driven laboratory experience that offers hands-on learning of formulation design and drug product process development.

Biotechnology Scientific Information Management Concentration

The scientific information management concentration focuses on the collection, analysis, and visualization of scientific data. This concentration addresses the issues surrounding *big data* that face industry today. Students have an opportunity to learn how to manage, store, visualize, and provide overall analysis of large scientific data sets. This is accomplished through both lecture courses and project-driven laboratory experience that provide hands-on learning of the impacts of data on the scientific process.

Biotechnology Regulatory Science Concentration

The regulatory science concentration focuses on the science behind good regulatory practice today. This concentration addresses the issues surrounding current and innovative science practices that influence regulatory decisions. Students have an opportunity to learn the science behind compliance. This is accomplished through both lecture courses and project-driven laboratory experience that provides hands-on learning of the science behind dossier analysis.

Biotechnology Enterprise Concentration

The biotechnology enterprise concentration integrates business and management skills with the science of biotechnology. Students learn the fundamental concepts of leadership, entrepreneurship and innovation, financial decision making, and marketing. They gain teamwork, management, and business development skills in the process and graduate prepared to become scientist-managers.

GORDON INSTITUTE OF ENGINEERING LEADERSHIP

Master's Degree in Biotechnology with Graduate Certificate in Engineering Leadership

Students may complete a Master of Science in Biotechnology in addition to earning a Graduate Certificate in Engineering Leadership. Students must apply and be admitted to the Gordon Engineering Leadership Program in order to pursue this option. The certificate program requires fulfillment of the 16-semester-hour curriculum required to earn the Graduate Certificate in Engineering Leadership, which includes an industry-based challenge project with multiple mentors. The integrated 42-semester-hour master's degree and certificate requires 26 hours of biotechnology course work.

Engineering Leadership (p. 222)

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Required Core		
BIOT 5120	Introduction to Biotechnology	3
BIOT 5219	The Biotechnology Enterprise	2
BIOT 5631	Cell Culture Processes for Biopharmaceutical Production	3
BIOT 6214	Experimental Design and Biostatistics	2

SCIENTIFIC INFORMATION MANAGEMENT CONCENTRATION

Code	Title	Hours
BIOT 5145	Basic Biotechnology Lab Skills	1
BIOT 5400	Scientific Information Management for Biotechnology Managers	3
BIOT 7245	Biotechnology Applications Laboratory	3
DA 5020	Collecting, Storing, and Retrieving Data	4
or DA 5030	Introduction to Data Mining/Machine Learning	
PPUA 5301	Introduction to Computational Statistics	4

REGULATORY SCIENCE CONCENTRATION

Code	Title	Hours
BIOT 5330		3
BIOT 5340	Introduction to Biotherapeutic Approvals	3
BIOT 5500	Introduction to Regulatory Science	3
BIOT 7245	Biotechnology Applications Laboratory	3
Electives (p. 288)		3

BIOTECHNOLOGY ENTERPRISE CONCENTRATION

Code	Title	Hours
BIOT 5225	Managing and Leading a Biotechnology Company	3
BIOT 5226	Biotechnology Entrepreneurship	3
BIOT 5227	Economics and Marketing for Biotechnology Managers	3
Electives (p. 288)		6

Elective List

Code	Title	Hours

Choose electives from the list and/or one-credit BUSN graduate level courses. Electives not on this list may be chosen with faculty advisor approval.

Code	Title	Hours
BINF 6308	Bioinformatics Computational Methods 1	
BIOL 5307	Biological Electron Microscopy	
BIOL 5499	Plant Biotechnology	
BIOL 5543	Stem Cells and Regeneration	
BIOL 5549	Microbial Biotechnology	
BIOL 5569	Advanced Microbiology	
BIOL 5573	Medical Microbiology	
BIOL 5581	Biological Imaging	
BIOL 5583	Immunology	
BIOL 6381	Ethics in Biological Research	
BIOL 6399	Dynamics of Microbial Ecology	
BIOT 5220	The Role of Patents in the Biotechnology Industry, Past and Future	
BIOT 5225	Managing and Leading a Biotechnology Company	
BIOT 5226	Biotechnology Entrepreneurship	
BIOT 5227	Economics and Marketing for Biotechnology Managers	
BIOT 5560	Bioprocess Fundamentals	
BIOT 5635	Downstream Processes for Biopharmaceutical Production	

Code	Title
BIOT 5640	Drug Product Processes for Biopharmaceuticals
BIOT 5700	Molecular Interactions of Proteins in Biopharmaceutical Formulations
CHEM 5550	Introduction to Glycobiology and Glycoprotein Analysis
CHEM 5616	Protein Mass Spectrometry
CHEM 5617	Protein Mass Spectrometry Laboratory
CHEM 5621	Principles of Chemical Biology for Chemists
CHEM 5625	Chemistry and Design of Protein Pharmaceuticals
CHEM 5638	Molecular Modeling
CHEM 7247	Advances in Nanomaterials
CHME 7340	Chemical Engineering Kinetics
ENTR 6200	Enterprise Growth and Innovation
ENTR 6210	Managing Operations in Early Stage Ventures
ENTR 6211	Entrepreneurship: Services and Retail Business Creation
ENTR 6212	Business Planning for New Ventures
HINF 5105	The American Healthcare System
HINF 6201	Organizational Behavior, Work Flow Design, and Change Management
MGMT 6210	Law for Managers and Entrepreneurs
MGSC 6200	Information Analysis
NNMD 5270	Introduction to Nanomedicine
NNMD 5470	Nano/Biomedical Commercialization: Concept to Market
PHSC 6218	Biomedical Chemical Analysis
PHSC 6224	Behavioral Pharmacology and Drug Discovery
PHSC 6226	Imaging in Medicine and Drug Discovery
PHSC 6290	Biophysical Methods in Drug Discovery
PHSC 7010	Pharmaceutical Sciences Laboratory
TECE 6230	Entrepreneurial Marketing and Selling
TECE 6250	Lean Design and Development

Program Credit/GPA Requirements

34 total semester hours required
Minimum 3.000 GPA required

Health Data Analytics, MS

The digitization of healthcare systems in clinical settings, in combination with the explosion of personal data collection devices, provides the opportunity of using data for revolutionizing approaches to care at all levels with an emphasis on precision medicine and person-centered care. The ability to take advantage of this "Big Data" opportunity, however, requires expertise at the intersection of health informatics, data science, and computational modeling. The Master of Science in Health Data Analytics is designed to prepare students to succeed in this emerging field. This program offers a strong, competency-based curriculum that addresses data analytics ranging from data acquisition from traditional and emerging data streams, data aggregation methods, data mining algorithms, predictive computational modeling, and visualization techniques. Students can expect to amass a broad

and deep understanding of the various methods, software tools, and topical expertise needed to discover meaningful patterns in health-related data and effectively communicate their implications to a number of diverse stakeholders. Successful graduates of the Master of Science in Health Data Analytics will be effective practitioners and leaders in the rapidly developing domain of data analytics with a focus on health and healthcare.

The interdisciplinary Master of Science in Health Data Analytics consists of 12 courses, drawn from the College of Computer and Information Science and the Bouvé College of Health Science; a capstone project; and an ongoing series of seminars on topics in health data analytics. Two tracks will be available to matriculating students: standard and research based.

LEARNING OUTCOMES

- Proficiency in the health and healthcare ecosystem, including stakeholder roles such as payers, providers, and government; social determinants of health; wellness promotion; acute vs.chronic care
- Ability to acquire, store, and validate data; familiarity with common health-related data sources and formats
- Proficiency in analyzing data using statistical, epidemiological, and data-mining methods along with appropriate software tools and programming languages
- Ability to interpret and present analytical results to nontechnical stakeholders using visualization and accessible narrative structures

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Analytics/Modeling/Statistics		
DA 5020	Collecting, Storing, and Retrieving Data	4
DA 5030	Introduction to Data Mining/Machine Learning	4
HINF 6400	Introduction to Health Data Analytics	3
PPUA 5301	Introduction to Computational Statistics	4
PPUA 5302	Information Design and Visual Analytics	4
Healthcare		
HINF 5102	Data Management in Healthcare	3
HINF 5105	The American Healthcare System	3
HINF Predictive Analy (TBA)		3

[1] Please see college administrator for course information.

Thesis/Capstone

Code	Title	Hours
Complete either Thesis or Capstone:		3
Thesis		
HINF Health Informatics Thesis (TBA)		
Capstone		
HINF 7701	Health Informatics Capstone Project	

Electives

At least one course must be chosen from the methods list.

Code	Title	Hours
Methods		
Complete 3–6 semester hours from the following:		3-6
PHTH 6202	Intermediate Epidemiology	
PHTH 6210	Applied Regression Analysis	
PHTH 6440	Advanced Methods in Biostatistics	
CS 6350	Empirical Research Methods	
CAEP 7712	Intermediate Statistical Data Analysis Techniques	
CAEP 7716	Advanced Research and Data Analyses 2	
Other Electives		
Complete 0–4 semester hours from the following:		0-4
ARTG 5330	Visualization Technologies 1	
ARTG 6320	Design of Information-Rich Environments	
HINF 5200	Theoretical Foundations in Personal Health Informatics	
HINF 5300	Personal Health Interface Design and Development	
HINF 6215	Project Management	
HINF 6220	Database Design, Access, Modeling, and Security	
PHTH 5226	Strategic Management and Leadership in Healthcare	
PHTH 5232	Evaluating Healthcare Quality	
PHTH 5234	Economic Perspectives on Health Policy	

Program Credit/GPA Requirements

37 total semester hours required
Minimum 3.000 GPA required

Health Informatics, MS

Northeastern's interdisciplinary Master of Science in Health Informatics was the first MS in the field. The program seeks to prepare students to address the combined clinical, technical, and business needs of health-related professionals. Successful students graduate with the knowledge of how technology, people, health, and the healthcare system interrelate; the ability to use technology and information management to improve healthcare delivery and outcomes; and the skills to communicate effectively among healthcare practitioners, administrators, and information technology professionals.

With approval from the health informatics program director, selected students can substitute one course from the Graduate Certificate in Data Analytics for a technical core requirement in the MS in Health Informatics degree, and up to two more courses from the Graduate Certificate in Data Analytics can be counted as electives for the MS in Health Informatics degree.

Northeastern also offers graduate certificate programs in health informatics. Three certificate programs enable you to choose the one that addresses your specific goals. These programs are listed separately in this catalog:

- Graduate Certificate in Health Informatics Management and Exchange

- Graduate Certificate in Health Informatics Privacy and Security

- Graduate Certificate in Health Informatics Software Engineering

Courses in the certificate program also apply toward master's degree requirements. This gives you the flexibility to complete a certificate and be well on your way to earning a degree if you decide later to continue your education.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

A grade of B− or higher is required in each course.

Code	Title	Hours
Required Core		
HINF 5101	Introduction to Health Informatics and Health Information Systems	3
HINF 5105	The American Healthcare System	3
HINF 7701	Health Informatics Capstone Project	3
Business Management		
Complete two courses from the following:		6
HINF 6201	Organizational Behavior, Work Flow Design, and Change Management	
HINF 6202	Business of Healthcare Informatics	
HINF 6215	Project Management	
HINF 6335	Management Issues in Healthcare Information Technology	
HINF 6240	Improving the Patient Experience through Informatics	
PHTH 5226	Strategic Management and Leadership in Healthcare	
Health Informatics		
Complete two courses from the following:		6
HINF 5102	Data Management in Healthcare	
HINF 5110	Global Health Information Management	
HINF 5200	Theoretical Foundations in Personal Health Informatics	
HINF 6205	Creation and Application of Medical Knowledge	
HINF 6350	Public Health Surveillance and Informatics	
HINF 6404	Patient Engagement Informatics and Analytics	
HINF 6405	Quantifying the Value of Informatics	
PHTH 5232	Evaluating Healthcare Quality	
Technical		
Complete two courses from the following:		6
HINF 6220	Database Design, Access, Modeling, and Security	
HINF 6355	Key Standards in Health Informatics Systems	
HINF 6400	Introduction to Health Data Analytics	
PHTH 5202	Introduction to Epidemiology	
PHTH 5210	Biostatistics in Public Health	
PHTH 6210	Applied Regression Analysis	
PHTH 6400	Principles of Population Health 1	
PHTH 6440	Advanced Methods in Biostatistics	

One course from the following may count toward the technical core requirement:

DA 5020	Collecting, Storing, and Retrieving Data	
DA 5030	Introduction to Data Mining/Machine Learning	
PPUA 5301	Introduction to Computational Statistics	
PPUA 5302	Information Design and Visual Analytics	

Electives

Code	Title	Hours
Complete two courses from the following. Any course not taken to complete a core requirement may be taken as an elective.		6
HINF 6345	Design for Usability in Healthcare	
DA 5020	Collecting, Storing, and Retrieving Data	
DA 5030	Introduction to Data Mining/Machine Learning	
PPUA 5301	Introduction to Computational Statistics	
PPUA 5302	Information Design and Visual Analytics	

Program Credit/GPA Requirements

Minimum 33 total semester hours required
Minimum 3.000 GPA required

Law and Urban Public Health, JD/MPH

Northeastern University's School of Law and Bouvé College of Health Sciences offer a dual-degree JD/MPH in urban health. Given the worldwide trend toward urbanization, the Master of Public Health (MPH) in Urban Public Health recognizes the growing need for professionals trained to respond to unique public health challenges and opportunities facing urban populations. The MPH program brings together interdisciplinary faculty (from the School of Law, D'Amore-McKim School of Business, College of Social Sciences and Humanities, College of Computer and Information Science, and the Bouvé College of Health Sciences) with expertise in collaborating with diverse urban populations to offer students an opportunity to obtain practice-based knowledge, skills, and experience needed to address urban public health problems.

See JD/MPH program page (http://www.northeastern.edu/law/academics/jd/dual-degrees/jdmph-bouve.html) for more information.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

A grade of B− or higher is required in each required course.

Code	Title	Hours
Required Core		
PHTH 5120	Race, Ethnicity, and Health in the United States	3

Code	Title	Hours
PHTH 5202	Introduction to Epidemiology	3
PHTH 5210	Biostatistics in Public Health	3
PHTH 5212	Public Health Administration and Policy	3
PHTH 5214	Environmental Health	3
PHTH 5540	Health Education and Program Planning	3
PHTH 6200	Principles and History of Urban Health	3
PHTH 6204	Society, Behavior, and Health	3
PHTH 6208	Urban Community Health Assessment	3
Practicum		
PHTH 6966	Practicum	3
Capstone		
PHTH 6910	Public Health Capstone	3

Electives

Code	Title	Hours
Complete 9 semester hours from the following. In consultation with your faculty advisor, you may complete electives from another discipline:		9
LAW 7300	Administrative Law	
LAW 7329	Environmental Law	
LAW 7335	Health Law	
LAW 7350	Negotiation	
LAW 7351	Prisoners' Rights Clinic	
LAW 7362	Poverty Law and Practice Clinic	
LAW 7410	Domestic Violence Clinic	
LAW 7428	State Local Government	
LAW 7463	Non-Profit Organizations	
LAW 7469	Disability Law	
LAW 7491	International Human Rights and the Global Economy	
LAW 7494	Bioethics and the Law	
LAW 7512	Problems in Public Health Law	
LAW 7514	Natural Resources Law	
LAW 7525	Law and Economic Development	
LAW 7527	Public Health Legal Clinic	
LAW 7526	Juvenile Courts: Delinquency, Abuse, Neglect	
LAW 7550	Refugee and Asylum Law	
LAW 7561	Private Litigation in the Public Interest	
LAW 7582	Elder Law	
LAW 7588	Reproductive and Sexual Rights and Health	
LAW 7600	Current Issues in Health Law and Policy	
LAW 7602	Bioproperty	
LAW 7606	Drug Law and Policy	
LAW 7617	Economic Perspectives on Health Policy	

Program Credit/GPA Requirements

42 total semester hours required for MPH. Please contact the School of Law (https://www.northeastern.edu/law/academics/jd/dual-degrees) for JD requirements.
Minimum 3.000 GPA required

Plan of Study

Year 1

Fall	Hours	Spring	Hours	Summer Full Semester	Hours
First-year law courses		First-year law courses		Law co-op	
	0		0		0

Year 2

Fall	Hours	Spring	Hours	Summer Full Semester	Hours
PHTH 5202	3	PHTH 5120	3	PHTH 5540	3
PHTH 5210	3	PHTH 5212	3	LAW 7443	3
PHTH 6200	3	PHTH 5214	3		
PHTH 6204	3	PHTH 6208	3		
	12		12		6

Year 3

Fall	Hours	Spring	Hours	Summer Full Semester	Hours
PHTH 6966	3	Law school courses		Law school courses	
Law co-op		Law co-op			
	3		0		0

Year 4

Fall	Hours	Spring	Hours
PHTH 6910	3	February bar exam	
	3		0

Total Hours: 36

Physician Assistant Studies and Health Informatics, MS/MS

The Northeastern University health informatics and physician assistant combined program allows qualified and interested students to achieve their goal of obtaining a more robust understanding of healthcare technology while also completing robust clinical training in the physician assistant program. This prepares a select group of exceptionally qualified clinicians to become leaders in healthcare technology application and development and fosters interdisciplinary collaboration in order to address problems in the healthcare and health information environments both locally and across the globe. The joint program is designed to provide students a greater understanding of technological issues in clinical practice, quantitative methods, and the use of scientific evidence and cutting-edge technology to optimize clinical workflows and improve patient outcomes.

This dual degree takes 34 months to complete (as opposed to 48, if each degree were pursued separately), and a total number of 8 credits are shared between both degrees.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Physician Assistant Requirements

A grade of C or higher is required in each course.

Code	Title	Hours
Required Core		
PA 6208	Professional Issues for Physician Assistants	2
PA 6326	Aspects of Primary Care	4
PA 6327	Emergency Medicine and Critical Care	2
PA 6328	Aging and Rehabilitation Medicine	2
PA 6329	Healthcare Delivery	2
Anatomy & Physiology		
PA 6200	Anatomy and Physiology 1	3
PA 6201	Anatomy and Physiology 2	3
Diagnosis & Evaluation		
PA 6203	Physical Diagnosis and Patient Evaluation 1	3
PA 6204	Physical Diagnosis and Patient Evaluation 2	3
Pharmacology		
PA 6205	Pharmacology 1	2
PA 6206	Pharmacology 2	2
PA 6207	Clinical Laboratory and Diagnostic Methods	4
Principles		
PA 6311	Principles of Medicine 1	4
PA 6312	Principles of Medicine 2	4
PA 6313	Principles of Medicine 3	4
PA 6320	Principles of Obstetrics and Gynecology	2
PA 6321	Principles of Surgery	2
PA 6322	Principles of Orthopedics	2
PA 6323	Clinical Neurology	2
PA 6324	Principles of Pediatrics	2
PA 6325	Principles of Psychiatry	2
Clinical		
PA 6400	Applied Study in Medicine	5
PA 6401	Applied Study in Ambulatory Medicine	5
PA 6402	Applied Study in Family Practice	5
PA 6403	Applied Study in Emergency Medicine	5
PA 6404	Applied Study in Obstetrics and Gynecology	5
PA 6405	Applied Study in Pediatrics	5
PA 6406	Applied Study in Surgery	5
PA 6407	Applied Study in Mental Health	5
PA 6408	Applied Study Elective	5

Health Informatics Requirements

A grade of B− or higher is required in each course.

Code	Title	Hours
Required Core		
HINF 7701	Health Informatics Capstone Project	3
Business Management		
Complete two courses from the following:		6
HINF 6201	Organizational Behavior, Work Flow Design, and Change Management	
HINF 6202	Business of Healthcare Informatics	
HINF 6215	Project Management	
HINF 6240	Improving the Patient Experience through Informatics	
HINF 6335	Management Issues in Healthcare Information Technology	
PHTH 5226	Strategic Management and Leadership in Healthcare	
Health Informatics		
Complete two courses from the following:		6
HINF 5102	Data Management in Healthcare	
HINF 5110	Global Health Information Management	
HINF 5200	Theoretical Foundations in Personal Health Informatics	
HINF 6205	Creation and Application of Medical Knowledge	
HINF 6350	Public Health Surveillance and Informatics	
HINF 6404	Patient Engagement Informatics and Analytics	
HINF 6405	Quantifying the Value of Informatics	
PHTH 5232	Evaluating Healthcare Quality	
Technical		
PHTH 5202	Introduction to Epidemiology	3
PHTH 5210	Biostatistics in Public Health	3
Electives		
Complete two courses from the following:		6
HINF 6345	Design for Usability in Healthcare	
DA 5020	Collecting, Storing, and Retrieving Data	
DA 5030	Introduction to Data Mining/Machine Learning	
PPUA 5301	Introduction to Computational Statistics	
PPUA 5302	Information Design and Visual Analytics	

Program Credit/GPA Requirements

128 total semester hours required
Minimum 3.000 GPA required

Public Health and Health Informatics, MPH/MS

The Master of Public Health (MPH) and Master of Science in Health Informatics (MSHI) combined program allows qualified and interested students to prepare to lead healthcare at the nexus between public health and health informatics. Graduates of this program will be well-educated in the complex issues associated with improvements in information technology, as well as changes to the public health and healthcare delivery systems. Recognizing the increasing overlap between health informatics and public health with a focus on urban health, this program incorporates course work from both the MPH and MSHI curricula for both degrees, reducing tuition costs and saving one year of study compared to obtaining both degrees individually.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

A grade of B− or higher is required in each course.

Public Health Requirements

Code	Title	Hours
Required Core		
PHTH 5120	Race, Ethnicity, and Health in the United States	3
PHTH 5202	Introduction to Epidemiology	3
PHTH 5210	Biostatistics in Public Health	3
PHTH 5212	Public Health Administration and Policy	3
PHTH 5214	Environmental Health	3
PHTH 5540	Health Education and Program Planning	3
or PPUA 6509	Techniques of Program Evaluation	
PHTH 6204	Society, Behavior, and Health	3
Urban Health		
PHTH 6200	Principles and History of Urban Health	3
PHTH 6208	Urban Community Health Assessment	3

Health Informatics Requirements

Code	Title	Hours
Required Core		
HINF 5101	Introduction to Health Informatics and Health Information Systems	3
HINF 6220	Database Design, Access, Modeling, and Security	3
HINF 6240	Improving the Patient Experience through Informatics	3
HINF 6355	Key Standards in Health Informatics Systems	3
HINF 6405	Quantifying the Value of Informatics	3

Capstone and Practicum

Code	Title	Hours
PHTH 6910	Public Health Capstone	3
PHTH 6966	Practicum	3

Electives

Code	Title	Hours
Complete three of the following, with at least one course completed from each group:		9
Group 1		
HINF 6201	Organizational Behavior, Work Flow Design, and Change Management	
HINF 6202	Business of Healthcare Informatics	
HINF 6215	Project Management	
Group 2		
PHTH 5226	Strategic Management and Leadership in Healthcare	
PHTH 5232	Evaluating Healthcare Quality	
HINF 6404	Patient Engagement Informatics and Analytics	

Program Credit/GPA Requirements

57 total semester hours required
Minimum 3.000 GPA required

Biopharmaceutical Analytical Sciences, Graduate Certificate

The Graduate Certificate in Biopharmaceutical Analytical Sciences has been designed in response to a need in the biotechnology industry for individuals with an advanced knowledge of the principles and practices of state-of-the-art analyses of protein with focus on the characterization of innovator and biosimilars. Individuals, particularly those who are working in the various sectors of biotechnology including basic research of biological systems, discovery, development, and manufacturing of biopharmaceuticals, have an opportunity to improve their competency and learn new practical skills that enable them to increase productivity and further contribute to their professions. In addition, the certificate was designed for both individuals with and without experience in biopharmaceuticals and their analysis.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

A grade of C− or higher is required in all courses.

Code	Title	Hours
CHEM 5616	Protein Mass Spectrometry	3
CHEM 5617	Protein Mass Spectrometry Laboratory	3
CHEM 5550	Introduction to Glycobiology and Glycoprotein Analysis	3
CHEM 5660	Analytical Biochemistry	3

Program Credit/GPA Requirements

12 total semester hours required
Minimum 3.000 GPA required

Early Intervention, Graduate Certificate

Northeastern University's Certificate Program in Early Intervention is an interdisciplinary, preservice training program that is designed to fulfill requirements for certification as an early intervention specialist, at the advanced provisional level, as set forth by the Massachusetts Department of Public Health (DPH). The interdisciplinary nature of the program is facilitated by the interaction of graduate students from school psychology, counseling psychology, physical therapy, speech and language pathology, and undergraduate students from human services and psychology.

The goals for the early intervention certificate program are:

- To prepare personnel to provide services to infants and toddlers with disabilities and their families, from linguistically and culturally diverse backgrounds in urban environments
- To prepare personnel who have attained all competencies relative to early intervention, specified by the Massachusetts DPH, and that are consistent with best practice and research
- To prepare personnel in an interdisciplinary manner, drawing from Northeastern University's multidisciplinary resources
- To prepare personnel to function effectively across teams (individualized family service plan teams, community teams, interagency teams) and to understand the roles of their interdisciplinary teammates

Upon graduation, students are eligible for employment in an early intervention service delivery setting.

The program is delivered in a hybrid format. Classes meet on campus one day each month, and additional course content is delivered through online distance education. The program can be taken alone or integrated with bachelor's, master's, or clinical doctoral degree programs. Personnel who are working in the field may use their work site for field training. Degree-bearing programs incorporate the courses in a variety of arrangements, meaning that some of the program's classes stand in place for others and/or serve as electives. These program plans are worked out with students' advisors.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

A grade of B or higher is required in all courses.

Code	Title	Hours
Required Core		
CAEP 5150	Early Intervention: Family Systems	3
CAEP 5151	Early Intervention: Infant and Toddler Development, Risk, and Disability	3
CAEP 5152	Early Intervention: Planning and Evaluating Services	3
SLPA 6335	Early Intervention: Assessment and Intervention	3
Practicum		
CAEP 8425	Early Intervention Practicum 1	2
CAEP 8426	Early Intervention Practicum 2	2

Program Credit/GPA Requirements

16 total semester hours required
Minimum 3.000 GPA required

Health Informatics Management and Exchange, Graduate Certificate

The certificate program in health informatics management and exchange offers you the opportunity to obtain the knowledge needed to support the collection, management, retrieval, and exchange of electronic health data. It is designed to prepare you for a position as a specialist in data management, interoperability standards, and health database design.

- Eight-month program
- Five courses, 15 semester hours

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

A grade of B− or higher is required in all course work.

Code	Title	Hours
Required Core		
HINF 5101	Introduction to Health Informatics and Health Information Systems	3
HINF 5102	Data Management in Healthcare	3

Management and Exchange		
HINF 6205	Creation and Application of Medical Knowledge	3
HINF 6220	Database Design, Access, Modeling, and Security	3
HINF 6355	Key Standards in Health Informatics Systems	3

Program Credit/GPA Requirements

15 total semester hours required
Minimum 3.000 GPA required

Health Informatics Privacy and Security, Graduate Certificate

The certificate program in health informatics privacy and security combines knowledge of health informatics with a strong foundation in important information security issues. Northeastern's status as a National Security Agency Center of Excellence for Information Security Education and Research ensures the program is both relevant and of high academic quality.

- Eight-month program
- Five courses, 18 semester hours

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

A grade of B− or higher is required in all course work.

Code	Title	Hours
Required Core		
HINF 5101	Introduction to Health Informatics and Health Information Systems	3
HINF 5102	Data Management in Healthcare	3
Privacy and Security		
IA 5130	Computer System Security	4
IA 5150	Network Security Practices	4
IA 5200	Security Risk Management and Assessment	4

Program Credit/GPA Requirements

18 total semester hours required
Minimum 3.000 GPA required

Health Informatics Software Engineering, Graduate Certificate

This certificate program offers software engineers the background in health informatics (as well as interchange and interoperability standards) needed to better understand the context in which they work and perform effectively in a health-related organization. Program design is flexible to allow completion on a rapid schedule or a slower pace that is more compatible with full-time workers.

- Eight-month program
- Five courses, 15 semester hours

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

A grade of B− or higher is required in all course work.

Code	Title	Hours
Required Core		
HINF 5101	Introduction to Health Informatics and Health Information Systems	3
HINF 5102	Data Management in Healthcare	3
Management and Exchange		
HINF 6205	Creation and Application of Medical Knowledge	3
HINF 6345	Design for Usability in Healthcare	3
HINF 6355	Key Standards in Health Informatics Systems	3

Program Credit/GPA Requirements

15 total semester hours required
Minimum 3.000 GPA required

School of Law

Website (http://www.northeastern.edu/mls)

Jeremy R. Paul, JD, Dean

Kristin Madison, JD, PhD, Associate Dean for Academic Affairs
Margaret Y.K. Woo, JD, LLM, Associate Dean for Research and Interdisciplinary Education
Gregory Tilley, MBA, Associate Dean for Finance and Administration

Northeastern University School of Law
400 Huntington Avenue
Boston, MA 02115
617.373.5149
lawweb@northeastern.edu

Programs
Master of Legal Studies (MLS)
- Legal Studies—Online (p. 296)

Graduate Certificate
- Business Law (p. 297)
- Health Law (p. 298)
- Healthcare Compliance (p. 298)
- Human Resources Law (p. 299)
- Intellectual Property Law (p. 299)

Legal Studies, MS—Online

This degree is designed for professionals who want a deeper understanding of law and legal concepts. Such professionals may be found in nonprofit organizations, foundations, financial services firms, pharmaceutical companies, insurance firms, compliance departments, or a host of other commercial and noncommercial settings. Examples of the professionals who would be interested in this degree are human resource professionals, claims representatives for insurance companies, professionals in healthcare organizations, bank loan officers, real estate brokers, risk managers, government affairs officers, management consultants advising organizations, development officers working on planned giving, and software entrepreneurs. They desire to know more about the law and to be able to deal more effectively with the lawyers with whom they interact during their professional lives. The degree includes concentrations in human resources law, business law, intellectual property law, and health law.

Program Plan

Students take one 3-semester-hour course per term. A term is approximately eight weeks; there are two terms (A and B) in each of three semesters (fall, spring, and summer). The course work is spread over 10 terms or five semesters. Every student in their first semester takes two required foundation courses. Students then take four out of five core courses, plus three or four elective courses from any of four concentrations. Students choosing not to concentrate may take courses from any concentration.

Program Features
TOTAL DEGREE CREDIT REQUIRED
The program requires 30 semester hours.

COURSE ORGANIZATION
The program comprises 10 courses:

- Each course is eight weeks
- Two courses are taken per semester
- Each course is 3 semester hours
- Course types:
    - Two foundation courses
    - Four or five core courses
    - Three or four elective courses

CONCENTRATIONS
The program includes four concentrations plus a general track. The concentrations are:

- Business Law
- Health Law
- Human Resources Law
- Intellectual Property Law

ACADEMIC STRUCTURE
- Six eight-week sessions per calendar year:
    - Spring A
    - Spring B
    - Summer A
    - Summer B
    - Fall A
    - Fall B
- Two eight-week courses (3 semester hours each) back-to-back in each 16-week semester
- Total of 10 courses needed to graduate

TIME TO DEGREE COMPLETION
Normal completion time is five semesters of part-time study, with students taking one course at a time.

ADMISSION CYCLES
- Fall 1 session
- Spring 1 session
- Summer 1 session

ADMISSION REQUIREMENTS
- Bachelor's degree from regionally accredited institution
- Online application
- Application fee—none
- Personal statement with designated questions to be answered
- Two letters of recommendation
- TOEFL for international students
- Transcripts from all previous higher educational institutions attended.
- Professional resumé

Program Requirements
Complete all courses and requirements listed below unless otherwise indicated.

Foundation Courses

Code	Title	Hours
LS 6101	Introduction to Legal Studies 1: Law and Legal Reasoning	3
LS 6102	Introduction to Legal Studies 2	3

Core Courses

Code	Title	Hours
Complete at least four of the following:		12-15
LS 6110	Law of Information and Records	3
LS 6120	Law and Strategy	3
LS 6130	Negotiation and Advocacy	3
LS 6140	Data Regulation and Compliance	3
LS 6150	Law and Organizational Management	3

Specialization Elective Courses

Code	Title	Hours
Complete three or four of the following:		9-12
LS 6160	Regulation and Global Business Strategies	3
LS 6170	Financial Transactions	3
LS 6180	Health Law Survey	3
LS 6181	Healthcare Regulation and Compliance	3
LS 6182	Patient Records, Privacy, and Security	3
LS 6210	Special Topics in Employee Rights and Employer Obligations	3
LS 6211	Antidiscrimination Law	3
LS 6212	Wages and Benefits	3
LS 6230	Intellectual Property Survey	3

Program Credit/GPA Requirements

30 total semester hours required
Minimum 3.000 GPA required

Business Law, Graduate Certficate

Program ABA Pending Approval

The Graduate Certificate in Business Law is designed to provide professionals in large and small enterprises with an ability to recognize, navigate, and leverage the laws that regulate business organizations and transactions.

Program Plan

Students take one 3-credit course per term. Each term is approximately eight weeks, and there are two terms (A and B) in each of three semesters (fall, spring, and summer). The course work may be spread over two or three semesters. Every student begins the program by taking a required foundation course (Introduction to Legal Studies II). Students then take three additional required courses, each that focuses specifically on health law.

Program Features

TOTAL CERTIFICATE CREDIT REQUIREMENT

The program requires 12 semester hours.

COURSE ORGANIZATION

The program comprises four courses:

- Each course is eight weeks

- One or two courses are taken each semester

- Each course is 3 semester hours

- Course type:

    - One foundation course

    - Three certificate-specific courses

ACADEMIC STRUCTURE

- Six eight-week sessions per calendar year:

    - Fall A

    - Fall B

    - Spring A

    - Spring B

    - Summer A

    - Summer B

One or two eight-week courses (3 semester hours each) taken in one to three semesters.

Total of four courses needed to complete certificate.

TIME TO CERTIFICATE COMPLETION

Normal completion time is two to three semesters (depending upon course sequencing) of part-time study, with students taking one course at a time.

ADMISSIONS CYCLES

- Fall B

- Spring B

- Summer B

ADMISSIONS REQUIREMENTS

- Bachelor's degree from regionally accredited institution

- Online application

- Application fee—none

- Personal statement with designated questions to be answered

- One letter of recommendation

- TOEFL for international students

- Transcripts from all previous higher educational institutions attended

- Professional resumé

Program Requirements

Program Pending ABA Approval

Complete all courses and requirements listed below unless otherwise indicated.

Requirements

Code	Title	Hours
LS 6102	Introduction to Legal Studies 2	3
LS 6170	Financial Transactions	3
LS 6160	Regulation and Global Business Strategies	3
Complete one of the following:		3
LS 6230	Intellectual Property Survey	
LS 6210	Special Topics in Employee Rights and Employer Obligations	

Program Credit/GPA Requirements

12 total semester hours required
Minimum 3.000 GPA required

Health Law, Graduate Certificate

The Graduate Certificate in Health Law is designed to provide professionals who work in healthcare with the skills needed to recognize, navigate, and leverage the many legal issues that arise within this heavily regulated industry.

Program Plan

Students take one 3-credit course per term. Each term is approximately eight weeks, and there are two terms (A and B) in each of three semesters (fall, spring, and summer). The course work may be spread over two or three semesters. Every student begins the program by taking a required foundation course (Introduction to Legal Studies 2 (LS 6102). Students then take three additional required courses, each that focuses specifically on health law.

Program Features

TOTAL CERTIFICATE CREDIT REQUIREMENT
The program requires 12 semester hours.

COURSE ORGANIZATION
The program comprises four courses:

- Each course is eight weeks
- One or two courses are taken each semester
- Each course is 3 semester hours
- Course type:
  - One foundation course
  - Three certificate-specific courses

ACADEMIC STRUCTURE
- Six eight-week sessions per calendar year:
  - Fall A
  - Fall B
  - Spring A
  - Spring B
  - Summer A
  - Summer B

One or two eight-week courses (3 semester hours each) taken in one to three semesters.

Total of four courses needed to complete certificate.

TIME TO CERTIFICATE COMPLETION
Normal completion time is two to three semesters (depending upon course sequencing) of part-time study, with students taking one course at a time.

ADMISSIONS CYCLES
- Fall B
- Spring B
- Summer B

ADMISSIONS REQUIREMENTS
- Bachelor's degree from regionally accredited institution
- Online application
- Application fee—none
- Personal statement with designated questions to be answered
- One letter of recommendation
- TOEFL for international students
- Transcripts from all previous higher educational institutions attended
- Professional resumé

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Requirements

Code	Title	Hours
LS 6102	Introduction to Legal Studies 2	3
LS 6180	Health Law Survey	3
LS 6181	Healthcare Regulation and Compliance	3
LS 6182	Patient Records, Privacy, and Security	3

Program Credit/GPA Requirements

12 total semester hours required
Minimum 3.000 GPA required

Healthcare Compliance, Graduate Certificate

Pending American Bar Association approval

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Requirements

Code	Title	Hours
Required Courses		
Introduction to Health (TBA)		1
Healthcare Compliance (TBA)		2
Healthcare Compliance (TBA)		2
Healthcare Compliance Capstone (TBA)		1
LS 6182	Patient Records, Privacy, and Security	3
LS 6180	Health Law Survey	3
or HINF 5105	The American Healthcare System	
Elective		
Complete one of the following:		3
FINA 6200	Value Creation through Financial Decision Making	
HRMG 6220	Health Organization Management	

LS 6110	Law of Information and Records
LS 6120	Law and Strategy
LS 6140	Data Regulation and Compliance
PHTH 5232	Evaluating Healthcare Quality
SCHM 6223	Managing Healthcare Supply Chain Operations
STRT 6220	Strategic Management for Healthcare Organizations

Program Credit/GPA Requirements

15 total semester hours required
Minimum 3.000 GPA required

Human Resources Law, Graduate Certificate

The Graduate Certificate in Human Resources Law is designed to provide professionals who work in human resources with the skills needed to recognize, navigate, and leverage the many legal issues that arise within this heavily regulated field.

Program Plan

Students take one 3-credit course per term. Each term is approximately eight weeks, and there are two terms (A and B) in each of three semesters (fall, spring, and summer). The course work may be spread over two or three semesters. Every student begins the program by taking a required foundation course (Introduction to Legal Studies 2 (LS 6102)). Students then take three additional required courses, each that focuses specifically on health law.

Program Features

TOTAL CERTIFICATE CREDIT REQUIREMENT

The program requires 12 semester hours.

COURSE ORGANIZATION

The program comprises four courses:

- Each course is eight weeks

- One or two courses are taken each semester

- Each course is 3 semester hours

- Course type:

  - One foundation course

  - Three certificate-specific courses

ACADEMIC STRUCTURE

- Six eight-week sessions per calendar year:

  - Fall A

  - Fall B

  - Spring A

  - Spring B

  - Summer A

  - Summer B

One or two eight-week courses (3 semester hours each) taken in one to three semesters.

Total of four courses needed to complete certificate.

TIME TO CERTIFICATE COMPLETION

Normal completion time is two to three semesters (depending upon course sequencing) of part-time study, with students taking one course at a time.

ADMISSIONS CYCLES

- Fall B

- Spring B

- Summer B

ADMISSIONS REQUIREMENTS

- Bachelor's degree from regionally accredited institution

- Online application

- Application fee—none

- Personal statement with designated questions to be answered

- One letter of recommendation

- TOEFL for international students

- Transcripts from all previous higher educational institutions attended

- Professional resumé

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Requirements

Code	Title	Hours
LS 6102	Introduction to Legal Studies 2	3
LS 6210	Special Topics in Employee Rights and Employer Obligations	3
LS 6211	Antidiscrimination Law	3
LS 6212	Wages and Benefits	3

Program Credit/GPA Requirements

12 total semester hours required
Minimum 3.000 GPA required

Intellectual Property Law, Graduate Certificate

Program Pending ABA Approval

The Graduate Certificate in Intellectual Property Law is designed to provide professionals who work in intellectual property, technology transfer, licensing, or related areas, as well as inventors and entrepreneurs, with the skills they need to recognize and protect intellectual property rights.

Program Plan

Students take one 3-credit course per term. Each term is approximately eight weeks, and there are two terms (A and B) in each of three semesters (fall, spring, and summer). The course work may be spread over two or three semesters. Every student begins the program by taking a required

foundation course (Introduction to Legal Studies 2 (LS 6102). Students then take three additional required courses, each that focuses specifically on health law.

Program Features
TOTAL CERTIFICATE CREDIT REQUIREMENT
The program requires 12 semester hours.

COURSE ORGANIZATION
The program comprises four courses:

- Each course is eight weeks
- One or two courses are taken each semester
- Each course is 3 semester hours
- Course type:
  - One foundation course
  - Three certificate-specific courses

ACADEMIC STRUCTURE
- Six eight-week sessions per calendar year:
  - Fall A
  - Fall B
  - Spring A
  - Spring B
  - Summer A
  - Summer B

One or two eight-week courses (3 semester hours each) taken in one to three semesters.

Total of four courses needed to complete certificate.

TIME TO CERTIFICATE COMPLETION
Normal completion time is two to three semesters (depending upon course sequencing) of part-time study, with students taking one course at a time.

ADMISSIONS CYCLES
- Fall B
- Spring B
- Summer B

ADMISSIONS REQUIREMENTS
- Bachelor's degree from regionally accredited institution
- Online application
- Application fee—none
- Personal statement with designated questions to be answered
- One letter of recommendation
- TOEFL for international students

- Transcripts from all previous higher educational institutions attended
- Professional resumé

Program Requirements
Program Pending ABA Approval

Complete all courses and requirements listed below unless otherwise indicated.

Requirements

Code	Title	Hours
LS 6102	Introduction to Legal Studies 2	3
LS 6230	Intellectual Property Survey	3
LS 6231	Identifying and Securing Intellectual Property Rights	3
LS 6232	Intellectual Property and Media	3

Program Credit/GPA Requirements
12 total semester hours required
Minimum 3.000 GPA required

College of Professional Studies

Website (http://www.cps.neu.edu/degree-programs/graduate)

Mary Loeffelholz, PhD, Dean of the College of Professional Studies and Vice President of Professional Education

David Fields, PhD, Associate Dean of Graduate Academic and Faculty Affairs

Lydia Young, PhD, Associate Dean of Academic and Faculty Affairs; Director of Graduate School of Education

50 Nightingale Hall
877.668.7727
617.373.2400

Academic Policies and Procedures

- Master's Degree Admission Requirements (p. 301)
- Transfer Credit Policies (p. 301)
- Special Student Status (p. 301)
- Personal Professional Enrichment (PPE) (p. 302)
- New Student Orientation (On-Ground and Online) (p. 302)
- Academic Resources (p. 302)
- Attendance Requirements (p. 302)
- Reentry to Program (p. 303)
- Readmission to Program (p. 303)
- Full-Time Status (p. 303)
- Active-Duty Military Personnel (p. 304)
- Registration and Taking Courses (p. 304)
- Student Evaluation of Courses (EvaluationKit) (p. 305)
- Academic Progression Standards (p. 306)
- Reinstatement after Academic Dismissal (p. 306)
- Completing Degree Requirements (p. 306)
- Degrees, Majors, and Concentrations (p. 306)
- Seeking more than One Certificate or Degree (p. 307)
- Graduation Requirements (p. 307)
- Global Partnership Programs (p. 308)
- Accommodations for Students with Disabilities (p. 308)
- Personal Information (p. 308)
- Graduate Campus (p. 308)

Master's Degree Admission Requirements

Note that all master's degrees offered through the College of Professional Studies (CPS) have the following admission requirements:

- Online application
- Statement of purpose (500–1,000 words)
- Professional resumé
- Official undergraduate transcript(s) noting conferral of a bachelor's degree
- Two letters of recommendation

- English-language proficiency proof (for non-native English-language speakers)
- TOEFL, IELTS, or TOEIC scores

Some programs have additional requirements.

Transfer Credit Policies

All graduate transfer credit awards are made on a case-by-case basis. Transfer credit awards are made for eligible courses successfully completed at regionally and programmatically accredited institutions. The Council for Higher Education Accreditation provides information about the organizations responsible for these two forms of accreditation. Official transcripts from all institutions should be sent directly to the College of Professional Studies Office of Admissions at the time of application.

Students seeking transfer credits earned at institutions outside the United States should submit an official English evaluation completed by an approved credential evaluator. Course descriptions and/or syllabi also should be translated into English and submitted to the College of Professional Studies Office of Admissions.

A maximum of 12 quarter hours or four 3-credit courses or three 4-credit courses obtained at another institution may be accepted as transfer toward the degree, provided the credits consist of work taken at the graduate level for graduate credit, carry minimum grades of B (or 3.000 on a 4.000 scale), have been earned at an accredited institution or equivalent, and have not been used toward any baccalaureate or advanced degree or certificate of advanced graduate study at another institution.

Transfer credits must be no more than five academic years old at the time the student is admitted to graduate study. Courses older than five years will be accepted only in rare circumstances.

Graduate Certificate Transfer Credit Policies
- A maximum of 4 quarter hours (one course) of transfer credit

Master Degree Transfer Credit Policies
- A maximum of 12 quarter hours of transfer credit

Doctoral Degree Transfer Credit Policies
- A maximum of 9 quarter hours of transfer credit for Doctor of Education students
- A maximum of 8 quarter hours of transfer credit for Transitional Doctor of Physical Therapy students
- No transfer credit is awarded for students in the Doctor of Law and Policy program

Special Student Status

Graduate applicants to the College of Professional Studies may be eligible to take up to two graduate (nondoctoral) courses toward their program while completing the formal application process by seeking special student status (http://www.cps.neu.edu/admissions/graduate/special-students.php).

- Students taking courses under special student status are expected to satisfy applicable course prerequisites before enrolling in a course.
- Students taking courses under special student status are not eligible for financial aid.
- Special student status does not guarantee acceptance.
- The maximum number of courses students may take under special student status is two. After completing two courses, students will be blocked from further course registration until they have been officially accepted into a program.

The following programs are not available for special student status: Master of Arts in Teaching (MAT); Master of Education, Special Education Concentration; Master of Science in Applied Nutrition; Doctor of Education; Doctor of Law and Policy.

Special student status is not an option for students seeking an F-1 visa.

Personal Professional Enrichment (PPE)

Students interested in taking graduate-level (nondoctoral) courses for personal or professional enrichment (PPE) need to complete an online application (http://www.cps.neu.edu/admissions/graduate) as PPE students. Once approved, students will be able to register through their myNortheastern account.

- Students on PPE status are expected to satisfy applicable course prerequisites before enrolling in a course.
- Students taking courses while on PPE status may elect to apply to a graduate certificate or degree program by completing the formal application process (http://www.cps.neu.edu/admissions/graduate). Up to two qualifying courses (or 8 credits) completed while on PPE status may be applied to the intended program of study. To be eligible, the minimum earned grade for the course(s) must be B.
- Students taking courses under PPE status are not eligible for financial aid.

PPE status is not an option for students seeking an F-1 visa.

New Student Orientation (On-Ground and Online)

New students taking courses on-ground receive an invitation to the on-ground orientation. The purpose of New Student Orientation is to provide information and tools for each student's success from the point of program entry to degree completion. All new students are expected to attend the on-ground orientation. If students cannot attend the on-ground orientation, they should thoroughly review the Student Reference Guide (available on the CPS website at: https://cps.northeastern.edu/academic-resources) and the New Admitted Student site located at http://www.orientation.cps.northeastern.edu/.

Academic Resources

Interactive Academic Integrity Checklist (IAIC)

The Interactive Academic Integrity Checklist (IAIC) is a Flash-based tool students can use before they turn in every assignment to ensure that they have not accidentally committed any of the most common violations of the academic integrity policy. Additionally, the IAIC contains links to examples of APA- and MLA-style formatting. See the version for desktop internet browsers (http://nuonline.adobeconnect.com/academicintegritychecklist) or the version for mobile devices (http://nuonline.adobeconnect.com/academicintegritychecklist_mobile).

Global Student Success

10 Belvedere
617.373.2455
globalss@neu.edu
www.cps.neu.edu/gss (http://www.cps.neu.edu/gss)

Global Student Success is committed to supporting the success of international students at Northeastern University through cross-cultural, linguistic, and academic support services. We also partner with faculty, staff, and administrators to integrate global dimensions and cross-cultural understanding into the Northeastern experience.

International Tutoring Center

Basement of Snell Library
617.373.2455
globalss@neu.edu
www.cps.neu.edu/gss (http://www.cps.neu.edu/gss)

Tutors provide high-quality ESL writing instruction and tutoring for international students who need assistance with papers, assignments, TOEFL writing, and research projects. Students can meet one-on-one with an ESL tutor for 50-minute appointments. This is a free service for Northeastern international students.

Smarthinking

Smarthinking is a free online tutoring service accessed through the student's Blackboard account for College of Professional Studies students.

Online tutoring sessions can be synchronous or asynchronous. Many different subjects such as writing, reading, basic math through multivariate calculus, business, biology, chemistry, and physics are available.

Attendance Requirements

Class participation is essential to success no matter the course format or its delivery.

Attendance requirements vary. It is the student's responsibility to ascertain what each instructor requires. If a student will be absent for any reason (e.g., illness, religious beliefs, or jury duty), it is his or her responsibility to inform the instructor and to abide by the attendance requirements as explained in the course syllabus. Unexplained absence from class or failure to meet a course deadline may seriously affect the student's academic progress and may result in a final grade of F.

"I Am Here" (IAH) Process

After course registration, students are required to verify their intent to enroll in College of Professional Studies class(es) through their myNEU account during the first week of each class start. This verification process is called "I Am Here" (IAH). Students who fail to complete this process on time will be dropped from the class(es), which may impact their financial aid or international student visa eligibility.

Students are responsible for ensuring completion of the IAH process, which requires that they do not log out of the system early. Students who do not receive a "Successful Completion" message have not reached the end of the procedure and must start again. Sometimes it may take 24 hours before students can restart the procedure.

Students registering for the first time after the start of classes will be considered "Here" for the semester.

Students who experience difficulty with the process or have questions should email the Office of the Registrar (registrar@northeastern.edu).

Nonattendance

Nonattendance does not constitute official course dropping or withdrawal, which means the student is fully responsible for the academic and financial consequences.

A student who registers for a course and completes the IAH process but does not officially drop the course by the deadline, regardless of his or her level of participation or attendance/nonattendance, is responsible for paying 100 percent of the tuition charges and applicable fees and the final earned grade. A student in this situation may earn an F grade that will be part of his or her permanent academic record.

Like all grades for courses attempted and/or completed, a grade earned due to nonattendance impacts a student's academic progression, an international student's visa eligibility, and a federal financial aid recipient's aid eligibility and award.

Reentry to Program

Application for reentry into any academic program is required of students whose studies are interrupted voluntarily for a period of one to three years. Students who are dismissed academically must wait at least one year before applying for reinstatement.

Students are expected to meet the requirements of the program curriculum current at the time of the approved reentry. If a student does not enroll in the term in which he or she was approved for reentry, he or she must follow the curriculum requirements for the term in which he or she resumes course work with approval. If a student waits for more than one year to resume his or her studies after being approved for reentry, he or she will have to apply for reentry again.

If the program into which the student is seeking reentry is no longer offered, the student may choose to enroll in another program if he or she meets the admissions requirements for that program. Contact the Office of Academic Advising (http://www.cps.neu.edu/student-resources/OAA.php) for assistance and to complete the appropriate form.

Readmission to Program

A new admission application is required of students whose studies are interrupted voluntarily for more than three years.

Students are expected to meet the requirements of the program curriculum current at the time of the approved readmission. If the program into which the student is seeking readmission is no longer offered, the student may apply to another program and must meet the admissions requirements for that program. Contact the Office of Admissions (http://www.cps.neu.edu/admissions) for assistance and to complete the admission application.

If readmitted, transfer credits that a student was previously awarded will be reevaluated following the transfer credit award rules current at the time of readmission. It is at the discretion of the academic program to determine applicability of courses previously completed.

Full-Time Status

A graduate (nondoctoral) student is considered a full-time student if he or she is enrolled in 9 quarter hours of graduate credit for the quarter. An exception is made for students matriculated in master's degree programs that only require 4-credit courses, in which case full-time student status is attained with enrollment in 8 quarter hours of graduate credit for the quarter.

A doctoral student's full-time status is determined by the structure of the program.

Note that full-time status may be defined differently for federal loan purposes. International students have other considerations/requirements to maintain their visa eligibility.

Course Load

Federal financial aid recipients must be enrolled in and successfully complete a minimum number of credits each term to maintain eligibility. For more information, contact your financial aid counselor.

Course Overload

A maximum course load (different from full-time status) for a graduate (nondoctoral) student is 16 credits taken across a 12-week term, with no more than 8 credits per 6-week session.

To be eligible for a course overload (greater than 16 credits per 12-week term or greater than 8 credits per 6-week session), a graduate (nondoctoral) student must:

- Have a record of successful study with 12 or more credits a term at Northeastern University
- Have a minimum cumulative grade-point average of 3.500
- Provide a rationale to support the request

Students need to complete the appropriate form (http://cps.neu.edu/student-resources/academic-forms.php) and return it to their career and academic coach. Course overload is approved per term.

Each doctoral program has its own enrollment and course load requirements. Doctoral students who wish to seek a course overload must consult with the program director or designee.

International Student Enrollment Requirements

In order to maintain lawful student status in the United States, international students must be mindful of the rules and regulations that govern their nonimmigrant visa classification. Numerous U.S. federal regulations make it especially important for students in the F (student) and J (exchange visitor) categories to consult regularly with an international student advisor at the Office of Global Studies (OGS) before taking any action that might impact their immigration status and educational endeavors in the United States.

All international students in F or J status must register before each quarter starts. It is strongly recommended that international students register for an appropriate full-time course load at least one month before the quarter starts. Any exceptions from full-time registration requirements must be preapproved by the OGS in accordance with specified regulations.

In the College of Professional Studies, there are 4 quarters that make up each academic year. Each 12-week quarter (term) in fall, winter, and spring is made up of Parts of Term (courses that are scheduled for less than 12 weeks). Some courses are scheduled for the entire 12 weeks of a quarter, while others are scheduled for either the first 6 weeks or the last 6 weeks. A full summer term is 8 weeks with Parts of Term as well. Students in F-1 and J-1 status must remain registered at all times during a quarter to remain in compliance. International students are not allowed to take courses during only one-half of an academic quarter.

Restrictions on course formats apply to international student enrollment requirements.

To achieve full-time status, graduate and doctoral international students must be enrolled in 8–9 credits each quarter. International students should consult with their student success specialist to develop a course plan to maintain their international student status.

For a 9-credit course load, international students must take at least 6 credits of courses that are held on campus, in the on-ground, blended, or hybrid format. Students may not take classes on campus for just the first or second 6 weeks of an 8- or 12-week quarter and then take only online courses during the other half of the term. For an 8-credit course load, international students must take at least 4 credits of courses that are held on campus, in blended or hybrid format.

Full-time status must be maintained for F-1 visa students throughout the academic year with the following exceptions:

- A student whose first term is *not* summer does not need to be enrolled in the summer term.
  - If a student's first term of enrollment is summer, he or she must be enrolled full-time that summer. For the second and subsequent summer terms, he or she does not need to be enrolled.
- In the final academic term of a student's program of study, enrollment may be for fewer than 9 credits, but it must either be on campus or a combination of on campus and online throughout the entire term.
- Contact the OGS (http://www.northeastern.edu/issi/contactus.html) if you would like or need one-on-one guidance and assistance on the vast array of federal requirements and procedures related to immigration and maintaining your legal status throughout your studies.

Directed Study

Directed studies are offered when a course is required for a student's program of study but said course is not available in a given academic term and there is immediacy for a student to complete said course. Academic deans/directors will make the decision if there is a compelling need to run a course as a directed study.

Independent Study

Independent study is an opportunity for a degree student to work independently under the supervision of an instructor to undertake special research, literature review, or experimental study projects in areas related to his or her program of study that he or she cannot accomplish as part of a standard course in the curriculum. A degree student may take up to two independent studies. The work to be done for an independent study is usually crafted by the student, with faculty input. Independent studies are entirely optional and not needed to graduate. A completed Request for Independent Study form (http://www.cps.neu.edu/student-resources/academic-forms.php), signed by both the student and the faculty member, must be submitted to the academic program for review and approval.

Active-Duty Military Personnel

As a member of the Service Member Opportunity Colleges, the College of Professional Studies' academic residency requirement is different for active-duty service members. Active-duty service members are required to complete 30 percent of the graduate certificate/degree program at the College of Professional Studies.

Registration and Taking Courses

Course Registration

For course registration information, visit the College of Professional Studies webpage (http://www.cps.neu.edu/class-registration).

Course registration procedures are as follows:

- Newly accepted and returning students add or drop courses through their myNortheastern account any time during the registration period.
- Certificate- and degree-seeking students whose studies have been interrupted voluntarily for one to three years or more need to first apply for reentry through the Office of Academic Advising before registering for course(s).
- Global program students should consult with their program to determine if they need to register on their own or if the program will register them.

All students need to be mindful of the college's course add/drop policies and deadlines to register as early as possible with the intent to secure a spot in the preferred course and to avoid being charged in full for missing the course drop/withdrawal deadline.

Auditing a Course

Graduate (nondoctoral) students are permitted to audit graduate (nondoctoral) courses, but they must complete the usual registration process and pay regular tuition fees. There is no reduction in fees for auditing.

An auditor may participate in class discussions, complete papers and projects, and take tests and examinations for informal evaluation. Regardless of the amount or quality of work completed, however, no academic credit will be granted at any time for audited courses. In addition, audited courses may not be used in the determination of enrollment status for financial aid purposes and do not count toward program completion.

The student's decision to audit a course must be communicated in writing to the Office of the University Registrar before the fourth class meeting for 12-week courses. For 4-, 6-, and 8-week courses, requests must be received by the second class meeting. No exception to this procedure may be approved without the authorization of the college's academic standing committee.

If approved, the student should inform the instructor of his or her status as auditor of the course.

Course Selection and Planning

Students should refer to their degree audits for program curriculum information, to select courses, and to monitor their progress toward degree completion. Students should access their degree audits through their myNortheastern account or request an audit from their student success specialist. Degree audits are unofficial records of academic progress. Students are encouraged to consult with their career and academic coach about their academic planning.

Course Prerequisites

Course prerequisites are courses that are required to have been completed prior to enrolling in another course. Before registering for a course through their myNortheastern account, students, regardless of matriculation status, should consult the College of Professional Studies website (http://www.cps.neu.edu/degree-programs/prerequisites.php) to determine whether they have satisfied the course prerequisites.

Course Corequisites

Course corequisites are courses that are required to be taken concurrently. Before registering for a course through their myNortheastern account, students, regardless of matriculation status, should read the course description to determine if there is a corequisite requirement and register for both courses.

Repeating a Course

If a student wishes to improve his or her cumulative grade-point average (GPA) by repeating a course, he or she may do so . A student may take the same course up to three times to earn a better grade. Only the grade earned in the last attempt is used to compute the GPA while all grades remain part of the student's permanent academic record. A student is required to pay the normal tuition charges for all repeated courses. A student may not repeat more than two courses or 8 quarter hours of credit, whichever is greater, to satisfy the requirements of the degree.

Financial aid recipients must be mindful that repeating a course could impact their aid eligibility. Students with questions about this possible impact should contact their financial aid counselor.

Course Waiver

A course waiver may be awarded to a student who has completed the equivalent course at an accredited institution other than the College of Professional Studies in the past five years. The waiver will exempt the student from completing the required course. The student will complete another course, as approved by the program, to satisfy the number of credits required for the program.

Doctoral students must consult with their academic program to determine if course waivers are permitted.

Course Formats and Credits

Visit the College of Professional Studies webpage (http://www.cps.neu.edu/class-registration/course-formats.php) for information on course formats.

The College of Professional Studies operates on a quarter credit system and offers courses in a variety of formats.

One quarter credit is equivalent to 0.75 semester credits.

Duration of Courses

Each full fall, winter, and spring term runs for 12 weeks. Each full summer term runs for 8 weeks.

Course durations are as follows:

- During the fall, winter, and spring terms, courses are scheduled for either 6 or 12 weeks.
- During the summer term, courses are scheduled for 4, 6, or 8 weeks.

Course Add/Drop Policy

Refer to the academic calendar (http://www.northeastern.edu/registrar/calendars.html) for specific dates.

Students may add a 4-week or 6-week course within the first week of the course. For 8- and 12-week courses, students may add a course within the first 2 weeks of the course.

Students who drop a course before the deadline will not be charged for the course and will not have a W (withdrawal) on their transcript. Thereafter, students are responsible for 100 percent of the tuition charges and applicable fees and the earned grade will be on the students'

permanent academic record. All such dates are specified in the academic calendar.

Students must add/drop courses using their myNortheastern account.

A reduction in a student's course load could affect a student's international student visa status or financial aid eligibility.

Students who experience difficulty adding or dropping a course should promptly email (registrar@northeastern.edu) the Office of the University Registrar. If it is determined that there is an issue with the student's myNortheastern account or access, he or she needs to contact the Service Desk at 617.373.4357 (HELP); help@northeastern.edu.

Students with holds (e.g., financial, judicial), may have restricted access to add, drop, or withdraw from a course. In such instances, students are responsible for resolving the hold immediately and to meet the established course registration deadlines.

Course Withdrawal Policy

Refer to the academic calendar (http://www.northeastern.edu/registrar/calendars.html) for specific dates.

Students who withdraw from a course after the add/drop deadline and before the last day to withdraw will receive a W grade and will be responsible for 100 percent of the tuition charges and applicable fees. The W grade does not affect the calculation of the GPA but it does impact a student's academic progression, which may result in the student being placed on academic probation or dismissal.

Students must withdraw from courses using their myNortheastern account.

A reduction in a student's course load could affect a student's international student visa status or financial aid eligibility.

Students who experience difficulty withdrawing from a course should promptly contact the Service Desk at 617.373.4357 (HELP); help@northeastern.edu.

Students who fail to withdraw from a course by the deadline, regardless of their level of class participation or attendance, are financially and academically responsible. A student's lack of participation/attendance will likely result in a final grade of F.

All students are encouraged to consult with their career and academic coach prior to withdrawing from a course. Withdrawals may impact a student's time to degree completion.

Student Evaluation of Courses (EvaluationKit)

Students play a critical role in the university's commitment to quality teaching and academic excellence when they participate in the evaluation of courses through EvaluationKIT, an online survey students complete anonymously at the completion of a course. Students are expected to participate in EvaluationKIT with constructive feedback that is relevant to teaching and course content.

Students may access EvaluationKIT summary results from previous terms via their myNEU web portal (http://www.myneu.neu.edu). Courses with a response rate of less than 20 percent of enrolled students will be excluded from the results. Courses with three or fewer students enrolled are not surveyed.

Academic Progression Standards

Academic Progress/Standing

To be in good standing, a graduate student must continuously maintain a minimum cumulative grade-point average (GPA) of 3.000 on a 4.000 scale and must also make continuous satisfactory academic progress (SAP). To make SAP, a student must earn at least 66 percent of his or her cumulative attempted credits. Nonmatriculated students are required to be in good academic standing to be allowed to register for any subsequent classes.

Students are responsible for reviewing their grades and academic standing at the end of each term through their myNortheastern account. If there are any discrepancies, students should immediately contact the instructor(s) directly. Students who want to appeal a grade have 20 working days from the date the grade is posted to do so.

Academic Probation and Dismissal

Notation of academic probation appears on a student's internal record but not on his or her permanent transcript.

With exception as specified by the program, a graduate (nondoctoral) student is placed on academic probation if his or her cumulative GPA is below 3.000 and/or if he or she does not earn at least 66 percent of his or her cumulative attempted credits. The student is strongly encouraged to consult with his or her career and academic coach to develop an individualized success plan (ISP) to improve his or her academic standing. Otherwise, a registration hold may be placed on the student's account.

A student whose cumulative GPA remains below 3.000, and/or does not earn at least 66 percent of his or her cumulative attempted credits in the term of enrollment subsequent to the one after he or she was placed on academic probation, will be academically dismissed. A student who has been academically dismissed from the college is automatically dismissed from his or her program of study.

Dismissal Notification

A student will be notified about his or her dismissal and has the right to appeal the dismissal decision to the college's academic standing committee if he or she can provide documented evidence supporting an appeal. The notification will include the appeal deadline.

Students are responsible for reviewing their grades and academic standing at the end of each term through their myNortheastern account.

Reinstatement after Academic Dismissal

A student who is academically dismissed from the college is not eligible to register again for courses at this college until he or she is approved for reinstatement. A student may apply for reinstatement after a minimum of one academic year if he or she can provide documented evidence supporting the application (e.g., completed two graduate courses with a grade of B or higher at another accredited college or relevant professional development opportunities during the one-plus year absence). The application must be made in writing by submitting the appropriate form and providing supporting documentation to the Office of Academic Advising (http://www.cps.neu.edu/student-resources/OAA.php).

If reinstatement to the college is approved, a student is expected to meet the most current requirements for program admissions and curriculum.

A student approved for reinstatement but who does not meet the admissions requirements for the intended program of study, or if the intended program of study is no longer available, may apply to another program.

Students reinstated must achieve good academic standing in the first term of reinstatement.

Completing Degree Requirements

Graduate and Doctoral Degree Programs

To earn a graduate or doctoral degree, students must complete all courses as prescribed in the curriculum; the required number of credits as per the curriculum; applicable thesis or dissertation; the residency requirement; and maintain a minimum cumulative grade-point average (GPA) of 3.000 or as outlined by the specific program.

Graduate Certificate Programs

To earn a graduate certificate, students must complete all courses as prescribed in the curriculum; the required number of credits as per the curriculum; the residency requirement; and maintain a minimum cumulative GPA of 3.000 or as outlined by the specific program.

Time Limit on Courses

Graduate course credits earned in the academic program or accepted by transfer are valid for a maximum of seven years.

Time Limit on Program Completion

- Graduate certificate students have up to three full years from the time of the first term of enrollment to complete the program.
- Master's degree students have up to seven full years from the time of the first term of enrollment to complete the program.
- Doctoral degree students, with the exception of the Transitional Doctor of Physical Therapy, have up to seven full years from the time of the first term of enrollment to complete the program.
- Transitional Doctor of Physical Therapy students who begin their program in the fall 2014 term or thereafter have up to four full years from the time of the first term of enrollment to complete the program.

Note: The College of Professional Studies makes adjustments to its academic program offerings and curricula to stay current and to be able to offer students the most relevant courses and knowledge in the field. Examples of such changes include adding new programs, adding/adjusting course requirements, adding/adjusting courses, and adding/adjusting curriculum requirements.

When there is a change to a curriculum or program requirement, students already matriculated and actively enrolled in the program may continue to follow the program requirements at the time of matriculation or to follow the new curriculum/program requirements, unless it is otherwise specified by the academic program at the time of the announcement of said changes.

Degrees, Majors, and Concentrations

Change of Major/Program of Study

A graduate (nondoctoral) student matriculated in a certificate/degree program who would like to enroll in a different graduate program, after consulting with their career and academic coach, must apply to the intended program by submitting the Change of Major form.

Previously awarded transfer credit awards are subject to change as a result of a program change. Students on financial aid or an international student visa are responsible for understanding the impact that results from a program change.

Doctoral students must consult with their program director or designee.

Declare a Concentration

Graduate and doctoral students matriculated in a degree program that offers concentrations must declare one concentration. This can be done at the time of application to the program as part of the admissions process. Students also may complete the appropriate form in consultation with their career and academic coach or academic program designee. Students who wish to pursue a customized specialization must seek prior approval from the academic program director.

Only university-approved concentrations are noted on students' official academic records. If a student pursues a customized specialization, no concentration will be noted on his or her official academic transcript.

Students must declare a concentration by the beginning of their last term of enrollment for degree completion.

Academic Internship and Cooperative Education

An academic internship or cooperative education placement is an opportunity for students to engage in a short-term workplace experience that is relevant to their academic course of study. The College of Professional Studies' Department of Cooperative Education (http://cps.northeastern.edu/experiential-learning/coops) makes every effort to work with students to identify experiential learning opportunities of three to six months to facilitate career exploration and transition. This program is an optional component of most degree programs. Students must qualify to participate. Review the website (http://cps.northeastern.edu/experiential-learning/coops) for guidelines, academic requirements, and opportunities.

Seeking more than One Certificate or Degree

A graduate (nondoctoral) student can be enrolled in only one graduate program at a time.

Graduate (nondoctoral) students seeking more than one certificate or degree after having completed a program should note that graduate credits earned toward:

1. A degree at any institution may not be used to satisfy the requirements of another graduate program.
2. A degree earned at the College of Professional Studies may be used to satisfy the requirements of a graduate certificate with a cap of 50 percent of the required credits of a graduate certificate, if the contents are determined to be applicable per the program director and if the credits were earned within seven years of pursuit of the certificate.
   a. If the same course is required in the degree and certificate programs and the student has exceeded the maximum number of credits that can be applied in the certificate program, he or she may request a course waiver to be permitted to take another course instead of repeating the course. See Course Waiver section.
3. With specified exception, a certificate earned at the College of Professional Studies may be used to satisfy the requirements of a graduate degree, if the contents are determined to be applicable per the program director and if the credits were earned within seven years of pursuit of the degree.

4. A certificate earned at the College of Professional Studies may be used to satisfy the requirements of a second certificate with a cap of one course of no more than 4 credits, if the contents are determined to be applicable per the program director and if the credits were earned within seven years of pursuit of the certificate.
   a. If the same course is required in both certificate programs and the student has exceeded the maximum number of credits that can be applied in the second certificate program, he or she will request a course waiver to be permitted to take another course instead of repeating the course. See Course Waiver section.
5. A certificate earned at another accredited institution may be accepted as transfer credits to satisfy the requirements of a graduate degree with a cap of four 3-credit courses or three 4-credit courses (no more than 12 credits), if the contents are determined to be applicable per the program director and if the credits were earned within seven years of pursuit of the degree.

A graduate (nondoctoral) degree student who wishes to pursue a graduate certificate concurrently may seek admission in the certificate program by the end of his or her first term of matriculation in the degree program. Courses that satisfy requirements for both the degree and certificate will count for each.

- When the certificate is identical to a concentration in a degree program, only the certificate credential will be earned. The student's transcript will not indicate completion of a concentration

A doctoral student can be enrolled in only one program at a time and may not seek an additional certificate or degree.

Graduation Requirements

Graduation Procedures

Only students who complete the graduation application process by specified deadlines will be considered for graduation and included in the graduation ceremony program. All qualified students must submit a graduation application in order to receive their diploma, regardless of whether they plan to attend the graduation ceremony.

Note important definitions: "Degree conferral date" and "graduation ceremony date" do not mean the same thing. Degree conferral date refers to the date of the university's official recognition of degree completion. For the purposes of the graduation application, that is accessed via a student's myNortheastern account. The "expected graduation date" (EGD) is the same as the degree conferral date. Northeastern University confers degrees four times each academic year: winter, spring, summer, and fall. The graduation ceremony date is the date that the college hosts the annual graduation ceremony.

To qualify for winter degree conferral, a student must satisfy all degree requirements by the end of the previous fall quarter. To qualify for spring degree conferral, a student must satisfy all degree requirements by the end of the previous winter quarter. To qualify for summer degree conferral, a student must satisfy all degree requirements by the end of the previous spring quarter. To qualify for fall degree conferral, a student must satisfy all degree requirements by the end of the previous summer quarter.

Doctoral candidates must be mindful of additional deadlines to complete their dissertation/thesis in time to be eligible for degree conferral and participation in a doctoral hooding and a graduation ceremony.

Each fall, the Office of the Registrar sends an email notification to students who may be eligible to graduate that academic year about

applying to graduate. Eligibility is based on the number of earned credits at the beginning of the fall term. This email notification informs and instructs students to complete the "Apply to Graduate" process, accessed via their myNortheastern account. Students are prompted to verify and provide critical information, e.g., spelling of the student's name on the diploma, intent to participate in the graduation ceremony, and mailing address.

An accurate EGD is required to gain access to the graduation application. The EGD is also used by clearinghouses to determine loan deferment schedules. If your EGD is not correct, contact your designated learner services specialist.

For more information, visit the College of Professional Studies Graduation web page (http://www.cps.neu.edu/student-resources/graduation).

Diploma
The following rules apply to the diploma.

- Information that will be printed on diplomas:
  - Major for only nonspecified degrees (Master of Arts, Master of Science).
- Changes made to a student's name after the diploma has been printed may be subject to a $50 fee and take more than one month to reprint.
- Changes made to a student's degree information and name submitted after the program deadline will not be noted in the graduation ceremony program. If a diploma was previously printed, it will need to be reprinted and can take more than one month.

Global Partnership Programs

Students enrolled in a College of Professional Studies' global partnership or a dual-degree program are required to abide by the policies and procedures of both institutions or as specified in their program.

Dual-degree candidates must apply to graduate at each institution by following each institution's policies and procedures.

Accommodations for Students with Disabilities

Northeastern University and the Disability Resource Center (DRC) are committed to providing disability services that enable students who qualify under Section 504 of the Rehabilitation Act and the Americans with Disabilities Act Amendments Act (ADAAA) to participate fully in the activities of the university. To receive accommodations through the DRC, students must provide appropriate documentation that demonstrates a current substantially limiting disability. Accommodations are provided based on an evaluation of the information provided by students and their clinicians, on a case-by-case basis. These services are available for, but not limited to, students with the following diagnoses:

- Learning disabilities and/or AD(H)D
- Autism spectrum disorders
- Chronic or degenerative disorders
- Hearing loss
- Mobility impairments
- Psychiatric disorders
- Traumatic or acquired brain injury
- Vision impairments

Students should provide documentation to the DRC at their earliest convenience to allow for sufficient time for review. After the documentation has been reviewed, a disability specialist will contact the student regarding appropriate next steps. Visit the DRC website (http://www.northeastern.edu/drc) for additional information or contact staff at 617.373.2675.

Personal Information

Change of Name
Report all name changes to the Office of the Registrar immediately. This is especially important when students marry and wish to use a new name on university records. Official documentation of the name change is required.

Change of Address
Report all address changes via the myNortheastern web portal (http://myneu.neu.edu) or in person at the Office of the Registrar or Office of Student Accounts. Both the permanent home address and the local address are required. International students must also report any changes of address to the Office of Global Services (OGS) within 10 days in order to ensure compliance with Student and Exchange Visitor Information System (SEVIS) requirements.

Graduate Campus

Students enrolled in a Northeastern University graduate (regional) campus are also required to abide by the policies and procedures specific to that campus.

Doctoral Degree Programs

Guided by industry leading faculty, our innovative **doctoral programs** combine cutting-edge course work with professionally relevant research projects. These programs will provide you with the opportunity to earn the policy, research, and administrative foundation necessary to advance to the top of your career.

Programs
Doctor of Education (EDD)
- Education (p. 308)

Doctor of Law and Policy (DLP)
- Law And Policy (p. 311)

Transitional Doctor of Physical Therapy (DPT)
- Physical Therapy (p. 311)
- Physical Therapy—Direct Entry (p. 312)

Education, EDD

The Doctor of Education (EdD) program offers a rich, dynamic learning experience—one that blends critical engagement with theory, practice, and research.

Offering innovative and engaging opportunities, our EdD seeks to further cultivate the skills and knowledge necessary to effect meaningful change in your organization. As a Doctor of Education student, you have an opportunity to collaborate with an accomplished group of fellow

practitioners, exposing you to global perspectives and strengthening your ability to think critically about today's educational challenges.

Built on Northeastern University's scholar-practitioner model, the EdD program integrates your professional experience with doctoral-level research, which should enable you to identify and address your practice-based issues while investigating matters of social justice. Through rigorous course work and collaborative experiences, you have an opportunity to conduct empirical research culminating in a doctoral thesis that examines a compelling educational challenge.

Admission Requirements

Note that all Doctor of Education degrees offered through the College of Professional Studies have the following admission requirements:

- Online application
- Academic transcripts (undergraduate **and** graduate)
- Admissions statement (1,000–1,200 words)
- Minimum of three years of professional work experience in a related field
- Professional resumé
- Faculty recommendation
- Two professional recommendations
- English-language proficiency proof (for non-native English-language speakers)

Curriculum, Teaching, Learning, and Leadership Concentration

The Doctor of Education with Concentration in Curriculum, Teaching, Learning, and Leadership helps educational leaders develop the competencies, dispositions, and values required to pursue educational reform, based on a commitment to social justice. Students explore the relationship between effective educational leadership and the ways that curriculum and teaching can enhance learning opportunities for students across their life span.

This EdD concentration focuses on preparing transformational leaders who recognize the importance of providing quality educational experiences for all learners.

Key learning objectives include how to:

- Assess how issues of social justice play out in contemporary educational settings
- Analyze education systems to gain an understanding of the evolution of micro- and macrolevel policies and legislation
- Examine international curriculum and instruction research and practices
- Investigate the development and interaction of leadership roles within organizations
- Explore the theoretical and historical dimensions of curriculum, teaching, and learning in varied educational settings

Higher Education Administration Concentration

The Doctor of Education with Concentration in Higher Education Administration includes the study of practice and scholarship within all sectors of postsecondary education including community colleges, four-year colleges, for-profit institutions, and research universities. The increased globalization of higher education is addressed throughout the program. The concentration allows experienced educators and administrators to reflect on and advance their knowledge in ways that will enhance their ability to make a contribution to higher education and further their careers.

This concentration offers students an opportunity to conduct research that addresses critical issues in higher education. This concentration seeks to produce graduates well-grounded in the educational roles and critical issues in colleges and universities, including:

- Cultural, ethical, and societal issues in higher education
- Historical considerations in higher education around the world
- Organization, governance, leadership, and administrative theories
- Higher education finance, law, and planning
- Establishing and sustaining initiatives in higher education

Organizational Leadership Studies Concentration

The Doctor of Education with Concentration in Organizational Leadership Studies positions experienced leaders to assume greater responsibilities within their organizations. Designed for leaders working in educational, government, healthcare, military, not-for-profit, for-profit, and management consulting organizations, this concentration combines theory, research, and practice to develop individuals who can effectively manage and lead change in today's fast-paced, global environment.

The interdisciplinary curriculum offers a strong foundation in leadership, culture, learning, change, communications, systems, and strategy. Students have an opportunity to conduct and apply doctoral research to develop real-world answers to the leadership challenges facing 21st-century organizations.

Throughout the course of the program, students have an opportunity to:

- Review contemporary leadership theory and models emphasizing recent conceptualizations such as adaptive, relational, distributed, complexity, and global leadership to refine their personal leadership knowledge, skills, and abilities
- Examine key models of organizational culture to build their own capability to understand and interact with different societal and organizational cultures across the world
- Enhance their ability to think systemically by developing the required competencies to create cultures and structuring processes for learning in their organizations
- Explore classical and modern theories of organization and design a forward-thinking organization creating all components, including vision, mission, strategy, structure, and processes
- Use both seminal and current theoretical approaches of organizational communication to investigate the dynamic interplay between communication processes and human organizing
- Examine seminal and modern group dynamics research to assess group processes and to stimulate group development inside their organizations
- Investigate topical consulting strategies and organizational assessment tools and conduct an organizational diagnosis to gain a comprehensive understanding of the models, variables, and perspectives used to understand complex organizational processes
- Integrate organizational power theory, research, and practical diagnostic tools to systematically identify and evaluate the political processes and behaviors at play inside their organizations

This program seeks to produce graduates who have the capacity to contribute new knowledge to leadership scholarship and become positive forces of change.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Note: A minimum of 51 quarter hours must be taken at the College of Professional Studies.

Required Foundation Courses

Code	Title	Hours
EDU 7209	Introduction to Doctoral Studies	3
EDU 7214	Changing Conceptions of Learning and Human Development: Research and Practice	3
EDU 7210	Leadership Theory and Research	3

Required Research Courses

Code	Title	Hours
EDU 7280	Fundamentals of Research	3
EDU 7281	Research Design	3
EDU 7294		3
EDU 7295	Dissertation in Practice Seminar	3

Concentration

Complete one of the following concentrations:

- Curriculum, Teaching, Learning, and Leadership
- Higher Education Administration
- Organizational Leadership Studies

Program Credit/GPA Requirements

60 total quarter hours required
Minimum 3.000 GPA required

CURRICULUM, TEACHING, LEARNING, AND LEADERSHIP

Code	Title	Hours
Required Courses		
EDU 7244	Curriculum Theory and Practice Over Time: Implications for Educational Leadership	3
EDU 7216	Social Justice and Educational Equity	3
EDU 7217	Educational Systems: The Dynamics between Policy, Values, and Practice	3
EDU 7242	Situated Leadership	3
EDU 7213	Education Entrepreneurship	3
Elective Courses		
Complete 12 quarter hours in the following range:		12
EDU 7000 to EDU 7999		
Doctoral Thesis Courses		
EDU 8796	Thesis Proposal and the Internal Review Board	0
EDU 8797	Thesis Data Collection, Initial Analysis, and Management	0
EDU 8798	Thesis Data Analysis and Presentation	0
EDU 8799	Thesis Findings and Discussion	12

HIGHER EDUCATION ADMINISTRATION

Code	Title	Hours
Required Courses [1]		
EDU 7204	Global and Historical Perspectives on Higher Education	3
EDU 7250	Organizational Systems and Institutional Governance	3
EDU 7253	The Legal Environment of Higher Education	3
EDU 7256	Financial Decision Making in Higher Education	3
EDU 7258	Strategic Management in Higher Education	3
Elective Courses [2]		
Complete 12 quarter hours in the following range:		12
EDU 7000 to EDU 7999		
Doctoral Thesis Courses		
EDU 8796	Thesis Proposal and the Internal Review Board	0
EDU 8797	Thesis Data Collection, Initial Analysis, and Management	0
EDU 8798	Thesis Data Analysis and Presentation	0
EDU 8799	Thesis Findings and Discussion	12

[1] Students who choose to pursue the **international higher education track within the higher education administration concentration** should complete (EDU 7260) and (EDU 7261) rather than Financial Decision Making in Higher Education (EDU 7256) and Strategic Management in Higher Education (EDU 7258)

[2] Students who choose to pursue the **international higher education track within the higher education administration concentration** should complete Educating Global Students: Issues and Practices (EDU 7264) as an elective.

ORGANIZATIONAL LEADERSHIP STUDIES

Code	Title	Hours
Required Courses [3]		
EDU 7278	Organization Theory and Design	3
EDU 7277	Organizational Learning and Systems Thinking	3
EDU 7276	Organizational Communication: Institutional and Global Perspectives	3
EDU 7272	Global Perspectives of Organizational Culture	3
EDU 7275	Contemporary Models of Leadership	3
Elective Courses [4]		
Complete 12 quarter hours in the following range:		12
EDU 7000 to EDU 7999		
Doctoral Thesis Courses		
EDU 8796	Thesis Proposal and the Internal Review Board	0
EDU 8797	Thesis Data Collection, Initial Analysis, and Management	0
EDU 8798	Thesis Data Analysis and Presentation	0
EDU 8799	Thesis Findings and Discussion	12

[3] Students who choose to pursue the **sports leadership track within the organizational leadership concentration** should complete Contemporary Models of Sports Leadership (EDU 7290) rather than Contemporary Models of Leadership (EDU 7275).

[4] Students who choose to pursue the **sports leadership track within the organizational leadership concentration** should complete Personnel Development in Sports Leadership (EDU 7291), Social Justice in Sports (EDU 7292), and Legal and Ethical Issues in Sports Leadership (EDU 7293) as electives.

Law And Policy, DLP

Public servants, executives, and managers operate in an increasingly complex global environment. A doctoral education seeks to provide the policy, analytic, and research skills necessary to advance one's career.

Developed jointly by the College of Professional Studies and Northeastern's Law and Public Policy program, the Doctor of Law and Policy program (DLP) is designed for experienced professionals who are interested in the origins, development, implementation, and analysis of legal and public policy decisions in government and related institutions. The program prepares students to advance their careers within a variety of fields while focusing their thesis research on a precise law and policy topic.

Students undertake the DLP in order to understand the ways in which public and related institutions formulate and execute policy. Students have the opportunity to develop the ability to interpret and assess the research of others, to acquire skills as researchers, and to communicate their knowledge to a wide range of audiences. Those who successfully complete the degree are equipped to bring their skills and knowledge to senior policy and management positions in government, nonprofit agencies, research organizations, consulting firms, and corporations.

The DLP program is structured so course work and the doctoral thesis can be completed in two years. Classes meet one weekend per month in Boston, and the learning continues online throughout the rest of the month.

Northeastern University also offers a traditional PhD in Law, Policy, and Society. To learn more, visit the Law and Public Policy program website (http://www.northeastern.edu/cssh/policyschool/law-public-policy-phd).

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Courses

Code	Title	Hours
LWP 6118	Historical Foundations of American Law	2
LWP 6119	Current Law and Policy Debates: Our Nation's Capital and Beyond	2
LWP 6120	Law and Legal Reasoning 1	2
LWP 6401	Law and Policy Concepts 1: The Policy Making Process	2
LWP 6424	Research Methods	2
LWP 6121	Law and Legal Reasoning 2	2
LWP 6402	Law and Policy Concepts 2: Strategizing for Public Policy	2
LWP 6423	Qualitative Methods	2
LWP 6122	Law and Legal Reasoning 3	2
LWP 6403	Law and Policy Concepts 3: Policy Case Studies	2
LWP 6420	Quantitative Methods	2
LWP 6123	Law and Legal Reasoning 4	2
LWP 6410	Economics for Policy Analysis	2
LWP 6404	Evaluation Research	2
LWP 6431	Political and Moral Ethics and Dilemmas	2
LWP 6500	Doctoral Research Design 1	2
LWP 6450	Public Policy Theory and Practice 1	2
LWP 6501	Doctoral Research Design 2	2
LWP 6451	Public Policy Theory and Practice 2	2
LWP 6502	Doctoral Research Design 3	2
LWP 6452	Public Policy Theory and Practice 3	2
LWP 6503	Doctoral Research Design 4	6

Program Credit/GPA Requirements

48 total quarter hours required
Minimum 3.000 GPA required

Transitional Doctor of Physical Therapy, DPT

Designed for practicing physical therapists, the transitional Doctor of Physical Therapy (DPT) is an innovative, 100 percent online program. Integrating art and science, as well as professional and experiential learning, this curriculum seeks to provide you with the necessary knowledge base for today's practitioners with an earned doctoral degree.

Core courses within this physical therapy doctoral program include differential diagnosis and medical screening, diagnostic imaging, pharmacology, nutrition, and motor control. The capstone course, Comprehensive Case Analysis (PTH 6900), is a culmination of all work within the transitional DPT curriculum. Students have an opportunity to prepare a comprehensive and publishable case report or other scholarly work in partial fulfillment of the requirement for a transitional DPT degree.

The transitional DPT also includes specializations in a variety of areas such as orthopaedics, pediatrics, geriatrics, advanced nutrition, women's health, education, and business management. If you have a unique specialization interest, you may also complete a directed study on a preapproved topic of your choosing.

Credit Requirement

The transitional DPT degree is built upon a core of six courses. Beyond the common core, requirements may vary depending on whether the physical therapist is MSPT or BSPT prepared in addition to the student's past experiences.

For students entering with a Master of Science in Physical Therapy, 26 quarter hours are required.

Residents of the state of North Carolina must have an earned master's degree to be eligible for admission to the transitional Doctor of Physical Therapy program.

For students entering with a Bachelor of Science in Physical Therapy, 35 quarter hours are required.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

*Note: 2*6 quarter hours are required for students entering with a Master of Science in Physical Therapy.

Core Requirements

Code	Title	Hours
Required Core		
PTH 6100	Differential Diagnosis and Medical Screening	4
PTH 6110	Diagnostic Imaging	4
PTH 6130	Pharmacology	3
PTH 6900	Comprehensive Case Analysis	4
PTH 6140	Motor Control	4
Nutrition		
Complete one of the following:		3-4
PTH 6120	Clinical Nutrition	
NTR 6120	Healthy Aging: Nutrition Strategies for Optimal Longevity	
NTR 6119	Pediatric Nutrition	
NTR 7147	Sports and Fitness Nutrition	

Elective

Code	Title	Hours
Complete one of the following:		4-5
PTH 6430	Educational Strategies for Effective Healthcare Delivery	
PTH 6480	Evidence-Based Exercise for the Older Adult	
PTH 6490	Pediatric Physical Therapy: Emerging Topics and Evidence-Based Practice	
PTH 6200	Research Methods and Statistical Analysis	
PTH 6235	Administrative and Management Keys for Contemporary Physical Therapist Practice	
PTH 6561	Evidence-Based Examination and Outcomes for the Cervical-Thoracic Spine and Temporomandibular Joint	
PTH 6563	Evidence-Based Examination and Outcomes for Lumbar Spine and Sacroiliac Joint	
PTH 6564	Evidence-Based Examination and Outcomes for Lower Extremity: Hip, Knee, Foot, and Ankle	

Program Credit/GPA Requirements

26 total quarter hours required
Minimum 3.000 GPA required

Transitional Doctor of Physical Therapy, DPT—Direct Entry

Designed for practicing physical therapists, the **transitional Doctor of Physical Therapy (DPT) is an innovative, 100 percent online program.** Integrating art and science, as well as professional and experiential education, the degree curriculum provides you with the necessary knowledge base for today's doctorally prepared practitioners.

Core courses within this physical therapy doctoral program include differential diagnosis and medical screening, diagnostic imaging, pharmacology, nutrition, and motor control. The capstone course,

Comprehensive Case Analysis (PTH 6900) , is a culmination of all work within the transitional DPT curriculum. Students will prepare a comprehensive and publishable case report or other scholarly work in partial fulfillment of the requirement for a transitional Doctor of Physical Therapy Degree.

The transitional Doctor of Physical Therapy also includes concentrations in a variety of areas such as orthopaedics, pediatrics, geriatrics, advanced nutrition, women's health, education, and business management. If you have a unique concentration interest, you may also complete a directed study on a preapproved topic of your choosing.

 Note: Degree requirements differ for North Carolina students. For more information, visit the Northeastern University—Charlotte website (http://www.northeastern.edu/charlotte/academic_program/transitional-doctor-of-physical-therapy).

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

*Note: 3*5 quarter hours are required for students entering with a Bachelor of Science in Physical Therapy.

Required Courses for all Students

Code	Title	Hours
PTH 6100	Differential Diagnosis and Medical Screening	4
PTH 6110	Diagnostic Imaging	4
PTH 6130	Pharmacology	3
PTH 6900	Comprehensive Case Analysis (All students should complete 14 credits including PTH 6100 prior to enrolling in PTH 6900)	4
PTH 6140	Motor Control	4
PTH 6200	Research Methods and Statistical Analysis	5

Required Nutrition Course

Code	Title	Hours
Complete one of the following:		3-4
PTH 6120	Clinical Nutrition	
NTR 6120	Healthy Aging: Nutrition Strategies for Optimal Longevity	
NTR 6119	Pediatric Nutrition	
NTR 7147	Sports and Fitness Nutrition	

Additional Required Elective for BS Entry Students

Code	Title	Hours
Complete one of the following:		4
PTH 6235	Administrative and Management Keys for Contemporary Physical Therapist Practice	
PTH 6430	Educational Strategies for Effective Healthcare Delivery	

Elective Course

Code	Title	Hours
Complete one of the following:		4-5
PTH 6430	Educational Strategies for Effective Healthcare Delivery	
PTH 6480	Evidence-Based Exercise for the Older Adult	
PTH 6490	Pediatric Physical Therapy: Emerging Topics and Evidence-Based Practice	
PTH 6200	Research Methods and Statistical Analysis	
PTH 6235	Administrative and Management Keys for Contemporary Physical Therapist Practice	
PTH 6561	Evidence-Based Examination and Outcomes for the Cervical-Thoracic Spine and Temporomandibular Joint	
PTH 6563	Evidence-Based Examination and Outcomes for Lumbar Spine and Sacroiliac Joint	
PTH 6564	Evidence-Based Examination and Outcomes for Lower Extremity: Hip, Knee, Foot, and Ankle	

Program Credit/GPA Requirements

35 total quarter hours required
Minimum 3.000 GPA required

<div style="background:red;color:white;padding:4px">

Master's Degree Programs

</div>

Representing in-demand fields such as education, technology, project management, and regulatory affairs, our **master's degree programs** are grounded in theory and applied in practice. Programs may be taken part-time or full-time, online, or on campus, providing you maximum flexibility and convenience for your busy schedule.

Programs
Master of Arts (MA)

Master of Arts in Teaching (MAT)

Master of Education (MEd)

Master of Professional Studies (MPS)

Master of Science (MS)

Master of Sports Leadership (MSLD)

<div style="background:red;color:white;padding:4px">

Homeland Security, MA

</div>

The Master of Arts in Homeland Security is intended to prepare the next generation of emergency managers and homeland security professionals for leadership roles in the public and private sectors. The degree offers a comprehensive program of studies covering core elements of homeland security and emergency management at the graduate level, including management skills, intelligence gathering and analysis, risk management, emergency planning and management, legal issues, technological issues, and social psychology. The master's in homeland security program is designed to develop high-level operational expertise through the application of the above content to the implementation of emergency response protocols as executed in the United States.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Courses

Code	Title	Hours
HLS 6000	Introduction to Homeland Security	3
HLS 6010	The Unconventional Threat to Homeland Security	3
HLS 6020	Technology for Homeland Security	3
HLS 6030	Intelligence for Homeland Security	3

HLS 6040	Critical Infrastructure: Vulnerability Analysis and Protection	3
HLS 6050	Multidisciplinary Approaches to Homeland Security	3
CMN 6050	Crisis Communication	3

Capstone/Thesis

Code	Title	Hours
Complete one of the following:		4
HLS 6983	Topics in Homeland Security	
HLS 7990	Thesis (Please Note: Student that are interested in taking HLS 7990 need to first take GST 6109 Basic Field Research)	

Concentration

Complete one of the following concentrations:

CONCENTRATION IN EMERGENCY MANAGEMENT

Code	Title	Hours
HLS 6060	Strategic Planning and Budgeting	3
HLS 6070	Emergency Management and Geographic Information Systems	3
HLS 6080	Continuity of Operations and Planning	3
HLS 6150	Essentials of Emergency Management	3
HLS 6155	Critical Infrastructure, Security, and Emergency Management	3
HLS 6160	Advanced Emergency Management	3

CONCENTRATION IN GEOSPATIAL SERVICES

Code	Title	Hours
HLS 6060	Strategic Planning and Budgeting	3
HLS 6070	Emergency Management and Geographic Information Systems	3
HLS 6080	Continuity of Operations and Planning	3
GIS 5103	Foundations of Geographic Information Science	4
GIS 6394	Crisis Mapping for Humanitarian Action	3

CONCENTRATION IN ORGANIZATION AND INFRASTRUCTURE CONTINUITY

Code	Title	Hours
CJS 6430	Risk Management	3
HLS 6090	Organization and Structural Continuity Planning	3
GIS 5103	Foundations of Geographic Information Science	4
ITC 6315	Information Security Risk Management	3
ITC 6310	Information Security Governance	3

CONCENTRATION IN PORT SECURITY

Code	Title	Hours
Students selecting this concentration are only required to take 4 quarter hours of electives.		
HLS 6100	Maritime Port Security 1 (recommended taken conconcurrently with HLS 6120)	4
HLS 6110	Maritime Port Security 2	4
HLS 6120	Aviation Security 1 (recommended taken conconcurrently with HLS 6100)	4
HLS 6130	Aviation Security 2	4

Elective

Code	Title	Hours
Complete one of the following:		3-4
CJS 6105	Domestic and International Terrorism	
HLS 6035	Advanced Intelligence Applications for Homeland Security	
CJS 6125	Issues in National Security	
CJS 6005	Legal and Regulatory Issues for Security Management	
CJS 6430	Risk Management	
GST 6300	Security and Terrorism	
CMN 6060	Negotiation, Mediation, and Facilitation	
CJS 6964		
EDU 6184	Interdisciplinary Foundations	
INT 6943	Integrative Experiential Learning	
CJS 5978	Independent Study	
GST 6109	Basic Field Research Methods	

Program Credit/GPA Requirements

45 total quarter hours required
Minimum 3.000 GPA required

Strategic Intelligence and Analysis, MA

The Master of Arts in Strategic Intelligence and Analysis is designed for students who seek careers in the intelligence field, as well as professionals whose agencies or clientele are charged with the acquisition and interpretation of intelligence. The degree features courses in fundamental intelligence disciplines, such as analysis and epistemology, intelligence collection, and others. Every analyst in the Intelligence Community is expected to be proficient in 6 core competencies. The competencies enumerated by the Director of National Intelligence (DNI) are as follows:

- Engagement and Collaboration
- Critical Thinking
- Personal Leadership and Integrity
- Accountability for Results
- Technical Expertise
- Communication

The program focuses on summarizing psychological theories relevant to critical thinking and analytical techniques, demonstrating knowledge, through examination procedures, of the major theories and research findings in intelligence analysis, becoming familiar with analytical literature through independent reading, and applying analytical techniques and theories to problem sets. The Master's in Strategic Intelligence and Analysis prepares the next generation of intelligence analysts for leadership roles in the public and private sectors.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Courses

Code	Title	Hours
SIA 6000	Psychology of Intelligence Analysis	4
SIA 6010	Intelligence Operations Management	4
SIA 6020	Globalization and Intelligence Issues	4
SIA 6030	Intelligence Analysis and Policy Relationship	4
CJS 6125	Issues in National Security	3

Capstone

Code	Title	Hours
Complete one of the following:		4
SIA 6983	Topics in Strategic Intelligence and Analysis	
SIA 7990	Thesis (Please Note: Students that are interested in taking SIA 7990 need to first take and pass GST 6109 Basic Field Research)	

Concentrations

Complete one of the following concentrations:

ANALYSIS FOR HOMELAND SECURITY

Code	Title	Hours
HLS 6030	Intelligence for Homeland Security	3
HLS 6020	Technology for Homeland Security	3
HLS 6010	The Unconventional Threat to Homeland Security	3
HLS 6050	Multidisciplinary Approaches to Homeland Security	3
GST 6300	Security and Terrorism	4

INTELLIGENCE COMMUNITY OPERATIONS AND ANALYSIS

Code	Title	Hours
SIA 6040	Interagency Collaboration	4
SIA 6050	All-Source Intelligence	4
SIA 6060	Human Intelligence Operations	4
SIA 6070	Analysis for Counterterrorism	4

REMOTE SENSING

Code	Title	Hours
Required Courses		
RMS 5105	Fundamentals of Remote Sensing	3
RMS 6110	Digital Image Processing	3
Electives		
Complete four of the following:		12
RMS 6215	Unmanned Aerial Systems for Geospatial Analysts	
RMS 6230	Remote Sensing and Global Change	
RMS 6240	Introduction to Radar and LiDAR Remote Sensing	
RMS 6250	Spatial Analytics for Vegetation and Precision Agriculture	
RMS 6260	Remote Sensing for Archaeology	
RMS 6270	Remote Sensing for Disaster Management	
RMS 6280	Automated Feature Extraction for the Geospatial Professional	
RMS 6290	Spectroscopic Image Analysis	
RMS 6292	Photogrammetry and GPS	
GIS 6394	Crisis Mapping for Humanitarian Action	

Electives

Code	Title	Hours
Complete 6–8 quarter hours from the following:		6-8
SIA 6080	Culture and Psychology	
SIA 6110	Law and Psychology	
SIA 6090	Intelligence Collection	
GST 6300	Security and Terrorism	
ITC 6300	Foundations of Information Security	
CJS 6430	Risk Management	
EDU 6184	Interdisciplinary Foundations	
SIA 6100	Leadership for Intelligence Professionals	
GST 6109	Basic Field Research Methods	

Program Credit/GPA Requirements

45 total quarter hours required
Minimum 3.000 GPA required

Teaching, Elementary Licensure, MAT

Designed for aspiring teachers and career changers, the Master of Arts in Teaching in Elementary Education (MAT)[1] offers an appreciation for and an understanding of the diverse educational needs, social concerns, and cultural values of today's elementary and secondary schools. This graduate degree in teaching seeks to enhance your foundational skills, broaden your perspectives, and strengthen your ability to inspire and educate. The master's degree, which includes a full term of student teaching, seeks to produce graduates well positioned to make a meaningful impact in their school, in their community, and in the lives of their students.

[1] The MAT (grades 1–6) has been approved at the initial licensure level by the Massachusetts Department of Elementary and Secondary Education.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Courses

Code	Title	Hours
EDU 6051	Culture, Equity, Power, and Influence	4
EDU 6086	Foundations of Literacy Development and Instruction	4
EDU 6104	Child and Adolescent Development, Learning, and Teaching	4
EDU 6107	Inclusion, Equity, and Diversity	4
EDU 6154	Inquiry in the Sciences and Humanities	4
EDU 6155	Inquiry in Mathematics	4
EDU 6185	English-Language Learners in the General Education Classroom	4
EDU 6183	Collaborative Strategies for Effective Classroom Management	1
EDU 6866	Teaching Practicum and Seminar	1-8

Elective Courses

Code	Title	Hours
Complete 8 quarter hours from the following:		8
EDU 6023	Institute in Creating a Community of Learners/Behaviors	
EDU 6184	Interdisciplinary Foundations	
EDU 6300	Introduction to Language and Linguistics	
EDU 6425	Special Education: Role of Special Educators in an Inclusive School	
EDU 6426	Developmental Language, Literacy, and Writing: Assessment and Instruction	
EDU 6429	Variations in Child and Adolescent Development	
EDU 6437	Assessment in Education	
EDU 6438	Teachers as Curriculum Leaders	
EDU 6465	Critical and Creative Thinking	
EDU 6516	Sheltered English Instruction and Assessment	
EDU 6520	Learning and the Brain: Translating Research into Practice	
EDU 6528	Adaptive Learning/Behavior Management Strategies: Consultation and Collaboration	
EDU 6569	Differentiated Instruction and Assessment in Mathematics	

Program Credit/GPA Requirements

45 total quarter hours required
Minimum 3.000 GPA required

LOOKING TO DEEPEN YOUR KNOWLEDGE AND EXPERTISE?

The MAT+ offers qualifying students the opportunity to complete a MAT with further study in a selected area of expertise. Currently, students can take additional course work to earn either an additional license in special education (teacher of students of moderate disabilities, PreK–8 or 5–12).

MAT+ IN SPECIAL EDUCATION

The MAT+ provides qualifying students with the opportunity to complete a Master of Arts in Teaching (MAT) with further study in a selected area of expertise. Currently, students can take additional course work to earn either an additional license in special education (teacher of students of moderate disabilities, PreK-8 or 5-12) or an additional license in ESL (teacher of English as a Second Language, PreK-8 or 5-12). Teacher candidates may also plan a program of study that allows for triple licensure in consultation with the program director.

The special education course requirements are:

Code	Title	Hours
Advanced special education course		4
Advanced literacy course		4
Advanced behavior management course		4
Assessment course		4
EDU 6874	Practicum, Portfolio, and Panel Review	4

MAT+ IN ENGLISH AS A SECOND LANGUAGE (ESL)

This Commonwealth of Massachusetts-approved MAT+ program consists of five courses, some of which may be taken as electives in the MAT program.

The English as a Second Language course requirements are:

Code	Title	Hours
EDU 6300	Introduction to Language and Linguistics	4
EDU 6516	Sheltered English Instruction and Assessment	4
EDU 6517	Foundations of Teaching English as a Second Language: Research and Practice	4
EDU 6310	Literacy Development and the Academic Domains	4
EDU 6874	Practicum, Portfolio, and Panel Review	4

Teaching, Secondary Licensure, MAT

Designed for aspiring teachers and career changers, the Master of Arts in Secondary Education (MAT)[1] offers an appreciation for and an understanding of the diverse educational needs, social concerns, and cultural values of today's secondary schools.

This MAT in secondary education seeks to enhance your foundational skills, broaden your perspectives, and strengthen your ability to inspire and educate. This master's degree, which includes a full term of student teaching, seeks to produce graduates well positioned to make a meaningful impact in their school, in their community, and in the lives of their students.

- Gain political, social, and historical perspectives on education
- Explore the richly complex environments of schools and communities
- Develop a working understanding of teaching and learning in diverse settings
- Investigate how humans learn, acquire knowledge, and make sense of their experiences
- Examine theories of teaching and explore how best to teach for understanding and learning achievement
- Research methods and materials, pedagogies, and assessment strategies that foster integrated learning

[1]   The Master of Arts in Secondary Education (grades 8–12) has been approved at the initial licensure level by the Massachusetts Department of Elementary and Secondary Education.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Courses

Code	Title	Hours
EDU 6051	Culture, Equity, Power, and Influence	4
EDU 6064	Curriculum and Assessment	4
EDU 6104	Child and Adolescent Development, Learning, and Teaching	4
EDU 6107	Inclusion, Equity, and Diversity	4
EDU 6162	Language, Culture, and Literacy in Middle and High Schools	4
EDU 6185	English-Language Learners in the General Education Classroom	4

Code	Title	Hours
EDU 6183	Collaborative Strategies for Effective Classroom Management	1
EDU 6866	Teaching Practicum and Seminar	1-8

Elective Courses

Code	Title	Hours
Complete 8 quarter hours from the following:		8
EDU 6023	Institute in Creating a Community of Learners/Behaviors	
EDU 6184	Interdisciplinary Foundations	
EDU 6300	Introduction to Language and Linguistics	
EDU 6425	Special Education: Role of Special Educators in an Inclusive School	
EDU 6426	Developmental Language, Literacy, and Writing: Assessment and Instruction	
EDU 6429	Variations in Child and Adolescent Development	
EDU 6437	Assessment in Education	
EDU 6438	Teachers as Curriculum Leaders	
EDU 6465	Critical and Creative Thinking	
EDU 6516	Sheltered English Instruction and Assessment	
EDU 6520	Learning and the Brain: Translating Research into Practice	
EDU 6528	Adaptive Learning/Behavior Management Strategies: Consultation and Collaboration	
EDU 6569	Differentiated Instruction and Assessment in Mathematics	

Program Credit/GPA Requirements

45 total quarter hours required
Minimum 3.000 GPA required

LOOKING TO DEEPEN YOUR KNOWLEDGE AND EXPERTISE?

The MAT+ offers qualifying students the opportunity to complete a MAT with further study in a selected area of expertise. Currently, students can take additional course work to earn either an additional license in special education (teacher of students of moderate disabilities, PreK–8 or 5–12) or an additional license in ESL (teacher of English as a Second Language, PreK-8 or 5-12).

MAT+ IN SPECIAL EDUCATION

The MAT+ provides qualifying students with the opportunity to complete a Master of Arts in Teaching (MAT) with further study in a selected area of expertise. Currently, students can take additional course work to earn either an additional license in special education (teacher of students of moderate disabilities, PreK-8 or 5-12) or an additional license in ESL (teacher of English as a Second Language, PreK-8 or 5-12). Teacher candidates may also plan a program of study that allows for triple licensure in consultation with the program director.

The special education course requirements are:

Code	Title	Hours
Advanced special education course		4
Advanced literacy course		4
Advanced behavior management course		4
Assessment course		4
EDU 6874	Practicum, Portfolio, and Panel Review	4

MAT+ IN ENGLISH AS A SECOND LANGUAGE (ESL)

This Commonwealth of Massachusetts-approved MAT+ program consists of five courses, some of which may be taken as electives in the MAT program.

The English as a Second Language course requirements are:

Code	Title	Hours
EDU 6300	Introduction to Language and Linguistics	4
EDU 6516	Sheltered English Instruction and Assessment	4
EDU 6517	Foundations of Teaching English as a Second Language: Research and Practice	4
EDU 6310	Literacy Development and the Academic Domains	4
EDU 6874	Practicum, Portfolio, and Panel Review	4

Education, MEd

eLearning and Instructional Design Concentration

Recent research on the science of learning has revolutionized our understanding of how people learn. As technology has become ubiquitous in society, learning takes place in many venues and formats: face-to-face, blended, online, and mobile. Seismic shifts are taking place in the education sector, such as competency-based learning and open education. These developments are creating a growing demand for professionals who can help their organizations think strategically about approaches to learning that are pedagogically sound and technology-savvy.

The elearning and instructional design concentration explores the leading edge of next-generation learning design, with the goal of preparing its graduates to thrive in a world of expanded opportunities and delivery modes for learning. The concentration's innovative approach blends academic and experiential workplace-based learning. During the course of study, students develop an online portfolio of work to demonstrate their capacity to think strategically, put creative ideas into action, and design environments that improve student learning to meet academic, personal, institutional, and organizational goals.

Higher Education Administration Concentration

Due to advances in elearning and increasing student enrollments, the need for capable and effective school administrators has never been greater. In addition to providing solid guidance and direction, they must work to meet the needs of faculty, students, and parents alike. In response, the College of Professional Studies (CPS) offers a Master of Education with Concentration in Higher Education Administration.

This innovative master's degree program explores complex industry issues such as student demographics, financial concerns, legal and policy requirements, technology, and competitive forces.

Learning Analytics

Learning analytics is where big data meets traditional quantitative methods in education. Governments, universities, schools, and educational organizations are collecting vast amounts of data about learners and how they learn.

Much of this data does not come in neat, well-organized, and collected formats. It exists in varied forms across systems and locations. Analysts need the skills to access and transform this data so we can better understand not only what students know, but how they know it. Learning analytics and educational data mining are the tools to transform this data into knowledge and lead, in the end, to improved education.

Graduates of this program will emerge with the knowledge, competencies, and skills to engage successfully in the entire analytics cycle from project planning and implementation to communication and reporting. Specifically, graduates will work with real educational data to acquire the ability to:

- Articulate and integrate diverse perspectives on the field of learning analytics, including learning analytics assumptions, theories, epistemologies, and debates
- Align learning analytics processes to address the needs of educational institutions and answer questions posed by educational leaders
- Select, prepare, analyze, interpret, and evaluate learning analytic models appropriately
- Interpret and clearly communicate results to various stakeholders throughout the educational system

Learning and Instruction Concentration

As the field of education evolves, today's educators are constantly challenged to be aware of and incorporate best-in-class practices, new technologies, and the latest research and trends within their classrooms. In response, the CPS offers the Master of Education with Concentration in Learning and Instruction.

Designed for a broad range of educators, this program provides an in-depth look at the critical issues that are transforming the face of education: technology and distance learning, globalization, creative and critical thinking, assessments, and learning outcomes.

Reflecting the new direction of education, this master's degree program also allows you to choose your area of focus by selecting from degree specializations in math, science, English-language learning, literacy, leadership, and technology.

Whether you are a classroom teacher or an administrator or work in youth development, community education, early childhood, or in a before/aftercare program, you have an opportunity to gain new perspectives and acquire fresh strategies for meeting the needs of today's students. This program seeks to produce graduates empowered to implement new ideas and innovative strategies that are designed to improve educational effectiveness.

Special Education Concentration

Demand for graduate-level-prepared special education practitioners is on the rise, driven by heightened degree requirements and a shortage of licensed, qualified teachers. In response, the CPS is pleased to offer the Master of Education with Concentration in Special Education. Designed for educators who are licensed at the initial or professional level in another discipline, this innovative master's degree program seeks to prepare you to meet the special needs of students across a variety of school environments.

This program meets the Massachusetts Department of Elementary and Secondary Education standards and competencies for an additional licensure as a Teacher of Students with Moderate Disabilities, PreK–8 and 5–12.

In this advanced program, you have an opportunity to explore specific topics on modifying curriculum, designing curriculum-based assessments, managing severe behaviors, developing individualized education programs (IEPs), leveraging community resources, and improving literacy. As a result, you have an opportunity to enhance your ability to meet the needs of a diverse student population and to achieve the competencies required for this specialized license.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Courses

Code	Title	Hours
EDU 6050	Education as an Advanced Field of Study	5
EDU 6051	Culture, Equity, Power, and Influence	4

Concentration

Complete one of the following concentrations:

- eLearning and Instructional Design
- Higher Education Administration
- Learning Analytics
- Learning and Instruction
- Special Education

Program Credit/GPA Requirements

45 total quarter hours required
Minimum 3.000 GPA required

ELEARNING AND INSTRUCTIONAL DESIGN		
Code	Title	Hours
Required Courses		
EDU 6319	How People Learn	4
EDU 6321	Models for Learning Design	4
EDU 6323	Technology as a Medium for Learning	4
EDU 6324	Competencies, Assessment, and Learning Analytics	4
EDU 6331	E-Learning Design as a Collaborative Profession	4
Capstone		
EDU 6225	Capstone (to be taken last)	4
Electives		
Complete three of the following:		12
EDU 6332	Open Learning	
EDU 6333	Social Media and Beyond	
EDU 6558	Issues in Education	
EDU 6202	Faculty, Curriculum, and Academic Community	
EDU 6329	Connecting Theory and Practice (This course should be taken at least 2 terms prior to Capstone to allow time for implementing a workplace-based experiential project that you will design as the signature assignment for the course.)	
EDU 6340	Learning Analytics Concepts and Theories	

EDU 6330	Digital Media Literacy	
EDU 6321	Models for Learning Design	
EDU 6184	Interdisciplinary Foundations	

HIGHER EDUCATION ADMINISTRATION

Code	Title	Hours
Required Courses		
EDU 6201	The Landscape of Higher Education	4
EDU 6324	Competencies, Assessment, and Learning Analytics	4
EDU 6447	The Demographics of Higher Education	4
Complete one of the following:		4
EDU 6202	Faculty, Curriculum, and Academic Community	
EDU 6203	Education Law, Policy, and Finance	
EDU 6221	Enrollment, Retention, Graduation, Success	
Complete one of the following:		4
EDU 6450	The Globalization of Education	
INT 6900	International Field Study Experience	
Capstone		
EDU 6225	Capstone (to be taken last)	4
Elective Courses		12
Complete 12 quarter hours from the following:		12
EDU 6319	How People Learn	
or EDU 6520	Learning and the Brain: Translating Research into Practice	
EDU 6329	Connecting Theory and Practice	
EDU 6332	Open Learning	
EDU 6330	Digital Media Literacy	
EDU 6558	Issues in Education	
EDU 6300	Introduction to Language and Linguistics	
EDU 6534	Bilingualism, Second Language, and Literacy Development	
EDU 6182	Educational Statistics	
EDU 6184	Interdisciplinary Foundations	

LEARNING ANALYTICS

Code	Title	Hours
Required Courses		
EDU 6340	Learning Analytics Concepts and Theories	4
EDU 6341	Introduction to Data Mining in Education	4
EDU 6343	Predictive Modeling for Learning Analytics	4
EDU 6344	Data Visualization for Learning Analytics	4
EDU 6345	Text Mining for Learning Analytics	4
EDU 6324	Competencies, Assessment, and Learning Analytics	4
EDU 6182	Educational Statistics	4
EDU 6319	How People Learn	4
Capstone		
EDU 6225	Capstone (to be taken last)	4

LEARNING AND INSTRUCTION

Code	Title	Hours
Required Courses		
EDU 6330	Digital Media Literacy	4
EDU 6328	Policy and Leadership	4
EDU 6437	Assessment in Education	4
Complete one of the following:		4
EDU 6465	Critical and Creative Thinking	
EDU 6520	Learning and the Brain: Translating Research into Practice	
EDU 6319	How People Learn	
Capstone		
EDU 6225	Capstone (to be taken last)	4
Electives		
Complete four courses from any other concentration:		16
EDU 6201	The Landscape of Higher Education	
EDU 6447	The Demographics of Higher Education	
EDU 6221	Enrollment, Retention, Graduation, Success	
EDU 6450	The Globalization of Education	
EDU 6332	Open Learning	
EDU 6323	Technology as a Medium for Learning	
EDU 6426	Developmental Language, Literacy, and Writing: Assessment and Instruction	
EDU 6528	Adaptive Learning/Behavior Management Strategies: Consultation and Collaboration	
EDU 6429	Variations in Child and Adolescent Development	
EDU 6558	Issues in Education	
EDU 6185	English-Language Learners in the General Education Classroom	
EDU 6300	Introduction to Language and Linguistics	
EDU 6534	Bilingualism, Second Language, and Literacy Development	
EDU 6182	Educational Statistics	
EDU 6438	Teachers as Curriculum Leaders	
EDU 6184	Interdisciplinary Foundations	

SPECIAL EDUCATION

Code	Title	Hours
Required Courses		
EDU 6425	Special Education: Role of Special Educators in an Inclusive School	4
EDU 6426	Developmental Language, Literacy, and Writing: Assessment and Instruction	4
EDU 6438	Teachers as Curriculum Leaders	4
EDU 6528	Adaptive Learning/Behavior Management Strategies: Consultation and Collaboration	4
EDU 6569	Differentiated Instruction and Assessment in Mathematics	4
EDU 6874	Practicum, Portfolio, and Panel Review	4
Electives		
Complete 12 quarter hours from the following:		12

EDU 6185	English-Language Learners in the General Education Classroom
EDU 6429	Variations in Child and Adolescent Development
EDU 6437	Assessment in Education
EDU 6465	Critical and Creative Thinking
EDU 6520	Learning and the Brain: Translating Research into Practice
EDU 6558	Issues in Education
EDU 6184	Interdisciplinary Foundations

Analytics, MPS

With the proliferation of data across all sectors of the global economy, there is an immediate need for individuals to be knowledgeable in how to harness this data for continuous analysis and study. This spectrum spans from commercial to nonprofit, from higher education to government and is constantly expanding with new sectors, as data mining becomes the standard for knowledge gathering in the digital age.

The Master's in Analytics helps to meet the demand from employers with a graduate program that provides students with an end-to-end analytics education through a core curriculum with integrated experiential learning opportunities. The program prepares students with a deep understanding of the mechanics of working with data (i.e., its collection, modeling, and structuring) along with the capacity to identify and communicate data-driven insights that ultimately influence decisions.

Not only will students graduate with a portfolio of work samples that demonstrate their range and depth of skill, they will be part of a larger network of analytics professionals who will serve them now and in the future.

- Build portfolios of real-world projects demonstrating competency with key technologies, visualization and communication techniques, and the ability to translate information into recommended actions.
- Gain a core analytical skillset upon which to layer more specialized technical skillsets or industry-specific applications.
- Develop a relationship to industry leaders and peers so that you may leverage your Northeastern education long after your formal education ends.
- Choose from a host of flexible programming options—all of which share an industry-defined core curriculum and a required, credit-bearing experiential requirement.
- Anticipate and contribute to the future direction of data analytics.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Courses

Code	Title	Hours
ALY 6000	Introduction to Analytics	3
ALY 6010	Probability Theory and Introductory Statistics	3
ALY 6015	Intermediate Analytics	3
ALY 6050	Introduction to Enterprise Analytics	3
ALY 6070	Communication and Visualization for Data Analytics	3

Concentration

Complete one of the following three concentrations:

Code	Title	Hours
Concentration in Statistical Modeling		
ALY 6110	Data Management and Big Data	3
ALY 6020	Predictive Analytics	3
ALY 6040	Data Mining Applications	3
ALY 6983	Topics	3
GIS 5103	Foundations of Geographic Information Science	4

Code	Title	Hours
Concentration in Evidence-Based Modeling		
ALY 6060	Decision Support and Business Intelligence	3
ALY 6100	Data-Driven Decision Making	3
ALY 6120	Leadership in Analytics	3
ALY 6040	Data Mining Applications	3
ALY 6130	Risk Management for Analytics	3

Code	Title	Hours
Concentration in Informational Design		
ALY 6030	Data Warehousing and SQL	3
ALY 6040	Data Mining Applications	3
ITC 6015	Enterprise Information Architecture	3
ITC 6020	Information Systems Design and Development	3
ALY 6060	Decision Support and Business Intelligence	3

Experiential Learning Course

Code	Title	Hours
ALY 6080	Integrated Experiential Learning	3

Experiential Capstone Course

Code	Title	Hours
ALY 6980	Capstone	3

Electives

Code	Title	Hours
Complete three of the following:		9
ALY 6020	Predictive Analytics	
ALY 6030	Data Warehousing and SQL	
ALY 6040	Data Mining Applications	
ALY 6050	Introduction to Enterprise Analytics	
ALY 6060	Decision Support and Business Intelligence	
ALY 6100	Data-Driven Decision Making	
ALY 6110	Data Management and Big Data	
ALY 6120	Leadership in Analytics	
ALY 6130	Risk Management for Analytics	
ALY 6140	Analytics Systems Technology	
ALY 6150	Healthcare/Pharmaceutical Data and Applications	
ALY 6160	Business Intelligence in Healthcare/Pharmaceutical	

ALY 6983	Topics
ITC 6045	Information Technology Policy, Ethics, and Social Responsibility
ITC 6310	Information Security Governance
EDU 6184	Interdisciplinary Foundations
GIS 5201	Advanced Spatial Analysis
ITC 6020	Information Systems Design and Development
LDR 6110	Leading Teams
PJM 6015	Project Risk Management
PJM 6005	Project Scope Management
PJM 6125	Project Evaluation and Assessment
LDR 6135	Ethical Leadership
PJM 6180	Project Stakeholder Management

Program Credit/GPA Requirements

45 total quarter hours required
Minimum 3.000 GPA required

Digital Media, MPS

Students in the Master of Professional Studies in Digital Media will build their skills and expertise while gaining experience using a variety of industry-standard and cutting-edge technologies and tools. Our curriculum is organized around three types of experiences: core courses, concentration electives, and a capstone that can be completed as an individual thesis or a team project.

Our core courses in media creation, interactive design, usability, design thinking, and narrative structure provide a baseline for producing content-rich experiences. A series of electives are offered in seven distinctive areas: 3-D animation, game design, digital video, social media, digital media management, or one of two tracks in interactive design: visual design or usability and production. In the capstone experience, you'll work with the guidance of faculty to channel your passion into a project that provides tangible evidence of your abilities.

Whether you are a full- or part-time student, our cohort structure allows you to build meaningful working relationships with students from around the globe. Team-based assignments strengthen your project management and leadership skills and allow you to take part in the design and development of more complex media projects than you could by working alone. The team efforts will also prepare you for your future as a professional in digital media's collaboration-oriented culture.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Core Courses

Code	Title	Hours
DGM 6122	Foundations of Digital Storytelling	4
DGM 6145	Information Technology and Creative Practice	4
DGM 6521	Web Creation for Content Management Systems	2
Complete one of the following:		4
DGM 6140	Sound Design	
DGM 6168	Usability and Human Interaction	
Complete one of the following options:		8

Thesis Option

DGM 6890	Thesis Proposal Development	
DGM 7990	Thesis	

Capstone Option

DGM 7980	Capstone	
Technical course from the workshops list		

Concentrations

Complete one of the following concentrations:

- 3-D Animation (p. 321)
- Digital Media Management (p.   )
- Digital Video (p.   )
- Game Design (p.   )
- Interactive Design (p.   )
- Social Media (p.   )

Elective

Code	Title	Hours
Complete one of the following:		3-4
ALY 6110	Data Management and Big Data	
DGM 6125	Time-Based Media	
DGM 6300	Digital Capture and Output	
DGM 6322	Advanced Digital Storytelling	
DGM 6943	Integrative Experiential Learning	
EDU 6184	Interdisciplinary Foundations	

Workshops

Optional digital media workshops are designed to provide valuable technical skills and tools for students in all graduate degree programs.

Code	Title	Hours
Students may complete one of the following:		
DGM 6515	Introduction to After Effects	
TCC 6410	Online Documentation	
TCC 6620	Collecting User Data	

Program Credit/GPA Requirements

45 total quarter hours required
Minimum 3.000 GPA required

3-D ANIMATION

Code	Title	Hours
DGM 6450	Animation Basics	4
DGM 6510	3-D Modeling	4
DGM 6530	Character Animation	4
DGM 6535	Rigging Principles and Techniques	4
DGM 6540	Compositing	4

DIGITAL MEDIA MANAGEMENT

Code	Title	Hours
DGM 6230	Digital Media Entrepreneurship	4
DGM 6280	Managing for Digital Media	4
DGM 6285	Interactive Marketing Fundamentals	4

DGM 6290	Social Media and Brand Strategy Implementation	4
DGM 6279	Project Management for Digital Media	4

DIGITAL VIDEO

Code	Title	Hours
Complete 20 quarter hours from the following:		20
DGM 6435	Digital Video Production	
DGM 6440	Editing in the Digital Studio	
DGM 6520	Lighting for the Camera	
DGM 6540	Compositing	
DGM 6545	Documentary and Nonfiction Production	
DGM 6430	Screenwriting: Linear and Interactive	

GAME DESIGN

Code	Title	Hours
Complete 20 quarter hours from the following:		20
DGM 6308	Intermediate Programming for Digital Media	
DGM 6400	Game Design Fundamentals	
DGM 6405	Game Development	
DGM 6410	Game Design Technology Lab	
DGM 6403	Game Engine Fundamentals	

INTERACTIVE DESIGN

Code	Title	Hours
Interactive Design		
DGM 6461	Interactive Information Design 1	4
Complete four courses from one of the following tracks:		16
Design Track		
DGM 6217	Typography for Interactivity	
DGM 6463	Interactive Information Design 2	
DGM 6317	Screen-Based Publication Design	
DGM 6471	Designing Infographics	
Usability and Development Track		
DGM 6451	Web Development	
DGM 6268	Usable Design for Mobile Digital Media	
DGM 6525	Research Methods for Global User Experiences	
TCC 6110	Information Architecture	
TCC 6710	Content Strategy	

SOCIAL MEDIA

Code	Title	Hours
CMN 6035	Legal, Policy, and Ethical Issues in the Digital Era	3
CMN 6045	Leveraging Digital Technologies: Strategy, Assessment, and Governance	3
CMN 6065	Implementation and Management of Social Media Channels and Online Communities	3
DGM 6285	Interactive Marketing Fundamentals	4
DGM 6290	Social Media and Brand Strategy Implementation	4
TCC 6710	Content Strategy	4

CMN 6035	Legal, Policy, and Ethical Issues in the Digital Era	3

Digital Media, MPS—Connect

Students in the Master of Professional Studies in Digital Media will build their skills and expertise while gaining experience using a variety of industry-standard and cutting-edge technologies and tools. Our curriculum is organized around three types of experiences: core courses, concentration electives, and a capstone that can be completed as an individual thesis or a team project.

Our core courses in media creation, interactive design, usability, design thinking, and narrative structure provide a baseline for producing content-rich experiences. A series of electives are offered in seven distinctive areas: 3-D animation, game design, digital video, social media, digital media management, or one of two tracks in interactive design: visual design or usability and production. In the capstone experience, you'll work with the guidance of faculty to channel your passion into a project that provides tangible evidence of your abilities.

Whether you are a full- or part-time student, our cohort structure allows you to build meaningful working relationships with students from around the globe. Team-based assignments strengthen your project management and leadership skills and allow you to take part in the design and development of more complex media projects than you could by working alone. The team efforts will also prepare you for your future as a professional in digital media's collaboration-oriented culture.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Foundation Courses

Code	Title	Hours
DGM 6105	Visual Communications Foundation	4
DGM 6108	Programming Foundations for Digital Media	4
DGM 6109	Lab for DGM 6108	2
DGM 6501	Web Creation Boot Camp	2

Required Core Courses

Code	Title	Hours
DGM 6122	Foundations of Digital Storytelling	4
DGM 6145	Information Technology and Creative Practice	4
DGM 6521	Web Creation for Content Management Systems	2
Complete one of the following:		4
DGM 6140	Sound Design	
DGM 6168	Usability and Human Interaction	
Complete one of the following options:		8
Thesis Option		
DGM 6890	Thesis Proposal Development	
DGM 7990	Thesis	
Capstone Option		
DGM 7980	Capstone	
Technical course from the workshops list		

Concentrations

Complete one of the following concentrations:

- 3-D Animation (p. 323)
- Digital Media Management (p.   )
- Digital Video (p.   )
- Game Design (p.   )
- Interactive Design (p.   )
- Social Media (p.   )

Electives

Code	Title	Hours
Complete one of the following:		3-4
ALY 6110	Data Management and Big Data	
DGM 6125	Time-Based Media	
DGM 6300	Digital Capture and Output	
DGM 6322	Advanced Digital Storytelling	
DGM 6943	Integrative Experiential Learning	
EDU 6184	Interdisciplinary Foundations	

Workshops

Optional digital media workshops are designed to provide valuable technical skills and tools for students in all graduate degree programs.

Code	Title	Hours
Students may complete one of the following:		
DGM 6506	Introduction to Digital Video	
DGM 6515	Introduction to After Effects	
TCC 6620	Collecting User Data	
TCC 6630	Introduction to XML	

Program Credit/GPA Requirements

56 total quarter hours required
Minimum 3.000 GPA required

3-D ANIMATION

Code	Title	Hours
DGM 6450	Animation Basics	4
DGM 6510	3-D Modeling	4
DGM 6530	Character Animation	4
DGM 6535	Rigging Principles and Techniques	4
DGM 6540	Compositing	4

DIGITAL MEDIA MANAGEMENT

Code	Title	Hours
DGM 6230	Digital Media Entrepreneurship	4
DGM 6280	Managing for Digital Media	4
DGM 6285	Interactive Marketing Fundamentals	4
DGM 6290	Social Media and Brand Strategy Implementation	4
DGM 6279	Project Management for Digital Media	4

DIGITAL VIDEO

Code	Title	Hours
Complete 20 quarter hours from the following:		20
DGM 6435	Digital Video Production	
DGM 6440	Editing in the Digital Studio	
DGM 6520	Lighting for the Camera	
DGM 6540	Compositing	
DGM 6545	Documentary and Nonfiction Production	
DGM 6430	Screenwriting: Linear and Interactive	

GAME DESIGN

Code	Title	Hours
Complete 20 quarter hours from the following:		20
DGM 6308	Intermediate Programming for Digital Media	
DGM 6400	Game Design Fundamentals	
DGM 6405	Game Development	
DGM 6410	Game Design Technology Lab	
DGM 6403	Game Engine Fundamentals	

INTERACTIVE DESIGN

Code	Title	Hours
Interactive Design		
DGM 6461	Interactive Information Design 1	4
Complete four courses from one of the following tracks:		16
Design Track		
DGM 6217	Typography for Interactivity	
DGM 6463	Interactive Information Design 2	
DGM 6317	Screen-Based Publication Design	
DGM 6471	Designing Infographics	
Usability and Development Track		
DGM 6451	Web Development	
DGM 6268	Usable Design for Mobile Digital Media	
DGM 6525	Research Methods for Global User Experiences	
TCC 6110	Information Architecture	
TCC 6710	Content Strategy	

SOCIAL MEDIA

Code	Title	Hours
CMN 6035	Legal, Policy, and Ethical Issues in the Digital Era	3
CMN 6045	Leveraging Digital Technologies: Strategy, Assessment, and Governance	3
CMN 6065	Implementation and Management of Social Media Channels and Online Communities	3
DGM 6285	Interactive Marketing Fundamentals	4
DGM 6290	Social Media and Brand Strategy Implementation	4
TCC 6710	Content Strategy	4

Enterprise Intelligence, MPS

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
EAI 6000	Fundamentals of Artificial Intelligence	3
EAI 6010	Applications of Artificial Intelligence	3
ALY 6110	Data Management and Big Data	3
EAI 6030	Usability and Human Interaction	3
EAI 6020	AI System Technologies	3

Concentration

Complete one of the following concentrations:

- AI for Business Ventures (p. 324)
- AI for Finance (p. 324)
- AI for Healthcare (p. 324)
- AI for Human Resources (p.   )

Experiential Network and Capstone

Code	Title	Hours
INT 6940	Experiential Learning Projects for Professionals	3
EAI 6980	Integrated Experiential Capstone	3

Elective Courses

Code	Title	Hours
Complete three of the following, or any concentration courses outside of your declared concentration:		9
CED 6050	Commerce and Economic Development	
CMN 6000	Introduction to Organizational Communication	
GIS 5201	Advanced Spatial Analysis	
GIS 6360	Spatial Databases	
LDR 6135	Ethical Leadership	
PJM 6005	Project Scope Management	
PJM 6015	Project Risk Management	
PJM 6205	Leading and Managing Technical Projects	
EDU 6184	Interdisciplinary Foundations	

Program Credit/GPA Requirements

45 total quarter hours required
Minimum 3.000 GPA required

Concentrations

AI FOR BUSINESS VENTURES

Code	Title	Hours
EDU 6558	Issues in Education	1-4
ALY 6040	Data Mining Applications	3
ITC 6015	Enterprise Information Architecture	3
EAI 6080	Advanced Analytical Utilization	3
EAI 6120	AI Communication and Visualization	3

AI FOR FINANCE

Code	Title	Hours
FIN 6101	Accounting Fundamentals for Financial Institutions	3,4
ALY 6040	Data Mining Applications	3
EAI 6050	Finance Information Processing	3
EAI 6080	Advanced Analytical Utilization	3
EAI 6120	AI Communication and Visualization	3

AI FOR HEALTHCARE

Code	Title	Hours
ALY 6150	Healthcare/Pharmaceutical Data and Applications	3
ALY 6040	Data Mining Applications	3
EAI 6060	Healthcare Information Processing	3
EAI 6080	Advanced Analytical Utilization	3
EAI 6120	AI Communication and Visualization	3

AI FOR HUMAN RESOURCES

Code	Title	Hours
HRM 6025	Workforce Analytics	3
ALY 6040	Data Mining Applications	3
EAI 6070	Human Resources Information Processing	3
EAI 6080	Advanced Analytical Utilization	3
EAI 6120	AI Communication and Visualization	3

Geospatial Services, MPS

The Northeastern University MPS in Geospatial Services program is designed for working professionals striving to maintain competitive, leading-edge capabilities at a time of rapidly growing utilization of geospatial data for diversity of government and business intelligence needs. Program strengths are highly correlated with geospatial workforce requirements as identified by geospatial enterprise leaders from government and industry (e.g., GEOINT Essential Body of Knowledge (http://usgif.org/certification/geoint_EBK)). Our curriculum incorporates tools, technologies, and services required in three primary sectors:

- *Location-based geodata* (collect, manage, distribute spatial information and imagery)
- *Geo-applications and devices* (devices and software for creating, visualizing, and sharing geospatial information)
- *Geo-expert industries* (turn location-based information into insights for commercial and government organizations)

Available 100 percent online and built to Northeastern University's high academic standards, our program's experiential focus emphasizes the connections between learning and workplace needs.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Courses

Code	Title	Hours
GIS 5103	Foundations of Geographic Information Science	4
RMS 5105	Fundamentals of Remote Sensing	3
GIS 5201	Advanced Spatial Analysis	3

GIS 6980	Capstone	3
Complete two of the following:		6-8
DGM 6105	Visual Communications Foundation	
ITC 6045	Information Technology Policy, Ethics, and Social Responsibility	
PJM 5900	Foundations of Project Management	
PJM 6000	Project Management Practices	
SIA 6000	Psychology of Intelligence Analysis	

Concentrations

If students prefer to focus their studies on a particular concentration, they may select 18 quarter hours from one of the concentrations below and complement their studies with 6 quarter hours of open elective courses to meet the minimum 45-quarter-hour degree requirement.

Students are not required to complete a concentration. Any combination of 24 quarter hours from concentration and elective courses will satisfy degree requirements.

GEOGRAPHIC INFORMATION SYSTEMS

Code	Title	Hours
Complete six of the following:		18
GIS 6320	Use and Applications of Free and Open-Source GIS Desktop Software	
GIS 6340	GIS Customization	
GIS 6350	Planning a GIS Implementation	
GIS 6360	Spatial Databases	
GIS 6370	Internet-Based GIS	
GIS 6385	GIS/Cartography	
GIS 6390	Business Applications of Geographic Information Systems	
GIS 6391	Healthcare Applications of Geographic Information Systems	
GIS 6394	Crisis Mapping for Humanitarian Action	
GIS 6395	Geospatial Analysis of Crime	
GIS 6396	GIS for Defense, Homeland Security, and Emergency Response	

REMOTE SENSING

Code	Title	Hours
RMS 6110	Digital Image Processing	3
Complete five of the following:		15
RMS 6215	Unmanned Aerial Systems for Geospatial Analysts	
RMS 6230	Remote Sensing and Global Change	
RMS 6240	Introduction to Radar and LiDAR Remote Sensing	
RMS 6250	Spatial Analytics for Vegetation and Precision Agriculture	
RMS 6270	Remote Sensing for Disaster Management	
RMS 6280	Automated Feature Extraction for the Geospatial Professional	
RMS 6290	Spectroscopic Image Analysis	
RMS 6292	Photogrammetry and GPS	
GIS 6394	Crisis Mapping for Humanitarian Action	

GEOSPATIAL ANALYTICS

Code	Title	Hours
ALY 6110	Data Management and Big Data	3
ALY 6020	Predictive Analytics	3
ALY 6040	Data Mining Applications	3
ALY 6983	Topics	3
ALY 6070	Communication and Visualization for Data Analytics	3
Open elective from GIS, RMS		3

Electives

Open electives can be fulfilled by choosing either 6 quarter hours from the courses listed above or below. Please note that if you are completing the concentration in statistical analytics, you will need to complete 9 quarter hours of open elective courses.

Code	Title	Hours
COP 6940	Personal and Career Development	3-4
INT 6940	Experiential Learning Projects for Professionals	1-4
EDU 6184	Interdisciplinary Foundations	2

Program Credit/GPA Requirements

45 total quarter hours required
Minimum 3.000 GPA required

Informatics, MPS

A relatively new and rapidly evolving area, informatics is increasingly used to solve today's problems. Whether it's used to create information and communication technologies, design decision support systems, develop 3-D visualizations, or devise mobile applications, informatics can be applied across a wide range of industries to address a variety of privacy, security, healthcare, environmental, educational, and social challenges. In response, Northeastern University offers the Master of Professional Studies in Informatics. Designed to improve your computing skills and enhance your knowledge of computing applications, this master's degree seeks to prepare you to excel in the fast-growing and dynamic field of informatics.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Courses

Code	Title	Hours
ITC 6400	Foundations of Informatics	3
ITC 6000	Database Management Systems	3
ITC 6010	Information Technology Strategy and Governance	3
ITC 6020	Information Systems Design and Development	3
ITC 6035	Information Technology Project Management	3
Capstone and Experiential Learning		
ITC 6040	Informatics Capstone	3
INT 6940	Experiential Learning Projects for Professionals	1-4

Optional Concentrations

Students are not required to complete one of the following concentrations, but they must complete 24 credit hours of course work approved by their career and academic coach.

- Information Security Management (p. 326)
- Geographic Information Systems (p. 326)
- Leading and Managing Technical Projects (p. 326)
- Analytics (p. 326)
- Human-Centered Informatics (p. 326)
- Cloud Computing Application and Management (p. 326)

INFORMATION SECURITY MANAGEMENT

Code	Title	Hours
ITC 6300	Foundations of Information Security	3
ITC 6305	IT Infrastructure (Systems, Networks, Telecom)	3
ITC 6310	Information Security Governance	3
ITC 6315	Information Security Risk Management	3
ITC 6320	Information Security Technology (Complete three of the following courses)	3
Complete one of the following:		3-4
ITC 6325	CISA Preparation	
ITC 6330	CISSP Preparation	
ITC 6080	Network Security Concepts	
ITC 6082	Network Protection	

GEOGRAPHIC INFORMATION SYSTEMS

Code	Title	Hours
Classes offered online only:		
GIS 5103	Foundations of Geographic Information Science	4
RMS 5105	Fundamentals of Remote Sensing	3
GIS 5201	Advanced Spatial Analysis	3
Complete three of the following:		9
GIS 6340	GIS Customization	
GIS 6350	Planning a GIS Implementation	
GIS 6360	Spatial Databases	
GIS 6370	Internet-Based GIS	
GIS 6385	GIS/Cartography	
GIS 6390	Business Applications of Geographic Information Systems	
GIS 6391	Healthcare Applications of Geographic Information Systems	

LEADING AND MANAGING TECHNICAL PROJECTS

Code	Title	Hours
PJM 6000	Project Management Practices	3
PJM 6205	Leading and Managing Technical Projects	3
PJM 6210	Communication Skills for Project Managers	3
PJM 6215	Leading Remote Project Teams	3
PJM 6810	Principles of Agile Project Management	3
PJM 6825	Agile Lean Product Development	3

ANALYTICS

Code	Title	Hours
ALY 6000	Introduction to Analytics	3
ALY 6010	Probability Theory and Introductory Statistics	3
ALY 6020	Predictive Analytics	3
ALY 6040	Data Mining Applications	3
ALY 6070	Communication and Visualization for Data Analytics	3
Complete one of the following:		3
ALY 6015	Intermediate Analytics	
ALY 6030	Data Warehousing and SQL	
ALY 6110	Data Management and Big Data	

HUMAN-CENTERED INFORMATICS

Code	Title	Hours
ITC 6410	Fundamentals of Human Behaviors for Interactive Systems	3
DGM 6461	Interactive Information Design 1	4
DGM 6168	Usability and Human Interaction	4
DGM 6268	Usable Design for Mobile Digital Media	4
Complete one of the following:		3-4
DGM 6463	Interactive Information Design 2	
ALY 6070	Communication and Visualization for Data Analytics	
ITC 6355	Web Application Design and Development	

CLOUD COMPUTING APPLICATION AND MANAGEMENT

Code	Title	Hours
ITC 6420	Introduction to Cloud Computing Applications and Management	3
ITC 6450	Advanced Cloud Computing Applications and Management	3
ITC 6015	Enterprise Information Architecture	3
ITC 6320	Information Security Technology	3
ITC 6355	Web Application Design and Development	3
Complete one of the following:		3-4
ITC 6082	Network Protection	
ITC 6460	Cloud Analytics	
ITC 6470	Enterprise Data Storage and Management Technologies	

Electives

Code	Title	Hours
Complete 5–6 quarter hours from the following:		6
DGM 6501	Web Creation Boot Camp	
DGM 6521	Web Creation for Content Management Systems	
DGM 6145	Information Technology and Creative Practice	
EDU 6184	Interdisciplinary Foundations	
GIS 6360	Spatial Databases	
ITC 6030	Computer Systems and Networks	
ITC 6080	Network Security Concepts	
ITC 6082	Network Protection	

ITC 6430	Enterprise Information Technology Service Management
ITC 6340	Mobile and Wireless Networks and Applications
ITC 6345	Systems and Network Administration
ALY 6050	Introduction to Enterprise Analytics
ALY 6060	Decision Support and Business Intelligence
ALY 6100	Data-Driven Decision Making
ALY 6110	Data Management and Big Data
ALY 6120	Leadership in Analytics
ALY 6130	Risk Management for Analytics
ALY 6015	Intermediate Analytics
ALY 6030	Data Warehousing and SQL
ITC 6045	Information Technology Policy, Ethics, and Social Responsibility
GIS 5103	Foundations of Geographic Information Science
GIS 6340	GIS Customization
GIS 6360	Spatial Databases
GIS 6391	Healthcare Applications of Geographic Information Systems
PJM 6000	Project Management Practices
PJM 6205	Leading and Managing Technical Projects
TCC 6110	Information Architecture

Program Credit/GPA Requirements

45 total quarter hours required
Minimum 3.000 GPA required

Applied Nutrition, MS

Increased attention on disease prevention through better dietary habits has heightened the demand for skilled nutrition professionals.

To meet the demands and need in the industry, this Master of Science in Applied Nutrition degree is designed to build upon your clinical knowledge and to allow you to concentrate in one of four specialty areas. This advanced program is open to individuals who hold undergraduate degrees in health science, dietetics, or a related area.

Led by real-world practitioners, including dietitians, an exercise scientist, and a clinical psychologist, this innovative nutrition degree seeks to provide you with a solid grounding in nutrition, metabolism, disease prevention, health promotion, and clinical behavior. Complementing the core nutrition courses is the college's renowned nutrition practicum that allows you to work directly with registered dietitians, fitness specialists, as well as other health professionals.

Further differentiating this master's degree in nutrition is the option to choose from four degree concentrations: business and entrepreneurship in nutrition; nutrition education; nutrition and fitness; and obesity and nutritional health. This degree program seeks to give you the knowledge and skills you need to succeed in the field of nutrition.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Courses

Code	Title	Hours
NTR 6100	Advanced Nutrition and Metabolism	4
NTR 6110	Medical Nutrition Therapy	4
NTR 6112	Research Methods in Nutrition	4
NTR 6115	Health Promotion/Disease Prevention	4
NTR 6118	Clinical Health Behavior Change	4
NTR 6165	Food and Society	4
NTR 6866	Applied Research in Nutrition (Recommended as the last course taken)	1-4

Concentration

Complete one of the following four concentrations:[1]

BUSINESS AND ENTREPRENEURSHIP IN NUTRITION

Code	Title	Hours
NTR 6155	Nutrition Entrepreneurship	3
NTR 6130	Healthcare and Nutrition Communication	4
PJM 5900	Foundations of Project Management	4
NTR 6202	The Financing of Nutrition and Wellness	3
NTR 7880	Nutrition in Practice	1-4

NUTRITION EDUCATION

Code	Title	Hours
Required Courses		
NTR 6200	Nutrition Education	4
NTR 6130	Healthcare and Nutrition Communication	4
NTR 6201	Commercialization of Nutrition and Nutritional Information	3
NTR 7880	Nutrition in Practice	1-4
Nutrition Education Elective		
Complete one of the following:		4
NTR 6119	Pediatric Nutrition	
NTR 6120	Healthy Aging: Nutrition Strategies for Optimal Longevity	
NTR 6101	Nutrition Program Planning	

NUTRITION AND FITNESS

Code	Title	Hours
Required Courses		
NTR 7147	Sports and Fitness Nutrition	3
NTR 6148	Exercise Physiology	3
NTR 6150	Sports Psychology	3
NTR 7880	Nutrition in Practice	1-4
Nutrition and Fitness Elective		
Complete one of the following:		4
NTR 6120	Healthy Aging: Nutrition Strategies for Optimal Longevity	
NTR 6101	Nutrition Program Planning	

OBESITY AND NUTRITIONAL HEALTH

Code	Title	Hours
Required Courses		
NTR 7130	Overweight and Obesity 1	4

NTR 7132	Overweight and Obesity 2	4
NTR 6201	Commercialization of Nutrition and Nutritional Information	3
NTR 7880	Nutrition in Practice	1-4
Obesity and Nutritional Health Elective		
Complete one of the following:		4
NTR 7140	Wellness and Nutrition	
NTR 7135	Eating Disorders in Children and Adults	

Program Credit/GPA Requirements

45 total quarter hours required
Minimum 3.000 GPA required

[1]   Interdisciplinary Foundations (EDU 6184) may be taken as an elective.

Commerce and Economic Development, MS

Globalization has created a borderless economy with a host of new opportunities and challenges for those engaged in commerce and economic development. While global markets offer exciting growth prospects, navigating the world stage requires in-depth knowledge of the financial, regulatory, and economic environments and institutions that affect the global economy and international trade. To meet the need for both insight and skills development, Northeastern University's College of Professional Studies—in collaboration with Northeastern University's College of Social Sciences and Humanities—offers the online Master of Science in Commerce and Economic Development.

This graduate-level program integrates economics, leadership, institutional organization, technology, and public policy into a unique and focused educational experience designed to help guide and advance a rewarding career in the private or public sectors.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Courses

Code	Title	Hours
CED 6010	Applied Microeconomic Theory 1	3
CED 6020	Applied Macroeconomic Theory 1	3
CED 6030	Mathematical Methods for Economics 1	3
CED 6040	Applied Econometrics	3
CED 6050	Commerce and Economic Development	3
CMN 6080	Intercultural Communication	3
CED 6910	Capstone: Master's Project	4

Concentration

Complete one of the following concentrations:

ECONOMIC ANALYSIS

Code	Title	Hours
CED 6011	Applied Microeconomic Theory 2	3
CED 6021	Applied Macroeconomic Theory 2	3
CED 6031	Mathematical Methods for Economics 2	3
CED 6041	Applied Econometrics II	3

| CED 6051 | Open Economy Macroeconomic Analysis | 3 |

ECONOMIC ENTREPRENEURSHIP

Code	Title	Hours
CED 6070	Economics of Human Capital	3
ALY 6050	Introduction to Enterprise Analytics	3
CMN 6095	Foundations of Developing Cultural Awareness	3
GST 6430	Leadership and Management	4
CED 6140	Economics of E-Commerce	3

DATA ANALYTICS

Code	Title	Hours
ALY 6000	Introduction to Analytics	3
ALY 6010	Probability Theory and Introductory Statistics	3
ALY 6015	Intermediate Analytics	3
ALY 6100	Data-Driven Decision Making	3
ALY 6110	Data Management and Big Data	3

FINANCIAL ECONOMICS

Code	Title	Hours
FIN 6161	Investment Analysis	4
FIN 6102	Asset and Liability Management	4
FIN 6120	Building Financial Relationships	4
CED 6210	Managerial Finance	3
CED 6220	International Finance	3

Electives

Code	Title	Hours
Complete 3–8 quarter hours from the following:		3-8
COP 6940	Personal and Career Development	
GST 6102	Global Corporate and Social Responsibility	
CED 6090	Cultural Economic Development	
CED 6110	Law and Economics	
CED 6120	Environmental Economics	
CED 6130	Sustainable Economic Development	
EDU 6184	Interdisciplinary Foundations	

Program Credit/GPA Requirements

45–48 total quarter hours required
Minimum 3.000 GPA required

Corporate and Organizational Communication, MS

Across all industries and professions, strong written and oral communication skills are essential to success. Whether you are seeking to advance in a communications-related field or get ahead in your current organization, this program seeks to provide the practical knowledge and valuable perspectives you need to communicate across a variety of contexts and situations.

From negotiation and writing to crisis management and public speaking, the Master of Science in Corporate and Organizational Communication degree program examines topics that are critical to effective organizational communication. Incorporating best practices, case studies, and classroom learning, courses within this innovative

master's degree in communication address complex communication challenges, seeking to provide you with a distinct advantage in today's competitive marketplace.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Courses

Note: Introduction to Organizational Communication (CMN 6000) is required for students who do not have any professional experience in communication. Students with professional communication experience should begin the program with Strategic Communication Management (CMN 6010):

Code	Title	Hours
CMN 6000 and INT 6000	Introduction to Organizational Communication and Writing Lab	3-4
CMN 6010	Strategic Communication Management	3
CMN 6020	Ethical Issues in Organizational Communication	3
CMN 6080	Intercultural Communication	3
CMN 6090	Organizational Culture, Climate, and Communication	3
CMN 6100	Communication Networks and Managing Information	3
CMN 6910	Organizational Communication Assessment	3

Capstone

Code	Title	Hours
CMN 6940	Projects for Professionals	4

Concentrations

Elective Courses

Note: Students who take Introduction to Organizational Communication (CMN 6000) are only required to take two courses in this section.

Code	Title	Hours
Complete three of the following:		4-12
CMN 6015	Introduction to the Digital Era: The Power of Social Media	
CMN 6025	Digital Era Skills: Platforms, Tools, and Techniques	
CMN 6050	Crisis Communication	
CMN 6061	Personal Branding	
CMN 6110	Group Dynamics and Interpersonal Conflict: Meeting Management	
CMN 6060	Negotiation, Mediation, and Facilitation	
COP 6940	Personal and Career Development	
INT 6943	Integrative Experiential Learning	
INT 6900	International Field Study Experience	
INT 6940	Experiential Learning Projects for Professionals	
TCC 6620	Collecting User Data	
TCC 6610	Prototyping	
CMN 6095	Foundations of Developing Cultural Awareness	
CMN 6085	Strategies for Cross-Cultural Facilitation and Negotiation	
CMN 6005	Foundations of Professional Communication	
EDU 6184	Interdisciplinary Foundations	

Program Credit/GPA Requirements

45 total quarter hours required
Minimum 3.000 GPA required

HUMAN RESOURCES MANAGEMENT

Code	Title	Hours
Required Courses		
HRM 6015	Introduction to Human Resources Management	3
HRM 6025	Workforce Analytics	3
HRM Concentration Electives		
Note: Students who take HRM 6015 select three elective courses; students waived from HRM 6015 select four elective courses:		9-12
HRM 6005	Creating a High-Performance Organization: Strategic Organizational and HRM Choices	
HRM 6010	Compensation and Benefits	
HRM 6020	Talent Acquisition and Onboarding	
HRM 6030	The Employment Contract	
HRM 6042	Strategic Workforce Planning	
HRM 6047	Managing the Employee Life Cycle	
HRM 6050	Employee Engagement	
HRM 6060	Organizational Design	
HRM 6070	Global Human Resources Management	

PUBLIC AND MEDIA RELATIONS

Code	Title	Hours
Required Courses		
PBR 6100	Introduction to Public Relations	3
PBR 6130	Public Relations Writing Seminar 1	3
PBR 6140	Public Relations Writing Seminar 2	3
PBR 6710	Public Relations Research: Understanding External Audiences	3
Public and Media Relations Electives		
Complete two of the following:		6-7

CMN 6025	Digital Era Skills: Platforms, Tools, and Techniques
CMN 6035	Legal, Policy, and Ethical Issues in the Digital Era
CMN 6045	Leveraging Digital Technologies: Strategy, Assessment, and Governance
DGM 6290	Social Media and Brand Strategy Implementation
PBR 6125	Community Relations and Corporate Social Responsibility

LEADERSHIP

Code	Title	Hours
Required Courses		
LDR 6100	Developing Your Leadership Capability	3
LDR 6110	Leading Teams	3
LDR 6120	Developing Organizational Leadership	3
LDR 6150	Innovation and Organizational Transformation	3
Leadership Elective		
Complete one of the following:		3
LDR 6135	Ethical Leadership	
LDR 6140	Strategy Development and Implementation	

PROJECT MANAGEMENT

Code	Title	Hours
Required Courses		
Note: Students with project management experience are not required to take PJM 5900:		
PJM 5900	Foundations of Project Management	4
PJM 6000	Project Management Practices	3
PJM 6005	Project Scope Management	3
PJM 6025	Project Scheduling and Cost Planning	3
PJM 6015	Project Risk Management	3
Project Management Electives		
Note: Students who take PJM 5900 are not required to take a course in this section.		
Complete one of the following:		3
PJM 6125	Project Evaluation and Assessment	
PJM 6135	Project Quality Management	
PJM 6140	Managing Troubled Projects	
PJM 6210	Communication Skills for Project Managers	
PJM 6710	Introduction to Program and Portfolio Management	

SOCIAL MEDIA AND ONLINE COMMUNICATION

Code	Title	Hours
Complete five of the following (CMN 6025, 6045, and 6065 are required):		15-18
CMN 6015	Introduction to the Digital Era: The Power of Social Media ((Students may waiver CMN 6015 if they have social media experience. Please consult with your academic advisor.))	
CMN 6025	Digital Era Skills: Platforms, Tools, and Techniques	

CMN 6045	Leveraging Digital Technologies: Strategy, Assessment, and Governance
CMN 6065	Implementation and Management of Social Media Channels and Online Communities
Complete one (or two, if CMN 6015 has been waived) of the following:	
CMN 6035	Legal, Policy, and Ethical Issues in the Digital Era
DGM 6285	Interactive Marketing Fundamentals
DGM 6290	Social Media and Brand Strategy Implementation
TCC 6710	Content Strategy
CMN 6040	Consumer Behaviors in the Online Environment

USABILITY/USER EXPERIENCE

Code	Title	Hours
TCC 6710	Content Strategy	4
TCC 6470	Web Accessibility for Technical Communicators	4
TCC 6490	Usability Testing for Technical Communicators	4
DGM 6268	Usable Design for Mobile Digital Media	4
TCC 6610	Prototyping	2
TCC 6620	Collecting User Data	2

CROSS-CULTURAL COMMUNICATION

Code	Title	Hours
Required Courses		
CMN 6082		
CMN 6085	Strategies for Cross-Cultural Facilitation and Negotiation	3
Complete 12 quarter hours from one of the following:		12
Social Justice Track		
PBR 6100	Introduction to Public Relations	
HSV 6120	Social Inequality, Social Change, and Community Building	
ITC 6045	Information Technology Policy, Ethics, and Social Responsibility	
HRM 6040	High-Performance Human Resources Systems and Development	
International Track		
GST 6100	Globalization and Global Politics and Economics	
GST 6101	Global Literacy, Culture, and Community	
LDR 6145	Global Leadership	
INT 6900	International Field Study Experience	

LEADING COMMUNICATION STRATEGY AND TALENT DEVELOPMENT

Code	Title	Hours
Required Courses		
CMN 6200	Strategic Communications Advisor: Roles and Responsibilities	3
CMN 6201	Managing Communication Resources	3
CMN 6202	Management Symposium	3
Electives		
Complete nine quarter hours:		9

Code	Title	
HRM 6020	Talent Acquisition and Onboarding	
LDR 6120	Developing Organizational Leadership	
PJM 6000	Project Management Practices	
PJM 6215	Leading Remote Project Teams	
CMN 6045	Leveraging Digital Technologies: Strategy, Assessment, and Governance	

Criminal Justice, MS

Criminal justice and security agencies are under increased scrutiny—challenged to provide efficient and effective services; be transparent in their interactions with the public; and respond to changing local, national, and world conditions. To be successful, justice system leaders need to think strategically, communicate locally, and act ethically while developing comprehensive (and often multijurisdictional) solutions to crime and terrorism problems.

In response, Northeastern University's College of Professional Studies—in collaboration with the School of Criminology and Criminal Justice—offers the Master of Science in Criminal Justice. This innovative online master's degree provides a path to excellence for leaders in law enforcement, courts, private security, and corrections organizations. Academically distinctive, graduate courses in this program emphasize leadership, communication, and ethics—themes that are designed to enhance your leadership capacity and improve your career prospects.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Foundation Courses

Code	Title	Hours
CJS 6020	Contemporary Issues in Criminal Justice Policy	3
CJS 6400	Administration of Justice	3
CJS 6405	Criminological Theory for Criminal Justice Leaders	3
CJS 6415	Legal Decision Making and Leadership	3
CJS 6470	Criminal Justice Capstone (Recommended as the last course)	3

Operations Courses

Code	Title	Hours
CJS 6425	Research Methods	3
CJS 6435	Program Evaluations	3
CJS 6440	GIS, Evidence-Based Learning, and Policy	3
CMN 6050	Crisis Communication	3

Concentration

Complete one of the following six concentrations:

- Community and Family Justice
- Corrections
- Global Criminal Justice
- Leadership
- Policing
- Security

Program Credit/GPA Requirements

45 total quarter hours required
Minimum 3.000 GPA required

COMMUNITY AND FAMILY JUSTICE

Code	Title	Hours
Required Courses		
CJS 6300	Communities and Crime	3
CJS 6330	Youth Justice and Crime	3
CJS 6340	Substance Abuse and Addictions	3
CJS 6305		3
CJS 6135	Intimate Partner Violence	3
Elective		
Complete 3 quarter hours from the following:		3
CJS 6005	Legal and Regulatory Issues for Security Management	
CJS 6025	Genocide and War Crimes	
CJS 6030	Organized Crime	
CJS 6035	Corruption, Integrity, and Accountability	
CJS 6040	Human Trafficking and Exploitation	
CJS 6045	Policing Issues around the Globe	
CJS 6105	Domestic and International Terrorism	
CJS 6125	Issues in National Security	
CJS 6135	Intimate Partner Violence	
CJS 6300	Communities and Crime	
CJS 6315	Administration of the Adult and Juvenile Correction Systems	
CJS 6325	Probation and Parole	
CJS 6330	Youth Justice and Crime	
CJS 6340	Substance Abuse and Addictions	
GST 6300	Security and Terrorism	
LDR 6110	Leading Teams	
LDR 6120	Developing Organizational Leadership	
LDR 6140	Strategy Development and Implementation	
LDR 6360	Dynamics of Change at the Community and Social Level	
INT 6943	Integrative Experiential Learning	
EDU 6184	Interdisciplinary Foundations	

CORRECTIONS

Code	Title	Hours
Required Courses		
Complete five of the following:		15
CJS 6145		
CJS 6300	Communities and Crime	
CJS 6315	Administration of the Adult and Juvenile Correction Systems	
CJS 6325	Probation and Parole	
CJS 6320		
CJS 6340	Substance Abuse and Addictions	
Elective		
Complete 3 quarter hours from the following:		3
CJS 6005	Legal and Regulatory Issues for Security Management	

CJS 6025	Genocide and War Crimes	
CJS 6030	Organized Crime	
CJS 6035	Corruption, Integrity, and Accountability	
CJS 6040	Human Trafficking and Exploitation	
CJS 6045	Policing Issues around the Globe	
CJS 6105	Domestic and International Terrorism	
CJS 6125	Issues in National Security	
CJS 6135	Intimate Partner Violence	
CJS 6300	Communities and Crime	
CJS 6315	Administration of the Adult and Juvenile Correction Systems	
CJS 6325	Probation and Parole	
CJS 6330	Youth Justice and Crime	
CJS 6340	Substance Abuse and Addictions	
GST 6300	Security and Terrorism	
LDR 6110	Leading Teams	
LDR 6120	Developing Organizational Leadership	
LDR 6140	Strategy Development and Implementation	
LDR 6360	Dynamics of Change at the Community and Social Level	
INT 6943	Integrative Experiential Learning	
EDU 6184	Interdisciplinary Foundations	

GLOBAL CRIMINAL JUSTICE

Code	Title	Hours
Required Courses		
Complete five of the following:		15-16
CJS 6025	Genocide and War Crimes	
CJS 6030	Organized Crime	
CJS 6035	Corruption, Integrity, and Accountability	
CJS 6040	Human Trafficking and Exploitation	
CJS 6045	Policing Issues around the Globe	
CJS 6105	Domestic and International Terrorism	
CJS 6125	Issues in National Security	
GST 6300	Security and Terrorism	
Elective		
Complete 3 quarter hours from the following:		3
CJS 6005	Legal and Regulatory Issues for Security Management	
CJS 6025	Genocide and War Crimes	
CJS 6030	Organized Crime	
CJS 6035	Corruption, Integrity, and Accountability	
CJS 6040	Human Trafficking and Exploitation	
CJS 6045	Policing Issues around the Globe	
CJS 6105	Domestic and International Terrorism	
CJS 6125	Issues in National Security	
CJS 6135	Intimate Partner Violence	
CJS 6300	Communities and Crime	
CJS 6315	Administration of the Adult and Juvenile Correction Systems	
CJS 6325	Probation and Parole	
CJS 6330	Youth Justice and Crime	
CJS 6340	Substance Abuse and Addictions	
GST 6300	Security and Terrorism	

LDR 6110	Leading Teams	
LDR 6120	Developing Organizational Leadership	
LDR 6140	Strategy Development and Implementation	
LDR 6360	Dynamics of Change at the Community and Social Level	
INT 6943	Integrative Experiential Learning	
EDU 6184	Interdisciplinary Foundations	

LEADERSHIP

Code	Title	Hours
Required Courses		
LDR 6100	Developing Your Leadership Capability	3
LDR 6110	Leading Teams	3
LDR 6120	Developing Organizational Leadership	3
LDR 6150	Innovation and Organizational Transformation	3
Complete one of the following:		3
LDR 6135	Ethical Leadership	
LDR 6140	Strategy Development and Implementation	
Elective		
Complete 3 quarter hours from the following:		3
CJS 6005	Legal and Regulatory Issues for Security Management	
CJS 6025	Genocide and War Crimes	
CJS 6030	Organized Crime	
CJS 6035	Corruption, Integrity, and Accountability	
CJS 6040	Human Trafficking and Exploitation	
CJS 6045	Policing Issues around the Globe	
CJS 6105	Domestic and International Terrorism	
CJS 6125	Issues in National Security	
CJS 6135	Intimate Partner Violence	
CJS 6300	Communities and Crime	
CJS 6315	Administration of the Adult and Juvenile Correction Systems	
CJS 6325	Probation and Parole	
CJS 6330	Youth Justice and Crime	
CJS 6340	Substance Abuse and Addictions	
GST 6300	Security and Terrorism	
LDR 6110	Leading Teams	
LDR 6120	Developing Organizational Leadership	
LDR 6360	Dynamics of Change at the Community and Social Level	
INT 6943	Integrative Experiential Learning	
EDU 6184	Interdisciplinary Foundations	

POLICING

Code	Title	Hours
Required Courses		
Complete five of the following:		15
CJS 6035	Corruption, Integrity, and Accountability	
CJS 6045	Policing Issues around the Globe	
CJS 6050		
CJS 6205		
CJS 6300	Communities and Crime	

	CJS 6420		

Elective

Complete 3 quarter hours from the following:			3
	CJS 6005	Legal and Regulatory Issues for Security Management	
	CJS 6025	Genocide and War Crimes	
	CJS 6030	Organized Crime	
	CJS 6035	Corruption, Integrity, and Accountability	
	CJS 6040	Human Trafficking and Exploitation	
	CJS 6045	Policing Issues around the Globe	
	CJS 6105	Domestic and International Terrorism	
	CJS 6125	Issues in National Security	
	CJS 6135	Intimate Partner Violence	
	CJS 6300	Communities and Crime	
	CJS 6315	Administration of the Adult and Juvenile Correction Systems	
	CJS 6325	Probation and Parole	
	CJS 6330	Youth Justice and Crime	
	CJS 6340	Substance Abuse and Addictions	
	GST 6300	Security and Terrorism	
	LDR 6110	Leading Teams	
	LDR 6120	Developing Organizational Leadership	
	LDR 6140	Strategy Development and Implementation	
	LDR 6360	Dynamics of Change at the Community and Social Level	
	INT 6943	Integrative Experiential Learning	
	EDU 6184	Interdisciplinary Foundations	

SECURITY

Code	Title	Hours
Required Courses		
Complete five of the following:		15-16
CJS 6005	Legal and Regulatory Issues for Security Management	
CJS 6035	Corruption, Integrity, and Accountability	
CJS 6045	Policing Issues around the Globe	
CJS 6105	Domestic and International Terrorism	
CJS 6125	Issues in National Security	
GST 6300	Security and Terrorism	
Elective		
Complete 3 quarter hours from the following:		3
CJS 6005	Legal and Regulatory Issues for Security Management	
CJS 6025	Genocide and War Crimes	
CJS 6030	Organized Crime	
CJS 6035	Corruption, Integrity, and Accountability	
CJS 6040	Human Trafficking and Exploitation	
CJS 6045	Policing Issues around the Globe	
CJS 6105	Domestic and International Terrorism	
CJS 6125	Issues in National Security	
CJS 6135	Intimate Partner Violence	
CJS 6300	Communities and Crime	
CJS 6315	Administration of the Adult and Juvenile Correction Systems	

	CJS 6325	Probation and Parole	
	CJS 6330	Youth Justice and Crime	
	CJS 6340	Substance Abuse and Addictions	
	GST 6300	Security and Terrorism	
	LDR 6110	Leading Teams	
	LDR 6120	Developing Organizational Leadership	
	LDR 6140	Strategy Development and Implementation	
	LDR 6360	Dynamics of Change at the Community and Social Level	
	INT 6943	Integrative Experiential Learning	
	EDU 6184	Interdisciplinary Foundations	

Global Studies and International Relations, MS

Globalization has created a world of new opportunities for those savvy enough to recognize them and acquire the new skill sets needed for success in international government, consulting, business and industry, nonprofit, and educational sectors.

This program is designed to prepare students for internationally focused positions that range from traditional practitioners of diplomacy, to development workers, to executives employed in the dynamic world of international consultancy, trade, and industry. With courses enriched by classmates from every continent, students are active learners in a collaborative, cross-cultural setting from their very first course.

The core curriculum ensures all students have a solid grounding in foundational courses such as international politics, economics, security, and diplomacy. Students then select from a broad-based menu of concentrations, allowing them to develop specialties. The program culminates in a capstone experience in which students elect to write a thesis, engage in a case study, or undertake short-term travel to conduct intensive field research.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Courses

Code	Title	Hours
GST 6100	Globalization and Global Politics and Economics	4
GST 6101	Global Literacy, Culture, and Community	4
GST 6109	Basic Field Research Methods	4
GST 6320	Peace and Conflict	4

Regional Studies Courses

Code	Title	Hours
Complete one of the following:		4
GST 6501	Regional Studies: East Asia	
GST 6502	Regional Studies: Middle East	
GST 6503	Regional Studies: Sub-Saharan Africa	
GST 6504	Regional Studies: Europe	
GST 6505	Regional Studies: Southwest and Central Asia	
GST 6506	Regional Studies: Latin America	

Capstone

Code	Title	Hours
Complete one of the following:		4
GST 6920	Case Study in Global Studies	
GST 7990	Thesis	
INT 6900	International Field Study Experience	

Electives

Code	Title	Hours
Complete 2–4 quarter hours from the following:		2-4
GST 7983	Topics	
COP 6940	Personal and Career Development (Requires participation in the cooperative education program.)	
INT 6943	Integrative Experiential Learning	
EDU 6184	Interdisciplinary Foundations	

Concentrations

Complete one of the following five concentrations:

- Global Health and Development (p.   )
- Conflict Resolution
- Diplomacy
- International Economics and Consulting
- Global Student Mobility

Program Credit/GPA Requirements

46-48 total quarter hours required
Minimum 3.000 GPA required

GLOBAL HEALTH AND DEVELOPMENT

Code	Title	Hours
Complete five of the following (one of the courses can be from another global studies concentration, a regional studies course, or a special topics course if you choose):		20
GST 6210	The Developers	
GST 6340	Poverty and Wealth	
GST 6350	Global Economics of Food and Agriculture	
GST 6610	Sustainable Development	
GST 6700	Global Health Perspectives, Politics, and Experiences in International Development	
GST 6710	Critical Issues and Challenges in the Practice of Global Health	

CONFLICT RESOLUTION

Code	Title	Hours
Complete five of the following (one of the courses can be from another global studies concentration, a regional studies course, or a special topics course if you choose):		20
GST 6324	Divided Societies in the Modern World	
GST 6326	International Conflict and Cooperation	
GST 6327	Conflict and Postconflict Development	
GST 6300	Security and Terrorism	
GST 6360	Nuclear Nonproliferation	
GST 6740	Human Rights	

DIPLOMACY

Code	Title	Hours
Complete five of the following (one of the courses can be from another global studies concentration, a regional studies course, or a special topics course if you choose):		20
GST 6600	The Practice of Diplomacy	
GST 6540	Politics of the European Union	
GST 6550	U.S. Foreign Policy	
GST 6560	Multilateral Diplomacy	
GST 6590	Public Diplomacy	
GST 6740	Human Rights	

INTERNATIONAL ECONOMICS AND CONSULTING

Code	Title	Hours
Complete five of the following (one of the courses can be from another global studies concentration, a regional studies course, or a special topics course if you choose):		20
GST 6580	Opportunities in International Consulting	
GST 6102	Global Corporate and Social Responsibility	
GST 6200	The Funders	
GST 6220	Globalization of Emerging Economies	
GST 6310	Immigration and Labor	
GST 6340	Poverty and Wealth	
GST 6430	Leadership and Management	

GLOBAL STUDENT MOBILITY

Code	Title	Hours
Complete five of the following (one of the courses can be from another global studies concentration, a regional studies course, or a special topics course if you choose):		20
GST 6810	International Higher Education	
GST 6820	Managing Study Abroad	
GST 6830	Managing International Students	
GST 6840	The Business of International Education	
GST 6850	Immigration and Legal Issues in International Higher Education	
GST 6410	Global Education in the Internet Age	

Human Services, MS

Professionals with graduate degrees in human services are needed to address a wide range of societal issues—whether by providing direct services, supervising personnel, or administering programs and policies. Often responsible for working with vulnerable populations, human services professionals must be adept at conducting assessments, developing service plans and policies, leading interdisciplinary teams, and managing care for at-risk clients.

To address this important need, the College of Professional Studies offers the online **Master of Science in Human Services.** In addition to a solid core curriculum, the program offers several electives, as well as concentrations in leadership, organizational communication, and global studies—enabling you to focus your graduate studies in the area that best matches your interests and career objectives. Reflecting Northeastern's philosophy of practice-oriented education, this human services master's degree includes work-based applications and a capstone service-learning

project, offering you an opportunity to deepen your knowledge within your chosen specialty. This human services graduate degree program seeks to produce graduates with the knowledge and skills they need to pursue a leadership role in the fulfilling field of human services.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Courses

Code	Title	Hours
HSV 6100	*Theory and Practice of Human Services* *(Required as the first course)*	*3*
HSV 6110	Human Services Management and Development	3
HSV 6120	Social Inequality, Social Change, and Community Building	3
HSV 6630	Research and Evaluation in Human Services	3
HSV 6640	Policy Issues in Human Services	3
HSV 6160	Introduction to Employee Assistance Programs	3
The following course should be taken last:		
HSV 6980	Capstone	3

Elective Courses

Code	Title	Hours
Complete three of the following:		9
NPM 6120	Financial Management for Nonprofit Organizations	
NPM 6130	Fundraising and Development for Nonprofit Organizations	
NPM 6140	Grant and Report Writing	
NPM 6150	Human Resources Management in Nonprofit Organizations	
CMN 6015	Introduction to the Digital Era: The Power of Social Media	
CMN 6080	Intercultural Communication	
INT 6943	Integrative Experiential Learning	
EDU 6184	Interdisciplinary Foundations	

Concentrations

Complete one of the following concentrations:

GLOBAL STUDIES

Code	Title	Hours
Required Courses		
GST 6100	Globalization and Global Politics and Economics	4
GST 6101	Global Literacy, Culture, and Community	4
GST 6320	Peace and Conflict	4
Elective		
Complete one of the following:		4
GST 6501	Regional Studies: East Asia	
GST 6502	Regional Studies: Middle East	
GST 6503	Regional Studies: Sub-Saharan Africa	
GST 6504	Regional Studies: Europe	
GST 6505	Regional Studies: Southwest and Central Asia	
GST 6506	Regional Studies: Latin America	

LEADERSHIP

Code	Title	Hours
LDR 6100	*Developing Your Leadership Capability* *(Prerequisite)*	*3*
LDR 6110	Leading Teams	3
LDR 6120	Developing Organizational Leadership	3
LDR 6150	Innovation and Organizational Transformation	3
Choose one of the following courses:		3
LDR 6135	Ethical Leadership	
LDR 6140	Strategy Development and Implementation	

ORGANIZATIONAL COMMUNICATION

Code	Title	Hours
CMN 6000 and INT 6000	Introduction to Organizational Communication and Writing Lab	3/1
CMN 6020	Ethical Issues in Organizational Communication	3
CMN 6050	Crisis Communication	3
CMN 6090	Organizational Culture, Climate, and Communication	3
CMN 6110	Group Dynamics and Interpersonal Conflict: Meeting Management	3

Program Credit/GPA Requirements

45-46 total quarter hours required
Minimum 3.000 GPA required

Leadership, MS

As today's workforce continues to diversify, leadership tasks and responsibilities have become more complex. The Master of Science in Leadership seeks to prepare you to meet these evolving challenges by helping you cultivate a personal leadership philosophy. Leveraging students' interdisciplinary backgrounds, this master's degree in leadership combines real-world lessons with an action-learning approach that is designed to build and strengthen your leadership capabilities.

In September of 2009, the Master of Science in Leadership with a Concentration in Project Management received accreditation by the Project Management Institute's Global Accreditation Center (GAC), the world's leading association for project management professionals. Accreditation is achieved by meeting the GAC's rigorous standards, which include an assessment of program objectives and outcomes, a review of on-site and online resources, evaluations of faculty and students, and proof of continuous improvements in the area of project management.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Courses

Code	Title	Hours
LDR 6100	Developing Your Leadership Capability	3
LDR 6101		
LDR 6110	Leading Teams	3
LDR 6120	Developing Organizational Leadership	3
LDR 6135	Ethical Leadership	3
LDR 6140	Strategy Development and Implementation	3
LDR 6145	Global Leadership	3
LDR 6150	Innovation and Organizational Transformation	3
LDR 7980	Capstone	4

Concentration

Complete one of the following seven concentrations:

- Health Management (p. 336)
- Human Resources Management (p. 336)
- Leading and Managing Technical Projects (p. 336)
- Nonprofit Management (p. 336)
- Organizational Communication (p. 336)
- Sport and Social Change (p. 337)

Electives

Code	Title	Hours
EDU 6184	Interdisciplinary Foundations	
Complete at least one of the following:		4
CMN 6000	Introduction to Organizational Communication	
LDR 6115	Leadership Communication	
Complete at least one of the following:		4
CMN 6095	Foundations of Developing Cultural Awareness	
COP 6940	Personal and Career Development	
INT 6000	Writing Lab	
INT 6900	International Field Study Experience	

Program Credit/GPA Requirements

45 total quarter hours required
Minimum 3.000 GPA required

HEALTH MANAGEMENT

Code	Title	Hours
HMG 6110	Organization, Administration, Financing, and History of Healthcare	3
HMG 6130	Healthcare Strategic Management	3
HMG 6140	Principles of Population-Based Management	3
HMG 6160	Healthcare Information Systems Management	3
HMG 6170	Health Law, Politics, and Policy	3

HUMAN RESOURCES MANAGEMENT

Code	Title	Hours
Required Courses		
HRM 6015	Introduction to Human Resources Management	3
HRM 6025	Workforce Analytics	3
Electives		
Complete three of the following. (Students waived out of HRM 6015, complete four of the following).		9
HRM 6005	Creating a High-Performance Organization: Strategic Organizational and HRM Choices	
HRM 6010	Compensation and Benefits	
HRM 6020	Talent Acquisition and Onboarding	
HRM 6030	The Employment Contract	
HRM 6042	Strategic Workforce Planning	
HRM 6047	Managing the Employee Life Cycle	
HRM 6050	Employee Engagement	
HRM 6060	Organizational Design	
HRM 6070	Global Human Resources Management	

LEADING AND MANAGING TECHNICAL PROJECTS

Code	Title	Hours
PJM 6000	Project Management Practices	3
PJM 6205	Leading and Managing Technical Projects	3
PJM 6210	Communication Skills for Project Managers	3
PJM 6215	Leading Remote Project Teams	3
PJM 6220	Planning and Scheduling Technical Projects	3

NONPROFIT MANAGEMENT

Code	Title	Hours
NPM 6110	Legal and Governance Issues in Nonprofit Organizations	3
NPM 6120	Financial Management for Nonprofit Organizations	3
NPM 6125	Promoting Nonprofit Organizations	3
NPM 6130	Fundraising and Development for Nonprofit Organizations	3
NPM 6140	Grant and Report Writing	3

ORGANIZATIONAL COMMUNICATION

Code	Title	Hours
CMN 6000 and INT 6000	Introduction to Organizational Communication and Writing Lab	3/1
CMN 6020	Ethical Issues in Organizational Communication	3
CMN 6050	Crisis Communication	3
CMN 6090	Organizational Culture, Climate, and Communication	3
CMN 6110	Group Dynamics and Interpersonal Conflict: Meeting Management	3

PROJECT MANAGEMENT

Code	Title	Hours
Required Courses		
Note: Students with project management experience are not required to take PJM 5900:		
PJM 5900	Foundations of Project Management	4
PJM 6000	Project Management Practices	3
PJM 6025	Project Scheduling and Cost Planning	3
PJM 6015	Project Risk Management	3
Electives		
Complete one of the following. (Note: Students who are not required to take PJM 5900 complete two of the following).		3
PJM 6125	Project Evaluation and Assessment	
PJM 6135	Project Quality Management	
PJM 6140	Managing Troubled Projects	
PJM 6710	Introduction to Program and Portfolio Management	

SPORT AND SOCIAL CHANGE

Code	Title	Hours
LDR 6410	Leadership and Organization in Sport	3
GST 6102	Global Corporate and Social Responsibility	4
HSV 6120	Social Inequality, Social Change, and Community Building	3
LDR 6360	Dynamics of Change at the Community and Social Level	3
LDR 6427	Gender and Diversity in Sport	3

Nonprofit Management, MS

Facing the threat of privatization and for-profit competition, nonprofit organizations are challenged to find leaders who not only possess keen business and managerial skills but can also effect change at a community or social level. Being successful in this dynamic and rewarding field requires strong leadership, managerial and interpersonal skills, as well as in-depth knowledge of fund-raising, marketing, program development, and governance issues.

Integrating theoretical approaches with practical applications, the **Master of Science in Nonprofit Management** seeks to prepare you for a leadership position in a not-for-profit university, hospital, charity, foundation, or religious organization. Upon completion of this nonprofit degree, you emerge well-equipped to embark on a career in nonprofit management—prepared, and inspired, to make a meaningful impact.

The mission of the Master of Science in Nonprofit Management at the College of Professional Studies is to offer courses that further develop the students' knowledge, skills, talent, and abilities. Faculty in the program support students' development goals through action-oriented courses that link theoretical learning to practical application. Nonprofit management courses aim to prepare students to be mission-driven executive leaders, managers, employees, and board members in public and private nonprofit organizations.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Courses

Code	Title	Hours
LDR 6100	Developing Your Leadership Capability	3
NPM 6110	Legal and Governance Issues in Nonprofit Organizations	3
NPM 6120	Financial Management for Nonprofit Organizations	3
NPM 6125	Promoting Nonprofit Organizations	3
NPM 6130	Fundraising and Development for Nonprofit Organizations	3
NPM 6140	Grant and Report Writing	3
NPM 6150	Human Resources Management in Nonprofit Organizations	3
NPM 6980	Capstone	3

Concentration

Complete one of the following concentrations:

- Global Studies
- Human Services
- Leadership
- Organizational Communication
- Project Management
- Social Media and Online Communication
- Sport and Social Change

Electives

Code	Title	Hours
Complete two of the following:		6
LDR 6110	Leading Teams	
LDR 6360	Dynamics of Change at the Community and Social Level	
CMN 6080	Intercultural Communication	
CMN 6050	Crisis Communication	
COP 6940	Personal and Career Development	
INT 6943	Integrative Experiential Learning	
EDU 6184	Interdisciplinary Foundations	

Program Credit/GPA Requirements

45–47 total quarter hours required
Minimum 3.000 GPA required

GLOBAL STUDIES

Code	Title	Hours
Required Courses		
GST 6100	Globalization and Global Politics and Economics	4
GST 6101	Global Literacy, Culture, and Community	4
GST 6320	Peace and Conflict	4
Elective		
Complete one of the following:		4
GST 6501	Regional Studies: East Asia	
GST 6502	Regional Studies: Middle East	
GST 6503	Regional Studies: Sub-Saharan Africa	
GST 6504	Regional Studies: Europe	

| GST 6505 | Regional Studies: Southwest and Central Asia | |
| GST 6506 | Regional Studies: Latin America | |

HUMAN SERVICES

Code	Title	Hours
HSV 6100	Theory and Practice of Human Services	3
HSV 6110	Human Services Management and Development	3
HSV 6630	Research and Evaluation in Human Services	3
HSV 6160	Introduction to Employee Assistance Programs	3
HSV 6640	Policy Issues in Human Services	3

LEADERSHIP

Code	Title	Hours
LDR 6110	Leading Teams	3
LDR 6120	Developing Organizational Leadership	3
LDR 6150	Innovation and Organizational Transformation	3
LDR 6135	Ethical Leadership	3
LDR 6140	Strategy Development and Implementation	3

ORGANIZATIONAL COMMUNICATION

Code	Title	Hours
CMN 6000 and INT 6000	Introduction to Organizational Communication and Writing Lab	3/1
CMN 6020	Ethical Issues in Organizational Communication	3
CMN 6050	Crisis Communication	3
CMN 6090	Organizational Culture, Climate, and Communication	3
CMN 6110	Group Dynamics and Interpersonal Conflict: Meeting Management	3

PROJECT MANAGEMENT

Code	Title	Hours
Required Courses [1]		
PJM 5900	Foundations of Project Management	4
PJM 6000	Project Management Practices	3
PJM 6005	Project Scope Management	3
PJM 6025	Project Scheduling and Cost Planning	3
PJM 6015	Project Risk Management	3
Electives		
Complete one of the following: [2]		3
PJM 6125	Project Evaluation and Assessment	
PJM 6135	Project Quality Management	
PJM 6140	Managing Troubled Projects	
PJM 6210	Communication Skills for Project Managers	
PJM 6710	Introduction to Program and Portfolio Management	

SOCIAL MEDIA AND ONLINE COMMUNICATION

Code	Title	Hours
Complete five of the following:		15-17
CMN 6015	Introduction to the Digital Era: The Power of Social Media	
CMN 6025	Digital Era Skills: Platforms, Tools, and Techniques	
CMN 6035	Legal, Policy, and Ethical Issues in the Digital Era	
CMN 6045	Leveraging Digital Technologies: Strategy, Assessment, and Governance	
CMN 6065	Implementation and Management of Social Media Channels and Online Communities	
DGM 6285	Interactive Marketing Fundamentals	
DGM 6290	Social Media and Brand Strategy Implementation	

SPORT AND SOCIAL CHANGE

Code	Title	Hours
LDR 6410	Leadership and Organization in Sport	3
GST 6102	Global Corporate and Social Responsibility	4
HSV 6120	Social Inequality, Social Change, and Community Building	3
LDR 6360	Dynamics of Change at the Community and Social Level	3
LDR 6427	Gender and Diversity in Sport	3

[1] This course is required for students who do not have **at least two years** of professional experience working on projects. This course is only intended for those who are not familiar with professional project work. Students with two years or more of professional project experience should not take Foundations of Project Management (PJM 5900).

[2] Students who take Foundations of Project Management (PJM 5900) are not required to take a course in this section.

Program and Portfolio Project Management, MS

The Master of Science in Program and Portfolio Project Management is intended to prepare project professionals for the more advanced-level roles in the organization. It provides a natural alignment to the professional advancement that exists within industry—from project manager to program manager to portfolio manager. Managing programs and portfolios successfully in any environment requires a unique set of interdisciplinary skills. This program seeks to bring together and train students in those skills that are most critical: program and portfolio management processes and tools, financial analysis, strategic and leadership skills, and communication skills and strategies. Advanced course work in program and project portfolio management will support project professionals in being prepared to focus on formulating strategies appropriate for changing market conditions, prioritizing and funding the appropriate initiatives and/or projects, successfully executing initiatives and/or projects in order to deliver strategic results, and using the lessons from unsuccessful strategy for strategy formulation.

The increasingly important role of program and project portfolio managers is becoming clear as companies orient more and more of their work in a projectized fashion. Another driving factor is better alignment of projects to the firm's strategy, doing the right projects to advance the organization. This has been made clear through the creation of advanced

industry certifications, such as the Program Management Professional (PgMP®) and the Portfolio Management Professional (PfMP®) credential by the Project Management Institute. This Master of Science degree will prepare these individuals with the knowledge, skills, and tools needed to effectively manage project-based programs and portfolios.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Courses

Code	Title	Hours
PJM 6710	Introduction to Program and Portfolio Management	3
PJM 6715	Advanced Program Management	3
PJM 6720	Advanced Portfolio Management	3
PJM 6725	Program and Portfolio Leadership	3
PJM 6730	Program and Portfolio Evaluation	3
PJM 6735	Program and Portfolio Management Capstone	3
PJM 6740	Managing Program and Portfolio Risk and Complexity	3
PJM 6750	Strategic Management and Decision Making for Program and Project Portfolio Managers	3

Required Electives

Code	Title	Hours
Complete two of the following:		6-7
CMN 6060	Negotiation, Mediation, and Facilitation	
CMN 6090	Organizational Culture, Climate, and Communication	
LDR 6135	Ethical Leadership	
LDR 6150	Innovation and Organizational Transformation	
INT 6943	Integrative Experiential Learning	
INT 6940	Experiential Learning Projects for Professionals	
EDU 6184	Interdisciplinary Foundations	

Concentration

Complete one of the following concentrations:

AGILE PROJECT MANAGEMENT

Code	Title	Hours
Required Courses		
PJM 6810	Principles of Agile Project Management	3
PJM 6815	Advanced Agile Project Management	3
PJM 6820	Agile Implementation and Governance	3
PJM 6825	Agile Lean Product Development	3
Elective		
Complete one of the following:		3
PJM 6205	Leading and Managing Technical Projects	
CMN 6060	Negotiation, Mediation, and Facilitation	

LEADERSHIP

Code	Title	Hours
Required Courses		
LDR 6100	Developing Your Leadership Capability	3
LDR 6110	Leading Teams	3
LDR 6120	Developing Organizational Leadership	3
LDR 6150	Innovation and Organizational Transformation	3
Elective		
Complete one of the following:		3
LDR 6135	Ethical Leadership	
LDR 6140	Strategy Development and Implementation	

ORGANIZATIONAL COMMUNICATION

Code	Title	Hours
Required Course		
CMN 6000 and INT 6000	Introduction to Organizational Communication and Writing Lab	4
Electives		
Complete four of the following:		12
CMN 6020	Ethical Issues in Organizational Communication	
CMN 6050	Crisis Communication	
CMN 6060	Negotiation, Mediation, and Facilitation	
CMN 6080	Intercultural Communication	
CMN 6090	Organizational Culture, Climate, and Communication	
CMN 6110	Group Dynamics and Interpersonal Conflict: Meeting Management	

PROJECT BUSINESS ANALYSIS

Code	Title	Hours
PJM 6610	Foundations of Project Business Analysis	3
PJM 6620	Project Business Analysis: Needs Assessment	3
PJM 6630	Project Business Analysis: Requirements Planning and Analysis	3
ALY 6000	Introduction to Analytics	3
PJM 6640	Leadership Strategies for the Business Analyst	3

Program Credit/GPA Requirements

45 total quarter hours required
Minimum 3.000 GPA required

Project Management, MS

Companies succeed or fail based on their ability to bring quality products and services to market in a timely manner. Without skilled project managers in place, companies are challenged to deliver projects on time, on budget, and according to specifications. From inception to completion, project managers are responsible for every step in the process: project definition, cost and risk estimation, schedule planning and monitoring, budget management, negotiation and conflict resolution, project leadership, and project presentation and evaluation.

The Master of Science in Project Management is designed to provide you with the practical skills and theoretical concepts you need to lead complex projects. Featuring real-world case studies, this project management degree presents techniques and tools for managing long- and short-term projects successfully and cost-effectively. Augmenting the core project management courses are concentrations that seek to provide you with content-specific expertise that enables you to deepen your knowledge in your field of interest.

In September of 2009, the Master of Science in Project Management received accreditation by the Project Management Institute's Global Accreditation Center (GAC), the world's leading association for project management professionals. Accreditation is achieved by meeting the GAC's rigorous standards, which include an assessment of program objectives and outcomes, a review of on-site and online resources, evaluations of faculty and students, and proof of continuous improvements in the area of project management.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Courses

Note: Foundations of Project Management (PJM 5900) must be completed *before* taking Project Management Practices (PJM 6000) for students who do not have at least three years of professional experience directing or leading project tasks. This course is highly recommended for students who do not have a basic working knowledge of Microsoft Project software. Students with project management experience are not required to take Foundations of Project Management (PJM 5900):

Code	Title	Hours
PJM 5900	Foundations of Project Management	4
PJM 6000	Project Management Practices	3
PJM 6005	Project Scope Management	3
PJM 6015	Project Risk Management	3
PJM 6025	Project Scheduling and Cost Planning	3
PJM 6135	Project Quality Management	3
The following course should be taken last:		
PJM 6910	Capstone	3

Project Management Required Electives

Code	Title	Hours
Complete two of the following. Note: Students who take PJM 5900 are required to take only one course in this section:		6
PJM 6125	Project Evaluation and Assessment	
PJM 6140	Managing Troubled Projects	
PJM 6145	Global Project Management	
PJM 6710	Introduction to Program and Portfolio Management	

Electives

Code	Title	Hours
Complete two of the following:		5-7
CMN 6000	Introduction to Organizational Communication	
CMN 6005	Foundations of Professional Communication	
CMN 6060	Negotiation, Mediation, and Facilitation	
CMN 6090	Organizational Culture, Climate, and Communication	
CMN 6095	Foundations of Developing Cultural Awareness	
CMN 6110	Group Dynamics and Interpersonal Conflict: Meeting Management	
COP 6940	Personal and Career Development	
INT 6943	Integrative Experiential Learning	
INT 6940	Experiential Learning Projects for Professionals	
PJM 6205	Leading and Managing Technical Projects	
PJM 6210	Communication Skills for Project Managers	
PJM 6215	Leading Remote Project Teams	
PJM 6175	Project Resource Management	
PJM 6180	Project Stakeholder Management	
EDU 6184	Interdisciplinary Foundations	

Concentrations

Complete one of the following concentrations:

- Clinical Trial Design (p.   )
- Construction Management (p. 340)
- Geographic Information Systems (p. 341)
- Information Security Management (p.   )
- Leadership (p. 341)
- Leading and Managing Technical Projects (p.   )
- Organizational Communication (p.   )
- Agile Project Management (p. 341)
- **Program and Portfolio Management**
- Project Business Analysis (p.   )

Program Credit/GPA Requirements

45–48 total quarter hours required
Minimum 3.000 GPA required

CLINICAL TRIAL DESIGN

Code	Title	Hours
Required Courses		
BTC 6211	Validation and Auditing of Clinical Trial Information	4
BTC 6213	Clinical Trial Design Optimization and Problem Solving	4
PMC 6212	Clinical Drug Development Data Analysis: Concepts	4
Elective		
Complete one of the following:		4
RGA 6210	Strategic Planning and Project Management for Regulatory Affairs	
BTC 6210	Human Experimentation: Methodological Issues Fundamentals	

CONSTRUCTION MANAGEMENT

Code	Title	Hours
CMG 6400	Introduction to Construction Management	4

Code	Title	Hours
CMG 6402	Alternative Project Delivery Methods and Project Controls	4
CMG 6403	Safety, Project Risk, and Quality Management	4
CMG 6405	Construction Law	4

GEOGRAPHIC INFORMATION SYSTEMS

Code	Title	Hours
Required Courses		
GIS 5101	Introduction to Geographic Information Systems	3
GIS 5102	Fundamentals of GIS Analysis	3
RMS 5105	Fundamentals of Remote Sensing	3
GIS 5201	Advanced Spatial Analysis	3
Elective		
Complete one of the following:		3
GIS 6340	GIS Customization	
GIS 6350	Planning a GIS Implementation	
GIS 6370	Internet-Based GIS	
GIS 6360	Spatial Databases	

INFORMATION SECURITY MANAGEMENT

Code	Title	Hours
Required Courses		
ITC 6300	Foundations of Information Security	3
ITC 6315	Information Security Risk Management	3
ITC 6310	Information Security Governance	3
ITC 6320	Information Security Technology	3
Elective		
Complete one of the following:		3
ITC 6020	Information Systems Design and Development	
ITC 6305	IT Infrastructure (Systems, Networks, Telecom)	
ITC 6335	Data Warehousing and Data Mining	
ITC 6345	Systems and Network Administration	

LEADERSHIP

Code	Title	Hours
Required Courses		
LDR 6100	Developing Your Leadership Capability	3
LDR 6110	Leading Teams	3
LDR 6120	Developing Organizational Leadership	3
LDR 6150	Innovation and Organizational Transformation	3
Elective		
Complete one of the following:		3
LDR 6135	Ethical Leadership	
LDR 6140	Strategy Development and Implementation	

LEADING AND MANAGING TECHNICAL PROJECTS

Code	Title	Hours
PJM 6205	Leading and Managing Technical Projects	3
PJM 6210	Communication Skills for Project Managers	3
PJM 6215	Leading Remote Project Teams	3
PJM 6220	Planning and Scheduling Technical Projects	3
PJM 6825	Agile Lean Product Development	3

ORGANIZATIONAL COMMUNICATION

Code	Title	Hours
Required Course		
CMN 6000 and INT 6000	Introduction to Organizational Communication and Writing Lab	3-4
Electives		
Complete four of the following:		12
CMN 6020	Ethical Issues in Organizational Communication	
CMN 6050	Crisis Communication	
CMN 6060	Negotiation, Mediation, and Facilitation	
CMN 6080	Intercultural Communication	
CMN 6090	Organizational Culture, Climate, and Communication	
CMN 6110	Group Dynamics and Interpersonal Conflict: Meeting Management	

AGILE PROJECT MANAGEMENT

Code	Title	Hours
Students in this concentration are only required to complete one project management required elective.		
PJM 6810	Principles of Agile Project Management	3
PJM 6815	Advanced Agile Project Management	3
PJM 6820	Agile Implementation and Governance	3
PJM 6825	Agile Lean Product Development	3
PJM 6205	Leading and Managing Technical Projects	3

PROGRAM AND PORTFOLIO MANAGEMENT

Code	Title	Hours
Students in this concentration are only required to complete one project management required elective.		
PJM 6710	Introduction to Program and Portfolio Management	3
PJM 6715	Advanced Program Management	3
PJM 6720	Advanced Portfolio Management	3
PJM 6725	Program and Portfolio Leadership	3
PJM 6730	Program and Portfolio Evaluation	3
PJM 6735	Program and Portfolio Management Capstone	3

PROJECT BUSINESS ANALYSIS

Code	Title	Hours
PJM 6610	Foundations of Project Business Analysis	3
PJM 6620	Project Business Analysis: Needs Assessment	3
PJM 6630	Project Business Analysis: Requirements Planning and Analysis	3
ALY 6000	Introduction to Analytics	3
PJM 6640	Leadership Strategies for the Business Analyst	3

Regulatory Affairs for Drugs, Biologics, and Medical Devices with Concentration in Clinical Research Regulatory Affairs, MS

The rapid growth of the biomedical product industries and the ever-evolving regulatory landscape have driven high demand for trained regulatory affairs professionals in both the public and private sectors. In response to this demand, Northeastern University's College of Professional Studies offers the Master of Science in Regulatory Affairs for Drugs, Biologics, and Medical Devices.

This unique graduate degree is designed to both broaden and deepen the student's understanding of current regulations and their practical application in the development of biomedical products. Courses within this program provide students with the opportunity to integrate both scientific knowledge and regulatory perspectives, within the larger context of global commercialization. From discovery through the postmarket phase of product development, this master's degree covers the regulatory and market access requirements to bring a medical product to—and maintain its presence in—the global marketplace.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Courses

Code	Title	Hours
RGA 6101	Therapeutic Product Development: A Regulatory Overview	4
RGA 6202	Medical Device Development: A Regulatory Overview	4
RGA 6203	Pharmaceutical and Medical Device Law: Topics and Cases	5
RGA 6207	Global Impact of Electronic Common Technical Document (eCTD) Submissions	4
BTC 6210	Human Experimentation: Methodological Issues Fundamentals	4
BTC 6213	Clinical Trial Design Optimization and Problem Solving	4
RGA 6300	Practical Applications in Biomedical Product Global Regulatory Affairs	4

Required Electives

Students must earn a minimum of 16 quarter hours by choosing at least one course from each elective category.

REGULATORY AND CLINICAL OPERATIONS

Code	Title	Hours
Complete at least one of the following:		3-4
BTC 6211	Validation and Auditing of Clinical Trial Information	
RGA 6000	Introduction to Food and Drug Administration (FDA) Pharmaceutical Regulation	
RGA 6001	Introduction to Food and Drug Administration Medical Device Regulation	
RGA 6212	Introduction to Safety Sciences	
RGA 6230	Clinical Laboratory Management in Clinical Trials	
RGA 6310	Regulatory Documentation Processes	
RGA 6385	Operational Aspects of Electronic Common Technical Document (eCTD) Submissions	

REGULATORY PERSPECTIVE: PRODUCT DEVELOPMENT, BUSINESS, AND STRATEGY

Code	Title	Hours
Complete at least one of the following:		2-4
BTC 6260	The Business of Medicine and Biotechnology	
RGA 6235	Emerging Product Categories in the Regulation of Drugs and Biologics	
RGA 6217	Biomedical Product Development: From Biotech to Boardroom to Market	
RGA 6215	Project Management in Early Drug Discovery and Development	
RGA 6210	Strategic Planning and Project Management for Regulatory Affairs	
RGA 6245	Regulation of Generic Pharmaceutical and Biosimilar Products	
RGA 6250	Financing and Reimbursement in Biomedical Product Development	
RGA 6216	The Medical, Social, and Financial Dimensions of Orphan Drugs	
RGA 6211	Combination Products and Convergence	
COP 6940	Personal and Career Development (Enrollment in COP 6940 requires participation in the cooperative education program [subject to availability.] Students must complete two of the following four courses prior to enrolling in COP 6940: RGA 6100, RGA 6201, RGA 6202, or BTC 6210.)	
INT 6943 and RGA 6920	Integrative Experiential Learning and Internship Reflection	
EDU 6184	Interdisciplinary Foundations	

INTERNATIONAL

Code	Title	Hours
Complete at least one of the following:		4-5
RGA 6228	Managing International Clinical Trials	
RGA 6221	European Union Compliance Process and Regulatory Affairs	
RGA 6223	Introduction to Canadian, Asian, and Latin American Regulatory Affairs	
RGA 6224	Regulation of Biomedical Product Commercialization by Health Canada	
RGA 6241	Working in Multicultural Environments: Challenges and Opportunities	
RGA 6247	Medicines Regulatory Harmonization in Africa	

SPECIAL TOPICS

Code	Title	Hours
Choose at least one of the following elective options:		
RGA 6242	Preparing EU Medical Device Clinical Evaluations	

RGA 6470	Research Ethics	
RGA 6431	Clinical Trial Agreements and Other Key Contracts in the Life Sciences	
RGA 6461	Cybersecurity and Regulation of Digital Health Technologies by the FDA	
RGA 6432	Real-World Evidence in Biomedical Research	
RGA 6420	Global IVD Regulations and Submissions	
RGA 6460	Intellectual Property in the Life Sciences	
RGA 6431	Clinical Trial Agreements and Other Key Contracts in the Life Sciences	
RGA 6410	Fundamentals of CMC Regulations and Methods	
RGA 6430	Clinical Trial Quality Oversight	

Program Credit/GPA Requirements

45 total quarter hours required
Minimum 3.000 GPA required

Regulatory Affairs for Drugs, Biologics, and Medical Devices with Concentration in General Regulatory Affairs, MS

The rapid growth of the biomedical product industries and the ever-evolving regulatory landscape have driven high demand for trained regulatory affairs professionals in both the public and private sectors. In response to this demand, Northeastern University's College of Professional Studies offers the Master of Science in Regulatory Affairs for Drugs, Biologics, and Medical Devices.

This unique graduate degree is designed to both broaden and deepen the student's understanding of current regulations and their practical application in the development of biomedical products. Courses within this program provide students with the opportunity to integrate both scientific knowledge and regulatory perspectives, within the larger context of global commercialization. From discovery through the postmarket phase of product development, this master's degree covers the regulatory and market access requirements to bring a medical product to—and maintain its presence in—the global marketplace.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Courses

Code	Title	Hours
RGA 6000	Introduction to Food and Drug Administration (FDA) Pharmaceutical Regulation	2
RGA 6001	Introduction to Food and Drug Administration Medical Device Regulation	2
BTC 6210	Human Experimentation: Methodological Issues Fundamentals	4
RGA 6002	Regulatory Compliance Culture	2
RGA 6101	Therapeutic Product Development: A Regulatory Overview	4
RGA 6202	Medical Device Development: A Regulatory Overview	4

RGA 6203	Pharmaceutical and Medical Device Law: Topics and Cases	5
RGA 6207	Global Impact of Electronic Common Technical Document (eCTD) Submissions	4
RGA 6300	Practical Applications in Biomedical Product Global Regulatory Affairs	4

Required Electives

Students must earn a minimum of 14 quarter hours by choosing at least one course from each category.

REGULATORY AND CLINICAL OPERATIONS

Code	Title	Hours
Complete at least one of the following:		3-4
BTC 6211	Validation and Auditing of Clinical Trial Information	
BTC 6213	Clinical Trial Design Optimization and Problem Solving	
RGA 6385	Operational Aspects of Electronic Common Technical Document (eCTD) Submissions	
RGA 6212	Introduction to Safety Sciences	
RGA 6230	Clinical Laboratory Management in Clinical Trials	
RGA 6280	Advanced Writing on International Biomedical Topics	
RGA 6310	Regulatory Documentation Processes	
RGA 6370	Advanced Regulatory Writing: Medical Device Submissions	
RGA 6380	Advanced Regulatory Writing: New Drug Applications	
RGA 6233	Application of Quality System Regulation in Medical Device Design and Manufacturing	
RGA 6234	Drug and Device Supplier Risk Management: Compliance and Processes	

REGULATORY PERSPECTIVE: PRODUCT DEVELOPMENT, BUSINESS, AND STRATEGY

Code	Title	Hours
Complete at least one of the following:		2-4
BTC 6260	The Business of Medicine and Biotechnology	
RGA 6215	Project Management in Early Drug Discovery and Development	
RGA 6216	The Medical, Social, and Financial Dimensions of Orphan Drugs	
RGA 6217	Biomedical Product Development: From Biotech to Boardroom to Market	
RGA 6219	Advanced Topics in Advertising and Promotion of Drugs and Medical Devices	
PMC 6212	Clinical Drug Development Data Analysis: Concepts	
RGA 6112	Biomedical Intellectual Property Management Strategy: Patents and Trade Secrets	

RGA 6205	Emerging Trends and Issues in the Medical Device Industry	
RGA 6210	Strategic Planning and Project Management for Regulatory Affairs	
RGA 6211	Combination Products and Convergence	
RGA 6245	Regulation of Generic Pharmaceutical and Biosimilar Products	
RGA 6250	Financing and Reimbursement in Biomedical Product Development	
COP 6940	Personal and Career Development (Enrollment in COP 6940 requires participation in the cooperative education program [subject to availability.] Students must complete two of the following four courses prior to enrolling in COP 6940: RGA 6100, RGA 6201, RGA 6202, or BTC 6210.)	
INT 6943 and RGA 6920	Integrative Experiential Learning and Internship Reflection	
EDU 6184	Interdisciplinary Foundations	

INTERNATIONAL

Code	Title	Hours
Complete at least one of the following:		4-5
RGA 6221	European Union Compliance Process and Regulatory Affairs	
RGA 6222	European Medical Device Regulations	
RGA 6223	Introduction to Canadian, Asian, and Latin American Regulatory Affairs	
RGA 6224	Regulation of Biomedical Product Commercialization by Health Canada	
RGA 6225	Japanese Medical Device Regulations and Registration	
RGA 6226	Canadian and Australian Medical Device Regulations	
RGA 6227	Emerging Medical Device Markets	
RGA 6228	Managing International Clinical Trials	
RGA 6241	Working in Multicultural Environments: Challenges and Opportunities	
RGA 6247	Medicines Regulatory Harmonization in Africa	

SPECIAL TOPICS

Code	Title	Hours
Choose at least one of the following electives:		
RGA 6461	Cybersecurity and Regulation of Digital Health Technologies by the FDA	
RGA 6470	Research Ethics	
RGA 6460	Intellectual Property in the Life Sciences	
RGA 6420	Global IVD Regulations and Submissions	
RGA 6410	Fundamentals of CMC Regulations and Methods	

Program Credit/GPA Requirements

45 total quarter hours required

Minimum 3.000 GPA required

Regulatory Affairs for Drugs, Biologics, and Medical Devices with Concentration in International Regulatory Affairs, MS

The rapid growth of the biomedical product industries and the ever-evolving regulatory landscape have driven high demand for trained regulatory affairs professionals in both the public and private sectors. In response to this demand, Northeastern University's College of Professional Studies offers the Master of Science in Regulatory Affairs for Drugs, Biologics, and Medical Devices.

This unique graduate degree is designed to both broaden and deepen the student's understanding of current regulations and their practical application in the development of biomedical products. Courses within this program provide students with the opportunity to integrate both scientific knowledge and regulatory perspectives, within the larger context of global commercialization. From discovery through the postmarket phase of product development, this master's degree covers the regulatory and market access requirements to bring a medical product to—and maintain its presence in—the global marketplace.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Courses

Code	Title	Hours
BTC 6210	Human Experimentation: Methodological Issues Fundamentals	4
RGA 6000	Introduction to Food and Drug Administration (FDA) Pharmaceutical Regulation	2
RGA 6001	Introduction to Food and Drug Administration Medical Device Regulation	2
RGA 6101	Therapeutic Product Development: A Regulatory Overview	4
RGA 6202	Medical Device Development: A Regulatory Overview	4
RGA 6204	Legal Issues in International Food, Drug, and Medical Device Regulation	4
RGA 6207	Global Impact of Electronic Common Technical Document (eCTD) Submissions	4
RGA 6223	Introduction to Canadian, Asian, and Latin American Regulatory Affairs	4
RGA 6241	Working in Multicultural Environments: Challenges and Opportunities	2
RGA 6300	Practical Applications in Biomedical Product Global Regulatory Affairs	4

Required Electives

Students must earn a minimum of 15 quarter hours by choosing at least one course from each elective category.

REGULATORY AND CLINICAL OPERATIONS

Code	Title	Hours
Complete at least one of the following:		3-4
BTC 6211	Validation and Auditing of Clinical Trial Information	

BTC 6213	Clinical Trial Design Optimization and Problem Solving
RGA 6212	Introduction to Safety Sciences
RGA 6370	Advanced Regulatory Writing: Medical Device Submissions
RGA 6380	Advanced Regulatory Writing: New Drug Applications
RGA 6385	Operational Aspects of Electronic Common Technical Document (eCTD) Submissions

REGULATORY PERSPECTIVE

Code	Title	Hours
Complete at least one of the following:		2-5
RGA 6203	Pharmaceutical and Medical Device Law: Topics and Cases	
BTC 6260	The Business of Medicine and Biotechnology	
RGA 6217	Biomedical Product Development: From Biotech to Boardroom to Market	
RGA 6235	Emerging Product Categories in the Regulation of Drugs and Biologics	
RGA 6205	Emerging Trends and Issues in the Medical Device Industry	
RGA 6210	Strategic Planning and Project Management for Regulatory Affairs	
RGA 6245	Regulation of Generic Pharmaceutical and Biosimilar Products	
RGA 6211	Combination Products and Convergence	
COP 6940	Personal and Career Development (Enrollment in COP 6940 requires participation in the cooperative education program (subject to availability). Students must complete two of the following four courses prior to enrolling in COP 6940: RGA 6100, RGA 6201, RGA 6202, or BTC 6210.)	
INT 6943 and RGA 6920	Integrative Experiential Learning and Internship Reflection	
EDU 6184	Interdisciplinary Foundations	

INTERNATIONAL

Code	Title	Hours
Complete at least one of the following:		4
RGA 6221	European Union Compliance Process and Regulatory Affairs	
RGA 6222	European Medical Device Regulations	
RGA 6223	Introduction to Canadian, Asian, and Latin American Regulatory Affairs	
RGA 6224	Regulation of Biomedical Product Commercialization by Health Canada	
RGA 6225	Japanese Medical Device Regulations and Registration	
RGA 6226	Canadian and Australian Medical Device Regulations	
RGA 6227	Emerging Medical Device Markets	
RGA 6228	Managing International Clinical Trials	

RGA 6229	Biomedical Product Regulatory Affairs in Emerging Markets: Russia and Kazakhstan
RGA 6211	Combination Products and Convergence
RGA 6244	Therapeutic Product Development in Canada
RGA 6243	Medical Device Product Development in Canada
RGA 6240	
RGA 6249	Chinese Food and Drug Administration Regulation of Biomedical Product Commercialization
RGA 6247	Medicines Regulatory Harmonization in Africa

SPECIAL TOPICS

Code	Title	Hours
Complete at least one of the following:		
RGA 6410	Fundamentals of CMC Regulations and Methods	
RGA 6242	Preparing EU Medical Device Clinical Evaluations	
RGA 6460	Intellectual Property in the Life Sciences	
RGA 6420	Global IVD Regulations and Submissions	
RGA 6246		
RGA 6002	Regulatory Compliance Culture	

Program Credit/GPA Requirements

45 total quarter hours required
Minimum 3.000 GPA required

Regulatory Affairs for Drugs, Biologics, and Medical Devices with Concentration in Medical Devices, MS

The medical devices regulation concentration within the master's degree for drugs, biologics, and medical devices program enables students to focus specifically on regulatory issues associated with global commercialization of medical device products and services. Medical device regulation, in many aspects, differs substantially from regulation of drug and biologic product commercialization. In addition to significant geographic variability between these product groups from a regulatory perspective, most of the regulatory operational functions associated with commercializing medical device products and services are unique to that product category. Moreover, these differences extend to both the preapproval and postapproval aspects of compliance reporting between the two sets of product groups. Given this variability, the medical devices regulation concentration gives students the opportunity to study the global regulatory marketing approval processes, compliance issues, and operational details specific to this product group. The concentration also enables students to compare and contrast both the similarities and differences between global medical device product and service regulations and those of drug and biologic product regulation.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Courses

Code	Title	Hours
RGA 6001	Introduction to Food and Drug Administration Medical Device Regulation	2
BTC 6210	Human Experimentation: Methodological Issues Fundamentals	4
RGA 6202	Medical Device Development: A Regulatory Overview	4
RGA 6203	Pharmaceutical and Medical Device Law: Topics and Cases	5
RGA 6370	Advanced Regulatory Writing: Medical Device Submissions	4
RGA 6300	Practical Applications in Biomedical Product Global Regulatory Affairs	4

Electives

Code	Title	Hours
Complete 22 quarter hours from the following. At least one elective must be taken from each of the categories below.		22
Regulatory and Clinical Operations		
RGA 6233	Application of Quality System Regulation in Medical Device Design and Manufacturing	
RGA 6234	Drug and Device Supplier Risk Management: Compliance and Processes	
Regulatory Perspective: Product Development, Business, and Strategy		
RGA 6219	Advanced Topics in Advertising and Promotion of Drugs and Medical Devices	
RGA 6112	Biomedical Intellectual Property Management Strategy: Patents and Trade Secrets	
RGA 6205	Emerging Trends and Issues in the Medical Device Industry	
RGA 6210	Strategic Planning and Project Management for Regulatory Affairs	
RGA 6211	Combination Products and Convergence	
COP 6940	Personal and Career Development (Enrollment in COP 6940 requires participation in the cooperative education program, subject to availability)	
INT 6943	Integrative Experiential Learning	
EDU 6184	Interdisciplinary Foundations	
International		
RGA 6222	European Medical Device Regulations	
RGA 6225	Japanese Medical Device Regulations and Registration	
RGA 6226	Canadian and Australian Medical Device Regulations	
RGA 6227	Emerging Medical Device Markets	
RGA 6241	Working in Multicultural Environments: Challenges and Opportunities	
RGA 6247	Medicines Regulatory Harmonization in Africa	
Special Topics		
RGA 6243	Medical Device Product Development in Canada	
RGA 6460	Intellectual Property in the Life Sciences	
RGA 6420	Global IVD Regulations and Submissions	
RGA 6242	Preparing EU Medical Device Clinical Evaluations	

Program Credit/GPA Requirements

45 total quarter hours required
Minimum 3.000 GPA required

Regulatory Affairs for Drugs, Biologics, and Medical Devices with Concentration in Operational Regulatory Affairs, MS

The rapid growth of the biomedical product industries and the ever-evolving regulatory landscape have driven high demand for trained regulatory affairs professionals in both the public and private sectors. In response to this demand, Northeastern University's College of Professional Studies offers the Master of Science in Regulatory Affairs for Drugs, Biologics, and Medical Devices.

This unique graduate degree is designed to both broaden and deepen the student's understanding of current regulations and their practical application in the development of biomedical products. Courses within this program provide students with the opportunity to integrate both scientific knowledge and regulatory perspectives, within the larger context of global commercialization. From discovery through the postmarket phase of product development, this master's degree covers the regulatory and market access requirements to bring a medical product to—and maintain its presence in—the global marketplace.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Courses

Code	Title	Hours
RGA 6000	Introduction to Food and Drug Administration (FDA) Pharmaceutical Regulation	2
RGA 6001	Introduction to Food and Drug Administration Medical Device Regulation	2
RGA 6101	Therapeutic Product Development: A Regulatory Overview	4
RGA 6202	Medical Device Development: A Regulatory Overview	4
RGA 6203	Pharmaceutical and Medical Device Law: Topics and Cases	5
RGA 6207	Global Impact of Electronic Common Technical Document (eCTD) Submissions	4
RGA 6385	Operational Aspects of Electronic Common Technical Document (eCTD) Submissions	4

| RGA 6248 | Global Regulatory Operations | 2 |
| RGA 6300 | Practical Applications in Biomedical Product Global Regulatory Affairs | 4 |

Required Electives

Students must earn a minimum of 14 quarter hours by completing at least three courses from the lists below.

REGULATORY AND CLINICAL OPERATIONS

Code	Title	Hours
BTC 6210	Human Experimentation: Methodological Issues Fundamentals	
BTC 6211	Validation and Auditing of Clinical Trial Information	
RGA 6212	Introduction to Safety Sciences	
RGA 6310	Regulatory Documentation Processes	
RGA 6370	Advanced Regulatory Writing: Medical Device Submissions	
RGA 6380	Advanced Regulatory Writing: New Drug Applications	

REGULATORY PERSPECTIVE: PRODUCT DEVELOPMENT, BUSINESS, AND STRATEGY

Code	Title	Hours
BTC 6260	The Business of Medicine and Biotechnology	
RGA 6235	Emerging Product Categories in the Regulation of Drugs and Biologics	
RGA 6205	Emerging Trends and Issues in the Medical Device Industry	
RGA 6210	Strategic Planning and Project Management for Regulatory Affairs	
RGA 6245	Regulation of Generic Pharmaceutical and Biosimilar Products	
RGA 6211	Combination Products and Convergence	
RGA 6112	Biomedical Intellectual Property Management Strategy: Patents and Trade Secrets	
COP 6940	Personal and Career Development (Enrollment in COP 6940 requires participation in the cooperative education program [subject to availability.] Students must complete two of the following four courses prior to enrolling in COP 6940: RGA 6100, RGA 6201, RGA 6202, or BTC 6210.)	
INT 6943 and RGA 6920	Integrative Experiential Learning and Internship Reflection	
EDU 6184	Interdisciplinary Foundations	

INTERNATIONAL

Code	Title	Hours
RGA 6221	European Union Compliance Process and Regulatory Affairs	
RGA 6222	European Medical Device Regulations	
RGA 6223	Introduction to Canadian, Asian, and Latin American Regulatory Affairs	
RGA 6224	Regulation of Biomedical Product Commercialization by Health Canada	
RGA 6225	Japanese Medical Device Regulations and Registration	
RGA 6226	Canadian and Australian Medical Device Regulations	
RGA 6241	Working in Multicultural Environments: Challenges and Opportunities	
RGA 6247	Medicines Regulatory Harmonization in Africa	
RGA 6204	Legal Issues in International Food, Drug, and Medical Device Regulation	

SPECIAL TOPICS

Code	Title	Hours
RGA 6461	Cybersecurity and Regulation of Digital Health Technologies by the FDA	
RGA 6431	Clinical Trial Agreements and Other Key Contracts in the Life Sciences	
RGA 6460	Intellectual Property in the Life Sciences	
RGA 6420	Global IVD Regulations and Submissions	
RGA 6410	Fundamentals of CMC Regulations and Methods	

Program Credit/GPA Requirements

45 total quarter hours required
Minimum 3.000 GPA required

Regulatory Affairs for Drugs, Biologics, and Medical Devices with Concentration in Regulatory Compliance, MS

The rapid growth of the biomedical product industries and the ever-evolving regulatory landscape have driven high demand for trained regulatory affairs professionals in both the public and private sectors. In response to this demand, Northeastern University's College of Professional Studies offers the Master of Science in Regulatory Affairs for Drugs, Biologics, and Medical Devices.

This unique graduate degree is designed to both broaden and deepen the student's understanding of current regulations and their practical application in the development of biomedical products. Courses within this program provide students with the opportunity to integrate both scientific knowledge and regulatory perspectives, within the larger context of global commercialization. From discovery through the postmarket phase of product development, this master's degree covers the regulatory and market access requirements to bring a medical product to—and maintain its presence in—the global marketplace.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Courses

Code	Title	Hours
BTC 6210	Human Experimentation: Methodological Issues Fundamentals	4
RGA 6000	Introduction to Food and Drug Administration (FDA) Pharmaceutical Regulation	2

RGA 6001	Introduction to Food and Drug Administration Medical Device Regulation	2
RGA 6101	Therapeutic Product Development: A Regulatory Overview	4
RGA 6202	Medical Device Development: A Regulatory Overview	4
RGA 6203	Pharmaceutical and Medical Device Law: Topics and Cases	5
RGA 6207	Global Impact of Electronic Common Technical Document (eCTD) Submissions	4
RGA 6462	Regulatory Compliance in the Pharmaceutical Industry: A Collaborative Approach	4
RGA 6300	Practical Applications in Biomedical Product Global Regulatory Affairs	4

Required Electives

Students must earn a minimum of 12 quarter hours by completing at least one course from each elective category.

REGULATORY AND CLINICAL OPERATIONS

Code	Title	Hours
Complete at least one of the following:		4
RGA 6212	Introduction to Safety Sciences	
BTC 6213	Clinical Trial Design Optimization and Problem Solving	
RGA 6385	Operational Aspects of Electronic Common Technical Document (eCTD) Submissions	
BTC 6211	Validation and Auditing of Clinical Trial Information	
RGA 6230	Clinical Laboratory Management in Clinical Trials	
RGA 6233	Application of Quality System Regulation in Medical Device Design and Manufacturing	
RGA 6234	Drug and Device Supplier Risk Management: Compliance and Processes	

REGULATORY PERSPECTIVE: PRODUCT DEVELOPMENT, BUSINESS, AND STRATEGY

Code	Title	Hours
Complete at least one of the following:		2-4
BTC 6260	The Business of Medicine and Biotechnology	
RGA 6217	Biomedical Product Development: From Biotech to Boardroom to Market	
RGA 6235	Emerging Product Categories in the Regulation of Drugs and Biologics	
RGA 6210	Strategic Planning and Project Management for Regulatory Affairs	
RGA 6245	Regulation of Generic Pharmaceutical and Biosimilar Products	
RGA 6205	Emerging Trends and Issues in the Medical Device Industry	
RGA 6211	Combination Products and Convergence	

COP 6940	Personal and Career Development (Enrollment in COP 6940 requires participation in the cooperative education program [subject to availability.] Students must complete two of the following four courses prior to enrolling in COP 6940: RGA 6100, RGA 6201, RGA 6202, or BTC 6210.)	
INT 6943 and RGA 6920	Integrative Experiential Learning and Internship Reflection	
EDU 6184	Interdisciplinary Foundations	

INTERNATIONAL

Code	Title	Hours
Complete at least one of the following:		4
RGA 6221	European Union Compliance Process and Regulatory Affairs	
RGA 6222	European Medical Device Regulations	
RGA 6223	Introduction to Canadian, Asian, and Latin American Regulatory Affairs	
RGA 6224	Regulation of Biomedical Product Commercialization by Health Canada	
RGA 6225	Japanese Medical Device Regulations and Registration	
RGA 6226	Canadian and Australian Medical Device Regulations	
RGA 6228	Managing International Clinical Trials	
RGA 6204	Legal Issues in International Food, Drug, and Medical Device Regulation	
RGA 6247	Medicines Regulatory Harmonization in Africa	
RGA 6248	Global Regulatory Operations	

SPECIAL TOPICS

Code	Title	Hours
Complete at least one of the following:		
RGA 6410	Fundamentals of CMC Regulations and Methods	
RGA 6461	Cybersecurity and Regulation of Digital Health Technologies by the FDA	
RGA 6431	Clinical Trial Agreements and Other Key Contracts in the Life Sciences	
RGA 6460	Intellectual Property in the Life Sciences	
RGA 6420	Global IVD Regulations and Submissions	
RGA 6430	Clinical Trial Quality Oversight	
RGA 6002	Regulatory Compliance Culture	

Program Credit/GPA Requirements

45 total quarter hours required
Minimum 3.000 GPA required

Regulatory Affairs for Drugs, Biologics, and Medical Devices with Concentration in Strategic Regulatory Affairs, MS

The rapid growth of the biomedical product industries and the ever-evolving regulatory landscape have driven high demand for trained regulatory affairs professionals in both the public and private sectors.

In response to this demand, Northeastern University's College of Professional Studies offers the Master of Science in Regulatory Affairs for Drugs, Biologics, and Medical Devices.

This unique graduate degree is designed to both broaden and deepen the student's understanding of current regulations and their practical application in the development of biomedical products. Courses within this program provide students with the opportunity to integrate both scientific knowledge and regulatory perspectives, within the larger context of global commercialization. From discovery through the postmarket phase of product development, this master's degree covers the regulatory and market access requirements to bring a medical product to—and maintain its presence in—the global marketplace.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Courses

Code	Title	Hours
BTC 6210	Human Experimentation: Methodological Issues Fundamentals	4
RGA 6101	Therapeutic Product Development: A Regulatory Overview	4
RGA 6202	Medical Device Development: A Regulatory Overview	4
RGA 6203	Pharmaceutical and Medical Device Law: Topics and Cases	5
RGA 6207	Global Impact of Electronic Common Technical Document (eCTD) Submissions	4
RGA 6217	Biomedical Product Development: From Biotech to Boardroom to Market	4
RGA 6300	Practical Applications in Biomedical Product Global Regulatory Affairs	4

Required Electives

Students must earn a minimum of 16 quarter hours by completing at least one course from each elective category.

REGULATORY AND CLINICAL OPERATIONS

Code	Title	Hours
Complete one of the following:		4
BTC 6211	Validation and Auditing of Clinical Trial Information	
BTC 6213	Clinical Trial Design Optimization and Problem Solving	
RGA 6212	Introduction to Safety Sciences	
RGA 6385	Operational Aspects of Electronic Common Technical Document (eCTD) Submissions	

REGULATORY PERSPECTIVE: PRODUCT DEVELOPMENT, BUSINESS, AND STRATEGY

Code	Title	Hours
Complete one of the following:		2-4
BTC 6260	The Business of Medicine and Biotechnology	
RGA 6463	Regulatory Strategy for Product Development and Life-Cycle Management	

Code	Title	Hours
RGA 6216	The Medical, Social, and Financial Dimensions of Orphan Drugs	
RGA 6235	Emerging Product Categories in the Regulation of Drugs and Biologics	
RGA 6112	Biomedical Intellectual Property Management Strategy: Patents and Trade Secrets	
RGA 6205	Emerging Trends and Issues in the Medical Device Industry	
RGA 6245	Regulation of Generic Pharmaceutical and Biosimilar Products	
RGA 6250	Financing and Reimbursement in Biomedical Product Development	
RGA 6210	Strategic Planning and Project Management for Regulatory Affairs	
RGA 6211	Combination Products and Convergence	
COP 6940	Personal and Career Development (Enrollment in COP 6940 requires participation in the cooperative education program [subject to availability.] Students must complete two of the following four courses prior to enrolling in COP 6940: RGA 6100, RGA 6201, RGA 6202, or BTC 6210.)	
INT 6943 and RGA 6920	Integrative Experiential Learning and Internship Reflection	
EDU 6184	Interdisciplinary Foundations	

INTERNATIONAL

Code	Title	Hours
Complete one of the following:		4-5
RGA 6221	European Union Compliance Process and Regulatory Affairs	
RGA 6222	European Medical Device Regulations	
RGA 6223	Introduction to Canadian, Asian, and Latin American Regulatory Affairs	
RGA 6224	Regulation of Biomedical Product Commercialization by Health Canada	
RGA 6225	Japanese Medical Device Regulations and Registration	
RGA 6226	Canadian and Australian Medical Device Regulations	
RGA 6227	Emerging Medical Device Markets	
RGA 6241	Working in Multicultural Environments: Challenges and Opportunities	
RGA 6204	Legal Issues in International Food, Drug, and Medical Device Regulation	
RGA 6247	Medicines Regulatory Harmonization in Africa	

SPECIAL TOPICS

Code	Title	Hours
Complete one of the following:		
RGA 6410	Fundamentals of CMC Regulations and Methods	
RGA 6461	Cybersecurity and Regulation of Digital Health Technologies by the FDA	

RGA 6432	Real-World Evidence in Biomedical Research	
RGA 6460	Intellectual Property in the Life Sciences	
RGA 6420	Global IVD Regulations and Submissions	
RGA 6246		

Program Credit/GPA Requirements

45 total quarter hours required
Minimum 3.000 GPA required

Regulatory Affairs of Food and Food Industries, MS

The Master of Science in Regulatory Affairs of Food and Food Industries is designed to offer a combination of theory and practical training for professionals looking to enter into, or advance in, the field of food regulatory affairs.

Our courses and curriculum are cross disciplinary, covering topics and methods that lie at the intersection of the life sciences, agricultural planning, food science, nutrition, law, economics, international relations, and regulatory policy. The breadth of the curriculum provides students from various educational and employment backgrounds with the opportunity to contribute to an evolving market.

Successful graduates of the program will gain the necessary knowledge and requisite skills to serve as leaders in the domain of food regulatory affairs. They will be equipped to serve instrumental roles in the formation of public policies, the implementation of regulatory guidelines, industry's compliance with regulations, and the regulatory strategies of companies looking to create a sustainable competitive advantage in the food industry.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Courses

Code	Title	Hours
RFA 6100	Introduction to Regulatory Affairs of Food and Food Industries	3
RFA 6110	From Farm to Family Table: Understanding the Food Regulatory Life Cycle	3
RFA 6120	Economic and Social Aspects of Food	3
RFA 6130	Food Law in the United States	3
RFA 6200	Comparing U.S. Regulatory Systems and Agencies	3
RFA 6215	Risk Analysis and Hazard Analysis in the Food Industry	3
RFA 6225	Introduction to Food Science	3
RFA 6235	Regulatory Differences and Similarities: An International Investigation	3
RFA 6300	Capstone: Regulatory Affairs of Food	3

Elective Courses

REGULATORY PROCESSES

Code	Title	Hours
Complete two of the following:		8
RFA 6205	Key Submissions for Food Regulatory Affairs	
RFA 6210	Food Safety and Modernization	
RFA 6220	Food Safety and Surveillance: Concepts and Applications	
RFA 6230	The Scientific, Social, and Commercial Aspects of Genetically Modified Foods	

BUSINESS AND MARKETING

Note: Personal and Career Development (COP 6940) or Integrative Experiential Learning (INT 6943) may only count toward one of the business and marketing elective courses. Enrollment in either of these courses requires participation in the cooperative education program (http://www.cps.neu.edu/degree-programs/internships-co-ops) (subject to availability).

Code	Title	Hours
Complete two of the following:		4-8
RFA 6310	Food Across International Borders: The International Food Trade	
RFA 6315	From Farm to Dinner Table: The Industrialization and Commercialization of Food	
RFA 6350	Political, Social, and Economic Influences on Food Law, Regulation, and Policy	
NTR 6155	Nutrition Entrepreneurship	
NTR 6165	Food and Society	
COP 6940	Personal and Career Development	
INT 6943	Integrative Experiential Learning	
EDU 6184	Interdisciplinary Foundations	

INTERNATIONAL FOOD REGULATIONS

Code	Title	Hours
Complete two of the following:		8
RFA 6410	Landmark Changes in International Food Policy	
RFA 6411	International Surveillance and Regulation of Food	
RFA 6412	FDA Model Food Code: Implications for Industry	
RFA 6413	Total Food Protection from Farm to Fork	
GST 6350	Global Economics of Food and Agriculture	

Program Credit/GPA Requirements

48–56 total quarter hours required
Minimum 3.000 GPA required

Respiratory Care Leadership, MS

Emerging environmental issues, recent technological advances, and a growing elderly population are escalating the need for skilled respiratory therapists. To be successful, today's respiratory care leaders must

be skilled educators, practitioners, and case managers. In response, Northeastern University's College of Professional Studies has developed the Master of Science in Respiratory Care Leadership.

Created for practicing respiratory therapists, this master's degree in respiratory care incorporates an action-learning approach that seeks to build leadership competencies and to advance your clinical knowledge. Core respiratory care courses cover areas such as advanced cardiopulmonary physiology and research design. In addition, you have the opportunity to focus your studies in one of four concentrations: adult and organizational learning, clinical trial design, health management, and respiratory specialty practice.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Respiratory Care Courses

Code	Title	Hours
RPT 7200	Advanced Cardiopulmonary Physiology	4
RPT 7205	The Evolving Roles of Respiratory Care Professionals	4
RPT 7210	Research Design	4
RPT 7215	Applied Research in Respiratory Care	4
RPT 7300	Development of Clinical Practice Guidelines and Respiratory Care Protocols	4
RPT 7302	Respiratory Therapist Education	4

Required Leadership Courses

Code	Title	Hours
Complete two of the following:		6-12
LDR 6100	Developing Your Leadership Capability	
LDR 6110	Leading Teams	
LDR 6135	Ethical Leadership	
LDR 6140	Strategy Development and Implementation	

Concentration

Complete one of the following concentrations:[1]

ADULT AND ORGANIZATIONAL LEARNING

Code	Title	Hours
Complete four of the following:		16
EDU 6051	Culture, Equity, Power, and Influence	
EDU 6201	The Landscape of Higher Education	
EDU 6202	Faculty, Curriculum, and Academic Community	
EDU 6221	Enrollment, Retention, Graduation, Success	
EDU 6319	How People Learn	
EDU 6323	Technology as a Medium for Learning	
EDU 6447	The Demographics of Higher Education	

CLINICAL TRIAL DESIGN

Code	Title	Hours
Complete four of the following:		16
BTC 6210	Human Experimentation: Methodological Issues Fundamentals	
BTC 6211	Validation and Auditing of Clinical Trial Information	
BTC 6213	Clinical Trial Design Optimization and Problem Solving	
BTC 6260	The Business of Medicine and Biotechnology	
RGA 6000	Introduction to Food and Drug Administration (FDA) Pharmaceutical Regulation	
RGA 6001	Introduction to Food and Drug Administration Medical Device Regulation	
RGA 6202	Medical Device Development: A Regulatory Overview	
RGA 6205	Emerging Trends and Issues in the Medical Device Industry	

HEALTH MANAGEMENT

Code	Title	Hours
Complete five of the following:		15
HMG 6110	Organization, Administration, Financing, and History of Healthcare	
HMG 6120	Human Resource Management in Healthcare	
HMG 6130	Healthcare Strategic Management	
HMG 6140	Principles of Population-Based Management	
HMG 6160	Healthcare Information Systems Management	
HMG 6170	Health Law, Politics, and Policy	
NPM 6120	Financial Management for Nonprofit Organizations	
NPM 6125	Promoting Nonprofit Organizations	
NPM 6130	Fundraising and Development for Nonprofit Organizations	

RESPIRATORY SPECIALTY PRACTICE

Code	Title	Hours
RPT 7400	Pulmonary Diseases and Disorders	4
RPT 7401	Cardiopulmonary Assessment and Diagnostics	4
Complete two of the following:		8
RPT 7402	Adult Critical Care	
RPT 7403	Neonatal and Pediatric Care	
RPT 7404	Pulmonary Wellness Education and Coordination	
RPT 7405	Development of Patient Management Plans	

Program Credit/GPA Requirements

45 total quarter hours required
Minimum 3.000 GPA required

[1] Interdisciplinary Foundations (EDU 6184) may be taken as an elective.

Technical Communication, MS

A proliferation of new technologies and applications has heightened the call for professionals who can communicate complex technical

ideas succinctly and articulately. In response, Northeastern University's College of Professional Studies offers the Master of Science in Technical Communication.

This online master's degree is designed to improve your technical communication skills and to provide you with a foundation for applying those skills across a variety of contexts. With three concentrations from which to choose—computer industry writing, social media and online communities, or usability/user experience—this graduate degree in technical communication seeks to prepare you for a rewarding career as a technical writer, editor, tool expert, or technical trainer.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Courses

Code	Title	Hours
TCC 6100	Introduction to Technical and Professional Writing	4
TCC 6102	Editing Technical Content	4
TCC 6110	Information Architecture	4
TCC 6120	Usability and User Experience	4
The following course should be taken last:		
TCC 6850	Technical Communications Capstone Project	4

Concentration

If students prefer to focus their studies on a particular concentration, they may select 16–18 quarter hours from one of the concentrations below and complement their studies with 8–10 quarter hours of elective courses to meet the minimum 46-quarter-hour degree requirement.

Students are not required to complete a concentration. Any combination of 26 quarter hours from concentration and elective courses will satisfy degree requirements.

COMPUTER INDUSTRY WRITING

Code	Title	Hours
Complete four of the following:		16
TCC 6430	Writing for the Computer Industry	
TCC 6440	Advanced Writing for the Computer Industry	
TCC 6400	Structured Documentation	
TCC 6450	Managing Technical Publications	
TCC 6410	Online Documentation	
TCC 6630	Introduction to XML	

SOCIAL MEDIA AND ONLINE COMMUNITIES

Code	Title	Hours
Required Course		
TCC 6710	Content Strategy	4
Electives		
Complete 12–14 quarter hours from the following:		12-14
CMN 6035	Legal, Policy, and Ethical Issues in the Digital Era	
CMN 6045	Leveraging Digital Technologies: Strategy, Assessment, and Governance	
CMN 6065	Implementation and Management of Social Media Channels and Online Communities	
DGM 6285	Interactive Marketing Fundamentals	
DGM 6290	Social Media and Brand Strategy Implementation	

USABILITY/USER EXPERIENCE

Code	Title	Hours
Choose any combination of the following courses to complete 16 quarter hours:		16
TCC 6710	Content Strategy	
TCC 6470	Web Accessibility for Technical Communicators	
DGM 6268	Usable Design for Mobile Digital Media	
TCC 6610	Prototyping	
TCC 6620	Collecting User Data	
TCC 6420	Information Design for the Web	

Electives

Code	Title	Hours
Choose a combination of 8–10 quarter hours of electives from the list below and any concentration courses listed above:		8-10
TCC 6480	Instructional Design for Technical Communicators	
TCC 6640	Wiki-Based Documentation	
TCC 6495	Document Design	
TCC 6150	Writing Portfolio	
EDU 6184	Interdisciplinary Foundations	

Program Credit/GPA Requirements

46 total quarter hours required
Minimum 3.000 GPA required

Sports Leadership, MSLD

The practice-oriented sports leadership master's degree is structured to accommodate midcareer athletic administrators and coaches, as well as individuals seeking to prepare for careers in the sports industry.

Developed in collaboration with Northeastern University's Center for the Study of Sport in Society, the Master of Sports Leadership seeks to prepare you for a variety of sport-related occupations—whether it's working with a professional or intercollegiate sports team; with a fitness club or wellness organization; or in marketing, communication, or sports management. Courses within this unique graduate degree examine the social and business issues that are critical to sports leadership. Offered in an online format with an intensive one-week summer institute in Boston, this practice-oriented degree seeks to provide you with a well-rounded educational experience, equipping you to advance your career in the sports industry.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Courses

Note: Sport in Society (LDR 6405) and Sports Media Relations (LDR 6441) are summer institute courses, available on-campus in Boston. Winter institute course available on campus in Charlotte, North Carolina.

Code	Title	Hours
LDR 6100	Developing Your Leadership Capability	3
LDR 6135	Ethical Leadership	3
LDR 6405	Sport in Society	3
LDR 6410	Leadership and Organization in Sport	3
LDR 6430	Sports Law	3
LDR 6441	Sports Media Relations	3

Internship/Capstone

Code	Title	Hours
Complete one of the following. This course should be the last course taken and requires faculty advisor approval:		3
LDR 6961	Internship	
LDR 6980	Capstone	

Elective Courses

Code	Title	Hours
Choose two of the following:		6
CMN 6015	Introduction to the Digital Era: The Power of Social Media	
LDR 6443	Ticket Sales and Strategies	
LDR 6470	Bystander Strategies for the Prevention of Gender-Based Violence	
INT 6943	Integrative Experiential Learning	
EDU 6184	Interdisciplinary Foundations	

Concentration

PROFESSIONAL SPORTS ADMINISTRATION

Code	Title	Hours
LDR 6323	Event Management	3
LDR 6400	Sports Management	3
LDR 6435	Fiscal Practices in Sports	3
LDR 6440	Sports Marketing and Promotions	3
LDR 6445	Corporate Sponsorships	3
LDR 6460	Risk Management in Athletics	3

COLLEGIATE ATHLETICS ADMINISTRATION

Code	Title	Hours
LDR 6400	Sports Management	3
LDR 6427	Gender and Diversity in Sport	3
LDR 6442	Athletic Fund-Raising	3
LDR 6455	NCAA Compliance	3
LDR 6465	Title IX	3
LDR 6615	Academic Advising for Student-Athletes	3

Program Credit/GPA Requirements

45 total quarter hours required
Minimum 3.000 GPA required

Graduate Certificate Programs

Enhance your skills and career potential with a graduate certificate from Northeastern University's College of Professional Studies. We offer over 355 certificates that represent fast-growing fields such as education, project management, leadership, and technology. **Courses are delivered online**, **on campus**, or in a **blended format**, offering you maximum flexibility and convenience for your busy schedule.

Programs

- Social Media and Online Communities (p. 371)
- Teaching English to Speakers Of Other Languages (p. 371)

3-D Animation, Graduate Certificate

Three-D animation is not only a major component in the film and broadcast industries, it is also a crucial element in online entertainment and a driving force for the gaming industry. Companies use animation in advertisements, websites, and training programs. The growing use of gaming technologies in education and industry (often referred to as Serious Games) has given rise to a need for skilled animators who can work closely with business and academic institutions.

The Graduate Certificate in 3D Animation offers a practice-oriented approach to the art and science of animation, with a particular emphasis on the special requirements of 3D modeling and animating for the gaming industry. Course work is designed to develop students' powers of visualization as well as provide a conceptual basis for visual narrative. The program seeks to produce graduates who are skilled in the use of industry-standard animation applications; understand visual principles of lighting, modeling, and surfacing; and are conversant with motion and special effects compositing.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Course

Code	Title	Hours
Complete one of the following. Note: For students with a portfolio waiver, DGM 6450 is the core course:		*4*
DGM 6105	Visual Communications Foundation	
DGM 6450	Animation Basics	

Required Courses

Code	Title	Hours
DGM 6122	Foundations of Digital Storytelling	4
DGM 6510	3-D Modeling	4
DGM 6530	Character Animation	4
DGM 6540	Compositing	4
DGM 6882	Animation Reel	1-4

Program Credit/GPA Requirements

22 total quarter hours required
Minimum 3.000 GPA required

Adult and Organizational Learning, Graduate Certificate

From globalization to technology, economic volatility to talent management, there is an increasing need to educate today's workforce for competitive advantage. To meet these needs, trainers, executive development professionals, human resource managers, and educators must stay current in adult and organizational learning.

The Graduate Certificate in Adult and Organizational Learning is designed to provide participants with foundational knowledge in adult learning, needs assessment, and program review. Students have an opportunity to gain expertise and understanding of the methods and models available for instruction, delivery channels, and overall program development.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Core Courses

Code	Title	Hours
EDU 6319	How People Learn	4
EDU 6323	Technology as a Medium for Learning	4
Complete one of the following:		4
EDU 6324	Competencies, Assessment, and Learning Analytics	
EDU 6437	Assessment in Education	
Complete one of the following:		4
EDU 6331	E-Learning Design as a Collaborative Profession	
EDU 6450	The Globalization of Education	

Program Credit/GPA Requirements

16 total quarter hours required
Minimum 3.000 GPA required

Advanced Study In Orthopedics, Graduate Certificate

The Northeastern University Graduate Certificate in Advanced Study of Orthopedics is designed for licensed physical therapists interested in developing advanced skills in orthopedic physical therapy. This program will consist of five courses (18 credits) and be taught 100 percent online. The online design of the program will provide practicing physical therapists the flexibility to adapt to their demanding schedules, save time on travel, and complete the program from the comfort of their homes. The program can be completed in 18 to 36 months with fall, winter, and summer start dates. The online format will foster the development of critical reflective thinking through case studies and discussions focusing on the most current information in orthopedic physical therapy.

Program Objectives

- Prepare physical therapists to integrate the current research into their orthopedic clinical practice
- Apply knowledge of the anatomy and biomechanics to the evaluation and treatment of the musculoskeletal system
- Interpret and analyze medical and physical examination findings based on the Patient/Client Management Model
- Analyze current surgical interventions for the musculoskeletal system as it applies to physical therapy care
- Provide the student with the knowledge and skills required to sit for the American Physical Therapy Association's Board of Physical Therapy Specialist Orthopaedic clinical specialization examination

Note: Contact Eric Folmar, program director, for further information: e.folmar@neu.edu (e.folmar@neu.edu?subject=CPS Website Inquiry) or 617.304.9253.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
PTH 6560	Patient Management Models and Evidence-Based Practice in Orthopedics	2

PTH 6561	Evidence-Based Examination and Outcomes for the Cervical-Thoracic Spine and Temporomandibular Joint	4
PTH 6562	Evidence-Based Examination and Outcomes for Upper Extremity: Shoulder, Elbow, and Hand	4
PTH 6563	Evidence-Based Examination and Outcomes for Lumbar Spine and Sacroiliac Joint	4
PTH 6564	Evidence-Based Examination and Outcomes for Lower Extremity: Hip, Knee, Foot, and Ankle	4

An optional two-and-a-half-day hands-on lab that will include components of each of the courses (upper extremity, lower extremity, spine) will be offered each spring. People enrolled in the program will have the option to take the hands-on labs for an extra fee.

Program Credit/GPA Requirements

18 total quarter hours required
Minimum 3.000 GPA required

Agile Project Management, Graduate Certificate

Northeastern University's graduate certificate in agile is designed to empower students to explore agile principles and practice and remain up-to-date with current trends in the agile framework. The increasingly important role of agile practitioners and managers is becoming clear as agile business development processes are being adopted by major companies because of its high degree of success in achieving improved time to market, reducing costs, and increasing overall customer satisfaction.

The graduate certificate in agile is led by highly credentialed faculty members that are agile practitioners with decades of experience in helping companies successfully implement agile in their organizations.

Through courses you take online, our agile graduate certificate project management curriculum will give you the opportunity to:

- Develop a strong framework and understanding of the role of agile management
- Develop an understanding of the agile management processes and methodologies
- Develop an understanding of how an agile approach to managing projects can deliver value to the organization
- Develop a personal leadership strategy for success as an agile practitioner
- Develop an agile evaluation plan to measure success

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Courses

Code	Title	Hours
PJM 6810	Principles of Agile Project Management	3
PJM 6815	Advanced Agile Project Management	3
PJM 6820	Agile Implementation and Governance	3
PJM 6825	Agile Lean Product Development	3

| PJM 6205 | Leading and Managing Technical Projects | 3 |
| CMN 6060 | Negotiation, Mediation, and Facilitation | 3 |

Program Credit/GPA Requirements

18 total quarter hours required
Minimum 3.000 GPA required

Cloud Computing Application and Management, Graduate Certificate

Cloud computing is the delivery of computing services over the internet. Due to the relatively lower cost of IT solutions, many organizations have started to take advantage of cloud services provided by Amazon Web Services, Microsoft Azure, IBM Cloud and Softlayer, Google Cloud Platform, Salesforce, and so on. These web service providers offer a broad range of global cloud-based IT products, including computing technologies, storage, databases, analytics, networking, mobile, developer tools, management tools, Internet of Things connectivity, and security and enterprise applications. These services can help organizations move faster, facilitate agile development, and better manage scalability.

The cloud computing application and management (CCA&M) graduate certificate offers students an opportunity to develop technical and management skills to address the needs of enterprise IT services. They will study theoretical and practical aspects of distributed systems from both technical and business perspectives. Successful students will be able to identify frameworks, techniques, and existing IT solutions to manage internet services at different levels (infrastructure, platform, and software). Students in the CCA&M graduate certificate program will also be able to demonstrate the ability to use APIs to integrate applications and business operations into the cloud. They can be directly employed by web service providers or instead work as IT solutions managers in organizations that contract with web service providers.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirement

Code	Title	Hours
Required Courses		
ITC 6420	Introduction to Cloud Computing Applications and Management	3
ITC 6450	Advanced Cloud Computing Applications and Management	3
ITC 6015	Enterprise Information Architecture	3
ITC 6320	Information Security Technology	3
ITC 6355	Web Application Design and Development	3
Elective		
Complete one of the following:		3-4
ITC 6082	Network Protection	
ITC 6460	Cloud Analytics	
ITC 6470	Enterprise Data Storage and Management Technologies	

Program Credit/GPA Requirements

18 total quarter hours required
Minimum 3.000 GPA required

Collegiate Athletics Administration, Graduate Certificate

College athletics in the United States is comprised of more than 1,200 schools, conferences, and organizations that collectively invest in the well-being of student-athletes—both on and off the field.

The Graduate Certificate in Collegiate Athletics Administration offers students an opportunity to obtain an in-depth understanding of the largest amateur segment of the sports industry. Through the program's curriculum, students will be given the opportunity to acquire leadership skills and knowledge in a variety of collegiate athletics topics including sports management, NCAA compliance, fund-raising, academic advising, gender and diversity in sport, and Title IX legislation.

Upon completion, all credits earned in the collegiate athletics administration certificate can also be applied directly into the Master of Sports Leadership (p. 352) program.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Courses

Code	Title	Hours
LDR 6400	Sports Management	3
LDR 6427	Gender and Diversity in Sport	3
LDR 6442	Athletic Fund-Raising	3
LDR 6455	NCAA Compliance	3
LDR 6465	Title IX	3
LDR 6615	Academic Advising for Student-Athletes	3

Program Credit/GPA Requirements

18 total quarter hours required
Minimum 3.000 GPA required

Computer Industry Writing, Graduate Certificate

The Graduate Certificate in Computer Industry Writing delivers in-demand technical writing and editing skills used in high-tech companies. You'll have the opportunity to develop several types of technical documentation, including online help, user manuals, screencasts, quick reference guides, and a DITA project. Our courses also give you ample exposure to popular software tools used by technical communicators in the field today. Courses from this certificate also serve as a concentration the Master of Science in Technical Communication (MSTC). You can directly apply the certificate courses to the MSTC.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Courses

Code	Title	Hours
TCC 6400	Structured Documentation	4
TCC 6410	Online Documentation	4
TCC 6430	Writing for the Computer Industry	4
TCC 6440	Advanced Writing for the Computer Industry	4
TCC 6630	Introduction to XML	2
TCC 6150	Writing Portfolio	2

Program Credit/GPA Requirements

20 total quarter hours required
Minimum 3.000 GPA required

Construction Management, Graduate Certificate

Over the last two decades, construction in both the public and private sector has become increasingly complex, requiring construction and project managers to have a stronger skill base to be successful in acquiring and executing projects.

The Graduate Certificate in Construction Management is intended to serve owners' representatives, consulting engineers, architects, design engineers, contractors, and subcontractors. Individuals who have a bachelor's degree, but not necessarily in construction, and who have been identified by their companies as having high potential for advancement are also good candidates for this program.

Courses from this certificate may be applied toward the Master of Science in Project Management.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Courses

Code	Title	Hours
CMG 6400	Introduction to Construction Management	4
CMG 6402	Alternative Project Delivery Methods and Project Controls	4
CMG 6403	Safety, Project Risk, and Quality Management	4
CMG 6405	Construction Law	4

Program Credit/GPA Requirements

16 total quarter hours required
Minimum 3.000 GPA required

Cross-Cultural Communication, Graduate Certificate

The Graduate Certificate in Cross-Cultural Communication will help to equip professionals with the knowledge and competencies to:

- Analyze personal cross-cultural awareness and implicit bias, in addition to interpret organizational cross-cultural communication strategy to develop effective communication processes and activities
- Evaluate communication audiences from a holistic perspective, thereby constructing effective verbal and nonverbal interactions based on cross-cultural consumption
- Formulate enlightened cross-cultural communication and inclusive diversity strategies, processes, and policies
- Demonstrate critical thinking skills through research, case analysis, role-plays, and experiential learning demonstrating agility, quick response, and diplomacy employing cross-cultural communication strategies

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Courses

Code	Title	Hours
CMN 6085	Strategies for Cross-Cultural Facilitation and Negotiation	3
CMN 6095	Foundations of Developing Cultural Awareness	3

Required Electives

Students must earn a minimum of 12 quarter hours.

SOCIAL JUSTICE TRACK

Code	Title	Hours
PBR 6100	Introduction to Public Relations	3
HSV 6120	Social Inequality, Social Change, and Community Building	3
ITC 6045	Information Technology Policy, Ethics, and Social Responsibility	3
HRM 6040	High-Performance Human Resources Systems and Development	3

INTERNATIONAL TRACK

Code	Title	Hours
GST 6100	Globalization and Global Politics and Economics	4
GST 6101	Global Literacy, Culture, and Community	4
LDR 6145	Global Leadership	3
HRM 6040	High-Performance Human Resources Systems and Development	3

Program Credit/GPA Requirements

18 total quarter hours required
Minimum 3.000 GPA required

Digital Media Management, Graduate Certificate

The digital media market space can present unexpected challenges to standard business models. The Graduate Certificate in Digital Media Management offers courses designed to help managers apply best business practices to these nontraditional challenges. Students are offered the opportunity to gain skills in managing functionally diverse digital media teams, responding effectively to response-critical projects, and implementing marketing strategy in a variety of media channels.

Courses in the program were selected by faculty from the College of Professional Studies' Master of Professional Studies in Digital Media. The certificate consists of one core course selected from the MPS in Digital Media (p. 321) curriculum combined with existing concentration courses.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Courses

Code	Title	Hours
DGM 6145	Information Technology and Creative Practice	4

Code	Title	Hours
DGM 6279	Project Management for Digital Media	4
DGM 6280	Managing for Digital Media	4
DGM 6285	Interactive Marketing Fundamentals	4

Electives

Code	Title	Hours
Complete one of the following:		4
DGM 6230	Digital Media Entrepreneurship	
DGM 6290	Social Media and Brand Strategy Implementation	

Program Credit/GPA Requirements

20 total quarter hours required
Minimum 3.000 GPA required

Digital Video, Graduate Certificate

With the quality and ease of use of digital video camcorders, anyone can capture moving images, but the result is like a Stradivarius violin: It takes training to make music. The Graduate Certificate in Digital Video is a hands-on introduction to digital video technologies, as well as an examination of the social, cultural, and political implications of moving-image production in the digital age. Students have an opportunity to gain competency in digital production and postproduction while exploring various formal, conceptual, and structural strategies. Students will also have an opportunity to learn to generate digital video that communicates effectively and inventively, in preparation for positions in the creative industries of gaming, design, and media production.

The courses in this program also serve as a concentration in the Master of Professional Studies in Digital Media.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Courses

Code	Title	Hours
DGM 6506	Introduction to Digital Video	2
DGM 6435	Digital Video Production	4
DGM 6440	Editing in the Digital Studio	4

Electives

Code	Title	Hours
Complete two of the following:		8
DGM 6125	Time-Based Media	
DGM 6430	Screenwriting: Linear and Interactive	
DGM 6545	Documentary and Nonfiction Production	

Program Credit/GPA Requirements

18 total quarter hours required
Minimum 3.000 GPA required

Biopharmaceutical Domestic Regulatory Affairs, Graduate Certificate

The biotechnology and pharmaceutical industries continue to experience rapid growth in the U.S. market. As companies in these industries seek

approval to market their products in the United States, demand for qualified regulatory affairs professionals continues to increase. Product development scientists, marketers, quality personnel, as well as legal experts that guide companies through the Food and Drug Administration (FDA) approval process, will benefit from regulatory affairs training.

The Graduate Certificate in Biopharmaceutical Domestic Regulatory Affairs is designed to provide students with a greater understanding of U.S. biologic and pharmaceutical product regulation and their unique development, marketing, manufacturing, and postmarket approval-related issues. The program also seeks to prepare students to ensure regulatory compliance, proper validation, and utilization of proper quantitative measurement techniques. Courses from this certificate may be applied toward the Master of Science in Regulatory Affairs for Drugs, Biologics, and Medical Devices.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Courses

Code	Title	Hours
RGA 6000	Introduction to Food and Drug Administration (FDA) Pharmaceutical Regulation	2
RGA 6101	Therapeutic Product Development: A Regulatory Overview	4
Complete the appropriate number of electives to meet the minimum quarter-hour requirement:		10-12
BTC 6210	Human Experimentation: Methodological Issues Fundamentals	
RGA 6002	Regulatory Compliance Culture	
RGA 6203	Pharmaceutical and Medical Device Law: Topics and Cases	
RGA 6207	Global Impact of Electronic Common Technical Document (eCTD) Submissions	
RGA 6210	Strategic Planning and Project Management for Regulatory Affairs	
RGA 6212	Introduction to Safety Sciences	
RGA 6215	Project Management in Early Drug Discovery and Development	
RGA 6216	The Medical, Social, and Financial Dimensions of Orphan Drugs	
RGA 6217	Biomedical Product Development: From Biotech to Boardroom to Market	
RGA 6380	Advanced Regulatory Writing: New Drug Applications	
RGA 6410	Fundamentals of CMC Regulations and Methods	

Program Credit/GPA Requirements

16 total quarter hours required
Minimum 3.000 GPA required

e-Learning and Instructional Design, Graduate Certificate

The e-learning and instructional design certificate increases opportunities for professional diversification and advancement as the contemporary landscape of learning increasingly requires a digital component. This curriculum is designed to prepare professionals to design pedagogically sound online, blended, and technology-enhanced educational experiences from stand-alone workshops to program suites.

Certificate participants investigate the latest research on the science of learning, draw on research-based principles to design engaging online and mobile environments, and become prepared to respond innovatively to societal and institutional changes that impact the field of online and mobile education.

Students will have the option of applying their four courses toward the e-learning and instructional design MEd program if they decide to pursue that degree.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Courses

Code	Title	Hours
EDU 6319	How People Learn	4
EDU 6321	Models for Learning Design	4
EDU 6323	Technology as a Medium for Learning	4

Elective

Code	Title	Hours
Complete one of the following:		4
EDU 6324	Competencies, Assessment, and Learning Analytics	
EDU 6331	E-Learning Design as a Collaborative Profession	
EDU 6332	Open Learning	
EDU 6333	Social Media and Beyond	

Program Credit/GPA Requirements

16 total quarter hours required
Minimum 3.000 GPA required

Emergency Management, Graduate Certificate

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Courses

Code	Title	Hours
HLS 6060	Strategic Planning and Budgeting	3
HLS 6070	Emergency Management and Geographic Information Systems	3
HLS 6080	Continuity of Operations and Planning	3
HLS 6150	Essentials of Emergency Management	3
HLS 6155	Critical Infrastructure, Security, and Emergency Management	3
HLS 6160	Advanced Emergency Management	3
HLS 6170	Emergency Management Capstone	3

Program Credit/GPA Requirements

21 total quarter hours required
Minimum 3.000 GPA required

Financial Markets and Institutions, Graduate Certificate

In this rapidly changing business environment, the barriers between institutions are eroding, and competition is increasing due to deregulation and new product development. Managing internal operations more efficiently and adapting to the changing external environment is critical to the long-term survival of institutions. The Graduate Certificate in Financial Markets and Institutions seeks to prepare students to measure the impact of accounting decisions on performance; to manage risks, assets, and liabilities to meet corporate goals; to understand domestic and international financial systems and the institutions within them; and to build financial relationships that foster marketing financial products.

An examination of financial services industry principles and practices seeks to provide individuals working in brokerage houses, investment or commercial banks, insurance companies, or real estate with a greater understanding of financial systems as well as how to manage risks, assets, and liabilities in meeting corporate goals.

Note: Courses from this certificate may not be applied toward the Master of Science in Leadership.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Courses

Code	Title	Hours
FIN 6101	Accounting Fundamentals for Financial Institutions	4
FIN 6161	Investment Analysis	4
FIN 6102	Asset and Liability Management	4
FIN 6120	Building Financial Relationships	4

Program Credit/GPA Requirements

16 total quarter hours required
Minimum 3.000 GPA required

Forensic Accounting, Graduate Certificate

News surrounding corporate corruption has had a significant impact on businesses, particularly the accounting industry. In response, the government has enacted sweeping accounting and business laws such as the Sarbanes-Oxley 2002 legislation. Additionally, many professional organizations, including the American Institute of Certified Public Accountants (AICPA) and the Association of Certified Fraud Examiners (ACFE), have made the prevention, detection, and prosecution of fraud and accounting abuse a priority.

This **four-course graduate certificate in forensic accounting** is designed to help students apply techniques in identifying, collecting, and examining evidence, including how to identify financial statement misrepresentation, transaction reconstruction, and tax evasion.

Note: Courses from this certificate may not be applied toward the Master of Science in Leadership.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Courses

Courses should be taken in the following sequence:

Code	Title	Hours
ACC 6210	Forensic Accounting Principles	4
ACC 6220	Dissecting Financial Statements	4
ACC 6230	Investigative Accounting and Fraud Examination	4
ACC 6240	Litigation Support	4

Program Credit/GPA Requirements

16 total quarter hours required
Minimum 3.000 GPA required

Game Design, Graduate Certificate

Game design is one of the fastest-growing fields in entertainment, business, and education. From healthcare to political science, companies use games to educate their constituents and enhance employee skills.

The Graduate Certificate in Game Design offers a practice-oriented approach to the art and science of game making. The program emphasizes visual design and programming for video games and fosters conceptual understanding of the principles of game design for all varieties of games—from educational board games to iPhone games.

Courses in this program also serve as a concentration in the Master of Professional Studies in Digital Media.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Courses

Code	Title	Hours
DGM 6122	Foundations of Digital Storytelling	4
DGM 6308	Intermediate Programming for Digital Media (Must take Test to qualify, if not take DMG 6108))	4
DGM 6400	Game Design Fundamentals	4
DGM 6403	Game Engine Fundamentals	4
DGM 6405	Game Development	4

Program Credit/GPA Requirements

20 total quarter hours required
Minimum 3.000 GPA required

Geographic Information Systems, Graduate Certificate

A geographic information system (GIS) combines layers of data to give needed information on specific locations. Such a system can map environmental sensitivities or geological features or can report on how best to speed emergency personnel to an accident or crime scene. Current fields using GIS include healthcare, public safety, environmental management, transportation and operations technology, real estate, and public utilities.

The Graduate Certificate in Geographic Information Systems program offers hands-on training, seeking to give students the necessary skills and understanding to apply GIS competently and effectively. As a result of the certificate curriculum, students should be well versed in GIS

theory, have practical hands-on exposure to GIS software and hardware, understand the representation of data in both mapped and tabular forms, and know how to plan and construct spatial databases.

The courses in this certificate program may be applied to the Master of Professional Studies in Geographic Information Technology.

Program Requirements
Complete all courses and requirements listed below unless otherwise indicated.

Required Courses

Code	Title	Hours
GIS 5101	Introduction to Geographic Information Systems	3
GIS 5102	Fundamentals of GIS Analysis	3
RMS 5105	Fundamentals of Remote Sensing	3
GIS 5201	Advanced Spatial Analysis	3

Electives

Code	Title	Hours
Complete two of the following:		6
GIS 6320	Use and Applications of Free and Open-Source GIS Desktop Software	
GIS 6340	GIS Customization	
GIS 6350	Planning a GIS Implementation	
GIS 6360	Spatial Databases	
GIS 6370	Internet-Based GIS	
GIS 6385	GIS/Cartography	
GIS 6390	Business Applications of Geographic Information Systems	
GIS 6391	Healthcare Applications of Geographic Information Systems	
GIS 6394	Crisis Mapping for Humanitarian Action	
GIS 6395	Geospatial Analysis of Crime	
GIS 6396	GIS for Defense, Homeland Security, and Emergency Response	

Program Credit/GPA Requirements
18 total quarter hours required
Minimum 3.000 GPA required

Global Student Mobility, Graduate Certificate

The Graduate Certificate in Global Student Mobility offers an in-depth look at the dynamic field of international higher education for those wishing to administer programs for domestic and/or international students, faculty, and institutions. Students will receive a grounding in cross-cultural theories while also exploring the widening range of program types, methods of delivery, and the importance of experiential and service-learning exchanges. Courses explore U.S.−government-sponsored programs, the role of nongovernmental organizations (NGOs) dedicated to international academic exchanges, and the fast-growing world of third-party providers. Taught by practitioners with real-world experience, students will have ample opportunity to review case studies illustrating both challenges and innovative practices in this essential and highly specialized area of higher education.

The continual expansion of globalization has changed the landscape of higher education worldwide and fueled the demand for professionals with the skills and knowledge to enter this increasingly specialized field. The graduate certificate is designed to prepare students for employment in various sectors of the international education field including:

- Study abroad
- International student and scholar services
- International admissions and recruitment
- The development and administration of international study, work, and volunteer exchange
- Student ESL and language programs
- The complex range of U.S.−government-sponsored international exchange programs such as Fulbright, Humphrey, Muskie, YES, and scores of others
- NGOs supporting these exchanges such as IIE, Amideast, American Councils, and many others
- Creating and administering exchange programs for working professionals outside of higher education, targeting religious, philanthropic, and thematic programs

Program Requirements
Complete all courses and requirements listed below unless otherwise indicated.

Required Courses

Code	Title	Hours
GST 6810	International Higher Education	4
GST 6820	Managing Study Abroad	4
GST 6830	Managing International Students	4

Elective

Code	Title	Hours
Complete one of the following:		4
GST 6101	Global Literacy, Culture, and Community	
INT 6900	International Field Study Experience (Requires co-registration in a 1 q.h. directed study. Students interested in taking INT 6900 should contact their Academic Advisor.)	

Program Credit/GPA Requirements
16 total quarter hours required
Minimum 3.000 GPA required

Global Studies and International Relations, Graduate Certificate

The Graduate Certificate in Global Studies and International Relations is designed to provide students with the skills and training necessary to analyze, research, and evaluate a topic of interest in a global location. Overall, the program curriculum focuses on the themes of transition and development in the global world. Core courses provide a base of knowledge about global issues and are combined with an elective that allows students to focus on a specific area of interest.

Program Requirements
Complete all courses and requirements listed below unless otherwise indicated.

Required Courses

Code	Title	Hours
GST 6100	Globalization and Global Politics and Economics	4
GST 6101	Global Literacy, Culture, and Community	4
GST 6320	Peace and Conflict	4

Elective

Code	Title	Hours
Complete one of the following:		4
GST 6501	Regional Studies: East Asia	
GST 6502	Regional Studies: Middle East	
GST 6503	Regional Studies: Sub-Saharan Africa	
GST 6504	Regional Studies: Europe	
GST 6505	Regional Studies: Southwest and Central Asia	
GST 6506	Regional Studies: Latin America	

Program Credit/GPA Requirements

16 total quarter hours required
Minimum 3.000 GPA required

Health Management, Graduate Certificate

Projections for the healthcare industry state that job growth will remain above average into the next decade. The needs of an aging population along with the increased human life cycle are just some of the factors contributing to this growth.

The Graduate Certificate in Health Management examines the financial, political, legal, and operational aspects of a healthcare facility and explores the evolution of healthcare delivery in the United States.

Health managers are found in different roles across healthcare organizations including:

- Strategic planning
- Operations
- Human resources
- Fund-raising
- Purchasing

Health managers are responsible for designing, administering, managing, and evaluating health policies, programs, and services. The courses in this certificate also serve as a concentration in the Master of Science in Leadership program.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Courses

Code	Title	Hours
HMG 6110	Organization, Administration, Financing, and History of Healthcare	3
HMG 6120	Human Resource Management in Healthcare	3
NPM 6120	Financial Management for Nonprofit Organizations	3
HMG 6130	Healthcare Strategic Management	3

Elective Courses

Code	Title	Hours
Complete two of the following (minimum of 6 quarter hours):		6
NPM 6110	Legal and Governance Issues in Nonprofit Organizations	
NPM 6150	Human Resources Management in Nonprofit Organizations	
HMG 6140	Principles of Population-Based Management	
HMG 6160	Healthcare Information Systems Management	
HMG 6170	Health Law, Politics, and Policy	
HRM 6020	Talent Acquisition and Onboarding	

Program Credit/GPA Requirements

18 total quarter hours required
Minimum 3.000 GPA required

Higher Education Administration, Graduate Certificate

The effective administration of higher education institutions has never been as critical as at this time. Consider:

- The president of the United States of America and the secretary of education are calling for access to higher education for all
- European and Asian universities are ascending in quality, increasing as market forces
- The electronic delivery of education is escalating, creating new pedagogy and delivery models

To meet these challenges, as well as changing demographics, financial concerns, and legal and policy requirements, administrators and leaders in higher education need to be increasingly sophisticated and knowledgeable.

The Graduate Certificate in Higher Education Administration is designed to provide participants with an overall understanding of managerial concepts as well as the operational and strategic concepts that lead to effective administration. This program is best suited for individuals seeking mid- to senior-level administrative roles and individuals interested in transitioning from industry and other organizations into academia.

The certificate is comprised of 16 quarter hours, which may be applied toward the Master of Education in Higher Education Administration.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Core Courses

Code	Title	Hours
EDU 6201	The Landscape of Higher Education	4
EDU 6202	Faculty, Curriculum, and Academic Community	4
EDU 6203	Education Law, Policy, and Finance	4

Elective

Code	Title	Hours
Complete one of the following:		4
EDU 6520	Learning and the Brain: Translating Research into Practice	
EDU 6319	How People Learn	
EDU 6332	Open Learning	
EDU 6330	Digital Media Literacy	
EDU 6558	Issues in Education	

Program Credit/GPA Requirements

16 total quarter hours required
Minimum 3.000 GPA required

Human-Centered Informatics, Graduate Certificate

Human-centered informatics (HCI) focuses on the design, development, and evaluation of IT systems with a particular emphasis on the relations and interactions between people and IT systems. The emphasis of understanding users experience when they interact with technology in the information-rich environment and the design of interfaces between users and systems makes it different from the focus of software engineering programs or visual and artistic design programs.

The human-centered informatics graduate certificate offers students the opportunity to learn the theories of cognitive and social psychology as well as universal principles of design adopted in human-computer interaction. Students develop the technical skills to study user experience in various IT environments (home, business, social media, healthcare, etc.), focusing on user needs, information architecture, and design of user interfaces. Successful students that graduate with the HCI graduate certificate will be able to propose innovative or improve design solutions to real-world problems.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Required Courses		
ITC 6410	Fundamentals of Human Behaviors for Interactive Systems	3
DGM 6461	Interactive Information Design 1	4
DGM 6168	Usability and Human Interaction	4
DGM 6268	Usable Design for Mobile Digital Media	4
Elective		
Complete one of the following:		3-4
DGM 6463	Interactive Information Design 2	
ALY 6070	Communication and Visualization for Data Analytics	
ITC 6355	Web Application Design and Development	

Program Credit/GPA Requirements

18 total quarter hours required
Minimum 3.000 GPA required

Human Resources Management, Graduate Certificate

In today's multifaceted organizations, human resource professionals must respond to the growing challenges of regulatory compliance, complex benefit plans, and training and motivating employees.

The Graduate Certificate in Human Resources Management seeks to foster a deep understanding of organizational development and effective change management, workforce planning and strategic recruitment, and training and performance management.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Courses

Code	Title	Hours
HRM 6015	Introduction to Human Resources Management	3
HRM 6025	Workforce Analytics	3

Electives

Code	Title	Hours
Complete four of the following. Students waived out of HRM 6015, complete five of the following:		12
HRM 6005	Creating a High-Performance Organization: Strategic Organizational and HRM Choices	
HRM 6010	Compensation and Benefits	
HRM 6020	Talent Acquisition and Onboarding	
HRM 6030	The Employment Contract	
HRM 6042	Strategic Workforce Planning	
HRM 6047	Managing the Employee Life Cycle	
HRM 6050	Employee Engagement	
HRM 6060	Organizational Design	
HRM 6070	Global Human Resources Management	

Program Credit/GPA Requirements

18 total quarter hours required
Minimum 3.000 GPA required

Information Security Management, Graduate Certificate

Information security is a management issue with global business implications. To succeed in today's network economy requires more than simply a focus on information technology (IT) issues. Succeeding also requires a focus on security strategy and management. IT security governance is an overarching consideration in all risk-assessment and management-related endeavors and is important for information security since many issues have legal, regulatory, policy, and ethical considerations. The associated risks of business today must be clearly understood and managed.

The Graduate Certificate in Information Security Management is designed to provide a conceptual and practical overview of information security management. It begins with an overview of key information security management issues and principles. It presents security governance challenges including the policy, law, regulatory, and ethical accountability frameworks that information security risk managers must work within.

The program includes review courses that prepare students for the CISSP and CISA exams.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Courses

Code	Title	Hours
ITC 6300	Foundations of Information Security	3
ITC 6305	IT Infrastructure (Systems, Networks, Telecom)	3
ITC 6310	Information Security Governance	3
ITC 6315	Information Security Risk Management	3
ITC 6320	Information Security Technology	3

Electives

Code	Title	Hours
Complete one of the following:		3-4
ITC 6325	CISA Preparation	
ITC 6330	CISSP Preparation	
ITC 6080	Network Security Concepts	

Program Credit/GPA Requirements

18–19 total quarter hours required
Minimum 3.000 GPA required

Interactive Design, Graduate Certificate

Digital media plays an increasingly significant role in the global culture and economy. The Graduate Certificate in Interactive Design offers an overview of courses in the creative process of storytelling and communicating through visuals and sound. Students have an opportunity to gain expertise in time-based design and interface and experience design through a practice-oriented problem-solving approach.

The courses in this program also serve as a concentration in the Master of Professional Studies in Digital Media.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirement

Code	Title	Hours
Required Courses		
DGM 6501	Web Creation Boot Camp	2
DGM 6521	Web Creation for Content Management Systems	2
DGM 6168	Usability and Human Interaction	4
or TCC 6120	Usability and User Experience	
DGM 6461	Interactive Information Design 1	4
DGM 6268	Usable Design for Mobile Digital Media	4
Electives		
Complete one of the following:		4
DGM 6217	Typography for Interactivity	
TCC 6490	Usability Testing for Technical Communicators	

Program Credit/GPA Requirements

20 total quarter hours required
Minimum 3.000 GPA required

Interdisciplinary Professional Studies, Graduate Certificate

The contemporary workplace challenges professionals to develop and sustain the ever-changing skill sets and multidisciplinary workplace competencies required for success as innovators, leaders, and change agents. Organizations are similarly challenged in fostering employee professional development to meet the fluctuating demands of a highly technological and global economy. Today's professionals desire state-of-the-art approaches for continuing their education, including shorter, flexible, modularized, and just-in-time academic opportunities. To meet the growing demand for 21st-century learning, custom tailored to individual and organizational needs, Northeastern University's College of Professional Studies created the Interdisciplinary Graduate Certificate in Professional Studies—or iCert for short.

iCert represents a radically different approach to professional and academic learning. This first-of-its-kind certificate is uniquely designed to provide flexible multidisciplinary course options aligned with individual or organizational needs by incorporating three powerful learning components:

1. Intentional planning and reflection: Students identify and reflect on professional strengths, needs, aptitudes, and career interests in their iCert foundations course, resulting in a personalized professional learning plan (PLP).
2. Individualized program design: Students choose courses from multiple program areas, based on their PLP, customized to meet their academic goals.
3. Innovative experiential learning: Students choose from credit or noncredit real-world learning opportunities through Northeastern's online Experiential Network and their final iCert capstone course, connecting classroom learning to their current or future professional aspirations.

iCert graduates are encouraged to:

- Identify, reflect on, and articulate professional goals in order to envision a future self
- Develop a career focus that integrates and builds or enhances knowledge, skills, and attitudes around the following multidisciplinary workplace competencies:
  - Communications
  - Creative problem solving
  - Cultural responsiveness
  - Leadership
  - Lifelong learning
  - Management
  - Systems thinking
  - Technological proficiency
- Translate classroom learning into practice through authentic workplace experiences
- Build a professional practice as individuals, members of organizations, and socially responsible members of the global community
- Continue graduate studies in the following 10 master's degrees:
  - Corporate and organizational communication
  - Education

- Homeland security
- Human services
- Leadership
- Learning analytics
- Nonprofit management
- Project management
- Sports leadership
- Technical communication

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Courses

Code	Title	Hours
EDU 6184	Interdisciplinary Foundations	2
EDU 6980	Interdisciplinary Capstone	2

Choose a minimum of 12 quarter hours from the following:

CORPORATE AND ORGANIZATIONAL COMMUNICATION

Code	Title	Hours
CMN 6080	Intercultural Communication	3
CMN 6020	Ethical Issues in Organizational Communication	3
CMN 6015	Introduction to the Digital Era: The Power of Social Media	3
CMN 6110	Group Dynamics and Interpersonal Conflict: Meeting Management	3
CMN 6060	Negotiation, Mediation, and Facilitation	3
CMN 6025	Digital Era Skills: Platforms, Tools, and Techniques	3

EDUCATION

Code	Title	Hours
EDU 6319	How People Learn	4
EDU 6323	Technology as a Medium for Learning	4
EDU 6051	Culture, Equity, Power, and Influence	4
EDU 6333	Social Media and Beyond	4
EDU 6450	The Globalization of Education	4

LEARNING ANALYTICS

Code	Title	Hours
EDU 6340	Learning Analytics Concepts and Theories	4
EDU 6341	Introduction to Data Mining in Education	4
EDU 6343	Predictive Modeling for Learning Analytics	4
EDU 6182	Educational Statistics	4

HOMELAND SECURITY

Code	Title	Hours
HLS 6000	Introduction to Homeland Security	3

HUMAN SERVICES

Code	Title	Hours
HSV 6100	Theory and Practice of Human Services	3
HSV 6110	Human Services Management and Development	3
HSV 6120	Social Inequality, Social Change, and Community Building	3

LEADERSHIP

Code	Title	Hours
LDR 6100	Developing Your Leadership Capability	3
LDR 6110	Leading Teams	3
LDR 6120	Developing Organizational Leadership	3

NONPROFIT MANAGEMENT

Code	Title	Hours
NPM 6110	Legal and Governance Issues in Nonprofit Organizations	3
NPM 6120	Financial Management for Nonprofit Organizations	3
NPM 6150	Human Resources Management in Nonprofit Organizations	3

PROJECT MANAGEMENT

Code	Title	Hours
PJM 5900	Foundations of Project Management	4
PJM 6000	Project Management Practices	3
PJM 6205	Leading and Managing Technical Projects	3
PJM 6210	Communication Skills for Project Managers	3
PJM 6215	Leading Remote Project Teams	3

SPORTS LEADERSHIP

Code	Title	Hours
LDR 6400	Sports Management	3

TECHNICAL COMMUNICATION

Code	Title	Hours
TCC 6100	Introduction to Technical and Professional Writing	4
TCC 6450	Managing Technical Publications	4
TCC 6430	Writing for the Computer Industry	4

Program Credit/GPA Requirements

16 total quarter hours required
Minimum 3.000 GPA required

International Biopharmaceutical Regulatory Affairs, Graduate Certificate

To work in today's global biopharmaceutical industry, there is a strong need to understand international regulations that impact the development, marketing, and manufacturing of pharmaceutical and biotechnology products.

The Graduate Certificate in Biopharmaceutical International Regulatory Affairs curriculum focuses on factors that facilitate the safety, performance, and efficacy of biomedical goods. Program training covers the assessment of international regulations and interpretation of their

likely impact on a company's global commercialization strategies. Through participation in the program, students will have an opportunity to gain an understanding of international regulatory requirements necessary to implement such strategies.

Course work covers biotechnology and pharmaceutical product approval processes, regulatory analysis, and liability laws as they exist across different regulatory systems. The graduate certificate will provide core regulatory knowledge to students entering into the field from bench research, clinical studies, quality control/assurance, pharmacy, bioengineering, business, and legal analysis. The curriculum covers regulatory environments in Europe, Latin America, Australia, Japan, and other emerging economies. Courses from this certificate may be applied toward the Master of Science in Regulatory Affairs for Drugs, Biologics, and Medical Devices.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Courses

Code	Title	Hours
RGA 6221	European Union Compliance Process and Regulatory Affairs	4
RGA 6241	Working in Multicultural Environments: Challenges and Opportunities	2
Complete two of the following:		8
RGA 6204	Legal Issues in International Food, Drug, and Medical Device Regulation	
RGA 6207	Global Impact of Electronic Common Technical Document (eCTD) Submissions	
RGA 6210	Strategic Planning and Project Management for Regulatory Affairs	
RGA 6212	Introduction to Safety Sciences	
RGA 6223	Introduction to Canadian, Asian, and Latin American Regulatory Affairs	
RGA 6224	Regulation of Biomedical Product Commercialization by Health Canada	
RGA 6229	Biomedical Product Regulatory Affairs in Emerging Markets: Russia and Kazakhstan	
RGA 6240		
RGA 6244	Therapeutic Product Development in Canada	
RGA 6245	Regulation of Generic Pharmaceutical and Biosimilar Products	
RGA 6249	Chinese Food and Drug Administration Regulation of Biomedical Product Commercialization	
RGA 6255	Global Convergence of Regulatory Science and Reimbursement/Market Access	

Program Credit/GPA Requirements

17 total quarter hours required
Minimum 3.000 GPA required

Leadership, Graduate Certificate

Today's cross-functional teams and organizations require a leadership style that capitalizes on the collective expertise and capabilities of the group. The development and mastery of collaborative leadership skills are not typically part of one's focused discipline preparation; hence, leadership requires deliberate development by those who assume leadership roles.

The Graduate Certificate in Leadership starts with the premise that everyone is capable of leadership. The program studies every aspect of leadership dynamics from the leader as an individual to working in teams and from the organization itself to the development of strategic leadership techniques. Course work exposes participants to a series of alternative perspectives of leadership, including collaborative models. Using the course's action-learning methods, participants build a personal model of leadership that they can put to immediate use in their workplace.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Courses

Code	Title	Hours
LDR 6100	Developing Your Leadership Capability	3
LDR 6110	Leading Teams	3
LDR 6120	Developing Organizational Leadership	3
LDR 6140	Strategy Development and Implementation	3

Leadership Electives

Code	Title	Hours
Complete two of the following:		6
LDR 6135	Ethical Leadership	
HRM 6005	Creating a High-Performance Organization: Strategic Organizational and HRM Choices	
LDR 6150	Innovation and Organizational Transformation	
CMN 6010	Strategic Communication Management	

Program Credit/GPA Requirements

18 total quarter hours required
Minimum 3.000 GPA required

Leading And Managing Technical Projects, Graduate Certificate

Whether you're an established project manager, or you're working in a technical field and aspire to be one, Northeastern's Graduate Certificate in Leading and Managing Technical Projects seeks to give you the foundational skills and practical knowledge you need to be successful.

Through courses you take online, our technical project management curriculum will give you the opportunity to:

- Develop the leadership and management skills to lead technical projects
- Learn how to communicate technical content to a nontechnical audience

- Gain practice leading remote teams, including global teams
- Plan and schedule projects using the most current and relevant methodologies
- Develop a personal leadership approach to motivate and inspire others

And should you choose, you can apply the credits you earn toward your certificate directly to our master's in project management (p. 339), master's in leadership (p. 335), master's in corporate and organizational communication (p. 328), or master's in Informatics (p. 325).

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Courses

Code	Title	Hours
PJM 6000	Project Management Practices	3
PJM 6205	Leading and Managing Technical Projects	3
PJM 6210	Communication Skills for Project Managers	3
PJM 6215	Leading Remote Project Teams	3
PJM 6220	Planning and Scheduling Technical Projects	3
PJM 6825	Agile Lean Product Development	3

Program Credit/GPA Requirements

18 total quarter hours required
Minimum 3.000 GPA required

Leading Communication Strategy and Talent Development, Graduate Certificate

The Graduate Certificate in Leading Communication and Talent Development responds to the growing demand for communicators who can assume a strategic advisory and leadership role. This certificate is intended to prepare communicators with the knowledge and competencies to:

- Participate in the development of their organization's strategic objectives through effective communication processes and activities
- Structure an effective communication function with a highly motivated team of communication professionals and appropriate allocation of resources
- Identify, mentor, and promote talented communication professionals
- Serve as a strategic advisor to the organization's senior management team

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Courses

Code	Title	Hours
CMN 6200	Strategic Communications Advisor: Roles and Responsibilities	3
CMN 6201	Managing Communication Resources	3
CMN 6202	Management Symposium	3

Electives

Code	Title	Hours
Complete three of the following:		9
HRM 6020	Talent Acquisition and Onboarding	
LDR 6120	Developing Organizational Leadership	
PJM 6000	Project Management Practices	
PJM 6215	Leading Remote Project Teams	
CMN 6045	Leveraging Digital Technologies: Strategy, Assessment, and Governance	

Program Credit/GPA Requirements

18 total quarter hours required
Minimum 3.000 GPA required

Learning Analytics, Graduate Certificate

Educators today are "swimming" in data about curricula, student assessment, social media, registrations, and demographics stored in data warehouses and "the cloud." This data makes it possible to collect, manage, and maintain massive amounts of educational information. The need to analyze and make data-based decisions in education has led to the emergence of a new field called learning analytics.

Through a set of focused courses, our curriculum will give you the opportunity to:

- Articulate and integrate diverse perspectives in the field of learning analytics, including learning analytics assumptions, theories, epistemologies, and debates
- Align learning analytics processes to address the needs of educational institutions and answer questions posed by educational leaders
- Select, prepare, implement, interpret, and evaluate learning analytic models appropriately

And should you choose, you can apply the credits you earn toward your certificate directly to our Master of Education concentration in learning analytics

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Courses

Code	Title	Hours
EDU 6340	Learning Analytics Concepts and Theories	4
EDU 6341	Introduction to Data Mining in Education	4
EDU 6182	Educational Statistics	4
EDU 6343	Predictive Modeling for Learning Analytics	4

Program Credit/GPA Requirements

16 total quarter hours required
Minimum 3.000 GPA required

Medical Devices Regulatory Affairs, Graduate Certificate

The national and regional medical device industries have continued to experience significant market growth, despite the fluctuations in the overall global economy. There are more than 7,000 medical device companies in the United States alone, and nearly 1,000 of these are based in Massachusetts. In total, the medical device sector in Massachusetts employs 36,000 workers, has a payroll of over $1.8 billion, and annual product shipments of $7.3 billion.

The Graduate Certificate in Medical Devices Regulatory Affairs provides students with an opportunity to gain a detailed knowledge of the regulations influencing the commercialization of new and existing medical devices. The intensely practical curriculum spans the entire life cycle of product development and introduces students to the salient features governing both pre- and postapproval stages. The program content also examines the relationship between regulatory agencies and the medical device industry. Students have the opportunity to take specialized courses on regulatory systems outside the United States.

The certificate will help advance the careers of students coming from such fields as bioengineering, quality control/assurance, intellectual property, business, and marketing. The choice of several courses makes this certificate ideal for students already working in the regulatory world as well as those just entering into the profession.

Courses from this certificate may be applied toward the Master of Science in Regulatory Affairs for Drugs, Biologics, and Medical Devices.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirement

Code	Title	Hours
Required Courses		
RGA 6001	Introduction to Food and Drug Administration Medical Device Regulation	2
RGA 6202	Medical Device Development: A Regulatory Overview	4
Electives		
Complete the appropriate number of electives to obtain minimum quarter hours required for the program:		10-12
BTC 6210	Human Experimentation: Methodological Issues Fundamentals	
BTC 6260	The Business of Medicine and Biotechnology	
RGA 6002	Regulatory Compliance Culture	
RGA 6112	Biomedical Intellectual Property Management Strategy: Patents and Trade Secrets	
RGA 6205	Emerging Trends and Issues in the Medical Device Industry	
RGA 6222	European Medical Device Regulations	
RGA 6225	Japanese Medical Device Regulations and Registration	
RGA 6226	Canadian and Australian Medical Device Regulations	
RGA 6227	Emerging Medical Device Markets	
RGA 6233	Application of Quality System Regulation in Medical Device Design and Manufacturing	
RGA 6242	Preparing EU Medical Device Clinical Evaluations	
RGA 6243	Medical Device Product Development in Canada	
RGA 6370	Advanced Regulatory Writing: Medical Device Submissions	
RGA 6420	Global IVD Regulations and Submissions	
ITP 6305		

Program Credit/GPA Requirements

16 total quarter hours required
Minimum 3.000 GPA required

Nonprofit Management, Graduate Certificate

Nonprofits today simply require a higher level of management expertise. Nonprofit managers are required to manage people and programs more efficiently and effectively. The Graduate Certificate in Nonprofit Management focuses on developing skills in organizational management, financial management, fund-raising, grant and report writing, human resources management, and governance.

The program integrates theoretical approaches with practical application to prepare students for positions in either small or large nonprofit organizations. The program targets individuals who work in the nonprofit sector as executive directors, managers, program staff, board members, and volunteers. Students have an opportunity to participate in case studies, individual and group projects, and class discussions.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Courses

Code	Title	Hours
NPM 6110	Legal and Governance Issues in Nonprofit Organizations	3
NPM 6120	Financial Management for Nonprofit Organizations	3
NPM 6125	Promoting Nonprofit Organizations	3
NPM 6130	Fundraising and Development for Nonprofit Organizations	3
NPM 6140	Grant and Report Writing	3
NPM 6150	Human Resources Management in Nonprofit Organizations	3

Program Credit/GPA Requirements

18 total quarter hours required
Minimum 3.000 GPA required

Organizational Communication, Graduate Certificate

The study of organizational communication focuses on the dynamics of communication in complex organizations for the purpose of learning how individuals within such organizations can become effective communicators. Whether the context of such communication is

meetings or professional presentations, communicating during a crisis, or intercultural exchanges, the message is consistent: Effective communication is a crucial factor in determining organizational success.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Courses

Code	Title	Hours
CMN 6010	Strategic Communication Management	3
CMN 6020	Ethical Issues in Organizational Communication	3
CMN 6910	Organizational Communication Assessment	3

Electives

Code	Title	Hours
Complete two of the following:		6
CMN 6061	Personal Branding	
CMN 6050	Crisis Communication	
CMN 6060	Negotiation, Mediation, and Facilitation	
Complete one of the following:		3
CMN 6080	Intercultural Communication	
CMN 6090	Organizational Culture, Climate, and Communication	
CMN 6100	Communication Networks and Managing Information	
CMN 6110	Group Dynamics and Interpersonal Conflict: Meeting Management	
CMN 6015	Introduction to the Digital Era: The Power of Social Media	

Program Credit/GPA Requirements

18 total quarter hours required
Minimum 3.000 GPA required

Port Security, Graduate Certificate

The Graduate Certificate in Port Security examines U.S. and international policy, laws, and regulations for maritime and aviation security in light of current security challenges, terrorism and transnational criminal threats, and the potential U.S. and global impact of maritime and aviation security failures. Emergency response and recovery mechanisms and implementation as well as organizations and associations critical to modern U.S. maritime and aviation port security infrastructure protection will be evaluated and exercised.

The certificate offers leaders an opportunity to evaluate maritime and aviation security risks, threats, and measures to mitigate within applicable U.S. and international policy, assess and implement response and planning mechanisms for maritime transportation system security and aviation and airport security requirements, and conduct real-world actionable planning and strategy development for maritime and aviation security response and crisis management, among other essential skills for senior leaders.

This certificate is ideal for homeland security professionals and industry leaders responsible for maritime and aviation port security, incident

management and response, and the planning and execution of maritime and aviation operations within today's security challenges.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Courses

Code	Title	Hours
HLS 6100	Maritime Port Security 1	4
HLS 6110	Maritime Port Security 2	4
HLS 6120	Aviation Security 1	4
HLS 6130	Aviation Security 2	4
HLS 6140	Port Security Capstone	4

Program Credit/GPA Requirements

20 total quarter hours required
Minimum 3.000 GPA required

Professional Sports Administration, Graduate Certificate

The revenue of the global professional sports industry has grown to $145 billion and also projects an increase in jobs by up to 13 percent by 2020 (PwC, 2015).

The Graduate Certificate in Professional Sports Administration is designed to give students an in-depth understanding of this professional segment of the sports industry. Through the program's curriculum, students will be given the opportunity to acquire professional leadership skills and knowledge in a variety of topical areas including sports management, marketing, sponsorship, event management, risk management, and finance.

Upon completion, all credits earned in the professional sports administration certificate can also be applied directly into the Master of Sports Leadership (p. 352) program.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Courses

Code	Title	Hours
LDR 6323	Event Management	3
LDR 6400	Sports Management	3
LDR 6435	Fiscal Practices in Sports	3
LDR 6440	Sports Marketing and Promotions	3
LDR 6445	Corporate Sponsorships	3
LDR 6460	Risk Management in Athletics	3

Program Credit/GPA Requirements

18 total quarter hours required
Minimum 3.000 GPA required

Program and Portfolio Management, Graduate Certificate

The increasingly important role of program and portfolio managers is clear, as we see more companies orienting their work in a projectized fashion. Not only are companies seeking to projectize their workflow, but they are seeking to better align projects with the strategic direction of the

company and industry. Program and portfolio managers need to be able to evidence the strategic value that projects are accomplishing and can continue to accomplish in their organizational context.

The need for organizations to coordinate their related projects into programs and to seek to understand the value of their work through the lens of a portfolio is recognized throughout all industry sectors. This has been made clear through the creation of advanced industry certifications, such as the Program Management Professional (PgMP®) and the Portfolio Management Professional (PfMP®) credential by the Project Management Institute.

Northeastern University's Graduate Certificate in Program and Portfolio Management is designed to prepare individuals with the knowledge, skills, and tools needed to effectively manage project-based programs and portfolios.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Courses

Code	Title	Hours
PJM 6710	Introduction to Program and Portfolio Management	3
PJM 6715	Advanced Program Management	3
PJM 6720	Advanced Portfolio Management	3
PJM 6725	Program and Portfolio Leadership	3
PJM 6730	Program and Portfolio Evaluation	3
PJM 6735	Program and Portfolio Management Capstone	3

Program Credit/GPA Requirements

18 total quarter hours required
Minimum 3.000 GPA required

Project Business Analysis, Graduate Certificate

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Courses

Code	Title	Hours
PJM 6000	Project Management Practices	3
PJM 6610	Foundations of Project Business Analysis	3
PJM 6620	Project Business Analysis: Needs Assessment	3
PJM 6630	Project Business Analysis: Requirements Planning and Analysis	3
PJM 6640	Leadership Strategies for the Business Analyst	3
ALY 6000	Introduction to Analytics	3

Program Credit/GPA Requirements

18 total quarter hours required
Minimum 3.000 GPA required

Project Management, Graduate Certificate

Technical and managerial employees at all levels of organizations are being asked to manage small and large projects. Many of these professionals have not been specifically trained to effectively and efficiently manage projects. The task of managing projects has its own body of knowledge. This program seeks to provide the practical and theoretical knowledge for which the Project Management Institute tests, and it is expected that individuals who successfully complete this program will be capable of fulfilling the education requirements of the Project Management Professional (PMP) certification exam.

This certificate program in project management is designed with sufficient course flexibility to accommodate professionals with various levels of project management experience. Project management principles are applicable to both manufacturing and service industries, including professionals in fields such as software engineering, construction management, and financial services.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Courses

Note: Foundations of Project Management (PJM 5900) is required for students who do not have at least two years of professional experience working on projects. This course is intended only for those who are not familiar with professional project work. Students with two years or more of professional project experience should not take this course:

Code	Title	Hours
PJM 5900	Foundations of Project Management	4
PJM 6000	Project Management Practices	3
PJM 6005	Project Scope Management	3
PJM 6025	Project Scheduling and Cost Planning	3
PJM 6015	Project Risk Management	3

Project Management Electives

Code	Title	Hours
Complete two of the following. Note: Students who take PJM 5900 are required to take only one course in this section:		6
PJM 6125	Project Evaluation and Assessment	
PJM 6135	Project Quality Management	
PJM 6140	Managing Troubled Projects	
PJM 6210	Communication Skills for Project Managers	
PJM 6710	Introduction to Program and Portfolio Management	
PJM 6810	Principles of Agile Project Management	

Program Credit/GPA Requirements

18 total quarter hours required
Minimum 3.000 GPA required

Public and Media Relations, Graduate Certificate

There is growing demand for communication professionals with digital media skills and a strategic perspective on brand and reputation management. According to the Bureau of Labor Statistics, employment of public relations specialists and managers will grow by 12 percent and

13 percent, respectively. The Graduate Certificate in Public and Media Relations is designed to prepare communication professionals who focus on external stakeholders for the challenges of a rapidly changing industry. This program focuses on developing strategic communication plans, crafting compelling messages, and performing audience research, while preparing students with the latest skills in digital platforms, tools, and techniques.

The goal of this program is to equip graduates with the knowledge and skills to:

- Design and produce public and media relations campaigns using written materials, social media, audio, video, and web-based tools
- Identify and anticipate audience behavior and expectations using primary and secondary research methods
- Strategically design, implement, and evaluate campaigns that support organizational performance

The courses in this program also serve as a concentration in the Master of Science in Corporate and Organizational Communication (p. 328).

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Courses

Code	Title	Hours
PBR 6100	Introduction to Public Relations	3
PBR 6135	Public Relations Strategy and Planning	3
PBR 6710	Public Relations Research: Understanding External Audiences	3

Elective Courses

Code	Title	Hours
Complete three of the following:		9-10
PBR 6125	Community Relations and Corporate Social Responsibility	
PBR 6130	Public Relations Writing Seminar 1	
PBR 6140	Public Relations Writing Seminar 2	
CMN 6025	Digital Era Skills: Platforms, Tools, and Techniques	
CMN 6035	Legal, Policy, and Ethical Issues in the Digital Era	
CMN 6045	Leveraging Digital Technologies: Strategy, Assessment, and Governance	
CMN 6050	Crisis Communication	
DGM 6290	Social Media and Brand Strategy Implementation	

Program Credit/GPA Requirements

18–19 total quarter hours required
Minimum 3.000 GPA required

Remote Sensing, Graduate Certificate

Remote sensing is the measurement of information by a recording device that is not in physical contact with the object being measured. In practice, remote sensing is the utilization at a distance (as from aircraft, space shuttle, spacecraft, satellite, or ship) of any device for gathering information about the environment. The term remote sensing is most often applied to terrestrial and weather observations but can be applied to planetary environments and astronomy. Remote sensing is applicable to many other situations, including land-use change, pollution tracking, land-use and planning, transportation systems, and military observation.

The online Graduate Certificate in Remote Sensing aims to make education and training in remote sensing available to adult and professional students. The remote sensing certificate program seeks to produce students who are well versed in remote sensing theory, who have hands-on exposure to remote sensing software and hardware, and who have learned how to extract pertinent data from remotely sensed data sets. This six-course certificate program seeks to provide students with the necessary skills and understanding to apply remote sensing knowledge competently and effectively in a variety of areas.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Courses

Code	Title	Hours
RMS 5105	Fundamentals of Remote Sensing	3
RMS 6110	Digital Image Processing	3

Remote Sensing Electives

Code	Title	Hours
Complete four of the following:		12
RMS 6215	Unmanned Aerial Systems for Geospatial Analysts	
RMS 6230	Remote Sensing and Global Change	
RMS 6240	Introduction to Radar and LiDAR Remote Sensing	
RMS 6250	Spatial Analytics for Vegetation and Precision Agriculture	
RMS 6270	Remote Sensing for Disaster Management	
RMS 6280	Automated Feature Extraction for the Geospatial Professional	
RMS 6290	Spectroscopic Image Analysis	
RMS 6292	Photogrammetry and GPS	
GIS 6394	Crisis Mapping for Humanitarian Action	

Program Credit/GPA Requirements

18 total quarter hours required
Minimum 3.000 GPA required

Respiratory Specialty Practice, Graduate Certificate

The goal and planned outcome of the respiratory specialty practice certificate program is to meet the need for registered respiratory therapists (RRTs) to document their competency in one of four respiratory care specialist practice areas:

1. Adult critical care
2. Neonatal and pediatric intensive care
3. Asthma and COPD education/wellness coordination
4. Pulmonary function testing

The goal and expected outcome is to help students working in these areas to reach a competency level where they can become board-certified specialists in one or more of the four specialty areas.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Courses

Code	Title	Hours
RPT 7400	Pulmonary Diseases and Disorders	4
RPT 7401	Cardiopulmonary Assessment and Diagnostics	4

Electives

Code	Title	Hours
Complete two of the following:		8
RPT 7402	Adult Critical Care	
RPT 7403	Neonatal and Pediatric Care	
RPT 7404	Pulmonary Wellness Education and Coordination	
RPT 7405	Development of Patient Management Plans	

Program Credit/GPA Requirements

16 total quarter hours required
Minimum 3.000 GPA required

Social Media and Online Communities, Graduate Certificate

Social media management and strategy development have become core skills required for communication professionals. According to WANTED Analytics, 1.6 million working professionals utilize social media skills in jobs at the manager and executive level. The Graduate Certificate in Social Media and Online Communities focuses on strategic framework and the role digital media has in supporting organizational performance. The program integrates theory and practice, including experimenting with various tools and platforms and reflecting on lessons learned from active management and experimentation.

Students completing the program will have the opportunity to obtain the knowledge and skills to:

- Take a strategic approach to the design and implementation of social media channels and online communities
- Learn how to define metrics for measuring success, develop training, and evaluate the performance of social media activities
- Manage organizational risks and learn best practices in the creation of social media policies and guidelines

Courses within the social media and online communities certificate program also serve as a concentration through the Master's in Corporate and Organizational Communication program (p. 328).

Program Requirements
Required Courses

Code	Title	Hours
Required Courses		
CMN 6015	Introduction to the Digital Era: The Power of Social Media [1]	3
CMN 6025	Digital Era Skills: Platforms, Tools, and Techniques	3
CMN 6035	Legal, Policy, and Ethical Issues in the Digital Era	3
CMN 6045	Leveraging Digital Technologies: Strategy, Assessment, and Governance	3
CMN 6065	Implementation and Management of Social Media Channels and Online Communities	3
Electives		
Complete one to two of the following: [1]		3-8
DGM 6285	Interactive Marketing Fundamentals	
DGM 6290	Social Media and Brand Strategy Implementation	
TCC 6710	Content Strategy	
CMN 6040	Consumer Behaviors in the Online Environment	

Program Credit/GPA Requirements

19–21 total quarter hours required
Minimum 3.000 GPA required

[1] Students may qualify to waive CMN 6015 if they have social media experience. Please consult with your academic advisor.

Teaching English To Speakers Of Other Languages, Graduate Certificate

The Graduate Certificate in Teaching English to Speakers of Other Languages (TESOL) is designed to provide students with a solid foundation in the structure and use of English language. The certificate offers teaching strategies, firmly grounded in research, theory, and practice, to instruct ESL/EFL (English as a Second Language/ English as a Foreign Language) to adults in the United States or internationally. Students have an opportunity to develop learning e-portfolios as part of their course work.

Topics covered by the program include best practices in TESOL methodology through a combination of lecture, small group work, reflection, classroom observation, and a practicum that provides hands-on experience designing lessons, materials, and assessments. Whether students want to teach English abroad, work with immigrant adult populations in the United States, or teach English at the university level, this graduate certificate will provide them with an opportunity to gain a combination of theoretical and practical training to teach English to speakers of other languages in international contexts, community colleges, and within organizations devoted to adult English-language learners.

This certificate does not lead to Massachusetts licensure.

SPECIAL REQUIREMENTS:
- The TESOL certificate program may be completed in two quarters and is offered 100 percent online.
- Students have the option to complete the practicum component online or on-ground.
- The program has two start terms: fall quarter and spring quarter.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Courses

Code	Title	Hours
EDU 6300	Introduction to Language and Linguistics	4
EDU 6534	Bilingualism, Second Language, and Literacy Development	4
EDU 6558	Issues in Education	1-4
EDU 6302	Teaching, Learning, and Assessment: How English Is Learned and Used	4
EDU 6312	TESOL Practicum and Seminar	5

Program Credit/GPA Requirements

18 total quarter hours required
Minimum 3.000 GPA required

College of Science

Website (http://www.northeastern.edu/cos/graduate)

Kenneth W. Henderson, PhD, Dean
Brent Nelson, PhD, Associate Dean, Undergraduate Affairs
David E. Budil, PhD, Associate Dean, Research and Graduate Affairs
Frederick C. Davis, PhD, Associate Dean, Faculty Affairs, Diversity and Inclusion
TBD, Associate Dean, Administration and Finance
James Poulos, MA, Associate Dean, Development
Lauren Machunis, MS, Assistant Dean, Undergraduate Advising and Enrollment Management
Kellie Melchin, MS, Assistant Dean, Graduate Administration

115 Richards Hall
617.373.5085
617.373.8583 (fax)
cos@northeastern.edu

Graduate Admissions and Student Services Office
617.373.4275
gradcos@northeastern.edu

The College of Science seeks to offer advanced students outstanding academics and real-world research experience through cutting-edge research opportunities that are both discipline based and interdisciplinary. Our doctoral and master's degree programs in the physical sciences, life sciences, and mathematics seek to give students a deep understanding of emerging fields such as chemical biology, cognition and neuroscience, environmental and marine science, biochemistry, bioinformatics, biotechnology, nanoscience, and network science. Our programs are positioned at the forefront of discovery, invention, and innovation. We seek to prepare students and professionals to enter the scientific workforce serving the academy, government, or private sector.

Academic Policies and Procedures

Grading Policies

In the College of Science, not more than two courses or 6 semester hours of credit, whichever is greater, may be repeated to satisfy the requirements for the degree. Only such repeats will be counted in calculating the cumulative grade-point average.

No grade changes are permitted after the end of the final examination period one calendar year from the semester in which the student registered for the course. In calculating the overall cumulative average, all graduate-level course work completed at the time of clearance for graduation will be counted unless the student is immediately continuing on for a PhD degree in his or her department.

Course Registration

Students are encouraged to obtain advisor approval of course selections each semester. This approval is required for all assistantship recipients, and some departments require it for all students. Students should check with individual departments for specific guidelines.

Transfer Credit

A student may petition to transfer up to 9 semester hours of his or her program using credits from another institution, provided that the credits transferred consist of a grade of B (3.000) or better in graduate-level courses, have been earned at a U.S–accredited institution, and have not been used toward any other degree. *Note:* If approved by the College of Science, credits from Northeastern University's College of Professional Studies (CPS) transfer to the College of Science as external credits and count toward the 9-semester-hour maximum of transfer credit. As courses at other institutions may not parallel courses at Northeastern, the student's academic department will determine the number of semester hours the external course will be worth. This calculation may result in fewer semester hours than the course was assigned at the institution at which the student completed the course. In addition, courses accepted for transfer credit must have been completed within five years of the date the student is admitted to graduate study. Grades are not transferred. Some departments may accept fewer than 9 transfer credits.

Awards

Only those students who are registered in degree programs are eligible for awards. Award recipients will receive an official award letter from the College of Science via email. Pay attention to this letter as it is an official contract that should be read carefully. In addition, to maintain awards, students must be making satisfactory progress toward their degrees.

Receipt of financial support administered by the College of Science is contingent on satisfactory academic progress toward the degree and on meeting department-specific guidelines. The College of Science requires that all students receiving awards will generally have two semesters to reach a 3.000 grade-point average (GPA). Students whose cumulative GPA is below 3.000 will be reviewed by their departments and by the College of Science and may have their funding terminated on recommendation of their department or by decision of the College of Science in consultation with their department. Renewals of awards will depend on the student making satisfactory academic progress toward the degree, including a GPA of 3.000 or the department's minimum GPA, if it is higher than the College of Science minimum, and satisfactory performance of any duties required by the award.

Satisfactory Progress

Satisfactory progress means satisfying requirements in the College of Science, in this graduate catalog, and in the regulations specified by the departments.

The College of Science sets minimum standards for all students to fulfill. Departments and programs may have additional requirements that exceed those of the College of Science. Students in the College of Science must be making satisfactory progress, including working toward the graduation requirement of a grade-point average of 3.000 in their course work and the timely completion of course work and comprehensive/qualifying examinations. See also the university's policy on academic standing ("Minimum Cumulative Grade-Point Average (p. 29)").

Time Limitation

Refer to university policy regarding time limitations. If students wish to apply for an extension of the time limit, they must submit a petition to their department of study. The petition must include a detailed plan for completion of all remaining degree requirements. In the case of master's degree time limit extension requests for course work, the department must certify that the content of each of the courses has not changed since the time the student completed the course. If deemed appropriate, the department will recommend a time limit extension to graduate student services. The associate dean for research and graduate education has final approval of time limit extensions.

Changes in Requirements

The continuing development of the College of Science graduate programs requires regular revision of curricula. When no hardship is imposed on the student because of changes and the facilities of the school permit, the student is expected to meet the most recent requirements. However, if it can be demonstrated to the director of graduate admissions and student services that doing so does impose a substantial hardship, the requirements of the year in which the student matriculated will be applicable.

The Doctor of Philosophy Degree (PhD)

The Doctor of Philosophy degree is awarded to candidates who provide evidence of high scholastic attainment and research ability in their major field. Specific degree requirements are administered by a committee in charge of the degree program. It is the responsibility of the chair of this committee to certify to the College of Science the completion of each requirement for each candidate.

Residence Requirement

A Doctor of Philosophy degree student must spend the equivalent of at least one academic year in residence at the university as a full-time graduate student. The committee of each degree program specifies the method by which the residence requirement is satisfied.

Qualifying Exam

In programs where a qualifying exam is required, students must complete this requirement within the time limit set by the program of study.

Comprehensive Examination

Degree programs may require a comprehensive examination. Generally, students are expected to complete all of the required degree course work prior to taking the comprehensive examination. Students must complete this requirement within the time limit set by the program of study, usually within one term of completing the required course work.

Doctoral Degree Candidacy

PhD degree candidacy is established when students have completed all departmental and university requirements for candidacy. These requirements vary by department and include completing the minimum number of graduate semester hours required of doctoral students by the department (this may include an earned master's degree accepted by the department) and passing a qualifying examination and/or a comprehensive examination. Once students reach doctoral degree candidacy they will be certified, in writing, by the college. Registration in course work is not permitted once a student reaches candidacy.

Continuity of Registration

For each of the first two semesters that a doctoral candidate has established candidacy, the student must register for Dissertation. For each semester beyond the two Dissertation registrations, the student must register for Doctoral Dissertation Continuation until the dissertation is approved by the College of Science. During the terms when a student is registered for Doctoral Dissertation or Dissertation Continuation, course work is not permitted as the course requirements for the degree have already been met. If the academic program requires enrollment in seminars or courses in addition to Dissertation or Dissertation Continuation, the department's graduate director will make a recommendation to the College of Science for approval. Approval must happen prior to registration. Students must be registered for Dissertation or Dissertation Continuation during the semester in which they take the final oral examination (including the full summer semester if that is when defense occurs). Any student who does not attend Northeastern University for a period of one year may be required to apply for readmission. A student who does not enroll for a period of three semesters, or one year, will be required to apply for readmission. Readmission is done via Apply Yourself. A student who does not enroll for a period of two semesters, or less than one year, may petition his or her department for reactivation. If the department is supportive, the student will be required to submit a written request to the departmental graduate committee. If the graduate committee feels the student is worthy of reactivation, the student's written request must be submitted to Graduate Admissions and Student Services. Please note that college admissions deadlines apply to requests for readmission and reactivation.

Dissertation

Each doctoral student must complete a dissertation that embodies the results of extended research and makes an original contribution to the field. This work should give evidence of the candidate's ability to carry out investigation and interpret in a logical manner the results of the research. The method of approval of the dissertation is established by the committee in charge of the degree program. The chair of the dissertation committee must be a full-time member of the faculty of Northeastern University. In addition, the chair of the dissertation committee must hold a doctoral degree. Typically, only one external committee member is allowed.

Final Oral Examination

The final oral examination will be on the subject matter of the doctoral dissertation and on important developments in the field of the dissertation. Other fields may be included if recommended by the examining committee. This examination will be taken after completion

of all other degree requirements and must be held at least two weeks prior to the Commencement at which the PhD is awarded. The oral exam must take place on campus in the presence of the chair/advisor and other dissertation committee members. The dissertation defense must be publicly announced prior to the defense and the opportunity given for other students, staff, and faculty to attend.

Interdisciplinary Doctoral Programs

Some graduate students may wish to pursue doctoral programs that involve substantial work in two or more departments. To meet this need, an interdisciplinary program may be established that corresponds in scope and depth to doctoral standards but does not agree exactly with the individual departmental regulations. Consult this graduate catalog for policies and guidelines pertaining to this doctoral option.

The Master's Degree Academic Requirements

A candidate for the master's degree must complete a minimum of 30 semester hours of graduate-level course work and such other study as may be required by the department in which the student is registered.

To qualify for the degree, a minimum cumulative average of 3.000, equivalent to a grade of B, must be obtained. This average will be calculated each semester according to the university grading system and will exclude any transfer credits or repeated courses. A student who does not make satisfactory progress toward degree requirements, as specified by the individual department, may be terminated from the program.

Comprehensive Examination

A final written or oral comprehensive examination is required in some programs. This examination will be given by the department concerned at least two weeks before the Commencement at which the degree is expected to be conferred.

Thesis

A master's thesis is required in some programs and should demonstrate the individual's capacity to execute independent work based on original material. Registration for Thesis is required in most programs.

Theses must be approved by the departmental graduate committee and, in cases in which a grade is required, must receive a grade of B (3.000) or better to be accepted.

Continuity of Registration

Students are expected to maintain satisfactory progress toward their intended degrees. All students must be registered in the last semester of their program. A student who does not enroll for a period of three semesters, or one year, will be required to apply for readmission. Readmission is done via Apply Yourself. A student who does not enroll for a period of two semesters, or less than one year, may petition his or her department for reactivation. If the department is supportive, the student will be required to submit a written request to the departmental graduate committee. If the graduate committee feels the student is worthy of reactivation, the student's written request must be submitted to Graduate Admissions and Student Services. Please note that college admissions deadlines apply to requests for readmission and reactivation.

Biology

Website (http://www.northeastern.edu/biology)

Jonathan L.Tilly, PhD

University Distinguished Professor and Chair

134 Mugar Life Sciences Building
617.373.2260
617.373.3724 (fax)
gradbio@northeastern.edu

Director of Graduate Studies for Biology
Erin J. Cram, PhD, Associate Professor, e.cram@northeastern.edu

Director of Graduate Studies for Bioinformatics
Steven Vollmer, PhD, Associate Professor, s.vollmer@northeastern.edu

The PhD program in biology emphasizes close interaction between graduate students and faculty in developing the intellectual and experimental skills required for creative independent research. Rigorous courses in a core biology curriculum, as well as advanced courses in particular research interests, are complemented by intensive research culminating in completion of a dissertation under faculty supervision. Students have an opportunity to declare a concentration in either cell and molecular biology or molecular microbiology.

The Department of Biology oversees the bioinformatics Master of Science program. The interdisciplinary program provides cross-disciplinary training in biology, computer science, and informational technology preparing students for cutting-edge jobs in the biotechnology and pharmaceutical industries. The program consists of four parts: fundamental courses, core courses, an optional co-op, and electives.

Programs
Doctor of Philosophy (PhD)

Master of Science (MS)

Graduate Certificate

Biology, PhD

The biology PhD program seeks to provide a broad background knowledge base in conjunction with in-depth study of a specialized area of biology. Two optional concentrations are available: cell and molecular biology and molecular microbiology. The program emphasizes close interaction between graduate students and faculty members in developing the intellectual and experimental skills required for creative, independent research.

The PhD program entails course work from a core biology curriculum along with advanced courses in the student's area of research interest. This is complemented by intensive research and completion of a dissertation under faculty supervision. Faculty research includes biochemistry, microbiology, cell and molecular biology, genetics, neurobiology, regenerative biology, and the biology of reproduction.

Program Requirements
Bachelor's Degree Entrance
Complete all courses and requirements listed below unless otherwise indicated.

Milestones
Qualifying examination

Annual review
Dissertation committee
Dissertation proposal
Colloquia (minimum of three)
First-author publication
Dissertation defense

Core Requirements

Code	Title	Hours
Research Ethics		
BIOL 7399	Research Problem Solving, Ethics, and Communication Skills	4
Colloquium		
Complete the following (repeatable) course twice:		2
BIOL 5100	Biology Colloquium	

BIOLOGY PHD WITHOUT CONCENTRATION

Code	Title	Hours
Required Course Work		
Complete 8 semester hours from the following:		8
BIOL 6303	Neurobiology and Behavior	
BIOL 6399	Dynamics of Microbial Ecology	
BIOL 6401	Research Methods and Critical Analysis in Molecular Cell Biology	
BIOL 6405	Prokaryotic Cell and Molecular Biology	
BIOL 6407	Biochemistry for Molecular Biologists	
Electives		
Complete 16 semester hours from the following:		16
BIOL 5103 to BIOL 8674		

Concentrations

- Cell and Molecular Biology (p.   )
- Molecular Microbiology (p. 376)

CELL AND MOLECULAR BIOLOGY CONCENTRATION

Code	Title	Hours
Required Course Work		
BIOL 6401	Research Methods and Critical Analysis in Molecular Cell Biology	4
BIOL 6407	Biochemistry for Molecular Biologists	4
Electives		
In consultation with faculty advisor, complete 16 semester hours from the topic of cell and molecular biology:		16
BIOL 5103 to BIOL 8674		

MOLECULAR MICROBIOLOGY CONCENTRATION

Code	Title	Hours
Required Course Work		
Complete 8 semester hours from the following:		8
BIOL 6399	Dynamics of Microbial Ecology	
BIOL 6405	Prokaryotic Cell and Molecular Biology	
BIOL 6407	Biochemistry for Molecular Biologists	
Electives		
In consultation with faculty advisor, complete 16 semester hours from the topic of molecular microbiology:		16
BIOL 5103 to BIOL 8674		

Dissertation

Code	Title	Hours
Complete the following (repeatable) course twice:		
BIOL 9990	Dissertation	

Program Credit/GPA Requirements

30 total semester hours required
Minimum 3.000 GPA required

Biology, PhD—Advanced Entry

The biology PhD program seeks to provide a broad background knowledge base in conjunction with in-depth study of a specialized area of biology. The program emphasizes close interaction between graduate students and faculty members in developing the intellectual and experimental skills required for creative, independent research.

Students entering the PhD program with a related Master of Science degree typically have significantly reduced course loads. An individualized course of study is designed by the biology graduate curriculum committee in consultation with the student and the student's advisor. The student can then focus on intensive research and completion of a dissertation under faculty supervision. Faculty research includes biochemistry, microbiology, cell and molecular biology, genetics, neurobiology, regenerative biology, and the biology of reproduction. Financial support (teaching assistantships or research assistantships) is normally provided for PhD students who are making satisfactory progress toward completion of their degree.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Milestones

Qualifying examination
Annual review
Dissertation committee
Dissertation proposal
Colloquia (minimum of three)
First-author publication
Dissertation defense

Core Requirements

APPROVED COURSE WORK
Consult your faculty advisor for acceptable courses.

APPROVED ELECTIVES
Consult your faculty advisor for acceptable electives.

Dissertation

Code	Title	Hours
Complete the following (repeatable) course twice:		
BIOL 9990	Dissertation	

Program Credit/GPA Requirements

Variable total semester hours required
Minimum 3.000 GPA required

Bioinformatics, MS

The Master of Science (MS) in Bioinformatics seeks to provide students with core knowledge in bioinformatics programming, integrating

knowledge from the biological, computational, and mathematical disciplines. Upon completion, students are equipped to apply bioinformatics and computational methods to biological problems. Students in the MS program have the opportunity to gain professional work experience via an optional co-op.

The program consists of core course work in computational methods, programming, and statistics, enhanced by electives in molecular biology, biochemistry, molecular modeling, web development, database design and management, data mining, and other related topics.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Computational Methods		
BINF 6308	Bioinformatics Computational Methods 1	4
BINF 6309	Bioinformatics Computational Methods 2	4
Research and Seminar		
BIOL 6381	Ethics in Biological Research	2
BINF 7385	Bioinformatics Seminar	2
Statistics and Programming		
BINF 6200	Bioinformatics Programming	4
MATH 7340	Statistics for Bioinformatics	4

Electives

Code	Title	Hours
Complete 12 semester hours from the following. Electives outside this list may be chosen in consultation with faculty advisor.		12
BIOE 5100	Medical Physiology	
BIOE 5235	Biomedical Imaging	
BIOE 5420	Cellular Engineering	
BIOL 5100	Biology Colloquium	
BIOL 5499	Plant Biotechnology	
BIOL 5543	Stem Cells and Regeneration	
BIOL 5549	Microbial Biotechnology	
BIOL 5569	Advanced Microbiology	
BIOL 5573	Medical Microbiology	
BIOL 5581	Biological Imaging	
BIOL 5583	Immunology	
BIOL 5585	Evolution	
BIOL 5587	Comparative Neurobiology	
BIOL 5591	Advanced Genomics	
BIOL 5593	Cell and Molecular Biology of Aging	
BIOL 5597	Immunotherapies of Cancer and Infectious Disease	
BIOL 6299	Molecular Cell Biology for Biotechnology	
BIOL 6300	Biochemistry	
BIOL 6301	Molecular Cell Biology	
BIOL 6303	Neurobiology and Behavior	
BIOL 6399	Dynamics of Microbial Ecology	

Code	Title	Hours
BIOL 6407	Biochemistry for Molecular Biologists	
BIOT 5120	Introduction to Biotechnology	
BIOT 5145	Basic Biotechnology Lab Skills	
BIOT 5219	The Biotechnology Enterprise	
BIOT 5225	Managing and Leading a Biotechnology Company	
BIOT 5226	Biotechnology Entrepreneurship	
BIOT 5227	Economics and Marketing for Biotechnology Managers	
BIOT 5560	Bioprocess Fundamentals	
BIOT 5631	Cell Culture Processes for Biopharmaceutical Production	
BIOT 5635	Downstream Processes for Biopharmaceutical Production	
BIOT 5640	Drug Product Processes for Biopharmaceuticals	
BIOT 5700	Molecular Interactions of Proteins in Biopharmaceutical Formulations	
BIOT 5810	Cutting-Edge Applications in Molecular Biotechnology	
BIOT 5850	Higher-Order Structure Analytics	
BIOT 7245	Biotechnology Applications Laboratory	
CHEM 5550	Introduction to Glycobiology and Glycoprotein Analysis	
CHEM 5616	Protein Mass Spectrometry	
CHEM 5617	Protein Mass Spectrometry Laboratory	
CHEM 5620	Protein Chemistry	
CHEM 5638	Molecular Modeling	
CHEM 5660	Analytical Biochemistry	
CHEM 7317	Analytical Biotechnology	
CS 5010	Programming Design Paradigm	
CS 5100	Foundations of Artificial Intelligence	
CS 5200	Database Management Systems	
CS 5400	Principles of Programming Language	
CS 5500	Managing Software Development	
CS 5600	Computer Systems	
CS 5610	Web Development	
CS 5700	Fundamentals of Computer Networking	
CS 5800	Algorithms	
CS 6140	Machine Learning	
CS 6200	Information Retrieval	
CS 6220	Data Mining Techniques	
DA 5020	Collecting, Storing, and Retrieving Data	
DA 5030	Introduction to Data Mining/Machine Learning	
EEMB 5130 and EEMB 5131	Ecological Dynamics and Lab for EEMB 5130	
MATH 5131	Introduction to Mathematical Methods and Modeling	
MATH 7203	Numerical Analysis 1	
MATH 7205	Numerical Analysis 2	
MATH 7233	Graph Theory	
MATH 7241	Probability 1	
MATH 7341	Probability 2	
MATH 7342	Mathematical Statistics	

MATH 7344	Regression, ANOVA, and Design
MATH 7345	Nonparametric Methods in Statistics
PHSC 6214	Experimental Design and Biostatistics
PHYS 5116	Complex Networks and Applications
PHYS 7331	Network Science Data
PHYS 7332	Network Science Data 2
PPUA 5301	Introduction to Computational Statistics
PPUA 5302	Information Design and Visual Analytics

Program Credit/GPA Requirements

32 total semester hours required
Minimum 3.000 GPA required

Bioinformatics, Graduate Certificate

The Graduate Certificate in Bioinformatics seeks to provide students with core knowledge in bioinformatics programming, integrating knowledge from the biological, computational, and mathematical disciplines. Students gain the data and genomic analysis skills needed to employ bioinformatics techniques to biological problems. The graduate certificate consists of four courses, three bioinformatics courses and one elective, totaling 15–16 semester hours.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
BINF 6200	Bioinformatics Programming	4
BINF 6308	Bioinformatics Computational Methods 1	4
BINF 6309	Bioinformatics Computational Methods 2	4

Elective

Code	Title	Hours
Complete one of the following. Electives outside this list may be chosen in consultation with faculty advisor:		3-4
BIOE 5100	Medical Physiology	
BIOE 5235	Biomedical Imaging	
BIOE 5420	Cellular Engineering	
BIOL 5100	Biology Colloquium	
BIOL 5499	Plant Biotechnology	
BIOL 5543	Stem Cells and Regeneration	
BIOL 5549	Microbial Biotechnology	
BIOL 5569	Advanced Microbiology	
BIOL 5573	Medical Microbiology	
BIOL 5581	Biological Imaging	
BIOL 5583	Immunology	
BIOL 5585	Evolution	
BIOL 5587	Comparative Neurobiology	
BIOL 5591	Advanced Genomics	
BIOL 5593	Cell and Molecular Biology of Aging	

BIOL 5597	Immunotherapies of Cancer and Infectious Disease
BIOL 6299	Molecular Cell Biology for Biotechnology
BIOL 6300	Biochemistry
BIOL 6301	Molecular Cell Biology
BIOL 6303	Neurobiology and Behavior
BIOL 6399	Dynamics of Microbial Ecology
BIOL 6407	Biochemistry for Molecular Biologists
BIOT 5120	Introduction to Biotechnology
BIOT 5130	Team Skills in Biotechnology
BIOT 5145	Basic Biotechnology Lab Skills
BIOT 5219	The Biotechnology Enterprise
BIOT 5225	Managing and Leading a Biotechnology Company
BIOT 5226	Biotechnology Entrepreneurship
BIOT 5227	Economics and Marketing for Biotechnology Managers
BIOT 5560	Bioprocess Fundamentals
BIOT 5631	Cell Culture Processes for Biopharmaceutical Production
BIOT 5635	Downstream Processes for Biopharmaceutical Production
BIOT 5640	Drug Product Processes for Biopharmaceuticals
BIOT 5700	Molecular Interactions of Proteins in Biopharmaceutical Formulations
BIOT 5810	Cutting-Edge Applications in Molecular Biotechnology
BIOT 5850	Higher-Order Structure Analytics
BIOT 7245	Biotechnology Applications Laboratory
CHEM 5550	Introduction to Glycobiology and Glycoprotein Analysis
CHEM 5616	Protein Mass Spectrometry
CHEM 5617	Protein Mass Spectrometry Laboratory
CHEM 5620	Protein Chemistry
CHEM 5660	Analytical Biochemistry
CHEM 7317	Analytical Biotechnology
CS 5010	Programming Design Paradigm
CS 5100	Foundations of Artificial Intelligence
CS 5200	Database Management Systems
CS 5400	Principles of Programming Language
CS 5500	Managing Software Development
CS 5600	Computer Systems
CS 5610	Web Development
CS 5700	Fundamentals of Computer Networking
CS 5800	Algorithms
CS 6140	Machine Learning
CS 6200	Information Retrieval
CS 6220	Data Mining Techniques
DA 5020	Collecting, Storing, and Retrieving Data
DA 5030	Introduction to Data Mining/Machine Learning
MATH 5131	Introduction to Mathematical Methods and Modeling

MATH 7203	Numerical Analysis 1
MATH 7205	Numerical Analysis 2
MATH 7233	Graph Theory
MATH 7241	Probability 1
MATH 7341	Probability 2
MATH 7342	Mathematical Statistics
MATH 7344	Regression, ANOVA, and Design
MATH 7345	Nonparametric Methods in Statistics
PHSC 6214	Experimental Design and Biostatistics
PHYS 5116	Complex Networks and Applications
PHYS 7331	Network Science Data
PHYS 7332	Network Science Data 2
PPUA 5301	Introduction to Computational Statistics
PPUA 5302	Information Design and Visual Analytics

Note: International students are required to select a 4-credit elective to maintain a full-time status, 8SH.

Program Credit/GPA Requirements
15–16 total semester hours required
Minimum 3.000 GPA required

Chemistry and Chemical Biology

Website (http://www.northeastern.edu/chemistry)

Michael P. Pollastri, PhD
Professor and Chair

102 Hurtig Hall
617.373.2822

Penny Beuning, PhD
Associate Professor and Director of Graduate Studies for Chemistry and Chemical Biology, p.beuning@northeastern.edu

Jared Auclair, PhD
Director of Graduate Studies for Biotechnology, j.auclair@northeastern.edu

Cynthia Bainton, Administrative Operations Manager for Biotechnology, c.bainton@northeastern.edu, 617.373.2627

The PhD program in chemistry and chemical biology provides research and professional opportunities for students that are based on fundamental chemical principles with translational applications to the real world. The program is built on academic rigor and research impact, based on the creativity and strengths of an increasingly diverse faculty and student body. We have harnessed our extensive connections in industry to create and maintain a thriving industry entry PhD program and provide our regular PhD students with internship opportunities in industry, government laboratories, and other venues that may lead to nontraditional careers. Students in our program leave with flexible skills that can be applied in creative and meaningful ways in academics, industry, and beyond. We are aligned in our core values with the mission of Northeastern University to "educate students for a life of fulfillment and accomplishments and create and translate knowledge to meet global and societal needs." This mission is at the core of the curriculum, research, mentoring strategies, and professional development opportunities offered to our students. It is implemented in a highly multidisciplinary and transparent environment where students have a voice and take real ownership and responsibility for their professional success. Within this context, PhD students work with chemistry and chemical biology faculty in interdisciplinary areas that include biochemistry and chemical biology, synthetic chemistry, medicinal chemistry, polymer and materials chemistry, computational chemistry, and bioanalytical chemistry.

The Master of Science in Chemistry is a part-time program designed to allow practicing chemical professionals in the greater Boston area who have an earned bachelor's degree in chemistry to pursue a master's part-time in chemistry by completing a course work program during the evening weekday hours. The department offers a diverse range of courses that mirror the faculty's research interests in biochemistry, chemical biology, synthetic chemistry, medicinal chemistry, polymer and materials chemistry, computational chemistry, and bioanalytical chemistry.

The Department of Chemistry and Chemical Biology oversees the biotechnology graduate programs. The Master of Science in Biotechnology, a professional science master's degree program, is an innovative, nonthesis graduate degree. It combines advanced interdisciplinary training in biotechnology, biology, chemistry, and pharmaceutical sciences with the development of high-value business skills critical to success in today's dynamic workplace. Students are offered the opportunity to gain hands-on experience during the program through Northeastern's established co-op program.

The biotechnology program also offers several graduate certificates in the areas of biopharmaceutical analytical sciences, biotechnology, biotechnology enterprise, experimental biotechnology, molecular biotechnology, pharmaceutical technologies, and process science.

Programs
Doctor of Philosophy (PhD)

Master of Science (MS)

Graduate Certificate

Chemistry, PhD

The PhD program in chemistry is designed for students who have earned a bachelor's or a master's degree in chemistry or related areas and who wish to earn a doctorate in chemistry. Research spans a wide range of multidisciplinary fields, with strengths in clean energy, polymers, materials, medicinal chemistry, bioanalytical chemistry, and chemical biology. Our research programs draw from a strong foundation in analytical, organic, physical, and biological chemistry in a collaborative and diverse environment. Our student-focused approach to mentoring,

a strong graduate student association, and faculty deeply rooted both in academics and industry provide a flexible platform for student development toward a large diversity of career paths.

Students typically take courses their first year while supported on teaching assistantships and achieve PhD candidacy the first or second half of year two. The primary emphasis of the program is on the completion of an original research project, its articulation in a well-written thesis, and its subsequent defense before the thesis committee through an open seminar followed by oral examination by the committee members.

Program Requirements
Bachelor's Degree Entrance

Complete all courses and requirements listed below unless otherwise indicated.

Milestones

Three qualifying examinations
Annual review
Candidacy
Dissertation committee
Minimum of three seminars
Dissertation defense

Core Requirements

Code	Title	Hours
Required Core		
CHEM 5600	Research Skills and Ethics in Chemistry	3
CHEM 7730	Advanced Laboratory Methods	4
CHEM 7750	Advanced Problem Solving	3
CHEM 8504	Graduate Seminar (repeatable)	1
At least one seminar must be taken for a letter grade.		
CHEM 8984	Research	1-6
Chemistry		
Complete 18 semester hours from the following:		18
CHEM 5550, CHEM 5570, or within the range of CHEM 5610 to CHEM 7320		

Dissertation

Code	Title	Hours
Complete the following (repeatable) course twice:		
CHEM 9990	Dissertation	0

Program Credit/GPA Requirements

33 total semester hours required
Minimum 3.000 GPA required

Chemistry, PhD—Advanced Entry

Advanced entry into the PhD program requires a master's degree in chemistry or a related area. Graduate courses taken during acquisition of the Master of Science degree allow completion of the PhD program with fewer course credits. Other than the course requirements, which are specified separately, see the PhD program requirements for details.

Industry Entry PhD

This program is strictly for students who already have a master's degree in chemistry or related area and have full-time employment at a company. The company must commit to all financial responsibilities accrued in

obtaining the degree and allow time for the student to work on a PhD thesis in collaborative research with a company supervisor and one of our faculty members. Graduate courses in the Department of Chemistry and Chemical Biology are taught in the evenings to accommodate the fact that our students work in industry during the day.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Milestones

Three qualifying examinations
Annual review
Candidacy
Dissertation committee
Minimum of three seminars
Dissertation defense

Core Requirements

Code	Title	Hours
CHEM 5600	Research Skills and Ethics in Chemistry	3
CHEM 7750	Advanced Problem Solving	3
CHEM 8504	Graduate Seminar	1

Dissertation

Code	Title	Hours
Complete the following (repeatable) course twice:		
CHEM 9990	Dissertation	0

Program Credit/GPA Requirements

7 total semester hours required
Minimum 3.000 GPA required

Biotechnology, MS

Overview

Northeastern's Master of Science in Biotechnology is a professional master's program, an innovative, nonthesis graduate degree. It combines advanced interdisciplinary training in biotechnology, biology, chemistry, and pharmaceutical sciences with the development of high-value business skills critical to success in today's dynamic workplace. Graduates are prepared to innovate, collaborate, and lead as research, managerial, or technical professionals in a wide range of biotechnology specialties.

Molecular Biotechnology Concentration

The molecular biotechnology concentration provides students with didactic and practical knowledge in molecular biotechnology, protein expression, and structural biology. Students learn how to generate and optimize molecular forms used to express recombinant proteins to be used as biopharmaceuticals. Particular attention is paid to cutting-edge technologies such as RNAi and CRISPR/CAS9. In addition, the students learn how to purify biopharmaceuticals and analyze aggregation and how to prevent it.

Process Sciences Concentration

The process sciences concentration focuses on the production of drug substance of biopharmaceuticals from cell culture process to purification of the biologic molecules. The students learn the principles of development and implementation of biological manufacturing processes through the integration of concepts and fundamentals of engineering

and life sciences. The concentration addresses biochemical engineering, mammalian cell culture process development, and protein purification. The learning of the students is reinforced by both lecture courses and project-driven laboratory experience that provides hands-on learning of cell culture and protein separation.

Biopharmaceutical Analytical Sciences Concentration

The biopharmaceutical analytical sciences concentration focuses on structures and activities of biological molecules and their variants formed during the production of biopharmaceuticals. Students learn the diversity of molecular forms derived from the biological products through various biological and chemical mechanisms and the impact of these structural changes on the safety and efficacy of these biopharmaceuticals. The students learn the science and practice applied in the biotechnology industry to analyze and characterize these molecular forms. This is accomplished through both lecture courses of the analytical sciences and project-driven laboratory experience that utilizes analytical techniques such as mass spectrometry and molecular separations.

Pharmaceutical Technologies Concentration

The pharmaceutical technologies concentration focuses on the conversion of purified proteins to biopharmaceutical drug products that are compatible for clinical use. This concentration addresses the design of the product formulation and the development and implementation of the drug product manufacturing processes. Students learn the sciences of the interactions of the biologic molecules in the process conditions and the relevant process technology, such as aseptic operations and freeze-drying, needed for drug product manufacturing. This is accomplished through both lecture courses and project-driven laboratory experience that offers hands-on learning of formulation design and drug product process development.

Biotechnology Scientific Information Management Concentration

The scientific information management concentration focuses on the collection, analysis, and visualization of scientific data. This concentration addresses the issues surrounding *big data* that face industry today. Students have an opportunity to learn how to manage, store, visualize, and provide overall analysis of large scientific data sets. This is accomplished through both lecture courses and project-driven laboratory experience that provide hands-on learning of the impacts of data on the scientific process.

Biotechnology Regulatory Science Concentration

The regulatory science concentration focuses on the science behind good regulatory practice today. This concentration addresses the issues surrounding current and innovative science practices that influence regulatory decisions. Students have an opportunity to learn the science behind compliance. This is accomplished through both lecture courses and project-driven laboratory experience that provides hands-on learning of the science behind dossier analysis.

Biotechnology Enterprise Concentration

The biotechnology enterprise concentration integrates business and management skills with the science of biotechnology. Students learn the fundamental concepts of leadership, entrepreneurship and innovation, financial decision making, and marketing. They gain teamwork, management, and business development skills in the process and graduate prepared to become scientist-managers.

GORDON INSTITUTE OF ENGINEERING LEADERSHIP
Master's Degree in Biotechnology with Graduate Certificate in Engineering Leadership

Students may complete a Master of Science in Biotechnology in addition to earning a Graduate Certificate in Engineering Leadership. Students must apply and be admitted to the Gordon Engineering Leadership Program in order to pursue this option. The certificate program requires fulfillment of the 16-semester-hour curriculum required to earn the Graduate Certificate in Engineering Leadership, which includes an industry-based challenge project with multiple mentors. The integrated 42-semester-hour master's degree and certificate requires 26 hours of biotechnology course work.

Engineering Leadership (p. 222)

Program Requirements
Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Required Core		
BIOT 5120	Introduction to Biotechnology	3
BIOT 5219	The Biotechnology Enterprise	2
BIOT 5631	Cell Culture Processes for Biopharmaceutical Production	3
BIOT 6214	Experimental Design and Biostatistics	2
BIOL 6299	Molecular Cell Biology for Biotechnology	3
CHEM 5620	Protein Chemistry	3
CHEM 7317	Analytical Biotechnology	3
Co-op		
BIOT 6500	Professional Development for Co-op	0
BIOT 6964	Co-op Work Experience	0

Concentrations
Complete one of the following seven concentrations:

- Molecular Biotechnology Concentration (p. 287)
- Process Sciences Concentration (p.   )
- Biopharmaceutical Analytical Sciences Concentration (p. 287)
- Pharmaceutical Technologies Concentration (p.   )
- Scientific Information Management Concentration (p.   )
- Regulatory (p.   ) Science Concentration (p.   )
- Biotechnology Enterprise Concentration (p. 288)

MOLECULAR BIOTECHNOLOGY CONCENTRATION

Code	Title	Hours
BIOT 5145	Basic Biotechnology Lab Skills	1
BIOT 5810	Cutting-Edge Applications in Molecular Biotechnology	3
BIOT 5850	Higher-Order Structure Analytics	3
BIOT 7245	Biotechnology Applications Laboratory	3
Electives (p. 288)		5

PROCESS SCIENCES CONCENTRATION

Code	Title	Hours
BIOT 5145	Basic Biotechnology Lab Skills	1
BIOT 5560	Bioprocess Fundamentals	3
BIOT 5635	Downstream Processes for Biopharmaceutical Production	3

| BIOT 7245 | Biotechnology Applications Laboratory | 3 |
| Electives (p. 288) | | 5 |

BIOPHARMACEUTICAL ANALYTICAL SCIENCES CONCENTRATION

Code	Title	Hours
BIOT 5145	Basic Biotechnology Lab Skills	1
BIOT 7245	Biotechnology Applications Laboratory	3
CHEM 5550	Introduction to Glycobiology and Glycoprotein Analysis	3
CHEM 5616	Protein Mass Spectrometry	3
Electives (p. 288)		5

PHARMACEUTICAL TECHNOLOGIES CONCENTRATION

Code	Title	Hours
BIOT 5145	Basic Biotechnology Lab Skills	1
BIOT 5640	Drug Product Processes for Biopharmaceuticals	3
BIOT 5700	Molecular Interactions of Proteins in Biopharmaceutical Formulations	3
BIOT 7245	Biotechnology Applications Laboratory	3
Electives (p. 288)		5

SCIENTIFIC INFORMATION MANAGEMENT CONCENTRATION

Code	Title	Hours
BIOT 5145	Basic Biotechnology Lab Skills	1
BIOT 5400	Scientific Information Management for Biotechnology Managers	3
BIOT 7245	Biotechnology Applications Laboratory	3
DA 5020 or DA 5030	Collecting, Storing, and Retrieving Data Introduction to Data Mining/Machine Learning	4
PPUA 5301	Introduction to Computational Statistics	4

REGULATORY SCIENCE CONCENTRATION

Code	Title	Hours
BIOT 5330		3
BIOT 5340	Introduction to Biotherapeutic Approvals	3
BIOT 5500	Introduction to Regulatory Science	3
BIOT 7245	Biotechnology Applications Laboratory	3
Electives (p. 288)		3

BIOTECHNOLOGY ENTERPRISE CONCENTRATION

Code	Title	Hours
BIOT 5225	Managing and Leading a Biotechnology Company	3
BIOT 5226	Biotechnology Entrepreneurship	3
BIOT 5227	Economics and Marketing for Biotechnology Managers	3
Electives (p. 288)		6

Elective List

Code	Title	Hours
Choose electives from the list and/or one-credit BUSN graduate level courses. Electives not on this list may be chosen with faculty advisor approval.		
BINF 6308	Bioinformatics Computational Methods 1	

BIOL 5307	Biological Electron Microscopy
BIOL 5499	Plant Biotechnology
BIOL 5543	Stem Cells and Regeneration
BIOL 5549	Microbial Biotechnology
BIOL 5569	Advanced Microbiology
BIOL 5573	Medical Microbiology
BIOL 5581	Biological Imaging
BIOL 5583	Immunology
BIOL 6381	Ethics in Biological Research
BIOL 6399	Dynamics of Microbial Ecology
BIOT 5220	The Role of Patents in the Biotechnology Industry, Past and Future
BIOT 5225	Managing and Leading a Biotechnology Company
BIOT 5226	Biotechnology Entrepreneurship
BIOT 5227	Economics and Marketing for Biotechnology Managers
BIOT 5560	Bioprocess Fundamentals
BIOT 5635	Downstream Processes for Biopharmaceutical Production
BIOT 5640	Drug Product Processes for Biopharmaceuticals
BIOT 5700	Molecular Interactions of Proteins in Biopharmaceutical Formulations
CHEM 5550	Introduction to Glycobiology and Glycoprotein Analysis
CHEM 5616	Protein Mass Spectrometry
CHEM 5617	Protein Mass Spectrometry Laboratory
CHEM 5621	Principles of Chemical Biology for Chemists
CHEM 5625	Chemistry and Design of Protein Pharmaceuticals
CHEM 5638	Molecular Modeling
CHEM 7247	Advances in Nanomaterials
CHME 7340	Chemical Engineering Kinetics
ENTR 6200	Enterprise Growth and Innovation
ENTR 6210	Managing Operations in Early Stage Ventures
ENTR 6211	Entrepreneurship: Services and Retail Business Creation
ENTR 6212	Business Planning for New Ventures
HINF 5105	The American Healthcare System
HINF 6201	Organizational Behavior, Work Flow Design, and Change Management
MGMT 6210	Law for Managers and Entrepreneurs
MGSC 6200	Information Analysis
NNMD 5270	Introduction to Nanomedicine
NNMD 5470	Nano/Biomedical Commercialization: Concept to Market
PHSC 6218	Biomedical Chemical Analysis
PHSC 6224	Behavioral Pharmacology and Drug Discovery
PHSC 6226	Imaging in Medicine and Drug Discovery
PHSC 6290	Biophysical Methods in Drug Discovery
PHSC 7010	Pharmaceutical Sciences Laboratory

| TECE 6230 | Entrepreneurial Marketing and Selling |
| TECE 6250 | Lean Design and Development |

Program Credit/GPA Requirements

34 total semester hours required
Minimum 3.000 GPA required

Chemistry, MS

Part-time Master's

The Department of Chemistry and Chemical Biology offers a part-time, course-based master's degree. Classes are offered in the evenings to accommodate students who have full-time jobs. A research thesis is not a requirement for the degree.

Master's

The department does not accept applications for the thesis-based master's degree from students who are not already at Northeastern.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Options

Complete one of the following options:

COURSE WORK OPTION

Code	Title	Hours
Complete 30 semester hours from the following courses:		30
CHEM 5550−CHEM 7750		

THESIS OPTION

Code	Title	Hours
Course Work		
Complete 15 semester hours from the following:		15
CHEM 5550, CHEM 5570, or within the range of CHEM 5610 to CHEM 7320		
Graduate Seminar (letter grade required)		
CHEM 5904	Seminar	1
or CHEM 8504	Graduate Seminar	
Skills and Ethics		
CHEM 5600	Research Skills and Ethics in Chemistry	3
Laboratory		
CHEM 7730	Advanced Laboratory Methods	4
Research		
CHEM 5984	Research	4
or CHEM 8984	Research	
Thesis		
CHEM 7990	Thesis	1-4

Program Credit/GPA Requirements

30 total semester hours required
Minimum 3.000 GPA required

Biopharmaceutical Analytical Sciences, Graduate Certificate

The Graduate Certificate in Biopharmaceutical Analytical Sciences has been designed in response to a need in the biotechnology industry for individuals with an advanced knowledge of the principles and practices of state-of-the-art analyses of protein with focus on the characterization of innovator and biosimilars. Individuals, particularly those who are working in the various sectors of biotechnology including basic research of biological systems, discovery, development, and manufacturing of biopharmaceuticals, have an opportunity to improve their competency and learn new practical skills that enable them to increase productivity and further contribute to their professions. In addition, the certificate was designed for both individuals with and without experience in biopharmaceuticals and their analysis.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

 A grade of C− or higher is required in all courses.

Code	Title	Hours
CHEM 5616	Protein Mass Spectrometry	3
CHEM 5617	Protein Mass Spectrometry Laboratory	3
CHEM 5550	Introduction to Glycobiology and Glycoprotein Analysis	3
CHEM 5660	Analytical Biochemistry	3

Program Credit/GPA Requirements

12 total semester hours required
Minimum 3.000 GPA required

Biotechnology, Graduate Certificate

The Graduate Certificate in Biotechnology has been designed in response to a need in the biotechnology industry for individuals without a biotechnology background to obtain a strong foundation in basic biotechnology concepts and skills. Individuals, particularly those who are working in fields other than biotechnology, will acquire competency and learn new practical skills enabling them to increase productivity and allow for transitions into more biotechnology-related fields.

Program Requiements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

 A grade of C− or higher is required in all courses.

Code	Title	Hours
BIOT 5120	Introduction to Biotechnology	3
BIOT 5631	Cell Culture Processes for Biopharmaceutical Production	3
BIOL 6299	Molecular Cell Biology for Biotechnology	3
CHEM 5620	Protein Chemistry	3

Program Credit/GPA Requirements

12 total semester hours required
Minimum 3.000 GPA required

Biotechnology Enterprise, Graduate Certificate

The graduate certificate in biotechnology enterprise has been designed in response to a need in the biotechnology industry for individuals with a

biotechnology background to obtain a strong foundation in the business aspects of biotechnology. Individuals, particularly those who are working in the field of biotechnology, will improve their business competency enabling them to better manage a team or move into a more business-orientated roll.

Program Requiements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

 A grade of C−or higher is required in all courses.

Code	Title	Hours
BIOT 5225	Managing and Leading a Biotechnology Company	3
BIOT 5226	Biotechnology Entrepreneurship	3
BIOT 5227	Economics and Marketing for Biotechnology Managers	3
CHEM 7317	Analytical Biotechnology	3

Program Credit/GPA Requirements

12 total semester hours required
Minimum 3.000 GPA required

Experimental Biotechnology, Graduate Certificate

The graduate certificate in experimental biotechnology has been designed in response to a need in the biotechnology industry for individuals without a biotechnology background to obtain a strong foundation in lab-based, hands-on, biotechnology skills. Individuals, particularly those who are working in fields other than biotechnology, will acquire competency and learn new practical lab skills enabling them to increase productivity and transition into more biotechnology-related fields.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

A grade of C− or higher is required in all courses.

Code	Title	Hours
BIOT 5145	Basic Biotechnology Lab Skills	1
BIOT 5219	The Biotechnology Enterprise	2
BIOL 5549	Microbial Biotechnology	4
BIOT 6214	Experimental Design and Biostatistics	2
BIOT 7245	Biotechnology Applications Laboratory	3

Program Credit/GPA Requirements

12 total semester hours required
Minimum 3.000 GPA required

Molecular Biotechnology, Graduate Certificate

The graduate certificate in molecular biotechnology has been designed in response to a need in the biotechnology industry for individuals with an advanced knowledge of the principles and practices of state-of-the-art molecular biology techniques and advanced protein structure analysis. Individuals, particularly those who are working in the various sectors of biotechnology including basic research of biological systems, discovery, development and manufacturing of biopharmaceuticals, will improve improve their competency and learn new practical skills enabling them to increase productivity and further contribute to their professions.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

A grade of C− or higher is required in all courses.

Code	Title	Hours
BIOT 5700	Molecular Interactions of Proteins in Biopharmaceutical Formulations	3
BIOT 5810	Cutting-Edge Applications in Molecular Biotechnology	3
BIOT 5850	Higher-Order Structure Analytics	3
CHEM 7317	Analytical Biotechnology	3

Program Credit/GPA Requirements

12 total semester hours required
Minimum 3.000 GPA required

Pharmaceutical Technologies, Graduate Certificate

The Graduate Certificate in Pharmaceutical Technology has been designed in response to a need in the biotechnology industry for individuals with an advanced knowledge of the principles and practices of the stages of drug development, biopharmaceutical development. Individuals, particularly those who are working in the various sectors of biotechnology including basic research of biological systems, discovery, development, and manufacturing of biopharmaceuticals, will improve their competency and learn new practical skills enabling them to increase productivity and further contribute to their professions.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

A grade of C− or higher is required in all courses.

Code	Title	Hours
BIOT 5640	Drug Product Processes for Biopharmaceuticals	3
BIOT 5700	Molecular Interactions of Proteins in Biopharmaceutical Formulations	3
CHEM 5550	Introduction to Glycobiology and Glycoprotein Analysis	3
CHEM 7317	Analytical Biotechnology	3

Program Credit/GPA Requirements

12 total semester hours required
Minimum 3.000 GPA required

Process Science, Graduate Certificate

The graduate certificate in process sciences has been designed in response to a need in the biotechnology industry for individuals with an advanced knowledge of the principles and practices of process

development of biopharmaceuticals. Individuals, particularly those who are working in the various sectors of biotechnology including basic research of biological systems, discovery, development and manufacturing of biopharmaceuticals, will improve their competency and learn new practical skills enabling them to increase productivity and further contribute to their professions.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

A grade of C− or higher is required in all courses.

Code	Title	Hours
BIOT 5560	Bioprocess Fundamentals	3
BIOT 5635	Downstream Processes for Biopharmaceutical Production	3
BIOT 5640	Drug Product Processes for Biopharmaceuticals	3
CHEM 7317	Analytical Biotechnology	3

Program Credit/GPA Requirements

12 total semester hours required
Minimum 3.000 GPA required

Regulatory Science, Graduate Certificate

This certificate was designed in response to a need in the biotechnology industry for individuals, in particular regulators, to obtain a strong foundation in the science behind good regulatory practice today, specifically in relation to biopharmaceuticals.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

A grade of C− or higher is required in all courses.

Code	Title	Hours
BIOT 5330		3
BIOT 5500	Introduction to Regulatory Science	3
CHEM 5620	Protein Chemistry	3

Elective

Code	Title	Hours
Complete 3 semester hours from the following:		3
BIOT		
BINF 6308	Bioinformatics Computational Methods 1	
BIOL 5307	Biological Electron Microscopy	
BIOL 5499	Plant Biotechnology	
BIOL 5543	Stem Cells and Regeneration	
BIOL 5549	Microbial Biotechnology	
BIOL 5569	Advanced Microbiology	
BIOL 5573	Medical Microbiology	
BIOL 5581	Biological Imaging	
BIOL 5583	Immunology	

Code	Title
BIOL 6381	Ethics in Biological Research
BIOL 6399	Dynamics of Microbial Ecology
BIOT 5040	Fundamentals of Biochemistry for Biotechnology
BIOT 5050	Organic Chemistry for Biotechnology
BIOT 5120	Introduction to Biotechnology
BIOT 5130	Team Skills in Biotechnology
BIOT 5145	Basic Biotechnology Lab Skills
BIOT 5219	The Biotechnology Enterprise
BIOT 5220	The Role of Patents in the Biotechnology Industry, Past and Future
BIOT 5225	Managing and Leading a Biotechnology Company
BIOT 5226	Biotechnology Entrepreneurship
BIOT 5227	Economics and Marketing for Biotechnology Managers
BIOT 5340	Introduction to Biotherapeutic Approvals
BIOT 5360	Drug Stability
BIOT 5400	Scientific Information Management for Biotechnology Managers
BIOT 5500	Introduction to Regulatory Science
BIOT 5560	Bioprocess Fundamentals
BIOT 5631	Cell Culture Processes for Biopharmaceutical Production
BIOT 5635	Downstream Processes for Biopharmaceutical Production
BIOT 5640	Drug Product Processes for Biopharmaceuticals
BIOT 5700	Molecular Interactions of Proteins in Biopharmaceutical Formulations
BIOT 5810	Cutting-Edge Applications in Molecular Biotechnology
BIOT 5820	Cellular Therapies
BIOT 5821	Introduction to Biopharmaceutical Technologies
BIOT 5850	Higher-Order Structure Analytics
BIOT 5976	Directed Study
BIOT 6214	Experimental Design and Biostatistics
BIOT 6400	Pre-co-op Experience
BIOT 6500	Professional Development for Co-op
BIOT 6962	Elective
BIOT 6964	Co-op Work Experience
BIOT 7245	Biotechnology Applications Laboratory
CHEM 5550	Introduction to Glycobiology and Glycoprotein Analysis
CHEM 5616	Protein Mass Spectrometry
CHEM 5617	Protein Mass Spectrometry Laboratory
CHEM 5621	Principles of Chemical Biology for Chemists
CHEM 5625	Chemistry and Design of Protein Pharmaceuticals
CHEM 5638	Molecular Modeling
CHEM 7247	Advances in Nanomaterials
CHME 7340	Chemical Engineering Kinetics
ENTR 6200	Enterprise Growth and Innovation

ENTR 6210	Managing Operations in Early Stage Ventures
ENTR 6211	Entrepreneurship: Services and Retail Business Creation
ENTR 6212	Business Planning for New Ventures
HINF 5105	The American Healthcare System
HINF 6201	Organizational Behavior, Work Flow Design, and Change Management
MGMT 6210	Law for Managers and Entrepreneurs
MGSC 6200	Information Analysis
NNMD 5270	Introduction to Nanomedicine
NNMD 5470	Nano/Biomedical Commercialization: Concept to Market
PHSC 6218	Biomedical Chemical Analysis
PHSC 6224	Behavioral Pharmacology and Drug Discovery
PHSC 6226	Imaging in Medicine and Drug Discovery
PHSC 6290	Biophysical Methods in Drug Discovery
PHSC 7010	Pharmaceutical Sciences Laboratory
TECE 6230	Entrepreneurial Marketing and Selling
TECE 6250	Lean Design and Development

Program Credit/GPA Requirements

12 total semester hours required
Minimum 3.000 GPA required

Marine and Environmental Sciences

Website (http://www.northeastern.edu/mes)

Geoffrey C. Trussell, PhD
Professor and Chair

Marine Science Center
781.581.7370
781.581.6076 (fax)
gradmes@northeastern.edu

Jonathan Grabowski, PhD
Associate Professor and Director of Graduate Studies and Co-Director of MS in Environmental Science and Policy
j.grabowski@northeastern.edu

Jennie Stephens, PhD
Dean's Professor of Sustainability Science and Policy, College of Social Sciences and Humanities, and Co-Director of MS in Environmental Science and Policy
j.stephens@northeastern.edu

David Dawson, Academic Coordinator, 617.373.2059, d.dawson@northeastern.edu

The PhD program in marine and environmental sciences is designed to train high-caliber and independent scientists whose research addresses fundamental and applied ecological and evolutionary questions at local, regional, national, and global scales.

This training will include both general and specialized course work in ecology and evolution, geoscience, sustainability, and marine sciences, with curricular programs providing specialized options tailored to each student's research interests. Students benefit from top-notch research

facilities at the Marine Science Center in Nahant and on the main campus in Boston. Graduates of the program are prepared for careers in academia, government agencies, and the private sector.

The Master of Science in Marine Biology, also known as the Three Seas Program, gives students an opportunity to learn in three world-renowned research facilities in New England, the Caribbean, and the Pacific Northwest. In addition to rigorous course work, the program offers the opportunity for students to formulate research questions, design and conduct critical experiments, and interpret and present results. The 15-month program culminates with an internship in the field and independent research project.

The Master of Science in Environmental Science and Policy is a joint program between the College of Science and the College of Social Sciences and Humanities' School of Public Policy and Urban Affairs. The interdisciplinary program aims to prepare the next generation of environmental professionals for dynamic opportunities focused on the science and policy of sustainability and resilience.

Programs
Doctor of Philosophy (PhD)

Master of Science (MS)

Marine and Environmental Sciences, PhD

The PhD in Marine and Environmental Sciences (MES) program provides students with advanced course work and training in the concentration areas of Marine Sciences, Geosciences, Sustainability Sciences, and Ecology and Evolutionary Biology. For students entering with a bachelor's degree, MES program completion requires 30 semester hours of graduate-level course work, of which 20 semester hours must carry a letter grade. All entering students must take a statistics course. This requirement may be waived for students who have taken a graduate level statistics course pending approval by the department's graduate committee. The remaining 10 semester hours must consist of two semesters of concentration seminars (one in the student's concentration and another of their choice), doctoral research, and approved graduate courses. Planned course work must be approved by the student's dissertation committee.

Students must pass three examinations during the course of their graduate studies:

1. An oral examination by the student's dissertation committee consisting of an oral presentation.
2. A proposal defense presented to the student's dissertation committee that explains the research areas that the student proposes to work in.
3. A defense of the student's written dissertation consisting of a public seminar, public question-and-answer period, and private defense of their work to their dissertation committee. Dissertation committees consist of at least four Northeastern faculty and one external faculty member.

A cumulative GPA of 3.000 is required for graduation. All PhD students are required to have at least one first-authored publication submitted to or accepted in a peer-reviewed journal prior to their defense. The PhD

will be awarded following submission of a dissertation, approved by the candidate's dissertation committee, to the College of Science.

Program Requirements
Bachelor's Degree Entrance

Complete all courses and requirements listed below unless otherwise indicated.

Milestones

Annual review
Dissertation committee
Qualifying examination
Dissertation proposal
Candidacy
First-author publication
Dissertation defense

Core Requirements

Code	Title	Hours
Readings		
Complete the following (repeatable) course twice:		2
EEMB 8982	Readings	
Research		
Complete the following (repeatable) course twice:		8
EEMB 8984	Research	

Concentration

Complete one of the following concentrations:

- Ecology and Evolutionary Biology (p. 387)
- Sustainability Sciences (p. 387)
- Geosciences (p. 388)
- Marine Sciences (p. 388)

ECOLOGY AND EVOLUTIONARY BIOLOGY

Code	Title	Hours
Seminars		
EEMB 7102	Seminar in Ecology and Evolutionary Biology	2
Complete one of the following:		2
EEMB Seminar in M (TBA)		
EEMB 7103	Seminar in Sustainability Sciences	
EEMB 7104	Seminar in Geosciences	
Statistics		
Complete one of the following:		4
ENVR 6500 and ENVR 6501	Biostatistics and Lab for ENVR 6500	
EEMB 5522 and EEMB 5523	Experimental Design Marine Ecology and Lab for EEMB 5522	
Alternative statistics course as approved by graduate committee		
Concentration Specific Electives		
Complete 12 semester hours from the following:		12
ENVR 5210	Environmental Planning	
ENVR 5242 and ENVR 5243	Ancient Marine Life and Lab for ENVR 5242	
ENVR 5260	Geographical Information Systems	
ENVR 5400	Marine Science Policy and Ethics	

Code	Title	Hours
EEMB 5130 and EEMB 5131	Ecological Dynamics and Lab for EEMB 5130	
EEMB 5504	Biology of Corals	
EEMB 5506	Biology and Ecology of Fishes	
EEMB 5508 and EEMB 5509	Marine Birds and Mammals and Lab for EEMB 5508	
EEMB 5512	Tropical Terrestrial Ecology	
EEMB 5516 and EEMB 5517	Oceanography and Lab for EEMB 5516	
EEMB 5518	Ocean and Coastal Processes	
EEMB 5520	Coral Reef Ecology	
EEMB 5528	Marine Conservation Biology	
EEMB 5532	Physiological and Molecular Marine Ecology	
EEMB 5534 and EEMB 5535	Marine Invertebrate Zoology and Botany and Lab for EEMB 5534	
EEMB 5536	Ocean and Coastal Sustainability	

Substitutions may be made with approval of graduate committee.

SUSTAINABILITY SCIENCES

Code	Title	Hours
Seminars		
EEMB 7103	Seminar in Sustainability Sciences	2
Complete one of the following:		2
EEMB Seminar in M (TBA)		
EEMB 7102	Seminar in Ecology and Evolutionary Biology	
EEMB 7104	Seminar in Geosciences	
Statistics		
ENVR 6500 and ENVR 6501	Biostatistics and Lab for ENVR 6500	4
Alternative statistics course as approved by graduate committee		
Concentration Specific Electives		
Complete 12 semester hours from the following:		12
ENVR 5115	Advanced Topics in Environmental Geology	
ENVR 5250	Geology and Land-Use Planning	
ENVR 5260	Geographical Information Systems	
ENVR 5400	Marine Science Policy and Ethics	
EEMB 5130 and EEMB 5131	Ecological Dynamics and Lab for EEMB 5130	
EEMB 5506	Biology and Ecology of Fishes	
EEMB 5516 and EEMB 5517	Oceanography and Lab for EEMB 5516	
EEMB 5518	Ocean and Coastal Processes	
EEMB 5528	Marine Conservation Biology	
EEMB 5536	Ocean and Coastal Sustainability	
INSH 6406	Analyzing Complex Digitized Data	
PPUA 5261	Dynamic Modeling for Environmental Decision Making	
PPUA 5301	Introduction to Computational Statistics	
PPUA 5302	Information Design and Visual Analytics	

Code	Title
PPUA 7346	Resilient Cities
POLS 7202	Quantitative Techniques
POLS 7334	Social Networks

Substitutions may be made with approval of graduate committee.

GEOSCIENCES

Code	Title	Hours
Seminars		
EEMB 7104	Seminar in Geosciences	2
Complete one of the following:		2
EEMB Seminar in M (TBA)		
EEMB 7102	Seminar in Ecology and Evolutionary Biology	
EEMB 7103	Seminar in Sustainability Sciences	
Statistics		
Complete one of the following:		4
ENVR 6500 and ENVR 6501	Biostatistics and Lab for ENVR 6500	
EEMB 5522 and EEMB 5523	Experimental Design Marine Ecology and Lab for EEMB 5522	
Alternative statistics course as approved by graduate committee		
Concentration Specific Electives		
Complete 12 semester hours from the following:		12
ENVR 5115	Advanced Topics in Environmental Geology	
ENVR 5190	Soil Science	
ENVR 5210	Environmental Planning	
ENVR 5230 and ENVR 5231	Structural Geology and Lab for ENVR 5230	
ENVR 5240 and ENVR 5241	Sedimentary Basin Analysis and Lab for ENVR 5240	
ENVR 5242 and ENVR 5243	Ancient Marine Life and Lab for ENVR 5242	
ENVR 5250	Geology and Land-Use Planning	
ENVR 5260	Geographical Information Systems	
ENVR 5270 and ENVR 5271	Glacial and Quaternary History and Lab for ENVR 5270	
EEMB 5518	Ocean and Coastal Processes	
EEMB 5536	Ocean and Coastal Sustainability	

Substitutions may be made with approval of graduate committee.

MARINE SCIENCES

Code	Title	Hours
Seminars		
EEMB Seminar in Mar (TBA)		2
Complete one of the following:		2
EEMB 7102	Seminar in Ecology and Evolutionary Biology	
EEMB 7103	Seminar in Sustainability Sciences	
EEMB 7104	Seminar in Geosciences	
Statistics		
Complete one of the following:		4
ENVR 6500 and ENVR 6501	Biostatistics and Lab for ENVR 6500	
EEMB 5522 and EEMB 5523	Experimental Design Marine Ecology and Lab for EEMB 5522	

Alternative statistics course as approved by graduate committee

Code	Title	Hours
Concentration Specific Electives		
Complete 12 semester hours from the following:		12
ENVR 5242 and ENVR 5243	Ancient Marine Life and Lab for ENVR 5242	
ENVR 5260	Geographical Information Systems	
ENVR 5270 and ENVR 5271	Glacial and Quaternary History and Lab for ENVR 5270	
ENVR 5400	Marine Science Policy and Ethics	
EEMB 5130 and EEMB 5131	Ecological Dynamics and Lab for EEMB 5130	
EEMB 5504	Biology of Corals	
EEMB 5506	Biology and Ecology of Fishes	
EEMB 5508 and EEMB 5509	Marine Birds and Mammals and Lab for EEMB 5508	
EEMB 5516 and EEMB 5517	Oceanography and Lab for EEMB 5516	
EEMB 5518	Ocean and Coastal Processes	
EEMB 5520	Coral Reef Ecology	
EEMB 5528	Marine Conservation Biology	
EEMB 5534 and EEMB 5535	Marine Invertebrate Zoology and Botany and Lab for EEMB 5534	
EEMB 5536	Ocean and Coastal Sustainability	

Substitutions may be made with approval of graduate committee.

Dissertation

Code	Title	Hours
Complete the following (repeatable) course twice:		
EEMB 9990	Dissertation	

Program Credit/GPA Requirements

30 total semester hours required
Minimum 3.000 GPA required

Marine and Environmental Sciences, PhD—Advanced Entry

The PhD in Marine and Environmental Sciences (MES) program provides students with advanced course work and training in the concentration areas of Marine Science, Geoscience, Sustainability, and Ecology and Evolution. Students admitted with a master's degree must take a statistics course and two semesters of seminar: one in the student's concentration and another of their choice. Transcripts detailing their previous course work will be submitted upon arrival to their dissertation committee and the marine and environmental sciences graduate committee to determine whether additional course work is required. The dissertation committee may require the student to pursue additional course work as needed to provide the necessary background for their program of study. Additional course work may also be required depending on the student's performance on written qualifying and oral examinations.

Students must pass three examinations during the course of their graduate studies:

1. An oral examination by the student's dissertation committee consisting of an oral presentation.
2. A proposal defense presented to the student's dissertation committee that explains the research areas that the student proposes to work in.
3. A defense of the student's written dissertation consisting of a public seminar, public question-and-answer period, and private defense of their work to their dissertation committee. Dissertation committees consist of at least four Northeastern faculty and one external faculty member.

A cumulative GPA of 3.000 is required for graduation. All PhD students are required to have at least one first-authored publication submitted to or accepted in a peer-reviewed journal prior to their defense. The PhD will be awarded following submission of a dissertation, approved by the candidate's dissertation committee, to the College of Science.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Milestones

Annual review
Dissertation committee
Qualifying examination
Dissertation proposal
Candidacy
First-author publication
Dissertation defense

Core Requirements

Code	Title	Hours
Statistics		
Complete one of the following:		4
ENVR 6500 and ENVR 6501	Biostatistics and Lab for ENVR 6500	
EEMB 5522 and EEMB 5523	Experimental Design Marine Ecology and Lab for EEMB 5522	
Alternative statistics course as approved by graduate committee		
Readings		
Complete the following (repeatable) course twice:		2
EEMB 8982	Readings	

Concentration

Complete one of the following concentrations:

- Ecology and Evolutionary Biology (p. 389)
- Sustainability Sciences (p. 389)
- Geosciences (p. 389)
- Marine Sciences (p. 389)

ECOLOGY AND EVOLUTIONARY BIOLOGY

Code	Title	Hours
Seminars		
EEMB 7102	Seminar in Ecology and Evolutionary Biology	2
Complete one of the following:		2
EEMB 7103	Seminar in Sustainability Sciences	
EEMB Seminar in Marine Sciences	(TBA)	
EEMB 7104	Seminar in Geosciences	

SUSTAINABILITY SCIENCES

Code	Title	Hours
Seminars		
EEMB 7103	Seminar in Sustainability Sciences	2
Complete one of the following:		2
EEMB Seminar in M	(TBA)	
EEMB 7102	Seminar in Ecology and Evolutionary Biology	
EEMB 7104	Seminar in Geosciences	

GEOSCIENCES

Code	Title	Hours
Seminars		
EEMB 7104	Seminar in Geosciences	2
Complete one of the following:		2
EEMB Seminar in M	(TBA)	
EEMB 7102	Seminar in Ecology and Evolutionary Biology	
EEMB 7103	Seminar in Sustainability Sciences	

MARINE SCIENCES

Code	Title	Hours
Seminars		
EEMB Seminar in Mar	(TBA)	2
Complete one of the following:		2
EEMB 7102	Seminar in Ecology and Evolutionary Biology	
EEMB 7103	Seminar in Sustainability Sciences	
EEMB 7104	Seminar in Geosciences	

Dissertation

Code	Title	Hours
Complete the following (repeatable) course twice:		
EEMB 9990	Dissertation	

Program Credit/GPA Requirements

10 total semester hours required
Minimum 3.000 GPA required

Environmental Science and Policy, MS

The Master of Science in Environmental Science and Policy program emphasizes a broadly interdisciplinary and synthetic approach that integrates knowledge in the environmental sciences (conservation biology, climate change, fisheries science, ecosystem function, biodiversity, restoration ecology) with the social sciences (policy, economics, sociology, political science, and development) and humanities (environmental history, philosophy, and ethics). The goal of the program is to equip professionals with substantive breadth in knowledge and skills at the intersection of environmental science and policy. The program focuses on training students to think critically about the underlying causes of environmental problems and understanding the reciprocal relationships between coupled human-natural ecosystems and the interconnections between social and technological innovations. The program explores practical approaches and potential solutions that

decision makers need to evaluate in policy debates related to promoting environmental sustainability.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Seminars		
PPUA 6101	Environmental Science and Policy Seminar 1	4
ENVR 6102	Environmental Science and Policy Seminar 2	4
Skills Courses		
Complete 6-8 semester hours from the following. At least one course needs to be taken from the College of Science Skills Course List and one course from the College of Social Sciences and Humanities Skills Course List.		6-8
College of Science Skills Course List		
EEMB 5130	Ecological Dynamics	
EEMB 5522	Experimental Design Marine Ecology	
ENVR 5210	Environmental Planning	
ENVR 5250	Geology and Land-Use Planning	
ENVR 5260	Geographical Information Systems	
ENVR 5400	Marine Science Policy and Ethics	
ENVR 6500	Biostatistics	
College of Social Sciences and Humanities Skills Course List		
LPSC 6313	Economic Analysis for Law, Policy, and Planning	
LPSC 7215	Advanced Quantitative Techniques	
LPSC 7305	Research and Statistical Methods	
LPSC 7311	Strategizing Public Policy	
POLS 7201	Research Design	
PPUA 5260	Ecological Economics	
PPUA 5261	Dynamic Modeling for Environmental Decision Making	
PPUA 5263	Geographic Information Systems for Urban and Regional Policy	
PPUA 5301	Introduction to Computational Statistics	
PPUA 6205	Research Design and Methodology in Urban and Regional Policy	
PPUA 6207	Research Toolkit for Urban and Regional Policy: Survey Techniques	
PPUA 6209	Research Toolkit for Urban and Regional Policy: Working with Datasets	
PPUA 6210	Research Toolkit for Urban and Regional Policy: Cost/Benefit Analysis	
PPUA 6212	Research Toolkit for Urban and Regional Policy: Project Management	
PPUA 6213	Research Toolkit for Urban and Regional Policy: Data Visualization	
PPUA 6216	Research Toolkit for Urban and Regional Policy: Grant Writing	
PPUA 6502	Economic Institutions and Analysis	
PPUA 6506	Techniques of Policy Analysis	
PPUA 6509	Techniques of Program Evaluation	
PPUA 7237	Advanced Spatial Analysis of Urban Systems	
SOCL 7211	Research Methods	

Electives

Any skills course not taken to fulfill the skills courses requirement can be taken as an elective. Students must take three electives from the College of Science and three from the College of Social Science and Humanities. Students may petition to enroll in other relevant graduate courses offered by other schools at Northeastern University.

COLLEGE OF SCIENCE ELECTIVE LIST

Code	Title	Hours
Complete three from the following:		12
EEMB 5518	Ocean and Coastal Processes	
EEMB 5528	Marine Conservation Biology	
EEMB 5536	Ocean and Coastal Sustainability	
EEMB 5548	Sociobiology	
ENVR 5210	Environmental Planning	
ENVR 5250	Geology and Land-Use Planning	

COLLEGE OF SOCIAL SCIENCES AND HUMANITIES ELECTIVE LIST

Code	Title	Hours
Complete three from the following:		12
LPSC 7311	Strategizing Public Policy	
LPSC 7312	Cities, Sustainability, and Climate Change	
PHTH 5214	Environmental Health	
PHTH 5230	Global Health	
PHTH 5440	Community-Based Participatory Research: Environmental Health	
PPUA 5260	Ecological Economics	
PPUA 5262	Big Data for Cities	
PPUA 5264	Energy Transitions and Climate Resilience: Technology, Policy, and Social Change	
PPUA 5266	Urban Theory and Science	
PPUA 5270	Food Systems and Public Policy	
PPUA 5275	Philanthropy and Civil Society	
PPUA 5302	Information Design and Visual Analytics	
PPUA 5390	Special Topics in Public Policy and Urban Affairs	
PPUA 6201	The 21st-Century City: Urban Opportunities and Challenges in a Global Context	
PPUA 6204	Urban Development and Politics	
PPUA 6505	Public Budgeting and Financial Management	
PPUA 6506	Techniques of Policy Analysis	
PPUA 6522	Administrative Ethics and Public Management	
PPUA 6551	Nonprofit Organizations and Social Change	
PPUA 6552	The Nonprofit Sector in Civil Society and Public Affairs	

PPUA 6553	Nonprofit Financial Resource Development	
PPUA 6862	Internship with Research	
PPUA 6966	Practicum	
PPUA 7225	The Open Classroom: Public Debates on Public Policy	
PPUA 7230	Housing Policy	
PPUA 7234	Land Use and Urban Growth Policy	
PPUA 7239	Problems in Metropolitan Policymaking	
PPUA 7249	Urban Coastal Sustainability	
PPUA 7231	Transportation Policy	
PPUA 7336	Social Capital and Resilience	
PPUA 7346	Resilient Cities	
PPUA 7673	Capstone in Public Policy and Urban Affairs	
SOCL 7211	Research Methods	
SOCL 7230	Political Ecology of Global Capitalism	
SOCL 7235	Urban Sociology	
SOCL 7243	Sociology of Health and Illness	
SOCL 7257	Contemporary Issues in Sociology	
SOCL 7267	Environment, Health, and Society	
SOCL 7287	Social Movements in Health	

Program Credit/GPA Requirements

Note: Typically, students will complete 12–16 semester hours of seminar and skills courses and 18–24 semester hours of electives.

36 total semester hours required
Minimum 3.000 GPA required

Marine Biology, MS—Three Seas Program

The MS in Marine Biology—Three Seas Program provides students the opportunity to study marine biology in three distinct environments at three world-renowned research facilities in New England, the Caribbean, and the Pacific Northwest. An internship in the field and independent research project provide the capstone to the fifteen-month graduate program.

Much more than course work in a classroom, the MS in Marine Biology—Three Seas Program delivers inquiry-based curriculum in marine science during which our students formulate research questions, design and conduct critical experiments, and interpret and present results. You will have an opportunity not only learn science, you have an opportunity to learn how to do science and become a marine scientist.

This program is for students eager to broaden their knowledge of marine biology or who want to further refine their interests.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Students register for International Study—Three Seas Program (ABRS 5120) for the fall and spring terms of year 1.

Code	Title	Hours
Seminar		
EEMB 5303	Marine Biology Careers Seminar	1

Biology

EEMB 5504	Biology of Corals	3
EEMB 5506	Biology and Ecology of Fishes	3
EEMB 5508 and EEMB 5509	Marine Birds and Mammals and Lab for EEMB 5508	3
EEMB 5518	Ocean and Coastal Processes	2
EEMB 5534 and EEMB 5535	Marine Invertebrate Zoology and Botany and Lab for EEMB 5534	5

Sustainability

EEMB 5516 and EEMB 5517	Oceanography and Lab for EEMB 5516	5
EEMB 5528	Marine Conservation Biology	3
EEMB 5536	Ocean and Coastal Sustainability	3

Ecology

EEMB 5512	Tropical Terrestrial Ecology	1
EEMB 5520	Coral Reef Ecology	2
EEMB 5522 and EEMB 5523	Experimental Design Marine Ecology and Lab for EEMB 5522	5
EEMB 5532	Physiological and Molecular Marine Ecology	3

Research

EEMB 5589	Diving Research Methods	2
Take the following (repeatable) course twice:		2
EEMB 8674	Marine Biology Research Project	

Program Credit/GPA Requirements

43 total semester hours required
Minimum 3.000 GPA required

Plan of Study

Year 1

Fall	Hours	Spring	Hours	Summer Full Semester	Hours
EEMB 5303	1	EEMB 5504	3	EEMB 8674	1
EEMB 5516 and EEMB 5517	5	EEMB 5506	3		
EEMB 5522 and EEMB 5523	5	EEMB 5508 and EEMB 5509	3		
EEMB 5534 and EEMB 5535	5	EEMB 5512	1		
EEMB 5536	3	EEMB 5518	2		
EEMB 5589	2	EEMB 5520	2		
		EEMB 5528	3		
		EEMB 5532	3		
	21		20		1

Year 2

Fall	Hours
EEMB 8674	1
	1

Total Hours: 43

Alexandru Suciu, PhD
Professor and Chair

567 Lake Hall
617.373.2450
617.373.5658 (fax)

Egon Schulte, PhD
Professor and Director of Graduate Studies, e.schulte@northeastern.edu
(e.schulte@northeastern.edu)

Chantal Cardona, Administrative Assistant, c.cardona@northeastern.edu
(c.cardona@northeastern.edu)

Mathematics is of ever-increasing importance to our society and everyday life. It has long been the language of science and technology and provides a rich source of methods for analyzing and solving problems encountered in the physical world. Today, mathematics is essential in virtually all fields of human endeavor, including business, the arts, and the social sciences.

PhD students work with internationally recognized faculty in research programs in both pure and applied mathematics. The program is designed to provide students with a broad overview of current mathematics and a strong command of areas of specialization.

The Department of Mathematics also offers Master of Science degrees in mathematics, applied mathematics, and operations research. These programs prepare students for careers in business, industry, or government. Students pursuing degrees in applied math and operations research take part in Northeastern's signature co-op program.

In addition to the numerous seminars and colloquia at Northeastern, there are ample opportunities for students in the Boston area to learn about important recent advances in the field.

Programs
Doctor of Philosophy (PhD)

Master of Science (MS)

Master of Science in Operations Research (MSOR)

Mathematics, PhD

Course Requirements

Students entering with a bachelor's degree are required to take 64 semester hours of course work divided between foundational and advanced offerings. Students entering the program will be allowed to place out of some (possibly all) of the eight basic-level courses; the graduate coordinator together with the first-year graduate advisor will determine the allowable course substitutions and will advise the student which foundational courses to take. Students may satisfy requirements for Algebra 1 (MATH 5111) and Analysis 1: Functions of One Variable (MATH 5101) by taking qualifying exams in algebra 1 and in analysis 1 at the start of the program. Students may satisfy foundational course requirements if they demonstrate proficiency by passing an assessment exam in the course at the beginning of the semester or by demonstrating that they have taken a similar course and have adequate knowledge of the course material (syllabus and transcript are required; a brief oral examination is also required in that case). Academic advising will happen just before the start of each term and during the add/drop period in order to plan a student's course registration for the term. A complete listing of foundational and advanced courses is available from the Department of Mathematics and the graduate dean's office. Students are not permitted to register for more than two "readings" courses and three "topics" courses for credit toward the degree without explicit permission from the graduate dean. A minimum grade-point average (GPA) of 3.000 is required for degree conferral.

Teaching Requirement

Some teaching experience is required while in the program. Students must attend university-led TA training at the start of the program; attend a one-semester TA training course conducted by faculty from the Department of Mathematics teaching committee; spend one semester shadowing faculty in the undergraduate classroom; and perform recitations and grading for the undergraduate course they are shadowing.

Qualifying Exams

Qualifying exam sessions are given once in spring and once in fall. Students will be required to pass four qualifying exams: algebra 1, analysis 1, and two other exams. The possible additional topics for qualifying exams are algebra 2, analysis 2, combinatorics, geometry, ordinary differential equations, partial differential equations, probability, statistics, topology, and algebraic geometry. A qualifying exam may be taken twice by any student. Additional attempts may be allowed at the discretion of the graduate committee with permission from the graduate dean in the College of Science. Two qualifying exams should be passed no later than the end of the second year and all four by the end of the third year.

Doctoral Candidacy

PhD candidacy is reached when all of the following conditions are met:

- Completion of eight advanced courses
- Identification of an unsolved research problem
- Successful passing of four qualifying exams
- Assignment of PhD supervisor and creation of a 1-page initial plan
- Completion of a 3-page plan of research
- Completion of a 10-page progress report and a one-hour defense of proposal, presented to supervisor and three faculty members of graduate committee

Dissertation Requirement

Each candidate must complete a dissertation that embodies the results of extended research and makes an original contribution to the field. This work should give evidence of the candidate's ability to carry out independent investigation and interpret, in a logical manner, the results of the research. There are two stages to this process:

- **Stage 1:** Students in the PhD program must have a dissertation supervisor within two years after joining the PhD program. The department views the failure of a student to find a supervisor within two years of joining the PhD program with concern and considers this sufficient cause to review the student's status in the PhD program. The process of obtaining a dissertation supervisor always involves two choices—the student chooses the supervisor, and the

supervisor chooses the student. For this reason, the department does not guarantee a dissertation supervisor for every student, but the department recognizes its responsibility to help the student find a satisfactory match. This aid is usually provided by the student's graduate advisor, who should be familiar with the student's progress in finding a dissertation supervisor. The dissertation supervisor guides the student's further education as well as directs the student's dissertation. The dissertation itself must represent an original solution of a problem in the chosen area of mathematics that makes a significant contribution to the mathematical knowledge in that area. Students must enroll in Dissertation or Dissertation Continuation while fulfilling the dissertation requirements.

- **Stage 2 (dissertation defense):** The final oral examination on the dissertation is held in accordance with university regulations and given by a dissertation committee of four faculty members (three from the university, including the supervisor, and one from outside Northeastern University). The dissertation supervisor should propose this dissertation committee to the graduate committee for its approval at least one month before the PhD dissertation defense.

Program Requirements
Bachelor's Degree Entry

Complete all courses and requirements listed below unless otherwise indicated.

Milestones

Four qualifying examinations
Annual review
Dissertation committee
Teaching requirement
Doctoral candidacy
Progress report and presentation
Dissertation defense

Prerequisites

Code	Title	Hours
Algebra and Analysis		
MATH 5101	Analysis 1: Functions of One Variable	4
MATH 5111	Algebra 1	4

Tracks

Complete one of the following three tracks:

- Pure Track (p. 393)
- Discrete Track (p. 393)
- Probability and Statistics Track (p. 393)

PURE TRACK

Code	Title	Hours
Analysis		
MATH 5102	Analysis 2: Functions of Several Variables	4
Algebra		
MATH 5112	Algebra 2	4
Foundational Courses		
Complete up to 16 semester hours from the following:		16
MATH 7202	Partial Differential Equations 1	
MATH 7203	Numerical Analysis 1	
MATH 7205	Numerical Analysis 2	
MATH 7221	Topology 2	
MATH 7233	Graph Theory	
MATH 7241	Probability 1	
MATH 7341	Probability 2	
MATH 7342	Mathematical Statistics	
MATH 7343	Applied Statistics	
Advanced Course Work		
Complete 32 semester hours from the advanced course work list. Only two readings and three topics courses are allowed. (p. 394)		32

DISCRETE TRACK

Code	Title	Hours
Algebra		
MATH 5112	Algebra 2	4
Probability		
MATH 7241	Probability 1	4
Foundational Courses		
Complete up to 16 semester hours from the following:		16
MATH 5102	Analysis 2: Functions of Several Variables	
MATH 5111	Algebra 1	
MATH 5112	Algebra 2	
MATH 7202	Partial Differential Equations 1	
MATH 7203	Numerical Analysis 1	
MATH 7205	Numerical Analysis 2	
MATH 7221	Topology 2	
MATH 7233	Graph Theory	
MATH 7341	Probability 2	
MATH 7342	Mathematical Statistics	
MATH 7343	Applied Statistics	
Advanced Course Work		
Complete 32 semester hours from the advanced course work list. Only two readings and three topics courses are allowed. (p. 394)		32

PROBABILITY AND STATISTICS TRACK

Code	Title	Hours
Analysis		
Complete 4 semester hours from the following:		4
MATH 5102	Analysis 2: Functions of Several Variables	
MATH 7203	Numerical Analysis 1	
Probability		
MATH 7241	Probability 1	4
or MATH 7342	Mathematical Statistics	
Foundational Courses		
Complete up to 16 semester hours from the following:		16
MATH 5102	Analysis 2: Functions of Several Variables	
MATH 5112	Algebra 2	
MATH 7202	Partial Differential Equations 1	
MATH 7203	Numerical Analysis 1	
MATH 7205	Numerical Analysis 2	
MATH 7221	Topology 2	
MATH 7233	Graph Theory	
MATH 7241	Probability 1	

MATH 7341	Probability 2
MATH 7342	Mathematical Statistics
MATH 7343	Applied Statistics
Advanced Course Work	
Complete 32 semester hours from the advanced course work list. Only two readings and three topics courses are allowed. (p. 394)	32

Advanced Course Work List

Code	Title	Hours
MATH 7206	Inverse Problems: Radon Transform, X-Ray Transform, and Applications	
MATH 7234	Optimization and Complexity	
MATH 7301	Functional Analysis	
MATH 7303	Complex Manifolds	
MATH 7311	Commutative Algebra	
MATH 7312	Lie Theory	
MATH 7315	Algebraic Number Theory	
MATH 7316	Lie Algebras	
MATH 7317	Modern Representation Theory	
MATH 7320	Modern Algebraic Geometry	
MATH 7321	Topology 3	
MATH 7344	Regression, ANOVA, and Design	
MATH 7345	Nonparametric Methods in Statistics	
MATH 7346 to MATH 7392		
MATH 7976 to MATH 8986		
MATH 8460	Graduate Seminar in Geometry and Representation Theory	
MATH 9948	Modern Mathematical Research	
MATH 9984	Research	
MATH 7721	Readings in Topology	
MATH 7732	Readings in Combinatorial Geometry	
MATH 7733	Readings in Graph Theory	
MATH 7734	Readings in Algebra	
MATH 7735	Readings in Algebraic Geometry	
MATH 7741	Readings in Probability and Statistics	
MATH 7751	Readings: Analysis	
MATH 7754	Readings in Ordinary Differential Equations	
MATH 7771	Readings in Geometry	

Dissertation

Code	Title	Hours
Complete the following (repeatable) course twice:		
MATH 9990	Dissertation	

Program Credit/GPA Requirements

64 total semester hours required
Minimum 3.000 GPA required

Mathematics, PhD—Advanced Entry

Course Requirements

Advanced students who enter the PhD program with a master's degree (or equivalent) will be allowed to place out of some (possibly all) of the eight basic-level courses; the graduate coordinator together with the first-year graduate advisor will determine the allowable course substitutions and will advise the student which foundational courses to take. Students may satisfy requirements for Algebra 1 (Algebra 1 (MATH 5111) and Analysis 1: Functions of One Variable (MATH 5101)) by taking qualifying exams in algebra 1 and in analysis 1 at the start of the program. Students may satisfy foundational course requirements if they demonstrate proficiency by passing an assessment exam in the course at the beginning of the semester or by demonstrating that they have taken a similar course and have adequate knowledge of the course material (syllabus and transcript are required; a brief oral examination is also required in that case). Academic advising will happen just before the start of each term and during the add/drop period in order to plan a student's course registration for the term. A complete listing of foundational and advanced courses is available from the Department of Mathematics and the graduate dean's office. Students are not permitted to register for more than two "readings" courses and three "topics" courses for credit toward the degree without explicit permission from the graduate dean. A minimum grade-point average (GPA) of 3.000 is required for degree conferral.

Teaching Requirement

Some teaching experience is required while in the program. Students must attend university-led TA training at the start of the program; attend a one-semester TA training course conducted by faculty from the Department of Mathematics teaching committee; spend one semester shadowing faculty in the undergraduate classroom; and perform recitations and grading for the undergraduate course they are shadowing.

Qualifying Exams

Qualifying exam sessions are given once in spring and once in fall. Students will be required to pass four qualifying exams: algebra 1, analysis 1, and two other exams. The possible additional topics for qualifying exams are algebra 2, analysis 2, combinatorics, geometry, ordinary differential equations, partial differential equations, probability, statistics, topology, and algebraic geometry. A qualifying exam may be taken twice by any student. Additional attempts may be allowed at the discretion of the graduate committee with permission from the graduate dean in the College of Science. Two qualifying exams should be passed no later than the end of the second year and all four by the end of the third year.

Doctoral Candidacy

PhD candidacy is reached when all of the following conditions are met:

- Completion of eight advanced courses
- Identification of an unsolved research problem
- Successful passing of four qualifying exams
- Assignment of PhD supervisor and creation of a 1-page initial plan
- Completion of a 3-page plan of research
- Completion of a 10-page progress report and a one-hour defense of proposal, presented to supervisor and three faculty members of graduate committee

Dissertation Requirement

Each candidate must complete a dissertation that embodies the results of extended research and makes an original contribution to the field. This work should give evidence of the candidate's ability to carry out independent investigation and interpret, in a logical manner, the results of the research. There are two stages to this process:

- **Stage 1:** Students in the PhD program must have a dissertation supervisor within two years after joining the PhD program. The department views the failure of a student to find a supervisor within

two years of joining the PhD program with concern and considers this sufficient cause to review the student's status in the PhD program. The process of obtaining a dissertation supervisor always involves two choices—the student chooses the supervisor, and the supervisor chooses the student. For this reason, the department does not guarantee a dissertation supervisor for every student, but the department recognizes its responsibility to help the student find a satisfactory match. This aid is usually provided by the student's graduate advisor, who should be familiar with the student's progress in finding a dissertation supervisor. The dissertation supervisor guides the student's further education as well as directs the student's dissertation. The dissertation itself must represent an original solution of a problem in the chosen area of mathematics that makes a significant contribution to the mathematical knowledge in that area. Students must enroll in Dissertation or Dissertation Continuation while fulfilling the dissertation requirements.

- **Stage 2 (dissertation defense):** The final oral examination on the dissertation is held in accordance with university regulations and given by a dissertation committee of four faculty members (three from the university, including the supervisor, and one from outside Northeastern University). The dissertation supervisor should propose this dissertation committee to the graduate committee for its approval at least one month before the PhD dissertation defense.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Milestones

Four qualifying examinations
Annual review
Dissertation committee
Teaching requirement
Doctoral candidacy
Progress report and presentation
Dissertation defense

Code	Title	Hours
Complete 0–16 semester hours of the following courses:		
MATH 5101	Analysis 1: Functions of One Variable	4
MATH 5102	Analysis 2: Functions of Several Variables	4
MATH 5111	Algebra 1	4
MATH 5112	Algebra 2	4

Tracks

Complete one of the following three tracks:

- Pure Track (p. 395)
- Discrete Track (p. 395)
- Probability and Statistics Track (p. 395)

PURE TRACK

Code	Title	Hours
Foudational Courses		
Complete 0–16 semester hours from the following:		0-16
MATH 7202	Partial Differential Equations 1	
MATH 7203	Numerical Analysis 1	
MATH 7205	Numerical Analysis 2	
MATH 7221	Topology 2	
MATH 7233	Graph Theory	

MATH 7241	Probability 1	
MATH 7341	Probability 2	
MATH 7342	Mathematical Statistics	
MATH 7343	Applied Statistics	
Advanced Course Work		
Complete 32 semester hours from the advanced course work list. Only two readings and three topics courses are allowed. (p. 395)		32

DISCRETE TRACK

Code	Title	Hours
Foundational Courses		
Complete 0–16 semester hours from the following:		0 - 16
MATH 5102	Analysis 2: Functions of Several Variables	
MATH 5111	Algebra 1	
MATH 5112	Algebra 2	
MATH 7203	Numerical Analysis 1	
MATH 7202	Partial Differential Equations 1	
MATH 7205	Numerical Analysis 2	
MATH 7221	Topology 2	
MATH 7233	Graph Theory	
MATH 7341	Probability 2	
MATH 7342	Mathematical Statistics	
MATH 7343	Applied Statistics	
Advanced Course Work		
Complete 32 semester hours from the advanced course work list. Only two readings and three topics courses are allowed. (p. 395)		32

PROBABILITY AND STATISTICS TRACK

Code	Title	Hours
Foundational Courses		
Complete 0–16 semester hours from the following:		0 - 16
MATH 5102	Analysis 2: Functions of Several Variables	
MATH 5112	Algebra 2	
MATH 7202	Partial Differential Equations 1	
MATH 7203	Numerical Analysis 1	
MATH 7205	Numerical Analysis 2	
MATH 7221	Topology 2	
MATH 7233	Graph Theory	
MATH 7241	Probability 1	
MATH 7341	Probability 2	
MATH 7342	Mathematical Statistics	
MATH 7343	Applied Statistics	
Advanced Course Work		
Complete 32 semester hours from the advanced course work list. Only two readings and three topics courses are allowed. (p. 395)		32

Advanced Course Work List

Code	Title	Hours
MATH 7206	Inverse Problems: Radon Transform, X-Ray Transform, and Applications	
MATH 7234	Optimization and Complexity	

MATH 7301	Functional Analysis
MATH 7303	Complex Manifolds
MATH 7311	Commutative Algebra
MATH 7312	Lie Theory
MATH 7315	Algebraic Number Theory
MATH 7316	Lie Algebras
MATH 7317	Modern Representation Theory
MATH 7320	Modern Algebraic Geometry
MATH 7321	Topology 3
MATH 7344	Regression, ANOVA, and Design
MATH 7345	Nonparametric Methods in Statistics
MATH 7346 to MATH 7392	
MATH 7976 to MATH 8986	
MATH 8460	Graduate Seminar in Geometry and Representation Theory
MATH 9948	Modern Mathematical Research
MATH 9984	Research
MATH 7721	Readings in Topology
MATH 7732	Readings in Combinatorial Geometry
MATH 7733	Readings in Graph Theory
MATH 7734	Readings in Algebra
MATH 7735	Readings in Algebraic Geometry
MATH 7741	Readings in Probability and Statistics
MATH 7751	Readings: Analysis
MATH 7754	Readings in Ordinary Differential Equations
MATH 7771	Readings in Geometry

Dissertation

Code	Title	Hours
Complete the following (repeatable) course twice:		
MATH 9990	Dissertation	

Program Credit/GPA Requirements

32–64 total semester hours required
Minimum 3.000 GPA required

Applied Mathematics, MS

Eight graduate courses (32 semester hours of credit) are required for the degree: three required courses and five elective courses. The required courses provide a basic training in mathematical methods, and the elective courses include a wide variety of advanced topics. In addition, the program allows up to two of the elective courses to be taken outside the Department of Mathematics. No course can be used to satisfy both a requirement and an elective.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Methods and Modeling		
MATH 5131	Introduction to Mathematical Methods and Modeling	4
Algebra and Analysis		

Code	Title	Hours
Complete one of the following:		4
MATH 5101	Analysis 1: Functions of One Variable	
MATH 5111	Algebra 1	
MATH 7241	Probability 1	
Statistics		
MATH 7342	Mathematical Statistics	4
or MATH 7343	Applied Statistics	

Tracks

Complete one of the following two tracks:

- Data Science Track (p.   )
- Course Work Track (p.   )

DATA SCIENCE TRACK

Code	Title	Hours
Data Science Courses		
Choose two from the following:		8
CS 6140	Machine Learning	
CS 6220	Data Mining Techniques	
DA 5020	Collecting, Storing, and Retrieving Data	
DA 5030	Introduction to Data Mining/Machine Learning	
DS 5220	Supervised Machine Learning and Learning Theory	
DS 5230	Unsupervised Machine Learning and Data Mining	
EECE 5644	Introduction to Machine Learning and Pattern Recognition	
INFO 6210	Data Management and Database Design	

Students may take other courses not on the list above from the College of Computer and Information Science in consultation with their faculty advisor.

COURSE WORK TRACK

Code	Title	Hours
Course Work		
Complete 8 semester hours. These courses may be chosen from outside the Department of Mathematics with faculty approval.		8

Electives

Code	Title	Hours
Complete 12 semester hours in the following subject area:		12
MATH		

Program Credit/GPA Requirements

32 total semester hours required
Minimum 3.000 GPA required

Mathematics, MS

A total of 32 semester hours, this program offers students with a bachelor's degree in mathematics or a related field an opportunity to broaden their knowledge in the several fields of mathematics and its applications. The program is designed to prepare graduates for careers in business, industry, or government. Previous course work will be evaluated to determine proficiency in certain content areas and degree plan may

be tailored accordingly. In some cases, a student may be required to take an assessment exam to determine content and knowledge proficiency. No course can be used to satisfy both a requirement and an elective. To qualify for degree conferral, students must obtain a minimum cumulative average of 3.000, equivalent to a grade of B.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Algebra 1 and Analysis 1		
MATH 5101	Analysis 1: Functions of One Variable	4
or MATH 5102	Analysis 2: Functions of Several Variables	
MATH 5111	Algebra 1	4
or MATH 5112	Algebra 2	
Algebra 2 and Analysis 2		
MATH 5102	Analysis 2: Functions of Several Variables	4
Complete 4 semester hours from the following:		4
MATH 5112	Algebra 2	
	Elective chosen from the list below	

Electives

Code	Title	Hours
Complete 16 semester hours from the following:		16
MATH 7202	Partial Differential Equations 1	
MATH 7203	Numerical Analysis 1	
MATH 7205	Numerical Analysis 2	
MATH 7221	Topology 2	
MATH 7233	Graph Theory	
MATH 7234	Optimization and Complexity	
MATH 7241	Probability 1	
MATH 7301	Functional Analysis	
MATH 7341	Probability 2	
MATH 7342	Mathematical Statistics	
MATH 7343	Applied Statistics	
MATH 7344	Regression, ANOVA, and Design	
MATH 7349	Stochastic Calculus and Introduction to No-Arbitrage Finance	

Program Credit/GPA Requirements

32 total semester hours required
Minimum 3.000 GPA required

Operations Research, MSOR

This program seeks to train students in the basic techniques and theory of operations research and their applications to real-world problems. Graduates should have developed their analytical skills to attack complex, large-scale optimization problems of both a deterministic and stochastic nature. Eight 4-semester-hour graduate courses are required for this degree. Previous course work will be evaluated to determine proficiency in certain content areas and degree plan may be tailored accordingly. In some cases, a student may be required to take an assessment exam to determine content and knowledge proficiency. No course can be used to satisfy both a requirement and an elective. To

qualify for degree conferral, a minimum cumulative grade-point average of 3.000, equivalent to a grade of B, must be obtained. Some courses listed for this program are offered in the College of Engineering or the College of Computer and Information Systems.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Probability		
Complete 4 semester hours from the following:		4
MATH 7241	Probability 1	
MATH 7341	Probability 2	
OR 7230	Probabilistic Operation Research	
Statistics		
MATH 7342	Mathematical Statistics	4
or MATH 7343	Applied Statistics	
Operations Research		
OR 6205	Deterministic Operations Research	4
Optimization and Complexity		
MATH 7234	Optimization and Complexity	4

Electives

Code	Title	Hours
Complete 16 semester hours from the following:		16
CS 5800	Algorithms	
CS 6140	Machine Learning	
CS 7805	Theory of Computation	
CSYE 6200	Concepts of Object-Oriented Design	
CSYE 6205	Concepts of Object-Oriented Design with C++	
EECE 7360	Combinatorial Optimization	
EMGT 5220	Engineering Project Management	
EMGT 6225	Economic Decision Making	
EMGT 6305	Financial Management for Engineers	
GE 5010	Customer-Driven Technical Innovation for Engineers	
GE 5100	Product Development for Engineers	
IE 5400	Healthcare Systems Modeling and Analysis	
IE 5500	Systems Engineering in Public Programs	
IE 5617	Lean Concepts and Applications	
IE 5630	Biosensor and Human Behavior Measurement	
IE 6300	Manufacturing Methods and Processes	
IE 7200	Supply Chain Engineering	
IE 7215	Simulation Analysis	
IE 7275	Data Mining in Engineering	
IE 7280	Statistical Methods in Engineering	
IE 7285	Statistical Quality Control	
IE 7290	Reliability Analysis and Risk Assessment	
IE 7315	Human Factors Engineering	

MATH 7233	Graph Theory
MATH 7346	Time Series
MATH 7349	Stochastic Calculus and Introduction to No-Arbitrage Finance
OR 7235	Inventory Theory
OR 7240	Integer and Nonlinear Optimization
OR 7310	Logistics, Warehousing, and Scheduling

Program Credit/GPA Requirements

32 total semester hours required
Minimum 3.000 GPA required

Physics

Website (http://www.northeastern.edu/physics)

Mark Williams, PhD
Professor and Chair

110 Dana Research Center
617.373.2902
617.373.2943 (fax)
gradphysics@northeastern.edu

Meni Wanunu, PhD
Professor and Director of Graduate Studies, m.wanunu@northeastern.edu (ma.williams@northeastern.edu)

Nancy Wong
Program Coordinator
617.373.4240
n.wong@northeastern.edu

Physics PhD and Master of Science students at Northeastern University have the opportunity to explore, discover, and apply the fundamental principles that run the universe. The program specializes in several subfields that reflect the forefront research activities of the department. These specializations include biological physics, condensed matter physics, elementary particle physics, nanomedicine, nanophysics, and network science.

The Department of Physics also offers a Graduate Certificate in Nanomedicine. The certificate is designed for students, engineers, and physicians to develop competency and practical skills in the application of nanotechnology to problems in medicine. This program is appropriate for those working in or seeking careers in biotechnology, pharmaceutical, biomedical, or clinical fields.

Programs
Doctor of Philosophy (PhD)
- Physics (p. 398)
- Physics—Advanced Entry (p. 401)

Master of Science (MS)
- Physics (p. 403)

Graduate Certificate
- Nanomedicine (p. 404)

Physics, PhD

The Department of Physics offers a Doctor of Philosophy in Physics with specializations in different subfields that reflect the forefront research activities of the department, including biological physics, condensed matter physics, elementary particle physics, nanomedicine, and network science. The program for the PhD degree consists of the required course work, a qualifying examination, a preliminary research seminar, the completion of a dissertation based upon original research performed by the student, and a dissertation defense upon completion of the dissertation. Based on these measures, students are expected to obtain a graduate-level understanding of basic physics concepts and demonstrate the ability to formulate a research plan, communicate orally a research plan, and conduct and present independent research.

Course Work

The required courses are grouped into two sets, Part 1 and Part 2, having a total of 42 semester hours as a minimum. Part 1 courses (first-year courses) are typically taken prior to the qualifying exam. Students without a master's degree must complete all Part 1 courses in the first year to remain in good academic standing in the graduate program. Part 2 courses (second-year courses) may be taken before or after passing the qualifying exam.

Grade Requirements

The minimum grade required for the successful completion of the Part 1 courses is a B (3.000) average. Students will only be allowed to take the qualifying exam if they fulfill this requirement. The minimum grade required for the successful completion of Part 2 (excluding advanced research) is at least a B (3.000) average for the Part 2 courses. The Part 2 courses, including any makeup of grade-point-average deficiencies (see following), must be completed within two calendar years of passing the qualifying exam. The department expects students to complete the bulk of these courses in the first year after the qualifying exam. The cumulative average will be calculated each semester. No more than two courses or 8 semester hours of credit, whichever is greater, may be repeated in order to satisfy the requirement for the PhD degree. A student who does not maintain a 3.000 cumulative average for two consecutive semesters, or is otherwise not making satisfactory progress toward the PhD degree requirements, may be recommended for termination at the discretion of the graduate committee. Within the above limitations, a required course for which a grade of F is received must be repeated with a grade of C or better and may be repeated only once. In calculating the overall cumulative average, all graduate-level course work completed at the time of clearance for graduation will be counted.

Qualifying Exam Requirement

A student who fails to achieve the required B average for the Part 1 courses must petition the graduate committee in order to remain in the graduate program and be eligible to take the qualifying exam. A student who fails to achieve the required B average for the Part 2 courses must petition the graduate committee in order to remain in the graduate program. All students registered in the PhD program are required to pass a qualifying exam unless they are granted an exemption (see below). The qualifying exam may include both written and oral parts.

The qualifying exam consists of two parts:

- **Part 1:** Classical physics (based on classical mechanics and mathematical methods), electromagnetic theory, and statistical physics.
- **Part 2:** Quantum physics (based on quantum mechanics and its applications) and statistical physics. The content of the qualifying

exam will be based on the content of the first-year courses, excluding Principles of Experimental Physics (PHYS 5318). A syllabus is available and on request will be distributed by the graduate coordinator to any student prior to the exam.

The qualifying exam is given twice yearly: once prior to the start of the fall semester and again within the first two weeks of the start of the spring semester. The exam will consist of one day each on Part 1 (classical physics/mathematical methods, electromagnetism, and statistical physics) and Part 2 (quantum physics and statistical physics).

All students enrolled in the PhD program must take the fall qualifying exam after completing their first-year course of study with the required grade-point average unless they are granted an exemption. Students taking the exam for the first time must take both Part 1 and Part 2. A student who does not pass the exam on his or her first attempt must pass the exam the next time it is given in order to continue in the PhD program. However, a student who passes one part of the first attempt is not required to repeat that part.

Any PhD student will be exempt from taking the quantum part of the qualifying exam if they receive both a grade of B+ or higher inQuantum Theory 1 (PHYS 7315), Quantum Theory 2 (PHYS 7316), and Statistical Physics (PHYS 7305) and have a GPA of 3.670 or higher in those three courses. To meet this standard, they must take all the above courses. Any PhD student will be exempt from taking the classical part of the qualifying exam if they receive both a grade of B+ or higher in Classical Mechanics/Math Methods (PHYS 7301), Electromagnetic Theory (PHYS 7302), and Statistical Physics (PHYS 7305) and have a GPA of 3.670 or higher in these three courses. To meet this standard, they must take all three of these courses.

A student who fails the written exam by less than 5 percent of the total possible score on the second attempt for that part will be automatically given an oral exam. A student who fails the written exam by more than 10 percent is excluded from taking an oral exam. These provisions apply separately to Parts 1 and 2 of the exam.

PhD Candidacy

Degree candidacy is established when the student has passed the qualifying examination and completed both the Part 1 and Part 2 course requirements. PhD candidacy may be achieved before completion of the advanced elective if the elective in the student's specialization is not offered in a given year. The elective must be taken at the next opportunity. PhD degree candidacy is certified by the college. A maximum of five years after the establishment of doctoral degree candidacy is allowed for the completion of degree requirements.

PhD Dissertation Requirement

All PhD students are required to complete a dissertation based upon new and original research in one of the three following options:

- In one of the current theoretical or experimental research programs in the department, under direct supervision of an advisor from the Department of Physics. A dissertation committee will be formed consisting of the advisor, two full-time members of the department, and an additional member, either from within the department or from an outside department or institution.
- In a recognized interdisciplinary field involving another research area of the university, under the direct supervision of a faculty member in that field. In this case, an interdisciplinary committee is formed under the approval of the graduate committee, consisting of the direct supervisor, a departmental advisor, one other member of the

department, and an additional member of either the department or the external department.

- In an area of applied research in one of the industrial or high-technology laboratories associated with the department's industrial PhD program. The direct supervisor is associated with the institution where the research is performed. In this case, a dissertation advisory committee is established by the graduate committee, consisting of the direct supervisor, the departmental advisor, and two other members of the department.

PhD students must select their departmental advisor no later than the end of the spring semester of their second year or their second semester after having passed the qualifying examination, whichever comes first. This process should start as soon as the student has identified a field of research or has passed the qualifying exam.

PhD Dissertation Committee, Preliminary Thesis Proposal, and Preliminary Research Seminar

By the end of the spring semester of the third year or the second semester in which the student is enrolled for PhD dissertation, whichever comes first, each PhD student must have an approved dissertation committee and thesis proposal.

The student (with the aid and approval of his or her thesis advisor) will submit a PhD thesis proposal to the graduate committee clearly outlining a plan to carry out new and original research in the context of previously published research in the scientific literature and also describe the methodologies to be employed. The thesis proposal is limited to 15 pages or less, including references. A proposed makeup of the dissertation committee will be submitted at the same time.

The graduate committee will evaluate the merit of the proposal and make recommendations for improvements when necessary, including any changes to the composition of the dissertation committee. No more than two submissions for a particular proposal may be made. In the case where a revised proposal does not meet a minimum academic standard that provides a basis for making such improvements, the graduate committee may instruct the student to select a different thesis topic or advisor.

After approval by the graduate committee, the proposal is circulated to the general faculty for comments. If the graduate coordinator receives any objections, the proposal will be referred back to the graduate committee for final resolution.

After the proposal and dissertation committee have been approved, the student will make a public presentation of the material in the preliminary research seminar before the dissertation committee in a format open to the full department and advertised one week in advance. The dissertation committee will then meet in closed session to evaluate the seminar. The preliminary research seminar must take place no later than the semester after the thesis proposal is approved and, normally, in the same semester.

In the event that the dissertation advisor is changed, a new committee must be formed, with the approval of the graduate committee, and a new preliminary research seminar given.

PhD Dissertation Defense

The dissertation defense consists of a public presentation, followed by a question period conducted by the dissertation committee and limited to them and the department faculty. The date of the dissertation presentation must be publicized and a copy of the thesis deposited with the graduate program coordinator at least one week prior to the defense. If during this posting period or in the two business days following the defense a written objection to the thesis is lodged with the

department chair by a member of the faculty, the chair may appoint an ad hoc postdefense review committee to provide advice on the scientific issues raised by the objection. Students should note that they must be registered for Dissertation or Dissertation Continuation during the semester in which they defend their dissertation and that they should schedule their defenses well in advance of the end of the semester in order to accommodate the review/waiting period and the time required to deposit the thesis.

The final dissertation defense is held in accordance with the College of Science regulations.

PhD Specialization Options

Students choose a specialization in biological physics; particle physics; condensed matter physics; or, with preapproval of a faculty member, in the following areas: nanomedicine or network science.

Multiple specializations are allowed if the individual requirements for each specialization are met.

Note that the specialization will not appear on the degree diploma or on the official transcript but can be listed as the field of study on CVs and grant proposals.

Transfer Credit

Students must petition in writing through the graduate committee to the director of graduate student services for all transfer credit. A copy of an official transcript must be attached to the Request for Transfer Credit form. A maximum of 8 semester hours of credit obtained at another institution may be accepted toward the PhD degree provided that the credits transferred consist of a grade of B or better, are graduate-level courses, have been earned at an accredited U.S. institution, and have not been used toward any other degree. Grades are not transferred.

Course Waivers

Course waivers may be accepted toward the PhD degree course requirements, though they will not change the numbers of credits required for the program. The student must have received a B grade or better in equivalent graduate-level core courses that have been earned at an accredited institution. Students must petition in writing to the graduate committee for all course waivers and provide documentation in the form of official transcripts to support their petition.

Residence Requirement

The residence requirement is satisfied by at least one year of full-time graduate work (i.e., enrollment in PhD Dissertation, for two consecutive semesters). Students must be continually enrolled throughout the pursuit of the dissertation.

Internship Option

A PhD candidate may spend one year in a participating high-technology, industrial, or government laboratory immediately after passing the PhD qualifying examination. In this program, the student is expected to remain in touch with the university by taking one course per semester at the university and by frequent contact with a faculty advisor. After the one-year paid internship, the student returns to the university to do the dissertation. Eligibility for this program is contingent on acceptance both by the department and by the external laboratory.

Program Requirements
Bachelor's Degree Entrance

Complete all courses and requirements listed below unless otherwise indicated.

Milestones

Two qualifying examinations
Annual review
Candidacy
Preliminary research seminar proposal with proposed dissertation committee
Preliminary research seminar talk
Dissertation defense

Core Requirements

Code	Title	Hours
Principles		
PHYS 5318	Principles of Experimental Physics	4
Computational		
PHYS 7301	Classical Mechanics/Math Methods	4
PHYS 7305	Statistical Physics	4
PHYS 7321	Computational Physics	4
Theory		
PHYS 7302	Electromagnetic Theory	4
PHYS 7315	Quantum Theory 1	4
PHYS 7316	Quantum Theory 2	4
Research		
PHYS 7210	Introduction to Research in Physics (Take this repeatable course twice)	0
PHYS 9984	Advanced Research	1-8

Electives

Code	Title	Hours
Complete 8 semester hours from the following:		8
If preapproved to specialize in nanomedicine or network science, consult program director.		
PHYS 7323	Elementary Particle Physics	
PHYS 7324	Condensed Matter Physics	
PHYS 7325	Quantum Field Theory 1	
PHYS 7731	Biological Physics 1	
Specialization Elective		
Choose 4 semester hours from your specialization below:		4

PhD Specialization Options

A specialization is required.[1]
Note: Specialization in nanomedicine or network science requires prior approval.

Code	Title	Hours
Biological Physics [2]		
PHYS 7731	Biological Physics 1	4
PHYS 7741	Biological Physics 2	4
Particle Physics [3]		
PHYS 7323	Elementary Particle Physics	4
PHYS 7326 or PHYS 7733	Quantum Field Theory 2 Topics: Elementary Particle Physics and Cosmology	4
Condensed Matter Physics		
PHYS 7324	Condensed Matter Physics	4
PHYS 7734	Topics: Condensed Matter Physics	4
Nanomedicine		
NNMD 5270	Introduction to Nanomedicine	3

NNMD 5370	Nanomedicine Research Techniques	4
Network Science		
PHYS 5116	Complex Networks and Applications	4
PHYS 7331	Network Science Data	4

Dissertation

Code	Title	Hours
Taken third year and beyond.		
Complete the following (repeatable) course twice:		
PHYS 9990	Dissertation	
Complete the following (repeatable) course until graduation:		
PHYS 9996	Dissertation Continuation	

Program Credit/GPA Requirements

42 total semester hours required
Minimum 3.000 GPA required

[1] Note that the specialization will not appear on the degree diploma or on the official transcript but can be listed as the field of study on CVs and grant proposals.

[2] By approval of the graduate committee, biological physics students may substitute graduate courses in biology, physics, or chemistry from the following list instead of PHYS 7741:
Biochemistry (BIOL 6300), Molecular Cell Biology (BIOL 6301), Optical Methods of Analysis (CHEM 5613), Molecular Modeling (CHEM 5638), . Additional appropriate courses may also be substituted by approval of the physics graduate committee.

[3] Elementary Particle Physics (PHYS 7323) is required for a specialization in particle physics. The advanced elective may be Topics: Elementary Particle Physics and Cosmology (PHYS 7733) **OR** Quantum Field Theory 2 (PHYS 7326).

Plan of Study

Year 1

Fall	Hours	Spring	Hours
PHYS 7210	0	PHYS 5318	4
PHYS 7301	4	PHYS 7210	0
PHYS 7302	4	PHYS 7305	4
PHYS 7315	4	PHYS 7316	4
	12		12

Year 2

Fall	Hours	Spring	Hours
PHYS 7321	4	PHYS 9984	1-8
Electives	8	Advanced elective	4
	12		5-12

Year 3

Fall	Hours	Spring	Hours
PHYS 9990	0	PHYS 9990	0
	0		0

Total Hours: 41-48

Physics, PhD—Advanced Entry

The Department of Physics offers a Doctor of Philosophy in Physics with specializations in different subfields that reflect the forefront research activities of the department, including biological physics, condensed matter physics, elementary particle physics, nanomedicine, and network science. The program for the PhD degree consists of the required course work, a qualifying examination, a preliminary research seminar, the completion of a dissertation based upon original research performed by the student, and a dissertation defense upon completion of the dissertation. Based on these measures, students are expected to obtain a graduate-level understanding of basic physics concepts and demonstrate the ability to formulate a research plan, communicate orally a research plan, and conduct and present independent research.

Course Work

Students entering with an approved MS degree from a U.S. institution will be required to take 10 semester hours of courses. The courses required will be determined by the graduate coordinator based on the student's transcripts.

Grade Requirements

The minimum grade required is a B (3.000) average. A student who does not maintain a 3.000 cumulative average for two consecutive semesters, or is otherwise not making satisfactory progress toward the PhD degree requirements, may be recommended for termination at the discretion of the graduate committee.

Qualifying Exam Requirement

Any new, entering student with a master's degree from a U.S. institution may take the qualifying exam upon arriving at Northeastern University. Failure of the exam at this time will not be used to limit the two opportunities to take the examination in the future. All students registered in the PhD program are required to pass a qualifying exam unless they are granted an exemption. The qualifying exam may include both written and oral parts.

The qualifying exam consists of two parts:

- **Part 1:** Classical physics (based on classical mechanics and mathematical methods), electromagnetic theory, and statistical physics.
- **Part 2:** Quantum physics (based on quantum mechanics and its applications) and statistical physics. A syllabus is available and on request will be distributed by the graduate coordinator to any student prior to the exam.

The qualifying exam is given twice yearly: once prior to the start of the fall semester and again within the first two weeks of the start of the spring semester. The exam will consist of one day each on Part 1 (classical physics/mathematical methods, electromagnetism, and statistical physics) and Part 2 (quantum physics and statistical physics).

Students who enter with a Master of Science degree from a U.S. institution may take the exam at the first opportunity after entering the program.

All students enrolled in the PhD program must take the fall qualifying exam after completing their first-year course of study with the required grade-point average. Students taking the exam for the first time must take both Part 1 and Part 2. A student who does not pass the exam on his or her first attempt must pass the exam the next time it is given in order to continue in the PhD program. However, a student who passes one part of the first attempt is not required to repeat that part.

A student who fails the written exam by less than 5 percent of the total possible score on the second attempt for that part will be automatically given an oral exam. A student who fails the written exam by more than 10 percent is excluded from taking an oral exam. These provisions apply separately to Parts 1 and 2 of the exam.

PhD Candidacy

Degree candidacy is established when the student has passed the qualifying examination and completed 10 semester hours of courses. PhD degree candidacy is certified by the college. A maximum of five years after the establishment of doctoral degree candidacy is allowed for the completion of degree requirements.

PhD Dissertation Requirement

All PhD students are required to complete a dissertation based upon new and original research in one of the three following options:

- In one of the current theoretical or experimental research programs in the department, under direct supervision of an advisor from the Department of Physics. A dissertation committee will be formed consisting of the advisor, two full-time members of the department, and an additional member, either from within the department or from an outside department or institution.
- In a recognized interdisciplinary field involving another research area of the university, under the direct supervision of a faculty member in that field. In this case, an interdisciplinary committee is formed under the approval of the graduate committee, consisting of the direct supervisor, a departmental advisor, one other member of the department, and an additional member of either the department or the external department.
- In an area of applied research in one of the industrial or high-technology laboratories associated with the department's industrial PhD program. The direct supervisor is associated with the institution where the research is performed. In this case, a dissertation advisory committee is established by the graduate committee, consisting of the direct supervisor, the departmental advisor, and two other members of the department.

PhD students must select their departmental advisor no later than the end of the spring semester of their second year or their second semester after having passed the qualifying examination, whichever comes first. This process should start as soon as the student has identified a field of research or has passed the qualifying exam.

PhD Dissertation Committee, Preliminary Thesis Proposal, and Preliminary Research Seminar

By the end of the spring semester of the third year or the second semester in which the student is enrolled for PhD dissertation, whichever comes first, each PhD student must have an approved dissertation committee and thesis proposal.

The student (with the aid and approval of his or her thesis advisor) will submit a PhD thesis proposal to the graduate committee clearly outlining a plan to carry out new and original research in the context of previously published research in the scientific literature and also describe the methodologies to be employed. The thesis proposal is limited to 15 pages or less, including references. A proposed makeup of the dissertation committee will be submitted at the same time.

The graduate committee will evaluate the merit of the proposal and make recommendations for improvements when necessary, including any changes to the composition of the dissertation committee. No more than two submissions for a particular proposal may be made. In the case where a revised proposal does not meet a minimum academic standard that provides a basis for making such improvements, the graduate committee may instruct the student to select a different thesis topic or advisor.

After approval by the graduate committee, the proposal is circulated to the general faculty for comments. If the graduate coordinator receives any objections, the proposal will be referred back to the graduate committee for final resolution.

After the proposal and dissertation committee have been approved, the student will make a public presentation of the material in the preliminary research seminar before the dissertation committee in a format open to the full department and advertised one week in advance. The dissertation committee will then meet in closed session to evaluate the seminar. The preliminary research seminar must take place no later than the semester after the thesis proposal is approved and, normally, in the same semester.

In the event that the dissertation advisor is changed, a new committee must be formed, with the approval of the graduate committee, and a new preliminary research seminar given.

PhD Dissertation Defense

The dissertation defense consists of a public presentation, followed by a question period conducted by the dissertation committee and limited to them and the department faculty. The date of the dissertation presentation must be publicized and a copy of the thesis deposited with the graduate program coordinator at least one week prior to the defense. If during this posting period or in the two business days following the defense a written objection to the thesis is lodged with the department chair by a member of the faculty, the chair may appoint an ad hoc postdefense review committee to provide advice on the scientific issues raised by the objection. Students should note that they must be registered for Dissertation or Dissertation Continuation during the semester in which they defend their dissertation and that they should schedule their defenses well in advance of the end of the semester in order to accommodate the review/waiting period and the time required to deposit the thesis.

The final dissertation defense is held in accordance with the College of Science regulations.

Residence Requirement

The residence requirement is satisfied by at least one year of full-time graduate work (i.e., enrollment in PhD Dissertation, for two consecutive semesters). Students must be continually enrolled throughout the pursuit of the dissertation.

Internship Option

A PhD candidate may spend one year in a participating high-technology, industrial, or government laboratory immediately after passing the PhD qualifying examination. In this program, the student is expected to remain in touch with the university by taking one course per semester at the university and by frequent contact with a faculty advisor. After the one-year paid internship, the student returns to the university to do the dissertation. Eligibility for this program is contingent on acceptance both by the department and by the external laboratory.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Milestones

Two qualifying examinations
Annual review
Candidacy
Preliminary research seminar proposal with proposed dissertation committee
Preliminary research seminar talk
Dissertation defense

Note: Any new, entering student with a master's degree from a U.S. institution may take the qualifying exam upon arriving at Northeastern University. Failure of the exam at this time will not be used to limit the two opportunities to take the examination in the future

Core Requirements

Code	Title	Hours
Course Work		
Students entering with an approved MS degree from a U.S. institution will be required to take 10 semester hours of courses. The courses required will be determined by the graduate coordinator based on the student's transcripts.		10

Dissertation

Code	Title	Hours
Complete the following (repeatable) course twice:		
PHYS 9990	Dissertation	
Complete the following (repeatable) course until graduation:		
PHYS 9996	Dissertation Continuation	

Program Credit/GPA Requirements

10 total semester hours required
Minimum 3.000 GPA required

Physics, MS

The Department of Physics offers Master of Science degrees with several options. The standard physics MS can be obtained by taking a specified set of courses without an MS thesis. Alternatively, an MS thesis may substitute for 8 credit hours of course work. Both of these options may be pursued either full time or part time. Upon completion of the MS degree in physics, students should be able to apply graduate-level knowledge and solve problems in the areas of electrodynamics, quantum mechanics, classical mechanics, statistical mechanics, and advanced mathematical methods.

Grade Requirements

To qualify for the MS degree, a cumulative average of 3.000, equivalent to a grade of B, must be obtained. No more than two courses or 6 semester hours of credit, whichever is greater, may be repeated in order to satisfy the requirements for the MS degree. A student who does not maintain a 3.000 cumulative average for two consecutive semesters, or is otherwise not making satisfactory progress toward the MS degree requirements, may be recommended for termination at the discretion of the graduate committee.

Within the above limitations, a required course for which a grade of F is received must be repeated with a grade of C or better and may be repeated only once. Elective courses in which an F has been received may be repeated once to obtain a C or better.

Transfer Credit

Students must petition, in writing, through the graduate committee to the director of graduate student services for all transfer credit. An official transcript must be attached to the Request for Transfer Credit form. A maximum of 8 semester hours of credit obtained at another institution may be accepted toward the MS degree provided that the credits transferred consist of a grade of B or better in graduate-level courses, have been earned at an accredited U.S. institution, and have not been used toward any other degree. Grades are not transferred.

Current MS Students Interested in the PhD Program

MS students interested in applying to the PhD program must complete the internal admission application.

Special Student Status

Special students are allowed to earn credit for a maximum of 12 semester hours. Students interested in taking more than 12 semester hours must make a formal application to the degree program online.

Course Work

There is a total of 32 semester hours of course work required as a minimum. There are two options for the MS degree:

Option 1 is the standard physics MS with or without an MS thesis. Up to 8 semester hours of courses can be substituted with an MS thesis.

Option 2 is the MS with a specialization (up to 23 semester hours of courses) in applied physics, engineering physics, biophysics, chemical physics, material physics, mathematical physics, and computational physics.

Graduate students desiring the MS with thesis option should arrange a thesis with a faculty advisor. The student may choose a field of research from three possible areas as outlined under the PhD dissertation section. The thesis must demonstrate the individual's capacity to execute independent work based on original material. The thesis must be approved by the graduate committee. The thesis may be completed in one semester (e.g., summer semester) or in consecutive semesters. Students who have not completed their thesis after the required number of thesis credits (12 semester hours) must register for MS Thesis with the appropriate course number each subsequent semester until the thesis is approved by the graduate school and submitted electronically to Proquest.

Both options require a minimum of 32 semester hours of graduate credit. The 32 semester hours may include up to 8 semester hours of transfer credit as approved by the physics department's graduate committee and the graduate school.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Computational Course Work		
PHYS 7301	Classical Mechanics/Math Methods	4
PHYS 7305	Statistical Physics	4
PHYS 7321	Computational Physics	4
Theory Course Work		
PHYS 7302	Electromagnetic Theory	4
PHYS 7315	Quantum Theory 1	4
PHYS 7316	Quantum Theory 2	4

Options

- Course work (p.   )
- Thesis (p. 404)
- Thesis with specialization (p. 404)[1]

COURSE WORK OPTION

Note: In consultation with your faculty advisor you may choose an area of specialization from physics, engineering, chemistry, biology, mathematics, psychology, or computer science. Additional elective courses are listed in the PhD program.

Code	Title	Hours
Electives		
Complete 8 semester hours from the following:		8
PHYS 5111	Astrophysics and Cosmology	
PHYS 5113	Introduction to Particle and Nuclear Physics	
PHYS 5115	Quantum Mechanics	
PHYS 5116	Complex Networks and Applications	
PHYS 5260	Introduction to Nanoscience and Nanotechnology	
PHYS 5318	Principles of Experimental Physics	
PHYS 7323	Elementary Particle Physics	
PHYS 7324	Condensed Matter Physics	
PHYS 7731	Biological Physics 1	

THESIS

Code	Title	Hours
Thesis		
PHYS 7990	Thesis	1-4
Elective		
Complete 4 semester hours from the following:		4
PHYS 5111	Astrophysics and Cosmology	
PHYS 5113	Introduction to Particle and Nuclear Physics	
PHYS 5115	Quantum Mechanics	

THESIS WITH SPECIALIZATION[1]

Applied physics, engineering physics, biophysics, chemical physics, materials physics, mathematical physics, or computational physics.

Code	Title	Hours
Thesis		
PHYS 7990	Thesis	1-4
Specialization		
Complete course work in consultation with faculty advisor.		8-12

Program Credit/GPA Requirements

32 total semester hours required
Minimum 3.000 GPA required

[1] Note that the specialization will not appear on the degree diploma or on the official transcript but can be listed as the field of study on CVs and grant proposals.

Plan of Study

Year 1

Fall	Hours	Spring	Hours
PHYS 7301	4	PHYS 7305	4
PHYS 7302	4	PHYS 7316	4
PHYS 7315	4	PHYS 7321	4
	12		12

Year 2

Fall	Hours
Elective or thesis	4
Additonal elective	4
	8

Total Hours: 32

Nanomedicine, Graduate Certificate

The Graduate Certificate in Nanomedicine is designed for scientists, engineers, and physicians to develop competency and practical skills in the application of nanotechnology to problems in medicine. This program is appropriate for those working in or seeking careers in biotechnology, pharmaceutical, biomedical, or clinical fields. Program participants receive advanced training in the fundamental and applied aspects of nanomedicine, as well as nanomedicine commercialization from bench to bedside. The curriculum includes a variety of activities for scientific and professional development, including lectures, case studies, journal readings, term projects, and close interactions with distinguished faculty and experts drawn from academia, hospitals, industry, and government.

The certificate consists of five nanomedicine (NNMD) courses, totaling 12 semester-hour credits. This is a part-time, 12-credit graduate program that can be completed in as little as two semesters.

Program Requirements

Complete all requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
NNMD 5270	Introduction to Nanomedicine	3
NNMD 5272	Nanomedicine Seminar 1	1
NNMD 5274	Nanomedicine Seminar 2	1
NNMD 5370	Nanomedicine Research Techniques	4
NNMD 5470	Nano/Biomedical Commercialization: Concept to Market	3

Electives

Code	Title	Hours
Students may apply 4 semester hours of elective credit to substitute for NNMD 5370:		4
BIOE 5100	Medical Physiology	
BIOL 5307	Biological Electron Microscopy	
BIOL 6381	Ethics in Biological Research	
BIOT 5145	Basic Biotechnology Lab Skills	
BIOT 5225	Managing and Leading a Biotechnology Company	
BIOT 5227	Economics and Marketing for Biotechnology Managers	
BIOT 5700	Molecular Interactions of Proteins in Biopharmaceutical Formulations	
BIOT 7245	Biotechnology Applications Laboratory	
CHEM 7247	Advances in Nanomaterials	
CHME 7350	Transport Phenomena	
PHSC 6210	Drug Design, Evaluation, and Development	
PHSC 6212	Research Skills and Ethics	

PHSC 6216	Human Physiology and Pathophysiology
PHSC 6226	Imaging in Medicine and Drug Discovery
PHSC 6290	Biophysical Methods in Drug Discovery
PHYS 5260	Introduction to Nanoscience and Nanotechnology
PHYS 7731	Biological Physics 1
PMST 6252	Pharmacokinetics and Drug Metabolism
PMST 6254	Advanced Drug Delivery System
POLS 7333	Science, Technology, and Public Policy

Program Credit/GPA Requirements

12 total semester hours required
Minimum 3.000 GPA required

Psychology

Website (http://www.northeastern.edu/psychology)

Joanne L. Miller, PhD
Matthews Distinguished University Professor and Chair

125 Nightingale Hall
617.373.3076
617.373.8714 (fax)

Judith Hall, PhD
University Distinguished Professor and Director of Graduate Studies, j.hall@northeastern.edu (e.cram@northeastern.edu)

Kelsy Smith, Staff Assistant, kel.smith@northeastern.edu (kel.smith@northeastern.edu)

The Department of Psychology PhD program gives students a research-intensive environment within a close-knit community of faculty and students. There are four main areas of specialization—behavioral neuroscience, cognition, perception, and personality/social—with crosscutting themes in health, affective science, and life span development.

The students are apprentices in faculty laboratories as they work to become experts in psychological science. During the time in the program, the responsibility for collaboration in research shifts from faculty member to student, culminating in the student's dissertation.

In addition to the apprenticeship relationship, there are required courses, advanced seminars, a colloquium series, assignments as teaching assistants, and work leading up to the dissertation.

Programs
Doctor of Philosophy (PhD)
- Psychology (p. 405)
- Psychology—Advanced Entry (p. 406)

Psychology, PhD

The PhD program in the Department of Psychology covers a wide spectrum of contemporary behavioral science within a close-knit community of faculty and students. The program offers four distinct areas of experimental emphasis: behavioral neuroscience, cognition, perception, and social/personality. The program does not offer training in clinical or counseling psychology. The objective of the PhD program is to prepare students to become experts in research and teaching in psychology. To accomplish this goal, the department takes a mentoring approach whereby the graduate students are apprentices in faculty laboratories, working closely with their faculty mentors throughout their time in the program. The basic apprenticeship relationship is supplemented by other activities, such as required courses (concentrated in the first and second years), advanced seminars and/or course work in this as well as other departments or universities, a colloquium series, assignments as teaching assistants, the master's project, and the dissertation and its oral defense. After the first year, the structure of the doctoral program, including course work, is flexible and assumes that the process of learning and scientific discovery must be individualized. Graduate students also have an opportunity to develop their teaching and research skills through close mentoring of undergraduate research assistants. The PhD program is a five-year, twelve-months-per-year program.

The dissertation committee must include at least three tenured or tenure-track faculty members from within the psychology department—two from the student's interest area and one from another area. The oral defense committee consists of the dissertation committee plus additional tenured and tenure-track faculty members from the psychology department.

Program Requirements
Bachelor's Degree Entrance

Complete all courses and requirements listed below unless otherwise indicated.

Milestones

First-year paper
Master's proposal
Master's paper
Master's presentation
Annual review
Dissertation committee
Dissertation proposal
Dissertation
Dissertation defense
At least two assigned courses as teaching assistant

Core Requirements

All graduate courses within the Department of Psychology are graded S/U. A grade of S is required in each psychology department course.

Code	Title	Hours
Proseminar		
Complete 12 semester hours from the following:		12
PSYC 5100	Proseminar in Psycholinguistics	
PSYC 5110	Proseminar in Cognition	
PSYC 5120	Proseminar in Sensation	
PSYC 5130	Proseminar in Perception	
PSYC 5140	Proseminar in Biology of Behavior	
PSYC 5150	Proseminar in Clinical Neuroscience	
PSYC 5160	Proseminar in Personality	
PSYC 5170	Proseminar in Social Psychology	
Quantitative Methods		
PSYC 5180	Quantitative Methods 1	3
PSYC 5181	Quantitative Methods 2	3
Ethics		

PSYC 7302	Ethics and Professional Issues	3
Research		
PSYC 7301	Research Methodologies Psychology	3
Project		
Take the following (repeatable) course three times:		9
PSYC 8401	Research Project	
Thesis		
Take the following (repeatable) course twice:		6
PSYC 7990	Thesis	

Electives

Code	Title	Hours
Complete 11 semester hours from the following:		11
Note: Proseminars not taken to fulfill core requirements and courses outside the department may be taken if approved by faculty advisor and Director of Graduate Studies.		
PSYC 7200 to PSYC 7300		
PSYC 5100	Proseminar in Psycholinguistics	
PSYC 5110	Proseminar in Cognition	
PSYC 5120	Proseminar in Sensation	
PSYC 5130	Proseminar in Perception	
PSYC 5140	Proseminar in Biology of Behavior	
PSYC 5150	Proseminar in Clinical Neuroscience	
PSYC 5160	Proseminar in Personality	
PSYC 5170	Proseminar in Social Psychology	

Dissertation

Code	Title	Hours
Complete the following (repeatable) course twice:		
PSYC 9990	Dissertation	
Complete the following (repeatable) course until graduation:		
PSYC 9996	Dissertation Continuation	

Program Credit/GPA Requirements

50 total semester hours required
Minimum 3.000 GPA required

Plan of Study

Year 1

Fall	Hours	Spring	Hours	Summer Full Semester	Hours
Complete 6 semester hours of the following:	6	Complete 6 semester hours of the following:	6	PSYC 8401	3
PSYC 5100		PSYC 5100		Elective	6
PSYC 5110		PSYC 5110			
PSYC 5120		PSYC 5120			
PSYC 5130		PSYC 5130			
PSYC 5140		PSYC 5140			
PSYC 5150		PSYC 5150			
PSYC 5160		PSYC 5160			
PSYC 5170		PSYC 5170			
Complete the following:	6	Complete the following:	6		
PSYC 5180		PSYC 5181			
PSYC 840`		PSYC 840`			
	12		12		9

Year 2

Fall	Hours	Spring	Hours	Summer Full Semester	Hours
PSYC 7990	3	Complete one of the following:	3	PSYC 7996	0
Elective	5	PSYC 730`			
		PSYC 7302			
		Complete the following:	3		
		PSYC 7990			
	8		6		0

Year 3

Fall	Hours	Spring	Hours	Summer Full Semester	Hours
PSYC 9990	0	Complete one of the following:	3	PSYC 9996	0
		PSYC 730`			
		PSYC 7302			
		Complete the following:	0		
		PSYC 9990			
	0		3		0

Year 4

Fall	Hours	Spring	Hours	Summer Full Semester	Hours
PSYC 9996	0	PSYC 9996	0	PSYC 9996	0
	0		0		0

Year 5

Fall	Hours	Spring	Hours	Summer Full Semester	Hours
PSYC 9996	0	PSYC 9996	0	PSYC 9996	0
	0		0		0

Total Hours: 50

Psychology, PhD—Advanced Entry

The PhD program in the Department of Psychology covers a wide spectrum of contemporary behavioral science within a close-knit community of faculty and students. The program offers four distinct areas of experimental emphasis: behavioral neuroscience, cognition, perception, and social/personality. The program does not offer training in clinical or counseling psychology. The objective of the PhD program is to prepare students to become experts in research and teaching in psychology. To accomplish this goal, the department takes a mentoring approach whereby the graduate students are apprentices in faculty laboratories, working closely with their faculty mentors throughout their time in the program. The basic apprenticeship relationship is supplemented by other activities, such as required courses (concentrated in the first and second years), advanced seminars and/or course work in this as well as other departments or universities, a colloquium series,

assignments as teaching assistants, the master's project, and the dissertation and its oral defense. After the first year, the structure of the doctoral program, including course work, is flexible and assumes that the process of learning and scientific discovery must be individualized. Graduate students also have an opportunity to develop their teaching and research skills through close mentoring of undergraduate research assistants. The PhD program is a five-year, 12-months-per-year program.

For students who enter the program with a suitable master's degree, degree candidacy is established through completion of a set of requirements determined on an individual basis. An additional 20 semester hours beyond the master's degree are required for the PhD degree. The dissertation committee must include at least three tenured or tenure-track faculty members from within the psychology department—two from the student's interest area and one from another area. The oral defense committee consists of the dissertation committee plus additional tenured and tenure-track faculty members from the psychology department.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated. Individual programs of study will be tailored to acknowledge students' previous course work.

Milestones

Master's presentation
Annual review
Dissertation committee
Dissertation proposal
Dissertation
Dissertation defense
At least two assigned courses as teaching assistant

Core Requirements

A grade of S is required in each psychology department course.

Code	Title	Hours
Consult your faculty advisor and director of graduate studies for acceptable course work.		10

Electives

Code	Title	Hours
Consult your faculty advisor and graduate coordinator for acceptable electives.		10

Dissertation

Code	Title	Hours
Complete the following (repeatable) course twice:		
PSYC 9990	Dissertation	

Program Credit/GPA Requirements

20 total semester hours required
Minimum 3.000 GPA required

Note: The number of semester hours to complete this program may be more than 20. The number of semester hours and the specific required courses will be determined by a review of previous course work by the graduate coordinator and faculty advisor.

Interdisciplinary

Programs
Doctor of Philosophy (PhD)
- Network Science (p. 226)

Master of Science (MS)
- Applied Physics and Engineering (p. 161)
- Environmental Science and Policy (p. 389)

Network Science, PhD

Website (http://www.networkscienceinstitute.org)

David Lazer, PhD
Distinguished Professor
College of Social Sciences and Humanities and College of Computer and Information Science

Network Science Program
177 Huntington Avenue, 10th Floor
617.373.8856
617.373.5884 (fax)
networkscience@northeastern.edu

The PhD program in network science aims to enhance our understanding of networks arising from the interplay of human behavior, sociotechnical infrastructures, information diffusion, and biological agents. This is an intrinsically multidisciplinary activity, with members of the network science community representing a wide range of fields including computer science, information science, complexity, physics, sociology, communication, organizational behavior, political science, and epidemiology. This is an interdisciplinary doctoral program focused on training students in network science across several colleges—including the College of Science, the College of Computer and Information Science, the College of Social Sciences and Humanities, Bouvé College of Health Sciences, the College of Engineering, and the College of Arts, Media and Design—with several research areas, including computational sciences, information sciences, health and life sciences, social sciences, and theoretical physics. See other collaborating colleges' catalog sections for possible concentration courses.

Course work is dependent on a student's area of research and subject to prior approval by their faculty advisor. Required course work includes the following: three foundational courses in network science—Complex Networks and Applications (PHYS 5116); Network Science Data (PHYS 7331); and Social Networks (POLS 7334)—at least one supplemental course in network science—Network Science Data 2 (PHYS 7332); Social Networks (POLS 7334); or Data Mining Techniques (CS 6220)—12 semester hours of elective course work defined by their area of research; and two research courses with core faculty of the program. A minimum of 32 credit hours of course work is required, though the graduate program committee may recommend additional course work based on student research interests.

Satisfactory progress in the program will be ongoing and formally evaluated at the end of both the first and second years of the program. Students are expected to maintain a cumulative GPA of 3.000 or better in all course work. Students are not allowed to retake courses. A student who does not maintain the 3.000 GPA, or is not making satisfactory progress on their dissertation research, may be recommended for termination by the graduate program committee.

Each student will have one primary research advisor from the network science doctoral program faculty.

Students will be expected to select their research advisor by the end of the spring semester of their second year in the program.

The dissertation committee consists of at least four members: the dissertation advisor, one additional network science doctoral program faculty member, one member expert in the specific topic of research (can be from outside the university), and one additional tenured/tenure-track faculty member from the concentration department/conferring college. The dissertation advisor must be a full-time tenured or tenure-track member of the Northeastern University faculty. Students may repeat the comprehensive examination once if they are unsuccessful.

Degree Candidacy

A student is considered a PhD candidate upon completion of all required course work with a minimum cumulative GPA of 3.000, satisfactory completion of the qualification exam, and satisfactory completion of the comprehensive exam.

Qualifying Examination

The qualification exam will be an oral examination of the material during the students' course work. The exam will be an hour in length and consist of questions selected by network science faculty who comprise the qualifying examination and dissertation committee. Students will receive 50 to 80 potential questions, which they must be prepared to answer, one month before the exam. The exam will consist of a subset of these questions. The qualifying exam will be offered twice annually, in the fall and spring term. All students are required to initially sit for the exam in the fall, typically in their third year of the PhD program. Students who do not pass the qualifying exam on their first attempt are expected to retake the exam in the spring term. Students may sit for the qualifying exam no more than twice.

Students who fail to complete the qualifying examination but who have completed all the PhD program's required course work with a cumulative GPA of 3.000 or better will be awarded a terminal Master of Science in Network Science degree. Note that no students will be admitted directly into the network science program for receipt of a master's degree.

Comprehensive Examination

Students must submit a written dissertation proposal to the qualifying examination and dissertation committee. The proposal should identify relevant literature, the research problem, the research plan, and the potential impact on the field. A presentation of the proposal will be made in an open forum, and the student must successfully defend it before the qualifying examination and dissertation committee. The comprehensive exam must precede the final dissertation defense by at least one year.

Dissertation Defense

A PhD student must complete and defend a dissertation that involves original research in network science. The dissertation defense must adhere to the College of Science policies.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Milestones

Annual review
Qualifying exam
Dissertation committee
Dissertation proposal
Dissertation defense

Core Requirements

Code	Title	Hours
Networks		
PHYS 5116	Complex Networks and Applications	4
PHYS 7331	Network Science Data	4
PHYS 7335	Dynamical Processes in Complex Networks	4
Choose one of the following:		4
PHYS 7332	Network Science Data 2	
CS 6220	Data Mining Techniques	
POLS 7334	Social Networks	
Research		
Complete the following (repeatable) course twice:		
NETS 8984	Research	1-4

Specializations

Choose one of the following specializations or 12 semester hours of elective course work from the electives course list:

- Computer Science (p.   )
- Political Science (p.   )
- Epidemiology (p. 228)
- Physics (p. 228)
- Math (p. 228)
- Electives (p. 228)

COMPUTER SCIENCE

Code	Title	Hours
Choose three from the following:		12
CS 6140	Machine Learning	
CS 6220	Data Mining Techniques	
CS 6240	Large-Scale Parallel Data Processing	
CS 7800	Advanced Algorithms	

POLITICAL SCIENCE

Code	Title	Hours
POLS 7200	Perspectives on Social Science Inquiry	4
POLS 7201	Research Design	4
POLS 7202	Quantitative Techniques	4

EPIDEMIOLOGY

Code	Title	Hours
PHTH 5202	Introduction to Epidemiology	3
PHTH 5224	Social Epidemiology	3
Electives: Choose two from the elective course list below.		6-8

PHYSICS

Code	Title	Hours
Choose three from the following:		12
PHYS 5318	Principles of Experimental Physics	
PHYS 7305	Statistical Physics	
PHYS 7731	Biological Physics 1	
PHYS 7321	Computational Physics	

MATH

Code	Title	Hours
Choose three from the following:		12
MATH 7241	Probability 1	
MATH 7233	Graph Theory	
MATH 7375	Topics in Topology	
MATH 7733	Readings in Graph Theory	

ELECTIVES

Complete a minimum of 12 semester hours of elective course work related to your area of research. Common electives include the following:

Code	Title	Hours
NETS 7341	Network Economics	4
NETS 7345	The Practice of Interdisciplinary Scholarship	4
NETS 7350	Bayesian and Network Statistics	4
NETS 7983	Topics	4
NETS 8941	Network Science Literature Review Seminar	2
MATH 7233	Graph Theory	4
CS 5800	Algorithms	4
CS 6140	Machine Learning	4
CS 7180	Special Topics in Artificial Intelligence	4
CS 7295	Special Topics in Data Visualization	4
PHYS 7337	Statistical Physics of Complex Networks	4
PPUA 5301	Introduction to Computational Statistics	4

Dissertation

Code	Title	Hours
Complete one of the following (repeatable) course twice:		
NETS 9990	Dissertation	

Program Credit/GPA Requirements

32 total semester hours required
Minimum 3.000 GPA required

Applied Physics and Engineering, MS

The combined MS program in applied physics and engineering allows graduate students to receive training in one of three concentrations of the electrical and computer engineering department while also receiving fundamental graduate-level physics training that is relevant to that area.

Thesis Option

A student may complete an additional 8 semester hours of thesis. Students may register for an additional two semesters of thesis work, Thesis (EECE 7990) (4 semester hours) or Thesis (PHYS 7990) (4 semester hours), depending on the affiliation of the thesis advisor. A thesis committee is composed of an advisor and two faculty members from physics or electrical engineering.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Concentrations

Complete one of the following concentrations:

- Microsystems, Materials, and Devices (p. 161)
- Electromagnetics, Plasma, and Optics (p. 162)
- Analysis, Modeling, and Computation (p. 162)

MICROSYSTEMS, MATERIALS, AND DEVICES

Code	Title	Hours
Core Courses		
EECE 7201	Solid State Devices	4
PHYS 7324	Condensed Matter Physics	4
Engineering Course Work		
Complete 12 semester hours from the following:		12
EECE 5606	Micro- and Nanofabrication	
EECE 5680	Electric Drives	
EECE 7204	Applied Probability and Stochastic Processes	
EECE 7240	Analog Integrated Circuit Design	
EECE 7242	Integrated Circuits for Mixed Signals and Data Communication	
EECE 7244	Introduction to Microelectromechanical Systems (MEMS)	
EECE 7245	Microwave Circuit Design for Wireless Communication	
EECE 7353	VLSI Design	
EECE 7398	Special Topics	
Physics Course Work		
Complete 12 semester hours from the following:		12
PHYS 5318	Principles of Experimental Physics	
PHYS 7301	Classical Mechanics/Math Methods	
PHYS 7302	Electromagnetic Theory	
PHYS 7305	Statistical Physics	
PHYS 7315	Quantum Theory 1	
PHYS 7316	Quantum Theory 2	
PHYS 7321	Computational Physics	
PHYS 7331	Network Science Data	
PHYS 7734	Topics: Condensed Matter Physics	

ELECTROMAGNETICS, PLASMA, AND OPTICS

Code	Title	Hours
Core Courses		
EECE 7203	Complex Variable Theory and Differential Equations	4
PHYS 7302	Electromagnetic Theory	4
Engineering Course Work		
Complete 12 semester hours from the following:		12
EECE 5648	Biomedical Optics	
EECE 5698	Special Topics in Electrical and Computer Engineering (Subsurface Imaging)	
EECE 7105	Optics for Engineers	
EECE 7202	Electromagnetic Theory 1	
EECE 7245	Microwave Circuit Design for Wireless Communication	
EECE 7270	Electromagnetic Theory 2	

EECE 7271	Computational Methods in Electromagnetics	
EECE 7275	Antennas and Radiation	
EECE 7293	Modern Imaging	
Physics Course Work		
Complete 12 semester hours from the following:		12
PHYS 5318	Principles of Experimental Physics	
PHYS 7305	Statistical Physics	
PHYS 7315	Quantum Theory 1	
PHYS 7316	Quantum Theory 2	
PHYS 7321	Computational Physics	
PHYS 7324	Condensed Matter Physics	
PHYS 7731	Biological Physics 1	

ANALYSIS, MODELING, AND COMPUTATION

Code	Title	Hours
Core Courses		
EECE 7205	Fundamentals of Computer Engineering	4
PHYS 7321	Computational Physics	4
Engineering Course Work		
Complete 12 semester hours from the following:		12
EECE 5639	Computer Vision	
EECE 5640	High-Performance Computing	
EECE 5642	Data Visualization	
EECE 5643	Simulation and Performance Evaluation	
EECE 5644	Introduction to Machine Learning and Pattern Recognition	
EECE 7205	Fundamentals of Computer Engineering	
EECE 7271	Computational Methods in Electromagnetics	
EECE 7352	Computer Architecture	
EECE 7353	VLSI Design	
EECE 7360	Combinatorial Optimization	
EECE 7374	Fundamentals of Computer Networks	
EECE 7376	Operating Systems: Interface and Implementation	
Physics Course Work		
Complete 12 semester hours from the following:		12
PHYS 5116	Complex Networks and Applications	
PHYS 5318	Principles of Experimental Physics	
PHYS 7301	Classical Mechanics/Math Methods	
PHYS 7305	Statistical Physics	
PHYS 7331	Network Science Data	
PHYS 7335	Dynamical Processes in Complex Networks	

Thesis Option

Students may register for an additional two semesters of thesis work, Thesis (EECE 7990) or Thesis (PHYS 7990) , depending on the affiliation of the thesis advisor. Thesis credits cannot be substituted for any of the course work listed above. This option requires a total of 40 semester hours for the master's degree.

Program Credit/GPA Requirements

32–40 total semester hours required
Minimum 3.000 GPA required

Graduate Certificate Programs

The College of Science is pleased to offer several graduate certificate programs for working professionals as well as post-baccalaureate students who want to build their knowledge in growing fields. Graduate certificates are offered in in Biotechnology, Bioinformatics, and Nanomedicine. These programs are ideal for people already in the field who want to enhance their career, or people who are looking to make a change.

- Graduate Certificate in Bioinformatics: This certificate program offers professionals working in the research, healthcare, and pharmaceutical industries the ability to employ bioinformatics algorithms and techniques to biological problems in their current practice.
- Graduate Certificate in Biotechnology: Designed in response to a need in the biotechnology industry for individuals without a biotechnology background to obtain a strong foundation in basic biotechnology concepts and skills.
- Graduate Certificate in Experimental Biotechnology: Learn the necessary skills used in biotherapeutic development through lab courses and traditional classroom learning.
- Graduate Certificate in Molecular Biotechnology: Become more knowledgeable about state-of-the-art molecular biology techniques and advanced protein structure analysis. Students will learn to generate and optimize molecular forms used to express recombinant proteins to be used as biopharmaceuticals.
- Graduate Certificate in Process Sciences: Students will learn the sciences of interactions of the biological molecules in the process conditions and the relevant process technology, such as, freeze drying, needed for drug product manufacturing.
- Graduate Certificate in Biopharmaceutical Analytical Sciences: In this certificate program students will learn the principles and practices of state-of-the-art analyses of protein structures with focus on the characterization and quantification of proteins and variant derivatives.
- Graduate Certificate in Pharmaceutical Technologies: The focus of this certificate is on the conversion of purified proteins to biopharmaceutical drug products that are compatible for clinical use.
- Graduate Certificate in Regulatory Science: Designed in response to a need in the biotechnology industry for individuals, in particular regulators, to obtain a strong foundation in the science behind good regulatory practice today, specifically in relation to biopharmaceuticals.
- Graduate Certificate in Biotechnology Enterprise: Students will learn the fundamental concepts of leadership, entrepreneurship and innovation, financial decision making and marketing.
- Graduate Certificate in Nanomedicine: This certificate is designed for scientists, engineers, and physicians to develop competency and practical skills in the application of nanotechnology to problems in medicine.

Program Requirements
Biology

- Bioinformatics (p. 378)

Chemistry and Chemical Biology

- Biopharmaceutical Analytical Sciences (p. 293)
- Biotechnology (p. 383)
- Biotechnology Enterprise (p. 383)

Physics

College of Social Sciences and Humanities

Graduate Admissions and Student Services (http://www.northeastern.edu/cssh/graduate/programs)

Uta G. Poiger, PhD, Dean
Natasha A. Frost, PhD, Associate Dean, Graduate Studies
Amy Killeen, MEd, Director, Graduate Admissions and Student Services
Sheila Magee Beare, MSCJ, Associate Director, Graduate Admissions and Student Services
Amber Crowe Connolly, MS, Administrative Coordinator, Graduate Admissions and Student Services

180 Renaissance Park
617.373.5990
617.373.7281 (fax)
gradcssh@northeastern.edu

CSSH Graduate Programs General Regulations (http://www.northeastern.edu/cssh/graduate/current_students)

Our Mission

The departments and programs of the College of Social Sciences and Humanities (CSSH)—with disciplines ranging from economics and history to English and international affairs, just to name a few—form an interdisciplinary collaborative of scholars with global perspectives. The CSSH mission is:

- To contribute to the liberal arts education of all Northeastern students

- To produce cutting-edge knowledge about and solutions to the political and social problems of our contemporary world

- To foster ethical reasoning and critical thought, with attention to the enduring significance of history, literature, and culture

This mission, along with a strong international focus, gives CSSH a central role in fulfilling Northeastern's ambition of educating global citizens.

Graduate Programs in the College of Social Sciences and Humanities

Graduate education at Northeastern integrates the highest level of scholarship across disciplinary boundaries with significant research and experiential learning opportunities. This multidimensional learning environment offers students an opportunity to develop critical thinking and creative problem-solving skills while introducing them to new perspectives in their fields. CSSH offers 13 master's programs, 7 doctoral programs, and 9 graduate certificate programs. Some courses and degree programs are offered in an online or hybrid format that is well suited for distance learners. Graduate programs in CSSH provide fertile ground and resources for advanced study and research. CSSH faculty members' cutting-edge interdisciplinary work inspires the development of new programs, research fellowship opportunities, and mentoring relationships.

All CSSH master's programs offer an optional cooperative education experience (co-op) to eligible students. Cooperative education is central to both the Northeastern experience and to the CSSH experiential liberal arts framework. Northeastern's signature co-op ecosystem provides qualified master's students with six-month work experiences in businesses, nonprofits, and government agencies in Boston and across

the United States. Graduate students take their work from campus learning spaces, apply their knowledge outside of the classroom, and then bring knowledge and skills gained in community learning spaces back to our campus learning spaces during the cocurricular experiential Integration course.

Our doctoral, master's, and professional degree programs produce graduates who are well prepared for the diverse demands of careers in academia, industry, and the professions. Please visit the College of Social Sciences and Humanities (http://www.northeastern.edu/cssh/graduate) website for additional information, including latest news and upcoming events.

School of Criminology and Criminal Justice

Website (http://www.northeastern.edu/cssh/sccj)

Anthony Braga, PhD
Distinguished Professor and Director

Amy Farrell, PhD
Associate Professor and Associate Director

Gregory Zimmerman, PhD
Associate Professor and Graduate Program Director

204 Churchill Hall
617.373.3327
617.373.8723 (fax)
sccj@northeastern.edu

Graduate Programs Contact
Jennifer Smith, Graduate Program Administrator, jenn.smith@northeastern.edu

CSSH Graduate Programs General Regulations (http://www.northeastern.edu/cssh/graduate/current_students)

The School of Criminology and Criminal Justice at Northeastern University seeks to prepare students for professional and research careers in criminal justice, criminology, and related fields by applying multidisciplinary and comparative social science to understand, predict, and explain crime and contribute to the development of public policy within urban communities. Using an active-learning approach, the school seeks to develop its students intellectually and ethically, while providing them with a keen appreciation for the complexities of crime and public and private efforts to make communities safer and to ensure justice. The school offers a Master of Science degree in criminology and criminal justice and a PhD degree in criminology and justice policy. In addition, the school offers a JD/MS in criminology and criminal justice program and a JD/PhD in criminology and justice policy in conjunction with the School of Law.

Programs
Doctor of Philosophy (PhD)

- Criminology and Justice Policy (p. 413)
- Criminology and Justice Policy—Advanced Entry (p. 413)

Master of Science (MS)

- Criminology and Criminal Justice (p. 414)

Dual Degrees

- Law, Criminology and Justice Policy, JD/PhD (p. 415)

- Law, Criminology and Justice Policy, JD/PhD—Advanced Entry (p. 416)

- Law and Criminal Justice, JD/MS (p. 417)

Criminology and Justice Policy, PhD

The doctoral program in criminology and justice policy at the School of Criminology and Criminal Justice at Northeastern University seeks to prepare students for professional and research careers in criminal justice, criminology, and related fields by applying multidisciplinary and comparative social science to understand, predict, and explain crime and contribute to the development of public policy within urban communities. Using an active-learning approach, the school seeks to develop its students intellectually and ethically, while providing them with a keen appreciation for the complexities of crime and public and private efforts to make communities safer and to ensure justice.

The program is full time and is small and student centered. Students may enter the program with either a bachelor's degree or a master's degree. It is expected that students will be able to complete the program in four to five years, and students entering with a master's degree will be able to complete the program in three to five years.

Year one in the doctoral program offers students an opportunity to obtain a broad foundational knowledge in the discipline: two semesters of criminological theory, two semesters of statistics, one semester of criminal justice process, and one semester of advanced research methods. To ensure that all students have mastered the foundational material emphasized across the required courses for the PhD program and can successfully integrate theory, research, and policy, all PhD students take a "foundations" qualifying examination at the end of their first year in the doctoral program.

After demonstrating mastery of the foundational knowledge in year one, students devote themselves to a more specific area of research in year two. Students demonstrate this commitment through a second qualifying examination, which consists of two stages: an area exam and a publishable paper. The two stages of this exam are required and should be related.

Following successful completion of the first and second qualifying examinations, and required and elective course work (totaling 54 semester hours), the students proceed to a formal dissertation proposal defense.

Doctoral Degree Candidacy

A student achieves candidacy when he or she has successfully completed all course work (54 semester hours for students entering with a bachelor's degree), passed both the foundations qualifying examination and the area qualifying examination, and deposited the final version of their dissertation proposal (approved by their full committee) with the school's graduate program office. Candidacy is certified, in writing, by the college.

Program Requirements
Bachelor's Degree Entrance

Complete all courses and requirements listed below unless otherwise indicated.

Milestones

Two qualifying examinations—foundations exam and area exam/publishable paper
Annual review
PhD candidacy
Dissertation proposal
Dissertation defense

Core Requirements

A cumulative 3.000 GPA is required for the core requirements.

Code	Title	Hours
Criminal Justice Process		
CRIM 7202	The Criminal Justice Process	4
Policy		
CRIM 7710	Criminology and Public Policy 1	4
CRIM 7711	Criminology and Public Policy 2	4
Analysis & Methods		
CRIM 7713	Advanced Research and Evaluation Methods	4
CRIM 7715	Multivariate Analysis 1	4
CRIM 7716	Multivariate Analysis 2	4
Practicum		
CRIM 7706	Practicum in Writing and Publishing	2

Electives

Code	Title	Hours
Complete 28 semester hours in the following range:		28
CRIM 7200 to CRIM 7989		

Dissertation

Code	Title	Hours
Exam Preparation		
CRIM 8960	Exam Preparation—Doctoral	
Dissertation		
Complete the following (repeatable) course twice:		
CRIM 9990	Dissertation	
Dissertation Continuation		
Following completion of two semesters of CRIM 9990, registration in the following class is required in each semester (including the summer if the dissertation is submitted in summer) until the dissertation is completed:		
CRIM 9996	Dissertation Continuation	

Program Credit/GPA Requirements

54 total semester hours required
Minimum 3.000 GPA required

Criminology and Justice Policy, PhD—Advanced Entry

The doctoral program in criminology and justice policy at the School of Criminology and Criminal Justice at Northeastern University seeks to prepare students for professional and research careers in criminal justice, criminology, and related fields by applying multidisciplinary and comparative social science to understand, predict, and explain crime and contribute to the development of public policy within urban communities. Using an active-learning approach, the school seeks to develop its students intellectually and ethically, while providing them with a keen

appreciation for the complexities of crime and public and private efforts to make communities safer and to ensure justice.

The program is full time and is small and student centered. Students may enter the program with either a bachelor's degree or a master's degree. It is expected that students entering will be able to complete the program in three to five years.

Year one in the doctoral program offers students an opportunity to obtain a broad foundational knowledge in the discipline: two semesters of criminological theory, two semesters of statistics, and one semester of advanced research methods. To ensure that all students have mastered the foundational material emphasized across the required courses for the PhD program and can successfully integrate theory, research, and policy, all PhD students take a "foundations" qualifying examination at the end of their first year in the doctoral program.

After demonstrating mastery of the foundational knowledge in year one, students devote themselves to a more specific area of research in year two. Students demonstrate this commitment through a second qualifying examination, which consists of two stages: an area exam and a publishable paper. The two stages of this exam are required and should be related.

Following successful completion of the first and second qualifying examinations, and required and elective course work (totaling 42 semester hours), the students proceed to a formal dissertation proposal defense.

Doctoral Degree Candidacy

A student achieves candidacy when he or she has successfully completed all course work (42 semester hours for students with advanced standing), passed the foundations qualifying examination, the area qualifying examination, and deposited the final version of their dissertation proposal (approved by their full committee) with the school's graduate program office. Candidacy is certified, in writing, by the college.

Program Requirements
Advanced Degree Entrance

Complete all courses and requirements listed below unless otherwise indicated.

Milestones

Two qualifying examinations—foundations exam and area exam/publishable paper
Annual review
Dissertation proposal
Dissertation defense

Core Requirements

A cumulative 3.000 GPA is required for the core requirement.

Code	Title	Hours
Criminal Justice Process		
CRIM 7202	The Criminal Justice Process	4
Policy		
CRIM 7710	Criminology and Public Policy 1	4
CRIM 7711	Criminology and Public Policy 2	4
Analysis & Methods		
CRIM 7713	Advanced Research and Evaluation Methods	4
CRIM 7715	Multivariate Analysis 1	4
CRIM 7716	Multivariate Analysis 2	4

Practicum		
CRIM 7706	Practicum in Writing and Publishing	2

Electives

Code	Title	Hours
Complete 16 semester hours in the following range:		16
CRIM 7200 to CRIM 7989		

Dissertation

Code	Title	Hours
Dissertation		
Complete the following (repeatable) course twice:		
CRIM 9990	Dissertation	
Dissertation Continuation		
Following completion of two semesters of CRIM 9990, registration in the following class is required in each semester (including the summer if the dissertation is submitted in summer) until the dissertation is completed:		
CRIM 9996	Dissertation Continuation	

Program Credit/GPA Requirements

42 total semester hours required
Minimum 3.000 GPA required

Criminology and Criminal Justice, MS

The master's program in criminology and criminal justice at Northeastern University concentrates both on the problem of crime as a form of deviant behavior and on the criminal justice and private security systems that deal with it. The program emphasizes a systems approach to criminal justice, stressing policy development and analysis, as well as the impact these policies have on the individuals and organizations charged with delivering justice in a fair and equitable manner. In concept and scope, the MS degree encompasses such related disciplines as law, sociology, political science, psychology, criminology, and public administration.

The master's program is comprised of required courses encompassing both substantive and technical skills. Additionally, students choose elective courses from offerings within the graduate program in criminal justice or in other graduate programs in the College of Social Sciences and Humanities. The course offerings afford students the flexibility to customize their own programs, which may include an internship, directed study, or master's thesis.

Faculty members in the graduate program represent several different academic disciplines, and teaching activities vary in nature depending on the instructors' specific objectives. The faculty's specialized interests help make possible a broad range of program offerings, including courses on the criminal justice process, victimology, security management, criminal law, juvenile justice, law and psychology, and terrorism.

The master's program offers an optional cooperative education experience ("co-op") to eligible students. Students extend the two-semester program to 18 months through a co-op work experience and its associated two-credit experiential integration course. Cooperative education is central to both the Northeastern experience and to the College of Social Sciences and Humanities experiential liberal arts framework. Northeastern's signature co-op ecosystem provides qualified master's students with 6-month work experiences in businesses, nonprofits, and government agencies in Boston and across the United

States. Graduate students take their work from campus learning spaces, apply their knowledge outside of the classroom, and then bring knowledge and skills gained in community learning spaces back to our campus learning spaces during the cocurricular experiential integration course.

Briefly stated, the graduate program endeavors to:

- Assist in developing criminal justice and private security leaders capable of assuming responsibility for policy planning and administration
- Offer students an opportunity to acquire the necessary skills and knowledge to conduct applied research while assisting them in developing the ability to apply this research in a variety of criminal justice settings
- Provide an opportunity for a solid educational foundation for those who wish to pursue more advanced graduate study beyond the Master of Science degree

Graduate study in criminology and criminal justice may be pursued on either a full- or part-time basis. All candidates for the Master of Science in Criminology and Criminal Justice degree must successfully complete a minimum of 32 semester hours of credit in course work.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

A cumulative 3.000 GPA is required for the core requirement.

Code	Title	Hours
Required Core		
CRIM 7200	Criminology	4
CRIM 7202	The Criminal Justice Process	4
Research & Statistics		
INSH 6300	Research Methods in the Social Sciences	4
INSH 6500	Statistical Analysis	4
or INSH 6404	Computational Social Science	

Electives

Code	Title	Hours
Complete 16 semester hours in the following range:		16
CRIM 5000 to CRIM 7989		

Optional Co-op Experience

Code	Title	Hours
Requires two consecutive semesters of Co-op Work Experience and Experiential Integration:		2
CRIM 6964 and INSH 6864	Co-op Work Experience and Experiential Integration	

Program Credit/GPA Requirements

32 total semester hours required (34 with optional co-op)
Minimum 3.000 GPA required

Law, Criminology and Justice Policy, JD/PhD

The joint JD/PhD program will expand the knowledge base and career options of students. The disciplines of criminology and justice policy and law share common interests in identifying opportunities to create conditions for justice, equality, and societal well-being. The joint degree will provide students with a comprehensive interdisciplinary understanding of what influences criminal justice problems and the sociopolitical, legal, and economic context in which they are found. Solving problems requires interdisciplinary knowledge and an analytical and practical skill set that includes interprofessional problem solving.

Program Requirements
Bachelor's Degree Entrance

Complete all courses and requirements listed below unless otherwise indicated.

Milestones

Two qualifying examinations—foundations exam and area exam/publishable paper
Annual review
PhD candidacy
Dissertation proposal
Dissertation defense

Core Requirements

A cumulative 3.000 GPA is required for the core requirement.

Code	Title	Hours
Criminal Justice Process		
CRIM 7202	The Criminal Justice Process	4
Policy		
CRIM 7710	Criminology and Public Policy 1	4
CRIM 7711	Criminology and Public Policy 2	4
Analysis & Methods		
CRIM 7713	Advanced Research and Evaluation Methods	4
CRIM 7715	Multivariate Analysis 1	4
CRIM 7716	Multivariate Analysis 2	4
Practicum		
CRIM 7706	Practicum in Writing and Publishing	2

Electives

Code	Title	Hours
Complete 28 hours from the following:		28
CRIM 7201	Global Criminology	
CRIM 7208		
CRIM 7224		
CRIM 7232		
CRIM 7256		
CRIM 7314		
CRIM 7334		
LAW 6103	Criminal Justice	
LAW 7301	Advanced Criminal Procedure: Adjudication	
LAW 7332	Evidence	
LAW 7351	Prisoners' Rights Clinic	
LAW 7398	Federal Courts and the Federal System	
LAW 7410	Domestic Violence Clinic	
LAW 7495	Advanced Criminal Procedure: Investigation	

LAW 7526	Juvenile Courts: Delinquency, Abuse, Neglect	
LAW 7528	Balancing Liberty and Security Seminar	
LAW 7597	Civil Rights and Restorative Justice Clinic	
LAW 7612	Wrongful Convictions and Post-Conviction Remedies	
LAW 7619	Healthcare Fraud and Abuse Law	
LAW 7647	Trial Practice	

Dissertation

Code	Title	Hours
Dissertation		
Complete the following (repeatable) course twice:		
CRIM 9990	Dissertation	
Dissertation Continuation		
Following completion of two semesters of CRIM 9990, registration in the following class is required in each semester (excluding summers) until the dissertation is completed:		
CRIM 9996	Dissertation Continuation	

Program Credit/GPA Requirements

54 total semester hours required for PhD. Please contact the School of Law (https://www.northeastern.edu/law/academics/jd/dual-degrees) for JD requirements.

Minimum 3.000 GPA required for PhD

Law, Criminology and Justice Policy, JD/PhD—Advanced Entry

The joint JD/PhD program will expand the knowledge base and career options of students. The disciplines of criminology and justice policy and law share common interests in identifying opportunities to create conditions for justice, equality, and societal well-being. The joint degree will provide students with a comprehensive interdisciplinary understanding of what influences criminal justice problems and the sociopolitical, legal, and economic context in which they are found. Solving problems requires interdisciplinary knowledge and an analytical and practical skill set that includes interprofessional problem solving.

Program Requirements
Advanced Degree Entrance

Complete all courses and requirements listed below unless otherwise indicated.

Milestones

Two qualifying examinations—foundations exam and area exam/publishable paper
Annual review
PhD candidacy
Dissertation proposal
Dissertation defense

Core Requirements

A cumulative 3.000 GPA is required for the core requirement.

Code	Title	Hours
Policy		
CRIM 7710	Criminology and Public Policy 1	4
CRIM 7711	Criminology and Public Policy 2	4

Analysis & Methods		
CRIM 7713	Advanced Research and Evaluation Methods	4
CRIM 7715	Multivariate Analysis 1	4
CRIM 7716	Multivariate Analysis 2	4
Practicum		
CRIM 7706	Practicum in Writing and Publishing	2

Electives

Code	Title	Hours
Complete 16 hours from the following:		16
CRIM 7201	Global Criminology	
CRIM 7208		
CRIM 7224		
CRIM 7232		
CRIM 7256		
CRIM 7314		
CRIM 7334		
LAW 6103	Criminal Justice	
LAW 7301	Advanced Criminal Procedure: Adjudication	
LAW 7332	Evidence	
LAW 7351	Prisoners' Rights Clinic	
LAW 7398	Federal Courts and the Federal System	
LAW 7410	Domestic Violence Clinic	
LAW 7495	Advanced Criminal Procedure: Investigation	
LAW 7526	Juvenile Courts: Delinquency, Abuse, Neglect	
LAW 7528	Balancing Liberty and Security Seminar	
LAW 7597	Civil Rights and Restorative Justice Clinic	
LAW 7612	Wrongful Convictions and Post-Conviction Remedies	
LAW 7619	Healthcare Fraud and Abuse Law	
LAW 7647	Trial Practice	

Dissertation

Code	Title	Hours
Dissertation		
Complete the following (repeatable) course twice:		
CRIM 9990	Dissertation	
Dissertation Continuation		
Following completion of two semesters of CRIM 9990, registration in the following class is required in each semester (excluding summers) until the dissertation is completed:		
CRIM 9996	Dissertation Continuation	

Program Credit/GPA Requirements

38 total semester hours required for PhD. Please contact the School of Law (https://www.northeastern.edu/law/academics/jd/dual-degrees) for JD requirements.

Minimum 3.000 GPA required for PhD

<div style="background:red">

Law, Criminology and Criminal Justice, JD/MS

</div>

The joint JD/MS program will expand the knowledge base and career options of students. The disciplines of criminal justice and law share common interests in identifying opportunities to create the conditions for justice, social equality, and societal well-being. The joint degree is designed to provide students with a comprehensive interdisciplinary understanding of what influences criminal justice problems and the social, political, legal, economic context in which they are found. Solving these problems requires interdisciplinary knowledge and an analytical and practical skill set that includes interprofessional problem solving.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

A cumulative 3.000 GPA is required for the core requirement.

Code	Title	Hours
Criminology and Criminal Justice		
CRIM 7200	Criminology	4
CRIM 7202	The Criminal Justice Process	4
Research and Statistics		
INSH 6300	Research Methods in the Social Sciences	4
INSH 6500	Statistical Analysis	4
or INSH 6404	Computational Social Science	

Electives

Code	Title	Hours
Complete 16 hours from the following:		16
CRIM 7201	Global Criminology	
CRIM 7208		
CRIM 7224		
CRIM 7232		
CRIM 7256		
CRIM 7314		
CRIM 7334		
LAW 6103	Criminal Justice	
LAW 7301	Advanced Criminal Procedure: Adjudication	
LAW 7332	Evidence	
LAW 7410	Domestic Violence Clinic	
LAW 7495	Advanced Criminal Procedure: Investigation	
LAW 7528	Balancing Liberty and Security Seminar	
LAW 7351	Prisoners' Rights Clinic	
LAW 7398	Federal Courts and the Federal System	
LAW 7526	Juvenile Courts: Delinquency, Abuse, Neglect	
LAW 7597	Civil Rights and Restorative Justice Clinic	
LAW 7612	Wrongful Convictions and Post-Conviction Remedies	
LAW 7619	Healthcare Fraud and Abuse Law	
LAW 7647	Trial Practice	

Program Credit/GPA Requirements

32 total semester hours required for MS. Please contact the School of Law (https://www.northeastern.edu/law/academics/jd/dual-degrees) for JD requirements.
Minimum 3.000 GPA required

<div style="background:red">

Economics

</div>

Website (http://www.northeastern.edu/cssh/economics)

William T. Dickens, PhD
University Distinguished Professor and Chair

Gregory H. Wassall, PhD
Associate Professor and Graduate Program Director

301 Lake Hall
617.373.2871
617.373.3640 (fax)
gradecon@northeastern.edu

Graduate Programs Contact
Jacquaetta Hester, Graduate Program Administrator, j.hester@northeastern.edu

CSSH Graduate Programs General Regulations (http://www.northeastern.edu/cssh/graduate/current_students)

The Department of Economics offers both a MA and a PhD program. The most distinctive feature of these programs is their emphasis on applied economics, coupled with attention to providing a solid grounding in microeconomic and macroeconomic theory, and econometrics. Students come from all over the world, and the curriculum is designed with this in mind, striving for balance in coverage of economies that are rich and poor, large and small, mixed and market. This gives a unique flavor to the course of study, making it well-suited to the analysis of the emerging global economy of the twenty-first century.

The Master of Arts program is in applied economic policy analysis, with broad specialization areas. The program is large enough to support a full slate of core and area courses each year, yet small enough to maintain a sense of community among the students. The program is especially appropriate for those who wish to work in or return to positions in government, teaching, finance, or industry, while providing a rigorous basis for those who want to continue their studies to the doctoral level.

Our world-famous co-op system offers qualified MA students the opportunity to apply for paid work positions as practicing economists for up to six months as part of their academic program. We feel that this paid work experience enhances our MA degree and its emphasis on application. Students have an opportunity to learn how to apply their knowledge, to solve problems, and to make a difference in the world before they graduate. Our graduates either find full-time work in their area of specialty or go on to earn additional graduate degrees. All of our graduates find jobs after completing our program.

The PhD program is small and focused, and we welcome applications from those with a bachelor's or master's degree who have had prior training in macroeconomic and microeconomic theory and possess strong quantitative skills. Students take course work in *industrial organization, competition policy, and regulatory* and *labor economics.*

Programs

Doctor of Philosophy (PhD)

Master of Arts (MA)

Economics, PhD

The PhD program in economics is small and focused, specializing in *industrial organization, competition policy, and regulatory economics* and *labor economics.*

Requirements

Students entering the doctoral program with a Master's degree in economics, please see **Economics PhD—Advanced Entry** (p. 419)**.**

COURSE WORK

Students entering the doctoral program with a bachelor's degree will take four master's-level core classes (16 semester hours), three doctoral-level core classes (12 semester hours), two classes in each of two doctoral fields (16 semester hours), and one elective (4 semester hours), for a total program requirement of 48 semester hours. Core courses at the master's and doctoral level are focused on developing an advanced theoretical and quantitative foundation (Macroeconomic Theory, Microeconomic Theory, and Applied Econometrics). The remainder of the course work is focused on the sophisticated application of analytical tools in the chosen field of concentration.

PhD students are expected to take three classes per semester as necessary to meet the degree's course work requirements in the minimum number of semesters.

EXAMINATIONS

Two Qualifying Examinations—Macroeconomics and Microeconomics

Qualifying examinations are required upon completion of Macroeconomics 2 and Microeconomics 2. Students must receive a minimum grade of B− in the associated theory class to sit for its exam. Students are given a maximum of two attempts to pass each exam to continue in the program. Failure to sit for an exam at the appropriate time without prior consent of the graduate program director will result in an automatic fail on that exam.

One Field Comprehensive Examination

A field examination is required upon completion of the associate field classes. Students will complete course work in two fields but are required to take a field examination in one field of their choosing. Students must receive a minimum grade of B− in the associated field classes in order to sit for that field's exam. The field examination includes questions from the chosen field, as well as questions on econometrics methodology. Students are given a maximum of two attempts to pass the exam to continue in the program. Failure to sit for an exam at the appropriate time without prior consent of the graduate program director will result in an automatic fail on that exam.

DOCTORAL DEGREE CANDIDACY

Following completion of required course work and examinations, students are certified as doctoral degree candidates (ABD). A degree candidate has a maximum of five years to defend and submit an acceptable doctoral dissertation.

DISSERTATION

The department expects that a doctoral candidate's **dissertation committee** will be formed and the dissertation proposal presented within six months of reaching degree candidacy. A dissertation committee includes a principal advisor and a minimum of two other members. The principal advisor must be a member of the economics department who holds a PhD degree and who is qualified in the chosen field. Other committee members must be qualified in the chosen field or econometrics, and one member may be from outside the department. Committee compositions must be approved by the graduate program director and department chair.

A **dissertation proposal** states the question or hypothesis, reviews the relevant literature, and explains how the proposed work will contribute to that literature and general understanding. The proposal sets forth data sources, models, and econometric issues in sufficient detail so that any faculty member not in the field will be able to assess its merits. Normally, the proposal should not exceed twenty double-spaced pages. The proposal is first approved by the dissertation committee and then presented at an open seminar.

WRITING THE DOCTORAL DISSERTATION

Writing the dissertation entails working with the principal advisor and other committee members until it is determined that a dissertation is complete, and the candidate is ready to present and defend the work at an open seminar. Candidates must arrange a date and time for the defense at least three weeks in advance. Students must familiarize themselves with the Guide to the Preparation of Theses and Dissertations (https://www.northeastern.edu/cssh/graduate/commencement/formatting-guidelines). The guide provides links to formatting tips, sample introductory pages, sample approval record, and deadlines. In addition, a checklist is provided to ensure students have fulfilled the required steps in the commencement clearance process.

Milestones

Maintaining satisfactory academic progress during doctoral candidacy requires the following:

PhD Annual Student Progress Review

Each PhD student will have an annual review of his or her progress toward the degree. Receipt of financial support administered by the graduate school is contingent upon satisfactory academic progress toward the degree and satisfactory performance in assigned duties. See the CSSH Graduate Programs General Regulations (https://www.northeastern.edu/cssh/graduate/current_students) for further details.

Field Lunch Participation

All PhD students registered for Doctoral Dissertation or Continuation who are in residence are expected to regularly attend a field seminar in industrial organization or labor. These seminars meet roughly every week, and their purpose is to assist students in choosing and evaluating dissertation topics as well as advancing and completing their dissertation. All doctoral candidates will be expected to present their research at various stages of writing their dissertation.

Seminar Series Participation

All PhD students registered for Doctoral Dissertation or Continuation who are in residence are expected to regularly attend academic seminars by speakers invited to campus through the Department of Economics Seminar Series. Participation in these seminars is an important component of doctoral training and is intended to expose students to current research in their field while helping to develop and hone their own presentation skills.

Practical Experience in Applied Economics Program

Participation in at least one semester of the Practical Experience in Applied Economics program is required of all students who have reached doctoral candidacy. The program is offered in the spring semester every other year. In this program, a variety of prominent practitioners working in consulting and government agencies in the fields of industrial organization and labor will describe their practical experience applying economics to a variety of consulting and policy problems, including antitrust, regulation, labor market policy, education, and health policy. This is a participatory class that will require advanced reading and preparation of questions for the practitioners in addition to other assignments.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Milestones

Two qualifying examinations—microeconomics and macroeconomics
Field comprehensive examination (student chooses field)
Doctoral degree candidacy
PhD annual student progress review
Dissertation committee
Dissertation proposal
Dissertation defense
Field lunch participation
Seminar series participation

Core Requirements

Code	Title	Hours
Quantitative		
ECON 5105	Math and Statistics for Economists	4
ECON 5140	Applied Econometrics	4
ECON 7740	Applied Econometrics 2	4
Theory		
ECON 5110	Microeconomic Theory	4
ECON 5120	Macroeconomic Theory	4
ECON 7710	Microeconomic Theory 2	4
ECON 7720	Macroeconomic Theory 2	4
Field		
Labor Economics Field		
ECON 7763	Labor Market Analysis	4
ECON 7764	Topics in Labor Economics	4
Industrial Organization Field		
ECON 7771	Framework of Industrial Organization	4
ECON 7772	Public Policy Toward Business	4

Elective

Code	Title	Hours
Complete 4 semester hours from the following:		4
ECON 5200 to ECON 5299		
ECON 7200 to ECON 7299		
ECON 7976	Directed Study	

Dissertation

Code	Title	Hours
Registration in the following class is required in the semester prior to sitting for the field examination:		
ECON 8960	Exam Preparation—Doctoral	

Registration in the following class is required in the semester that students sit for the field examination and begin dissertation planning:

ECON 9986	Research	

Registration in the following class is required in the fall and spring semesters following achievement of doctoral candidacy:

ECON 9990	Dissertation	

Following completion of two semesters of ECON 9990, registration in the following class is required in each semester (excluding summers) until the dissertation is completed:

ECON 9996	Dissertation Continuation	

Program Credit/GPA Requirements

48 total semester hours required
Minimum 3.000 GPA required

Economics, PhD—Advanced Entry

The PhD program in applied economics is small and focused, specializing in *industrial organization, competition policy, and regulatory economics* and *labor economics*.

Requirements

Students entering the doctoral program without a master's degree, please see **Economics PhD** (p. 418)**.**

COURSE WORK

Students entering the doctoral program with a master's degree will take three doctoral-level core classes (12 semester hours), two classes in each of two doctoral fields (16 semester hours), and one elective (4 semester hours), for a total program requirement of 32 semester hours. If the master's degree is not in economics, additional course work may be required in order to meet course prerequisites. Core courses are focused on developing an advanced theoretical and quantitative foundation (macroeconomic theory, microeconomic theory, and applied econometrics). The remainder of the course work is focused on the sophisticated application of analytical tools in the chosen field of concentration.

PhD students are expected to take three classes per semester as necessary to meet the degree's course work requirements in the minimum number of semesters.

EXAMINATIONS

Two Qualifying Examinations—Macroeconomics and Microeconomics

Qualifying examinations are required upon completion of Macroeconomics 2 and Microeconomics 2. Students must receive a minimum grade of B– in the associated theory class to sit for its exam. Students are given a maximum of two attempts to pass each exam to continue in the program. Failure to sit for an exam at the appropriate time without prior consent of the graduate program director will result in an automatic fail on that exam.

One Field Comprehensive Examination

A field examination is required upon completion of the associate field classes. Students will complete course work in two fields but are required to take a field examination in one field of their choosing. Students must receive a minimum grade of B– in the associated field classes in order to sit for that field's exam. The field examination includes questions from the chosen field, as well as questions on econometrics methodology.

Students are given a maximum of two attempts to pass the exam to continue in the program. Failure to sit for an exam at the appropriate time without prior consent of the graduate program director will result in an automatic fail on that exam.

DOCTORAL DEGREE CANDIDACY

Following completion of required course work and examinations, students are certified as doctoral degree candidates (ABD). A degree candidate has a maximum of five years to defend and submit an acceptable doctoral dissertation.

DISSERTATION COMMITTEE AND PROPOSAL

The department expects that a doctoral candidate's dissertation committee will be formed and the dissertation proposal presented within six months of reaching degree candidacy.

A **dissertation committee** includes a principal advisor and a minimum of two other members. The principal advisor must be a current member of the economics department who holds a PhD degree and who is qualified in the chosen field. Other committee members must be qualified in the chosen field or econometrics, and one member may be from outside the department. Committee compositions must be approved by the graduate program director and department chair.

A **dissertation proposal** states the question or hypothesis, reviews the relevant literature, and explains how the proposed work will contribute to that literature and general understanding. The proposal sets forth data sources, models, and econometric issues in sufficient detail so that any faculty member not in the field will be able to assess its merits. Normally, the proposal should not exceed twenty double-spaced pages. The proposal is first approved by the dissertation committee and then presented at an open seminar.

WRITING THE DOCTORAL DISSERTATION

Writing the dissertation entails working with the principal advisor and other committee members until it is determined that a dissertation is complete, and the candidate is ready to present and defend the work at an open seminar. Candidates must arrange a date and time for the defense at least three weeks in advance. Students must familiarize themselves with the Guide to the Preparation of Theses and Dissertations (https://www.northeastern.edu/cssh/graduate/commencement/formatting-guidelines). The guide provides links to formatting tips, sample introductory pages, sample approval record, and deadlines. In addition, a checklist is provided to ensure students have fulfilled the required steps in the commencement clearance process.

Milestones

Maintaining satisfactory academic progress during doctoral candidacy requires the following:

PhD Annual Student Progress Review

Each PhD student will have an annual review of his or her progress toward the degree. Receipt of financial support administered by the college is contingent upon satisfactory academic progress toward the degree and satisfactory performance in assigned duties. See the College of Social Sciences and Humanities Graduate Programs General Regulations (https://www.northeastern.edu/cssh/graduate/current_students) for further details.

Field Lunch Participation

All PhD students registered for Doctoral Dissertation or Continuation who are in residence are expected to regularly attend a field seminar in industrial organization or labor. These seminars meet roughly every week, and their purpose is to assist students in choosing and evaluating dissertation topics as well as advancing and completing their

dissertation. All doctoral candidates will be expected to present their research at various stages of writing their dissertation.

Seminar Series Participation

All PhD students registered for Doctoral Dissertation or Continuation who are in residence are expected to regularly attend academic seminars by speakers invited to campus through the Department of Economics Seminar Series. Participation in these seminars is an important component of doctoral training and is intended to expose students to current research in their field while helping to develop and hone their own presentation skills.

Practical Experience in Applied Economics Program

Participation in at least one semester of the Practical Experience in Applied Economics program is required of all students who have reached doctoral candidacy. The program is offered in the spring semester every other year. In this program, a variety of prominent practitioners working in consulting and government agencies in the fields of industrial organization and labor will describe their practical experience applying economics to a variety of consulting and policy problems, including antitrust, regulation, labor market policy, education, and health policy. This is a participatory class that will require advanced reading and preparation of questions for the practitioners in addition to other assignments.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Milestones

Two qualifying examinations—microeconomics and macroeconomics
Field comprehensive examination (student chooses field)
Doctoral degree candidacy
PhD annual student progress review
Dissertation committee
Dissertation proposal
Dissertation defense
Field lunch participation
Seminar series participation

Core Requirements

Code	Title	Hours
Quantitative		
ECON 7740	Applied Econometrics 2	4
Theory		
ECON 7710	Microeconomic Theory 2	4
ECON 7720	Macroeconomic Theory 2	4
Field		
Labor Economics Field		
ECON 7763	Labor Market Analysis	4
ECON 7764	Topics in Labor Economics	4
Industrial Organization Field		
ECON 7771	Framework of Industrial Organization	4
ECON 7772	Public Policy Toward Business	4

Elective

Code	Title	Hours
Complete 4 semester hours from the following:		4
ECON 7200 to ECON 7299		
ECON 7976	Directed Study	

Dissertation

Code	Title	Hours
Registration in the following class is required in the semester prior to sitting for the field examination:		
ECON 8960	Exam Preparation—Doctoral	
Registration in the following class is required in the semester that students sit for the field examination and begin dissertation planning:		
ECON 9986	Research	
Registration in the following class is required in the fall and spring semesters following achievement of doctoral candidacy:		
ECON 9990	Dissertation	
Following completion of two semesters of ECON 9990, registration in the following class is required in each semester (excluding summers) until the dissertation is completed:		
ECON 9996	Dissertation Continuation	

Program Credit/GPA Requirements

32 total semester hours required
Minimum 3.000 GPA required

Economics, MA

The Master of Arts program focuses on applied economic policy analysis, with broad specialization areas. The program is large enough to support a full slate of core and area courses each year, yet small enough to maintain a sense of community among the students. The program is especially appropriate for those who wish to work in or return to positions in government, teaching, finance, or industry, while providing a rigorous basis for those who want to continue their studies to the doctoral level.

We offer the opportunity for master's students to apply for paid work positions through Northeastern's world-famous co-op program. Qualified and approved master's students can participate in co-op as practicing economists for up to six months as part of their academic program (note that a 3.500 QPA is required in order to apply). This paid work experience enhances the degree and its emphasis on application. Students have an opportunity to learn how to apply their knowledge, to solve problems, and to make a difference in the world before they graduate. Our graduates either find full-time work in their area of specialty or go on to earn additional graduate degrees. All of our graduates find jobs after completing our program. For more information, please visit economics co-op (https://www.northeastern.edu/cssh/economics/undergraduate/experiential-learning/co-op).

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Quantitative		
ECON 5105	Math and Statistics for Economists	4
ECON 5140	Applied Econometrics	4
Theory		
ECON 5110	Microeconomic Theory	4
ECON 5120	Macroeconomic Theory	4

Electives

With prior approval from the graduate program director, the following courses may substitute for electives: Thesis (ECON 7990) or Internship In Economics (ECON 8550). Additionally, a student may select a maximum of four graduate semester hours offered by other departments.

Code	Title	Hours
Complete 16 semester hours in the following range:		16
ECON 5200 to ECON 7772		

Optional Co-op Experience

Code	Title	Hours
Requires two consecutive semesters of Co-op Work Experience and Experiential Integration:		2
ECON 6964 and INSH 6864	Co-op Work Experience and Experiential Integration	

Program Credit/GPA Requirements

32 semester hours required (34 with optional co-op)
Minimum 3.000 GPA required

English

Website (http://www.northeastern.edu/cssh/english/graduate)

Elizabeth Maddock Dillon, PhD
Professor and Chair
e.dillon@northeastern.edu

Ryan Cordell, PhD
Assistant Professor and Graduate Program Director
r.cordell@northeastern.edu

405 Lake Hall
617.373.3692
617.373.2509 (fax)
gradenglish@northeastern.edu

Graduate Programs Contact
Melissa Daigle, Graduate Program Administrator,
m.daigle@northeastern.edu

CSSH Graduate Programs General Regulations (http://www.northeastern.edu/cssh/graduate/current_students)

The graduate program in English is grounded in the study of British and American literature through the most current modes of humanistic inquiry and in the disciplines of writing and rhetoric. Both in course work and through the NULab for Texts, Maps, and Networks (http://www.northeastern.edu/nulab), the graduate program in English also offers training in the digital humanities. Altogether, our degree programs provide a challenging, flexible, and wide-ranging education in English studies today.

Programs

Doctor of Philosophy (PhD)

Master of Arts (MA)

Graduate Certificate

English, PhD

The PhD program seeks to train students to be productive scholars and teachers in the fields of both literary studies and rhetoric and composition. In course work, students read and analyze the important texts, current issues, and critical methodologies of the discipline. Drawing on the breadth of this preparation, students demonstrate their ability to recognize and produce scholarly arguments in designing the three comprehensive field papers in areas of scholarly interest and competence corresponding to recognized and emerging fields of study. Finally, the dissertation offers students an opportunity to design a focused research project in consultation with a dissertation advisor. Throughout the program, faculty works closely with doctoral students to develop their scholarly and professional identities in preparation for careers in academia.

Academic Standing/Progress

To be considered in good academic standing, PhD students must be making progress toward their degree requirements, including maintaining a 3.500 minimum cumulative grade-point average (GPA) and completing the comprehensive examination within one year of finishing course work.

Doctoral Degree Candidacy

Students entering with a relevant BA must complete 48 semester hours, complete the language requirement, and pass the comprehensive examination.

General Regulations

Program requirements are described in the CSSH Graduate Programs General Regulations (http://www.northeastern.edu/cssh/graduate/current_students) and the Graduate Program in English PhD Guide (https://www.northeastern.edu/cssh/english/graduate/current-student-resources). Both documents are updated annually.

Program Requirements

Bachelor's Degree Entrance

Milestones

Annual progress review
Two languages
Comprehensive exam
Doctoral degree candidacy
Dissertation prospectus
Public prospectus/dissertation work-in-progress presentation
Dissertation defense

Core Requirements

Code	Title	Hours
Proseminar		
ENGL 5103	Proseminar	4
Writing and the Teaching of Writing		
ENGL 7392	Writing and the Teaching of Writing	4
Theories and Methods		
Complete 4 semester hours from the following:		4
ENGL 7342	Topics in Criticism	
ENGL 7351	Topics in Literary Study (selected topics only)	
ENGL 7358	Topics in Literature and other Disciplines (selected topics only)	
ENGL 7370	Topics in Digital Humanities	
WMNS 6100	Theorizing Gender and Sexuality	
WMNS 7976	Directed Study (GCWS Consortium, selected topics only)	
Writing and Rhetoric		
Complete 4 semester hours from the following:		4
ENGL 7111		
ENGL 7112		
ENGL 7121		
ENGL 7360	Topics in Rhetoric	
ENGL 7391		
ENGL 7393		
ENGL 7395	Topics in Writing	
ENGL 7396		
ENGL 7397		
ENGL 7398		
Literary Periods		
Literature Pre-1700		
Complete 4 semester hours from the following:		4
ENGL 7213	Topics in Early American Literature	
ENGL 7261		
ENGL 7262		
ENGL 7263		
ENGL 7271		
ENGL 7274		
ENGL 7281	Topics in Medieval Literature	
ENGL 7282	Topics in Renaissance Literature	
ENGL 7283	Topics in 17th-Century Literature	
ENGL 7342	Topics in Criticism (selected topics only)	
ENGL 7358	Topics in Literature and other Disciplines (selected topics only)	
Literature 1700–1900		
Complete 4 semester hours from the following:		4
ENGL 7212		
ENGL 7214	Topics in 19th-Century American Literature	
ENGL 7233		
ENGL 7264		
ENGL 7266		
ENGL 7275		

Code	Title	Hours
ENGL 7284	Topics in 18th-Century Literature	
ENGL 7285		
ENGL 7286		
ENGL 7291		
ENGL 7351	Topics in Literary Study (selected topics only)	
ENGL 7352	(selected topics only)	

Literature Post-1900

Code	Title	Hours
Complete 4 semester hours from the following:		4
ENGL 7211		
ENGL 7215	Topics in 20th-Century American Literature	
ENGL 7244	African-American Novel	
ENGL 7251		
ENGL 7287		
ENGL 7351	Topics in Literary Study (selected topics only)	
ENGL 7355	(selected topics only)	
ENGL 7358	Topics in Literature and other Disciplines (selected topics only)	
ENGL 7359	(selected topics only)	
ENGL 7361		
ENGL 7362		

Electives

Code	Title	Hours
Complete 20 semester hours of ENGL courses.		20

Dissertation

Code	Title	Hours
Exam Preparation		
ENGL 8960	Exam Preparation—Doctoral (Only needed for PhD students who have completed coursework but have yet to complete the comprehensive exams. Not repeatable.)	
Research		
ENGL 9986	Research	
Dissertation		
Complete the following (repeatable) course twice:		
ENGL 9990	Dissertation	
Dissertation Continuation		
Following completion of two semesters of ENGL 9990, registration in the following class is required in each semester (excluding summers) until the dissertation is completed:		
ENGL 9996	Dissertation Continuation	

Program Credit/GPA Requirements

48 total semester hours required
Minimum 3.500 GPA required

English, PhD—Advanced Entry

The PhD program seeks to train students to be productive scholars and teachers in the fields of both literary studies and rhetoric and composition. In course work, students read and analyze the important texts, current issues, and critical methodologies of the discipline. Drawing on the breadth of this preparation, students demonstrate their ability to recognize and produce scholarly arguments in designing the three comprehensive field papers in areas of scholarly interest and competence corresponding to recognized and emerging fields of study. Finally, the dissertation offers students an opportunity to design a focused research project in consultation with a dissertation advisor. Throughout the program, faculty works closely with doctoral students to develop their scholarly and professional identities in preparation for careers in academia.

Academic Standing/Progress

To be considered in good academic standing, PhD students must be making progress toward their degree requirements, including maintaining a 3.500 minimum cumulative grade-point average (GPA) and completing the comprehensive examination within one year of finishing course work.

Doctoral Degree Candidacy

Students entering with a relevant MA must complete 24 semester hours, complete the language requirement, and pass the comprehensive examination.

General Regulations

Program requirements are described in the CSSH Graduate Programs General Regulations and the Graduate Program in English PhD Guide. Both documents are updated annually.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Milestones

Annual progress review
Two languages
Comprehensive exam
Doctoral degree candidacy
Dissertation prospectus
Public prospectus/dissertation work-in-progress presentation
Dissertation defense

Core Requirements

Code	Title	Hours
Proseminar		
ENGL 5103	Proseminar	4
Writing and the Teaching of Writing		
ENGL 7392	Writing and the Teaching of Writing	4

Electives

Code	Title	Hours
Complete 16 semester hours of ENGL courses.		16

Dissertation

Code	Title	Hours
Exam Preparation		
ENGL 8960	Exam Preparation—Doctoral (Only needed for PhD students who have completed coursework but have yet to complete the comprehensive exams. Not repeatable.)	
Research		
ENGL 9986	Research	
Dissertation		

Complete the following (repeatable) course twice:

ENGL 9990	Dissertation

Dissertation Continuation

Following completion of two semesters of ENGL 9990, registration in the following class is required in each semester (excluding summers) until the dissertation is completed:

ENGL 9996	Dissertation Continuation

Program Credit/GPA Requirements

24 total semester hours required
Minimum 3.500 GPA required

English, MA

The Master of Arts degree launches students into the study of literature, writing, and rhetoric at the graduate level. The program offers two years of intensive study in the major fields of British and American literature, covering the debates and approaches that animate the discipline of English. Our MA graduates are fully prepared to proceed to study at the doctoral level, and their training in critical thinking, language skills, and cultural history has also proven to be fruitful preparation for a range of careers outside of academia.

The master's program offers an optional cooperative education experience (co-op) to eligible students. Co-operative education is central to both the Northeastern experience and to the College of Social Sciences and Humanities experiential liberal arts framework. Northeastern's signature co-op ecosystem provides qualified master's students with six-month work experiences in businesses, nonprofits, and government agencies in Boston and across the United States. Graduate students take their work from campus learning spaces, apply their knowledge outside of the classroom, and then bring knowledge and skills gained in community learning spaces back to our campus learning spaces during the cocurricular experiential integration course.

Academic Standing/Progress

To be considered in good academic standing, MA students must be making progress toward their degree requirements, including maintaining a 3.000 minimum cumulative grade-point average (GPA).

General Regulations

Program requirements are described in the CSSH Graduate Programs General Regulations (http://www.northeastern.edu/cssh/graduate/current_students) and the Graduate Program in English MA Guide (https://www.northeastern.edu/cssh/english/graduate/current-student-resources). Both documents are updated annually.

Program Requirements
Milestones

Annual progress review
One language
Comprehensive examination (timed examination and thesis options)

Core Requirements

Code	Title	Hours
Proseminar		
ENGL 5103	Proseminar	4
Theories and Methods		
Complete 4 semester hours from the following:		4
ENGL 7342	Topics in Criticism	

ENGL 7351	Topics in Literary Study (selected topics only)	
ENGL 7358	Topics in Literature and other Disciplines (selected topics only)	
ENGL 7370	Topics in Digital Humanities	
WMNS 6100	Theorizing Gender and Sexuality	
WMNS 7976	Directed Study (GCWS Consortium, selected topics only)	

Writing and Rhetoric

Complete 4 semester hours from the following (if completing 12 semester hours of Literary Period requirements).		4-8
Complete 8 semester hours from the following (if completing 8 hours of Literary Period requirements).		
ENGL 7111		
ENGL 7112		
ENGL 7121		
ENGL 7360	Topics in Rhetoric	
ENGL 7391		
ENGL 7392	Writing and the Teaching of Writing (Master's students may register with permission from the instructor)	
ENGL 7393		
ENGL 7395	Topics in Writing	
ENGL 7396		
ENGL 7397		
ENGL 7398		

Literary Periods

Complete 8 semester hours from TWO of the following Literary Periods (if completing 8 semester hours of Writing and Rhetoric requirements), or Complete 12 semester hours from THREE of the following Literary Periods (if completing 4 semester hours of Writing and Rhetoric requirements):		8-12
Literature Pre-1700		
ENGL 7213	Topics in Early American Literature	
ENGL 7261		
ENGL 7262		
ENGL 7263		
ENGL 7271		
ENGL 7274		
ENGL 7281	Topics in Medieval Literature	
ENGL 7282	Topics in Renaissance Literature	
ENGL 7283	Topics in 17th-Century Literature	
ENGL 7342	Topics in Criticism (selected topics only)	
ENGL 7358	Topics in Literature and other Disciplines (selected topics only)	
Literature 1700−1900		
ENGL 7212	(selected topics only)	
ENGL 7214	Topics in 19th-Century American Literature	
ENGL 7233		
ENGL 7264		
ENGL 7266		
ENGL 7275		
ENGL 7284	Topics in 18th-Century Literature	
ENGL 7285		

ENGL 7286	
ENGL 7291	
ENGL 7351	Topics in Literary Study (selected topics only)
ENGL 7352	(selected topics only)
Literature Post-1900	
ENGL 7211	(selected topics only)
ENGL 7215	Topics in 20th-Century American Literature
ENGL 7224	
ENGL 7244	African-American Novel
ENGL 7251	
ENGL 7287	
ENGL 7351	Topics in Literary Study (selected topics only)
ENGL 7355	(selected topics only)
ENGL 7358	Topics in Literature and other Disciplines (selected topics only)
ENGL 7359	(selected topics only)
ENGL 7361	
ENGL 7362	
Comprehensive Examination Options	
Timed, Written Exam or Thesis	
Master's Qualifying Exam	
ENGL 7000	Qualifying Exam (Required for students who must maintain full-time status while completing the comprehensive examination)	0
Thesis	
A minimum 3.500 GPA is required to pursue this option.	
ENGL 6960	Exam Preparation—Master's (Required for students who must maintain full-time status while completing the MA Thesis. Not repeatable.)	0

Electives

Code	Title	Hours
Complete 8 semester hours of ENGL courses.		8

Optional Co-op Experience

Code	Title	Hours
Requires two consecutive semesters of Co-op Work Experience and Experiential Integration:		2
ENGL 6964 and INSH 6864	Co-op Work Experience and Experiential Integration	

Program Credit/GPA Requirements

32 total semester hours required (34 with optional co-op)
Minimum 3.000 GPA required

<div style="background:red;color:white">

Digital Humanities, Graduate Certificate

</div>

Elizabeth Maddock Dillon, PhD
Certificate Co-Director
e.dillon@northeastern.edu

Julia Flanders, PhD
Certificate Co-Director
j.flanders@northeastern.edu

Sarah Connell, PhD
Certificate Administrator
sa.connell@northeastern.edu

CSSH Graduate Programs General Regulations (https://www.northeastern.edu/cssh/graduate/current_students)

The Graduate Certificate in Digital Humanities allows students to pursue an organized course of study in digital humanities with the interdisciplinary faculty of the NULab for Texts, Maps, and Networks (http://www.northeastern.edu/nulab) while completing requirements for their degrees in existing Northeastern University doctoral and master's programs. *This is not a stand-alone certificate*; rather, it will be completed by students in the course of their existing program of study.

Digital humanities (DH) is an emerging field of research that is interdisciplinary in scope and collaborative in nature. The field is developing in relation to new digital technologies that have changed the objects of study, methods, and opportunities for research and teaching in existing humanities fields. Digitized texts are now read and accessed in new ways; digitized corpora of texts make possible new modes of quantitative and qualitative analysis (including "distant reading," text mining, mapping, and network analysis); born digital objects constitute new primary sources in need of humanistic theorization, approaches, and critical vocabularies; and modes of encoding, aggregating, and connecting texts enable the creation of new archival resources that are changing our understanding of the archive itself as well revealing new historical, literary, and cultural patterns.

The field is new and developing rapidly and many students are eager for training in this area—both because DH is at the cutting edge of disciplinary work and because it offers new opportunities for employment within the academy and outside of it.

Academic Standing/Progress

Students in the program are monitored for academic progress. Those students whose GPA falls below a 3.000 are notified by and meet with the director of academic programs. They are counseled that if their GPA does not rise to a 3.000 or higher, they run the risk of not graduating and are advised on strategies for improvement.

Final Project

The student will complete a final independent DH research project located in the student's home program (such as a thesis, or a portion thereof) or participation in a collaborative DH project with substantial student participation. The final project will be overseen by the NULab faculty members teaching the NULab Project Seminar during its development; NULab workshop instructors will advise students on their projects and help students get guidance from other faculty as appropriate. Final projects will be submitted with three components: the project itself, a written project description of about 2,000 words, and a presentation to the NULab community. The DH certificate committee will formally approve all final projects.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Topics/Readings/Methods		
ENGL 7370	Topics in Digital Humanities (Introduction to Digital Humanities)	4
or HIST 7370	Texts, Maps, and Networks: Readings and Methods for Digital History	
Lab Project Seminar		
Complete the following (repeatable) 2-credit course two times:		4
INSH 7910	NULab Project Seminar	

Elective

Code	Title	Hours
Complete 4 semester hours from the following:		4
ARTG 5100	Information Design Studio 1: Principles	
ARTG 5120	Research Methods for Design	
CS 6120	Natural Language Processing	
CS 7290	Special Topics in Data Science	
ENGL 7370	Topics in Digital Humanities	
INSH 6406	Analyzing Complex Digitized Data	
JRNL 6340	Fundamentals of Digital Journalism	
JRNL 6341	Telling Your Story with Data	
JRNL 6355	Seminar in Investigative Reporting	
HIST 7219	Topics in Cultural History (selected topics only)	
POLS 7334	Social Networks	
PPUA 5301	Introduction to Computational Statistics	
PPUA 5302	Information Design and Visual Analytics	

Program Credit/GPA Requirements

Minimum 12 total semester hours required
Minimum 3.000 GPA required

History

Website (https://www.northeastern.edu/cssh/history/graduate/programs)

Heather Streets-Salter, PhD
Professor and Chair

Heather Streets-Salter, PhD
Professor, Chair, and Graduate Program Director, PhD and MA (World History concentration)

Martin Blatt, PhD
Professor of the Practice and Graduate Program Director, MA (Public History concentration)

249 Meserve Hall
617.373.2662
617.373.3661 (fax)
gradhistory@northeastern.edu

Graduate Programs Contact

Bonne Knipfer, Graduate Program Administrator, b.knipfer@northeastern.edu

CSSH Graduate Programs General Regulations (https://www.northeastern.edu/cssh/graduate/current_students)

Graduate work in history focuses on global and world history, which study the interactions among geographical regions and historical processes around the globe. Students at both the master's and doctoral levels concentrate their work on the history of regions or peoples in Africa, Asia, Europe, Latin America, or the United States, with attention to the intersections and connections between national, regional, and global developments. The Department of History also offers a master's degree with a concentration in public history that emphasizes the study of topics such as material culture, historical exhibits and museums, historical agencies, and archival administration. Recent doctoral students have been the recipients of major fellowships for conducting dissertation research abroad, including Fulbright, Fulbright-Hays, Social Science Research Council, and Chateaubriand fellowships.

Programs
Doctor of Philosophy (PhD)

Master of Arts (MA)

Graduate Certificate

History, PhD

The PhD program, with a focus on global, transnational, and comparative history, seeks to train research historians who plan to teach at the college and university level. Systematic training in theory and methodology and preparation for college teaching are distinctive features of the Northeastern program.

Academic Standing/Progress

Students are required to maintain an overall GPA of at least 3.500. In addition, the PhD annual review is based on a report by the student's advisor, with attention to:

1. Success in setting up a doctoral committee
2. Passing the departmental language examination in the language of their field
3. Successful performance of teaching assistant duties
4. Successful completion of courses in the tiered system (i.e., the required course sequence)
5. Successful completion, where appropriate, of other required activities, including construction of the comprehensive examination list and the dissertation proposal and scheduling of comprehensive examinations

Doctoral Degree Candidacy

Students entering without an MA in history must complete 45 semester hours and must pass the qualifying examination by the end of the third year in the program. Upon completion of these two requirements, students will be deemed PhD degree candidates by the college.

Program Requirements
Milestones

Qualifying examination
Annual review
Language
PhD candidacy
Dissertation committee
Dissertation proposal
Dissertation defense

Core Requirements

Code	Title	Hours
Theory and Methodology		
A grade of B or higher is required:		
HIST 5101	Theory and Methodology 1	4
HIST 5102	Theory and Methodology 2	4
Digital History		
HIST 7370	Texts, Maps, and Networks: Readings and Methods for Digital History	4
Readings or Directed Study		
Complete 20 semester hours in either Readings or Directed Study:		20
HIST 8982	Readings	
or HIST 7976	Directed Study	
Research Seminar		
HIST 7314	Research Seminar in World History	4
Practicum		
HIST 8409	Practicum in Teaching	1

Electives

Code	Title	Hours
Complete 8 semester hours from the following range:		8
HIST 7200 to HIST 7702		

Dissertation

Code	Title	Hours
Exam Preparation		
Only needed for PhD students who have completed all course work but have not yet passed the comprehensive exam:		
HIST 8960	Exam Preparation—Doctoral	
Dissertation		
Complete the following (repeatable) course twice:		
HIST 9990	Dissertation	
Dissertation Continuation		
Following completion of two semesters of HIST 9990, registration in the following class is required in each semester (excluding summers) until the dissertation is completed:		
HIST 9996	Dissertation Continuation	

Program Credit/GPA Requirements

45 total semester hours required
Minimum 3.500 GPA required

History, PhD—Advanced Entry

The PhD program, with a focus on global, transnational, and comparative history seeks to train research historians who plan to teach at the college and university level. Systematic training in theory and methodology and preparation for college teaching are distinctive features of the Northeastern program.

Academic Standing/Progress

Students are required to maintain an overall GPA of at least 3.500. In addition, the PhD annual review is based on a report by the student's advisor, with attention to:

1. Success in setting up a doctoral committee
2. Passing the departmental language examination in the language of their field
3. Successful performance of teaching assistant duties
4. Successful completion of courses in the tiered system (i.e., the required course sequence)
5. Successful completion, where appropriate, of other required activities, including construction of the comprehensive examination list and the dissertation proposal and scheduling of comprehensive examinations

Doctoral Degree Candidacy

Students entering with an MA in history from outside Northeastern must complete 37 semester hours and must pass the qualifying examination by the end of the third year in the program. Upon completion of these two requirements, students will be certified as PhD degree candidates by the college.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Milestones

Qualifying examination
Annual review
Language
PhD Candidacy
Dissertation committee
Dissertation proposal
Dissertation defense

Core Requirements

Code	Title	Hours
Theory and Methodology		
A grade of B or higher is required:		
HIST 5101	Theory and Methodology 1	4
HIST 5102	Theory and Methodology 2	4
Digital History		
HIST 7370	Texts, Maps, and Networks: Readings and Methods for Digital History	4
Readings or Directed Study		
Complete 12 semester hours of either Readings or Directed Study:		12
HIST 8982	Readings	
or HIST 7976	Directed Study	
Research Seminar		
HIST 7314	Research Seminar in World History	4
Practicum		
HIST 8409	Practicum in Teaching	1

Electives

Code	Title	Hours
Complete 8 semester hours from the following range:		8
HIST 7200 to HIST 7702		

Dissertation

Code	Title	Hours
Exam Preparation		
Only needed for PhD students who have completed all course work but have yet to pass the comprehensive exam. Not repeatable.		
HIST 8960	Exam Preparation—Doctoral	
Dissertation		
Complete the following (repeatable) course twice:		
HIST 9990	Dissertation	
Dissertation Continuation		
Following completion of two semesters of HIST 9990, registration in the following class is required in each semester (excluding summers) until the dissertation is completed:		
HIST 9996	Dissertation Continuation	

Program Credit/GPA Requirements

37 total semester hours required
Minimum 3.500 GPA required

History, MA

The Master of Arts in History offers two concentrations: public history and world history.

Public history encompasses the practice of history outside the academy in museums, state and local historical societies, archives, the National Park Service, and more. Public history includes the study of such topics as material culture, historical exhibits and museums, historical agencies, archival administration, and how difficult issues including slavery and site of violence are presented to the public.

World history focuses on the history of regions or peoples in Africa, Europe, Latin America, Asia, or the United States, with attention to the intersections and connections between national, regional, and global developments.

The master's program offers an optional cooperative education experience ("co-op") to eligible students. Cooperative education is central to both the Northeastern experience and to the College of Social Sciences and Humanities experiential liberal arts framework. Northeastern's signature co-op ecosystem provides qualified master's students with six-month work experiences as practicing public historians. Graduate students take their work from campus learning spaces, apply their knowledge outside of the classroom, and then bring knowledge and skills gained in community learning spaces back to our campus learning spaces during the cocurricular experiential integration course.

Academic Standing/Progress

Students are expected to maintain a 3.000 grade-point average (GPA). Should the GPA drop below 3.000, the student will be placed on academic probation and allowed one more semester to bring his or her GPA to the 3.000 level. If the student is not able to meet this requirement by the end of the following semester, the student may be asked to leave the program.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

The Master of Arts in History offers two concentrations: world history (p. 428) and public history (p. 428). The program requires a concentration. Please consult with a Department of History graduate program director for additional details.

Concentration in World History

CORE REQUIREMENTS

Code	Title	Hours
Theory and Methodology		
A grade of B or higher is required:		
HIST 5101	Theory and Methodology 1	4
HIST 5102	Theory and Methodology 2	4
Research Seminar		
HIST 7301 to HIST 7325		4

ELECTIVES

Code	Title	Hours
Complete 20 semester hours from the following:		20
HIST 5101 to HIST 5295		
HIST 7205 to HIST 7218		
HIST 7220 to HIST 7297		

Concentration in Public History

CORE REQUIREMENTS

Code	Title	Hours
Theory and Methodology		
A grade of B or higher is required:		
HIST 5101	Theory and Methodology 1	4
Public History		
HIST 5237	Issues and Methods in Public History	4
Digital History		
HIST 7370	Texts, Maps, and Networks: Readings and Methods for Digital History	4
Fieldwork		
Complete the following (repeatable) course twice:		4
HIST 8410	Fieldwork in History 1	
Research Seminar		
Complete 4 semester hours from the following:		4
HIST 7301 to HIST 7325		
HIST 5000 to 5900		

ELECTIVES

Code	Title	Hours
Complete 12 semester hours from the following:		12
HIST 5238 to HIST 5248		
HIST 5295 to HIST 6966		
HIST 7201 to HIST 7297		

Optional Co-op Experience

Code	Title	Hours
Requires two consecutive semesters of Co-op Work Experience and Experiential Integration:		2

| HIST 6964 and INSH 6864 | Co-op Work Experience and Experiential Integration | |

Program Credit/GPA Requirements

32 total semester hours required (34 with optional co-op)
Minimum 3.000 GPA required

Public History, Graduate Certificate

The Graduate Certificate in Public History allows students to pursue an organized course of study in public history while completing requirements for their degrees in existing doctoral and master's programs. Students have an opportunity to gain a knowledge of core methods and issues in the field of public history and are enabled to use public history approaches in their own research and work.

Public history is a well-established field of practice that marries academic research and methods to public applications and collaborations. Public historians typically work in museums, archives, historical societies, documentary film production, and social activism, though training in public history is useful to a wide variety of humanistic, social science, and legal fields.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Issues and Methods		
HIST 5237	Issues and Methods in Public History	4
Fieldwork		
Complete the following (repeatable) two-credit course twice:		4
HIST 8410	Fieldwork in History 1	

Elective

Code	Title	Hours
Complete one of the following:		4
HIST 5238	Managing Nonprofit Organizations	
HIST 5241	Exhibits and Museums	
HIST 5244	Historic Preservation	
HIST 7219	Topics in Cultural History	
HIST 7240	Visual and Material Culture	
HIST 7250	Topics in Public History (Sites of Violence and Public Memory)	
HIST 7250	Topics in Public History (Public History and Slavery)	

Program Credit/GPA Requirements

12 total semester hours required
Minimum 3.000 GPA required

Political Science

Website (https://www.northeastern.edu/cssh/polisci)

Thomas J. Vicino, PhD
Associate Professor and Chair
t.vicino@northeastern.edu

Graduate Program Directors

Mai'a K. Davis Cross, PhD
PhD and MA Programs
m.cross@northeastern.edu

Daniel Aldrich, PhD
MS Security and Resilience Studies Program
d.aldrich@northeastern.edu

903 Renaissance Park
617.373.4404
617.373.5311 (fax)
gradpolisci@northeastern.edu

Graduate Programs Contact
Rosy Trovato, Graduate Program Administrator,
r.trovato@northeastern.edu

CSSH Graduate Programs General Regulations (http://www.northeastern.edu/cssh/graduate/current_students)

Graduate training in political science prepares students to analyze important issues in world affairs and succeed in a wide array of careers—from government and academia to the nonprofit and private sectors. Graduate programs in political science, public policy, public administration, security and resilience studies, and international affairs at Northeastern explore the theory and practice of politics, public policy, and public management in the United States and throughout the world. In teaching and research, faculty members in the department cover a broad range of topics and issues in the field of political science. Core areas of inquiry within our department include national and international security, international and U.S. public policy, resilience, network science, European studies, Middle East studies, and democratization and development.

Programs
Doctor of Philosophy (PhD)
- Political Science (p. 429)
- Political Science, PhD—Advanced Entry (p. 430)

Master of Arts (MA)
- Political Science (p. 431)

Master of Public Administration (MPA)
- Public Administration (p. 433)

Master of Science (MS)
- Security and Resilience Studies (p. 434)

Graduate Certificate
- Security and Resilience Studies (p. 436)

Political Science, PhD

Mai'a K. Davis Cross, PhD
Graduate Program Director
m.cross@northeastern.edu

Rosy Trovato, Graduate Program Administrator, 617.373.4404, r.trovato@northeastern.edu

CSSH Graduate Programs General Regulations (https://www.northeastern.edu/cssh/graduate/current_students)

The Doctor of Philosophy in Political Science is grounded in the core fields of the discipline—American government and politics, comparative politics, international relations, and public policy. Students identify a primary and secondary field as areas of emphasis. The curriculum introduces students to the core fields and also seeks to develop their research skills through a series of methods courses. Students may develop a traditional, academic focus in one of the fields, or they may combine it with public policy to highlight a policy orientation. The program focuses on preparing students to be academic scholars and teachers as well as practitioners in research and public service. The PhD degree includes completion of required courses, passing a written and oral comprehensive examination, and the successful defense of the dissertation before a faculty committee.

Credit Requirements

Students entering with a bachelor's degree must complete 56 semester hours. Students currently in the MA or MPA program and accepted into the PhD program before completing the MA or MPA must complete 56 semester hours as well as all curriculum requirements of the PhD program.

Doctoral Degree Candidacy

Doctoral degree candidacy is attained after successfully completing all course work and passing written and oral comprehensive examinations.

Academic Standing/Progress

All doctoral students must maintain an overall cumulative grade-point average (GPA) of 3.500 while making progress toward the degree requirements. Students who fall below any applicable standard for two consecutive semesters are subject to dismissal from the graduate program. Additionally, receipt of financial support administered by the department, college, or university is contingent on satisfactory academic progress toward the degree and specific guidelines as published in the terms of award. Students who have ungraded courses or courses graded as incomplete risk no longer being eligible for financial aid awards.

Language Proficiency

Students who conduct research in a language other than English must demonstrate proficiency as necessary for completion of the dissertation. Language courses do not count as electives.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Milestones

Comprehensive examination
Annual review
Language (as determined by committee)
PhD candidacy
Dissertation proposal
Dissertation committee
Dissertation defense

Core Requirements

Code	Title	Hours
Seminars		
Complete 12 semester hours from the following:		12
POLS 7204	Seminar in Public Policy	
POLS 7205	Seminar in American Government and Politics	
POLS 7206	Seminar in Comparative Politics	
POLS 7207	Seminar in International Relations	
Inquiry and Design		
POLS 7201	Research Design	4
Quantitative Techniques		
POLS 7202	Quantitative Techniques	4
LPSC 7215	Advanced Quantitative Techniques	4
Advanced methods courses from other disciplines may be chosen in consultation with your faculty advisor.		

Electives

Courses from other disciplines may be chosen in consultation with your faculty advisor.

Code	Title	Hours
Complete 32 semester hours in the following:		32
POLS 7200 to POLS 7978		

Dissertation

Code	Title	Hours
Exam Preparation		
POLS 8960	Exam Preparation—Doctoral (Only required for PhD students who have completed coursework but have yet to complete the comprehensive exam. Required for students who must maintain full-time status while completing thesis or comprehensive exam.)	
Dissertation		
Complete the following (repeatable) course twice:		
POLS 9990	Dissertation	
Dissertation Continuation		
Following completion of two semesters of POLS 9990, registration in the following class is required in each semester (excluding summers) until the dissertation is completed:		
POLS 9996	Dissertation Continuation	

Program Credit/GPA Requirements

56 total semester hours required
Minimum 3.500 GPA required

introduces students to these fields and also seeks to develop their research skills through a series of methods courses. Students may develop a traditional, academic focus in one of the fields, or they may combine it with public policy to highlight a policy orientation. The program is designed to prepare students to be academic scholars and teachers as well as practitioners in research and public service. The PhD degree requires completion of required courses, passing a written and oral comprehensive examination, and the successful defense of the dissertation before a faculty committee.

Credit Requirements and Advanced Standing

Students entering with a master's degree from outside Northeastern may receive advanced standing for relevant prior course work but must complete a minimum of 32 semester hours. Students entering with a Northeastern MA in political science must complete a minimum of 24 semester hours while also satisfying all PhD course requirements. Master's-level course work that results in advanced standing is evaluated by the graduate program director to determine its applicability to the PhD curriculum.

Doctoral Degree Candidacy

Doctoral degree candidacy is attained after successful completion of all course work and passing written and oral comprehensive examinations.

Academic Standing/Progress

All doctoral students must maintain an overall cumulative grade-point average (GPA) of 3.500 while making progress toward the degree requirements. Students who fall below any applicable standard for two consecutive semesters are subject to dismissal from the graduate program. Additionally, receipt of financial support administered by the department, college, or university is contingent on satisfactory academic progress toward the degree and specific guidelines as published in the terms of award. Students who have ungraded courses or courses graded as incomplete risk no longer being eligible for financial aid awards.

Language Proficiency

For students who conduct research in a language other than English, he or she must demonstrate proficiency as necessary for completion of the dissertation. Language courses do not count as electives.

Program Requirements

Complete all courses and requirements listed below.

Milestones

Comprehensive examination
Annual review
Language (as determined by committee)
PhD candidacy
Dissertation proposal
Dissertation committee
Dissertation defense

Core Requirements

Consult the graduate program director regarding which major-required courses apply to your individual plan of study.

Code	Title	Hours
Seminar		
Complete 4–12 semester hours from the following:		4-12
POLS 7204	Seminar in Public Policy	
POLS 7205	Seminar in American Government and Politics	
POLS 7206	Seminar in Comparative Politics	
POLS 7207	Seminar in International Relations	
Inquiry and Design		
POLS 7201	Research Design	4
Quantitative Techniques		
POLS 7202	Quantitative Techniques	4
LPSC 7215	Advanced Quantitative Techniques	4
Advanced methods courses from other disciplines may be chosen in consultation with your faculty advisor.		

Electives

Courses from other disciplines may be chosen in consultation with your faculty advisor.

Code	Title	Hours
Complete 8–20 semester hours in the following:		8-20
POLS 7200 to POLS 7978		

Dissertation

Code	Title	Hours
Exam Preparation		
POLS 8960	Exam Preparation—Doctoral (Only required for PhD students who have completed coursework but have yet to complete the comprehensive exam.)	
Dissertation		
Complete the following (repeatable) course twice:		
POLS 9990	Dissertation	
Dissertation Continuation		
Following completion of two semesters of POLS 9990, registration in the following class is required in each semester (excluding summers) until the dissertation is completed:		
POLS 9996	Dissertation Continuation	

Program Credit/GPA Requirements

24–44 total semester hours required
Minimum 3.500 GPA required

Political Science, MA

Mai'a K. Davis Cross, PhD
Graduate Program Director
m.cross@northeastern.edu

Rosy Trovato, Graduate Program Administrator, 617.373.4404,
r.trovato@northeastern.edu

CSSH Graduate Programs General Regulations (https://www.northeastern.edu/cssh/graduate/current_students)

The Master of Arts program focuses on the core scholarly areas of political science. Students specialize in one of five concentration areas: American government and politics, comparative government and politics, international relations, public policy, and security studies. Courses in the MA program serve as a foundation for work in a doctoral program or as preparation for careers in government, nonprofit organizations, or related work in the private sector.

To earn the Master of Arts in Political Science degree at Northeastern, you must successfully complete 32 semester hours (typically eight

courses) of credit. Full-time students can expect to complete the degree within two academic years. Course work consists of 4 semester hours in a required statistics course, 12 semester hours within a chosen concentration, and 16 semester hours of electives (including the experiential education requirement). To see the full breakdown, click the Program Requirements tab above.

Academic Standing/Progress

Satisfactory progress in the MA program includes maintaining a grade-point average (GPA) of 3.000 overall as well as in the student's concentration area. A final cumulative GPA of at least 3.000 in all course work is required to qualify for the Master of Arts degree. Any course in which a student earns lower than a C grade cannot be used to fulfill concentration area requirements. A student who fails to make satisfactory progress is placed on academic probation, which is a warning that the student may not be allowed to continue in the graduate program unless the deficiency is addressed.

Experiential Education Requirement

In addition to in-class course work, students are required to complete an experiential education component that advances their learning, research, and/or career objectives. Experiential education offers MA students a direct experience with focused reflection relevant to their academic studies. For students with research interests, the experience focuses on related activities, such as primary source analysis and data gathering. For other students, the experience involves engagement with areas of practice and policy, such as an internship. Students register for the relevant course with a minimum of 4 semester hours and maximum of 8 semester hours to satisfy the experiential education requirement.

An optional cooperative education experience (co-op) can also satisfy the experiential education requirement. Cooperative education is central to both the Northeastern experience and to the College of Social Sciences and Humanities Experiential Liberal Arts framework. Northeastern's signature co-op ecosystem provides qualified master's students with six-month work experiences in businesses, nonprofits, and government agencies in Boston and across the United States. Graduate students take their work from campus learning spaces, apply their knowledge outside of the classroom, and then bring knowledge and skills gained in community learning spaces back to our campus learning spaces during the cocurricular experiential integration course.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirement

Code	Title	Hours
Quantitative Techniques		
POLS 7202	Quantitative Techniques	4

Concentrations

- American Government (p. 432)
- International Relations (p. 432)
- Comparative Politics (p. 432)
- Public Policy (p. 432)
- Security Studies (p. 433)

AMERICAN GOVERNMENT CONCENTRATION

Code	Title	Hours
Seminar		
POLS 7205	Seminar in American Government and Politics	4
American Government Courses		
Complete 8 semester hours from the following:		8
POLS 7251	Congress and Policy	
POLS 7313	State Government	
POLS 7341	Security and Resilience Policy	
PPUA 6502	Economic Institutions and Analysis	
PPUA 6505	Public Budgeting and Financial Management	
PPUA 6530	State and Local Public Finance	
PPUA 7240	Health Policy and Politics	
PPUA 7245	Education Policy in the United States	

INTERNATIONAL RELATIONS CONCENTRATION

Code	Title	Hours
Seminar		
POLS 7207	Seminar in International Relations	4
International Relations Courses		
Complete 8 semester hours from the following:		8
POLS 7325	Contemporary Issues in Third World Development	
POLS 7341	Security and Resilience Policy	
POLS 7369	International Security	
POLS 7376	Government and Politics of the Middle East	
POLS 7394	Topical Seminar in International Relations	
PPUA 7243	International Development Administration and Planning	
PPUA 7244	Comparative Public Policy and Administration	

COMPARATIVE POLITICS CONCENTRATION

Code	Title	Hours
Seminar		
POLS 7206	Seminar in Comparative Politics	4
Comparative Politics Courses		
Complete 8 semester hours from the following:		8
POLS 7325	Contemporary Issues in Third World Development	
POLS 7333	Science, Technology, and Public Policy	
POLS 7352	Democratization: Basic Approaches	
POLS 7362	Nationalism	
POLS 7366	Genocide in a Comparative Perspective	
POLS 7370	Europe and European Union Governance	
PPUA 7244	Comparative Public Policy and Administration	

PUBLIC POLICY CONCENTRATION

Code	Title	Hours
Seminar		
POLS 7204	Seminar in Public Policy	4

or PPUA 6506	Techniques of Policy Analysis	

Public Policy Courses

Complete 8 semester hours from the following:		8
POLS 7251	Congress and Policy	
POLS 7333	Science, Technology, and Public Policy	
POLS 7341	Security and Resilience Policy	
POLS 7362	Nationalism	
PPUA 6506	Techniques of Policy Analysis	
PPUA 6507	Institutional Leadership and the Public Manager	
PPUA 6509	Techniques of Program Evaluation	
PPUA 6552	The Nonprofit Sector in Civil Society and Public Affairs	
PPUA 7239	Problems in Metropolitan Policymaking	
PPUA 7240	Health Policy and Politics	
PPUA 7244	Comparative Public Policy and Administration	
PPUA 7245	Education Policy in the United States	

SECURITY STUDIES CONCENTRATION

Code	Title	Hours
Seminar		
POLS 7341	Security and Resilience Policy	4
Security Studies Courses		
Complete 8 semester hours from the following:		8
POLS 7343 to POLS 7349		
POLS 7369	International Security	

Electives

Code	Title	Hours
Complete 16 semester hours in the following range: [1]		16
POLS 5100 to POLS 7990		

Optional Co-op Experience

Code	Title	Hours
Complete two consecutive semesters of Co-op Work Experience and Experiential Integration:		2
POLS 6964 and INSH 6864	Co-op Work Experience and Experiential Integration	

Program Credit/GPA Requirements

32 total semester hours required (34 with optional co-op)
Minimum 3.000 GPA required

[1] Students who do not complete the Optional Co-Op Experience are required to complete 4-8 semester hours from POLS 7407, POLS 7976, POLS 7980, or POLS 7990 to complete the Experiential Education Requirement

<div style="background:red;color:white;padding:4px">Public Administration, MPA</div>

Christopher Bosso, PhD
Graduate Program Director
c.bosso@northeastern.edu
310 Renaissance Park
617.373.4398

Louis DaRos
Graduate Program Administrator
l.daros@northeastern.edu
310 Renaissance Park
617.373.5913

CSSH Graduate Programs General Regulations (https://www.northeastern.edu/cssh/graduate/current_students)

The Master of Public Administration (MPA) is the management and leadership degree for those seeking to serve the public good. The program seeks to equip its students with skills in policy analysis, program evaluation, research methods, and written and verbal communications. Students have an opportunity to develop competencies in budgeting and human resources, organizational management and leadership, and the interplay between ethics and accountability in a diverse society. Throughout the degree program, students gain career-oriented experience through internships, small group projects, and other interactions with professionals in the field. These experiences are designed to enable the Northeastern MPA graduate to move into a wide array of public and nonprofit sector positions at the local, state, national, and international levels.

Mission Statement

The mission of the MPA program at Northeastern University is to serve the needs of the public affairs community, including students, working professionals, faculty, and researchers, by providing a practice-oriented and research-based graduate educational experience. The faculty pledges the best instruction available in a set of courses designed to integrate theoretical foundations with practical skills. The MPA program will prepare students to be effective in a dynamic and increasingly diverse professional environment. We also commit ourselves to assisting students in every possible way to secure internships, postgraduate employment, and overall career advancement. Students, in turn, are expected to meet high levels of academic excellence combined with ethical and professional integrity. Committed to the ideals of public service and advancing the public interest, we seek students who share the same enthusiasm.

The MPA program offers an optional cooperative education experience ("co-op") to eligible students. Cooperative education is central to both the Northeastern experience and to the College of Social Sciences and Humanities experiential liberal arts framework. Northeastern's signature co-op ecosystem provides qualified master's students with six-month work experiences in businesses, nonprofits, and government agencies in Boston and across the United States. Graduate students take their work from campus learning spaces, apply their knowledge outside of the classroom, and then bring knowledge and skills gained in community learning spaces back to our campus learning spaces during the cocurricular experiential integration course.

The Northeastern University MPA program is nationally accredited by NASPAA.

Academic Standing/Progress

Students in the program are monitored for academic progress. Those students whose grade-point average (GPA) falls below a 3.000 are notified by and meet with the director of academic programs. They are counseled that if their GPA does not rise to a 3.000 or higher, they run the risk of not graduating and are advised on strategies for improvement.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

A cumulative 3.000 GPA is required for the core requirements.

Code	Title	Hours
Quantitative Techniques		
LPSC 7305	Research and Statistical Methods	4
or POLS 7202	Quantitative Techniques	
or INSH 6500	Statistical Analysis	
Analysis		
PPUA 6506	Techniques of Policy Analysis	4
PPUA 6502	Economic Institutions and Analysis	4
Administration and Management		
PPUA 6500	Principles of Public Administration	4
PPUA 6505	Public Budgeting and Financial Management	4
PPUA 6507	Institutional Leadership and the Public Manager	4
Capstone		
PPUA 7673	Capstone in Public Policy and Urban Affairs	4

Internship Requirement

An approved internship or waiver is required.

Code	Title	Hours
Internship Waived		
Electives		
Complete 12 semester hours from the Course List. (p. 434)		12
OR		
Internship Completed for Course Credit		
PPUA 6862	Internship with Research	4
Electives		
Complete 8 semester hours from the Course List. (p. 434)		8
OR		
Internship Completed Not for Course Credit		
PPUA 6861	Internship	0
Electives		
Complete 12 semester hours from the Course List. (p. 434)		12

Optional Co-op Experience

Code	Title	Hours
Requires two consecutive semesters of Co-op Work Experience and Experiential Integration:		2
PPUA 6964 and INSH 6864	Co-op Work Experience and Experiential Integration	

Course List

Code	Title	Hours
LPSC 5000 to LPSC 7999		
PPUA 5000 to PPUA 7999		
CRIM 5000 to CRIM 7999 (by advisement only)		
ECON 5000 to ECON 7999 (by advisement only)		
ENGL 5000 to ENGL 7999 (by advisement only)		
HIST 5000 to HIST 7999 (by advisement only)		
POLS 5000 to POLS 7999 (by advisement only)		
SOCL 5000 to SOCL 7999 (by advisement only)		

Program Credit/GPA Requirements

40 total semester hours required (42 with optional co-op)
Minimum 3.000 GPA

Security and Resilience Studies, MS

Daniel Aldrich, PhD
Graduate Program Director
d.aldrich@northeastern.edu

Rosy Trovato
Graduate Program Administrator
617.373.4404
r.trovato@northeastern.edu

CSSH Graduate Programs General Regulations (http://www.northeastern.edu/cssh/graduate/current_students)

Security and resilience studies is an emerging field of inquiry that focuses on how global, national, and subnational actors manage a range of chronic transnational challenges—such as terrorism, organized crime, weapons proliferation, cyberattacks, bioterrorism, climate change and catastrophic disasters, migration, and radicalization—that can be destabilizing to societies. It explores how strategic doctrines, organization processes, bureaucratic behaviors, and security tools and tactics are adapting to these challenges by placing greater emphasis on resilience. Resilience is a concept rooted in multiple disciplines that is gaining widespread currency at the community, societal, and global levels given the prevalence of human-made and naturally occurring threats that do not lend themselves to preventive and protective measures. Strategies for dealing with these threats emphasize measures that mitigate, respond to, recover from, and adapt to risk in order to safeguard essential functions and societal values. Many of these measures involve the role of technologies, system design, and engineering as well as policy, regulatory, and governance issues. Students at Northeastern who enroll in the Master of Science in Security and Resilience Studies have an opportunity to become prepared to inform and support domestic and international efforts to deal with the major sources of turbulence in the 21st century.

The master's program offers an optional cooperative education experience ("co-op") to eligible students. Cooperative education is central to both the Northeastern experience and to the College of Social Sciences and Humanities experiential liberal arts framework. Northeastern's signature co-op ecosystem provides qualified master's students with six-month work experiences in businesses, nonprofits, and government agencies in Boston and across the United States. Graduate students take their work from campus learning spaces, apply their knowledge outside of the classroom, and then bring knowledge and skills gained in community learning spaces back to our campus learning spaces during the cocurricular experiential integration course.

To earn the Master of Science in Security and Resilience Studies degree at Northeastern, you must successfully complete 32 semester hours of credit (34 semester hours with co-op). Full-time students can expect to complete the degree within one calendar year. This program can be completed either at Northeastern University's Boston campus or online.

Academic Standing/Progress

Satisfactory progress in the MS program includes maintaining a minimum grade-point average of 3.000.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Required Core Courses		
POLS 7341	Security and Resilience Policy [1]	4
Core Elective Courses		
Complete 8 semester hours from the following:		8
CRIM 7200	Criminology	
POLS 7343	Counterterrorism [1]	
POLS 7346	Resilient Cities [1]	
or PPUA 7346	Resilient Cities	
POLS 7369	International Security [1]	
POLS 7441	Cyberconflict [1]	
PPUA 5390	Special Topics in Public Policy and Urban Affairs	
Research Methods		
Complete 4 semester hours from the following:		4
CRIM 7404	Research Methods and Statistics	
INSH 6300	Research Methods in the Social Sciences	
POLS 7201	Research Design	
PPUA 6205	Research Design and Methodology in Urban and Regional Policy	
SOCL 7211	Research Methods	

Capstone

Code	Title	Hours
Choose one of the following options in consultation with faculty advisor and program director:		4
POLS 7980	Capstone Project	
or PPUA 7673	Capstone in Public Policy and Urban Affairs	

Electives

Electives are organized by themes to allow students to think thematically.

Code	Title	Hours
Complete 12 credits from any combination of the following elective themes:		12

- Administration, Management, and Policy (p. 435)
- Counterterrorism and Conflict Studies (p. 435)
- Cybersecurity Policy (p. 435)
- Resilient Cities (p. 435)
- Criminal Justice (p.   )

ADMINISTRATION, MANAGEMENT, AND POLICY

Code	Title	Hours
CRIM 7202	The Criminal Justice Process	
CRIM 7230	Police and Society	
CRIM 7404	Research Methods and Statistics	
POLS 7202	Quantitative Techniques	
POLS 7387	Global Governance	
POLS 7704	Critical Infrastructure Resilience [1]	
PPUA 6502	Economic Institutions and Analysis	
PPUA 6503	Public Personnel Administration [1]	
PPUA 6504	Organizational Theory and Management [1]	
PPUA 6505	Public Budgeting and Financial Management [1]	
PPUA 6506	Techniques of Policy Analysis [1]	
PPUA 6507	Institutional Leadership and the Public Manager [1]	

COUNTERTERRORISM AND CONFLICT STUDIES

Code	Title	Hours
CRIM 7201	Global Criminology	
CRIM 7264	Immigration and Crime	
POLS 7343	Counterterrorism [1]	
POLS 7344	Hard Power, Soft Power, and Smart Power	
POLS 7366	Genocide in a Comparative Perspective	
POLS 7369	International Security [1]	

CYBERSECURITY POLICY

Code	Title	Hours
CRIM 7246	Security Management	
CRIM 7260	Topics in Criminal Justice	
IA 5001	Cyberspace Technology and Applications	
IA 5010	Foundations of Information Assurance [1]	
IA 5200	Security Risk Management and Assessment [1]	
IA 5210	Information System Forensics [1]	
IA 5240	Cyberlaw: Privacy, Ethics, and Digital Rights [1]	
IA 5250	Decision Making for Critical Infrastructure	
POLS 7441	Cyberconflict [1]	

RESILIENT CITIES

Code	Title	Hours
CRIM 7200	Criminology	
CRIM 7270	Crime and Community Context	
CRIM 7312	Special Topics in Criminology and Public Policy	
CRIM 7316	Advanced Topics in Methods	
LPSC 7312	Cities, Sustainability, and Climate Change	
POLS 7346	Resilient Cities [1]	
or PPUA 7346	Resilient Cities	
POLS 7704	Critical Infrastructure Resilience [1]	
PPUA 5261	Dynamic Modeling for Environmental Decision Making	
PPUA 5262	Big Data for Cities	
PPUA 5263	Geographic Information Systems for Urban and Regional Policy	
PPUA 5266	Urban Theory and Science	
PPUA 6201	The 21st-Century City: Urban Opportunities and Challenges in a Global Context	

| PPUA 6205 | Research Design and Methodology in Urban and Regional Policy | |
| PPUA 7237 | Advanced Spatial Analysis of Urban Systems | |

CRIMINAL JUSTICE

Code	Title	Hours
CRIM 7200	Criminology	
CRIM 7201	Global Criminology	
CRIM 7202	The Criminal Justice Process	
CRIM 7260	Topics in Criminal Justice	
CRIM 7262	Evidence-Based Crime Policy	
CRIM 7312	Special Topics in Criminology and Public Policy	
CRIM 7316	Advanced Topics in Methods	

Optional Co-op Experience

Code	Title	Hours
Requires two consecutive semesters of Co-op Work Experience and Experiential Integration:		2
POLS 6964 and INSH 6864	Co-op Work Experience and Experiential Integration	

Program Credit/GPA Requirements

32 total semester hours (34 with optional co-op) required
Minimum 3.000 GPA required

[1]   Occasional online offering

Security and Resilience Studies, Graduate Certificate

Program Director
Daniel Aldrich, PhD, d.aldrich@northeastern.edu

Program Administrator
Rosy Trovato, r.trovato@northeastern.edu
617.373.4404

CSSH Graduate Programs General Regulations (http://www.northeastern.edu/cssh/graduate/current_students)

The goal of the Graduate Certificate in Security and Resilience Studies is to prepare students to manage contemporary transnational risks by offering them an opportunity to gain a comprehensive understanding of the principles and policies for security and resilience of critical systems. This goal is achieved by:

- Passing a core course in security and resilience policy that introduces students to a comprehensive approach to managing transnational risks
- Passing recommended foundation courses for cyberspace policy, security administration, and counterterrorism specializations that provide a broad perspective on transnational threats and the means states use to address them
- Learning how to work with others in groups and exercise leadership in teams by completing group assignments and projects

The certificate requires students to take three courses for a total of 12 semester hours. This program can be completed at Northeastern University's Boston campus or online.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirement

Code	Title	Hours
POLS 7341	Security and Resilience Policy	4

Electives

Code	Title	Hours
Complete 8 semester hours from the following:		8
CRIM 7200	Criminology	
POLS 7343	Counterterrorism	
POLS 7346	Resilient Cities	
POLS 7369	International Security	
POLS 7441	Cyberconflict	
PPUA 5390	Special Topics in Public Policy and Urban Affairs	

Program Credit/GPA Requirements

12 total semester hours required
Minimum 3.000 GPA required

School of Public Policy and Urban Affairs

 Website (http://www.northeastern.edu/cssh/policyschool)

Jennie Stephens, PhD
Director
j.stephens@northeastern.edu

Graduate Program Directors

Alan Clayton-Matthews, PhD
PhD Program, Public Policy
a.clayton-matthews@northeastern.edu

Christopher Bosso, PhD
JD/MS Program, Law and Public Policy
MPP Program, MPA Program
Certificate Program, Public Policy Analysis
Certificate Program, Nonprofit Sector, Philanthropy, and Social Change
c.bosso@northeastern.edu

Jeffrey Juris, PhD
MA Program, International Affairs
j.juris@northeastern.edu

Daniel O'Brien, PhD
MS Program, Urban Informatics
Certificate Program, Urban Analytics
d.obrien@northeastern.edu

Gavin Shatkin, PhD
MS Program, Urban and Regional Policy
Certificate Program, Urban Studies
g.shatkin@northeastern.edu

Jennie Stephens, PhD
MS Program, Environmental Science and Policy
Professor and Graduate Program Director

j.stephens@northeastern.edu

310 Renaissance Park
617.373.8900
617.373.7905 (fax)
sppua@northeastern.edu

Graduate Programs Contacts
Louis DaRos, Graduate Program Administrator, l.daros@northeastern.edu
Julie Switkes, Graduate Program Administrator,
j.switkes@northeastern.edu

CSSH Graduate Programs General Regulations (https://
www.northeastern.edu/cssh/graduate/current_students)

The School of Public Policy and Urban Affairs is nationally and internationally recognized for excellence and innovation in policy-oriented education, applied research, and engagement. Our mission is to educate professional master's and doctoral students who are sought after as policy analysts, program evaluators,and leaders of nonprofit, public, private sector, and academic institutions; to create and disseminate policy-relevant knowledge and analytical methods of value to policymakers and the public; and to serve the broader community through policy analysis and technical assistance.

The school is committed to excellence in research and education on pressing and emerging policy issues of the day—public health, climate change, environmental challenges, the court and justice systems, and creating sustainable and resilient cities that provide economic opportunity for their residents. We define our approach as locally informed and internationally relevant. Our hallmark is to engage students in building the world that they would like to live in through experiential learning opportunities and applied research.

Programs
Doctor of Philosophy (PhD)

Master of Arts (MA)

Master of Public Administration (MPA)

Master of Public Policy (MPP)

Master of Science (MS)

Dual Degree

Graduate Certificates

Public Policy, PhD

Website (https://www.northeastern.edu/cssh/policyschool/law-public-policy-phd)

Alan Clayton-Matthews, PhD
Graduate Program Director
a.clayton-matthews@northeastern.edu (a.clayton-matthews@northeastern.edu)
310 Renaissance Park
617.373.2909

Julie Switkes, Graduate Program Administrator, 617.373.2891,
j.switkes@northeastern.edu (j.switkes@northeastern.edu)

CSSH Graduate Programs General Regulations (http://www.northeastern.edu/cssh/graduate/current_students)

This is an interdisciplinary social science program that combines several social science and legal theoretical perspectives with both quantitative and qualitative research methodologies. The wide-ranging faculty in the School of Public Policy and Urban Affairs can support students' research and dissertations in many fields—urban policy and regional economic development; sustainability and climate change; health policy; crime, social justice, and inequality; and the intersection of law and policy. Students work with faculty members to formulate a plan of study within their field of concentration by choosing courses from graduate programs offered in the policy school, the College of Social Sciences and Humanities, and in other colleges and schools at Northeastern University. Students also study a common body of knowledge developed in core courses on policy, research methods, and law. The school's research centers and faculty members' research projects provide opportunities for students to develop insight, experience, and synergies to help with their own research goals. The college and school offer a high level of support allowing all students to be devoted full-time to their studies and research.

Doctoral Degree Candidacy
Complete all required course work with a minimum 3.500 grade-point average (GPA) in the core courses and pass the comprehensive examinations. Students entering without a JD or master's degree must complete 55 semester hours.

Program Requirements
Complete all courses and requirements listed below unless otherwise indicated.

Milestones
Comprehensive examination
Seminars
Annual review
PhD candidacy
Dissertation committee
Dissertation proposal
Dissertation defense

Core Requirements

A grade of B+ or higher is required in each course.

Code	Title	Hours
Seminar		
POLS 7204	Seminar in Public Policy	4
PPUA 7976	Directed Study	1-4
Research and Statistical Methods		
INSH 6500	Statistical Analysis	4
INSH 6302	Qualitative Methods	4
INSH 6300	Research Methods in the Social Sciences	4
Advanced Methods		
Complete one of the following. An additional concentration elective may be taken in lieu of the advanced methods elective:		4
INSH 7500	Advanced Quantitative Analysis	
or INSH 7600	Advanced Methodological and Quantitative Techniques	

Experiential Research Residency

A PhD research residency or waiver is required.

Code	Title	Hours
PPUA 9980	Experiential PhD Research Residency	0

Concentrations

Complete one of the following concentrations:

- Sustainability and Resilience (p. 438)
- Health Policy and Management (p. 438)
- Urban and Regional Policy (p. 438)

SUSTAINABILITY AND RESILIENCE

Code	Title	Hours
Seminar		
PPUA 7511		
Law Requirement		
Complete 3 semester hours from the following:		3
LW 7329	Environmental Law	
LW 7494		
LW 7514		
LW 7580		
Electives		
Complete 24 semester hours from the following:		24
CIVE 7110	Critical Infrastructure Resilience	
LPSC 7312	Cities, Sustainability, and Climate Change	
POLS 7333	Science, Technology, and Public Policy	
POLS 7341	Security and Resilience Policy	
POLS 7704	Critical Infrastructure Resilience	
PPUA 7234	Land Use and Urban Growth Policy	
PPUA 7237	Advanced Spatial Analysis of Urban Systems	
PPUA 7249	Urban Coastal Sustainability	
PPUA 7336	Social Capital and Resilience	
PPUA 7346	Resilient Cities	
PPUA 7976	Directed Study	
SOCL 7230	Political Ecology of Global Capitalism	
SOCL 7267	Environment, Health, and Society	

HEALTH POLICY AND MANAGEMENT

Code	Title	Hours
Seminar		
PPUA 7247	Seminar in U.S. Health Policy and Management	4
Health Organization		
HRMG 6220	Health Organization Management	3
Business Elective		
Complete 3 semester hours from the following:		3
STRT 6220	Strategic Management for Healthcare Organizations	
SCHM 6223	Managing Healthcare Supply Chain Operations	
FINA 6220	Healthcare Finance	
Law Requirement		
LW 7335	Health Law	3
Electives		
Complete a minimum of 18 semester hours from the following:		18
ECON 7200	Topics in Applied Economics	
PPUA 6509	Techniques of Program Evaluation	
PPUA 7244	Comparative Public Policy and Administration	
PPUA 7240	Health Policy and Politics	
PPUA 7243	International Development Administration and Planning	
SOCL 7243	Sociology of Health and Illness	
SOCL 7267	Environment, Health, and Society	
SOCL 7287	Social Movements in Health	
PHTH 6000-9999 (public health elective, by advisement)		

URBAN AND REGIONAL POLICY

Code	Title	Hours
Seminar		
PPUA 7521		
Law Requirement		
LW 7655	Advancing Economic and Social Equity through Municipal Policy and Law	2
Electives		
Complete 24 semester hours from the following:		24
SOCL 7221	Globalization, Development, and Social Justice	
SOCL 7227	Race and Ethnic Relations	
SOCL 7235	Urban Sociology	
SOCL 7268	Globalization and the City	
CRIM 7230	Police and Society	
CRIM 7264	Immigration and Crime	
CRIM 7270	Crime and Community Context	
CRIM 7316	Advanced Topics in Methods	
ARCH 5210	Environmental Systems	
ECON 7210	Applied Microeconomic Policy Analysis	
ECON 7240	Workshop in Applied Econometrics	

Code	Title	
ECON 7250	International Economic Development	
ECON 7260	Urban Economic Systems	
ECON 7261	Urban Economic Development	
ECON 7262	Regional Economic Theory	
ECON 7266	Economics of Government	
ECON 7270	Economics of Law and Regulation	
ECON 7740	Applied Econometrics 2	
ECON 7763	Labor Market Analysis	
LPSC 7215	Advanced Quantitative Techniques	
POLS 7325	Contemporary Issues in Third World Development	
POLS 7334	Social Networks	
PPUA 6201	The 21st-Century City: Urban Opportunities and Challenges in a Global Context	
PPUA 6204	Urban Development and Politics	
PPUA 6509	Techniques of Program Evaluation	
PPUA 6525	Institutions and Public Policy	
PPUA 7237	Advanced Spatial Analysis of Urban Systems	
PPUA 7976	Directed Study	

Exam and Dissertation

Code	Title	Hours
Exam Prep		
Only needed for PhD students who have completed all course work but have not yet passed the comprehensive exam. Not repeatable.		
LPSC 8960		
Dissertation		
Complete the following (repeatable) course twice:		
LPSC 9990	Dissertation	
Dissertation Continuation		
Following completion of two semesters of LPSC 9990, registration in the following class is required in each semester (excluding summers) until the dissertation is completed:		
LPSC 9996	Dissertation Continuation	

Program Credit/GPA Requirements

55 total semester hours required
Minimum 3.500 GPA required

Public Policy, PhD—Advanced Entry

Website (https://www.northeastern.edu/cssh/policyschool/law-public-policy-phd)

Alan Clayton-Matthews, PhD
Graduate Program Director
a.clayton-matthews@northeastern.edu (a.clayton-matthews@northeastern.edu)
310 Renaissance Park
617.373.2909

Julie Switkes, Graduate Program Administrator, 617.373.2891, j.switkes@northeastern.edu (j.switkes@northeastern.edu)

CSSH Graduate Programs General Regulations (http://www.northeastern.edu/cssh/graduate/current_students)

This is an interdisciplinary social science program that combines several social science and legal theoretical perspectives with both quantitative and qualitative research methodologies. The wide-ranging faculty in the School of Public Policy and Urban Affairs can support students' research and dissertations in many fields—urban policy and regional economic development; sustainability and climate change; health policy; crime, social justice, and inequality; and the intersection of law and policy. Students work with faculty members to formulate a plan of study within their field of concentration by choosing courses from graduate programs offered in the policy school, the College of Social Sciences and Humanities, and in other colleges and schools at Northeastern University. Students also study a common body of knowledge developed in core courses on policy, research methods, and law. The school's research centers and faculty members' research projects provide opportunities for students to develop insight, experience, and synergies to help with their own research goals. The college and school offer a high level of support allowing all students to be devoted full-time to their studies and research.

Doctoral Degree Candidacy

Complete all required course work with a minimum 3.500 grade-point average (GPA) in the core courses and pass the comprehensive examinations. Students entering with a JD or master's degree must complete 47 semester hours.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Milestones

Comprehensive examination
Seminars
Annual review
PhD candidacy
Dissertation committee
Dissertation proposal
Dissertation defense

Core Requirements

A grade of B+ or higher is required in each course.

Code	Title	Hours
Seminar		
POLS 7204	Seminar in Public Policy	4
PPUA 7976	Directed Study	1-4
Research and Statistical Methods		
INSH 6500	Statistical Analysis	4
INSH 6302	Qualitative Methods	4
INSH 6300	Research Methods in the Social Sciences	4
Advanced Methods		
Complete one of the following. An additional concentration elective may be taken in lieu of the advanced methods elective:		4
INSH 7500	Advanced Quantitative Analysis	
or INSH 7600	Advanced Methodological and Quantitative Techniques	

Experiential Research Residency

A PhD research residency or waiver is required.

Code	Title	Hours
PPUA 9980	Experiential PhD Research Residency	0

Concentrations

Complete one of the following concentrations:

- Sustainability and Resilience (p. 440)
- Health Policy and Management (p. 440)
- Urban and Regional Policy (p. 440)

SUSTAINABILITY AND RESILIENCE

Code	Title	Hours
Seminar		
PPUA 7511		
Law Requirement		
Complete 3 semester hours from the following:		3
LW 7329	Environmental Law	
Electives		
Complete 16 semester hours from the following:		16
CIVE 7110	Critical Infrastructure Resilience	
LPSC 7312	Cities, Sustainability, and Climate Change	
POLS 7333	Science, Technology, and Public Policy	
POLS 7341	Security and Resilience Policy	
POLS 7704	Critical Infrastructure Resilience	
PPUA 7234	Land Use and Urban Growth Policy	
PPUA 7237	Advanced Spatial Analysis of Urban Systems	
PPUA 7249	Urban Coastal Sustainability	
PPUA 7336	Social Capital and Resilience	
PPUA 7346	Resilient Cities	
PPUA 7976	Directed Study	
SOCL 7230	Political Ecology of Global Capitalism	
SOCL 7267	Environment, Health, and Society	

HEALTH POLICY AND MANAGEMENT

Code	Title	Hours
Seminar		
PPUA 7247	Seminar in U.S. Health Policy and Management	4
Health Organization		
HRMG 6220	Health Organization Management	3
Business Elective		
Complete 3 semester hours from the following:		3
STRT 6220	Strategic Management for Healthcare Organizations	
SCHM 6223	Managing Healthcare Supply Chain Operations	
FINA 6220	Healthcare Finance	
Law Requirement		
LW 7335	Health Law	3
Complete a minimum of 10 semester hours from the following:		10
ECON 7200	Topics in Applied Economics	

Code	Title	Hours
PPUA 6509	Techniques of Program Evaluation	
PPUA 7240	Health Policy and Politics	
PPUA 7243	International Development Administration and Planning	
PPUA 7244	Comparative Public Policy and Administration	
SOCL 7243	Sociology of Health and Illness	
SOCL 7267	Environment, Health, and Society	
SOCL 7287	Social Movements in Health	
PHTH 6000-9999 (public health elective, by advisement)		

URBAN AND REGIONAL POLICY

Code	Title	Hours
Seminar		
PPUA 7521		
Law Requirement		
LW 7655	Advancing Economic and Social Equity through Municipal Policy and Law	2
Electives		
Complete 16 semester hours from the following:		16
SOCL 7221	Globalization, Development, and Social Justice	
SOCL 7227	Race and Ethnic Relations	
SOCL 7235	Urban Sociology	
SOCL 7268	Globalization and the City	
CRIM 7230	Police and Society	
CRIM 7264	Immigration and Crime	
CRIM 7270	Crime and Community Context	
CRIM 7316	Advanced Topics in Methods	
ARCH 5210	Environmental Systems	
ECON 7210	Applied Microeconomic Policy Analysis	
ECON 7240	Workshop in Applied Econometrics	
ECON 7250	International Economic Development	
ECON 7260	Urban Economic Systems	
ECON 7261	Urban Economic Development	
ECON 7262	Regional Economic Theory	
ECON 7266	Economics of Government	
ECON 7270	Economics of Law and Regulation	
ECON 7740	Applied Econometrics 2	
ECON 7763	Labor Market Analysis	
LPSC 7215	Advanced Quantitative Techniques	
POLS 7325	Contemporary Issues in Third World Development	
POLS 7334	Social Networks ^{javascript:void(0)}	
PPUA 6201	The 21st-Century City: Urban Opportunities and Challenges in a Global Context	
PPUA 6204	Urban Development and Politics	
PPUA 6509	Techniques of Program Evaluation	
PPUA 6525	Institutions and Public Policy	
PPUA 7237	Advanced Spatial Analysis of Urban Systems	
PPUA 7976	Directed Study	

Exam and Dissertation

Code	Title	Hours
Exam Prep		
LPSC 8960		

Only required for students who have completed PhD course work but have yet to complete the comprehensive exam. Not repeatable.

Dissertation		

Complete the following (repeatable) course twice:

LPSC 9990	Dissertation	
Dissertation Continuation		

Following completion of two semesters of LPSC 9990, registration in the following class is required in each semester (including summer if the dissertation is submitted in summer) until the dissertation is completed:

LPSC 9996	Dissertation Continuation	

Program Credit/GPA Requirements

47 total semester hours required
Minimum 3.500 GPA required

International Affairs, MA

Jeffrey Juris, PhD
Graduate Program Director
j.juris@northeastern.edu
201 Renaissance Park
617.373.3857

Julie Switkes
Graduate Program Administrator
j.switkes@northeastern.edu (j.switkes@northeastern.edu)
310 Renaissance Park
617.373.2891

CSSH Graduate Programs General Regulations (http://www.northeastern.edu/cssh/graduate/current_students)

We live in an increasingly interconnected global environment where people, goods, ideas, and conflicts traverse borders with rising frequency. Leaders in the activist, policy, and academic spheres must learn not only how to critically analyze these phenomena but also to envisage harnessing their constructive potential. The Master of Arts in International Affairs is an interdisciplinary graduate program dedicated to preparing tomorrow's global citizens.

A holistic approach to enhancing our understanding of the world must span the limits of any one academic field and embrace cross-disciplinary analytical competencies. Spanning several social sciences and humanities, our courses are taught by leading scholars who research democratization, gender, globalization, ethnic conflict and cooperation, human rights and international law, international relations, social activism, social justice, and many other topics. Through its core courses, its two thematic emphases—globalization, development, and social justice and international public policy—as well as global, policy, and methodological electives, this graduate program allows students to pursue a variety of themes.

The master's program offers an optional cooperative education experience ("co-op") to eligible students. Cooperative education is central to both the Northeastern experience and to the College of Social Sciences and Humanities experiential liberal arts framework. Northeastern's signature co-op ecosystem provides qualified master's students with six-month work experiences in businesses, nonprofits, and government agencies in Boston and across the United States. Graduate students take their work from campus learning spaces, apply their knowledge outside of the classroom, and then bring knowledge and skills gained in community learning spaces back to our campus learning spaces during the cocurricular experiential integration course.

Academic Standing/Progress

Students in the program are monitored for academic progress. Those students whose grade-point average (GPA) falls below a 3.000 are notified by and meet with the director of academic programs. They are counseled that if their GPA does not rise to a 3.000 or higher, they run the risk of not graduating and are advised on strategies for improvement.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Political Economy		
Complete 8 semester hours from the following:		8
INTL 5200	Political Economy: Interdisciplinary Perspectives	
POLS 7387	Global Governance	
SOCL 7221	Globalization, Development, and Social Justice	
Social Science Methods		
Complete 4 semester hours from the following:		4
ECON 5110	Microeconomic Theory	
ECON 5120	Macroeconomic Theory	
ECON 7251	International Finance	
INSH 6300	Research Methods in the Social Sciences	
INSH 6500	Statistical Analysis	
LPSC 7305	Research and Statistical Methods	
POLS 7201	Research Design	
POLS 7202	Quantitative Techniques	
SOCL 7211	Research Methods	
SOCL 7220	Seminar in Qualitative Analysis	
Public Policy		
Complete 4 semester hours from the following:		4
PPUA 6502	Economic Institutions and Analysis	
PPUA 6506	Techniques of Policy Analysis	
PPUA 6507	Institutional Leadership and the Public Manager	
PPUA 6509	Techniques of Program Evaluation	
PPUA 6551	Nonprofit Organizations and Social Change	
PPUA 6553	Nonprofit Financial Resource Development	

Electives

Selected in consultation with faculty advisor.

Code	Title	Hours
Complete 20 semester hours from the following:		20
LPSC 5000 to LPSC 7999		
PPUA 5000 to PPUA 7999		
CRIM 5000 to CRIM 7999 (by advisement only)		
ECON 5000 to ECON 7999 (by advisement only)		
ENGL 5000 to ENGL 7999 (by advisement only)		
HIST 5000 to HIST 7999 (by advisement only)		
POLS 5000 to POLS 7999 (by advisement only)		
SOCL 5000 to SOCL 7999 (by advisement only)		

Optional Co-op Experience

Code	Title	Hours
Requires two consecutive semesters of Co-op Work Experience and Experiential Integration:		2
PPUA 6964 and INSH 6864	Co-op Work Experience and Experiential Integration	

Program Credit/GPA Requirements

36 total semester hours required (38 with optional co-op)
Minimum 3.000 GPA required

Public Administration, MPA

Christopher Bosso, PhD
Graduate Program Director
c.bosso@northeastern.edu
310 Renaissance Park
617.373.4398

Louis DaRos
Graduate Program Administrator
l.daros@northeastern.edu
310 Renaissance Park
617.373.5913

CSSH Graduate Programs General Regulations (https://www.northeastern.edu/cssh/graduate/current_students)

The Master of Public Administration (MPA) is the management and leadership degree for those seeking to serve the public good. The program seeks to equip its students with skills in policy analysis, program evaluation, research methods, and written and verbal communications. Students have an opportunity to develop competencies in budgeting and human resources, organizational management and leadership, and the interplay between ethics and accountability in a diverse society. Throughout the degree program, students gain career-oriented experience through internships, small group projects, and other interactions with professionals in the field. These experiences are designed to enable the Northeastern MPA graduate to move into a wide array of public and nonprofit sector positions at the local, state, national, and international levels.

Mission Statement

The mission of the MPA program at Northeastern University is to serve the needs of the public affairs community, including students, working professionals, faculty, and researchers, by providing a practice-oriented and research-based graduate educational experience. The faculty pledges the best instruction available in a set of courses designed to integrate theoretical foundations with practical skills. The MPA program will prepare students to be effective in a dynamic and increasingly diverse professional environment. We also commit ourselves to assisting students in every possible way to secure internships, postgraduate employment, and overall career advancement. Students, in turn, are expected to meet high levels of academic excellence combined with ethical and professional integrity. Committed to the ideals of public service and advancing the public interest, we seek students who share the same enthusiasm.

The MPA program offers an optional cooperative education experience ("co-op") to eligible students. Cooperative education is central to both the Northeastern experience and to the College of Social Sciences and Humanities experiential liberal arts framework. Northeastern's signature co-op ecosystem provides qualified master's students with six-month work experiences in businesses, nonprofits, and government agencies in Boston and across the United States. Graduate students take their work from campus learning spaces, apply their knowledge outside of the classroom, and then bring knowledge and skills gained in community learning spaces back to our campus learning spaces during the cocurricular experiential integration course.

The Northeastern University MPA program is nationally accredited by NASPAA.

Academic Standing/Progress

Students in the program are monitored for academic progress. Those students whose grade-point average (GPA) falls below a 3.000 are notified by and meet with the director of academic programs. They are counseled that if their GPA does not rise to a 3.000 or higher, they run the risk of not graduating and are advised on strategies for improvement.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

A cumulative 3.000 GPA is required for the core requirements.

Code	Title	Hours
Quantitative Techniques		
LPSC 7305	Research and Statistical Methods	4
or POLS 7202	Quantitative Techniques	
or INSH 6500	Statistical Analysis	
Analysis		
PPUA 6506	Techniques of Policy Analysis	4
PPUA 6502	Economic Institutions and Analysis	4
Administration and Management		
PPUA 6500	Principles of Public Administration	4
PPUA 6505	Public Budgeting and Financial Management	4
PPUA 6507	Institutional Leadership and the Public Manager	4
Capstone		
PPUA 7673	Capstone in Public Policy and Urban Affairs	4

Internship Requirement

An approved internship or waiver is required.

Code	Title	Hours
Internship Waived		
Electives		

Complete 12 semester hours from the Course List. (p. 434)		12
OR		
Internship Completed for Course Credit		
PPUA 6862	Internship with Research	4
Electives		
Complete 8 semester hours from the Course List. (p. 434)		8
OR		
Internship Completed Not for Course Credit		
PPUA 6861	Internship	0
Electives		
Complete 12 semester hours from the Course List. (p. 434)		12

Optional Co-op Experience

Code	Title	Hours
Requires two consecutive semesters of Co-op Work Experience and Experiential Integration:		2
PPUA 6964 and INSH 6864	Co-op Work Experience and Experiential Integration	

Course List

Code	Title	Hours
LPSC 5000 to LPSC 7999		
PPUA 5000 to PPUA 7999		
CRIM 5000 to CRIM 7999 (by advisement only)		
ECON 5000 to ECON 7999 (by advisement only)		
ENGL 5000 to ENGL 7999 (by advisement only)		
HIST 5000 to HIST 7999 (by advisement only)		
POLS 5000 to POLS 7999 (by advisement only)		
SOCL 5000 to SOCL 7999 (by advisement only)		

Program Credit/GPA Requirements

40 total semester hours required (42 with optional co-op)
Minimum 3.000 GPA

Public Policy, MPP

Christopher Bosso, PhD
Graduate Program Director
c.bosso@northeastern.edu
310 Renaissance Park
617.373.4398

Louis DaRos**,** Graduate Program Administrator, 617.373.5913, l.daros@northeastern.edu

CSSH Graduate Programs General Regulations (http://www.northeastern.edu/cssh/gradaute/current_students)

The Master of Public Policy (MPP) is the recognized industry standard for those seeking careers in public policy analysis and design. As such, a typical MPP degree emphasizes the analysis of data and other relevant information to enable graduates to assess public problems, develop appropriate policy responses, and evaluate program effectiveness. MPP graduates enter careers as policy analysts, researchers, consultants, program evaluators, and policymakers in a broad range of public and nonprofit settings, ranging from the local to the international, and in the private sector. At Northeastern, the MPP joins our long-established and nationally accredited Master of Public Administration (MPA) as well as our Master of Science in Urban and Regional Policy (MURP), Urban

Informatics, and International Affairs. As such, MPP students will be part of a larger School of Public Policy and Urban Affairs community of great intellectual and policy area diversity.

The MPP program offers an optional cooperative education experience (co-op) to eligible students. Cooperative education is central to both the Northeastern experience and to the College of Social Sciences and Humanities experiential liberal arts framework. Northeastern's signature co-op ecosystem provides qualified master's students with six-month work experiences in businesses, nonprofits, and government agencies in Boston and across the United States. Graduate students take their work from campus learning spaces, apply their knowledge outside of the classroom, and then bring knowledge and skills gained in community learning spaces back to our campus learning spaces during the cocurricular experiential integration course.

Academic Standing/Progress

Students in the program are monitored for academic progress. Those students whose grade-point average (GPA) falls below a 3.000 are notified by and meet with the director of academic programs. They are counseled that if their GPA does not rise to a 3.000 or higher, they run the risk of not graduating and are advised on strategies for improvement.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Methods, Statistics, and Applications Core		
LPSC 7305	Research and Statistical Methods	4
or POLS 7202	Quantitative Techniques	
or INSH 6500	Statistical Analysis	
PPUA 6205	Research Design and Methodology in Urban and Regional Policy	4
or INSH 6300	Research Methods in the Social Sciences	
PPUA 6509	Techniques of Program Evaluation	4
or PPUA 6506	Techniques of Policy Analysis	
Policy Frameworks and Practice Core		
PPUA 6502	Economic Institutions and Analysis	4
LPSC 7311	Strategizing Public Policy	4
PPUA 7673	Capstone in Public Policy and Urban Affairs	4
Methods and Statistics Elective		
Complete 4 semester hours from the following:		4
LPSC 7215	Advanced Quantitative Techniques	
PPUA 5261	Dynamic Modeling for Environmental Decision Making	
PPUA 5262	Big Data for Cities	
PPUA 5263	Geographic Information Systems for Urban and Regional Policy	

Internship Requirement

An approved internship or waiver is required.

Code	Title	Hours
Internship Waived		
Electives		
Complete 12 semester hours from the Course List. (p. 444)		12

OR

Internship Completed for Course Credit

| PPUA 6862 | Internship with Research | 4 |

Electives

| Complete 8 semester hours from the Course List. (p. 444) | 8 |

OR

Internship Completed Not for Course Credit

| PPUA 6861 | Internship | 0 |

Electives

| Complete 12 semester hours from the Course List. (p. 444) | 12 |

Specialization

No specialization is required. If you wish to pursue a specialization, please consult the program director. Specializations can include policy analysis and statistics, sustainability and climate change, urban informatics, law and policy, health policy, security and resilience.

Optional Co-op Experience

Code	Title	Hours
Requires two consecutive semesters of Co-op Work Experience and Experiential Integration:		2
PPUA 6964 and INSH 6864	Co-op Work Experience and Experiential Integration	

Course List

Code	Title	Hours
PPUA 5000 to PPUA 7999		
LPSC 5000 to LPSC 7999		
CRIM 5000 to CRIM 7999 (by advisement only)		
ECON 5000 to ECON 7999 (by advisement only)		
ENGL 5000 to 7999 (by advisement only)		
HIST 5000 to HIST 7999 (by advisement only)		
POLS 5000 to POLS 7999 (by advisement only)		
SOCL 5000 to SOCL 7999 (by advisement only)		

Program Credit/GPA Requirements

40 total semester hours required (42 with optional co-op)

Minimum 3.000 GPA required

Urban Informatics, MS

Daniel O'Brien, PhD
Graduate Program Director
d.obrien@northeastern.edu
310 Renaissance Park
617.373.6234

Louis DaRos
Graduate Program Administrator
l.daros@northeastern.edu
310 Renaissance Park
617.373.5913

CSSH Graduate Programs General Regulations (https://www.northeastern.edu/cssh/graduate/current_students)

The STEM-designated Master of Science in Urban Informatics (MSUI) degree couples comprehensive data analytics skills with an understanding of the big questions faced by cities in the 21st-century city. This cutting-edge program is built upon a unique cross-college initiative, which offers comprehensive state-of-the-art training in the core skills of data analytics—including quantitative analysis, data mining, machine learning, and data visualization. Urban informatics students supplement training in these foundational skills with a specialized sequence of courses that address how data and technology are being used to tackle key social, infrastructural, and environmental challenges.

By combining a theoretically informed perspective of cities with advanced skills in accessing, managing, analyzing, and communicating insights from large complex, data sets, graduates are a part of the next wave of urban professionals ready to lead in the public, private, and nonprofit sectors. Given the continuous growth in urban data and technology, these professionals are essential to shaping the future of urban areas around the globe.

This program provides a uniquely integrated urban and informatics degree with a substantial experiential education component. The focus throughout is on practical application, and students have multiple opportunities to apply what they are learning.

The master's program offers an optional cooperative education experience ("co-op") to eligible students. Cooperative education is central to both the Northeastern experience and to the College of Social Sciences and Humanities experiential liberal arts framework. Northeastern's signature co-op ecosystem provides qualified master's students with six-month work experiences in businesses, nonprofits, and government agencies in Boston and across the United States. Graduate students take their work from campus learning spaces, apply their knowledge outside of the classroom, and then bring knowledge and skills gained in community learning spaces back to our campus learning spaces during the cocurricular experiential integration course.

Academic Standing/Progress

Students in the program are monitored for academic progress. Those students whose grade-point average (GPA) falls below a 3.000 are notified by and meet with the director of academic programs. They are counseled that if their GPA does not rise to a 3.000 or higher, they run the risk of not graduating and are advised on strategies for improvement.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Data Science Courses		
DA 5020 or DA 5030	Collecting, Storing, and Retrieving Data Introduction to Data Mining/Machine Learning	4
PPUA 5301	Introduction to Computational Statistics	4
PPUA 5302	Information Design and Visual Analytics	4
Methods and Applications		
PPUA 5262	Big Data for Cities	4
PPUA 5263	Geographic Information Systems for Urban and Regional Policy	4
PPUA 5266	Urban Theory and Science	4
Analysis		
PPUA 7237 or PPUA 5261	Advanced Spatial Analysis of Urban Systems Dynamic Modeling for Environmental Decision Making	4

Research or Capstone

PPUA 6966	Practicum	4
or PPUA 7673	Capstone in Public Policy and Urban Affairs	

Portfolio

PPUA 6410	Urban Informatics Portfolio	1

Optional Co-op Experience

Code	Title	Hours
Requires two consecutive semesters of Co-op Work Experience and Experiential Integration:		2
PPUA 6964 and INSH 6864	Co-op Work Experience and Experiential Integration	

Program Credit/GPA Requirements

33 total semester hours required (35 with optional co-op)

Minimum 3.000 GPA required

Urban Planning and Policy, MS

The Master of Science in Urban Planning and Policy (MUPP) program trains leaders interested in building just and sustainable solutions to today's critical urban problems, including challenges of affordable housing provision, equitable and sustainable economic growth, sustainable transportation, and climate change adaptation and mitigation. This innovative program combines the expertise in urban planning and policy analysis and data analytics of the School of Public Policy and Urban Affairs with expertise in physical planning, design, and data visualization at the School of Architecture. The core curriculum of the program provides students with a solid foundation in essential skills and concepts, including research design and statistics, economic analysis, legal foundations of urban planning and policy, and the history of urban development and urban planning. Students also have the opportunity to develop substantial expertise in a specialization area, including urban analytics, urban sustainability and resilience, urban design and physical planning, and urban development policy and planning.

The optional cooperative education experience (co-op) is available to eligible students. Cooperative education is central to both the Northeastern experience and to the College of Social Sciences and Humanities experiential liberal arts framework. Northeastern's signature co-op ecosystem provides qualified master's students with six-month work experiences in businesses, nonprofits, and government agencies in Boston and across the United States. Graduate students take their work from campus learning spaces, apply their knowledge outside of the classroom, and then bring knowledge and skills gained in community learning spaces back to our campus learning spaces during the cocurricular experiential integration course.

In addition to the co-op option, students in the MUPP program have opportunities to gain experience in the application of their knowledge and skills via internships, class projects, and a capstone research report. They graduate prepared for careers working for state and local government, federal agencies, community development corporations and other nonprofit organizations, research institutes, and as private-sector planning consultants.

This program is not accepting applicants until spring 2019.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Planning and Policy		
LPSC 5201		4
PPUA 6201	The 21st-Century City: Urban Opportunities and Challenges in a Global Context	4
PPUA 6502	Economic Institutions and Analysis	4
SUEN 6340	Topics in Urban Environmental Design	4
Research Design		
PPUA 6205	Research Design and Methodology in Urban and Regional Policy	4
Quantitative Techniques		
Students in the urban analytics focus area are encouraged to take PPUA 5301.		
Choose one from the following:		4
LPSC 7305	Research and Statistical Methods	
or INSH 6500	Statistical Analysis	
or POLS 7202	Quantitative Techniques	
or PPUA 5301	Introduction to Computational Statistics	

Focus Areas

Complete one of the following focus areas:

- Urban Design and Physical Planning (p. 67)
- Urban Analytics (p. 67)
- Sustainability and Resilience (p. 67)
- Urban Development Policy and Planning (p. 68)

URBAN DESIGN AND PHYSICAL PLANNING

Code	Title	Hours
Gateway Course		
ARCH 6340	Graduate Topics in Architecture	4
Tracks		
Complete one of the following tracks:		8
Urban Design and Real Estate		
ARCH 5310	Design Tactics and Operations	
ARCH 5530	Innovative Models in Real Estate Development and Design	
Physical Planning and Design for Sustainable Urbanism		
SUEN 7230	Urban Ecologies and Technologies 1	
SUEN 7240	Urban Ecologies and Technologies 2	
Urban Experience Track		
ARTG 5150	Information Visualization Principles and Practices	
ARTG		
Capstone		
SUEN 6120	Graduate Studio 2: Sustainable Urban Systems	6

URBAN ANALYTICS

Code	Title	Hours
Gateway Course		
PPUA 5262	Big Data for Cities	4
Required Courses		
ARTG 5150	Information Visualization Principles and Practices	4
PPUA 5263	Geographic Information Systems for Urban and Regional Policy	4
Capstone		
PPUA 7673	Capstone in Public Policy and Urban Affairs	4

SUSTAINABILITY AND RESILIENCE

Code	Title	Hours
Gateway Course		
LPSC 7312	Cities, Sustainability, and Climate Change	4
or SUEN 6310	Cities, Nature, and Design in Contemporary History and Theory	
Methods		
Complete one of the following:		4
PPUA 5261	Dynamic Modeling for Environmental Decision Making	
PPUA 5263	Geographic Information Systems for Urban and Regional Policy	
SUEN 7230	Urban Ecologies and Technologies 1	
Capstone		
PPUA 7673	Capstone in Public Policy and Urban Affairs	4
Elective		
Complete one of the following:		4
PPUA 5260	Ecological Economics	
PPUA 5261	Dynamic Modeling for Environmental Decision Making	
PPUA 7231	Transportation Policy	
PPUA 7234	Land Use and Urban Growth Policy	
PPUA 7249	Urban Coastal Sustainability	
SUEN 6110	Graduate Studio 1: Sustainable Urban Sites	
SUEN 6120	Graduate Studio 2: Sustainable Urban Systems	
SUEN 6220	Implementation and Visualization for Urban Environments 2	
SUEN 6310	Cities, Nature, and Design in Contemporary History and Theory	
SUEN 6340	Topics in Urban Environmental Design	
SUEN 7230	Urban Ecologies and Technologies 1	
SUEN 7240	Urban Ecologies and Technologies 2	
SUEN 7320	Pro-Seminar: Issues in Designed Urban Environments	

URBAN DEVELOPMENT POLICY AND PLANNING

Code	Title	Hours
Gateway Course		
Complete one of the following:		4
PPUA 7230	Housing Policy	
PPUA 7231	Transportation Policy	
PPUA 7233	Contemporary Community Development	
Methods		
PPUA 5263	Geographic Information Systems for Urban and Regional Policy	4
or PPUA 7236	Introduction to Real Estate Development for Urban Policy Makers	
Capstone		
PPUA 7673	Capstone in Public Policy and Urban Affairs	4
Elective		
Complete one of the following:		4
PPUA 5270	Food Systems and Public Policy	
PPUA 6506	Techniques of Policy Analysis	
PPUA 6530	State and Local Public Finance	
PPUA 6551	Nonprofit Organizations and Social Change	
PPUA 7230	Housing Policy	
PPUA 7231	Transportation Policy	
PPUA 7232	Immigration and Urban America	
PPUA 7233	Contemporary Community Development	
PPUA 7234	Land Use and Urban Growth Policy	
PPUA 7236	Introduction to Real Estate Development for Urban Policy Makers	
SUEN 6110	Graduate Studio 1: Sustainable Urban Sites	
SUEN 6120	Graduate Studio 2: Sustainable Urban Systems	
SUEN 6340	Topics in Urban Environmental Design	

Electives

Code	Title	Hours
Complete two of the following:		8
ARCH 5310	Design Tactics and Operations	
ARCH 5530	Innovative Models in Real Estate Development and Design	
ARCH 6100	Graduate Skills Studio	
ARCH 6330	Seminar in Modern Architecture	
ARCH 6340	Graduate Topics in Architecture	
ARTG 5100	Information Design Studio 1: Principles	
ARTG 5120	Research Methods for Design	
ARTG 5130	Visual Communication for Information Design	
ARTG 5330	Visualization Technologies 1	
ARTG 6330	Information Design Mapping Strategies	
DA 5020	Collecting, Storing, and Retrieving Data	
DA 5030	Introduction to Data Mining/Machine Learning	
PPUA 5260	Ecological Economics	
PPUA 5261	Dynamic Modeling for Environmental Decision Making	
PPUA 5263	Geographic Information Systems for Urban and Regional Policy	
PPUA 5270	Food Systems and Public Policy	

PPUA 5302	Information Design and Visual Analytics	
PPUA 6506	Techniques of Policy Analysis	
PPUA 6530	State and Local Public Finance	
PPUA 6551	Nonprofit Organizations and Social Change	
PPUA 7245	Education Policy in the United States	
PPUA 7230	Housing Policy	
PPUA 7231	Transportation Policy	
PPUA 7232	Immigration and Urban America	
PPUA 7233	Contemporary Community Development	
PPUA 7234	Land Use and Urban Growth Policy	
PPUA 7236	Introduction to Real Estate Development for Urban Policy Makers	
PPUA 7237	Advanced Spatial Analysis of Urban Systems	
PPUA 7249	Urban Coastal Sustainability	
SUEN 6110	Graduate Studio 1: Sustainable Urban Sites	
SUEN 6120	Graduate Studio 2: Sustainable Urban Systems	
SUEN 6210	Implementation and Visualization for Urban Environments 1	
SUEN 6220	Implementation and Visualization for Urban Environments 2	
SUEN 6310	Cities, Nature, and Design in Contemporary History and Theory	
SUEN 6340	Topics in Urban Environmental Design	
SUEN 7230	Urban Ecologies and Technologies 1	
SUEN 7240	Urban Ecologies and Technologies 2	
SUEN 7320	Pro-Seminar: Issues in Designed Urban Environments	

Optional Co-op Experience

Code	Title	Hours
Requires two consecutive semesters of Co-op Work Experience and Experiential Integration:		2
PPUA 6964 and INSH 6864	Co-op Work Experience and Experiential Integration	

Program Credit/GPA Requirements

48 total semester hours required (50 with optional co-op)
Minimum 3.000 GPA required

Urban and Regional Policy, MS

Gavin Shatkin, PhD
Graduate Program Director
g.shatkin@northeastern.edu (g.shatkin@northeastern.edu)
310 Renaissance Park
617.373.3074

Julie Switkes
Graduate Program Administrator
j.switkes@northeastern.edu
310 Renaissance Park
617.373.2891

CSSH Graduate Programs General Regulations (http://www.northeastern.edu/cssh/graduate/current_students)

The Master of Science in Urban and Regional Policy (MURP) seeks to equip students with the skills to solve today's critical urban problems through the use of policy analysis, research, and strategic action. Many of the major issues that societies face today—issues of climate change and sustainability, equity and social justice, and economic growth—have their roots in urban growth and change. Solutions to these issues require a multisystem approach that coordinates interventions in economic, environmental, sociocultural, political, spatial, and infrastructural systems in order to maximize impact. For example, revitalizing a distressed community requires connecting it to economic opportunity through transportation and economic development interventions, providing good-quality affordable housing, fostering social interaction through the creation of public space, encouraging the development of strong social institutions, and dealing with environmental concerns.

The MURP degree marries training in theories and frameworks of urban development with an understanding of urban politics and the way in which different policy strategies evolve through the interplay between branches and levels of government. Students have an opportunity to learn skills of policy analysis, economic analysis, quantitative and qualitative research, and oral and written communication. Moreover, students have opportunities to gain experience in the application of their knowledge and skills through internships, co-op, class projects, and a capstone research report. Students graduate and enter the workforce with a unique set of perspectives, skills, experiences, and professional connections. Many go on to careers working for state and local government, federal agencies, community development corporations and other nonprofit organizations, research institutes, and as private-sector policy consultants.

The optional cooperative education experience ("co-op") is available to eligible students. Cooperative education is central to both the Northeastern experience and to the College of Social Sciences and Humanities experiential liberal arts framework. Northeastern's signature co-op ecosystem provides qualified master's students with six-month work experiences in businesses, nonprofits, and government agencies in Boston and across the United States. Graduate students take their work from campus learning spaces, apply their knowledge outside of the classroom, and then bring knowledge and skills gained in community learning spaces back to our campus learning spaces during the cocurricular experiential integration course.

The program is not accepting applicants for Spring 2019.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Quantitative Techniques		
LPSC 7305	Research and Statistical Methods	4
or POLS 7202	Quantitative Techniques	
or INSH 6500	Statistical Analysis	
Policy		
PPUA 6201	The 21st-Century City: Urban Opportunities and Challenges in a Global Context	4
PPUA 6204	Urban Development and Politics	4
PPUA 6502	Economic Institutions and Analysis	4

Evaluation and Research

PPUA 6205	Research Design and Methodology in Urban and Regional Policy	4
or INSH 6300	Research Methods in the Social Sciences	

Research Toolkits

Complete 4 semester hours from the following. An additional elective from the Course List may be taken in lieu of Research Toolkits.	4
PPUA 6206 to PPUA 6214	
PPUA 6216	Research Toolkit for Urban and Regional Policy: Grant Writing

Capstone

PPUA 7673	Capstone in Public Policy and Urban Affairs	4

Internship Requirement

An approved internship or waiver is required.

Code	Title	Hours
Internship Waived		
Electives		
Complete 20 semester hours from the Course List. (p. 448)		20
OR		
Internship Completed for Course Credit		
PPUA 6862	Internship with Research	4
Electives		
Complete 16 semester hours from the Course List. (p. 448)		16
OR		
Internship Completed Not for Course Credit		
PPUA 6861	Internship	0
Electives		
Complete 20 semester hours from the Course List. (p. 448)		20

Optional Co-op Experience

Code	Title	Hours
Requires two consecutive semesters of Co-op Work Experience and Experiential Integration:		2
PPUA 6964 and INSH 6864	Co-op Work Experience and Experiential Integration	

Course List

Code	Title	Hours
LPSC 5000 to LPSC 7999		
PPUA 5000 to PPU 7999		
CRIM 5000 to CRIM 7999 (by advisement only)		
ECON 5000 to ECON 7999 (by advisement only)		
ENGL 5000 to ENGL 7999 (by advisement only)		
HIST 5000 to HIST 7999 (by advisement only)		
POLS 5000 to POLS 7999 (by advisement only)		
SOCL 5000 to SOCL 7999 (by advisement only)		

Program Credit/GPA Requirements

48 total semester hours required (50 with optional co-op)
Minimum 3.000 GPA required

Environmental Science and Policy, MS

The Master of Science in Environmental Science and Policy program emphasizes a broadly interdisciplinary and synthetic approach that integrates knowledge in the environmental sciences (conservation biology, climate change, fisheries science, ecosystem function, biodiversity, restoration ecology) with the social sciences (policy, economics, sociology, political science, and development) and humanities (environmental history, philosophy, and ethics). The goal of the program is to equip professionals with substantive breadth in knowledge and skills at the intersection of environmental science and policy. The program focuses on training students to think critically about the underlying causes of environmental problems and understanding the reciprocal relationships between coupled human-natural ecosystems and the interconnections between social and technological innovations. The program explores practical approaches and potential solutions that decision makers need to evaluate in policy debates related to promoting environmental sustainability.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Seminars		
PPUA 6101	Environmental Science and Policy Seminar 1	4
ENVR 6102	Environmental Science and Policy Seminar 2	4
Skills Courses		
Complete 6-8 semester hours from the following. At least one course needs to be taken from the College of Science Skills Course List and one course from the College of Social Sciences and Humanities Skills Course List.		6-8
College of Science Skills Course List		
EEMB 5130	Ecological Dynamics	
EEMB 5522	Experimental Design Marine Ecology	
ENVR 5210	Environmental Planning	
ENVR 5250	Geology and Land-Use Planning	
ENVR 5260	Geographical Information Systems	
ENVR 5400	Marine Science Policy and Ethics	
ENVR 6500	Biostatistics	
College of Social Sciences and Humanities Skills Course List		
LPSC 6313	Economic Analysis for Law, Policy, and Planning	
LPSC 7215	Advanced Quantitative Techniques	
LPSC 7305	Research and Statistical Methods	
LPSC 7311	Strategizing Public Policy	
POLS 7201	Research Design	
PPUA 5260	Ecological Economics	
PPUA 5261	Dynamic Modeling for Environmental Decision Making	
PPUA 5263	Geographic Information Systems for Urban and Regional Policy	
PPUA 5301	Introduction to Computational Statistics	

PPUA 6205	Research Design and Methodology in Urban and Regional Policy
PPUA 6207	Research Toolkit for Urban and Regional Policy: Survey Techniques
PPUA 6209	Research Toolkit for Urban and Regional Policy: Working with Datasets
PPUA 6210	Research Toolkit for Urban and Regional Policy: Cost/Benefit Analysis
PPUA 6212	Research Toolkit for Urban and Regional Policy: Project Management
PPUA 6213	Research Toolkit for Urban and Regional Policy: Data Visualization
PPUA 6216	Research Toolkit for Urban and Regional Policy: Grant Writing
PPUA 6502	Economic Institutions and Analysis
PPUA 6506	Techniques of Policy Analysis
PPUA 6509	Techniques of Program Evaluation
PPUA 7237	Advanced Spatial Analysis of Urban Systems
SOCL 7211	Research Methods

Electives

Any skills course not taken to fulfill the skills courses requirement can be taken as an elective. Students must take three electives from the College of Science and three from the College of Social Science and Humanities. Students may petition to enroll in other relevant graduate courses offered by other schools at Northeastern University.

COLLEGE OF SCIENCE ELECTIVE LIST

Code	Title	Hours
Complete three from the following:		12
EEMB 5518	Ocean and Coastal Processes	
EEMB 5528	Marine Conservation Biology	
EEMB 5536	Ocean and Coastal Sustainability	
EEMB 5548	Sociobiology	
ENVR 5210	Environmental Planning	
ENVR 5250	Geology and Land-Use Planning	

COLLEGE OF SOCIAL SCIENCES AND HUMANITIES ELECTIVE LIST

Code	Title	Hours
Complete three from the following:		12
LPSC 7311	Strategizing Public Policy	
LPSC 7312	Cities, Sustainability, and Climate Change	
PHTH 5214	Environmental Health	
PHTH 5230	Global Health	
PHTH 5440	Community-Based Participatory Research: Environmental Health	
PPUA 5260	Ecological Economics	
PPUA 5262	Big Data for Cities	
PPUA 5264	Energy Transitions and Climate Resilience: Technology, Policy, and Social Change	
PPUA 5266	Urban Theory and Science	
PPUA 5270	Food Systems and Public Policy	
PPUA 5275	Philanthropy and Civil Society	
PPUA 5302	Information Design and Visual Analytics	

PPUA 5390	Special Topics in Public Policy and Urban Affairs
PPUA 6201	The 21st-Century City: Urban Opportunities and Challenges in a Global Context
PPUA 6204	Urban Development and Politics
PPUA 6505	Public Budgeting and Financial Management
PPUA 6506	Techniques of Policy Analysis
PPUA 6522	Administrative Ethics and Public Management
PPUA 6551	Nonprofit Organizations and Social Change
PPUA 6552	The Nonprofit Sector in Civil Society and Public Affairs
PPUA 6553	Nonprofit Financial Resource Development
PPUA 6862	Internship with Research
PPUA 6966	Practicum
PPUA 7225	The Open Classroom: Public Debates on Public Policy
PPUA 7230	Housing Policy
PPUA 7234	Land Use and Urban Growth Policy
PPUA 7239	Problems in Metropolitan Policymaking
PPUA 7249	Urban Coastal Sustainability
PPUA 7231	Transportation Policy
PPUA 7336	Social Capital and Resilience
PPUA 7346	Resilient Cities
PPUA 7673	Capstone in Public Policy and Urban Affairs
SOCL 7211	Research Methods
SOCL 7230	Political Ecology of Global Capitalism
SOCL 7235	Urban Sociology
SOCL 7243	Sociology of Health and Illness
SOCL 7257	Contemporary Issues in Sociology
SOCL 7267	Environment, Health, and Society
SOCL 7287	Social Movements in Health

Program Credit/GPA Requirements

Note: Typically, students will complete 12–16 semester hours of seminar and skills courses and 18–24 semester hours of electives.

36 total semester hours required
Minimum 3.000 GPA required

Engineering and Public Policy with Concentration in Infrastructure Resilience, MS

The purpose of this degree is to provide students with a background in engineering with the tools necessary to conduct robust policy analysis. It includes required core courses from the Department of Civil and Environmental Engineering and the School of Public Policy, complemented by electives in engineering and public policy, which can be met by two courses and a master's report (recommended), or by one course and a thesis, or by three courses. A minimum of 16 semester hours must be taken in the College of Engineering.

Degree Requirements	With Report	With Thesis	Course Work Only
Required core courses	20 SH	20 SH	20 SH
Other electives	8 SH	4 SH	12 SH
Master of Science report/ thesis	4 SH	8 SH	
Minimum semester hours required	32 SH	32 SH	32 SH

Graduate Certificate Options

Students enrolled in a master's degree have the opportunity to also pursue one of the many engineering graduate certificate options in addition to or in combination with the MS degree. Students should consult their faculty advisor regarding these options (p. 229).

GORDON INSTITUTE OF ENGINEERING LEADERSHIP

Master's Degree in Engineering and Public Policy with Concentration in Infrastructure Resilience with Graduate Certificate in Engineering Leadership

Students may complete a Master of Science in Engineering and Public Policy with Concentration in Infrastructure Resilience in addition to earning a Graduate Certificate in Engineering Leadership. Students must apply and be admitted to the Gordon Engineering Leadership Program in order to pursue this option. The program requires fulfillment of the 16 semester-hour curriculum required to earn the Graduate Certificate in Engineering Leadership, which includes an industry-based challenge project with multiple mentors. The integrated 36-semester-hour degree and certificate will require 20 hours of advisor-approved infrastructure resilience technical courses.

Engineering Leadership (p. 222)

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Infrastructure Resilience		
CIVE 7110	Critical Infrastructure Resilience	4
Environmental Systems Modeling		
Complete 4 semester hours from the following:		4
CIVE 5261	Dynamic Modeling for Environmental Investment and Policymaking	
CIVE 5275	Life Cycle Assessment of Materials, Products, and Infrastructure	
CIVE 5280	Remote Sensing of the Environment	
CIVE 5699	Special Topics in Civil Engineering (Climate Science and Technology Adaptation and Policy)	
CIVE 7388	Special Topics in Civil Engineering (Informatics in Civil Engineering)	
CIVE 7392	Special Topics in Environmental Engineering (Agent-based Modeling)	
Economics		
Complete 4 semester hours from the following:		4
ECON 7210	Applied Microeconomic Policy Analysis	
LPSC 6313	Economic Analysis for Law, Policy, and Planning	
Public Policy and Analysis		
Complete 4 semester hours from the following:		4
LPSC 7311	Strategizing Public Policy	
PPUA 6506	Techniques of Policy Analysis	
PPUA 6509	Techniques of Program Evaluation	
Statistics		
Complete 4 semester hours from the following:		4
CIVE 7100	Time Series and Geospatial Data Sciences	
IE 6200	Engineering Probability and Statistics	
IE 7280	Statistical Methods in Engineering	
LPSC 7215	Advanced Quantitative Techniques	

Options

Complete one of the following options:

COURSE WORK OPTION

Code	Title	Hours
Complete 12 semester hours from the infrastructure course list below.		12

REPORT OPTION

Code	Title	Hours
CIVE 8674	Master's Report	4
Complete 8 semester hours from the Infrastructure course list below.		8

THESIS OPTION

Code	Title	Hours
CIVE 7990	Thesis	8
Complete 4 semester hours from the Infrastructure course list below.		4

Infrastructure Course List

Any required core course not used to meet the required core course requirement can be taken as a restricted elective.

Code	Title	Hours
EMGT 6225	Economic Decision Making	
ENVR 5260	Geographical Information Systems	
IA 5250	Decision Making for Critical Infrastructure	
IE 5500	Systems Engineering in Public Programs	
IE 5640	Data Mining for Engineering Applications	
IE 7290	Reliability Analysis and Risk Assessment	
ME 5645	Environmental Issues in Manufacturing and Product Use	
PPUA 5260	Ecological Economics	
PPUA 5262	Big Data for Cities	
PPUA 5263	Geographic Information Systems for Urban and Regional Policy	
PPUA 7230	Housing Policy	
PPUA 7231	Transportation Policy	

PPUA 7234	Land Use and Urban Growth Policy
PPUA 7237	Advanced Spatial Analysis of Urban Systems
PPUA 7239	Problems in Metropolitan Policymaking
PPUA 7240	Health Policy and Politics

Program Credit/GPA Requirements

32 total semester hours required
Minimum 3.000 GPA required

Engineering and Public Policy with Concentration in Energy & Environment, MS

The purpose of this degree is to provide students with a background in engineering with the tools necessary to conduct robust policy analysis. It includes required core courses from the Department of Civil and Environmental Engineering and the School of Public Policy, complemented by electives in engineering and public policy, which can be met by two courses and a master's report (recommended), or by one course and a thesis, or by three courses. A minimum of 16 semester hours must be taken in the College of Engineering.

Degree Requirements	With Report	With Thesis	Course Work Only
Required core courses	20 SH	20 SH	20 SH
Other electives	8 SH	4 SH	12 SH
Master of Science report/ thesis	4 SH	8 SH	
Minimum semester hours required	32 SH	32 SH	32 SH

Graduate Certificate Options

Students enrolled in a master's degree have the opportunity to also pursue one of the many engineering graduate certificate options in addition to or in combination with the MS degree. Students should consult their faculty advisor regarding these options (p. 229).

GORDON INSTITUTE OF ENGINEERING LEADERSHIP
Master's Degree in Engineering and Public Policy with Concentration in Energy and Environment with Graduate Certificate in Engineering Leadership

Students may complete a Master of Science in Engineering and Public Policy with Concentration in Energy and Environment in addition to earning a Graduate Certificate in Engineering Leadership. Students must apply and be admitted to the Gordon Engineering Leadership Program in order to pursue this option. The program requires fulfillment of the 16 semester-hour curriculum required to earn the Graduate Certificate in Engineering Leadership, which includes an industry-based challenge project with multiple mentors. The integrated 36-semester-hour degree and certificate will require 20 hours of advisor-approved energy and environment technical courses.

Engineering Leadership (p. 222)

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Energy and Environment		
CIVE 7272	Air Quality Management	4
or ENGR 5670	Sustainable Energy: Materials, Conversion, Storage, and Usage	
Environmental Systems Modeling		
Complete 4 semester hours from the following:		4
CIVE 5261	Dynamic Modeling for Environmental Investment and Policymaking	
CIVE 5275	Life Cycle Assessment of Materials, Products, and Infrastructure	
CIVE 5699	Special Topics in Civil Engineering (Climate Science and Technology Adaptation and Policy)	
CIVE 7388	Special Topics in Civil Engineering (Agent-Based Modeling)	
Economics		
Complete 4 semester hours from the following:		4
PPUA 5260	Ecological Economics	
ECON 7210	Applied Microeconomic Policy Analysis	
LPSC 6313	Economic Analysis for Law, Policy, and Planning	
Public Policy and Analysis		
Complete 4 semester hours from the following:		4
LPSC 7311	Strategizing Public Policy	
PPUA 6506	Techniques of Policy Analysis	
PPUA 6509	Techniques of Program Evaluation	
Statistics		
Complete 4 semester hours from the following:		4
CIVE 7100	Time Series and Geospatial Data Sciences	
IE 6200	Engineering Probability and Statistics	
IE 7280	Statistical Methods in Engineering	
LPSC 7215	Advanced Quantitative Techniques	

Options

Complete one of the following options:

COURSE WORK OPTION

Code	Title	Hours
Complete 12 semester hours from the Energy and Environment Course List below.		12

REPORT OPTION

Code	Title	Hours
CIVE 8674	Master's Report	4
Complete 8 semester hours from the Energy and Environment Course List below.		8

THESIS OPTION

Code	Title	Hours
CIVE 7990	Thesis	8
Complete 4 semester hours from the Energy and Environment Course List below.		4

Energy and Environment Course List

Any required core course not used to meet the required core course requirement can be taken as a restricted elective.

Code	Title	Hours
CIVE 5271	Solid and Hazardous Waste Management	
CIVE 5280	Remote Sensing of the Environment	
CIVE 5300	Environmental Engineering Laboratory	
CIVE 7252	Water Engineering, Resources, and Energy Recovery	
CIVE 7261	Surface Water Quality Modeling	
CIVE 7388	Special Topics in Civil Engineering (Informatics in Civil Engineering)	
CIVE 7392	Special Topics in Environmental Engineering (Hydraulic Modeling)	
EMGT 6225	Economic Decision Making	
ENVR 5210	Environmental Planning	
ENVR 5260	Geographical Information Systems	
ME 5645	Environmental Issues in Manufacturing and Product Use	
IE 5500	Systems Engineering in Public Programs	
IE 5640	Data Mining for Engineering Applications	
PPUA 5262	Big Data for Cities	
PPUA 5263	Geographic Information Systems for Urban and Regional Policy	
PPUA 7237	Advanced Spatial Analysis of Urban Systems	

Program Credit/GPA Requirements

32 total semester hours required

Minimum 3.000 GPA required

Public Policy Analysis, Graduate Certificate

Christopher Bosso, PhD
Graduate Program Director
c.bosso@northeastern.edu
310 Renaissance Park
617.373.4398

Louis DaRos
Graduate Program Administrator
l.daros@northeastern.edu
310 Renaissance Park
617.373.5913

CSSH Graduate General Regulations (https://www.northeastern.edu/cssh/graduate/current_students)

The Graduate Certificate in Public Policy Analysis seeks to provide current Northeastern students in a variety of graduate programs outside of the Master of Public Policy program with the tools necessary to analyze and to shape public policy at the local, state, and national levels. Students have an opportunity to gain an understanding of the political and legal processes of policymaking, develop skills central to conducting research on policy questions, and learn techniques for evaluating the effectiveness of competing policies.

Academic Standing/Progress

Students in the program are monitored for academic progress. Those students whose grade-point average (GPA) falls below a 3.000 are notified by and meet with the director of academic programs. They are counseled that if their GPA does not rise to a 3.000 or higher, they run the risk of not graduating and are advised on strategies for improvement.

Program Requirements
Core Requirements *

Code	Title	Hours
Analysis Methods and Skills		
Complete 8 semester hours from the following:		8
PPUA 6502	Economic Institutions and Analysis	
LPSC 7311	Strategizing Public Policy	
or PPUA 6506	Techniques of Policy Analysis	
PPUA 5260	Ecological Economics	
PPUA 5261	Dynamic Modeling for Environmental Decision Making	
PPUA 5262	Big Data for Cities	
PPUA 5263	Geographic Information Systems for Urban and Regional Policy	
PPUA 5302	Information Design and Visual Analytics	
PPUA 6205	Research Design and Methodology in Urban and Regional Policy	
PPUA 6509	Techniques of Program Evaluation	
PPUA 7237	Advanced Spatial Analysis of Urban Systems	
Policy		
Complete 4 semester hours from the following:		4
PPUA 5264	Energy Transitions and Climate Resilience: Technology, Policy, and Social Change	
PPUA 5270	Food Systems and Public Policy	
PPUA 6525	Institutions and Public Policy	
PPUA 7230	Housing Policy	
PPUA 7231	Transportation Policy	
PPUA 7232	Immigration and Urban America	
PPUA 7234	Land Use and Urban Growth Policy	
PPUA 7239	Problems in Metropolitan Policymaking	
PPUA 7240	Health Policy and Politics	
PPUA 7244	Comparative Public Policy and Administration	
PPUA 7245	Education Policy in the United States	

** **Students cannot double count required degree courses for the certificate.***

Program Credit/GPA Requirements

12 total semester hours required

Minimum 3.000 GPA required

Nonprofit Sector, Philanthropy, and Social Change, Graduate Certificate

Christopher Bosso, PhD
Graduate Program Director
c.bosso@northeastern.edu
310 Renaissance Park

617.373.4398

Louis DaRos
Graduate Program Administrator
l.daros@northeastern.edu
310 Renaissance Park
617.373.5913

CSSH Graduate Programs General Regulations (https://www.northeastern.edu/cssh/graduate/current_students)

The Graduate Certificate in Nonprofit Sector, Philanthropy, and Social Change is a response to recent developments in social change theory, practice, and funding that are placing new demands and expectations on social change actors in the nonprofit, public, and private sectors, including nonprofit leaders, philanthropists, policymakers, and corporate social responsibility managers. These developments include the emergence of hybrid, cross-sector business models and new intermediary mechanisms for channeling the flow of capital into social change; new expectations and standards for performance measurement, transparency, and accountability; more sophisticated use of data and technology to support decision making, evaluation, and continual improvement; decreased public funding for traditional nonprofit activities; and the emergence of social media as a vehicle for mobilizing people and resources. The certificate enables social change professionals in all sectors to respond to these changes more effectively and will distinguish itself from other nonprofit certificate programs by focusing on the relationship between social program implementation and funding.

The certificate is a professionally oriented, application-based program for students seeking leadership positions in nonprofit organizations or in a public agency that deals extensively with nonprofits. The curriculum is designed to address the distinctive features and practices of the nonprofit sector and emphasizes management techniques helpful to nonprofit leaders.

Academic Standing/Progress

Students in the program are monitored for academic progress. Those students whose GPA falls below a 3.000 are notified by and meet with the director of academic programs. They are counseled that if their GPA does not rise to a 3.000 or higher, they run the risk of not graduating and are advised on strategies for improvement.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
PPUA 6551	Nonprofit Organizations and Social Change	4
PPUA 6552	The Nonprofit Sector in Civil Society and Public Affairs	4

Elective

Code	Title	Hours
Complete 4 semester hours from the following. Courses outside this list may be taken as electives with approval of the graduate program director.		4
PPUA 5275	Philanthropy and Civil Society	
PPUA 6509	Techniques of Program Evaluation	
PPUA 6522	Administrative Ethics and Public Management	

PPUA 6523	Accountability, Performance Measurement, and Contracting in the Public Sector
PPUA 6553	Nonprofit Financial Resource Development
PPUA 6554	International NGOs and Transnational Activism
PPUA 6966	Practicum
PPUA 7243	International Development Administration and Planning
PPUA 7976	Directed Study

Program Credit/GPA Requirements

12 total semester hours required
Minimum 3.000 GPA required

Urban Analytics, Graduate Certificate

Daniel O'Brien, PhD
Graduate Program Director
d.obrien@northeastern.edu
310 Renaissance Park
617.373.6234

Louis DaRos
Graduate Program Administrator
l.daros@northeastern.edu
310 Renaissance Park
617.373.5913

CSSH Graduate General Regulations (https://www.northeastern.edu/cssh/graduate/current_students)

With 75 percent of the world's population projected to be living in cities by 2050, the need for professionals in urban planning and related careers will only increase. The Graduate Certificate in Urban Analytics seeks to prepare students outside of the Master of Science in Urban Informatics program to manage the progressively complex issues involved with rapidly expanding data and technological resources in cities. As Claire Lane of the City of Boston recently noted, "The blueprints for great cities are increasingly anchored in big data, expressed in GIS [Geographic Information Systems] and codified in coherent policy." Successful graduates with an urban analytics certificate have skills in each of these areas, which prepares them to be professionals ready to shape the future of cities across the globe.

Students are trained with the practical and theoretical knowledge necessary to understand the intricacies of interconnected urban systems and to analyze how these systems work together to create sustainable, resilient, and just cities. The curriculum emphasizes the expertise needed to bridge emerging technological capacities and traditional policymaking processes. Students cultivate applied skills in visual presentation, analysis, and modeling of new data sets—all of which helps to inform investment and policymaking. Inspired by Northeastern's leadership in experiential education, students use Boston and cities around the world as learning labs.

ACADEMIC STANDING/PROGRESS

Students in the program are monitored for academic progress. Those students whose grade-point average (GPA) falls below a 3.000 are notified by and meet with the director of academic programs. They are counseled

that if their GPA does not rise to a 3.000 or higher, they run the risk of not graduating and are advised on strategies for improvement.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
PPUA 5262	Big Data for Cities	4
PPUA 5263	Geographic Information Systems for Urban and Regional Policy	4

Elective

Code	Title	Hours
Complete 4 semester hours from the following:		4
PPUA 5261	Dynamic Modeling for Environmental Decision Making	
PPUA 5266	Urban Theory and Science	
PPUA 7237	Advanced Spatial Analysis of Urban Systems	

Program Credit/GPA Requirements

12 total semester hours required
Minimum 3.000 GPA required

<div style="background:red">

Urban Studies, Graduate Certificate

</div>

Gavin Shatkin, PhD
Graduate Program Director
g.shatkin@northeastern.edu
310 Renaissance Park
617.373.3074

Julie Switkes
Graduate Program Administrator
j.switkes@northeastern.edu
310 Renaissance Park
617.373.2891

CSSH Graduate Programs General Regulations (https://www.northeastern.edu/cssh/graduate/current_students)

The Graduate Certificate in Urban Studies provides a foundation in the fundamentals of urban and regional policy theory for students outside the Master of Science in Urban and Regional Policy degree. It also allows students to pursue course work in a range of areas of concentration, including housing and community development, urban environmental sustainability, economic development, international comparative urban policy, and transportation. The certificate is not a stand-alone program but is anchored by and incorporated into participating graduate programs.

Academic Standing/Progress

Students in the program are monitored for academic progress. Those students whose grade-point average (GPA) falls below a 3.000 are notified by and meet with the director of academic programs. They are counseled that if their GPA does not rise to a 3.000 or higher, they run the risk of not graduating and are advised on strategies for improvement.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
PPUA 6201	The 21st-Century City: Urban Opportunities and Challenges in a Global Context	4
PPUA 7673	Capstone in Public Policy and Urban Affairs	4

Elective

Code	Title	Hours
Complete 4 semester hours in the following range (selected by advisement):		4
PPUA 5000 to PPUA 7999		

Program Credit/GPA Requirements

12 total semester hours required
Minimum 3.000 GPA required

<div style="background:red">

Law and Public Policy, JD/MS

</div>

Christopher Bosso, PhD
Graduate Program Director
c.bosso@northeastern.edu
310 Renaissance Park
617.373.4398

Louis DaRos**,** Graduate Program Administrator, 617.373.5913, l.daros@northeastern.edu

CSSH Graduate Programs General Regulations (http://www.northeastern.edu/cssh/graduate/current_students)

The JD/MS in Law and Public Policy (LPP) is a joint program with and open only to students in the Northeastern University School of Law designed to equip graduates with a unique blend of skills for navigating a complex and rapidly changing policy landscape. The program builds on students' legal training with a compelling blend of skills in applied public policy analysis, policy design, and strategic policy formation. Students also gain career-relevant experience through internships, small group capstone projects, and other interactions with professionals in the field. All are part of a learning process designed to enable the Northeastern law and public policy graduates to navigate, and to redefine, diverse policy areas.

Ideally, students apply to the joint LPP simultaneously. Those who apply and are admitted complete the MS in LPP after completing the first year in the School of Law. Applicants will also be considered once enrolled in the JD, provided the student applies for entry to the MS in LPP in the fall of year two or the fall of year three of the JD program. In these cases, permission of the School of Law is required.

Please note that the School of Public Policy and Urban Affairs offers approximately 20 MS graduate courses in the fall and spring semesters.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Analysis and Statistical Methods		
PPUA 6502	Economic Institutions and Analysis	4
LPSC 7305	Research and Statistical Methods	4
or POLS 7202	Quantitative Techniques	
or INSH 6500	Statistical Analysis	
Policy Courses		
LPSC 7311	Strategizing Public Policy	4
PPUA 7673	Capstone in Public Policy and Urban Affairs	4
Evaluation and Research		
PPUA 6509	Techniques of Program Evaluation	4

Electives

Code	Title	Hours
Complete 8 semester hours from the following:		8
LPSC 5000 to LPSC 7999		
PPUA 5000 to PPU 7999		
CRIM 5000 to CRIM 7999 (by advisement)		
ECON 5000 to ECON 7999 (by advisement)		
ENGL 5000 to ENGL 7999 (by advisement)		
HIST 5000 to HIST 7999 (by advisement)		
POLS 5000 to POLS 7999 (by advisement)		
SOCL 5000 to SOCL 7999 (by advisement)		

Law Requirements

Code	Title	Hours
Complete 9 semester hours from the following subject areas:		9
LW, LAW		

Program Credit/GPA Requirements

37 total semester hours required
Minimum 3.000 GPA required

<div style="background:red;color:white;padding:4px">

Sociology

</div>

Website (http://www.northeastern.edu/cssh/socant)

Matthew Hunt, PhD
Professor and Chair

Liza Weinstein, PhD
Associate Professor and Graduate Program Director

960 Renaissance Park
617.373.2686
617.373.2688 (fax)
gradsoc@northeastern.edu

Graduate Programs Contact
Pamela Simmons, Graduate Program Administrator,
p.simmons@northeastern.edu (j.collins@northeastern.edu)

CSSH Graduate Programs General Regulations (https://www.northeastern.edu/cssh/socant/wp-content/uploads/sites/19/2014/11/GENREGS.pdf)

Uncertainty about the economy, healthcare, and the labor market. Ethnic conflicts in an era of rapid globalization. Concern for the environment.

Shifting gender arrangements as work and family come into conflict. Violence in school and even in houses of worship.

Never has there been a greater need for sociological research focused on the problems and issues of our time.

The Department of Sociology and Anthropology at Northeastern University offers a PhD degree in sociology within a flexible program attractive to students interested in both academic and nonacademic careers. Students pursuing the PhD degree earn an MA degree en route to completing the doctorate, unless they earned the MA in sociology elsewhere. The program seeks to provide students with the theoretical foundation and research skills needed to engage in a career in teaching and research, in the public sector, or in industry. Thirty-two faculty members bring a wide range of substantive interests, organized around four specialization areas: the sociology of gender; globalization; environment and health; and urban sociology. Apart from these formal areas of concentration, the department has extraordinary strengths in inequality and social movements.

Our faculty have won numerous prizes for excellence in the classroom, and many have also played leadership roles in establishing prestigious centers and interdisciplinary programs on Northeastern's campus.

The Department of Sociology and Anthropology is a founding unit of Northeastern's School of Public Policy and Urban Affairs, which is dedicated to providing advanced research opportunities in a multidisciplinary environment. The department also maintains strong ties with the Brudnick Center for the Study of Conflict and Violence; the Women's, Gender, and Sexuality Studies program; the Kitty and Michael Dukakis Center for Urban and Regional Policy; the Northeastern Environmental Justice Research Collaborative; the Social Science Environmental Health Research Institute; and PhD in Public Policy program.

Programs
Doctor of Philosophy

<div style="background:red;color:white;padding:4px">

Sociology, PhD

</div>

The PhD program is designed to attract students who wish to develop a broad base of sociological knowledge, such as would equip students to embark on academic careers in leading institutions of higher education. The PhD program boasts a wide array of curricular strengths and diverse methodological offerings, all of which draw upon the department's emphasis on the study of social inequalities along lines of race, class, and gender. Faculty expertise ranges widely from domestic U.S. concerns to issues that affect groups, regions, and societies on a global scale.

The PhD program is organized around four key areas of specialization:

- Globalization (http://www.northeastern.edu/cssh/socant/graduate/globalization)
- Urban Sociology (http://www.northeastern.edu/cssh/socant/graduate/urban-sociology)
- Sociology of Gender (http://www.northeastern.edu/cssh/socant/graduate/sociology-of-gender)
- Environment and Health (http://www.northeastern.edu/cssh/socant/graduate/environment-and-health)

In addition to the graduate courses offered in the areas of specialization, the program offers a strong foundation in both theory (classical and

contemporary) and methods (quantitative and qualitative). Reflecting the program's distinctive emphasis on social inequalities, students are required to select a core elective in this field, choosing from a list of approved courses maintained by the department (e.g., Social Psychology of Stratification (SOCL 7263) and Class Structure and Social Inequality (SOCL 7252)). As students complete their core requirements, they also work closely with individual faculty members to advance their work within one of the department's standing areas of specialization. Students also have the right to petition to construct their own areas of specialization (pending departmental approval) and have completed area examinations in a host of subfields. Among these are environmental justice, political economy of global capitalism, theoretical criminology, feminist theory, political sociology, social psychology, sociology of violence, and immigration, among many others.

The PhD program is designed to admit relatively small numbers of graduate students each year, which affords students the opportunity to forge close working relationships with the faculty. Our faculty and graduate students work together in a number of interdisciplinary research projects, programs, and centers, including the Social Science Environmental Health Research Institute (http://www.northeastern.edu/environmentalhealth); the Brudnick Center on Violence and Conflict (http://www.northeastern.edu/brudnickcenter); the Dukakis Center for Urban and Regional Policy (http://www.northeastern.edu/dukakiscenter); the (http://catalog.northeastern.edu/graduate/social-sciences-humanities/sociology/sociology-phd/Institute%20on%20Urban%20Health%20Research%20and%20Practice)Institute on Urban Health Research and Practice (http://www.northeastern.edu/iuhrp); the Environmental Justice Research Collaborative (http://www.northeastern.edu/nejrc); the Institute on Race and Justice (http://www.northeastern.edu/irj); and the Women's, Gender, and Sexuality Studies Program (https://www.northeastern.edu/cssh/wgss). Many of the faculty in the Department of Sociology and Anthropology have additional interests and are affiliated with other departments on campus, including environmental studies; law and public policy; Latino, Latin American, and Caribbean studies; African-American studies; international affairs, Jewish studies; and criminal justice. Students who wish to work with faculty in other disciplines are encouraged to enlist the aid of the sociology graduate director or their advisors in contacting individual faculty members.

Admissions

Students interested in the PhD apply directly to that program. Students admitted without a master's degree earn the MA in sociology en route once PhD course work is completed. Please note that all applicants for the doctoral program are required to submit a writing sample that should consist of written materials that demonstrate their capacity for scholarship at the doctoral level. (Copies of several course or term papers or a copy of a master's thesis or paper are appropriate.)

Theory Examination

Students entering the graduate program must take a theory qualifying examination at the conclusion of their first year of study during the spring semester. The theory qualifying examination is a standard exam taken by all students in the same cohort. The exam is graded on a pass/fail basis. Students who fail the examination may take it a second time but will not be allowed to enroll for course work beyond the 30-semester-hour MA requirement or their first year of PhD residence (whichever case applies) until successfully completing the qualifying exam. Students who fail the examination on their second attempt will be asked to leave the program. In the latter case, a student may petition the graduate committee for a review of the student's record and performance in the program.

Course Requirements

As prerequisites, all doctoral candidates are expected to have completed the core methodology and theory requirements for the Master of Arts in Sociology:

- (SOCL 7210)
- Research Methods (SOCL 7211)
- Foundations of Social Theory 1 (SOCL 7200)
- Foundations of Social Theory 2 (SOCL 7201)

Doctoral candidates are also required to complete two advanced methods classes from a list of approved courses maintained by the department. Finally, doctoral students must take a course in the area of social inequality, choosing from a list of approved courses maintained by the department.

Students entering with a bachelor's degree complete 60 semester hours. Students entering with a master's degree complete a minimum of 28 semester hours beyond the master's degree.

Degree Candidacy

To enter into degree candidacy, the student must have earned a Master of Arts degree or its departmental semester-hour equivalent, passed the qualifying examination, established a graduate committee of three faculty members from the sociology department, and successfully completed the candidacy examination.

Once students complete doctoral course work, they will register for the following courses in the following sequence:

- Exam Preparation—Doctoral (SOCL 8960) The semester following completion of course work, students will register for Exam Preparation. During this semester, students should complete their first comprehensive exam. Students only register for Exam Preparation once. Even if a student is unable to complete their first comprehensive exam during this time frame, they will not register for Exam Preparation again.
- Research (SOCL 9986) The next semester, students will register for Research, during which their second comprehensive examination should be completed. Upon completion of both comprehensive examinations, students will have achieved PhD degree candidacy, be certified by the graduate school, and will have five years to complete the dissertation.
- Dissertation (SOCL 9990) Upon achieving PhD degree candidacy, students will register for two consecutive semesters of Dissertation, during which they should complete and defend their dissertation proposal.
- Dissertation Continuation (SOCL 9996) Following the successful defense of their dissertation proposal, students will register for Dissertation Continuation for their remaining semesters until the dissertation is approved by the graduate school and submitted electronically to Proquest. Students do not have to register for Dissertation Continuation during the summer unless that is when their dissertation defense occurs.

Program Requirements
Bachelor's Degree Entrance

Complete all courses and requirements listed below unless otherwise indicated.

Milestones

Qualifying examination
Annual review

Two field comprehensive examinations
Dissertation committee
Dissertation proposal
Dissertation defense

Core Requirements

Code	Title	Hours
Core Courses		
SOCL 7200	Foundations of Social Theory 1	4
SOCL 7201	Foundations of Social Theory 2	4
INSH 6500	Statistical Analysis	4
SOCL 7211	Research Methods	4
or INSH 6300	Research Methods in the Social Sciences	
SOCL 7263	Social Psychology of Stratification	4
Advanced Methods		
Complete 8 semester hours from the following:		8
INSH 7400	Quantitative Analysis	
SOCL 7220	Seminar in Qualitative Analysis	
or INSH 6302	Qualitative Methods	
CRIM 7316	Advanced Topics in Methods	
PHTH 6320	Qualitative Methods in Health and Illness	
PPUA 6509	Techniques of Program Evaluation	

Electives

Code	Title	Hours
Complete 32 semester hours in the following subject area:		32
SOCL		

Dissertation

Code	Title	Hours
Exam Preparation		
Required for students who must maintain full-time status while completing comprehensive exam.		
SOCL 8960	Exam Preparation—Doctoral	
Research		
SOCL 9986	Research	
Dissertation		
Complete the following (repeatable) course twice:		
SOCL 9990	Dissertation	
Dissertation Continuation		
Following completion of two semesters of SOCL 9990, registration in the following class is required in each semester (excluding summers) until the dissertation is completed:		
SOCL 9996	Dissertation Continuation	

Program Credit/GPA Requirements

60 total semester hours required
Minimum 3.000 GPA required

Sociology, PhD—Advanced Entry

The PhD program is designed to attract students who wish to develop a broad base of sociological knowledge, such as would equip students to embark on academic careers in leading institutions of higher education. The PhD program boasts a wide array of curricular strengths and diverse methodological offerings, all of which draw upon the department's emphasis on the study of social inequalities along lines of race, class, and gender. Faculty expertise ranges widely from domestic U.S. concerns to issues that affect groups, regions, and societies on a global scale.

The PhD program is organized around four key areas of specialization.

- Globalization (http://www.northeastern.edu/cssh/socant/graduate/globalization)
- Urban Sociology (http://www.northeastern.edu/cssh/socant/graduate/urban-sociology)
- Sociology of Gender (http://www.northeastern.edu/cssh/socant/graduate/sociology-of-gender)
- Environment and Health (http://www.northeastern.edu/cssh/socant/graduate/environment-and-health)

In addition to the graduate courses offered in the areas of specialization, the program provides a strong foundation in both theory (classical and contemporary) and methods (quantitative and qualitative). Reflecting the program's distinctive emphasis on social inequalities, students are required to select a core elective in this field, choosing from a list of approved courses maintained by the department (e.g., a course on the social psychology of stratification or a seminar in social inequality). As students complete their core requirements, they also work closely with individual faculty members to advance their work within one of the department's standing areas of concentration. Students also have the right to petition to construct their own areas of specialization (pending departmental approval) and have completed area examinations in a host of subfields. Among these are environmental justice, political economy of global capitalism, theoretical criminology, feminist theory, political sociology, social psychology, sociology of violence, and immigration, among many others.

The PhD program is designed to admit relatively small numbers of graduate students each year, which affords students the opportunity to forge close working relationships with the faculty. Our faculty and graduate students work together in a number of interdisciplinary research projects, programs, and centers, including the Social Science Environmental Health Research Institute (http://www.northeastern.edu/environmentalhealth); the Brudnick Center on Violence and Conflict (http://www.northeastern.edu/brudnickcenter); the Dukakis Center for Urban and Regional Policy (http://www.northeastern.edu/dukakiscenter); the Institute on Urban Health Research and Practice (http://www.northeastern.edu/iuhrp); Environmental Justice Research Collaborative (http://www.northeastern.edu/nejrc), the Institute on Race and Justice (http://www.northeastern.edu/irj), and the Women's, Gender and Sexuality Studies Program (https://www.northeastern.edu/cssh/wgss). Many of the faculty in the Department of Sociology and Anthropology have additional interests and are affiliated with other departments on campus, including environmental studies; law, policy, and society; Latino, Latin American, and Caribbean studies; African-American studies; international affairs; Jewish studies; and criminal justice. Students who wish to work with faculty in other disciplines are encouraged to enlist the aid of the sociology graduate program director or their advisers in contacting individual faculty members.

Admissions

Students admitted with a master's degree in sociology from another institution may be exempt from taking the theory exam but may be required to do some additional course work in theory and methods. For students admitted with a master's degree in a field other than sociology, the theory exam requirement and supplementary course work requirements will be determined on a case-by-case basis. Please note that all applicants for the doctoral program are required to submit a

writing sample. The writing sample should consist of written materials that demonstrate students' capacity for scholarship at the doctoral level. (Copies of several course or term papers or a copy of a master's thesis or paper are appropriate.)

Theory Examination

Students entering the graduate program must take a theory qualifying examination at the conclusion of their first year of study during the spring semester. The theory qualifying examination is a standard exam taken by all students in the same cohort. The exam is graded on a pass/fail basis. Students who fail the examination may take it a second time but will not be allowed to enroll for course work beyond the 30-semester-hour MA requirement or their first year of PhD residence (whichever case applies) until successfully completing the qualifying exam. Students who fail the examination on their second attempt will be asked to leave the program. In the latter case, a student may petition the graduate committee for a review of the student's record and performance in the program.

Degree Candidacy

To enter into degree candidacy, the student must have earned a Master of Arts degree or its departmental semester hour's equivalent, passed the qualifying examination, established a graduate committee of three faculty members from the sociology department, and successfully completed the candidacy examination.

Course Requirements

Students entering the PhD program from another university will be required to take the core requirements courses unless they can provide evidence of the completion of equivalent courses during their master's degree work. Credits earned for master's-level core requirements cannot be counted toward the doctorate.

- (SOCL 7210)
- Research Methods (SOCL 7211)
- Foundations of Social Theory 1 (SOCL 7200)
- Foundations of Social Theory 2 (SOCL 7201)

Doctoral candidates are also required to complete two advanced methods classes from a list of approved courses maintained by the department. Finally, doctoral students must take a course in the area of social inequality, choosing from a list of approved courses maintained by the department.

A minimum of 28 semester hours of graduate work beyond the master's degree is required.

Once students complete doctoral course work, they will register for the following courses in the following sequence:

- Exam Preparation—Doctoral (SOCL 8960) The semester following completion of course work, students will register for Exam Preparation. During this semester, students should complete their first comprehensive exam. Students only register for Exam Preparation once. Even if a student is unable to complete their first comprehensive exam during this time frame, they will not register for Exam Preparation again.
- Research (SOCL 9986) The next semester, students will register for Research, during which their second comprehensive examination should be completed. Upon completion of both comprehensive examinations, students will have achieved PhD degree candidacy, be certified by the graduate office, and will have five years to complete the dissertation.

- Dissertation (SOCL 9990) Upon achieving PhD degree candidacy, students will register for two consecutive semesters of Dissertation, during which they should complete and defend their dissertation proposal.
- Dissertation Continuation (SOCL 9996) Following the successful defense of their dissertation proposal, students will register for Dissertation Continuation for their remaining semesters until the dissertation is approved by the graduate office and submitted electronically to Proquest.

Students do not have to register for Dissertation Continuation during the summer unless that is when their dissertation defense occurs.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Milestones

Qualifying examination or waiver
Annual review
Two field comprehensive examinations
Dissertation committee
Dissertation proposal
Dissertation defense

Core Requirements

Code	Title	Hours
Core Course		
SOCL 7263	Social Psychology of Stratification	4
Advanced Methods		
Complete 8 semester hours from the following:		8
INSH 7400	Quantitative Analysis	
SOCL 7220	Seminar in Qualitative Analysis	
or INSH 6302	Qualitative Methods	
CRIM 7316	Advanced Topics in Methods	
PHTH 6320	Qualitative Methods in Health and Illness	
PPUA 6509	Techniques of Program Evaluation	

Electives

Code	Title	Hours
Complete 16 semester hours in the following subject area:		16
SOCL		

Dissertation

Code	Title	Hours
Exam Preparation		
Required for students who have completed coursework but have yet to complete the comprehensive exam. Not repeatable. Required for students who must maintain full-time status while completing thesis or comprehensive exam.		
SOCL 8960	Exam Preparation—Doctoral	
Research		
SOCL 9986	Research	
Dissertation		
Complete the following (repeatable) course twice:		
SOCL 9990	Dissertation	
Dissertation Continuation		

Following completion of two semesters of SOCL 9990, registration in the following class is required in each semester (including the summer if the dissertation is submitted in summer) until the dissertation is completed:

SOCL 9996   Dissertation Continuation

Program Credit/GPA Requirements

28 total semester hours required
Minimum 3.000 GPA required

Interdisciplinary

Doctor of Philosophy (PhD)

- Network Science (p. 226)

Master of Science (MS)

- Environmental Science and Policy (p. 389)
- Engineering and Public Policy with Concentration in Energy and Environment (p. 146)
- Engineering and Public Policy with Concentration in Infrastructure Resilience (p. 147)

Graduate Certificate

- Data Analytics (p. 109)
- Digital Humanities (p. 425)
- Women's, Gender, and Sexuality Studies (p. 465)

Network Science, PhD

Website (http://www.networkscienceinstitute.org)

David Lazer, PhD
Distinguished Professor
College of Social Sciences and Humanities and College of Computer and Information Science

Network Science Program
177 Huntington Avenue, 10th Floor
617.373.8856
617.373.5884 (fax)
networkscience@northeastern.edu

The PhD program in network science aims to enhance our understanding of networks arising from the interplay of human behavior, sociotechnical infrastructures, information diffusion, and biological agents. This is an intrinsically multidisciplinary activity, with members of the network science community representing a wide range of fields including computer science, information science, complexity, physics, sociology, communication, organizational behavior, political science, and epidemiology. This is an interdisciplinary doctoral program focused on training students in network science across several colleges—including the College of Science, the College of Computer and Information Science, the College of Social Sciences and Humanities, Bouvé College of Health Sciences, the College of Engineering, and the College of Arts, Media and Design—with several research areas, including computational sciences, information sciences, health and life sciences, social sciences, and theoretical physics. See other collaborating colleges' catalog sections for possible concentration courses.

Course work is dependent on a student's area of research and subject to prior approval by their faculty advisor. Required course work includes the following: three foundational courses in network science —Complex Networks and Applications (PHYS 5116); Network Science Data (PHYS 7331); and Social Networks (POLS 7334)—at least one supplemental course in network science—Network Science Data 2 (PHYS 7332); Social Networks (POLS 7334); or Data Mining Techniques (CS 6220)—12 semester hours of elective course work defined by their area of research; and two research courses with core faculty of the program. A minimum of 32 credit hours of course work is required, though the graduate program committee may recommend additional course work based on student research interests.

Satisfactory progress in the program will be ongoing and formally evaluated at the end of both the first and second years of the program. Students are expected to maintain a cumulative GPA of 3.000 or better in all course work. Students are not allowed to retake courses. A student who does not maintain the 3.000 GPA, or is not making satisfactory progress on their dissertation research, may be recommended for termination by the graduate program committee.

Each student will have one primary research advisor from the network science doctoral program faculty.

Students will be expected to select their research advisor by the end of the spring semester of their second year in the program.

The dissertation committee consists of at least four members: the dissertation advisor, one additional network science doctoral program faculty member, one member expert in the specific topic of research (can be from outside the university), and one additional tenured/tenure-track faculty member from the concentration department/conferring college. The dissertation advisor must be a full-time tenured or tenure-track member of the Northeastern University faculty. Students may repeat the comprehensive examination once if they are unsuccessful.

Degree Candidacy

A student is considered a PhD candidate upon completion of all required course work with a minimum cumulative GPA of 3.000, satisfactory completion of the qualification exam, and satisfactory completion of the comprehensive exam.

Qualifying Examination

The qualification exam will be an oral examination of the material during the students' course work. The exam will be an hour in length and consist of questions selected by network science faculty who comprise the qualifying examination and dissertation committee. Students will receive 50 to 80 potential questions, which they must be prepared to answer, one month before the exam. The exam will consist of a subset of these questions. The qualifying exam will be offered twice annually, in the fall and spring term. All students are required to initially sit for the exam in the fall, typically in their third year of the PhD program. Students who do not pass the qualifying exam on their first attempt are expected to retake the exam in the spring term. Students may sit for the qualifying exam no more than twice.

Students who fail to complete the qualifying examination but who have completed all the PhD program's required course work with a cumulative GPA of 3.000 or better will be awarded a terminal Master of Science in Network Science degree. Note that no students will be admitted directly into the network science program for receipt of a master's degree.

Comprehensive Examination

Students must submit a written dissertation proposal to the qualifying examination and dissertation committee. The proposal should identify relevant literature, the research problem, the research plan, and the potential impact on the field. A presentation of the proposal will be made in an open forum, and the student must successfully defend it before the

qualifying examination and dissertation committee. The comprehensive exam must precede the final dissertation defense by at least one year.

Dissertation Defense

A PhD student must complete and defend a dissertation that involves original research in network science. The dissertation defense must adhere to the College of Science policies.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Milestones

Annual review
Qualifying exam
Dissertation committee
Dissertation proposal
Dissertation defense

Core Requirements

Code	Title	Hours
Networks		
PHYS 5116	Complex Networks and Applications	4
PHYS 7331	Network Science Data	4
PHYS 7335	Dynamical Processes in Complex Networks	4
Choose one of the following:		4
PHYS 7332	Network Science Data 2	
CS 6220	Data Mining Techniques	
POLS 7334	Social Networks	
Research		
Complete the following (repeatable) course twice:		
NETS 8984	Research	1-4

Specializations

Choose one of the following specializations or 12 semester hours of elective course work from the electives course list:

- Computer Science (p.   )
- Political Science (p.   )
- Epidemiology (p. 228)
- Physics (p. 228)
- Math (p. 228)
- Electives (p. 228)

COMPUTER SCIENCE

Code	Title	Hours
Choose three from the following:		12
CS 6140	Machine Learning	
CS 6220	Data Mining Techniques	
CS 6240	Large-Scale Parallel Data Processing	
CS 7800	Advanced Algorithms	

POLITICAL SCIENCE

Code	Title	Hours
POLS 7200	Perspectives on Social Science Inquiry	4
POLS 7201	Research Design	4
POLS 7202	Quantitative Techniques	4

EPIDEMIOLOGY

Code	Title	Hours
PHTH 5202	Introduction to Epidemiology	3
PHTH 5224	Social Epidemiology	3
Electives: Choose two from the elective course list below.		6-8

PHYSICS

Code	Title	Hours
Choose three from the following:		12
PHYS 5318	Principles of Experimental Physics	
PHYS 7305	Statistical Physics	
PHYS 7731	Biological Physics 1	
PHYS 7321	Computational Physics	

MATH

Code	Title	Hours
Choose three from the following:		12
MATH 7241	Probability 1	
MATH 7233	Graph Theory	
MATH 7375	Topics in Topology	
MATH 7733	Readings in Graph Theory	

ELECTIVES

Complete a minimum of 12 semester hours of elective course work related to your area of research. Common electives include the following:

Code	Title	Hours
NETS 7341	Network Economics	4
NETS 7345	The Practice of Interdisciplinary Scholarship	4
NETS 7350	Bayesian and Network Statistics	4
NETS 7983	Topics	4
NETS 8941	Network Science Literature Review Seminar	2
MATH 7233	Graph Theory	4
CS 5800	Algorithms	4
CS 6140	Machine Learning	4
CS 7180	Special Topics in Artificial Intelligence	4
CS 7295	Special Topics in Data Visualization	4
PHYS 7337	Statistical Physics of Complex Networks	4
PPUA 5301	Introduction to Computational Statistics	4

Dissertation

Code	Title	Hours
Complete one of the following (repeatable) course twice:		
NETS 9990	Dissertation	

Program Credit/GPA Requirements

32 total semester hours required
Minimum 3.000 GPA required

Environmental Science and Policy, MS

The Master of Science in Environmental Science and Policy program emphasizes a broadly interdisciplinary and synthetic approach that integrates knowledge in the environmental sciences (conservation

biology, climate change, fisheries science, ecosystem function, biodiversity, restoration ecology) with the social sciences (policy, economics, sociology, political science, and development) and humanities (environmental history, philosophy, and ethics). The goal of the program is to equip professionals with substantive breadth in knowledge and skills at the intersection of environmental science and policy. The program focuses on training students to think critically about the underlying causes of environmental problems and understanding the reciprocal relationships between coupled human-natural ecosystems and the interconnections between social and technological innovations. The program explores practical approaches and potential solutions that decision makers need to evaluate in policy debates related to promoting environmental sustainability.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Seminars		
PPUA 6101	Environmental Science and Policy Seminar 1	4
ENVR 6102	Environmental Science and Policy Seminar 2	4
Skills Courses		
Complete 6-8 semester hours from the following. At least one course needs to be taken from the College of Science Skills Course List and one course from the College of Social Sciences and Humanities Skills Course List.		6-8
College of Science Skills Course List		
EEMB 5130	Ecological Dynamics	
EEMB 5522	Experimental Design Marine Ecology	
ENVR 5210	Environmental Planning	
ENVR 5250	Geology and Land-Use Planning	
ENVR 5260	Geographical Information Systems	
ENVR 5400	Marine Science Policy and Ethics	
ENVR 6500	Biostatistics	
College of Social Sciences and Humanities Skills Course List		
LPSC 6313	Economic Analysis for Law, Policy, and Planning	
LPSC 7215	Advanced Quantitative Techniques	
LPSC 7305	Research and Statistical Methods	
LPSC 7311	Strategizing Public Policy	
POLS 7201	Research Design	
PPUA 5260	Ecological Economics	
PPUA 5261	Dynamic Modeling for Environmental Decision Making	
PPUA 5263	Geographic Information Systems for Urban and Regional Policy	
PPUA 5301	Introduction to Computational Statistics	
PPUA 6205	Research Design and Methodology in Urban and Regional Policy	
PPUA 6207	Research Toolkit for Urban and Regional Policy: Survey Techniques	
PPUA 6209	Research Toolkit for Urban and Regional Policy: Working with Datasets	
PPUA 6210	Research Toolkit for Urban and Regional Policy: Cost/Benefit Analysis	
PPUA 6212	Research Toolkit for Urban and Regional Policy: Project Management	
PPUA 6213	Research Toolkit for Urban and Regional Policy: Data Visualization	
PPUA 6216	Research Toolkit for Urban and Regional Policy: Grant Writing	
PPUA 6502	Economic Institutions and Analysis	
PPUA 6506	Techniques of Policy Analysis	
PPUA 6509	Techniques of Program Evaluation	
PPUA 7237	Advanced Spatial Analysis of Urban Systems	
SOCL 7211	Research Methods	

Electives

Any skills course not taken to fulfill the skills courses requirement can be taken as an elective. Students must take three electives from the College of Science and three from the College of Social Science and Humanities. Students may petition to enroll in other relevant graduate courses offered by other schools at Northeastern University.

COLLEGE OF SCIENCE ELECTIVE LIST

Code	Title	Hours
Complete three from the following:		12
EEMB 5518	Ocean and Coastal Processes	
EEMB 5528	Marine Conservation Biology	
EEMB 5536	Ocean and Coastal Sustainability	
EEMB 5548	Sociobiology	
ENVR 5210	Environmental Planning	
ENVR 5250	Geology and Land-Use Planning	

COLLEGE OF SOCIAL SCIENCES AND HUMANITIES ELECTIVE LIST

Code	Title	Hours
Complete three from the following:		12
LPSC 7311	Strategizing Public Policy	
LPSC 7312	Cities, Sustainability, and Climate Change	
PHTH 5214	Environmental Health	
PHTH 5230	Global Health	
PHTH 5440	Community-Based Participatory Research: Environmental Health	
PPUA 5260	Ecological Economics	
PPUA 5262	Big Data for Cities	
PPUA 5264	Energy Transitions and Climate Resilience: Technology, Policy, and Social Change	
PPUA 5266	Urban Theory and Science	
PPUA 5270	Food Systems and Public Policy	
PPUA 5275	Philanthropy and Civil Society	
PPUA 5302	Information Design and Visual Analytics	
PPUA 5390	Special Topics in Public Policy and Urban Affairs	
PPUA 6201	The 21st-Century City: Urban Opportunities and Challenges in a Global Context	
PPUA 6204	Urban Development and Politics	

PPUA 6505	Public Budgeting and Financial Management	
PPUA 6506	Techniques of Policy Analysis	
PPUA 6522	Administrative Ethics and Public Management	
PPUA 6551	Nonprofit Organizations and Social Change	
PPUA 6552	The Nonprofit Sector in Civil Society and Public Affairs	
PPUA 6553	Nonprofit Financial Resource Development	
PPUA 6862	Internship with Research	
PPUA 6966	Practicum	
PPUA 7225	The Open Classroom: Public Debates on Public Policy	
PPUA 7230	Housing Policy	
PPUA 7234	Land Use and Urban Growth Policy	
PPUA 7239	Problems in Metropolitan Policymaking	
PPUA 7249	Urban Coastal Sustainability	
PPUA 7231	Transportation Policy	
PPUA 7336	Social Capital and Resilience	
PPUA 7346	Resilient Cities	
PPUA 7673	Capstone in Public Policy and Urban Affairs	
SOCL 7211	Research Methods	
SOCL 7230	Political Ecology of Global Capitalism	
SOCL 7235	Urban Sociology	
SOCL 7243	Sociology of Health and Illness	
SOCL 7257	Contemporary Issues in Sociology	
SOCL 7267	Environment, Health, and Society	
SOCL 7287	Social Movements in Health	

Program Credit/GPA Requirements

Note: Typically, students will complete 12–16 semester hours of seminar and skills courses and 18–24 semester hours of electives.

36 total semester hours required
Minimum 3.000 GPA required

Engineering and Public Policy with Concentration in Energy & Environment, MS

The purpose of this degree is to provide students with a background in engineering with the tools necessary to conduct robust policy analysis. It includes required core courses from the Department of Civil and Environmental Engineering and the School of Public Policy, complemented by electives in engineering and public policy, which can be met by two courses and a master's report (recommended), or by one course and a thesis, or by three courses. A minimum of 16 semester hours must be taken in the College of Engineering.

Degree Requirements	With Report	With Thesis	Course Work Only
Required core courses	20 SH	20 SH	20 SH
Other electives	8 SH	4 SH	12 SH
Master of Science report/thesis	4 SH	8 SH	
Minimum semester hours required	32 SH	32 SH	32 SH

Graduate Certificate Options

Students enrolled in a master's degree have the opportunity to also pursue one of the many engineering graduate certificate options in addition to or in combination with the MS degree. Students should consult their faculty advisor regarding these options (p. 229).

GORDON INSTITUTE OF ENGINEERING LEADERSHIP

Master's Degree in Engineering and Public Policy with Concentration in Energy and Environment with Graduate Certificate in Engineering Leadership

Students may complete a Master of Science in Engineering and Public Policy with Concentration in Energy and Environment in addition to earning a Graduate Certificate in Engineering Leadership. Students must apply and be admitted to the Gordon Engineering Leadership Program in order to pursue this option. The program requires fulfillment of the 16 semester-hour curriculum required to earn the Graduate Certificate in Engineering Leadership, which includes an industry-based challenge project with multiple mentors. The integrated 36-semester-hour degree and certificate will require 20 hours of advisor-approved energy and environment technical courses.

Engineering Leadership (p. 222)

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Energy and Environment		
CIVE 7272	Air Quality Management	4
or ENGR 5670	Sustainable Energy: Materials, Conversion, Storage, and Usage	
Environmental Systems Modeling		
Complete 4 semester hours from the following:		4
CIVE 5261	Dynamic Modeling for Environmental Investment and Policymaking	
CIVE 5275	Life Cycle Assessment of Materials, Products, and Infrastructure	
CIVE 5699	Special Topics in Civil Engineering (Climate Science and Technology Adaptation and Policy)	
CIVE 7388	Special Topics in Civil Engineering (Agent-Based Modeling)	
Economics		
Complete 4 semester hours from the following:		4
PPUA 5260	Ecological Economics	
ECON 7210	Applied Microeconomic Policy Analysis	
LPSC 6313	Economic Analysis for Law, Policy, and Planning	
Public Policy and Analysis		
Complete 4 semester hours from the following:		4
LPSC 7311	Strategizing Public Policy	

| PPUA 6506 | Techniques of Policy Analysis | |
| PPUA 6509 | Techniques of Program Evaluation | |

Statistics

Complete 4 semester hours from the following:		4
CIVE 7100	Time Series and Geospatial Data Sciences	
IE 6200	Engineering Probability and Statistics	
IE 7280	Statistical Methods in Engineering	
LPSC 7215	Advanced Quantitative Techniques	

Options

Complete one of the following options:

COURSE WORK OPTION

Code	Title	Hours
Complete 12 semester hours from the Energy and Environment Course List below.		12

REPORT OPTION

Code	Title	Hours
CIVE 8674	Master's Report	4
Complete 8 semester hours from the Energy and Environment Course List below.		8

THESIS OPTION

Code	Title	Hours
CIVE 7990	Thesis	8
Complete 4 semester hours from the Energy and Environment Course List below.		4

Energy and Environment Course List

Any required core course not used to meet the required core course requirement can be taken as a restricted elective.

Code	Title	Hours
CIVE 5271	Solid and Hazardous Waste Management	
CIVE 5280	Remote Sensing of the Environment	
CIVE 5300	Environmental Engineering Laboratory	
CIVE 7252	Water Engineering, Resources, and Energy Recovery	
CIVE 7261	Surface Water Quality Modeling	
CIVE 7388	Special Topics in Civil Engineering (Informatics in Civil Engineering)	
CIVE 7392	Special Topics in Environmental Engineering (Hydraulic Modeling)	
EMGT 6225	Economic Decision Making	
ENVR 5210	Environmental Planning	
ENVR 5260	Geographical Information Systems	
ME 5645	Environmental Issues in Manufacturing and Product Use	
IE 5500	Systems Engineering in Public Programs	
IE 5640	Data Mining for Engineering Applications	
PPUA 5262	Big Data for Cities	
PPUA 5263	Geographic Information Systems for Urban and Regional Policy	
PPUA 7237	Advanced Spatial Analysis of Urban Systems	

Program Credit/GPA Requirements

32 total semester hours required
Minimum 3.000 GPA required

Engineering and Public Policy with Concentration in Infrastructure Resilience, MS

The purpose of this degree is to provide students with a background in engineering with the tools necessary to conduct robust policy analysis. It includes required core courses from the Department of Civil and Environmental Engineering and the School of Public Policy, complemented by electives in engineering and public policy, which can be met by two courses and a master's report (recommended), or by one course and a thesis, or by three courses. A minimum of 16 semester hours must be taken in the College of Engineering.

Degree Requirements	With Report	With Thesis	Course Work Only
Required core courses	20 SH	20 SH	20 SH
Other electives	8 SH	4 SH	12 SH
Master of Science report/ thesis	4 SH	8 SH	
Minimum semester hours required	32 SH	32 SH	32 SH

Graduate Certificate Options

Students enrolled in a master's degree have the opportunity to also pursue one of the many engineering graduate certificate options in addition to or in combination with the MS degree. Students should consult their faculty advisor regarding these options (p. 229).

GORDON INSTITUTE OF ENGINEERING LEADERSHIP

Master's Degree in Engineering and Public Policy with Concentration in Infrastructure Resilience with Graduate Certificate in Engineering Leadership

Students may complete a Master of Science in Engineering and Public Policy with Concentration in Infrastructure Resilience in addition to earning a Graduate Certificate in Engineering Leadership. Students must apply and be admitted to the Gordon Engineering Leadership Program in order to pursue this option. The program requires fulfillment of the 16 semester-hour curriculum required to earn the Graduate Certificate in Engineering Leadership, which includes an industry-based challenge project with multiple mentors. The integrated 36-semester-hour degree and certificate will require 20 hours of advisor-approved infrastructure resilience technical courses.

Engineering Leadership (p. 222)

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Infrastructure Resilience		
CIVE 7110	Critical Infrastructure Resilience	4
Environmental Systems Modeling		
Complete 4 semester hours from the following:		4
CIVE 5261	Dynamic Modeling for Environmental Investment and Policymaking	
CIVE 5275	Life Cycle Assessment of Materials, Products, and Infrastructure	
CIVE 5280	Remote Sensing of the Environment	
CIVE 5699	Special Topics in Civil Engineering (Climate Science and Technology Adaptation and Policy)	
CIVE 7388	Special Topics in Civil Engineering (Informatics in Civil Engineering)	
CIVE 7392	Special Topics in Environmental Engineering (Agent-based Modeling)	
Economics		
Complete 4 semester hours from the following:		4
ECON 7210	Applied Microeconomic Policy Analysis	
LPSC 6313	Economic Analysis for Law, Policy, and Planning	
Public Policy and Analysis		
Complete 4 semester hours from the following:		4
LPSC 7311	Strategizing Public Policy	
PPUA 6506	Techniques of Policy Analysis	
PPUA 6509	Techniques of Program Evaluation	
Statistics		
Complete 4 semester hours from the following:		4
CIVE 7100	Time Series and Geospatial Data Sciences	
IE 6200	Engineering Probability and Statistics	
IE 7280	Statistical Methods in Engineering	
LPSC 7215	Advanced Quantitative Techniques	

Options

Complete one of the following options:

COURSE WORK OPTION

Code	Title	Hours
Complete 12 semester hours from the infrastructure course list below.		12

REPORT OPTION

Code	Title	Hours
CIVE 8674	Master's Report	4
Complete 8 semester hours from the Infrastructure course list below.		8

THESIS OPTION

Code	Title	Hours
CIVE 7990	Thesis	8
Complete 4 semester hours from the Infrastructure course list below.		4

Infrastructure Course List

Any required core course not used to meet the required core course requirement can be taken as a restricted elective.

Code	Title	Hours
EMGT 6225	Economic Decision Making	
ENVR 5260	Geographical Information Systems	
IA 5250	Decision Making for Critical Infrastructure	
IE 5500	Systems Engineering in Public Programs	
IE 5640	Data Mining for Engineering Applications	
IE 7290	Reliability Analysis and Risk Assessment	
ME 5645	Environmental Issues in Manufacturing and Product Use	
PPUA 5260	Ecological Economics	
PPUA 5262	Big Data for Cities	
PPUA 5263	Geographic Information Systems for Urban and Regional Policy	
PPUA 7230	Housing Policy	
PPUA 7231	Transportation Policy	
PPUA 7234	Land Use and Urban Growth Policy	
PPUA 7237	Advanced Spatial Analysis of Urban Systems	
PPUA 7239	Problems in Metropolitan Policymaking	
PPUA 7240	Health Policy and Politics	

Program Credit/GPA Requirements

32 total semester hours required
Minimum 3.000 GPA required

Data Analytics, Graduate Certificate

The interdisciplinary Graduate Certificate in Data Analytics is offered through a collaboration between the College of Computer and Information Sciences and the College of Social Sciences and Humanities. The certificate curriculum emphasizes the skills needed to bridge between emerging technological capacities and traditional policymaking processes. The program is designed to provide students with foundational knowledge in data science—including data management, machine learning, data mining, statistics, and visualizing and communicating data—that can be applied to data-driven decision making in any discipline.

For more information on the certificate, refer to the program's website (http://www.northeastern.edu/datascience).

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
DA 5020	Collecting, Storing, and Retrieving Data	4
DA 5030	Introduction to Data Mining/Machine Learning	4

PPUA 5301	Introduction to Computational Statistics	4
PPUA 5302	Information Design and Visual Analytics	4

Program Credit/GPA Requirements

16 total semester hours required
Minimum 3.000 GPA required

<div style="background:#cc0000;color:#fff;padding:6px;font-weight:bold">Digital Humanities, Graduate Certificate</div>

Elizabeth Maddock Dillon, PhD
Certificate Co-Director
e.dillon@northeastern.edu

Julia Flanders, PhD
Certificate Co-Director
j.flanders@northeastern.edu

Sarah Connell, PhD
Certificate Administrator
sa.connell@northeastern.edu

CSSH Graduate Programs General Regulations (https://www.northeastern.edu/cssh/graduate/current_students)

The Graduate Certificate in Digital Humanities allows students to pursue an organized course of study in digital humanities with the interdisciplinary faculty of the NULab for Texts, Maps, and Networks (http://www.northeastern.edu/nulab) while completing requirements for their degrees in existing Northeastern University doctoral and master's programs. *This is not a stand-alone certificate*; rather, it will be completed by students in the course of their existing program of study.

Digital humanities (DH) is an emerging field of research that is interdisciplinary in scope and collaborative in nature. The field is developing in relation to new digital technologies that have changed the objects of study, methods, and opportunities for research and teaching in existing humanities fields. Digitized texts are now read and accessed in new ways; digitized corpora of texts make possible new modes of quantitative and qualitative analysis (including "distant reading," text mining, mapping, and network analysis); born digital objects constitute new primary sources in need of humanistic theorization, approaches, and critical vocabularies; and modes of encoding, aggregating, and connecting texts enable the creation of new archival resources that are changing our understanding of the archive itself as well revealing new historical, literary, and cultural patterns.

The field is new and developing rapidly and many students are eager for training in this area—both because DH is at the cutting edge of disciplinary work and because it offers new opportunities for employment within the academy and outside of it.

Academic Standing/Progress

Students in the program are monitored for academic progress. Those students whose GPA falls below a 3.000 are notified by and meet with the director of academic programs. They are counseled that if their GPA does not rise to a 3.000 or higher, they run the risk of not graduating and are advised on strategies for improvement.

Final Project

The student will complete a final independent DH research project located in the student's home program (such as a thesis, or a portion thereof) or participation in a collaborative DH project with substantial student participation. The final project will be overseen by the NULab faculty members teaching the NULab Project Seminar during its development; NULab workshop instructors will advise students on their projects and help students get guidance from other faculty as appropriate. Final projects will be submitted with three components: the project itself, a written project description of about 2,000 words, and a presentation to the NULab community. The DH certificate committee will formally approve all final projects.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Topics/Readings/Methods		
ENGL 7370	Topics in Digital Humanities (Introduction to Digital Humanities)	4
or HIST 7370	Texts, Maps, and Networks: Readings and Methods for Digital History	
Lab Project Seminar		
Complete the following (repeatable) 2-credit course two times:		4
INSH 7910	NULab Project Seminar	

Elective

Code	Title	Hours
Complete 4 semester hours from the following:		4
ARTG 5100	Information Design Studio 1: Principles	
ARTG 5120	Research Methods for Design	
CS 6120	Natural Language Processing	
CS 7290	Special Topics in Data Science	
ENGL 7370	Topics in Digital Humanities	
INSH 6406	Analyzing Complex Digitized Data	
JRNL 6340	Fundamentals of Digital Journalism	
JRNL 6341	Telling Your Story with Data	
JRNL 6355	Seminar in Investigative Reporting	
HIST 7219	Topics in Cultural History (selected topics only)	
POLS 7334	Social Networks	
PPUA 5301	Introduction to Computational Statistics	
PPUA 5302	Information Design and Visual Analytics	

Program Credit/GPA Requirements

Minimum 12 total semester hours required
Minimum 3.000 GPA required

<div style="background:#cc0000;color:#fff;padding:6px;font-weight:bold">Women's, Gender, and Sexuality Studies, Graduate Certificate</div>

Website (https://www.northeastern.edu/cssh/wgss/graduate/certificate)

Suzanna Walters
Graduate Program Director
s.walters@northeastern.edu

Kiki Samko
Graduate Program Administrator

k.samko@no (k.samko@neu.edu)rtheastern.edu (k.samko@northeastern.edu)
617.373.4984

The Graduate Certificate in Women's, Gender, and Sexuality Studies (WGSS) is designed for students currently enrolled in a Northeastern University master's or doctoral program. The certificate aims to provide enhanced competency by:

- Analyzing contemporary feminist theoretical frameworks, methodologies, issues, and topics and their relation to established disciplines
- Focusing on the intersection of gender with sexuality, race, class, and other vectors of power and identity
- Broadening and enriching analytical skills in one or more disciplines while drawing on the interdisciplinary perspectives of WGSS
- Challenging the traditional separation of academic theory from political and professional practice

Prospective certificate students are advised initially to consult with the WGSS program director to develop a plan for completing the certificate.

WGSS also offers a specific path for master's of public health students to complete a graduate certificate in WGSS. MPH students are able to apply theories, concepts, and methods gained from the WGSS certificate to urban health issues. Certificate students will work with an advisor in the public health program to develop a plan for completing the certificate.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirement

Code	Title	Hours
Complete one of the following:		4
WMNS 6100	Theorizing Gender and Sexuality	
WMNS 7615	Feminist Inquiry	
WMNS 7100	Queer Theory: Sexualities, Genders, Politics	
or SOCL 7100	Queer Theory: Sexualities, Genders, Politics	

Electives

Code	Title	Hours
Complete two of the following. At least one course must come from outside the student's home discipline. Any course not taken to complete the required course work may be taken as an elective. Electives outside this list may be chosen in consultation with program director. Students may also consider courses at the Graduate Consortium for Studies of Gender, Culture, Women, and Sexuality (located at MIT).		8
CAEP 6380	Seminar in Feminist Psychology	
HIST 7304	Research Seminar in Gender and Society in the Modern World	
SOCL 7222	Gender and Globalization	
SOCL 7225	Gender and Social Movements	
SOCL 7265	Sociology of Gender	
SOCL 7273	Gender and Social Policy	
WMNS 7635	Understanding the Pornographic and the Obscene	
WMNS 7900	Special Topics in Women's, Gender, and Sexuality Studies	

WMNS 7976	Directed Study	

The following courses are required for MPH students, in addition to one elective from the list above. Non–MPH students may not use these courses as electives.

PHTH 5120	Race, Ethnicity, and Health in the United States	
PHTH 6204	Society, Behavior, and Health	

The course below is an elective for MPH students only and must incorporate a project focused on gender and/or sexuality into the selected urban public health issue. A WGSS faculty member must serve on the capstone committee.

PHTH 6910	Public Health Capstone	

Program Credit/GPA Requirements

12 total semester hours required
Minimum 3.000 GPA required

Faculty

Mehdi Abedi
Assistant Teaching Professor, Mechanical and Industrial Engineering; Northeastern University, PhD

Emad Aboelela
Associate Teaching Professor, Electrical and Computer Engineering; University of Miami, PhD

Max Abrahms
Assistant Professor, Political Science; University of California, Los Angeles, PhD

Ali Abur
Professor, Electrical and Computer Engineering; Ohio State University, PhD

Laurie Achin
Visiting Lecturer, American Sign Language; Gallaudet University, MA

Daniel Adams
Associate Professor, Architecture; Harvard University, MArch

George G. Adams
College of Engineering Distinguished Professor, Mechanical and Industrial Engineering; University of California, Berkeley, PhD

Jeffrey Agar
Associate Professor, Chemistry and Chemical Biology and Pharmaceutical Sciences; University of Georgia, PhD

Rajesh Aggarwal
Professor, Finance; Harvard University, PhD

Christina Agostinelli-Fucile
Assistant Teaching Professor, World Languages Center; State University of New York, Buffalo, PhD

Ruth Aguilera
Distinguished Professor, International Business and Strategy; Harvard University, PhD

Amal Ahmed
Associate Professor, Computer and Information Science; Princeton University, PhD

Amira Ahmed Mohamed
Visiting Scholar, International Affairs; University of East London (United Kingdom), PhD

Jaehan Ahn
Assistant Professor, Accounting; University of Oklahoma, PhD

Sophia Ainslie
Lecturer, Art + Design; School of the Museum of Fine Arts/Tufts University, MFA

Mohammad Alam
Professor, Economics; University of Western Ontario (Canada), PhD

Noor E. Alam
Assistant Professor, Mechanical and Industrial Engineering; University of Alberta (Canada), PhD

Brian Albrecht
Associate Cooperative Education Coordinator, College of Engineering; Carnegie Mellon University, MS

Len Albright
Assistant Professor, Sociology and Anthropology and Public Policy and Urban Affairs; University of Chicago, PhD

Daniel Aldrich
Professor, Political Science and Public Policy and Urban Affairs; Harvard University, PhD

Todd M. Alessandri
Associate Professor, International Business and Strategy; University of North Carolina, Chapel Hill, PhD

Jacques Alexis
Assistant Academic Specialist, College of Professional Studies; University of Wisconsin, Platteville, MS

Nicole Aljoe
Associate Professor, English; Tufts University, PhD

Kristen Allison
Assistant Pofessor, Communication Sciences and Disorders; University of Wisconsin, Madison, PhD

Michael Allshouse
Assistant Professor, Mechanical and Industrial Engineering; Massachusetts Institute of Technology, PhD

Meryl Alper
Assistant Professor, Communication Studies; University of Southern California, PhD

Shannon Alpert
Assistant Teaching Professor, College of Professional Studies; University of North Carolina, Charlotte, EdD

Akram N. Alshawabkeh
George A. Snell Professor of Engineering, Civil and Environmental Engineering; Louisiana State University, PhD

Sari Altschuler
Assistant Professor, English; City University of New York, PhD

George O. Alverson
Associate Professor, Physics; University of Illinois, Urbana-Champaign, PhD

Christopher Amato
Assistant Professor, Computer and Information Science; University of Massachusetts, Amherst, PhD

Steven Amato
Associate Teaching Professor, College of Professional Studies; Boston College, PhD

Saurabh Ambulkar
Assistant Professor, Supply Chain and Information Management; Iowa State University, PhD

Jane Amidon
Professor, Architecture; Harvard University, MLA

Mansoor M. Amiji
University Distinguished Professor, Pharmaceutical Sciences; Purdue University, PhD

Mahshid Amirabadi
Assistant Professor, Electrical and Computer Engineering; Texas AM University, PhD

Ghita Amor-Tijani
Lecturer, Computer and Information Science; George Washington University, PhD

Teiichi Ando
Professor, Mechanical and Industrial Engineering; Colorado School of Mines, PhD

Jonathan Andrew
Associate Cooperative Education Coordinator, College of Social Sciences and Humanities; SIT Graduate Institute, MA

Edwin C. Andrews
Associate Professor, Art + Design; Indiana University, MFA

Jose Annunziato
Assistant Teaching Professor, Computer and Information Science; University of Massachusetts, Amherst, PhD

Javier Apfeld
Assistant Professor, Biology; University of California, San Francisco, PhD

Carmen G. Armengol
Associate Professor, Applied Psychology; Pennsylvania State University, PhD

Richard Arrowood
Associate Teaching Professor, College of Professional Studies; Massachusetts School of Law, JD

Cheryl Arruda
Assistant Cooperative Education Coordinator, College of Engineering; Northeastern University, MEd

Lori Ashline
Assistant Teaching Professor, College of Professional Studies; Western New England University, JD

Javed A. Aslam
Professor, Computer and Information Science; Massachusetts Institute of Technology, PhD

Yernat Assylbekov
Zelevinsky Research Professor, Mathematics; University of Washington, PhD

Anand Asthagiri
Associate Professor, Bioengineering; Massachusetts Institute of Technology, PhD

Polly Attwood
Associate Teaching Professor, College of Professional Studies; Harvard University, EdD

Debra Auguste
Professor, Chemical Engineering; Princeton University, PhD

Earlene Avalon
Assistant Teaching Professor, College of Professional Studies; Simmons College, PhD

Emily Avery-Miller
Assistant Teaching Professor, English; Emerson College, MFA

Cheryl Avitabile
Assistant Clinical Professor, Nursing; Massachusetts General Hospital Institute of Health Professions, DNP

Hava Avraham
Research Assistant Professor, Center for Drug Discovery; Hebrew University of Jerusalem (Israel), PhD

Joseph L. Ayers
Professor, Marine and Environmental Sciences; University of California, Santa Cruz, PhD

Sophie Bacq
Assistant Professor and Mark L. and Karen D. Vachon Faculty Fellow, Entrepreneurship and Innovation; Louvain School of Management (Belgium), PhD

Robert Baginski
Assistant Clinical Professor, Physician Assistant Program; University of Connecticut, DSc

Jianqui Bai
Assistant Professor, Finance; University of Southern California, PhD

Rekha Bai
Lecturer, Mathematics; University of Iowa, PhD

Moya Bailey
Assistant Professor, Cultures, Societies, and Global Studies and Women's, Gender, and Sexuality Studies; Emory University, PhD

Richard H. Bailey
Professor, Marine and Environmental Sciences; University of North Carolina, Chapel Hill, PhD

Ambika Bajpayee
Assistant Professor, Bioengineering; Massachusetts Institute of Technology, PhD

Allison K. Baker
Lecturer, Psychology; Northeastern University, PhD

Shalanda Baker
Professor, Law and Public Policy and Urban Affairs; Northeastern University, JD; University of Wisconsin, LLM

Apostolia Baki
Research Assistant Professor, Pharmaceutical Sciences; University of Athens (Greece), PhD

Ilter Bakkal
Assistant Teaching Professor, Economics; Northern Illinois University, PhD

Charles Bame-Aldred
Associate Academic Specialist, Accounting; University of Massachusetts, Amherst, PhD

Benita Bamgbade
Assistant Professor, Pharmacy and Health Systems Sciences; University of Texas, Austin, PhD

Elitsa Banalieva
Associate Professor and Gary Gregg Faculty Fellow, International Business and Strategy; Indiana University, PhD

Debra Bangs
Assistant Clinical Professor, Physical Therapy, Movement, and Rehabilitation Sciences; Massachusetts General Hospital Institute of Health Professions, DPT

Brendan Bannister
Associate Professor, Management and Organizational Development; Kent State University, DBA

Arun Bansil
University Distinguished Professor, Physics; Harvard University, PhD

Albert-Laszlo Barabasi
Robert Gray Dodge Professor and University Distinguished Professor, Physics and Computer and Information Science; Boston University, PhD

Emanuela Barberis
Associate Professor, Physics; University of California, Santa Cruz, PhD

Gia Barboza
Assistant Professor, Cultures, Societies, and Global Studies and International Affairs and Political Science; Michigan State University, PhD

Gloria Barczak
Professor, Marketing; Syracuse University, PhD

Sumner Barenberg
Professor of the Practice, Bioengineering; Case Western Reserve University, PhD

Emily S. Barnard
Zelevinsky Research Professor, Mathematics; North Carolina State University, PhD

Cynthia Baron
Associate Academic Specialist, College of Professional Studies; Northeastern University, MBA

Amilcar Barreto
Associate Professor, Cultures, Societies, and Global Studies and International Affairs; State University of New York, Buffalo, PhD

Lisa Barrett
University Distinguished Professor, Psychology; University of Waterloo (Canada), PhD

Margarita Barrios Ponce
Assistant Teaching Professor, Art + Design; Yale University, MFA

Carey Barry
Assistant Clinical Professor, Physician Assistant Program; Quinnipiac University, MS

Yakov Bart
Associate Professor and Thomas Moore Faculty Fellow, Marketing; University of California, Berkeley, PhD

Stefano Basagni
Associate Professor, Electrical and Computer Engineering; University of Texas, Dallas, PhD

Marla Baskerville
Associate Professor, Management and Organizational Development; Tulane University, PhD

John Basl
Assistant Professor, Philosophy and Religion; University of Wisconsin, Madison, PhD

Maureen Basmajian
Senior Cooperative Education Coordinator, D'Amore-McKim School of Business; Boston College, MBA

Kayla Bassett
Assistant Cooperative Education Coordinator, D'Amore-McKim School of Business; Northeastern University, MS

Linnea Basu
Associate Cooperative Education Coordinator, College of Social Sciences and Humanities; Northeastern University, MS

Oleg Batishchev
Professor of the Practice, Physics; Moscow Institute of Physics and Technology (Russia), PhD

Christopher E. Beasley
Associate Professor, Mathematics; Princeton University, PhD

Nicholas Beauchamp
Assistant Professor, Political Science; New York University, PhD

Michelle A. Beauchesne
Associate Professor, Nursing; Boston University, DNSc

Mike Beaudet
Professor of the Practice, Journalism; Northeastern University, MA

Laura Beerits
Assistant Teaching Professor, English; University of Texas, Austin, PhD

Gail S. Begley
Teaching Professor, Biology; Boston University, PhD

Mehdi Behroozi
Assistant Professor, Mechanical and Industrial Engineering; University of Minnesota, PhD

Edward Beighley
Associate Professor, Civil and Environmental Engineering; University of Maryland, PhD

Chiara Bellini
Assistant Professor, Bioengineering; University of Calgary (Canada), PhD

Lynda Beltz
Assistant Teaching Professor, College of Professional Studies; Indiana University, Bloomington, PhD

Sidi Bencherif
Assistant Professor, Chemical Engineering; Carnegie Mellon University, PhD

Jonathan Benda
Associate Teaching Professor, Writing Program; Syracuse University, PhD

Elisabeth Bennett
Associate Teaching Professor, College of Professional Studies; University of Georgia, PhD

James C. Benneyan
Professor, Mechanical and Industrial Engineering; University of Massachusetts, Amherst, PhD

Iris Berent
Professor, Psychology; University of Pittsburgh, PhD

Dionisio Bernal
Professor, Civil and Environmental Engineering; University of Tennessee, PhD

Eugene A. Bernstein
Associate Teaching Professor, Pharmaceutical Sciences; Ivanovo Medical Institute (Russia), PhD

Baktybek Beshimov
Professor of the Practice, College of Professional Studies; Kyrgyz National University (Kyrgyzstan), PhD

Craig T. Bettinson
Director of Cooperative Education, College of Arts, Media and Design; Northeastern University, MEd

Penny Beuning
Associate Professor, Chemistry and Chemical Biology; University of Minnesota, PhD

Peter J. Bex
Professor, Psychology; Cardiff University (United Kingdom), PhD

Dapeng Bi
Assistant Professor, Physics; Brandeis University, PhD

Timothy Bickmore
Professor, Computer and Information Science; Massachusetts Institute of Technology, PhD

Brian Bicknell
Assistant Teaching Professor, College of Professional Studies; University of Massachusetts, EdD

Allan Bird
Darla and Frederick Brodsky Trustee Professor in Global Business, International Business and Strategy; University of Oregon, PhD

Priyanka Bishnoi
Assistant Cooperative Education Coordinator, College of Computer and Information Science; University of Southern California, MS

Scott Bishop
Professor of the Practice, Architecture; University of Pennsylvannia, MArch

Deborah Blackwell
Associate Clinical Professor, Nursing; University of Texas, DNP

Nathan Blake
Associate Teaching Professor, Media and Screen Studies; University of California, PhD

Samuel J. Blank
Professor, Mathematics; Brandeis University, PhD

Robert J. Blaser
Associate Cooperative Education Coordinator, Pharmacy and Health Systems Sciences; Massachusetts College of Pharmacy, MS

Martin Blatt
Professor of the Practice, History; Boston University, PhD

John Bleakney
Assistant Cooperative Education Coordinator, Graduate School of Engineering; State University of New York, Albany, MA

Francis Blessington
Professor, English; Brown University, PhD

Cameron Blevins
Assistant Professor, History; Stanford University, PhD

Aaron Block
Associate Teaching Professor, English; Emerson College, MFA

Barry Bluestone
Russell B. and Andrée B. Stearns Trustee Professor of Political Economy, Public Policy and Urban Affairs; University of Michigan, PhD

Linda Blum
Professor, Sociology and Anthropology; University of California, Berkeley, PhD

Rhonda M. Board
Associate Professor, Nursing; Ohio State University, PhD

Janet Bobcean
Associate Professor, Theatre; Ohio University, MFA

Erika Boeckeler
Assistant Professor, English; Harvard University, PhD

Geoff Boeing
Assistant Professor, Public Policy and Urban Affairs; University of California, Berkeley, PhD

Ioana Corina Bogdan
Assistant Teaching Professor, Electrical and Computer Engineering; University of Metz (France), PhD

Charles Bognanni
Senior Cooperative Education Coordinator, D'Amore-McKim School of Business; Northeastern University, MEd

Christopher Bolick
Assistant Academic Specialist, College of Professional Studies; Western Carolina University, MS

Paul J. Bolster
Professor, Finance; Virginia Polytechnic Institute, PhD

Tamara Bonaci
Lecturer, Computer and Information Science; University of Washington, PhD

Andrea Bonezzi
Assistant Professor, Marketing; Northwestern University, PhD

Lorraine A. Book
Assistant Clinical Professor, Communication Sciences and Disorders; Florida State University, PhD

Raymond G. Booth
Professor, Pharmaceutical Sciences and Chemistry and Chemical Biology; University of California, San Francisco, PhD

Monica Borgida
Assistant Teaching Professor, College of Professional Studies; University of Pisa and Bologna (Italy), PhD

Michelle Borkin
Assistant Professor, Computer and Information Science; Harvard University, PhD

Natalie Bormann
Teaching Professor, Political Science; University of Newcastle upon Tyne (United Kingdom), PhD

Jeffery A. Born
Professor, Finance; University of North Carolina, Chapel Hill, PhD

Christopher Bosso
Professor, Public Policy and Urban Affairs; University of Pittsburgh, PhD

Ekaterina Botchkovar
Associate Professor, Criminology and Criminal Justice; North Carolina State University, PhD

Kevin Boudreau
Associate Professor, Entrepreneurship and Innovation; Massachusetts Institute of Technology, PhD

Alma Bournazian
Associate Academic Specialist, American Sign Language; Western Maryland College, MS

Stacey Bourns
Professor, World Languages Center; University of Texas, Austin, PhD

Carla Bouwmeester
Associate Clinical Professor, Pharmacy and Health Systems Sciences; Massachusetts College of Pharmacy, PharmD

Jennifer L. Bowen
Associate Professor, Marine and Environmental Sciences; Boston University, PhD

James Boyer
Assistant Academic Specialist, Accounting; Northeastern University, MBA

Nicole M. Boyson
Professor, Finance; Ohio State University, PhD

Kara Braciale
Lecturer, Art + Design; University of Illinois, Chicago, MFA

Anthony Braga
Distinguished Professor, Criminology and Criminal Justice; Rutgers University, PhD

Maxim Braverman
Professor, Mathematics; Tel Aviv University (Israel), PhD

Heather C. Brenhouse
Assistant Professor, Psychology; Northeastern University, PhD

Janet Briand-McGowan
Assistant Clinical Professor, Nursing; Northeastern University, DNP

Becky A. Briesacher
Associate Professor, Pharmacy and Health Systems Sciences; University of Maryland, Baltimore, PhD

Amy M. Briesch
Associate Professor, Applied Psychology; University of Connecticut, PhD

Elizabeth Britt
Associate Professor, English; Rensselaer Polytechnic Institute, PhD

Sharon M. Britton
Assistant Cooperative Education Coordinator, College of Engineering; Massachusetts Institute of Technology, MS

Oscar Brookins
Associate Professor, Economics; State University of New York, Buffalo, PhD

Dana H. Brooks
Professor, Electrical and Computer Engineering; Northeastern University, PhD

Cammy Brothers
Associate Professor, Architecture and Art + Design; Harvard University, PhD

Craig Brown
Visiting Associate Professor, Finance; University of Michigan, PhD

Nicholas Brown
Associate Teaching Professor, Architecture and History; University of Illinois, Urbana-Champaign, PhD

Nicholas Brown
Assistant Teaching Professor, Graduate School of Engineering; University of California, Los Angeles, PhD

Philip M. Brown
University Distinguished Professor, Sociology and Anthropology and Health Sciences; Brandeis University, PhD

Ronald Brown
Assistant Teaching Professor, College of Professional Studies; Harvard University, EdD

Timothy Brown
Professor, History; University of California, Berkeley, PhD

Todd A. Brown
Clinical Instructor, Pharmacy and Health Systems Sciences; Northeastern University, MHP

James Browning
Assistant Teaching Professor, Engineering; University of Colorado, Boulder, PhD

Maria Brucato
Assistant Teaching Professor, World Languages Center; University of Texas, PhD

Elizabeth Bucar
Associate Professor, Philosophy and Religion; University of Chicago, PhD

David E. Budil
Associate Professor, Chemistry and Chemical Biology; University of Chicago, PhD

Jamie G. Bunce
Lecturer, Behavioral Neuroscience; University of Connecticut, PhD

Lucy Bunning
Assistant Teaching Professor, College of Professional Studies; Lesley University, PhD

Jeffrey Burds
Associate Professor, History; Yale University, PhD

Lynn H. Burke
Senior Cooperative Education Coordinator, College of Arts, Media and Design; University of Massachusetts, Amherst, MEd

Pamela J. Burke
Clinical Professor, Nursing; Boston College, PhD

Jose Buscaglia
Professor, Cultures, Societies, and Global Studies; University of Buffalo, PhD

Jeremy Bushnell
Associate Teaching Professor, Writing Program; University of Arizona, Tucson, MFA

Ahmed A. Busnaina
University Distinguished Professor, William Lincoln Smith Professor of Mechanical Engineering, Mechanical and Industrial Engineering; Oklahoma State University, PhD

Bobette Buster
Professor of the Practice, Journalism; Northwestern University, MFA

Michael Butera
Clinical Instructor, Nursing; Northeastern University, MS

Qinghong Cai
Associate Teaching Professor, World Languages Center; University of Kansas, MS

Victoria Cain
Assistant Professor, History; Columbia University, PhD

Paula Caligiuri
Distinguished Professor of Global Leadership, International Business and Strategy; Pennsylvania State University, PhD

Lisa M. Campagnoni
Assistant Cooperative Education Coordinator, College of Science; Northeastern University, MA

Octavia Camps
Professor, Electrical and Computer Engineering; University of Washington, PhD

Yanet Canavan
Assistant Academic Specialist, World Languages Center; Salem State College, MA

Kristopher Cannon
Assistant Teaching Professor, Media and Screen Studies; Georgia State University, PhD

Mira Cantor
Professor, Art + Design; University of Illinois, Urbana-Champaign, MFA

Luca Caracoglia
Associate Professor, Civil and Environmental Engineering; University of Trieste (Italy), PhD

Benjamin Caras
Lecturer, Art + Design; University of Massachusetts, Amherst, MFA

Peter Cardillo
Assistant Cooperative Education Coordinator, Graduate School of Engineering; Boston College, MS

Joelle Carlo
Assistant Teaching Professor, Pharmaceutical Sciences; State University of New York, Buffalo, PhD

Alexa A. Carlson
Associate Clinical Professor, Pharmacy and Health Systems Sciences; Butler University, PharmD

Mary Carney
Associate Cooperative Education Coordinator, Bouvé College of Health Sciences; Boston College, MSN

Heather Carpenter-Oliveira
Assistant Cooperative Education Coordinator, College of Engineering; Northeastern University, MS

Jonathan Carr
Associate Teaching Professor, Theatre; Columbia University, MFA

Michelle Carr
Lecturer, Communication Studies; Kingston University (United Kingdom), MA

Sara Carr
Assistant Professor, Architecture; University of California, Berkeley, PhD

Rebecca L. Carrier
Professor, Chemical Engineering; Massachusetts Institute of Technology, PhD

Matthew Carroll
Professor of the Practice, Journalism; Northeastern University, BS

Patricia Case
Assistant Teaching Professor, Health Sciences; Harvard University, PhD

Bonnie Jo Casey
Assistant Clinical Professor, Physician Assistant Program; University of New England, MS

Cristian Cassella
Assistant Professor, Electrical and Computer Engineering; Carnegie Mellon University, PhD

Ana-Maria Castravet
Associate Professor, Mathematics; Massachusetts Institute of Technology, PhD

Smajl Cenjic
Assistant Cooperative Education Coordinator, College of Computer and Information Science; Cambridge College, MA

Jana Cephas
Assistant Professor, Architecture; Harvard University, PhD

Robert J. Cersosimo
Associate Professor, Pharmacy and Health Systems Sciences; University of Utah, PharmD

Christopher Cesario
Assistant Clinical Professor, Physical Therapy, Movement, and Rehabilitation Sciences; Northeastern University, DPT

Yunrong Chai
Assistant Professor, Biology; Cornell University, PhD

Paul M. Champion
Professor, Physics; University of Illinois, Urbana-Champaign, PhD

Chee Chan
Associate Academic Specialist, Marketing; Michigan State University, PhD

Katherine Chan
Assistant Teaching Professor, Music; University of Minnesota, PhD

Changyan Chen
Research Professor, Center for Drug Discovery; Columbia University, PhD

Qin Chen
Professor, Civil and Environmental Engineering and Marine and Environmental Sciences; Old Dominion University, PhD

Yi-Da Chen
Assistant Professor, Supply Chain and Information Management; University of Arizona, PhD

Esther Chewning
Senior Cooperative Education Coordinator, D'Amore-McKim School of Business; Suffolk University, MS

Cherese Childers-McKee
Assistant Teaching Professor, College of Professional Studies; University of North Carolina, PhD

Elizabeth A. Chilvers
Associate Professor, Cooperative Education, D'Amore-McKim School of Business; Northeastern University, MEd

W. Paul Chiou
Assistant Teaching Professor, Finance; Rutgers University, PhD

David R. Choffnes
Assistant Professor, Computer and Information Science; Northwestern University, PhD

Sam S. Choi
Associate Teaching Professor, Architecture; Harvard University, MArch

Sunho Choi
Assistant Professor, Chemical Engineering; University of Minnesota, PhD

Bartlomiej Chomanski
Visiting Lecturer, Philosophy and Religion; University of Miami, PhD

Chun-An Chou
Assistant Professor, Mechanical and Industrial Engineering; Rutgers University, PhD

Kaushik Roy Chowdhury
Associate Professor, Electrical and Computer Engineering; University of Cincinnati, MS

Ken Y. Chung
Assistant Teaching Professor, Chemistry and Chemical Biology; Michigan State University, PhD

Samuel Chung
Assistant Professor, Bioengineering; Harvard University, PhD

Hillary Chute
Professor, English and Art + Design; Rutgers University, PhD

Dawn M. Cisewski
Assistant Teaching Professor, Psychology; Indiana University of Pennsylvania, PsyD

Bruce H. Clark
Associate Professor, Marketing; Stanford University, PhD

Edmund L. Clark
Associate Academic Specialist, Entrepreneurship and Innovation; Clark University, MBA

Heather Clark
Professor, Bioengineering and Chemistry and Chemical Biology; University of Michigan, PhD

Sean I. Clark
Zelevinsky Research Professor, Mathematics; University of Virginia, PhD

Stephen B. Clark
Assistant Clinical Professor, Physical Therapy, Movement, and Rehabilitation Sciences; Northeastern University, DPT

Alan Clayton-Matthews
Associate Professor, Public Policy and Urban Affairs and Economics; Boston College, PhD

Sandra S. Cleveland
Associate Clinical Professor, Communication Sciences and Disorders; Pennsylvania College of Optometry, AuD

William D. Clinger
Associate Professor, Computer and Information Science; Massachusetts Institute of Technology, PhD

Paul Closas
Assistant Professor, Electrical and Computer Engineering; Universitat Politècnica de Catalunya (Spain), PhD

Emily Clough
Assistant Professor, Political Science and International Affairs; Harvard University, PhD

Ricardo Coelho Guerreiro Da Silva Camacho
Visiting Lecturer, Architecture; Harvard University, MArch

Dennis Cokely
Professor, American Sign Language; Georgetown University, PhD

Maxine Cokely
Associate Academic Specialist, College of Professional Studies; Bowie State University, MA

Stephanie Colbry
Assistant Teaching Professor, College of Professional Studies; Eastern University, PhD

John D. Coley
Associate Professor, Psychology; University of Michigan, PhD

Greg Collier
Professor of the Practice, Entrepreneurship and Innovation; Eastern Michigan University, MBA

Randall C. Colvin
Associate Professor, Psychology; University of Illinois, Urbana-Champaign, PhD

Sally Conant
Assistant Cooperative Education Coordinator, College of Engineering; Salve Regina University, MA

Michael Conley
Assistant Clinical Professor, Pharmacy and Health Systems Sciences; Northeastern University, PharmD

Richard Conley
Associate Cooperative Education Coordinator, College of Social Sciences and Humanities; Boston University, JD

Kelly Conn
Associate Teaching Professor, College of Professional Studies; Boston University, PhD

Adam I. Cooper
Senior Lecturer, Linguistics; Cornell University, PhD

Seth Cooper
Assistant Professor, Computer and Information Science; University of Washington, PhD

Gene D. Cooperman
Professor, Computer and Information Science; Brown University, PhD

Ryan Cordell
Assistant Professor, English; University of Virginia, PhD

Marie B. Corkery
Associate Clinical Professor, Physical Therapy, Movement, and Rehabilitation Sciences; Northeastern University, DPT

Patricia Corrigan
Assistant Cooperative Education Coordinator, College of Science; Suffolk University, MA

Felipe Cortes
Assistant Professor, Finance; Washington University, St. Louis, PhD

Xavier Costa
Professor, Architecture; University of Pennsylvania, PhD

Hugh G. Courtney
Professor, International Business and Strategy; Massachusetts Institute of Technology, PhD

Arthur J. Coury
University Distinguished Professor, Chemical Engineering; University of Minnesota, PhD

Erin J. Cram
Professor, Biology; University of California, Berkeley, PhD

Frederick Crane
Senior Academic Specialist, Entrepreneurship and Innovation; Bradford University, PhD

Justin D. Crane
Assistant Professor, Biology; McMaster University (Canada), PhD

Steven Cranford
Assistant Professor, Civil and Environmental Engineering; Massachusetts Institute of Technology, PhD

William F. Crittenden
Professor, International Business and Strategy; University of Arkansas, PhD

Maia Cross
Associate Professor, Political Science and International Affairs; Princeton University, PhD

Robert Cross
Assistant Teaching Professor, History; Princeton University, PhD

Pedro Miguel Cruz
Assistant Professor, Art + Design; Universidade de Coimbra (Portugal), PhD

Alvaro Cuervo-Cazurra
Professor and Robert Morrison Fellow, International Business and Strategy; Massachusetts Institute of Technology, PhD

Carlos Cuevas
Associate Professor, Criminology and Criminal Justice; Alliant International University, PhD

Meng Cui
Research Associate Professor, Pharmaceutical Sciences; Jilin University (China), PhD

Thomas P. Cullinane
Professor, Mechanical and Industrial Engineering; Virginia Polytechnic Institute and State University, PhD

Derek Curry
Assistant Professor, Art + Design; University of California, Los Angeles, MFA

Mary Ellen Cushman
Professor, English; Rensselaer Polytechnic Institute, PhD

Julia Cybularz
Visiting Associate Teaching Professor, Art + Design; School of Visual Arts, MFA

Kamran Dadkhah
Associate Professor, Economics; Indiana University, PhD

Guohao Dai
Associate Professor, Bioengineering; Massachusetts Institute of Technology, PhD

Elise J. Dallimore
Associate Professor, Communication Studies; University of Washington, PhD

James Dana Jr.
Professor, Economics and International Business and Strategy; Massachusetts Institute of Technology, PhD

Luis Dau
Associate Professor, International Business and Strategy; University of South Carolina, PhD

Geoffrey Davies
Matthews Distinguished University Professor, Chemistry and Chemical Biology; Birmingham University (United Kingdom), PhD, DSc

Duncan Davis
Assistant Teaching Professor, Engineering; North Carolina State University, PhD

Frederick C. Davis
Professor, Biology; University of Texas, Austin, PhD

Nicole Davis
Assistant Clinical Professor, Applied Psychology; Simmons College, MS

Theo Davis
Professor, English; Johns Hopkins University, PhD

Leslie Day
Associate Clinical Professor, Physical Therapy, Movement, and Rehabilitation Sciences; Northeastern University, PhD

Anthony P. De Ritis
Professor, Music; University of California, Berkeley, PhD

Michael Dean
Assistant Teaching Professor, College of Professional Studies; Columbia University, PhD

Adenekan (Nick) Dedeke
Lecturer, Supply Chain and Information Management; Technische Universität Kaiserslautern (Germany), PhD

Mohammad Dehghanimohammadabadi
Assistant Teaching Professor, Mechanical and Industrial Engineering; Western New England University, PhD

Candice Delmas
Assistant Professor, Philosophy and Religion and Political Science; Boston University, PhD

John Dencker
Professor, Management and Organizational Development; Harvard University, PhD

Jack Dennerlein
Professor, Physical Therapy, Movement, and Rehabilitation Sciences; University of California, PhD

Megan Denver
Assistant Professor, Criminology and Criminal Justice; University at Albany, PhD

Alexander DePaoli
Visiting Assistant Professor, Marketing; Stanford University, PhD

Leila F. Deravi
Assistant Professor, Chemistry and Chemical Biology; Vanderbilt University, PhD

Nate Derbinsky
Associate Teaching Professor, Computer and Information Science; University of Michigan, Ann Arbor, PhD

Marco Deseriis
Assistant Professor, Media and Screen Studies; New York University, PhD

Peter J. Desnoyers
Associate Professor, Computer and Information Science; University of Massachusetts, Amherst, PhD

David A. DeSteno
Professor, Psychology; Yale University, PhD

H. William Detrich
Professor, Marine and Environmental Sciences; Yale University, PhD

Darin Detwiler
Assistant Teaching Professor, College of Professional Studies; Northeastern University, PhD

John W. Devlin
Professor, Pharmacy and Health Systems Sciences; University of Toronto (Canada), PharmD

James Dew
Visiting Lecturer, Economics; Texas AM University, PhD

Janet Dewan
Assistant Clinical Professor, Nursing; Northeastern University, PhD

Alessandra Di Credico
Lecturer, Physics; University of Rome (Italy), PhD

Panagoula Diamanti-Karanou
Visiting Lecturer, Political Science and International Affairs; Northeastern University, PhD

Jacqueline Diani
Senior Cooperative Education Coordinator, Bouvé College of Health Sciences; University of Virginia, MEd

Martin Dias
Associate Teaching Professor, Supply Chain and Information Management; Bentley University, PhD

Amy DiBattista
Lecturer, Psychology; Northeastern University, PhD

William Dickens
Professor, Economics and Public Policy and Urban Affairs; Massachusetts Institute of Technology, PhD

Elizabeth Dillon
Professor, English; University of California, Berkeley, PhD

Charles DiMarzio
Associate Professor, Electrical and Computer Engineering; Northeastern University, PhD

Aidong A. Ding
Associate Professor, Mathematics; Cornell University, PhD

Kathleen C. Dioli
Associate Cooperative Education Coordinator, Chemistry and Chemical Biology; Bowling Green State University, MA

Brandon Dionne
Assistant Clinical Professor, Pharmacy and Health Systems Sciences; University of New England, PharmD

Daniel L. Distel
Research Professor, Marine and Environmental Sciences; University of California, San Diego, PhD

Margarita V. DiVall
Clinical Professor, Pharmacy and Health Systems Sciences; Northeastern University, PharmD

Mary Kate Dodgson
Assistant Professor, Accounting; University of Massachusetts, Amherst, PhD

Lisa Cantwell Doherty
Associate Cooperative Education Coordinator, College of Social Sciences and Humanities; Northeastern University, MA

Silvia Dominguez
Associate Professor, Sociology and Anthropology; Boston University, PhD

Hua Dong
Associate Academic Specialist, World Languages Center; Emerson College, MA

Pamela Donlan
Assistant Clinical Professor, Physical Therapy, Movement, and Rehabilitation Sciences; Northeastern University, PhD

Margaret Dougherty
Assistant Teaching Professor, College of Professional Studies; University of Massachusetts, EdD

Brenda Douglas
Associate Clinical Professor, Nursing; Northeastern University, DNP

Daniel C. Douglass
Lecturer, Marine and Environmental Sciences; University of Wisconsin, PhD

Mark Douglass
Associate Clinical Professor, Pharmacy and Health Systems Sciences; University of Michigan, PharmD

Kevin Drakulich
Associate Professor, Criminology and Criminal Justice; University of Washington, PhD

Andrea Dropkin
Assistant Cooperative Education Coordinator, D'Amore-McKim School of Business; Bentley University, MBA

Laura Dudley
Assistant Clinical Professor, Applied Psychology; Northeastern University, PhD

Lisa Duffy
Assistant Professor, Nursing; Boston College, DNP

Tara Duffy
Lecturer, Marine and Environmental Sciences; Stony Brook University, PhD

Molly Dugan
Assistant Teaching Professor, College of Professional Studies; Boston College, PhD

Michael Dukakis
Distinguished Professor, Political Science; Harvard University, JD

Daniel M. Dulaski
Teaching Professor, Civil and Environmental Engineering; University of Massachusetts, Amherst, PhD

Catherine Dunand
Assistant Academic Specialist, World Languages Center; Boston University, MA

Jill Dupree
Visiting Lecturer, Economics; University of Colorado, Boulder, PhD

Joanne Dupuis
Assistant Clinical Professor, Nursing; Massachusetts School of Law, PhD

Kathleen Durant
Assistant Teaching Professor, Computer and Information Science; Harvard University, PhD

Jennifer G. Dy
Professor, Electrical and Computer Engineering; Purdue University, PhD

Eno Ebong
Assistant Professor, Chemical Engineering; Rensselaer Polytechnic Institute, PhD

Stephanie Eby
Lecturer, Marine and Environmental Sciences; Syracuse University, PhD

Rajagopal Echambadi
Professor, Entrepreneurship and Innovation; University of Houston, PhD

Matthew Eckelman
Assistant Professor, Civil and Environmental Engineering; Yale University, PhD

Kimberly Eddleston
Professor and Daniel and Dorothy Grady Faculty Fellow, Entrepreneurship and Innovation; University of Connecticut, PhD

Scott Edmiston
Professor of the Practice, Theatre; Boston University, MFA

Laurie Edwards
Associate Teaching Professor, Writing Program; Emerson College, MFA

Jessica Edwards George
Associate Clinical Professor, Applied Psychology; Northeastern University, PhD

Christopher L. Egan
Assistant Cooperative Education Coordinator, College of Science; Boston University, MA

Jean Egan
Senior Cooperative Education Coordinator, College of Social Sciences and Humanities; Northeastern University, MEd

Robert C. Eidson
Lecturer, Psychology; Northeastern University, PhD

Stanley J. Eigen
Professor, Mathematics; McGill University (Canada), PhD

Adam Ekenseair
Assistant Professor, Chemical Engineering; University of Texas, Austin, PhD

Ehsan Elhamifar
Assistant Professor, Computer and Information Science; Johns Hopkins University, PhD

Tina Eliassi-Rad
Associate Professor, Computer and Information Science; University of Wisconsin, Madison, PhD

B. Parker Ellen
Assistant Professor, Management and Organizational Development; Florida State University, PhD

Ryan Ellis
Assistant Professor, Communication Studies; University of California, San Diego, PhD

Constance Emerson
Assistant Academic Specialist, College of Professional Studies; Purdue University, West Lafayette, MS

John R. Engen
Distinguished Professor, Chemistry and Chemical Biology and Barnett Institute; University of Nebraska, Lincoln, PhD

Christen Enos
Associate Teaching Professor, Writing Program; Emerson College, MFA

Slava S. Epstein
Distinguished Professor, Biology; Moscow State University (Russia), PhD

Randall Erb
Assistant Professor, Mechanical and Industrial Engineering; Duke University, PhD

Deniz Erdogmus
Professor, Electrical and Computer Engineering; University of Florida, PhD

Ozlem Ergun
Professor, Mechanical and Industrial Engineering; Massachusetts Institute of Technology, PhD

Cuneyt Eroglu
Associate Professor, Supply Chain and Information Management; Ohio State University, PhD

Bilge Erten
Assistant Professor, International Affairs and Economics; University of Massachusetts, Amherst, PhD

Rhea T. Eskew
Professor, Psychology; Georgia Institute of Technology, PhD

Jonathan Esole
Assistant Professor, Mathematics; Leiden University (Netherlands), PhD

Abigail Evans
Lecturer, Computer and Information Science; University of Washington, PhD

Sara Ewell
Associate Teaching Professor, College of Professional Studies; University of North Carolina, Chapel Hill, PhD

William Ewell
Associate Teaching Professor, College of Professional Studies; University of North Carolina, PhD

Daniel Faber
Professor, Sociology and Anthropology; University of California, Santa Cruz, PhD

Mary Lynn Fahey
Clinical Instructor, Nursing; Simmons College, MS

Olubunmi Faleye
Professor and Donald F. Harding Professor of Finance and Insurance, Finance; University of Alberta (Canada), PhD

Hui Fang
Assistant Professor, Electrical and Computer Engineering; University of California, Berkeley, PhD

Qianqian Fang
Assistant Professor, Bioengineering; Dartmouth College, PhD

David Fannon
Assistant Professor, Architecture and Civil and Environmental Engineering; University of California, Berkeley, MS

Nasser S. Fard
Associate Professor, Mechanical and Industrial Engineering; University of Arizona, PhD

Amir Farhat
Associate Teaching Professor, Electrical and Computer Engineering; University of Pennsylvania, PhD

Amy Farrell
Associate Professor, Criminology and Criminal Justice; Northeastern University, PhD

Yunsi Fei
Professor, Electrical and Computer Engineering; Princeton University, PhD

Adrian E. Feiguin
Assistant Professor, Physics; Universidad Nacional de Rosario (Argentina), PhD

Allen G. Feinstein
Teaching Professor, Music; New England Conservatory of Music, MM

Nathan I. Felde
Professor, Art + Design; Massachusetts Institute of Technology, MS

Lisa Feldman Barrett
University Distinguished Professor, Psychology; University of Waterloo (Canada), PhD

Matthias Felleisen
Trustee Professor, Computer and Information Science; Indiana University, PhD

Samuel Felton
Assistant Professor, Mechanical and Industrial Engineering; Harvard University, PhD

Carol Femia
Clinical Instructor, Nursing; Massachusetts General Hospital Institute of Health Professions, MS

Hicham Fenniri
Professor, Chemical Engineering; Université de Strasbourg (France), PhD

Loretta A. Fernandez
Assistant Professor, Civil and Environmental Engineering and Marine and Environmental Sciences; Massachusetts Institute of Technology, PhD

Waththage N. Fernando
Lecturer, Mathematics; University of South Florida, PhD

Lori Ferrins
Research Assistant Professor, Chemistry and Chemical Biology; Monash University, PhD

Craig F. Ferris
Professor, Psychology and Pharmaceutical Sciences; New York Medical College, PhD

Kirsten Fertuck
Assistant Teaching Professor, Biochemistry; Michigan State University, PhD

Susan F. Fine
Clinical Instructor, Communication Sciences and Disorders; New York University, MA

Sarah Finn
Associate Teaching Professor, Writing Program; University of Massachusetts, Amherst, PhD

Branden Fitelson
Distinguished Professor, Philosophy and Religion; California Institute of Technology, PhD

Brian Fitzgerald
Assistant Professor, Accounting; Texas AM University, PhD

Joan Fitzgerald
Professor, Public Policy and Urban Affairs; Pennsylvania State University, PhD

Diane F. Fitzpatrick
Clinical Professor, Physical Therapy, Movement, and Rehabilitation Sciences; Northeastern University, DPT

Josephine Flanagan
Assistant Cooperative Education Coordinator, College of Engineering; Suffolk University, JD

Julia Flanders
Professor of the Practice, English and Library Systems; Brown University, PhD

Laure B. Flapan
Zelevinsky Research Professor, Mathematics; University of California, Los Angeles, PhD

Eric Folmar
Assistant Clinical Professor, Physical Therapy, Movement, and Rehabilitation Sciences; Quinnipiac University, MS

Paul Fombelle
Associate Professor and Thomas Moore Faculty Fellow, Marketing; Arizona State University, PhD

Murray Forman
Professor, Media and Screen Studies; McGill University (Canada), PhD

Lisa M. Foster
Assistant Cooperative Education Coordinator, Bouvé College of Health Sciences; Northeastern University, MS

Dimitrios Fotiadis
Lecturer, Supply Chain and Information Management; Northeastern University, MS

Brooke Foucault Welles
Assistant Professor, Communication Studies; Northwestern University, PhD

Charles F. Fountain
Professor, Journalism; Columbia University, MS

James Fox
Lipman Family Professor of Criminology, Law, and Public Policy, Criminology and Criminal Justice and Law and Public Policy; University of Pennsylvania, PhD

Laura Frader
Professor, History; University of Rochester, PhD

Debra L. Franko
Professor, Applied Psychology; McGill University (Canada), PhD

Peter Fraunholtz
Assistant Teaching Professor, History and International Affairs; Boston College, PhD

Susan Freeman
Teaching Professor, Engineering; Northeastern University, PhD

Clark Freifeld
Lecturer, Computer and Information Science; Boston University, PhD

Michael Frengel
Associate Academic Specialist, Music; City University London (United Kingdom), PhD

John H. Friar
Senior Academic Specialist, Entrepreneurship and Innovation; Massachusetts Institute of Technology, PhD

Natasha Frost
Professor, Criminology and Criminal Justice; City University of New York, PhD

Yun (Raymond) Fu
Associate Professor, Electrical and Computer Engineering and Computer and Information Science; University of Illinois, Urbana-Champaign, PhD

Carolin Fuchs
Teaching Professor, World Languages Center; Justus-Liebig Universität Gießen (Germany), PhD

Brian Fulton
Lecturer, Chemistry and Chemical Biology; Iowa State University, PhD

Peter G. Furth
Professor, Civil and Environmental Engineering; Massachusetts Institute of Technology, PhD

Timothy Gagnon
Associate Academic Specialist, Accounting; Sacred Heart University, MBA

Sean Gallagher
Assistant Clinical Professor, College of Professional Studies; Northeastern University, EdD

Susan Gallagher
Clinical Instructor, Nursing; Massachusetts General Hospital Institute of Health Professions, MS

Joshua Gallaway
William O. DiPietro Assistant Professor, Chemical Engineering; Columbia University, PhD

Auroop Ganguly
Professor, Civil and Environmental Engineering; Massachusetts Institute of Technology, PhD

Lori Gardinier
Teaching Professor, Human Services; Northeastern University, PhD

Julie Garey
Assistant Teaching Professor, Political Science; Northeastern University, PhD

Karen Garneau
Associate Teaching Professor, Writing Program; Northeastern University, PhD

Shytierra Gaston
Assistant Professor, Criminology and Criminal Justice; University of Missouri, St. Louis, PhD

Wolfgang Gatterbauer
Associate Professor, Computer and Information Science; Vienna University of Technology (Austria), PhD

Edward Geisinger
Assistant Professor, Biology; New York University, MD, PhD

Prasanth George
Assistant Teaching Professor, Mathematics; State University of New York, Buffalo, PhD

Francis Georges
Assistant Teaching Professor, Economics; Boston College, PhD

Roger W. Giese
Professor, Pharmaceutical Sciences; Massachusetts Institute of Technology, PhD

Joseph M. Giglio
Senior Academic Specialist, International Business and Strategy; Northeastern University, PhD

Thomas R. Gilbert
Associate Professor, Chemistry and Chemical Biology; Massachusetts Institute of Technology, PhD

Laurance Ginsberg
Assistant Academic Specialist, Accounting; Bentley University, MST

Karen Giuliano
Associate Professor, Nursing; Boston College, PhD

Daniel G. Glasscock
Zelevinsky Research Professor, Mathematics; Ohio State University, PhD

Leonard J. Glick
Senior Academic Specialist, Management and Organizational Development; Harvard University, EdD

Elizabeth Glowacki
Postdoctoral Teaching Associate, Communication Studies; University of Texas, Austin, PhD

Daniel Godfrey
Professor, Music; University of Iowa, PhD

Veronica S. Godoy-Carter
Associate Professor, Biology; Tufts University, PhD

Kevin Gold
Assistant Teaching Professor, Computer and Information Science; Yale University, PhD

Natalia Gold
Assistant Teaching Professor, International Business and Strategy; Saint Petersburg State University of Engineering (Russia), PhD

Stephen Golden
Lecturer, Entrepreneurship and Innovation; Suffolk University, MBA

William Goldman
Lecturer, Accounting; Northeastern University, MBA

Ann C. Golub-Victor
Clinical Professor, Physical Therapy, Movement, and Rehabilitation Sciences; Northeastern University, DPT

Edgar D. Goluch
Associate Professor, Chemical Engineering; University of Illinois, Urbana-Champaign, PhD

Kathleen Gonso
Associate Teaching Professor, Writing Program; Emerson College, MFA

Michael J. Gonyeau
Clinical Professor, Pharmacy and Health Systems Sciences; Albany College of Pharmacy, PharmD

Frankie Gonzalez
Assistant Cooperative Education Coordinator, D'Amore-McKim School of Business; Northeastern University, BS

Gregory Goodale
Associate Professor, Communication Studies; University of Illinois, Urbana-Champaign, PhD

Teresa Goode
Assistant Teaching Professor, College of Professional Studies; Columbia University, EdD

Patricia Goodman
Assistant Teaching Professor, College of Professional Studies; George Washington University, EdD

Matthew Goodwin
Associate Professor, Health Sciences and Computer and Information Science; University of Rhode Island, PhD

Mark Gooley
Lecturer, Finance; Northeastern University, PhD

Ian Gorton
Professor of the Practice, Computer and Information Science; Shefield Hallam University (United Kingdom), PhD

Gary Goshgarian
Professor, English; University of Wisconsin, Madison, PhD

Tarik C. Gouhier
Assistant Professor, Marine and Environmental Sciences; McGill University (Canada), PhD

Robson Goulart
Assistant Cooperative Education Coordinator, College of Engineering; Boston University, MS

Andrew Gouldstone
Associate Professor, Mechanical and Industrial Engineering; Massachusetts Institute of Technology, PhD

Jonathan H. Grabowski
Associate Professor, Marine and Environmental Sciences; University of North Carolina, Chapel Hill, PhD

Jennifer Gradecki
Assistant Professor, Art + Design; University of California, Los Angeles, MFA

Steve Granelli
Assistant Teaching Professor, Communication Studies; Syracuse University, MS

Laura Green
Professor, English; University of California, Berkeley, PhD

Kristin Curry Greenwood
Associate Clinical Professor, Physical Therapy, Movement, and Rehabilitation Sciences; Northeastern University, EdD, DPT

Brent Griffin
Assistant Teaching Professor, College of Professional Studies; Northeastern University, PhD

Jacqueline Griffin
Assistant Professor, Mechanical and Industrial Engineering; Georgia Institute of Technology, PhD

Joseph Griffin
Associate Teaching Professor, College of Professional Studies; Gordon Conwell Theological Seminary, PhD

John Griffith
Clinical Professor, Health Sciences; Boston University, PhD

Amir Grinstein
Associate Professor, Mark L. and Karen D. Vachon Faculty Fellow, Marketing; Hebrew University of Jerusalem (Israel), PhD

Francesca Grippa
Associate Teaching Professor, College of Professional Studies; University of Salento (Italy), PhD

Craig Gruber
Associate Teaching Professor, College of Professional Studies; Clark University, PhD

Tiantian Gu
Associate Professor, Finance; University of Wisconsin, Madison, PhD

Jason J. Guo
Research Associate Professor, Barnett Institute; University of Connecticut, PhD

Surendra M. Gupta
Professor, Mechanical and Industrial Engineering; Purdue University, PhD

Andrei Guschin
Assistant Teaching Professor, Graduate School of Engineering; Russian Academy of Sciences (Russian Federation), PhD

Philip Gust
Clinical Instructor, Computer and Information Science; University of Arizona, MS

Barbara Guthrie
Professor, Nursing; New York University, PhD

Mohamed Habibullah
Assistant Teaching Professor, Supply Chain and Information Management; University of Missouri, Columbia, PhD

David Hagen
Assistant Teaching Professor, College of Professional Studies; New England School of Law, JD

Michelle Hagopian
Assistant Cooperative Education Coordinator, College of Arts, Media and Design; University of Illinois, MS

Jerome F. Hajjar
CDM Smith Professor in Civil Engineering, Civil and Environmental Engineering; Cornell University, PhD

Golnoosh Hakimdavar
Associate Teaching Professor, College of Professional Studies; University of Turin (Italy), PhD

Danielle Haley
Assistant Professor, Health Sciences; Emory University, PhD

Judith A. Hall
University Distinguished Professor, Psychology; Harvard University, PhD

James Halverson
Assistant Professor, Physics; University of Pennsylvania, PhD

Pauline Hamel
Associate Clinical Professor, Health Sciences; Boston University, EdD

Paul Hand
Assistant Professor, Mathematics and Computer and Information Science; New York University, PhD

Michael Handel
Associate Professor, Sociology and Anthropology; Harvard University, PhD

Nancy Hanrahan
Professor, Nursing; Boston College, PhD

Robert N. Hanson
Matthews Distinguished University Professor, Chemistry and Chemical Biology; University of California, Berkeley, PhD

Sharon Harlan
Professor, Health Sciences and Sociology and Anthropology; Cornell University, PhD

Kelly Harrington
Associate Cooperative Education Coordinator, D'Amore-McKim School of Business; Suffolk University, MBA

Shaunna Harrington
Associate Academic Specialist, College of Professional Studies; Boston University, MA

Vincent Harris
University Distinguished Professor, William Lincoln Smith Professor of Electrical and Computer Engineering, Electrical and Computer Engineering; Northeastern University, PhD

Vanecia Harrison
Associate Cooperative Education Coordinator, College of Science; Emmanuel College, MA

Casper Harteveld
Assistant Professor, Game Design; Delft University of Technology (Netherlands), PhD

Woodrow Hartzog
Professor, Law and Computer and Information Science; University of North Carolina, Chapel Hill, PhD

Christopher Hasson
Assistant Professor, Physical Therapy, Movement, and Rehabilitation Sciences; University of Massachusetts, Amherst, PhD

Heather Hauck
Senior Cooperative Education Coordinator, D'Amore-McKim School of Business; Northeastern University, MS

Claudia Haupt
Associate Professor, Law and Political Science; Columbia University, JSD; University of Cologne (Germany), PhD

Thomas Havens
Professor, History; University of California, Berkeley, PhD

Lorna Hayward
Associate Professor, Physical Therapy, Movement, and Rehabilitation Sciences; Boston University, EdD

Haikun He
Assistant Academic Specialist, College of Professional Studies; Columbia University, MEd

Julia Hechtman
Lecturer, Art + Design; University of Illinois, Chicago, MFA

Meghan Heckman
Assistant Professor, Journalism; Northeastern University, MA

Gretchen Heefner
Associate Professor, History; Yale University, PhD

Donald E. Heiman
Professor, Physics; University of California, Irvine, PhD

Amy Helburn
Lorraine C. Snell Visiting Professor, Health Sciences; University of Massachusetts, PhD

Brian Helmuth
Professor, Marine and Environmental Sciences and Public Policy and Urban Affairs; University of Washington, PhD

Jason Hemann
Lecturer, Computer and Information Science; Indiana University, PhD

Carlene Hempel
Associate Teaching Professor, Journalism; University of North Carolina, Chapel Hill, MA

Dale Herbeck
Professor, Communication Studies; University of Iowa, PhD

Angela Herbert
Assistant Academic Specialist, American Sign Language; Northeastern University, BS

David A. Herlihy
Teaching Professor, Music; Boston College, JD

Catalina Herrera Almanza
Assistant Professor, Economics and International Affairs; Cornell University, PhD

Carie Hersh
Assistant Teaching Professor, Sociology and Anthropology; Duke University, JD

Kelsey Hersh
Assistant Cooperative Education Coordinator, D'Amore-McKim School of Business; Northeastern University, MS

Joshua Hertz
Assistant Teaching Professor, Engineering; Massachusetts Institute of Technology, PhD

Benjamin Hescott
Teaching Professor, Computer and Information Science; Boston University, PhD

Kamber Hetrick
Assistant Professor, Accounting; University of Illinois, Urbana-Champaign, PhD

Babak Heydari
Associate Professor, Mechanical and Industrial Engineering; University of California, Berkeley, PhD

Mary J. Hickey
Associate Clinical Professor, Physical Therapy, Movement, and Rehabilitation Sciences; Northeastern University, DPT

Carlos Hidrovo Chavez
Assistant Professor, Mechanical and Industrial Engineering; Massachusetts Institute of Technology, PhD

Logan M. Higgins
Lecturer, Biology; Massachusetts Institute of Technology, PhD

Malcolm D. Hill
Associate Professor, Marine and Environmental Sciences; University of California, Santa Cruz, PhD

Charles H. Hillman
Professor, Psychology and Health Sciences; University of Maryland, College Park, PhD

Robin Hillyard
Associate Teaching Professor, Graduate School of Engineering; Cambridge University (United Kingdom), PhD

John Hinson
Assistant Teaching Professor, Theatre; Brandeis University, MFA

Tad Hirsch
Professor, Art + Design; Massachusetts Institute of Technology, PhD

Hubert Ho
Lecturer, Music; University of California, Berkeley, PhD

Marie Odile Hobeika
Postdoctoral Teaching Associate, Communication Studies; University of Pittsburgh, PhD

Lynda Hodgson
Associate Teaching Professor, College of Professional Studies; Virginia Commonwealth University, PhD

Timothy Hoff
Professor, Management and Organizational Development and Public Policy and Urban Affairs; State University of New York, Albany, PhD

Jessica Hoffman
Associate Professor, Applied Psychology; Lehigh University, PhD

Uwe Hohgrawe
Assistant Teaching Professor, College of Professional Studies; University of Wuppertal (Germany), PhD

Udi Hoitash
Associate Professor and Cowan Research Professor, Accounting; Rutgers University, PhD

Trenton Honda
Assistant Clinical Professor, Physician Assistant Program; Northeastern University, PhD

Michael J. Hoppmann
Associate Teaching Professor, Communication Studies; University of Tübingen (Germany), PhD

Adam Hosein
Associate Professor, Philosophy and Religion; Massachusetts Institute of Technology, PhD

Elizabeth M. Howard
Associate Professor, Nursing; Boston College, PhD

Jeffrey P. Howe
Assistant Professor, Journalism; Boston University, MFA

Hanchen Huang
Donald D. Smith Professor in Mechanical Engineering, Mechanical and Industrial Engineering; University of California, Los Angeles, PhD

Anne R. Hughes
Associate Professor, Marine and Environmental Sciences; University of California, Davis, PhD

Francisco Hung
Associate Professor, Chemical Engineering; North Carolina State University, PhD

Matthew Hunt
Professor, Sociology and Anthropology; Indiana University, PhD

Patrick Hurley
Assistant Professor, Accounting; University of Wisconsin, Madison, PhD

Mark Huselid
Distinguished Professor of Workforce Analytics, International Business and Strategy; State University of New York, Buffalo, PhD

Roxana E. Iacob
Research Associate Professor, Chemistry and Chemical Biology; Konstanz University (Germany), PhD

Anthony Iarrobino
Professor, Mathematics; Massachusetts Institute of Technology, PhD

Patricia Illingworth
Professor, Philosophy and Religion; University of California, San Diego, PhD; Boston University, JD

Jennifer Ingemi
Assistant Teaching Professor, Behavioral Neuroscience; University of Massachusetts, PhD

Vinay K. Ingle
Associate Professor, Electrical and Computer Engineering; Rensselaer Polytechnic Institute, PhD

Francesca Inglese
Assistant Professor, Music; Brown University, PhD

Rei Inouye
Associate Teaching Professor, World Languages Center; Temple University, PhD

Stephen S. Intille
Associate Professor, Computer and Information Science and Health Sciences; Massachusetts Institute of Technology, PhD

Efstratios Ioannidis
Assistant Professor, Electrical and Computer Engineering; University of Toronto (Canada), PhD

Roderick Ireland
Distinguished Professor, Criminology and Criminal Justice; Harvard University, LLM; Northeastern University, PhD

Derek M. Isaacowitz
Professor, Psychology; University of Pennsylvania, PhD

Jacqueline A. Isaacs
Professor, Mechanical and Industrial Engineering; Massachusetts Institute of Technology, PhD

Michelle L. Israel
Associate Cooperative Education Coordinator, College of Science; Northeastern University, MS

Nathan E. Israeloff
Associate Professor, Physics; University of Illinois, Urbana-Champaign, PhD

Alexander R. Ivanov
Associate Professor, Chemistry and Chemical Biology; Russian Academy of Science, Institute of Bioorganic Chemistry (Moscow), PhD

Maura Daly Iversen
Professor, Physical Therapy, Movement, and Rehabilitation Sciences; Harvard University, SD; Massachusetts General Hospital Institute of Health Professions, DPT

Julia Ivy
Associate Teaching Professor, International Business and Strategy; Lancaster University (United Kingdom), PhD

Denise Jackson
Associate Professor, Psychology; University of Pittsburgh, PhD

Ellen Jackson
Assistant Teaching Professor, Writing Program; Stanford University, MFA

Sarah Jackson
Assistant Professor, Communication Studies; University of Minnesota, PhD

William J. Jackson
Senior Cooperative Education Coordinator, College of Arts, Media and Design; University of Massachusetts, Boston, MEd

Michelle Jacobs
Assistant Clinical Professor, Pharmacy and Health Systems Sciences; University of California, San Francisco, PharmD

Beverly Jaeger-Helton
Teaching Professor, Mechanical and Industrial Engineering; Northeastern University, PhD

Michael Jaeggli
Assistant Teaching Professor, Bioengineering; Clemson University, PhD

Nader Jalili
Professor, Mechanical and Industrial Engineering; University of Connecticut, PhD

Safa Jamali
Assistant Professor, Mechanical and Industrial Engineering; Case Western Reserve University, PhD

Bogume Jang
Lecturer, Mathematics; Purdue University, PhD

Solomon M. Jekel
Associate Professor, Mathematics; Dartmouth College, PhD

Qingying Jia
Research Assistant Professor, Chemistry and Chemical Biology; Illinois Institute of Technology, PhD

Benedict Jimenez
Associate Professor, Political Science; University of Illinois, Chicago, PhD

Holly Jimison
Professor of the Practice, Computer and Information Science and Nursing; Stanford University, PhD

Xiaoning Jin
Assistant Professor, Mechanical and Industrial Engineering; University of Michigan, PhD

Xuemin Jin
Associate Teaching Professor, Mechanical and Industrial Engineering; University of Maryland, PhD

Donghee Jo
Assistant Professor, Economics; Duke University, MA

Dinesh John
Assistant Professor, Health Sciences; University of Tennessee, PhD

Brooke Johnson
Assistant Cooperative Education Coordinator, D'Amore-McKim School of Business; Boston College, MEd

Steven Johnson
Assistant Cooperative Education Coordinator, College of Engineering; Suffolk University, MS

Vanessa D. Johnson
Associate Professor, Applied Psychology; Western Michigan University, PhD

Kimberly Jones
Associate Teaching Professor, International Affairs; Northeastern University, PhD

Rachel Jones
Associate Professor, Nursing; New York University, PhD

Thomas Jones
Associate Professor, Sociology and Anthropology and Sociology and Anthropology; Princeton University, PhD

Dierdre Jordan
Associate Cooperative Education Coordinator, Bouvé College of Health Sciences; Northeastern University, MS

Tiffany Joseph
Associate Professor, Sociology and Anthropology and International Affairs; University of Michigan, PhD

Alison Joyce
Assistant Cooperative Education Coordinator, College of Engineering; Ohio University, MEd

Maria Jump
Associate Teaching Professor, Computer and Information Science; University of Texas, Austin, PhD

Yung Joon Jung
Professor, Mechanical and Industrial Engineering; Rensselaer Polytechnic Institute, PhD

Jeffrey Juris
Associate Professor, Sociology and Anthropology; University of California, Berkeley, PhD

David R. Kaeli
College of Engineering Distinguished Professor, Electrical and Computer Engineering; Rutgers University, PhD

Sallyann Kakas
Assistant Cooperative Education Coordinator, Finance; Northeastern University, BS

Jayant Kale
Professor and Philip R. McDonald Chair, Finance; University of Texas, Austin, PhD

Sagar V. Kamarthi
Professor, Mechanical and Industrial Engineering; Pennsylvania State University, PhD

John Kane
Lecturer, Art + Design; Yale University, BA

Mary M. Kane
Senior Cooperative Education Coordinator, D'Amore-McKim School of Business; University of Massachusetts, Boston, MEd

Michael Kane
Assistant Professor, Civil and Environmental Engineering; University of Michigan, PhD

Sarah Kanouse
Associate Professor, Art + Design; University of Illinois, Urbana-Champaign, MFA

Carla Kaplan
Davis Distinguished Professor in American Literature, English and Women's, Gender, and Sexuality Studies; Northwestern University, PhD

Swastik Kar
Associate Professor, Physics; Indian Institute of Physics (India), PhD

Samina Karim
Professor, Entrepreneurship and Innovation; University of Michigan, PhD

Alain S. Karma
College of Arts and Sciences Distinguished Professor, Physics; University of California, Santa Barbara, PhD

Edward Katz
Associate Teaching Professor, Computer and Information Science; University of Louisiana, Lafayette, PhD

Ralph Katz
Professor, Entrepreneurship and Innovation; University of Pennsylvania, PhD

Jonathan Kaufman
Professor, Journalism; Harvard University, MA

William Kay
Associate Professor, Political Science; Indiana University, PhD

Bret Keeling
Associate Teaching Professor, Writing Program; University of Washington, PhD

Maureen Kelleher
Associate Professor, Sociology and Anthropology; University of Missouri, Columbia, PhD

Karen P. Kelley
Senior Cooperative Education Coordinator, College of Engineering; Northeastern University, MEd

Ryann Kelley
Associate Cooperative Education Coordinator, Finance; Northeastern University, MEd

Thomas M. Kelley
Lecturer, Physics; University of Minnesota, PhD

Kathleen Kelly
Professor, English; University of North Carolina, Chapel Hill, PhD

Mary Kelting
Associate Professor, Philosophy and Religion; University of Wisconsin, Madison, PhD

Daniel D. Kennedy
Associate Professor, Journalism; Boston University, MLA

Aileen Kent Yates
Assistant Cooperative Education Coordinator, College of Computer and Information Science; University of Massachusetts, Amherst, BA

Heidi Kevoe Feldman
Associate Professor, Communication Studies; Rutgers University, PhD

Leila Keyvani Someh
Assistant Teaching Professor, Engineering; Northeastern University, PhD

Ban-An Khaw
Professor, Pharmaceutical Sciences; Boston College, PhD

Konstantin Khrapko
Professor, Biology and Pharmaceutical Sciences; Engelhardt Institute of Molecular Biology, Moscow (Russia), PhD

Ilham Khuri-Makdisi
Associate Professor, History; Harvard University, PhD

Sheri Kiami
Assistant Clinical Professor, Physical Therapy, Movement, and Rehabilitation Sciences; Simmons College, DPT

Angela Kilby
Assistant Professor, Economics; Massachusetts Institute of Technology, PhD

Daniel Kim
Associate Professor, Health Sciences; University of Toronto (Canada), MD; Harvard University, PhD

Eunsong Kim
Assistant Professor, English; University of Texas, Austin, PhD

Jonghan Kim
Assistant Professor, Pharmaceutical Sciences; Ohio State University, PhD

Miso Kim
Assistant Professor, Art + Design; Carnegie Mellon University, PhD

Nancy S. Kim
Associate Professor, Psychology; Yale University, PhD

Somy Kim
Associate Teaching Professor, Writing Program; University of California, San Diego, PhD

Tiffany Kim
Assistant Clinical Professor, Nursing; University of Pennsylvania, PhD

Yong-Bin Kim
Professor, Electrical and Computer Engineering; Colorado State University, PhD

John Kimani
Assistant Teaching Professor, Electrical and Computer Engineering; University of Wisconsin, Milwaukee, PhD

David L. Kimbro
Assistant Professor, Marine and Environmental Sciences; University of California, Davis, PhD

Nancy Kimelman
Assistant Teaching Professor, Economics; Brown University, PhD

Nancy Kindelan
Professor, Theatre; University of Wisconsin, Madison, PhD

Christopher K. King
Professor, Mathematics; Harvard University, PhD

Donald R. King
Associate Professor, Mathematics; Massachusetts Institute of Technology, PhD

Margaret Kirchoff
Assistant Teaching Professor, College of Professional Studies; George Washington University, EdD

Engin Kirda
Professor, Computer and Information Science and Electrical and Computer Engineering; Technical University of Vienna (Austria), PhD

Rein U. Kirss
Associate Professor, Chemistry and Chemical Biology; University of Wisconsin, Madison, PhD

Jennifer L. Kirwin
Clinical Professor, Pharmacy and Health Systems Sciences; Northeastern University, PharmD

Risa Kitagawa
Assistant Professor, Political Science and International Affairs; Stanford University, PhD

Mark Kjellman
Assistant Teaching Professor, Writing Program; Boston University, PhD

Alan Klein
Professor, Sociology and Anthropology; State University of New York, Buffalo, PhD

Sarah Klionsky
Assistant Cooperative Education Coordinator, College of Science; University of Wisconsin, Madison, MA

Kristian Kloeckl
Associate Professor, Art + Design and Architecture; University of Venice (Italy), PhD

Thomas Koenig
Professor, Sociology and Anthropology; University of California, Santa Barbara, PhD

Mieczyslaw M. Kokar
Professor, Electrical and Computer Engineering; University of Wroclaw (Poland), PhD

Tali Konry
Assistant Professor, Pharmaceutical Sciences; Ben Gurion University (Israel), PhD

Constantin Konstantopoulos
Associate Teaching Professor, Graduate School of Engineering; Boston University, PhD

Abigail N. Koppes
Assistant Professor, Chemical Engineering; Rensselaer Polytechnic Institute, PhD

Ryan Koppes
Assistant Professor, Chemical Engineering; Rensselaer Polytechnic Institute, PhD

Sarah Kostanski
Assistant Cooperative Education Coordinator, College of Engineering; Framingham State University, MS

Ilka Kostka
Assistant Teaching Professor, College of Professional Studies; New York University, PhD

Harilaos Koutsopoulos
Professor, Civil and Environmental Engineering; Massachusetts Institute of Technology, PhD

Linda Kowalcky
Professor of the Practice, Public Policy and Urban Affairs; Johns Hopkins University, PhD

Gregory J. Kowalski
Associate Professor, Mechanical and Industrial Engineering; University of Wisconsin, Madison, PhD

Sergey Kravchenko
Professor, Physics; Institute of Solid State Physics (Russia), PhD

Caroline Krehbiel
Visiting Assistant Professor, Applied Psychology; Lehigh University, PhD

Dmitri Krioukov
Associate Professor, Physics; Old Dominion University, PhD

Ganesh Krishnamoorthy
Professor, Accounting; University of Southern California, PhD

Karthik Krishnan
Associate Professor, Finance; Boston College, PhD

Louis J. Kruger
Associate Professor, Applied Psychology; Rutgers University, PsyD

Laura Kuhl
Assistant Professor, Public Policy and Urban Affairs and International Affairs; Tufts University, PhD

Abhishek Kumar
Assistant Teaching Professor, Mechanical and Industrial Engineering; University of Michigan, PhD

Venkat Kuppuswamy
Assistant Professor, Entrepreneurship and Innovation; Harvard Business School, DBA

Jessica Kurr
Postdoctoral Teaching Associate, Communication Studies; Pennsylvania State University, PhD

Steven R. Kursh
Associate Academic Specialist, Finance; University of Pennsylvania, PhD

John Kwoka
Neal F. Finnegan Distinguished Professor, Economics; University of Pennsylvania, PhD

Michelle Laboy
Assistant Professor, Architecture; University of Michigan, MArch

John LaBrie
Professor of the Practice, College of Professional Studies; University of Pennsylvania, EdD

Jamie Ladge
Associate Professor, Management and Organizational Development; Boston College, PhD

Jay Laird
Assistant Teaching Professor, College of Professional Studies; Lesley University, MFA

Venkatraman Lakshmibai
Professor, Mathematics; Tata University (India), PhD

Charlotte Lam
Assistant Cooperative Education Coordinator, College of Science; California State University, Sacramento, MA

Joan LaMachia
Associate Cooperative Education Coordinator, College of Social Sciences and Humanities; Boston College, MEd

Anna Lamin
Associate Professor and Matthew Eagan Faculty Fellow, International Business and Strategy; University of Minnesota, PhD

Jason Lancaster
Associate Clinical Professor, Pharmacy and Health Systems Sciences; Massachusetts College of Pharmacy, PharmD

William Lancaster
Senior Lecturer, Communication Studies; Michigan State University, MA

Lucas J. Landherr
Associate Teaching Professor, Chemical Engineering; Cornell University, PhD

Theodore Landsmark
Distinguished Professor, Public Policy and Urban Affairs; Boston University, PhD

Henry W. Lane
Professor, International Business and Strategy; Harvard University, DBA

David Lang
Lecturer, Mathematics; Boston College, PhD; Northeastern University, PhD

Timothy Lannin
Assistant Teaching Professor, Bioengineering; Cornell University, PhD

Amy Lantinga
Associate Teaching Professor, College of Professional Studies; University of Tennessee, EdD

Denise Lapon Garcia
Associate Professor, Political Science and International Affairs; University of Geneva (Switzerland), PhD

Philip Larese-Casanova
Associate Professor, Civil and Environmental Engineering; University of Iowa, PhD

Sonya L. Larrieux
Associate Clinical Professor, Physical Therapy, Movement, and Rehabilitation Sciences; Northeastern University, PhD

Barbara Larson
Associate Academic Specialist, Management and Organizational Development; Harvard Business School, DBA

Elizabeth Larson
Assistant Cooperative Education Coordinator, D'Amore-McKim School of Business; Northeastern University, MBA

Kimberly Larson
Associate Teaching Professor, College of Professional Studies; Drexel University, PhD

Felicia G. Lassk
Associate Professor, Marketing; University of South Florida, PhD

Amanda Reeser Lawrence
Associate Professor, Architecture; Harvard University, PhD

David M. Lazer
Distinguished Professor, Political Science and Computer and Information Science; University of Michigan, Ann Arbor, PhD

Christina Lee
Assistant Professor, Applied Psychology; New York University, PhD

Cynthia Lee
Professor, Management and Organizational Development; University of Maryland, PhD

Doreen Lee
Associate Professor, Sociology and Anthropology; Cornell University, PhD

Jung Lee
Associate Professor, Philosophy and Religion; Brown University, PhD

Kristen Lee
Associate Teaching Professor, College of Professional Studies; Northeastern University, EdD

Lee-Peng Lee
Lecturer, Mathematics; Massachusetts Institute of Technology, PhD

Matt Lee
Teaching Professor, Human Services; University of Illinois, Urbana-Champaign, PhD

Yang W. Lee
Associate Professor, Supply Chain and Information Management; Massachusetts Institute of Technology, PhD

Carolyn W. T. Lee-Parsons
Associate Professor, Chemical Engineering and Chemistry and Chemical Biology; Cornell University, PhD

Miriam E. Leeser
Professor, Electrical and Computer Engineering; Cambridge University (United Kingdom), PhD

Laurel Leff
Associate Professor, Journalism; Yale University, MA

Lori Lefkovitz
Ruderman Professor of Jewish Studies, Jewish Studies and English; Brown University, PhD

Patrick Legros
Distinguished Professor, Economics; California Institute of Technology, PhD

Bradley M. Lehman
Professor, Electrical and Computer Engineering; Georgia Institute of Technology, PhD

Robert Lentz
Associate Academic Specialist, Entrepreneurship and Innovation; Babson College, MBA

Benjamin Lerner
Assistant Teaching Professor, Computer and Information Science; University of Washington, PhD

Neal Lerner
Professor, English; Boston University, EdD

Marina Leslie
Associate Professor, English; Yale University, PhD

Hanoch Lev-Ari
Professor, Electrical and Computer Engineering; Stanford University, PhD

Danielle Levac
Assistant Professor, Physical Therapy, Movement, and Rehabilitation Sciences; McMaster University (Canada), PhD

Tatyana Levchenko
Research Assistant Professor, Pharmaceutical Sciences; Academy of Medical Sciences Moscow (Russia), PhD

Yiannis A. Levendis
College of Engineering Distinguished Professor, Mechanical and Industrial Engineering; California Institute of Technology, PhD

Elinor Levine
Assistant Cooperative Education Coordinator, D'Amore-McKim School of Business; University of Massachusetts, Amherst, MEd

Herbert Levine
Professor, Physics and Bioengineering; Princeton University, PhD

Kim Lewis
University Distinguished Professor, Biology; Moscow University (Russia), PhD

Laura H. Lewis
Cabot Professor, Chemical Engineering and Mechanical and Industrial Engineering; University of Texas, Austin, PhD

David J. Lewkowicz
Professor, Communication Sciences and Disorders; City University of New York, Hunter College, PhD

Ang Li
Assistant Professor, Architecture; Princetown University, MArch

Chieh Li
Associate Professor, Applied Psychology; University of Massachusetts, Amherst, EdD

Rui Li
Associate Clinical Professor, Health Sciences; Baylor University, PhD

Robert Lieb
Professor, Supply Chain and Information Management; University of Maryland, DBA

Karl J. Lieberherr
Professor, Computer and Information Science; Eidgenössische Technische Hochschule Zürich (Switzerland), PhD

Karin N. Lifter
Professor, Applied Psychology; Columbia University, PhD

Xue Lin
Assistant Professor, Electrical and Computer Engineering; University of Southern California, PhD

Yingzi Lin
Associate Professor, Mechanical and Industrial Engineering; University of Saskatchewan (Canada), PhD

Alisa K. Lincoln
Professor, Sociology and Anthropology and Health Sciences; Columbia University, PhD

Katherine Lind
Postdoctoral Teaching Associate, Communication Studies; Indiana University, PHD

John J. Lindhe
Senior Lecturer, Mathematics; Northeastern University, MA

Gabor P. Lippner
Assistant Professor, Mathematics; Eotvos University (Hungary), PhD

James Lipsky
Associate Academic Specialist, American Sign Language; Boston University, MA

Heather A. Littlefield
Associate Teaching Professor, Linguistics; Boston University, PhD

Kelvin Liu
Associate Professor, Accounting; University of South Carolina, PhD

Xiaoping Liu
Visiting Assistant Professor, Supply Chain and Information Management; University of Massachusetts, Lowell, PhD

Yang Liu
Assistant Professor, Mechanical and Industrial Engineering; Columbia University, PhD

Yongmin Liu
Assistant Professor, Mechanical and Industrial Engineering and Electrical and Computer Engineering; University of California, Berkeley, PhD

Ioannis Livanis
Associate Teaching Professor, International Affairs and Political Science; University of Florida, PhD

Carol Livermore
Associate Professor, Mechanical and Industrial Engineering; Harvard University, PhD

Martha Loftus
Assistant Teaching Professor, College of Professional Studies; Harvard University, EdD

Diomedes E. Logothetis
Professor, Pharmaceutical Sciences; Harvard University, PhD

Mark Lomanno
Visiting Assistant Teaching Professor, Music; University of Texas, Austin, PhD

Fabrizio Lombardi
International Test Conference Professor, Electrical and Computer Engineering; University of London (United Kingdom), PhD

Marissa Lombardi
Assistant Teaching Professor, College of Professional Studies; Northeastern University, EdD

Guido Lopez
Associate Teaching Professor, College of Professional Studies;
Northeastern University, PhD

Steven A. Lopez
Assistant Professor, Chemistry and Chemical Biology; University of
California, Los Angeles, PhD

Connie Lorette
Assistant Clinical Professor, Nursing; Boston College, PhD

Ralph H. Loring
Associate Professor, Pharmaceutical Sciences; Cornell University, PhD

Ivan Loseu
Professor, Mathematics; Moscow State University (Russia), PhD

Daniel Lothian
Visiting Scholar, Journalism; American University, MA

Kathleen E. Lotterhos
Assistant Professor, Marine and Environmental Sciences; Florida State
University, PhD

Salim A. Lotuff III
Teaching Professor, Communication Studies; Northeastern University, MA

Deirdre Loughridge
Assistant Professor, Music; University of Pennsylvania, PhD

Jennifer O. Love
Associate Academic Specialist, Engineering; University of Iowa, MS

Timothy Love
Associate Professor, Architecture; Harvard University, MArch

William Lovely
Assistant Academic Specialist, International Business and Strategy;
Northeastern University, DLP

Amy Shirong Lu
Assistant Professor, Communication Studies and Health Sciences;
University of North Carolina, Chapel Hill, PhD

Long Lu
Assistant Professor, Computer and Information Science; Georgia Institute
of Technology, PhD

Mary Ludden
Assistant Teaching Professor, College of Professional Studies; Walden
University, PhD

Razvan Lungeanu
Assistant Professor, Entrepreneurship and Innovation; Northwestern
University, PhD

Katherine Luongo
Associate Professor, History; University of Michigan, Ann Arbor, PhD

Steven Lustig
Associate Professor, Chemical Engineering; Purdue University, PhD

David E. Luzzi
Professor, Mechanical and Industrial Engineering; Northwestern
University, PhD

Vasiliki Lykourinou
Assistant Teaching Professor, Chemistry and Chemical Biology;
University of South Florida, PhD

Jun Ma
Associate Professor, Economics; University of Washington, PhD

Kayse Maass
Assistant Professor, Mechanical and Industrial Engineering; University of
Michigan, PhD

Patricia A. Mabrouk
Professor, Chemistry and Chemical Biology; Massachusetts Institute of
Technology, PhD

Esther MacKenzie
Visiting Clinical Instructor, Nursing; Boston University, MA

Andrew Mackie
Assistant Clinical Professor, Physician Assistant Program; University of
Nebraska, MS

Emanuele Macri
Associate Professor, Mathematics; SISSA (Italy), PhD

Jeanne Madden
Associate Professor, Pharmacy and Health Systems Sciences; Harvard
University, PhD

Kristin Madison
Professor, Health Sciences and Law; Stanford University, PhD

Tracy Magee
Assistant Clinical Professor, Nursing; Boston College, PhD

Bala Maheswaran
Teaching Professor, Engineering; Northeastern University, PhD

Debra Mahfouz
Associate Clinical Professor, Pharmacy and Health Systems Sciences;
University of Rhode Island, PharmD

Elizabeth Mahler
Associate Teaching Professor, College of Professional Studies; George
Washington University, EdD

Luigia Maiellaro
Teaching Professor, World Languages Center; Russian State University
for the Humanities (Russia), PhD

Lee Makowski
Professor, Bioengineering and Chemistry and Chemical Biology;
Massachusetts Institute of Technology, PhD

Purnima Makris
Associate Professor, Electrical and Computer Engineering;
Massachusetts Institute of Technology, PhD

Alexandros Makriyannis
George D. Behrakis Chair and Professor, Center for Drug Discovery and
Chemistry and Chemical Biology; University of Kansas, PhD

Michael Malamas
Research Associate Professor, Center for Drug Discovery and Chemistry
and Chemical Biology; University of Pennsylvania, PhD

Mario Maletta
Professor, Accounting; University of Massachusetts, Amherst, PhD

Shiti Malhotra
Lecturer, Linguistics; University of Maryland, PhD

Veronika Maliborska
Assistant Teaching Professor, College of Professional Studies; Purdue University, PhD

Mikhail B. Malioutov
Professor, Mathematics; Moscow State University (Russia), PhD

Andrew Mall
Assistant Professor, Music; University of Chicago, PhD

Craig E. Maloney
Associate Professor, Mechanical and Industrial Engineering; University of California, Santa Barbara, PhD

Roman Manetsch
Associate Professor, Chemistry and Chemical Biology and Pharmaceutical Sciences; University of Basel (Switzerland), PhD

John Manferdelli
Professor of the Practice, Computer and Information Science; University of California, Berkeley, PhD

Swapnil Maniar
Professor of the Practice, Health Sciences; Johns Hopkins University, PhD

Justin Manjourides
Assistant Professor, Health Sciences; Harvard University, PhD

Emily Mann
Teaching Professor, Human Services; University of Wisconsin, Madison, PhD

James M. Manning
Professor, Biology; Tufts University, PhD

Peter Manning
Elmer V.H. and Eileen M. Brooks Chair in Policing, Criminology and Criminal Justice; Duke University, PhD

Moira Mannix Votel
Associate Cooperative Education Coordinator, Bouvé College of Health Sciences; Columbia University, MA

Peter Manolios
Professor, Computer and Information Science; University of Texas, Austin, PhD

Valentina Marano
Assistant Professor, International Business and Strategy; University of South Carolina, PhD

Janice Maras
Assistant Teaching Professor, Health Sciences; Northeastern University, EdD

Krassimir Marchev
Professor of the Practice, College of Professional Studies; Northeastern University, PhD

Edwin Marengo Fuentes
Associate Professor, Electrical and Computer Engineering; Northeastern University, PhD

Donald G. Margotta
Associate Professor, Finance; University of North Carolina, Chapel Hill, PhD

Alina Marian
Professor, Mathematics; Harvard University, PhD

Tucker Marion
Associate Professor, Entrepreneurship and Innovation; Pennsylvania State University, PhD

Robert S. Markiewicz
Professor, Physics; University of California, Berkeley, PhD

Alycia Markowski
Associate Clinical Professor, Physical Therapy, Movement, and Rehabilitation Sciences; Northeastern University, DPT

Mindy Marks
Associate Professor, Economics; Washington University, PhD

Stacy Marsella
Professor, Computer and Information Science and Psychology; Rutgers University, PhD

Ineke Marshall
Professor, Sociology and Anthropology and Criminology and Criminal Justice; Bowling Green State University, PhD

Dayna L. Martinez
Assistant Teaching Professor, Mechanical and Industrial Engineering; University of South Florida, Tampa, PhD

Ramiro Martinez
Professor, Criminology and Criminal Justice and Sociology and Anthropology; Ohio State University, PhD

José Angel Martinez-Lorenzo
Assistant Professor, Mechanical and Industrial Engineering and Electrical and Computer Engineering; Universidad de Vigo (Spain), PhD

Alexander Martsinkovsky
Associate Professor, Mathematics; Brandeis University, PhD

David Massey
Professor, Mathematics; Duke University, PhD

Jude E. Mathews
Associate Teaching Professor, Chemistry and Chemical Biology; Clemson University, PhD

Kristen Mathieu Gonzalez
Clinical Instructor, Nursing; University of Phoenix, MS

Daniele Mathras
Assistant Professor, Marketing; Arizona State University, PhD

Thomas M. Matta
Assistant Clinical Professor, Pharmacy and Health Systems Sciences; Xavier University of Lousiana, PharmD

Carla Mattos
Professor, Chemistry and Chemical Biology; Massachusetts Institute of Technology, PhD

Lucy Maulsby
Associate Professor, Architecture; Columbia University, PhD

Ernest Mauristhene
Associate Cooperative Education Coordinator, D'Amore-McKim School of Business; Hardin-Simmons University, MBA

Jessica Maxwell
Associate Clinical Professor, Physical Therapy, Movement, and Rehabilitation Sciences; Boston University, PhD; Massachusetts General Hospital Institute of Health Professions, DPT

William Mayer
Professor, Political Science; Harvard University, PhD

Mary Mayville
Assistant Clinical Professor, Nursing; Northeastern University, DNP

Dori P. Mazor
Associate Cooperative Education Coordinator, College of Arts, Media and Design; Brandeis University, MBA

Charn McAllister
Assistant Professor, Management and Organizational Development; Florida State University, PhD

Michelle McAllister
Visiting Assistant Professor, Accounting; Florida State University, PhD

Laurie McCadden
Clinical Instructor, Nursing; University of Massachusetts, Lowell, MSN

Paulette McCarty
Assistant Academic Specialist, Management and Organizational Development; University of Tennessee, PhD

Jane McCool
Assistant Clinical Professor, Nursing; University of Rhode Island, PhD

Al McCready
Assistant Teaching Professor, College of Professional Studies; George Washington University, PhD

Eileen McDonagh
Professor, Political Science; Harvard University, PhD

Ann McDonald
Associate Professor, Art + Design; Yale University, MFA

Matthew McDonald
Associate Professor, Music; Yale University, PhD

Brianne McDonough
Assistant Cooperative Education Coordinator, College of Computer and Information Science; Salem State University, MS

Melissa McElligott
Assistant Teaching Professor, Biology; Northeastern University, PhD

Seamus McGovern
Lecturer, Supply Chain and Information Management; Northeastern University, PhD

Nicol E. McGruer
Professor, Electrical and Computer Engineering; Michigan State University, PhD

Jean McGuire
Professor of the Practice, Health Sciences; Brandeis University, PhD

Hugh McManus
Associate Teaching Professor, Mechanical and Industrial Engineering; Stanford University, PhD

Cristine McMartin-Miller
Associate Teaching Professor, College of Professional Studies; Purdue University, PhD

Joseph McNabb
Professor of the Practice, College of Professional Studies; Northeastern University, PhD

Robert C. McOwen
Professor, Mathematics; University of California, Berkeley, PhD

Frances Nelson McSherry
Teaching Professor, Theatre; New York University, MFA

Iraz Mehdi
Assistant Cooperative Education Coordinator, College of Engineering; California State University, Long Beach, MS

Emanuel S. Melachrinoudis
Professor, Mechanical and Industrial Engineering; University of Massachusetts, Amherst, PhD

Waleed Meleis
Associate Professor, Electrical and Computer Engineering; University of Michigan, PhD

Susan L. Mello
Assistant Professor, Communication Studies; University of Pennsylvania, PhD

Tina J. Mello
Assistant Cooperative Education Coordinator, College of Science; Boston College, MA

Richard H. Melloni Jr.
Professor, Psychology; University of Massachusetts, PhD

Tommaso Melodia
Associate Professor, Electrical and Computer Engineering; Georgia Institute of Technology, PhD

Latika Menon
Associate Professor, Physics; Tata Institute of Fundamental Research, Bombay (India), PhD

Francisco Mesch
Assistant Cooperative Education Coordinator, College of Computer and Information Science; Washington State University, MS

Hameed Metghalchi
Professor, Mechanical and Industrial Engineering; Massachusetts Institute of Technology, ScD

Laura Meyer
Assistant Cooperative Education Coordinator, Graduate School of Engineering; Cleveland State University, MEd

Marc H. Meyer
Robert J. Shillman Professor of Entrepreneurship and Matthews Distinguished University Professor, Entrepreneurship and Innovation; Massachusetts Institute of Technology, PhD

Michael Meyer
Associate Teaching Professor, Philosophy and Religion; Boston University, PhD

Ningfang Mi
Associate Professor, Electrical and Computer Engineering; University of Texas, Dallas, MS

Vidoje Mihajlovikj
Lecturer, Computer and Information Science; Clarkson University, PhD

Lara Milane
Assistant Teaching Professor, Pharmaceutical Sciences; Northeastern University, PhD

Loiza Miles
Assistant Academic Specialist, World Languages Center; Sorbonne University (France), MA

William Miles
Professor, Political Science; Tufts University, PhD

Danielle M. Miller
Assistant Clinical Professor, Pharmacy and Health Systems Sciences; Northeastern University, PharmD

Edward Miller
Assistant Teaching Professor, College of Professional Studies; Boston College, PhD

Gregory Miller
Associate Professor, Pharmaceutical Sciences; University of New York, PhD

Heather Miller
Assistant Clinical Professor, Computer and Information Science; Ecole Polytechnique Federale de Lausanne (Switzerland), PhD

Joanne L. Miller
Matthews Distinguished University Professor, Psychology; University of Minnesota, PhD

Matthew Miller
Professor, Health Sciences; Yale University, MD; Harvard University, ScD

Renee Miller
Distinguished Professor, Computer and Information Science; University of Wisconsin, Madison, PhD

Ennio Mingolla
Professor, Communication Sciences and Disorders; University of Connecticut, PhD

Marilyn L. Minus
Associate Professor, Mechanical and Industrial Engineering; Georgia Institute of Technology, PhD

Alan Mislove
Associate Professor, Computer and Information Science; Rice University, PhD

Cheryl Mitteness
Acadmic Specialist, Entrepreneurship and Innovation; University of Louisville, PhD

Nancy Mizzoni
Clinical Instructor, Nursing; Northeastern University, MS

Anahit Mkrtchyan
Assistant Professor, Finance; Pennsylvania State University, PhD

Sarah Mockler
Assistant Cooperative Education Coordinator, College of Engineering; Boston College, MA

Alicia Modestino
Associate Professor, Public Policy and Urban Affairs and Economics; Harvard University, PhD

Valentine Moghadam
Professor, International Affairs; American University, PhD

Mohsen Moghaddam
Assistant Professor, Mechanical and Industrial Engineering; Purdue University, PhD

Shan Mohammed
Associate Clinical Professor, Health Sciences; Case Western Reserve University, MD

Changiz Mohiyeddini
Associate Professor, Applied Psychology; University of Trier (Germany), PsyD

Beth Molnar
Associate Professor, Health Sciences; Harvard University, ScD

James Monaghan
Assistant Professor, Biology; University of Kentucky, PhD

Yasmil Montes
Assistant Cooperative Education Coordinator, College of Computer and Information Science; Cambridge College, MS

Susan F. Montgomery
Senior Academic Specialist, Entrepreneurship and Innovation and Law; Northeastern University, JD

Robert M. Mooradian
Professor and Harding Research Professor, Finance; University of Pennsylvania, PhD

Rebekah Moore
Visiting Assistant Professor, Music; Indiana University, PhD

Enrique F. Moreno
Senior Lecturer, Physics; Universidad Nacional de La Plata (Argentina), PhD

Kimberly Moreno
Professor, Accounting; University of Massachusetts, Amherst, PhD

Joanne Morreale
Associate Professor, Media and Screen Studies; Temple University, PhD

Mounira Morris
Assistant Teaching Professor, College of Professional Studies; University of Massachusetts, Amherst, EdD

Kristen Morse
Assistant Cooperative Education Coordinator, Bouvé College of Health Sciences; Ithaca College, DPT

Hossein Mosallaei
Professor, Electrical and Computer Engineering; University of California, Los Angeles, PhD

Edward Moss
Associate Teaching Professor, Writing Program; Emerson College, MFA

Lorraine Ann Mountain
Senior Cooperative Education Coordinator, College of Engineering; Tufts University, MS

Amy Mueller
Assistant Professor, Civil and Environmental Engineering and Marine and Environmental Sciences; Massachusetts Institute of Technology, PhD

Sinan Muftu
Professor, Mechanical and Industrial Engineering; University of Rochester, PhD

Tania Muino
Assistant Academic Specialist, World Languages Center; University of Barcelona (Spain), MA

Sanjeev Mukerjee
Professor, Chemistry and Chemical Biology; Texas AM University, PhD

Jay Mulki
Associate Professor, Marketing; University of South Florida, PhD

Anthony Mullen
Associate Teaching Professor, Computer and Information Science; University of Groningen (Netherlands), PhD

Patrick Mullen
Associate Professor, English; University of Pittsburgh, PhD

Seth Mulliken
Assistant Teaching Professor, Media and Screen Studies; North Carolina State Univeristy, PhD

Samuel E. Munoz
Assistant Professor, Marine and Environmental Sciences and Civil and Environmental Engineering; University of Wisconsin, Madison, PhD

Kellianne Murphy
Senior Cooperative Education Coordinator, College of Arts, Media and Design; Northeastern University, MA

Lauren A. Murphy
Assistant Clinical Professor, Physical Therapy, Movement, and Rehabilitation Sciences; Portland State University, PhD

Robert Murray
Assistant Academic Specialist, Supply Chain and Information Management; Harvard Business School, MBA

Shashi K. Murthy
Professor, Chemical Engineering; Massachusetts Institute of Technology, PhD

Hande Musdal Ondemir
Assistant Teaching Professor, Mechanical and Industrial Engineering; Northeastern University, PhD

Cecelia Musselman
Associate Teaching Professor, Writing Program; Columbia University, PhD

Shakir Mustafa
Teaching Professor, World Languages Center; Boston University, PhD

Andrew Myers
Associate Professor, Civil and Environmental Engineering; Stanford University, PhD

David Myers
Associate Teaching Professor, Finance; University of Washington, PhD

Laura Mylott
Clinical Professor, Nursing; Boston College, PhD

Nada Naji
Lecturer, Computer and Information Science; University of Neuchatel (Switzerland), PhD

Thomas K. Nakayama
Professor, Communication Studies; University of Iowa, PhD

Laurie Nardone
Associate Teaching Professor, English; Emory University, PhD

Pran Nath
Matthews Distinguished University Professor, Physics; Stanford University, PhD

Hamid Nayeb-Hashemi
Professor, Mechanical and Industrial Engineering; Massachusetts Institute of Technology, PhD

Collette Ncube
Assistant Professor, Health Sciences; University of Pittsburgh, PhD

Brent Nelson
Associate Professor, Physics; University of California, Berkeley, PhD

Carl W. Nelson
Associate Professor, International Business and Strategy; University of Manchester (United Kingdom), PhD

Laura Nelson
Assistant Professor, Sociology and Anthropology; University of California, Berkeley, PhD

Huy Nguyen
Assistant Professor, Computer and Information Science; Princeton University, PhD

Julie Nguyen
Assistant Cooperative Education Coordinator, College of Engineering; Columbia University, MA

Jennifer Nichol
Assistant Professor, Accounting; University of Illinois, Urbana-Champaign, PhD

Sandy Nickel
Assistant Teaching Professor, College of Professional Studies; University of Iowa, PhD

Mark J. Niedre
Associate Professor, Bioengineering; University of Toronto (Canada), PhD

Spyridon Nikas
Research Associate Professor, Center for Drug Discovery; Aristotle University (Greece), PhD

Jelena Nikolic
Assistant Teaching Professor, Economics; Nottingham University (United Kingdom), PhD

Matthew Nippins
Assistant Clinical Professor, Physical Therapy, Movement, and Rehabilitation Sciences; Massachusetts General Hospital Institute of Health Professions, DPT

Matthew C Nisbet
Professor, Communication Studies; Cornell University, PhD

Cristina Nita-Rotaru
Professor, Computer and Information Science; Johns Hopkins University, PhD

Daniel Noemi Voionmaa
Associate Professor, Cultures, Societies, and Global Studies; Yale University, PhD

Alison Nogueira
Associate Cooperative Education Coordinator, College of Engineering; Suffolk University, MEd

David Nolan
Associate Clinical Professor, Physical Therapy, Movement, and Rehabilitation Sciences; Massachusetts General Hospital Institute of Health Professions, DPT

Kimberly Nolan
Assistant Teaching Professor, College of Professional Studies; University of Vermont, EdD

Carey Noland
Associate Professor, Communication Studies; Ohio University, PhD

Ellen Noonan
Associate Teaching Professor, Writing Program; Emerson College, MFA

Matthew Noonan
Associate Teaching Professor, Writing Program; Massachusetts College of Art, MFA

Guevara Noubir
Professor, Computer and Information Science; Swiss Federal Institute of Technology, Lausanne (Switzerland), PhD

Gilbert Nyaga
Associate Professor and Joe Dichiacchio Faculty Fellow, Supply Chain and Information Management; Michigan State University, PhD

Daniel O?Brien
Assistant Professor, Public Policy and Urban Affairs and Criminology and Criminal Justice; Binghamton University, PhD

Brian O?Connell
Assistant Teaching Professor, Engineering; Tufts University, PhD

Donica O?Malley
Postdoctoral Teaching Associate, Communication Studies; University of Pittsburgh, PhD

Jessica Oakes
Assistant Professor, Bioengineering; University of California, San Diego, PhD

Antonio Ocampo-Guzman
Associate Professor, Theatre; York University (Canada), MFA

Curtis Odom
Visiting Lecturer, Management and Organizational Development; Pepperdine University, EdD

Dietmar Offenhuber
Assistant Professor, Art + Design and Public Policy and Urban Affairs; Massachusetts Institute of Technology, PhD

Marvin Onabajo
Assistant Professor, Electrical and Computer Engineering; Texas AM University, PhD

Kay Onan
Associate Professor, Chemistry and Chemical Biology; Duke University, PhD

Mary Jo Ondrechen
Professor, Chemistry and Chemical Biology; Northwestern University, PhD

Annalisa Onnis-Hayden
Associate Teaching Professor, Civil and Environmental Engineering; University of Cagliari (Italy), PhD

Alina Oprea
Associate Professor, Computer and Information Science; Carnegie Mellon University, PhD

Toyoko J. Orimoto
Assistant Professor, Physics; University of California, Berkeley, PhD

Jessica Ormsby
Assistant Cooperative Education Coordinator, College of Engineering; University of Massachusetts, Boston, MEd

Andrew Orr-Skirvin
Associate Clinical Professor, Pharmacy and Health Systems Sciences; University of Texas, Austin, PharmD

Elika Ortega Guzman
Assistant Professor, Cultures, Societies, and Global Studies; University of Western Ontario (Canada), PhD

Sarah Ostadabbas
Assistant Professor, Electrical and Computer Engineering; University of Texas, Dallas, PhD

Timothy Ouillette
Assistant Teaching Professor, Communication Studies; Art Institute of Boston, MFA

Jane Owens
Associate Professor, Pharmacy and Health Systems Sciences; Pennsylvania State University, PhD

Oyindasola O. Oyelaran
Associate Teaching Professor, Chemistry and Chemical Biology; Harvard University, PhD

Yusuf Ozbek
Associate Teaching Professor, Graduate School of Engineering; Northeastern University, PhD

Sean O'Connell
Assistant Academic Specialist, College of Professional Studies; University of Massachusetts, MA

Catherine O'Connor
Clinical Instructor, Nursing; Boston College, MS

George A. O'Doherty
Professor, Chemistry and Chemical Biology; Ohio State University, PhD

Russ O'Haver
Senior Academic Specialist, Accounting; University of New York, PhD

Peggy L. O'Kelly
Principal Lecturer, Accounting; University of Michigan, MBA

Donald M. O'Malley
Associate Professor, Biology; Harvard University, PhD

Therese M. O'Neil-Pirozzi
Associate Professor, Communication Sciences and Disorders; Boston University, ScD

Taskin Padir
Associate Professor, Electrical and Computer Engineering; Purdue University, PhD

Robert K. Painter
Senior Lecturer, Linguistics; State University of New York, Buffalo, PhD

Himlona Palikhe
Assistant Teaching Professor, Graduate School of Engineering; Texas Tech University, PhD

Costas Panagopoulos
Professor, Political Science; New York University, PhD

Kwamina Panford
Associate Professor, Cultures, Societies, and Global Studies; Northeastern University, PhD

Coleen C. Pantalone
Associate Professor, Finance; Iowa State University, PhD

Themis Papageorge
Associate Clinical Professor, Computer and Information Science; Massachusetts Institute of Technology, PhD

Harikrishnan Parameswaran
Assistant Professor, Bioengineering; Boston University, PhD

Serena Parekh McGushin
Associate Professor, Philosophy and Religion; Boston College, PhD

Jason Parente
Assistant Clinical Professor, Physician Assistant Program; Northeastern University, MS

Melissa Parenti
Assistant Teaching Professor, College of Professional Studies; University of Southern California, EdD

Andrea Parker
Assistant Professor, Computer and Information Science and Health Sciences; Georgia Institute of Technology, PhD

Christopher Parsons
Assistant Professor, History; University of Toronto (Canada), PhD

Nikos Passas
Professor, Criminology and Criminal Justice; University of Edinburgh (Scotland), PhD

Rupal Patel
Professor, Communication Sciences and Disorders and Computer and Information Science; University of Toronto (Canada), PhD

Dipu Patel-Junankar
Assistant Clinical Professor, Physician Assistant Program; University of Nebraska, MPAS

Bryan Patterson
Assistant Teaching Professor, College of Professional Studies; University of Florida, PhD

Mark R. Patterson
Professor, Marine and Environmental Sciences and Civil and Environmental Engineering; Harvard University, PhD

Koen Pauwels
Distinguished Professor, Marketing; University of California, Los Angeles, PhD

Michael Pavel
Professor of the Practice, Computer and Information Science and Health Sciences; New York University, PhD

Spiro Pavlopoulos
Research Associate Professor, Center for Drug Discovery; Victorian College of Pharmacy, Melborne (Australia), PhD

Virgiliu Pavlu
Associate Teaching Professor, Computer and Information Science; Northeastern University, PhD

Nancy Pawlyshyn
Associate Teaching Professor, College of Professional Studies; Capella University, PhD

Celia Pearce
Associate Professor, Game Design; University of the Arts London (United Kingdom), PhD

Neal J. Pearlmutter
Associate Professor, Psychology; Massachusetts Institute of Technology, PhD

Melissa Pearson
Assistant Teaching Professor, Writing Program; University of South Carolina, PhD

Christoffer Pedersen
Assistant Professor, Art + Design; University of Copenhagen (Denmark), PhD

Melissa Peiken
Associate Cooperative Education Coordinator, College of Computer and Information Science; Emerson College, MEd

Russell Pensyl
Professor, Art + Design; Western Michigan University, MFA

Diane Perez
Assistant Academic Specialist, College of Professional Studies; Salem State University, MEd

Ivan Petkov
Assistant Professor, Economics; Boston College, PhD

Courtney Pfluger
Assistant Teaching Professor, Chemical Engineering; Northeastern University, PhD

Pegaret Pichler
Assistant Professor, Finance; Stanford University, PhD

Susan E. Picillo
Senior Lecturer, Communication Studies; Cambridge College, MEd

Pamela Pietrucci
Visiting Lecturer, Communication Studies; University of Washington, PhD

Jessica Pike
Assistant Cooperative Education Coordinator, College of Engineering; Bridgewater State University, MEd

Sara Pintado-Lopez
Associate Professor, Health Sciences; University Carlos III of Madrid (Spain), PhD

Ameet Pinto
Assistant Professor, Civil and Environmental Engineering; Virginia Polytechnic Institute and State University, PhD

Maricla Pirozzi
Assistant Cooperative Education Coordinator, Graduate School of Engineering; European School of Economics (Italy), MBA

Leigh Plant
Research Associate Professor, Pharmaceutical Sciences; University of Leeds (United Kingdom), PhD

Harlan D. Platt
Professor, Finance; University of Michigan, PhD

Marjorie Platt
Professor, Accounting; University of Michigan, PhD

Robert Platt Jr.
Assistant Professor, Computer and Information Science; University of Massachusetts, Amherst, PhD

Mya Poe
Associate Professor, English; University of Massachusetts, Amherst, PhD

Hermine Poghosyan
Assistant Professor, Nursing; University of Massachusetts Boston, PhD

Ann Polcari
Associate Clinical Professor, Nursing; Boston College, PhD

Stephanie Pollack
Professor of the Practice, Public Policy and Urban Affairs; Harvard Law School, JD

Michael P. Pollastri
Professor, Chemistry and Chemical Biology; Brown University, PhD

Marius Popescu
Visiting Assistant Professor, Finance; Virginia Polytechnic Institute and State University, PhD

Hilary Poriss
Associate Professor, Music; University of Chicago, PhD

Gary Porter
Assistant Teaching Professor, Finance; University of South Carolina, PhD

Gerald Porter
Visiting Lecturer, Economics; Babson College, MBA

Richard D. Porter
Professor, Mathematics; Yale University, PhD

Veronica L. Porter
Associate Professor, Cooperative Education, College of Science; Northeastern University, MEd

John Portz
Professor, Political Science; University of Wisconsin, Madison, PhD

Mary-Susan Potts-Santone
Teaching Professor, Biology; University of New Hampshire, PhD

Karen Pounds
Assistant Clinical Professor, Nursing; University of Rhode Island, PhD

Michael J. Power
Lecturer, Supply Chain and Information Management; Northeastern University, MBA

Edward Powers
Assistant Teaching Professor, College of Professional Studies; Northeastern University, PhD

Susan G. Powers-Lee
Professor, Biology; University of California, Berkeley, PhD

Silvia Prina
Associate Professor, Economics; Boston University, PhD

Robert Prior
Associate Teaching Professor, College of Professional Studies; Nova Southeastern University, EdD

Robert Pritchard
Associate Teaching Professor, Economics; Northeastern University, PhD

Mark Prokosch
Senior Lecturer, Psychology; University of California, Davis, PhD

Sheila M. Puffer
Professor and University Distinguished Professor, International Business and Strategy; University of California, Berkeley, PhD

Karen Quigley
Research Associate Professor, Psychology; Ohio State University, PhD

Gordana Rabrenovic
Associate Professor, Sociology and Anthropology; State University of New York, Albany, PhD

John Rachlin
Assistant Teaching Professor, Computer and Information Science; Boston University, PhD

Joseph A. Raelin
Professor and Asa S. Knowles Chair of Practice-Oriented Education, Management and Organizational Development; State University of New York, Buffalo, PhD

Sriramasundarar Rajagopalan
Assistant Teaching Professor, College of Professional Studies; Capella University, PhD

Rajmohan Rajaraman
Professor, Computer and Information Science; University of Texas, Austin, PhD

Ravi Ramamurti
University Distinguished Chair Professor, International Business and Strategy; Harvard University, DBA

Valeria Ramdin
Assistant Clinical Professor, Nursing; Northeastern University, DNSc

Alireza Ramezani
Assistant Professor, Electrical and Computer Engineering; University of Michigan, PhD

Janet Randall
Professor, English; University of Massachusetts, Amherst, PhD

Aanjhan Ranganathan
Assistant Professor, Computer and Information Science; ETH Zurich (Switzerland), PhD

Carey M. Rappaport
College of Engineering Distinguished Professor, Electrical and Computer Engineering; Massachusetts Institute of Technology, ScD

Andrea Raynor
Teaching Professor, Art + Design; School of Visual Arts, MFA

Desislava Raytcheva
Lecturer, Biology; Northeastern University, PhD

Leena Razzaq
Assistant Teaching Professor, Computer and Information Science; Worcester Polytechnic Institute, PhD

Joseph Reagle
Associate Professor, Communication Studies; New York University, PhD

Debra J. Reid
Associate Clinical Professor, Pharmacy and Health Systems Sciences; Northeastern University, PharmD

Imke Reimers
Assistant Professor, Economics; University of Minnesota, PhD

Karen Reiss Medwed
Associate Teaching Professor, College of Professional Studies; New York University, PhD

Marketa Rejtar
Assistant Clinical Professor, Nursing; Massachusetts General Hospital Institute of Health Professions, PhD

John R. Reynolds
Professor, Pharmacy and Health Systems Sciences; Duquesne University, PharmD

Karl Reynolds
Associate Teaching Professor, College of Professional Studies; University of Washington, PhD

Mahtab Rezvani
Assistant Academic Specialist, College of Professional Studies; California State University, Los Angeles, MA

Christopher Richardson
Lecturer, Biology; Boston University, PhD

Milda Richardson
Lecturer, Art + Design; Boston University, PhD

Megan Richmond
Assistant Cooperative Education Coordinator, D'Amore-McKim School of Business; Boston College, MEd

Janet S. Rico
Associate Clinical Professor, Nursing; Northeastern University, PhD

Mirek Riedewald
Associate Professor, Computer and Information Science; University of California, Santa Barbara, PhD

Christoph Riedl
Assistant Professor, Supply Chain and Information Management and Computer and Information Science; Technische Universität München (Germany), PhD

Justin B. Ries
Associate Professor, Marine and Environmental Sciences; Johns Hopkins University, PhD

Matteo Rinaldi
Associate Professor, Electrical and Computer Engineering; University of Pennsylvania, PhD

Christie Rizzo
Assistant Professor, Applied Psychology; University of Southern California, Los Angeles, PhD

Christina Roberts
Associate Cooperative Education Coordinator, D'Amore-McKim School of Business; Simmons College, MBA

Susan J. Roberts
Professor, Nursing; Boston University, DNSc

Christopher J. Robertson
Professor, International Business and Strategy; Florida State University, PhD

Craig M. Robertson
Associate Professor, Media and Screen Studies; University of Illinois, Urbana-Champaign, PhD

William Robertson
Associate Professor, Computer and Information Science and Electrical and Computer Engineering; University of California, Santa Barbara, PhD

Cordula Robinson
Associate Teaching Professor, College of Professional Studies; University College London (United Kingdom), PhD

Hillary Robinson
Associate Professor, Law and Sociology and Anthropology; Massachusetts Institute of Technology, PhD; Harvard University, JD

Holbrook Robinson
Associate Professor, Cultures, Societies, and Global Studies; University of California, Berkeley, PhD

Tracy L. Robinson Wood
Professor, Applied Psychology; Harvard University, EdD

Brian Robison
Assistant Teaching Professor, Music; Cornell University, DMA

David Rochefort
Distinguished Professor, Political Science; Brown University, PhD

Rachel Rodgers
Associate Professor, Applied Psychology; Université de Toulouse-Le Mirail (France), PhD

Kirsten Rodine Hardy
Associate Professor, Political Science; University of California, Berkeley, PhD

Bruce Ronkin
Professor, Music; University of Maryland, DMA

Tayla Rose
Assistant Clinical Professor, Pharmacy and Health Systems Sciences; University of Connecticut, PharmD

Rebeca B. Rosengaus
Associate Professor, Marine and Environmental Sciences; Boston University, PhD

James R. Ross
Associate Professor, Journalism; American University, MA

Alexandra Roth
Associate Academic Specialist, International Business and Strategy; University of Frankfurt (Germany), PhD

Sara Rouhanifard
Assistant Professor, Bioengineering; Yeshiva University, PhD

Deya Roy
Postdoctoral Teaching Associate, Communication Studies; State University of New York, Amherst, MA

Jeffrey W. Ruberti
Professor, Bioengineering; Tulane University, PhD

Michael Ruff
Assistant Teaching Professor, Accounting; Bentley University, PhD

Timothy J. Rupert
Professor, Accounting; Pennsylvania State University, PhD

Ivan Rupnik
Associate Professor, Architecture; Harvard University, MArch

Bruce Russell
Associate Academic Specialist, Supply Chain and Information Management; National University of Ireland (Ireland), PhD

J. Timothy Sage
Associate Professor, Physics; University of Illinois, Urbana-Champaign, PhD

Vinod Sahney
University Distinguished Professor, Mechanical and Industrial Engineering; University of Wisconsin, Madison, PhD

Yuki Sakurai
Visiting Lecturer, World Languages Center; Ohio State University, MA

Masoud Salehi
Associate Professor, Electrical and Computer Engineering; Stanford University, PhD

Carmel Salhi
Assistant Professor, Health Sciences; Harvard University, PhD

William Sanchez
Associate Professor, Applied Psychology; Boston University, PhD

Nada Sanders
Distinguished Professor of Supply Chain Management, Supply Chain and Information Management; Ohio State University, PhD

Tova Sanders
Associate Teaching Professor, College of Professional Studies; George Washington University, EdD

Ronald Sandler
Professor, Philosophy and Religion; University of Wisconsin, Madison, PhD

Billye Sankofa Waters
Associate Teaching Professor, College of Professional Studies; University of North Carolina, PhD

Ravi Sarathy
Professor, International Business and Strategy; University of Michigan, PhD

Linda Sarkisian
Assistant Cooperative Education Coordinator, D'Amore-McKim School of Business; Lynn University, MBA

Mehrdad Sasani
Associate Professor, Civil and Environmental Engineering; University of California, Berkeley, PhD

Ajay B. Satpute
Assistant Professor, Psychology; University of California, Los Angeles, PhD

Behrooz (Barry) Satvat
Associate Teaching Professor, Chemical Engineering; Massachusetts Institute of Technology, ScD

Daniel Saulnier
Associate Cooperative Education Coordinator, College of Engineering; Babson College, MBA

Kevin Scanlon
Professor of the Practice, Entrepreneurship and Innovation; University of London (United Kingdom), PhD

Samuel V. Scarpino
Assistant Professor, Marine and Environmental Sciences and Physics; University of Texas, Austin, PhD

Carmen Sceppa
Professor, Health Sciences; Francisco Marroquin University (Guatemala), MD; Tufts University, PhD

Martin Schedlbauer
Associate Clinical Professor, Computer and Information Science; University of Massachusetts, PhD

Gunar Schirner
Associate Professor, Electrical and Computer Engineering; University of California, Irvine, PhD

Ralf W. Schlosser
Professor, Communication Sciences and Disorders; Purdue University, PhD

Benjamin Schmidt
Assistant Professor, History; Princeton University, PhD

Walter Schnyder
Associate Teaching Professor, Computer and Information Science; Swiss Federal Institute of Technology (Switzerland), PhD

Egon Schulte
Professor, Mathematics; University of Dortmund (Germany), PhD

Kathryn Schulte Grahame
Associate Teaching Professor, Engineering; Columbia University, PhD

Joseph Schwartz
Associate Teaching Professor, Communication Studies; University of Iowa, PhD

Michael Schwartz
Assistant Cooperative Education Coordinator, Graduate School of Engineering; Northeastern University, MS

Martin Schwarz Jr.
Associate Professor, Mathematics; Courant Institute, PhD

Cody Scott
Assistant Professor, Computer and Information Science; University of Maryland, PhD

Douglass Scott
Senior Lecturer, Art + Design; Yale University, MFA

Frank (Alex) Scott
Assistant Professor, Supply Chain and Information Management; Pennsylvania State University, PhD

Steven Scyphers
Assistant Professor, Marine and Environmental Sciences; University of South Alabama, PhD

Darcey Searles
Postdoctoral Teaching Associate, Communication Studies; Rutgers University, PhD

Max Sederer
Assistant Cooperative Education Coordinator, College of Engineering; Tufts University, MEd

Magy Seif El-Nasr
Associate Professor, Computer and Information Science and Art + Design; Northeastern University, PhD

Ethan Selinger
Assistant Cooperative Education Coordinator, College of Computer and Information Science; University of Massachusetts, Lowell, MS

Laura Senier
Assistant Professor, Sociology and Anthropology and Health Sciences; Brown University, PhD

Sumi Seo
Lecturer, Mathematics; University of Missouri, Columbia, PhD

Susan Setta
Associate Professor, Philosophy and Religion; Pennsylvania State University, PhD

Bahram Shafai
Professor, Electrical and Computer Engineering; George Washington University, ScD

Michael Shah
Lecturer, Computer and Information Science; Tufts University, PhD

Rebecca M. Shansky
Assistant Professor, Psychology; Yale University, PhD

Harvey Shapiro
Associate Clinical Professor, College of Professional Studies; Hebrew Union College, PhD

William T. Sharp
Assistant Teaching Professor, Psychology; Boston Graduate School of Psychoanalysis, PhD

Gavin M. Shatkin
Associate Professor, Public Policy and Urban Affairs and Architecture; Rutgers University, PhD

Dennis R. Shaughnessy
Senior Academic Specialist, Entrepreneurship and Innovation; University of Maryland, JD

Margaret Shea
Associate Cooperative Education Coordinator, D'Amore-McKim School of Business; Boston University, BLS

Thomas C. Sheahan
Professor, Civil and Environmental Engineering; Massachusetts Institute of Technology, ScD

Sandra Shefelbine
Associate Professor, Mechanical and Industrial Engineering and Bioengineering; Stanford University, PhD

Abhi Shelat
Associate Professor, Computer and Information Science; Massachusetts Institute of Technology, PhD

Paxton Sheldahl
Assistant Teaching Professor, Architecture; Harvard University, MArch

Eliot Sherman
Senior Lecturer, Finance; Bentley College, MST

H. David Sherman
Professor, Accounting; Harvard University, DBA

Amit Shesh
Associate Teaching Professor, Computer and Information Science; University of Minnesota, Twin Cities, PhD

Shiaoming Shi
Assistant Teaching Professor, Bioengineering; University of Pittsburgh, PhD

Craig Shillaber
Assistant Teaching Professor, Civil and Environmental Engineering; Virginia Polytechnic Institute and State University, MS

Jennifer Shire
Assistant Cooperative Education Coordinator, College of Computer and Information Science; Columbia University, MBA

Olin Shivers
Professor, Computer and Information Science; Carnegie Mellon University, PhD

Mariya Shiyko
Associate Professor, Applied Psychology; City University of New York, PhD

Katy Shorey
Assistant Teaching Professor, Philosophy and Religion; University of Missouri, PhD

Aatmesh Shrivastava
Assistant Professor, Electrical and Computer Engineering; University of Virginia, Charlottesville, PhD

Stephanie Sibicky
Assistant Clinical Professor, Pharmacy and Health Systems Sciences; University of Rhode Island, PhD

Brandon Sichling
Assistant Teaching Professor, Art + Design; Emerson College, MFA

Jose Sierra
Associate Teaching Professor, Computer and Information Science; Universidad Carlos III de Madrid (Spain), PhD

Robert Sikes
Associate Professor, Physical Therapy, Movement, and Rehabilitation Sciences; University of Texas, Houston, PhD

Michael B. Silevitch
Robert Black Professor of Engineering and College of Engineering Distinguished Professor, Electrical and Computer Engineering; Northeastern University, PhD

Peter Simon
Teaching Professor, Economics; Northern Illinois University, PhD

Simon Singer
Professor, Criminology and Criminal Justice; University of Pennsylvania, PhD

Hanumant Singh
Professor, Electrical and Computer Engineering and Mechanical and Industrial Engineering; Massachusetts Institute of Technology, PhD

Rifat Sipahi
Associate Professor, Mechanical and Industrial Engineering; University of Connecticut, PhD

Michail V. Sitkovsky
Eleanor W. Black Chair in Immunophysiology and Pharmaceutical Biotechnology and Professor, Institute for Tissue Damage and Biology; Moscow State University (Russia), PhD

Mark Sivak
Associate Teaching Professor, Art + Design and Engineering; Northeastern University, PhD

Adrienne Slaughter
Lecturer, Computer and Information Science; University of Washington, PhD

Nikolai Slavov
Assistant Professor, Bioengineering; Princeton University, PhD

Rory Smead
Ronald L. and Linda A. Rossetti Professor for the Humanities, Philosophy and Religion; University of California, Irvine, PhD

David A. Smith
Assistant Professor, Computer and Information Science; Johns Hopkins University, PhD

Keith Smith
Assistant Professor, Marketing; University of Georgia, PhD

Matthew Smith
Associate Professor, Philosophy and Religion; University of North Carolina, Chapel Hill, PhD

Ronald Bruce Smith
Associate Professor, Music; University of California, Berkeley, PhD

Wendy A. Smith
College of Arts and Sciences Distinguished Associate Professor, Biology; Duke University, PhD

Eugene S. Smotkin
Professor, Chemistry and Chemical Biology; University of Texas, Austin, PhD

Bridget Smyser
Associate Teaching Professor, Mechanical and Industrial Engineering; Worcester Polytechnic Institute, PhD

Nancy P. Snyder
Associate Teaching Professor, Psychology; Harvard University, EdD

Dani Snyder-Young
Assistant Professor, Theatre; New State University, PhD

Pablo Soberon Bravo
Zelevinsky Research Professor, Mathematics; University College London (United Kingdom), PhD

Claudia Sokol
Associate Teaching Professor, World Languages Center; University of Buenos Aires (Argentina), MD

Eduardo Sontag
University Distinguished Professor, Electrical and Computer Engineering and Bioengineering; University of Florida, PhD

Maria Sorenson
Visiting Clinical Instructor, Nursing; Northeastern University, MSN

Susan Soroka
Assistant Teaching Professor, Writing Program; Drew University, PhD

Nikolaos S. Soukos
Assistant Teaching Professor, Physics and Biology; University of Munich (Germany), PhD

Bert A. Spector
Associate Professor, International Business and Strategy; University of Missouri, PhD

Denise Spencer
Senior Lecturer, Supply Chain and Information Management; Boston College, PhD

Karen M. Spikes
Lecturer, Psychology; Cornell University, PhD

David Sprague
Lecturer, Computer and Information Science; University of Victoria (Canada), PhD

Bryan Q. Spring
Assistant Professor, Physics; University of Illinois, Urbana-Champaign, PhD

Shelia Springer
Postdoctoral Teaching Associate, Communication Studies; University of Arizona, Tucson, MA

Srinivas Sridhar
College of Arts and Sciences Distinguished Professor, Physics; California Institute of Technology, PhD

Kandarp Srinivasan
Assistant Professor, Finance; Washington University, St. Louis, PhD

Thomas Starr
Professor, Art + Design; Yale University, MFA

Mary Steffel
Assistant Professor, Marketing; Princeton University, PhD; University of Florida, PhD

Karen Stein
Visiting Assistant Professor, Art + Design; Virginia Commonwealth University, MFA

Leslie Stein
Assistant Teaching Professor, College of Professional Studies; United States International University, EdD

Armen B. Stepanyants
Associate Professor, Physics; University of Rhode Island, PhD

Jennie Stephens
Professor, Public Policy and Urban Affairs; California Institute of Technology, PhD

Dagmar Sternad
Professor, Biology and Electrical and Computer Engineering; University of Connecticut, PhD

Sara Stifano
Postdoctoral Teaching Associate, Communication Studies; University of Connecticut, PhD

Sebastian Stockman
Associate Teaching Professor, Writing Program; Emerson College, MFA

Milica Stojanovic
Professor, Electrical and Computer Engineering; Northeastern University, PhD

Janos Stone
Lecturer, Art + Design; Boston University, MFA

Michael Stone
Assistant Teaching Professor, Economics; University of Conneticut, PhD

Jacob Stowell
Associate Professor, Criminology and Criminal Justice; State University of New York, Albany, PhD

Tracy Strain
Professor of the Practice, Media and Screen Studies; Harvard University, MEd

Amy Stratman
Assistant Academic Specialist, College of Professional Studies; Simmons College, MA

Phyllis R. Strauss
Matthews Distinguished University Professor, Biology; Rockefeller University, PhD

Heather Streets-Salter
Professor, History; Duke University, PhD

Aron P. Stubbins
Associate Professor, Marine and Environmental Sciences and Civil and Environmental Engineering and Chemistry and Chemical Biology; Newcastle University (United Kingdom), PhD

Ming Su
Associate Professor, Chemical Engineering; Northwestern University, PhD

Fernando Suarez
Jean C. Tempel Professor, Entrepreneurship and Innovation; Massachusetts Institute of Technology, PhD

Alexandru I. Suciu
Professor, Mathematics; Columbia University, PhD

Annemarie C. Sullivan
Clinical Instructor, Health Sciences; Northeastern University, MS

Denis Sullivan
Professor, Political Science and International Affairs; University of Michigan, PhD

Fareena Sultan
Professor, Marketing; Columbia University, PhD

Hao Sun
Assistant Professor, Civil and Environmental Engineering; Columbia University, PhD

Linlin Sun
Assistant Research Professor, Chemical Engineering; Northeastern University, PhD

Nian-Xiang Sun
Professor, Electrical and Computer Engineering; Stanford University, PhD

Ravi Sundaram
Professor, Computer and Information Science; Massachusetts Institute of Technology, PhD

Gloria Sutton
Associate Professor, Art + Design; University of California, Los Angeles, PhD

John D. Swain
Associate Professor, Physics; University of Toronto (Canada), PhD

Richard S. Swasey Jr.
Principal Lecturer, Finance; University of Virginia, MBA

Jacqueline F. Sweeney
Senior Cooperative Education Coordinator, College of Arts, Media and Design; Northeastern University, MS

Nina Sylvanus
Associate Professor, Sociology and Anthropology; Ecole des Hautes Etudes en Sciences Sociales, Paris (France), PhD

Balazs Szelenyi
Associate Teaching Professor, College of Professional Studies; University of California, Los Angeles, PhD

Mario Sznaier
Dennis Picard Trustee Professor, Electrical and Computer Engineering; University of Washington, PhD

Srinivas Tadigadapa
Professor, Electrical and Computer Engineering; Cambridge University (United Kingdom), PhD

Gilead Tadmor
Professor, Electrical and Computer Engineering; Weizmann Institute of Science (Israel), PhD

Paul Tagliamonte
Visiting Lecturer, Supply Chain and Information Management; Boston College, MS

David Tamés
Assistant Teaching Professor, Art + Design; Massachusetts College of Art and Design, MFA

Michael Tannebaum
Visiting Lecturer, Communication Studies; Georgia State University, PhD

Aysen Tanyeri-Abur
Associate Teaching Professor, Economics; Texas AM University, PhD

Peter Tarasewich
Assistant Teaching Professor, Supply Chain and Information Management; University of Connecticut, PhD

Mary Suzanne Tarmina
Associate Clinical Professor, Nursing; University of Utah, PhD

Mohammad E. Taslim
Professor, Mechanical and Industrial Engineering; University of Arizona, PhD

Tomasz R. Taylor
Professor, Physics; University of Warsaw (Poland), PhD

Philip Thai
Assistant Professor, History; Stanford University, PhD

Ganesh Thakur
Associate Professor, Pharmaceutical Sciences; Institute of Chemical Technology (India), PhD

Ronald S. Thomas
Senior Lecturer, International Business and Strategy; Harvard University, PhD

Corliss Thompson
Associate Teaching Professor, College of Professional Studies; University of North Carolina, Chapel Hill, PhD

Jamal Thorne
Assistant Teaching Professor, Art + Design; Northeastern University, MFA

George Thrush
Professor, Architecture; Harvard University, MArch

Jonathan L. Tilly
University Distinguished Professor, Biology; Rutgers, the State University of New Jersey, PhD

Frank Tip
Professor, Computer and Information Science; University of Amsterdam (Netherlands), PhD

Lisa J. Tison-Thomas
Assistant Cooperative Education Coordinator, College of Science; Emmanuel College, MA

Devesh Tiwari
Assistant Professor, Electrical and Computer Engineering; North Carolina State University, PhD

Yustianto Tjiptowidjojo
Assistant Teaching Professor, Mechanical and Industrial Engineering; Mississippi State University, PhD

Gordana G. Todorov
Professor, Mathematics; Brandeis University, PhD

Svetlana Todorova
Visiting Lecturer, Supply Chain and Information Management; Varna University of Management (Bulgaria), PhD

Alessio Tognetti
Assistant Academic Specialist, World Languages Center; University of Washington, MA

Valerio Toledano Laredo
Professor, Mathematics; University of Cambridge (United Kingdom), PhD

Michael Tolley
Associate Professor, Political Science; Johns Hopkins University, PhD

Peter Y. Topalov
Professor, Mathematics; Moscow State University (Russia), PhD

Vladimir P. Torchilin
University Distinguished Professor, Pharmaceutical Sciences; Moscow State University (Russia), PhD, DSc

Ali Touran
Professor, Civil and Environmental Engineering; Stanford University, PhD

Emery A. Trahan
Professor, Finance; State University of New York, Albany, PhD

Stavros Tripakis
Associate Professor, Computer and Information Science; Joseph Fourier University (France), PhD

Andrew Trotman
Assistant Professor, Accounting; Bond University (Australia), PhD

Geoffrey C. Trussell
Professor, Marine and Environmental Sciences; College of William and Mary, PhD

Kumiko Tsuji
Assistant Teaching Professor, World Languages Center; Georgetown University, PhD

Nathaniel Tuck
Lecturer, Computer and Information Science; University of Massachusetts, Lowell, PhD

Eugene Tunik
Associate Professor, Physical Therapy, Movement, and Rehabilitation Sciences; Rutgers University, PhD

Berna Turam
Professor, International Affairs and Sociology and Anthropology; McGill University (Canada), PhD

Esther Tutella-Chen
Assistant Academic Specialist, College of Professional Studies; Vanderbilt University, MEd

Rafael Ubal Tena
Assistant Teaching Professor, Electrical and Computer Engineering; Universidad Politecnica de Valencia (Spain), PhD

Jonathan Ullman
Assistant Professor, Computer and Information Science; Harvard University, PhD

Annique Un
Associate Professor, International Business and Strategy; Massachusetts Institute of Technology, PhD

Christopher Unger
Associate Teaching Professor, College of Professional Studies; Harvard University, EdD

Steven R. Untersee
Lecturer, Biology; Tufts University, PhD

Moneesh Upmanyu
Professor, Mechanical and Industrial Engineering; University of Michigan, PhD

Ricardo Valdez
Assistant Teaching Professor, College of Professional Studies; University of Washington, PhD

Steven Vallas
Professor, Sociology and Anthropology; Rutgers University, PhD

Jenny A. Van Amburgh
Clinical Professor, Pharmacy and Health Systems Sciences; Albany College of Pharmacy, PharmD

Jan-Willem Van De Meent
Assistant Professor, Computer and Information Science; Leiden University (Netherlands), PhD

Anne L. Van De Ven-Moloney
Research Assistant Professor, Physics; Rice University, PhD

Maria Van Pelt
Associate Clinical Professor, Nursing; Villanova University, DNSc

Kathleen Vander Laan
Associate Cooperative Education Coordinator, College of Computer and Information Science; Salem State University, MBA

Ashkan Vaziri
Associate Professor, Mechanical and Industrial Engineering; Northeastern University, PhD

Elaine Vejar
Assistant Academic Specialist, College of Professional Studies; University of Massachusetts, Lowell, MS

Oana Veliche
Lecturer, Mathematics; Purdue University, PhD

Venkata Vemuri
Research Assistant Professor, Pharmaceutical Sciences; Osmania University (India), PhD

Vivek Venkatachalam
Assistant Professor, Physics; Harvard University, PhD

Madhavi Venkatesan
Visiting Assistant Teaching Professor, Economics; Vanderbilt University, PhD

Anand Venkateswaran
Associate Professor, Finance; Georgia State University, PhD

Susan H. Ventura
Associate Clinical Professor, Physical Therapy, Movement, and Rehabilitation Sciences; Northeastern University, PhD

Alessandro Vespignani
Sternberg Family Distinguished University Professor, Physics and Health Sciences and Computer and Information Science; University of Rome La Sapienza (Italy), PhD

Gustavo Vicentini
Assistant Teaching Professor, Economics; Boston University, PhD

Thomas Vicino
Associate Professor, Political Science and Public Policy and Urban Affairs; University of Maryland, PhD

Emanuele Viola
Associate Professor, Computer and Information Science; Harvard University, PhD

Jan Vitek
Professor, Computer and Information Science; University of Geneva (Switzerland), PhD

Olga Vitek
Sy and Laurie Sternberg Interdisciplinary Associate Professor, Computer and Information Science and Chemistry and Chemical Biology; Purdue University, PhD

Triet Vo Huu
Research Assistant Professor, Computer and Information Science; Northeastern University, PhD

Steven V. Vollmer
Associate Professor, Marine and Environmental Sciences; Harvard University, PhD

Robert J. Volpe
Associate Professor, Applied Psychology; Lehigh University, PhD

Erik Voss
Associate Teaching Professor, College of Professional Studies; Iowa State University, PhD

Sara Wadia-Fascetti
Professor, Civil and Environmental Engineering; Stanford University, PhD

Nancy Waggner
Associate Cooperative Education Coordinator, Pharmaceutical Sciences; Suffolk University, JD

Thomas Wahl
Associate Professor, Computer and Information Science; University of Texas, Austin, PhD

Thomas E. Wales
Research Associate Professor, Chemistry and Chemical Biology; Duke University, PhD

C.J. Walker
Professor of the Practice, College of Professional Studies; George Washington University, PhD

Jacob Walker
Assistant Cooperative Education Coordinator, College of Engineering; Northeastern University, MS

Louise Walker
Associate Professor, History; Yale University, PhD

Byron Wallace
Assistant Professor, Computer and Information Science; Tufts University, PhD

Rachel Walsh
Assistant Cooperative Education Coordinator, College of Engineering; Suffolk University, MS

Robin Walters
Zelevinsky Research Professor, Psychology; University of Chicago, PhD

Suzanna Walters
Professor, Women's, Gender, and Sexuality Studies and Sociology and Anthropology; City University of New York, PhD

Belinda Walzer
Assistant Teaching Professor, Writing Program; University of North Carolina, Greensboro, PhD

Richard Wamai
Associate Professor, Cultures, Societies, and Global Studies; University of Helsinki (Finland), PhD

Kai-tak Wan
Professor, Mechanical and Industrial Engineering; University of Maryland, College Park, PhD

Lu Wang
Assistant Professor, Computer and Information Science; Cornell University, PhD

Ming Wang
College of Engineering Distinguished Professor, Civil and Environmental Engineering; University of New Mexico, PhD

Qi Wang
Assistant Professor, Civil and Environmental Engineering; Virginia Polytechnic Institute and State University, PhD

Yanzhi Wang
Assistant Professor, Electrical and Computer Engineering; University of Southern California, PhD

Meni Wanunu
Associate Professor, Physics; Weizmann Institute of Science (Israel), PhD

Robert J. Ward
Lecturer, Music; University of California, San Diego, MA

Oliver Wason
Visiting Assistant Teaching Professor, Theatre; Yale University, MFA

Gregory Wassall
Associate Professor, Economics; Rutgers University, PhD

Barbara L. Waszczak
Professor, Pharmaceutical Sciences; University of Michigan, PhD

Maureen Watkins
Assistant Clinical Professor, Physical Therapy, Movement, and Rehabilitation Sciences; Northeastern University, DPT

Natalya Watson
Assistant Teaching Professor, College of Professional Studies; University of Colorado, PhD

Dov Waxman
Professor, Political Science and International Affairs and Jewish Studies; Johns Hopkins University, PhD

Rebecca Webb
Assistant Cooperative Education Coordinator, College of Engineering; Boston College, MA

Thomas J. Webster
Arthur W. Zafiropoulo Professor, Chemical Engineering; Rensselaer Polytechnic Institute, PhD

Vanessa Wei
Assistant Teaching Professor, World Languages Center; University of Iowa, MA

Liza Weinstein
Associate Professor, Sociology and Anthropology; University of Chicago, PhD

Michael Weintraub
Associate Clinical Professor, Computer and Information Science; Ohio State University, PhD

Jonathan Weitsman
Robert G. Stone Professor, Mathematics; Harvard University, PhD

Brandon Welsh
Professor, Criminology and Criminal Justice; University of Cambridge (United Kingdom), PhD

Edward G. Wertheim
Associate Professor, Management and Organizational Development; Yeshiva University, PhD

Richard West
Assistant Professor, Chemical Engineering; University of Cambridge (United Kingdom), PhD

Alan West-Duran
Associate Professor, Cultures, Societies, and Global Studies; New York University, PhD

Rebecca Westerling
Assistant Cooperative Education Coordinator, College of Social Sciences and Humanities; Boston College, MA

Richard Whalen
Teaching Professor, Engineering; Northeastern University, PhD

Susan Whitfield-Gabrieli
Professor, Psychology; University of California, Berkeley, PhD

Paul C. Whitford
Assistant Professor, Physics; University of California, San Diego, PhD

John Whitney
Assistant Professor, Mechanical and Industrial Engineering; Harvard University, PhD

Daniel Wichs
Assistant Professor, Computer and Information Science; New York University, PhD

Peter H. Wiederspahn
Associate Professor, Architecture; Harvard University, MArch

Afi Wiggins
Assistant Teaching Professor, College of Professional Studies; University of Virginia, PhD

John Wihbey
Assistant Professor, Journalism; Columbia University, MS

Ronald J. Willey
Professor, Chemical Engineering; University of Massachusetts, Amherst, PhD

Margaret Williams
Visiting Lecturer, Communication Studies; University of Illinois, Chicago, PhD

Mark C. Williams
Professor, Physics; University of Minnesota, PhD

Stephen Williams
Associate Cooperative Education Coordinator, College of Social Sciences and Humanities; Suffolk University, JD

Tiffani Williams
Professor of the Practice, Computer and Information Science; University of Central Florida, PhD

Christo Wilson
Assistant Professor, Computer and Information Science; University of California, Santa Barbara, PhD

Sheila Winborne
Assistant Teaching Professor, Philosophy and Religion; Harvard University, PhD

Eric Winter
Assistant Cooperative Education Coordinator, College of Engineering; Northeastern University, MS

Pamela Wojnar
Assistant Teaching Professor, College of Professional Studies; University of Sports Academy, EdD

John Wolfe
Associate Teaching Professor, College of Professional Studies; Columbia University, EdD

Darien Wood
Professor, Physics; University of California, Berkeley, PhD

Dori C. Woods
Assistant Professor, Biology; University of Notre Dame, PhD

Adam Woolley
Associate Clinical Professor, Pharmacy and Health Systems Sciences; Massachusetts College of Pharmacy, PharmD

Benjamin Woolston
Assistant Professor, Chemical Engineering; Massachusetts Institute of Technology, PhD

Lisa Worsh
Senior Cooperative Education Coordinator, College of Social Sciences and Humanities; Bridgewater State College, MEd

Shu-Shih Y. Wu
Lecturer, Mathematics; Northeastern University, PhD

Sara A. Wylie
Assistant Professor, Sociology and Anthropology and Health Sciences; Massachusetts Institute of Technology, PhD

Xia Xiao
Assistant Professor, Accounting; University of Arizona, PhD

Wei Xie
Assistant Professor, Mechanical and Industrial Engineering; Northwestern University, PhD

Shiawee X. Yang
Associate Professor, Finance; Pennsylvania State University, PhD

Diane Yasgur
Assistant Cooperative Education Coordinator, College of Engineering; New York University, MBA

Lichuan Ye
Associate Professor, Nursing; University of Pennsylvania, DNSc

Mishac K. Yegian
College of Engineering Distinguished Professor, Civil and Environmental Engineering; Massachusetts Institute of Technology, PhD

Edmund Yeh
Professor, Electrical and Computer Engineering; Massachusetts Institute of Technology, PhD

Boris Yelin
Assistant Teaching Professor, World Languages Center; Purdue University, PhD

Benjamin Yelle
Assistant Teaching Professor, Philosophy and Religion; University of Miami, PhD

Sheng-Che Yen
Assistant Professor, Physical Therapy, Movement, and Rehabilitation Sciences; New York University, PhD

Mark L. Yorra
Senior Cooperative Education Coordinator, Pharmacy and Health Systems Sciences; Northeastern University, EdD

Carol Young
Assistant Teaching Professor, College of Professional Studies; University of Massachusetts, PhD

Gary Young
Professor, International Business and Strategy and Health Sciences; State University of New York, Buffalo, PhD

Lydia Young
Associate Teaching Professor, College of Professional Studies; Boston College, PhD

Nancy Young
Assistant Teaching Professor, College of Professional Studies; Boston University, PhD

Sara C. Young-Hong
Clinical Instructor, Communication Sciences and Disorders; University of Pittsburgh, MA

Qi (Rose) Yu
Assistant Professor, Computer and Information Science; University of Southern California, Los Angeles, PhD

Shuishan Yu
Associate Professor, Architecture; University of Washington, PhD

Jennifer Yule
Associate Academic Specialist, Marketing; Glasgow Caledonian University (Scotland), PhD

Nizar Zaarour
Assistant Teaching Professor, Supply Chain and Information Management; Northeastern University, PhD

Michelle Zaff
Assistant Cooperative Education Coordinator, College of Social Sciences and Humanities; Suffolk University, JD

Christos Zahopoulos
Associate Professor, College of Professional Studies; Northeastern University, PhD

Carl Zangerl
Assistant Teaching Professor, College of Professional Studies; University of Illinois, PhD

Alan J. Zaremba
Associate Professor, Communication Studies; State University of New York, Buffalo, PhD

Michele C. Zee
Assistant Teaching Professor, Behavioral Neuroscience; University of Oregon, PhD

Ibrahim Zeid
Professor, Mechanical and Industrial Engineering; University of Akron, PhD

Edward David Zepeda
Assistant Professor, Supply Chain and Information Management; University of Minnesota, PhD

David P. Zgarrick
Professor, Pharmacy and Health Systems Sciences; Ohio State University, PhD

Ke Zhang
Associate Professor, Chemistry and Chemical Biology; Washington University, St. Louis, PhD

Yue May Zhang
Associate Professor, Accounting; University of Pittsburgh, PhD

Xiaolei Zhao
Zelevinsky Research Professor, Mathematics; University of Michigan, PhD

Kungcheng Zheng
Assistant Professor, Finance; University of Michigan, PhD

Ting Zhou
Associate Professor, Mathematics; University of Washington, PhD

Xiaomu Zhou
Assistant Teaching Professor, College of Professional Studies; University of Michigan, PhD

Zhaohui S. Zhou
Professor, Chemistry and Chemical Biology; Scripps Research Institute, PhD

Hongli Zhu
Assistant Professor, Mechanical and Industrial Engineering; South China University of Technology (China), PhD

Sali Ziane
Associate Teaching Professor, World Languages Center; University of Paris XIII (France), PhD

Nathanial Ziegler
Assistant Cooperative Education Coordinator, College of Engineering; Indiana University of Pennsylvania, MEd

Katherine S. Ziemer
Professor, Chemical Engineering; West Virginia University, PhD

Emily Zimmerman
Assistant Professor, Communication Sciences and Disorders; University of Kansas, PhD

Gregory Zimmerman
Associate Professor, Criminology and Criminal Justice; State University of New York, Albany, PhD

Kathrin Zippel
Associate Professor, Sociology and Anthropology; University of Wisconsin, Madison, PhD

Steven Zoloth
Professor, Health Sciences; University of Pennsylvania, PhD

Elizabeth Zulick
Assistant Teaching Professor, College of Professional Studies; Boston University, PhD

Ronald Zullo
Senior Lecturer, Accounting; Bentley University, MS

Günther K. H. Zupanc
Professor, Biology; University of California, San Diego, PhD; University of Tübingen (Germany), Dr. rer. nat. habil.

Alexander Zvonok
Research Assistant Professor, Pharmaceutical Sciences; Belarusian State University (Belarus), PhD

Nikolai Zvonok
Research Assistant Professor, Pharmaceutical Sciences; Russian Academy of Sciences (Russia), PhD

Appendix

University Leadership

Officers of the University

Joseph E. Aoun, BA, MA, PhD, *President*
Michael A. Armini, BA, MA, *Senior Vice President for External Affairs*
James C. Bean, BS, MS, PhD, *Provost and Senior Vice President for Academic Affairs*
Diane Nishigaya MacGillivray, BA, MA, *Senior Vice President for University Advancement*
Philomena V. Mantella, BS, MSW, PhD, *Senior Vice President and CEO of the Professional Advancement Network*
Ralph C. Martin II, BA, JD, *Senior Vice President and General Counsel*
Thomas Nedell, BA, MBA, *Senior Vice President for Finance and Treasurer*

Academic Deans

Nadine Aubry, BS, MS, PhD, *Dean of the College of Engineering*
Carla E. Brodley, BA, MS, PhD, *Dean of the College of Computer and Information Science*
Raj Echambadi, BS, MBA, PhD, *Dean of the D'Amore-McKim School of Business*
Kenneth W. Henderson, BSc, PhD, *Dean of the College of Science*

Elizabeth Hudson, BA, MA, PhD, *Dean of the College of Arts, Media and Design*
Mary Loeffelholz, BA, MA, PhD, *Dean of the College of Professional Studies*
James R. Hackney, AB, JD, *Dean of the School of Law*
Uta Poiger, BA, MA, AM, PhD, *Dean of the College of Social Sciences and Humanities*
Susan L. Parish, BA, MSW, PharmD, *Dean of Bouvé College of Health Sciences*

Vice Provosts

Susan Ambrose, BA, MA, PhD, *Senior Vice Provost for Undergraduate Education and Experiential Learning*
John Armendariz, EdD, *Vice Provost for Institutional Diversity and Inclusion*
Debra Franko, BA, PhD, *Senior Vice Provost for Academic Affairs*
David Luzzi, BE, PhD, MBA, *Senior Vice Provost for Research*
Breean Fortier, BA, MA, *Senior Vice Provost for Budget, Planning, and Administration*
Ni (Phil) He, LLB, PhD, *Vice Provost for Graduate Education*
Sara Wadia-Fascetti, BS, MS, PhD, *Vice Provost for the PhD Network*

Vice Presidents

Anthony Rini, BA, MPA, EdD, *Vice President for Finance*
Rick Davis, BS, MA, *Vice President for Alumni Relations*
Joseph J. Donnelly Jr., BA, *Vice President for Advancement and Campaign Director*
Nicholas F. Ducoff, BBA, JD, *Vice President for New Ventures*
Madeleine A. Estabrook, AB, JD, *Vice President for Student Affairs*
Cole W. Camplese BA, MS, *Vice President and Chief Information Officer*
Luanne M. Kirwin, BA, MA, *Vice President of Development*
Sundar Kumarasamy, BA, MS, *Vice President for Enrollment Management*
Timothy E. Leshan, BA, MPA, *Vice President for Government Relations*
Chris Mallet, BS, MPA, *Vice President for Online Experiential Learning*
Jane Moyer, BA, MA, *Vice President for Human Resources Management*
Lisa Sinclair, BA, JD, *Vice President of Legal Affairs*
Kathy Spiegelman, BA, MS, *Vice President and Chief of Campus Planning and Development*
Brian Sullivan, BS, MBA, *Vice President and Chief Marketing Officer*
John Tobin, BA, *Vice President for City and Community Affairs*
Renata Nyul, BA, MS, *Vice President for Communications*

Other Administrative Leaders

Linda D. Allen, BA, MEd, *Assistant Vice President and University Registrar*
Michael A. Davis, BA, MA, *Director of Public Safety and Chief of Police*
Jeff Konya, BA, JD *Director of Athletics and Recreation*
Dan Cohen, BA, MA, PhD, *Dean, University Libraries and Vice Provost for Information Collaboration*

Statements of Accreditation and State Authorization

Accreditation

Northeastern University has maintained its status as a member in good standing of the New England Association of Schools and Colleges (NEASC) Commission on Institutions of Higher Education (CIHE) since it was awarded its initial accreditation in 1940. The university was last reviewed by NEASC in 2008 and will be reviewed again in fall 2018.

Northeastern University possesses degree-granting authority in Massachusetts, under the auspices of the Massachusetts Board of Higher Education.

Program	Accrediting Agency
Northeastern University	New England Association of Schools and Colleges (NEASC)

BOUVÉ COLLEGE OF HEALTH SCIENCES

Program	Accrediting Agency
BS in Athletic Training	Commission on Accreditation of Athletic Training Education (CAATE)
BS in Health Science	Council on Education for Public Health
MS in Speech-Language Pathology and Audiology	Council on Academic Accreditation in Audiology and Speech-Language Pathology (CAA) of the American Speech-Language-Hearing Association (ASHA), Massachusetts Board of Education[1]
BS in Nursing	Commission on Collegiate Nursing Education (CCNE) and Massachusetts Board of Registration in Nursing[2]
MS in Physician Assistant Studies	Accreditation Review Commission on Education for the Physician Assistant, Inc. (ARC-PA)
MS in Nursing	Commission on Collegiate Nursing Education (CCNE) and Massachusetts Board of Registration in Nursing[2]
MS in Nursing in Anesthesia	Council on Accreditation of Nurse Anesthesia Educational Programs (COA); Commission on Collegiate Nursing Education (CCNE) and Massachusetts Board of Registration in Nursing[2]
Registered Nurse/BSN[3]	Commission on Collegiate Nursing Education (CCNE) and Massachusetts Board of Registration in Nursing[2]
Post BS Doctor of Nursing Practice US Army Program in Anesthesia Nursing (USAGPAN)	Council on Accreditation of Nurse Anesthesia Educational Programs (COA)
DPT in Physical Therapy	Commission on Accreditation of Physical Therapy Education (CAPTE)
MS/MBA (two-year program)	Commission on Collegiate Nursing Education (CCNE) and Massachusetts Board of Registration in Nursing[2]; Commission on Collegiate Nursing Education (CCNE) and the Association to Advance Collegiate Schools of Business (AACSB International)
MS and CAGS in Applied Educational Psychology— School Psychology	Massachusetts Department of Education (DOE) and National Association of School Psychologists (NASP)

MS in Applied Educational Psychology — School Counseling	Massachusetts Department of Education (DOE)
AuD in Audiology	Council on Academic Accreditation in Audiology and Speech-Language Pathology (CAA) of the American Speech-Language-Hearing Association (ASHA), Massachusetts Board of Education[1]
MPH Master of Public Health in Urban Health	Council on Education for Public Health
PharmD	Accreditation Council for Pharmacy Education (ACPE)
PhD in Counseling and School Psychology	American Psychology Association (APA)

[1] The Massachusetts Board of Education approves (not accredits) programs.

[2] The Massachusetts Board of Registration in Nursing approves (not accredits) programs.

[3] Accredited under the aegis of the "sponsoring" full-time college.

College of Arts, Media and Design

Program	Accrediting Agency
Master of Architecture (Urban Architecture)	National Architectural Accreditation Board (NAAB)

D'Amore-McKim School of Business

Program	Accrediting Agency
BS in Business Administration	AACSB International—The Association to Advance Collegiate Schools of Business
BS and MS in International Business	AACSB International—The Association to Advance Collegiate Schools of Business
MBA	AACSB International—The Association to Advance Collegiate Schools of Business
MS in Finance	AACSB International—The Association to Advance Collegiate Schools of Business
MS in Taxation	AACSB International—The Association to Advance Collegiate Schools of Business
MS in Accounting	AACSB International—The Association to Advance Collegiate Schools of Business
MS in Accounting/MBA	AACSB International—The Association to Advance Collegiate Schools of Business
MS in Finance/MBA	AACSB International—The Association to Advance Collegiate Schools of Business
MS in Technological Entrepreneurship	AACSB International—The Association to Advance Collegiate Schools of Business

College of Computer and Information Science

Program	Accrediting Agency
BS in Computer Science	Computing Accreditation Commission of ABET (Accreditation Board for Engineering and Technology)

College of Engineering

Program	Accrediting Agency
BS in Computer Engineering	Engineering Accreditation Commission of ABET
BS in Chemical Engineering	Engineering Accreditation Commission of ABET
BS in Civil Engineering	Engineering Accreditation Commission of ABET
BS in Electrical Engineering	Engineering Accreditation Commission of ABET
BS in Industrial Engineering	Engineering Accreditation Commission of ABET
BS in Mechanical Engineering	Engineering Accreditation Commission of ABET

College of Professional Studies

Program	Accrediting Agency
AS and Certificate in Paramedic Technology	Massachusetts Department of Public Health, Office of Emergency Medical Services
BS in Finance and Accounting Management[1]	AACSB International—The Association to Advance Collegiate Schools of Business
BS in Management[1]	AACSB International—The Association to Advance Collegiate Schools of Business
BS and AS in Computer Engineering Technology	Accredited by the Technology Accreditation Commission of ABET, 111 Market Place Suite 1050 Baltimore, MD 21202-4012 Telephone: 410.347.7700
BS and AS in Electrical Engineering Technology	Accredited by the Technology Accreditation Commission of ABET, 111 Market Place Suite 1050 Baltimore, MD 21202-4012 Telephone: 410.347.7700
BS and AS in Mechanical Engineering Technology	Accredited by the Technology Accreditation Commission of ABET, 111 Market Place Suite 1050 Baltimore, MD 21202-4012 Telephone: 410.347.7700
Education Programs in:	
Teacher of Biology, 8–12	Massachusetts Department of Elementary and Secondary Education
Teacher of Chemistry, 8–12	Massachusetts Department of Elementary and Secondary Education
Teacher of Earth Science, 5–8, 8–12	Massachusetts Department of Elementary and Secondary Education

Teacher of Mathematics, 5–8, 8–12	Massachusetts Department of Elementary and Secondary Education
Teacher of Physics, 8–12	Massachusetts Department of Elementary and Secondary Education
Elementary Education, 1–6	Massachusetts Department of Elementary and Secondary Education
Teacher of English, 8–12	Massachusetts Department of Elementary and Secondary Education
Teacher of Foreign Language: Spanish, 5–12	Massachusetts Department of Elementary and Secondary Education
Teacher of History, 8–12	Massachusetts Department of Elementary and Secondary Education
Teacher of Political Science/Political Philosophy, 8–12	Massachusetts Department of Elementary and Secondary Education
Teacher of Students with Moderate Disabilities Pre-K–8, 5–12	Massachusetts Department of Elementary and Secondary Education
MS in Leadership with Project Management	Project Management Institute's Global-Accreditation-Center
MS in Technology Commercialization	AACSB International—The Association to Advance Collegiate Schools

[1]   Accredited under the aegis of the "sponsoring" full-time college.

College of Social Science and Humanities

Program	Accrediting Agency
BS in Criminal Justice	Massachusetts Board of Education [1]
MS in Criminal Justice	Massachusetts Board of Education[1]
PhD in Criminal Justice	Massachusetts Board of Education[1]
Master of Public Administration	National Association of Schools of Public Affairs and Administration

[1]   The Massachusetts Board of Education approves (not accredits) programs.

School of Law

Program	Accrediting Agency
JD	American Bar Association Association of American Law Schools[4]

[4]   The Association of American Law Schools is an elected membership organization, not an accrediting body.

State Approvals, Authorizations, and Exemptions

Some states require that universities authorized to operate in their state make public disclosures. See the corresponding addendum on the Online and Graduate Professional Degree Programs website (http://www.northeastern.edu/online/about-northeastern-online/state-agreements.php) for up-to-date, state-prescribed regulatory information applicable to all degree levels.

Institutional Calendars and Online Resources

The online resources listed below supplement this catalog.

Institutional Calendars

University events:
http://calendar.northeastern.edu/

Academic calendars:
www.northeastern.edu/registrar/calendars.html (http://www.northeastern.edu/registrar/calendars.html)

Other Online Resources

Course descriptions:
https://registrar.northeastern.edu/article/catalog-2017-2018/

Class schedules:
https://registrar.northeastern.edu/article/schedule-of-classes/

Campus maps:
www.northeastern.edu/campusmap (http://www.northeastern.edu/campusmap)

General Information

The *Northeastern University Graduate Catalog* contains the university's primary statements about these academic programs and degree requirements, as authorized by the president or the Board of Trustees. For information about other academic policies and procedures; student responsibilities; student academic and cocurricular life; faculty rights and responsibilities; or general personnel policies, benefits, and services, please refer to the *Cooperative Education Student Handbook, Faculty Handbook,* and related procedural guides, as appropriate.

Accreditation. Northeastern University is accredited by the New England Association of Schools and Colleges, Inc.

Delivery of Services. Northeastern University assumes no liability for delay or failure to provide educational or other services or facilities due to causes beyond its reasonable control. Causes include, without limitation, power failure, fire, strikes by university employees or others, damage by natural elements, and acts of public authorities. The university will, however, exert reasonable efforts, when it judges them to be appropriate, to provide comparable services, facilities, or performance; but its inability or failure to do so shall not subject the university to liability.

The *Northeastern University Graduate Catalog* contains current information about the university calendar, admissions, degree requirements, fees, and regulations; however, such information is not intended and should not be regarded to be contractual.

Northeastern University reserves the sole right to promulgate and change rules and regulations and to make changes of any nature in its program; calendar; admissions policies, procedures, and standards; degree requirements; fees; and academic schedule whenever necessary or desirable, including, without limitation, changes in course content and class schedule, the cancellation of scheduled classes and other academic activities, and the substitution of alternatives for scheduled

classes and other academic activities. In any such case, the university will give whatever notice is reasonably practical.

Northeastern University will endeavor to make available to its students a fine education and a stimulating and congenial environment. However, the quality and rate of progress of an individual's academic career and professional advancement upon completion of a degree or program are largely dependent on his or her own abilities, commitment, and effort. In many professions and occupations, there are also requirements imposed by federal and state statutes and regulatory agencies for certification or entry into a particular field. These requirements may change while a student is enrolled in a program and may vary from state to state or country to country. Although the university stands ready to help its students find out about requirements and changes in them, it is the student's responsibility to initiate the inquiry.

Tuition Default Policy. In cases where the student defaults on his or her tuition, the student shall be liable for the outstanding tuition and all reasonable associated collection costs incurred by the university, including attorneys' fees.

Emergency Closing of the University. Northeastern University posts emergency announcements, including news of weather-related closings, on its homepage (http://www.northeastern.edu) and notifies members of the community individually through the NU ALERT system. In addition, the university has made arrangements to notify students, faculty, and staff by radio and television when it becomes necessary to cancel classes because of extremely inclement weather. AM stations WBZ (1030), WILD (1090), and WRKO (680), and FM station WBUR (90.9) are the radio stations authorized to announce the university's decision to close. Television stations WBZ-TV4, WCVB-TV5, and WHDH-TV7 will also report cancellations. Since instructional television courses originate from live or broadcast facilities at the university, neither the classes nor the courier service operates when the university is closed. Please listen to the radio or television to determine whether the university will be closed.

If a storm occurs at night, the announcement of university closing is given to the radio stations at approximately 6 a.m. Classes are generally canceled for that entire day and evening at all campus locations unless stated otherwise. When a storm begins late in the day, cancellations of evening classes may be announced. This announcement is usually made between 2 p.m. and 3 p.m.

Equal Opportunity Policy. Northeastern University does not discriminate on the basis of race, color, religion, sex, sexual orientation, age, national origin, disability, or veteran status in admission to, access to, treatment in, or employment in its programs and activities. In addition, Northeastern University will not condone any form of sexual harassment. Handbooks containing the university's nondiscrimination policies and its grievance procedures are available in the Office of Institutional Diversity and Inclusion, 125 Richards Hall. Inquiries regarding the university's nondiscrimination policies may be directed to:

Office of Institutional Diversity and Inclusion
125 Richards Hall
Northeastern University
Boston, Massachusetts 02115
617.373.2133

Inquiries concerning the application of nondiscrimination policies may also be referred to the Regional Director, Office for Civil Rights, U.S. Department of Education, 8th Floor, 5 Post Office Square, Boston, MA 02109-3921.

Disability Resource Center. The Disability Resource Center provides a variety of disability-related services and accommodations to Northeastern University's students and employees with disabilities.

Northeastern University's compliance with Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990 are coordinated by the senior director of the Disability Resource Center. Persons requiring information regarding the Disability Resource Center should contact the center at 617.373.2675 or, if using TTY, via Relay 711.

Family Educational Rights and Privacy Act. In accordance with the Family Educational Rights and Privacy Act of 1974, Northeastern University permits its students to inspect their records wherever appropriate and to challenge specific parts of them when they feel it is necessary to do so. Specific details of the law as it applies to Northeastern are printed in the *Undergraduate Student Handbook* and *Graduate Student Handbook* and are distributed annually at registration for the university's colleges and graduate schools.

Cleary Act. Northeastern is committed to assisting all members of the university community in providing for their own safety and security. Information regarding campus security and personal safety, including topics such as crime prevention, university police law enforcement authority, crime reporting policies, crime statistics for the most recent three-year period, and disciplinary procedures, is available upon request from the Northeastern University Director of Public Safety, 360 Huntington Avenue, Boston, MA 02115, or by calling 617.373.2696.

Mission Statement:
To educate students for a life of fulfillment and accomplishment.
To create and translate knowledge to meet global and societal needs.

Index