Population Health, PhD ......................................................... 211
Graduate School of Engineering Certificates ....................... 212
Bouvé College of Health Sciences ........................................... 214
Academic Policies and Procedures ........................................ 214
Health Certification ............................................................... 214
Practicum/Internship Policies ................................................ 214
Background Checks .............................................................. 215
Liability Insurance ............................................................... 215
Grading ............................................................................. 215
Transfer of Credit ............................................................... 215
Course Waiver ..................................................................... 215
Academic Progression .......................................................... 216
Student’s Academic Standing ................................................ 216
Academic Probation Policy .................................................... 216
Applied Psychology ............................................................... 217
Counseling Psychology, PhD ................................................ 217
School Psychology, PhD ....................................................... 218
Applied Behavior Analysis, CAGS ......................................... 219
Counseling Psychology, CAGS .............................................. 220
Applied Behavior Analysis, MS .............................................. 220
College Student Development and Counseling, MS ............... 221
Counseling Psychology, MSCP .............................................. 221
School Psychology, MS/CAGS .............................................. 222
Applied Behavior Analysis, Graduate Certificate .................... 223
Early Intervention, Graduate Certificate ................................ 223
Communication Sciences and Disorders ................................. 224
Speech-Language Pathology, MS ............................................ 224
Health Sciences ..................................................................... 224
Population Health, PhD ....................................................... 211
Public Health, MPH .............................................................. 226
Exercise Science with Concentration in Physical Activity and Public Health, MS ........................................... 227
Health Data Analytics, MS ................................................... 98
Health Informatics, MS .......................................................... 228
Pharmacy and Public Health, PharmD/MPH .......................... 228
Physician Assistant Studies and Public Health, MS/MPH .......... 229
Exercise Science for Clinicians, Graduate Certificate .............. 230
Health Informatics Management and Exchange, Graduate Certificate ...................................................... 231
Health Informatics Privacy and Security, Graduate Certificate ........................................................................ 231
Health Informatics Software Engineering, Graduate Certificate ........................................................................ 231
Nursing, PhD ..................................................................... 232
Nursing, PhD—Advanced Entry .............................................. 232
Nursing Practice, DNP ............................................................ 233
DNP with Concentration in Nurse Anesthesia ......................... 233
Adult-Gerontology Nurse Practitioner, Acute Care, CAGS ........ 234
Adult-Gerontology Nurse Practitioner, Primary Care, CAGS .... 234
Family Psychiatric Nurse Practitioner, CAGS ......................... 235
Neonatal Nurse Practitioner, CAGS ....................................... 235
Nurse Anesthesia, CAGS ...................................................... 235
Pediatric Nurse Practitioner, Acute Care, CAGS .................... 236
Pediatric Nurse Practitioner, Acute and Primary Care, CAGS ....................................................................... 236
Pediatric Nurse Practitioner, Primary Care, CAGS .................. 236
Adult-Gerontology Nurse Practitioner, Acute Care, MS ......... 237
Adult-Gerontology Nurse Practitioner, Primary Care, MS ........ 237
Family Psychiatric Nurse Practitioner, MS ............................. 238
Family Nurse Practitioner, Primary Care, MS ......................... 238
Neonatal Nurse Practitioner, MS ........................................... 239
Pediatric Nurse Practitioner, Acute and Primary Care, MS ........ 239
Pediatric Nurse Practitioner, Primary Care, MS ..................... 240
Nursing—Direct Entry, MS ..................................................... 240
Nursing Administration, MS ................................................... 241
Nursing Anesthesia, MS ......................................................... 241
Nursing and Business Administration, MS/MBA ..................... 242
School of Pharmacy ................................................................ 242
Biomedical Sciences, PhD ..................................................... 243
Medicinal Chemistry, PhD ..................................................... 243
Pharmaceutical Sciences, PhD ............................................. 244
Pharmacology, PhD ............................................................. 245
Pharmacy, PharmD ............................................................... 245
Pharmacy, PharmD—Direct Entry ........................................... 246
Biomedical Nanotechnology, MS .......................................... 248
Biomedical Sciences, MS ...................................................... 249
Medicinal Chemistry, MS ..................................................... 249
Pharmaceutical Sciences, MS ............................................. 250
Pharmacology, MS ............................................................... 250
Pharmacy and Public Health, PharmD/MPH .......................... 228
Physical Therapy, Movement, and Rehabilitation Sciences .... 252
Physical Therapy, DPT .......................................................... 252
Physical Therapy—Postbaccalaureate Entry ......................... 253
Occupational Ergonomics and Health, MS ............................. 254
Disability Studies, Graduate Certificate ................................ 255
Occupational Ergonomics and Health, Graduate Certificate ... 256
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physician Assistant</td>
<td>256</td>
</tr>
<tr>
<td>Physician Assistant Studies, MS</td>
<td>256</td>
</tr>
<tr>
<td>Physician Assistant Studies and Health Informatics, MS/MS</td>
<td>257</td>
</tr>
<tr>
<td>Physician Assistant Studies and Public Health, MS/MPH</td>
<td>229</td>
</tr>
<tr>
<td>Interdisciplinary</td>
<td>259</td>
</tr>
<tr>
<td>Personal Health Informatics, PhD</td>
<td>259</td>
</tr>
<tr>
<td>Biotechnology, MS</td>
<td>259</td>
</tr>
<tr>
<td>Health Data Analytics, MS</td>
<td>98</td>
</tr>
<tr>
<td>Health Informatics, MS</td>
<td>98</td>
</tr>
<tr>
<td>Health Informatics, MS—ALIGN Program</td>
<td>99</td>
</tr>
<tr>
<td>Law and Urban Public Health, JD/MPH</td>
<td>264</td>
</tr>
<tr>
<td>Physician Assistant Studies and Health Informatics, MS/MS</td>
<td>257</td>
</tr>
<tr>
<td>Aging, Graduate Certificate</td>
<td>266</td>
</tr>
<tr>
<td>Biopharmaceutical Analytical Sciences, Graduate Certificate</td>
<td>266</td>
</tr>
<tr>
<td>Early Intervention, Graduate Certificate</td>
<td>223</td>
</tr>
<tr>
<td>Health Informatics Management and Exchange, Graduate Certificate</td>
<td>267</td>
</tr>
<tr>
<td>Health Informatics Privacy and Security, Graduate Certificate</td>
<td>267</td>
</tr>
<tr>
<td>Health Informatics Software Engineering, Graduate Certificate</td>
<td>267</td>
</tr>
<tr>
<td>School of Law</td>
<td>269</td>
</tr>
<tr>
<td>Legal Studies, MS—Online</td>
<td>269</td>
</tr>
<tr>
<td>Business Law, Graduate Certificate</td>
<td>270</td>
</tr>
<tr>
<td>Health Law, Graduate Certificate</td>
<td>271</td>
</tr>
<tr>
<td>Human Resources Law, Graduate Certificate</td>
<td>271</td>
</tr>
<tr>
<td>Intellectual Property Law, Graduate Certificate</td>
<td>272</td>
</tr>
<tr>
<td>College of Professional Studies</td>
<td>274</td>
</tr>
<tr>
<td>Academic Policies and Procedures</td>
<td>274</td>
</tr>
<tr>
<td>Master’s Degree Admission Requirements</td>
<td>274</td>
</tr>
<tr>
<td>Transfer Credit Policies</td>
<td>274</td>
</tr>
<tr>
<td>Special Student Status</td>
<td>274</td>
</tr>
<tr>
<td>Personal Professional Enrichment (PPE)</td>
<td>275</td>
</tr>
<tr>
<td>New Student Orientation (On-Ground and Online)</td>
<td>275</td>
</tr>
<tr>
<td>Academic Resources</td>
<td>275</td>
</tr>
<tr>
<td>Attendance Requirements</td>
<td>275</td>
</tr>
<tr>
<td>Reentry to Program</td>
<td>276</td>
</tr>
<tr>
<td>Readmission to Program</td>
<td>276</td>
</tr>
<tr>
<td>Full-Time Status</td>
<td>276</td>
</tr>
<tr>
<td>Active-Duty Military Personnel</td>
<td>277</td>
</tr>
<tr>
<td>Registration and Taking Courses</td>
<td>277</td>
</tr>
<tr>
<td>Student Evaluation of Courses (EvaluationKit)</td>
<td>278</td>
</tr>
<tr>
<td>Academic Progression Standards</td>
<td>279</td>
</tr>
<tr>
<td>Reinstatement after Academic Dismissal</td>
<td>279</td>
</tr>
<tr>
<td>Completing Degree Requirements</td>
<td>279</td>
</tr>
<tr>
<td>Degrees, Majors, and Concentrations</td>
<td>280</td>
</tr>
<tr>
<td>Seeking more than One Certificate or Degree</td>
<td>280</td>
</tr>
<tr>
<td>Graduation Requirements</td>
<td>281</td>
</tr>
<tr>
<td>Global Partnership Programs</td>
<td>281</td>
</tr>
<tr>
<td>Accommodations for Students with Disabilities</td>
<td>281</td>
</tr>
<tr>
<td>Personal Information</td>
<td>281</td>
</tr>
<tr>
<td>Graduate Campus</td>
<td>282</td>
</tr>
<tr>
<td>Doctoral Degree Programs</td>
<td>282</td>
</tr>
<tr>
<td>Education, EDD</td>
<td>282</td>
</tr>
<tr>
<td>Law and Policy, DLP</td>
<td>284</td>
</tr>
<tr>
<td>Physical Therapy, DPT</td>
<td>285</td>
</tr>
<tr>
<td>Physical Therapy, DPT—Direct Entry</td>
<td>285</td>
</tr>
<tr>
<td>Master’s Degree Programs</td>
<td>286</td>
</tr>
<tr>
<td>Homeland Security, MA</td>
<td>287</td>
</tr>
<tr>
<td>Teaching, Elementary Licensure, MAT</td>
<td>288</td>
</tr>
<tr>
<td>Teaching, Secondary Licensure, MAT</td>
<td>289</td>
</tr>
<tr>
<td>Education, MEd</td>
<td>290</td>
</tr>
<tr>
<td>Analytics, MPS</td>
<td>292</td>
</tr>
<tr>
<td>Digital Media, MPS</td>
<td>293</td>
</tr>
<tr>
<td>Digital Media, MPS—ALIGN Program</td>
<td>294</td>
</tr>
<tr>
<td>Geospatial Services, MPS</td>
<td>295</td>
</tr>
<tr>
<td>Informatics, MPS</td>
<td>296</td>
</tr>
<tr>
<td>Applied Nutrition, MS</td>
<td>298</td>
</tr>
<tr>
<td>Commerce and Economic Development, MS</td>
<td>298</td>
</tr>
<tr>
<td>Corporate and Organizational Communication, MS</td>
<td>299</td>
</tr>
<tr>
<td>Criminal Justice, MS</td>
<td>301</td>
</tr>
<tr>
<td>Global Studies and International Relations, MS</td>
<td>304</td>
</tr>
<tr>
<td>Human Services, MS</td>
<td>307</td>
</tr>
<tr>
<td>Leadership, MS</td>
<td>308</td>
</tr>
<tr>
<td>Nonprofit Management, MS</td>
<td>309</td>
</tr>
<tr>
<td>Program and Portfolio Project Management, MS</td>
<td>310</td>
</tr>
<tr>
<td>Project Management, MS</td>
<td>311</td>
</tr>
<tr>
<td>Regulatory Affairs for Drugs, Biologics, and Medical Devices with</td>
<td></td>
</tr>
<tr>
<td>Concentration in Clinical Research Regulatory Affairs, MS</td>
<td>313</td>
</tr>
<tr>
<td>Regulatory Affairs for Drugs, Biologics, and Medical Devices with</td>
<td></td>
</tr>
<tr>
<td>Concentration in General Regulatory Affairs, MS</td>
<td>314</td>
</tr>
<tr>
<td>Regulatory Affairs for Drugs, Biologics, and Medical Devices with</td>
<td></td>
</tr>
<tr>
<td>Concentration in International Regulatory Affairs, MS</td>
<td>315</td>
</tr>
<tr>
<td>Regulatory Affairs for Drugs, Biologics, and Medical Devices with</td>
<td></td>
</tr>
<tr>
<td>Concentration in Operational Regulatory Affairs, MS</td>
<td>316</td>
</tr>
</tbody>
</table>
Graduate Certificate Programs ........................................................................ 322

3-D Animation, Graduate Certificate ............................................................ 322
Adult And Organizational Learning, Graduate Certificate ......................... 323
Advanced Study in Orthopedics, Graduate Certificate ............................... 323
Agile Project Management, Graduate Certificate .......................................... 323
Cloud Computing Application and Management, Graduate Certificate ....... 324
Collegiate Athletics Administration, Graduate Certificate ......................... 324
Construction Management, Graduate Certificate ........................................... 324
Cross-Cultural Communication, Graduate Certificate ............................... 325
Digital Media Management, Graduate Certificate ......................................... 325
Digital Video, Graduate Certificate ............................................................... 325
Domestic Biopharmaceutical Regulatory Affairs, Graduate Certificate ....... 326
eLearning and Instructional Design, Graduate Certificate ......................... 326
Financial Markets And Institutions, Graduate Certificate ......................... 327
Forensic Accounting, Graduate Certificate .................................................... 327
Game Design, Graduate Certificate ............................................................... 327
Geographic Information Systems, Graduate Certificate ............................. 327
Global Student Mobility, Graduate Certificate .............................................. 328
Global Studies And International Relations, Graduate Certificate ............. 328
Health Management, Graduate Certificate ..................................................... 329
Higher Education Administration, Graduate Certificate ............................ 329
Human-Centered Informatics, Graduate Certificate ..................................... 330
Human Resources Management, Graduate Certificate .............................. 330
Information Security Management, Graduate Certificate ......................... 330
Interactive Design, Graduate Certificate ....................................................... 331
Interdisciplinary Professional Studies, Graduate Certificate ....................... 331
International Biopharmaceutical Regulatory Affairs, Graduate Certificate .... 332
Leadership, Graduate Certificate .................................................................. 332
Leading And Managing Technical Projects, Graduate Certificate ............. 333
Leading Communication Strategy and Talent Development, Graduate Certificate .................................................................................. 333
Learning Analytics, Graduate Certificate ..................................................... 334
Medical Devices Regulatory Affairs, Graduate Certificate ......................... 334
Nonprofit Management, Graduate Certificate .............................................. 335
Organizational Communication, Graduate Certificate ............................... 335
Port Security, Graduate Certificate ............................................................... 335
Professional Sports Administration, Graduate Certificate ......................... 336
Program And Portfolio Management, Graduate Certificate ....................... 336
Project Management, Graduate Certificate ................................................. 336
Public and Media Relations, Graduate Certificate ....................................... 337
Remote Sensing, Graduate Certificate ......................................................... 337
Respiratory Specialty Practice, Graduate Certificate .................................... 338
Social Media And Online Communities, Graduate Certificate ................. 338
Teaching English To Speakers Of Other Languages, Graduate Certificate .......... 338
College of Science ....................................................................................... 340

Academic Policies and Procedures ............................................................... 340
Grading Policies ......................................................................................... 340
Course Registration .................................................................................... 340
Transfer Credit ........................................................................................... 340
Awards ........................................................................................................ 340
Satisfactory Progress .................................................................................. 340
Time Limitation .......................................................................................... 341
Changes in Requirements ........................................................................... 341
The Doctor of Philosophy Degree (PhD) ....................................................... 341
The Master's Degree Academic Requirements ............................................ 342
Biology ......................................................................................................... 342
Biology, PhD .............................................................................................. 342
Biology, PhD—Advanced Entry ................................................................... 343
Bioinformatics, MS .................................................................................... 343
Bioinformatics, MS—ALIGN Program .......................................................... 344
Chemistry and Chemical Biology ............................................................... 345
Chemistry, PhD ......................................................................................... 345
Chemistry, PhD—Advanced Entry ............................................................... 346
Biotechnology, MS ...................................................................................... 259
Chemistry, MS ........................................................................................... 348
Biopharmaceutical Analytical Sciences, Graduate Certificate .................... 266
Biotechnology, Graduate Certificate ........................................................... 349
Biotechnology Enterprise, Graduate Certificate ........................................... 349
Experimental Biotechnology, Graduate Certificate ..................................... 349
Molecular Biotechnology, Graduate Certificate .......................................... 350
Pharmaceutical Technologies, Graduate Certificate ................................. 350
Process Science, Graduate Certificate ........................................................ 350
Marine and Environmental Sciences ........................................................... 350
Ecology, Evolution, and Marine Biology, PhD .......................... 351
Ecology, Evolution, and Marine Biology, PhD—Advanced Entry .......................... 351
Marine Biology, MS—Three Seas Program ........................................... 352
Mathematics ...................................................................................... 352
Mathematics, PhD ........................................................................... 353
Mathematics, PhD—Advanced Entry .................................................. 355
Applied Mathematics, MS ................................................................. 358
Mathematics, MS .............................................................................. 358
Operations Research, MSOR .............................................................. 359
Physics ............................................................................................. 359
Physics, PhD .................................................................................... 360
Physics, PhD—Advanced Entry ......................................................... 362
Physics, MS ....................................................................................... 365
Nanomedicine, Graduate Certificate ................................................... 366
Psychology ....................................................................................... 366
Psychology, PhD .............................................................................. 367
Psychology, PhD—Advanced Entry .................................................... 368
Interdisciplinary ................................................................................ 369
Network Science, PhD ...................................................................... 209
Applied Physics and Engineering, MS .................................................. 147
College of Social Sciences and Humanities ........................................ 372
School of Criminology and Criminal Justice ....................................... 372
Criminology and Justice Policy, PhD .................................................. 373
Criminology and Justice Policy, PhD—Advanced Entry ..................... 373
Criminology and Criminal Justice, MS ................................................. 374
Law, Criminology and Justice Policy, JD/PhD .................................... 375
Law, Criminology and Justice Policy, JD/PhD—Advanced Entry ........... 376
Law, Criminology and Criminal Justice, JD/MS ................................. 377
Global Criminology, Graduate Certificate .......................................... 377
Economics ......................................................................................... 378
Economics, PhD .............................................................................. 378
Economics, PhD—Advanced Entry .................................................... 380
Economics, MA ................................................................................ 381
English ............................................................................................... 382
English, PhD ..................................................................................... 382
English, PhD—Advanced Entry ......................................................... 384
English, MA ....................................................................................... 384
Digital Humanities, Graduate Certificate ........................................... 385
History ............................................................................................... 386
History, PhD ..................................................................................... 387
History, PhD—Advanced Entry .......................................................... 387
History, MA ....................................................................................... 388
Public History, Graduate Certificate .................................................. 389
Political Science ................................................................................ 389
Political Science, PhD ....................................................................... 390
Political Science, PhD—Advanced Entry ............................................ 390
Political Science, MA ....................................................................... 391
Public Administration, MPA ............................................................. 393
Security and Resilience Studies, MS ................................................... 394
Security and Resilience Studies, Graduate Certificate ....................... 396
School of Public Policy and Urban Affairs ......................................... 396
Law and Public Policy, PhD ............................................................... 397
Law and Public Policy, PhD—Advanced Entry .................................. 398
International Affairs, MA ................................................................. 399
Public Administration, MPA ............................................................. 393
Public Policy, MPP ........................................................................... 402
Urban Informatics, MS ...................................................................... 403
Urban and Regional Policy, MS ......................................................... 403
Public Policy Analysis, Graduate Certificate .................................... 404
Nonprofit Sector, Philanthropy, and Social Change, Graduate Certificate .................................................. 405
Urban Analytics, Graduate Certificate .............................................. 405
Urban Studies, Graduate Certificate .................................................. 406
Law and Public Policy, JD/MS ........................................................... 406
Sociology ......................................................................................... 407
Sociology, PhD ................................................................................. 407
Sociology, PhD—Advanced Entry ...................................................... 409
Sociology, MA .................................................................................. 411
Interdisciplinary ................................................................................ 411
Network Science, PhD .................................................................... 209
Data Analytics, Graduate Certificate ................................................. 106
Digital Humanities, Graduate Certificate .......................................... 385
Women’s, Gender, and Sexuality Studies, Graduate Certificate ......... 414
Faculty ............................................................................................. 416
Appendix ......................................................................................... 452
Governing Boards and Officers of Northeastern .................................. 452
University Leadership ....................................................................... 453
Statements of Accreditation and State Authorization ....................... 454
Institutional Calendars and Online Resources ................................... 456
General Information ....................................................................... 456
Index ............................................................................................... 458
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. 274) 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.

**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.

**Certificate Programs**
Certificates that appear on the transcript

**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.

**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 [website](http://www.northeastern.edu/provost/policies).

**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 [website](http://www.northeastern.edu/provost/policies).

**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.

**General Regulations and Requirements for the Master’s Degree**

**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 provisionally. 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/rcintro.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.
General Regulations and Requirements for Interdisciplinary Graduate Degrees

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.

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. 10). 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. 10). 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.
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 (p. 14)
- Information for International Students (p. 14)
- Academic Resources (p. 15)
- Information Technology Services (p. 16)
- Campus Resources (p. 17)

### 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 11,000 international students and scholars who represent approximately 130 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 website.

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 (http://www.northeastern.edu/ogs/schedule.html) 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 (http://www.northeastern.edu/ogs/schedule.html).

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 (p. 15)
• Office of the Registrar (p. 16)

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**

617.373.4357 (xHELP)
help@northeastern.edu
ITS Website (http://www.northeastern.edu/its)

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 myNEU, Northeastern’s online portal; on-site and online training on popular software; and high-performance research computing.

**ITS Service Desk**

ITS Service Desk, Snell Library
617.373.4357 xHELP
help@northeastern.edu

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

- Troubleshooting Northeastern University—provided accounts and applications, including email
- Investigating wired and wireless network connection problems
- Troubleshooting network printer problems
- Assisting with myNEU and Blackboard questions
- ITS Help and Information Desk, Snell Library
  617.373.4357 xHELP
  help@northeastern.edu

The ITS Help and Information Desk is located on the first floor of Snell Library near the InfoCommons. Visit the ITS Help and Information Desk for the following services:

- Assistance on computer-related issues to students, faculty, and staff with a valid Northeastern ID
- Support for ITS-managed computer labs
- Access to equipment available for loan including AV equipment and laptop computers and adapters.

**myNEU**

myNEU Website (http://myneu.neu.edu)

Your myNEU username and password provide access to key university platforms, from the myNEU portal to other university systems, including wireless network access, printing, and email.

myNEU—the online portal for the Northeastern community—is a central resource for students, faculty, and staff. The myNEU 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 myNEU. It is your responsibility to maintain accurate personal and emergency contact information.

**ResNet and the ResNet Resource Center**

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

ResNet—a service of ITS 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 Hplus service, mobile devices, gaming systems and other devices, student email, computer troubleshooting, and repair services for Apple and Dell computers.

**Printing**

The Northeastern Printing Program provides a limited amount of free printing each year to students, faculty, and staff. Each September, as an active member of the community, you are given a credit of $120 on your Husky Card to use at your discretion at any of the ITS-managed printers located across the main Boston campus as well as the Boston Financial District campus, Charlotte campus, and Seattle campus. 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 myNEU (https://myneu.neu.edu) to print remotely. When you locate a printer associated with the appropriate printing queue, simply swipe your HuskyCard, select your print job, and it will print. For more information visit the ITS website (https://www.northeastern.edu/its/services/printing-plan).
Appropriate Use Policy
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. For more information, visit the Appropriate Use Policy webpage (http://www.northeastern.edu/aup).

Training Services
ITS training provides the following instructor-led and web-based courses free of charge to all members of the Northeastern community:

- **Instructor-led training:** this includes classes such as Tools for Creating Online Content and Interactions, Introduction to Online Photo Editors, Blackboard, and other software that ITS and Academic Technology Services (ATS) support. Instructor-led training generally occurs in a library computer lab to enable a hands-on approach to learning software with a facilitator who can respond to participant interests.

- **Web-based training:** ITS training offers computer training over the internet, including Mac tutorials, MS Office tutorials, some application-specific training provided by the application vendors, and via Lynda.com, which offers 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 or any mobile device.

To browse the list of courses or to register for a class, visit the training section of the ITS (https://www.northeastern.edu/its) or the Learn@ATS section of the ATS (http://www.ats.neu.edu/learnats) website.

Academic Technology Services (ATS)
212 Snell Library
ats@northeastern.edu
ATS Website (http://www.ats.neu.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. 17)
- Campus Recreation (p. 17)
- Center for Advancing Teaching and Learning Through Research (p. 17)
- Disability Resource Center (p. 18)
- Graduate Student Government (p. 18)
- Husky Card Services (p. 18)
- John A. and Marcia E. Curry Student Center (p. 18)
- Northeastern University Bookstore (p. 19)
- Parking (p. 19)
- Public Safety (p. 19)
- University Health and Counseling Services (p. 19)
- We Care (p. 20)

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 (http://www.campusrec.neu.edu)

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.
- Apply to the Future Faculty Program for Teaching in Higher Education to prepare for the various dimensions of a faculty career.

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.
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.
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.
College Expenses

- Tuition and Fees (p. 21)
- Student Refunds (p. 21)
- Financial Aid Assistance (p. 22)
- Bill Payment (p. 24)

## Tuition and Fees

### Tuition

<table>
<thead>
<tr>
<th>Graduate Program</th>
<th>Cost per Credit Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applied Behavioral Analysis</td>
<td>$1,095</td>
</tr>
<tr>
<td>Arts, Media and Design</td>
<td>$1,433</td>
</tr>
<tr>
<td>Audiology (AuD) (per term)</td>
<td>$12,400</td>
</tr>
<tr>
<td>Audiology (AuD) clinical (per term)</td>
<td>$9,215</td>
</tr>
<tr>
<td>Biotechnology, Bioinformatics, Applied Math</td>
<td>$1,445</td>
</tr>
<tr>
<td>Bouvé College of Health Sciences</td>
<td>$1,445</td>
</tr>
<tr>
<td>Business Administration, including online graduate programs</td>
<td>$1,560</td>
</tr>
<tr>
<td>College of Professional Studies—Doctorate in Education</td>
<td>$797</td>
</tr>
<tr>
<td>College of Professional Studies—Graduate on campus and online (excluding MEd and MAT)</td>
<td>$671</td>
</tr>
<tr>
<td>College of Professional Studies—MEd and MAT programs</td>
<td>$552</td>
</tr>
<tr>
<td>Computer and Information Science</td>
<td>$1,540</td>
</tr>
<tr>
<td>Direct Entry PharmD (per term)</td>
<td>$24,280</td>
</tr>
<tr>
<td>Direct Entry PharmD Clinical</td>
<td>$14,875</td>
</tr>
<tr>
<td>Engineering</td>
<td>$1,523</td>
</tr>
<tr>
<td>Health Informatics</td>
<td>$1,212</td>
</tr>
<tr>
<td>Information Assurance</td>
<td>$1,450</td>
</tr>
<tr>
<td>Marine Biology</td>
<td>$1,260</td>
</tr>
<tr>
<td>MS in Accounting</td>
<td>$1,565</td>
</tr>
<tr>
<td>MS in Innovations</td>
<td>$1,665</td>
</tr>
<tr>
<td>MS/MBA (full program)</td>
<td>$66,528</td>
</tr>
<tr>
<td>Nurse Anesthetist clinical (in addition to tuition)</td>
<td>$3,610</td>
</tr>
<tr>
<td>Nursing, direct entry (per term)</td>
<td>$17,290</td>
</tr>
<tr>
<td>Physical Therapy—postbaccalaureate direct entry (DPT) (per semester)</td>
<td>$16,780</td>
</tr>
<tr>
<td>Physical Therapy—postbaccalaureate direct entry (DPT) clinical (per semester)</td>
<td>$11,440</td>
</tr>
<tr>
<td>Physician Assistant (per term)</td>
<td>$14,380</td>
</tr>
<tr>
<td>RN to BSN online</td>
<td>$796</td>
</tr>
<tr>
<td>Science</td>
<td>$1,445</td>
</tr>
<tr>
<td>Social Sciences and Humanities</td>
<td>$1,295</td>
</tr>
<tr>
<td>Dissertation (flat rate)</td>
<td>Equivalent to 1.5 times the college per-credit-hour rate listed above</td>
</tr>
</tbody>
</table>

### Fees

<table>
<thead>
<tr>
<th>Item</th>
<th>Fee</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student center fee (per term, Boston campus only)</td>
<td>$70 full-time</td>
</tr>
<tr>
<td></td>
<td>$10 part-time</td>
</tr>
<tr>
<td>College of Professional Studies student center fee (per quarter, Boston campus only)</td>
<td>$8.25</td>
</tr>
<tr>
<td>Student recreation fee (per term)</td>
<td>$56 full-time</td>
</tr>
<tr>
<td></td>
<td>$25 part-time</td>
</tr>
<tr>
<td>College of Professional Studies student recreation fee (per quarter, Boston campus only)</td>
<td>$10</td>
</tr>
<tr>
<td>Student activities fee (per year, Boston campus only)</td>
<td>$14</td>
</tr>
<tr>
<td>Health and counseling fee</td>
<td>$225</td>
</tr>
<tr>
<td>Health plan fee (yearly, optional)</td>
<td>Visit the NUSHP website: <a href="http://www.northeastern.edu/nushp">www.northeastern.edu/nushp</a> (<a href="http://www.northeastern.edu/nushp">http://www.northeastern.edu/nushp</a>)</td>
</tr>
<tr>
<td></td>
<td>Parking (optional, per semester)</td>
</tr>
<tr>
<td>International student fee</td>
<td>$250</td>
</tr>
</tbody>
</table>

### Student Refunds

**Refund Policies**

Inquiries about credit balances should be directed to Student Accounts. Refund requests for credit balances are made via the “Self-Service” tab on the student’s myNEU web portal (http://myneu.neu.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
Financial Aid Assistance

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) 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 myNEU (http://www.myneu.neu.edu/cp/home/displaylogin), click on the “Self-Service” tab, 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 program.
- 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-fs aid) 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's financial need. Repayment begins one month after graduation.

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 myNEU 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 the “Self-Service” tab. 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/finance-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/finance-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 myNEU (http://myneu.neu.edu) and are processed the same day they are received by the university.
- Through the monthly payment plan. Call 800.635.0120 or visit the Tuition Payment Plan website (http://www.tuitionpaymentplan.com/enroll).
- 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.

**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**

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 the myNEU web portal (http://myneu.neu.edu) by the designated deadline date each academic year. For deadlines and additional information, visit the NUSHP website. (http://www.northeastern.edu/nushp)
making available to the said student such opportunity. No adverse or prejudice 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 Residential 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 implicating 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.

---

**Student Records and Transcripts**

**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.

<table>
<thead>
<tr>
<th>Letter Grade</th>
<th>Numerical Equivalent</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>4.000</td>
<td>Outstanding achievement</td>
</tr>
<tr>
<td>A–</td>
<td>3.667</td>
<td>Good achievement</td>
</tr>
<tr>
<td>B+</td>
<td>3.333</td>
<td>Good achievement</td>
</tr>
<tr>
<td>B</td>
<td>3.000</td>
<td>Good achievement</td>
</tr>
<tr>
<td>B–</td>
<td>2.667</td>
<td>Good achievement</td>
</tr>
<tr>
<td>C+</td>
<td>2.333</td>
<td>Good achievement</td>
</tr>
</tbody>
</table>

**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:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Numerical Equivalent</th>
<th>Semester Hours</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>3.000</td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>A</td>
<td>4.000</td>
<td>1</td>
<td>4</td>
</tr>
</tbody>
</table>

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.”

**Graduate Course Numbering**

<table>
<thead>
<tr>
<th>Course Numbers</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0001–0999</td>
<td>Orientation and basic</td>
</tr>
<tr>
<td>5000–5999</td>
<td>First-level graduate</td>
</tr>
<tr>
<td>6000–6999</td>
<td>Second-level graduate</td>
</tr>
<tr>
<td>7000–7999</td>
<td>Third-level graduate</td>
</tr>
<tr>
<td>8000–8999</td>
<td>Clinical/research/readings</td>
</tr>
<tr>
<td>9000–9999</td>
<td>Doctoral research and dissertation</td>
</tr>
</tbody>
</table>

**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)

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.

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.

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 (http://www.ori.dhhs.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 myNU 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 EII) 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.

---

**Legislation**

The academic standing committee or the college's vice president of administrative affairs may not determine a resolution that contradicts any decision of the prior finding or action 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.

---

**GRIEVANCE PROCEDURE FOR DISABLED STUDENTS**

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 Equity, 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 Equity. 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, 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 each 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 deprecates 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.

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. 31).” 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.
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 (http://www.northeastern.edu/camd/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. 41)
- Master’s Degree Policies (p. 41)
- Graduate Student Classification (p. 42)

### 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. 27)”).

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 Classification

Student Aid Awards

Only those students who are registered in degree programs are eligible for awards. 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 myNEU 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/uhec/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. 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 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.

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

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

Lucy Maulsby, PhD
Associate Professor and Interim Director
l.maulsby@northeastern.edu

151 Ryder Hall
617-373-4637

Peter H. Wiederspahn, M.Arch
Associate Professor/Graduate Coordinator
p.wiederspahn@northeastern.edu

Master of Architecture

Northeastern offers a Master of Architecture degree accredited by the National Architectural Accreditation Board. The graduate coordinator for the school is Peter Wiederspahn. He also oversees the MArch program. Professor Jane Amidon is the coordinator of the MDES-SUEN program.

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**

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)**

- One-Year Program (p. 43)
- Two-Year Program (p. 44)
- Three-Year Program (p. 44)
- Three-Year Program—Advanced Degree Entrance (p. 46)

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

- One-Year Program (p. 47)
- Two-Year Program (p. 47)

**Program Requirements**

Complete all courses and requirements listed below unless otherwise indicated.

**Program Requirements**

<table>
<thead>
<tr>
<th>Semester 1</th>
<th>Semester 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARCH 6330</td>
<td>ARCH 6340</td>
</tr>
<tr>
<td>Seminar in Modern Architecture</td>
<td>Graduate Topics in Architecture</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>ARCH 6430</td>
<td>ARCH 6440</td>
</tr>
<tr>
<td>Case Studies 1</td>
<td>Case Studies 2</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>ARCH 7130</td>
<td>ARCH 7140</td>
</tr>
<tr>
<td>Master’s Research Studio</td>
<td>Master’s Degree Project</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Elective</td>
<td>Students must complete a 4-semester-hour graduate elective.</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

**Program Credit/GPA Requirements**

32 total semester hours required

Minimum 3.000 GPA required

**Plan of Study**

<table>
<thead>
<tr>
<th>Year 1</th>
<th>Fall</th>
<th>Hours</th>
<th>Spring</th>
<th>Hours</th>
<th>Summer 1</th>
<th>Hours</th>
<th>Summer 2</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARCH 6330</td>
<td>4</td>
<td>ARCH 6340</td>
<td>4</td>
<td>Vacation</td>
<td>0</td>
<td>Vacation</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>ARCH 6430</td>
<td>4</td>
<td>ARCH 6440</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ARCH 7130</td>
<td>6</td>
<td>ARCH 7140</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elective</td>
<td></td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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.

YEAR ONE

Students in their first semester have the option to either study in our Berlin program in Germany or study in Boston. Both the Berlin Design Studio and Boston Option Design Studio focus on urban housing and its aggregation. Students have the opportunity to learn and develop new patterns of housing specifically for those cities with their individual design interventions. 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 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.

Requirements

<table>
<thead>
<tr>
<th>Studio</th>
<th>Fall Hours</th>
<th>Spring Hours</th>
<th>Summer 1 Hours</th>
<th>Summer 2 Hours</th>
<th>Total Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARCH 5115</td>
<td>6</td>
<td></td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ARCH 5120</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ARCH 7130</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Case Study</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ARCH 6430</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ARCH 6440</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Building and Environment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ARCH 5210</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ARCH 5220</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Topics and Seminar</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ARCH 5310</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ARCH 6330</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ARCH 6340</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Research Project</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ARCH 7140</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electives</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total Hours: 68

*Berlin curriculum

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 Berlin program and have the option to enroll in the summer intern program 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.

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 Berlin program in Germany or study in Boston. Both the Berlin Design Studio and Boston Option Design Studio focus on urban housing and its aggregation. Students have the opportunity to learn and develop new patterns of housing specifically for those cities with their individual design interventions. 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.

- Students in the Boston option should complete Design Tactics and Operations (ARCH 5310), Option Studio (ARCH 5115), and Structural Systems (ARCH 5230).
- Students in the Berlin option should complete Architecture and Urbanism Abroad (ARCH 3361), Studio Abroad (ARCH 3155), and Seminar Abroad (ARCH 3362)

General Requirements

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 5230 Structural Systems 4
or ARCH 3362 Seminar Abroad 4
ARCH 2240 Architectonic Systems 4
ARCH 3450 Advanced Architectural Communication 4
ARCH 5210 Environmental Systems 4
ARCH 5220 Integrated Building Systems 4

Studio
ARCH 5115 Option Studio 6
or ARCH 3155 Studio Abroad 6
ARCH 5120 Comprehensive Design Studio 6
ARCH 6100 Graduate Skills Studio 6
ARCH 6200 Graduate Studio 1: Architectural Design 6
ARCH 7130 Master’s Research Studio 6

Professional Practice
ARCH 6430 Case Studies 1 4
ARCH 6440 Case Studies 2 4

Topics and Seminar

Table:

<table>
<thead>
<tr>
<th>Year 1</th>
<th>Fall</th>
<th>Hours</th>
<th>Spring</th>
<th>Hours</th>
<th>Summer 1</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARCH 2330 (and)</td>
<td>4</td>
<td>ARCH 2340 (and)</td>
<td>4</td>
<td>Vacation</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>ARCH 223</td>
<td></td>
<td>ARCH 234</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ARCH 6100</td>
<td>6</td>
<td>ARCH 5210 (and)</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ARCH 2240</td>
<td>4</td>
<td>ARCH 521</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ARCH 2230</td>
<td>4</td>
<td>ARCH 6200</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>or Elective (Required)*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elective (Required)</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>18</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Year 2

<table>
<thead>
<tr>
<th>Year 2</th>
<th>Fall</th>
<th>Hours</th>
<th>Spring</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARCH 2230 (or)</td>
<td>4</td>
<td>ARCH 3450</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>ARCH 336</td>
<td></td>
<td>ARCH 5120</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>ARCH 5115</td>
<td>6</td>
<td>ARCH 5220</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>ARCH 315</td>
<td>ARCH 6340 (1 of 2)</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ARCH 5310 (or)</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ARCH 336</td>
<td>Elective (Optional or)</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GRMN 111C</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>18</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Year 3

<table>
<thead>
<tr>
<th>Year 3</th>
<th>Fall</th>
<th>Hours</th>
<th>Spring</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARCH 6330</td>
<td>4</td>
<td>ARCH 6340 (2 of 2)</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>ARCH 6430</td>
<td>4</td>
<td>ARCH 6440</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>ARCH 7130</td>
<td>6</td>
<td>ARCH 7140</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>
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.

Only select courses in the first year of the program will be waived. All waivers are at the discretion of the school and applicants may be required to provide documentation if they seek additional 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.

| 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 5230 | Structural Systems | 4 |
|         | or ARCH 3362 | Seminar Abroad |  |
|         | ARCH 2240 | Architectonic Systems | 4 |
| Studio | ARCH 6100 | Graduate Skills Studio | 6 |

### General Requirements

| Studio | ARCH 5110 | Housing and Aggregation | 6 |
|        | or ARCH 3155 | Studio Abroad |  |
|        | ARCH 5120 | Comprehensive Design Studio | 6 |
|        | ARCH 6200 | Graduate Studio 1: Architectural Design | 6 |
|        | ARCH 7130 | Master’s Research Studio | 6 |

### Electives

#### Required Electives

Complete 8 semester hours of non-ARCH courses.

#### Additional Elective or Topics

Complete 8 semester hours of non-ARCH courses.

### Program Credit/GPA Requirements

78–104 total semester hours required

Minimum 3.000 GPA required

### Plan of Study

#### Year 1

<table>
<thead>
<tr>
<th>Fall Hours</th>
<th>Spring Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARCH 2330 (and)</td>
<td>ARCH 2340 (and)</td>
</tr>
<tr>
<td>ARCH 2331</td>
<td>ARCH 2341</td>
</tr>
<tr>
<td>ARCH 2240</td>
<td>ARCH 5210 (and)</td>
</tr>
<tr>
<td>ARCH 6100</td>
<td>ARCH 5211</td>
</tr>
<tr>
<td>ARCH 2230 (or)*</td>
<td>ARCH 6200 (required)</td>
</tr>
<tr>
<td>Elective (required)</td>
<td>Elective (required)</td>
</tr>
<tr>
<td>**</td>
<td>**</td>
</tr>
<tr>
<td>18</td>
<td>18</td>
</tr>
</tbody>
</table>

#### Year 2

<table>
<thead>
<tr>
<th>Fall Hours</th>
<th>Spring Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARCH 2230 (and)</td>
<td>ARCH 2231 or</td>
</tr>
<tr>
<td>ARCH 3362**</td>
<td>ARCH 5120</td>
</tr>
<tr>
<td>ARCH 5110 (or)</td>
<td>ARCH 5220</td>
</tr>
<tr>
<td>ARCH 3155**</td>
<td>ARCH 6340 (1 of 2)</td>
</tr>
<tr>
<td>ARCH 5310</td>
<td></td>
</tr>
<tr>
<td>ARCH 3361**</td>
<td></td>
</tr>
<tr>
<td>Elective (optional or)</td>
<td>4</td>
</tr>
<tr>
<td>**</td>
<td>**</td>
</tr>
<tr>
<td>**</td>
<td>**</td>
</tr>
<tr>
<td>18</td>
<td>18</td>
</tr>
</tbody>
</table>

#### Year 3

<table>
<thead>
<tr>
<th>Fall Hours</th>
<th>Spring Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARCH 6430</td>
<td>ARCH 6340 (2 of 2)</td>
</tr>
<tr>
<td>ARCH 6330</td>
<td>ARCH 6440</td>
</tr>
</tbody>
</table>
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.

**Requirements**

**Studio**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUEN 7130</td>
<td>Master’s Research Studio: Design and the Resilient City</td>
<td>6</td>
</tr>
<tr>
<td>SUEN 7140</td>
<td>Master’s Research Studio: Master’s Project</td>
<td>6</td>
</tr>
</tbody>
</table>

**Proseminar**

Complete 8 semester hours from the following (repeatable) courses:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUEN 7320</td>
<td>Pro-Seminar: Issues in Designed Urban Environments</td>
<td>4</td>
</tr>
<tr>
<td>SUEN 6340</td>
<td>Topics in Urban Environmental Design</td>
<td>4</td>
</tr>
</tbody>
</table>

**Technology**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUEN 7230</td>
<td>Urban Ecologies and Technologies 1</td>
<td>4</td>
</tr>
<tr>
<td>SUEN 7240</td>
<td>Urban Ecologies and Technologies 2</td>
<td>4</td>
</tr>
</tbody>
</table>

**Electives**

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

Complete 8 semester hours from the following subject areas:

- 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**

<table>
<thead>
<tr>
<th>Semester</th>
<th>Hours</th>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>6</td>
<td>SUEN 7130</td>
<td>Master’s Research Studio: Design and the Resilient City</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SUEN 7140 (or co-op*)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spring</td>
<td>6</td>
<td>SUEN 7230</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SUEN 7240</td>
<td></td>
<td>4</td>
</tr>
</tbody>
</table>

Total Hours: 104

*Note: Only courses in year 1 may be waived. Course waivers at discretion of program director.

* Take Arch 2230 in Fall Year 1 if planning on Berlin program in Fall Year 2.

**Berlin curriculum**

**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.

**Requirements**

**Studio**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUEN 6110</td>
<td>Graduate Studio 1: Sustainable Urban Sites</td>
<td>6</td>
</tr>
<tr>
<td>SUEN 6120</td>
<td>Graduate Studio 2: Sustainable Urban Systems</td>
<td>6</td>
</tr>
<tr>
<td>SUEN 7130</td>
<td>Master’s Research Studio: Design and the Resilient City</td>
<td>6</td>
</tr>
<tr>
<td>SUEN 7140</td>
<td>Master’s Research Studio: Master’s Project</td>
<td>6</td>
</tr>
</tbody>
</table>

**Cities: Design and Planning**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUEN 6310</td>
<td>Cities, Nature, and Design in Contemporary History and Theory</td>
<td>4</td>
</tr>
<tr>
<td>LPSC 7312</td>
<td>Cities, Sustainability, and Climate Change</td>
<td>3</td>
</tr>
<tr>
<td>LPSC 8400</td>
<td>Planning Module in Urban Law and Policy</td>
<td>1</td>
</tr>
</tbody>
</table>

**Proseminar**

Complete 8 semester hours from the following (repeatable) courses:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUEN 7320</td>
<td>Pro-Seminar: Issues in Designed Urban Environments</td>
<td>4</td>
</tr>
<tr>
<td>SUEN 6340</td>
<td>Topics in Urban Environmental Design</td>
<td>4</td>
</tr>
</tbody>
</table>

**Technology**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUEN 6210</td>
<td>Implementation and Visualization for Urban Environments 1</td>
<td>4</td>
</tr>
<tr>
<td>SUEN 6220</td>
<td>Implementation and Visualization for Urban Environments 2</td>
<td>4</td>
</tr>
<tr>
<td>SUEN 7230</td>
<td>Urban Ecologies and Technologies 1</td>
<td>4</td>
</tr>
<tr>
<td>SUEN 7240</td>
<td>Urban Ecologies and Technologies 2</td>
<td>4</td>
</tr>
</tbody>
</table>

**Electives**

Electives in other disciplines may be taken in consultation with your faculty advisor.
Complete 8 semester hours from the following subject areas:

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

<table>
<thead>
<tr>
<th>Fall</th>
<th>Hours</th>
<th>Spring</th>
<th>Hours</th>
<th>Summer 1</th>
<th>Hours</th>
<th>Summer 2</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUEN 6110</td>
<td>6</td>
<td>SUEN 6120</td>
<td>6</td>
<td>Vacation</td>
<td>0</td>
<td>Vacation</td>
<td>0</td>
</tr>
<tr>
<td>SUEN 6210</td>
<td>4</td>
<td>SUEN 6220</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SUEN 6310</td>
<td>4</td>
<td>LPSC 7312 (and)</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elective (optional)</td>
<td>4</td>
<td>LPSC 8400</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

|Elective (optional) | 4     |          |       |          |       |

18 18 0 0

Year 2

<table>
<thead>
<tr>
<th>Fall</th>
<th>Hours</th>
<th>Spring</th>
<th>Hours</th>
<th>Summer 1</th>
<th>Hours</th>
<th>Summer 2</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUEN 7130</td>
<td>6</td>
<td>SUEN 7140 (or co-op)*</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SUEN 7320</td>
<td>4</td>
<td>SUEN 7320 (or)</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SUEN 7230</td>
<td>4</td>
<td>SUEN 6340</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elective</td>
<td>4</td>
<td>SUEN 7240</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

|Elective | 4     |          |       |          |       |

18 18 0 0

Total Hours: 72

*Note: Students may opt to do a full- or part-time graduate co-op. Co-op does not count toward degree credits.

Art + Design

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

Tad Hirsch, PhD
Chair
239 Ryder Hall
617.373.2347
Dara-Lynn Pelechatz, Administrative Officer,
D.Pelechatz@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)

Casper Harteved, PhD
Assistant Professor and Game Science and Design and Game Analytics Graduate Coordinator

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

Mira Cantor, MFA
Professor and Studio Art (SMFA) Graduate Coordinator
313 Ryder Hall
617.373.2348

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. 48)
- Information Design and Visualization (p. 49)
- Interdisciplinary Arts (p. 50)

Master of Science (MS)
- Experience Design (p. 51)

Graduate Certificate
- Arts Administration and Cultural Entrepreneurship (p. 52)
- Cultural Entrepreneurship (p. 52)
- Experience Design (p. 53)
- Information Design and Visualization (p. 54)

Experience Design, MFA

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
The 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.

Requirements

Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARTG 5600</td>
<td>Experience Design Studio 1—Principles</td>
<td>4</td>
</tr>
<tr>
<td>ARTG 5610</td>
<td>Design Systems</td>
<td>4</td>
</tr>
<tr>
<td>ARTG 5620</td>
<td>Notational Systems for Experience</td>
<td>4</td>
</tr>
<tr>
<td>ARTG 5630</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>ARTG 5640</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>ARTG 6310</td>
<td>Design for Behavior and Experience</td>
<td>4</td>
</tr>
<tr>
<td>ARTG 6600</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>ARTG 6700</td>
<td></td>
<td>4</td>
</tr>
</tbody>
</table>

Thesis

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARTG 7600</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>ARTG 7990</td>
<td>Thesis</td>
<td>4</td>
</tr>
<tr>
<td>ARTG 7991</td>
<td></td>
<td>4</td>
</tr>
</tbody>
</table>

Open Electives

Complete courses from the following list: 16

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARTD 5001</td>
<td>Art, Context, Action 1</td>
</tr>
<tr>
<td>ARTG 5310</td>
<td>Visual Cognition</td>
</tr>
<tr>
<td>ARTG 5320</td>
<td>Statistics Basics for Designers</td>
</tr>
<tr>
<td>ARTG 5330</td>
<td>Visualization Technologies</td>
</tr>
<tr>
<td>ARTG 5650</td>
<td></td>
</tr>
</tbody>
</table>

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

Year 1

<table>
<thead>
<tr>
<th></th>
<th>Fall</th>
<th>Hours</th>
<th>Spring</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARTG 5600</td>
<td>4 ARTG 6600</td>
<td>4</td>
<td>ARTG 6600</td>
<td></td>
</tr>
<tr>
<td>ARTG 5620</td>
<td>4 ARTG 6310</td>
<td>4</td>
<td>ARTG 5630</td>
<td>4</td>
</tr>
<tr>
<td>ARTG 5630</td>
<td>4 ARTG 5640</td>
<td>4</td>
<td>ARTG 5610</td>
<td>4</td>
</tr>
</tbody>
</table>

16 16

Year 2

<table>
<thead>
<tr>
<th></th>
<th>Fall</th>
<th>Hours</th>
<th>Spring</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARTG 6700</td>
<td>4 ARTG 7990</td>
<td>4</td>
<td>ARTG 7600</td>
<td>4</td>
</tr>
<tr>
<td>ARTG 7600</td>
<td>4 ARTG 7791</td>
<td>4</td>
<td>Elective</td>
<td>4</td>
</tr>
<tr>
<td>Elective</td>
<td></td>
<td>4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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.

Requirements

Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARTG 5100</td>
<td>Information Design Studio 1: Principles</td>
<td>4</td>
</tr>
<tr>
<td>ARTG 5110</td>
<td>Information Design History</td>
<td>4</td>
</tr>
<tr>
<td>ARTG 5120</td>
<td>Information Design Research Methods</td>
<td>4</td>
</tr>
<tr>
<td>ARTG 5130</td>
<td>Visual Communication for Information Design</td>
<td>4</td>
</tr>
<tr>
<td>ARTG 5330</td>
<td>Visualization Technologies</td>
<td>4</td>
</tr>
<tr>
<td>ARTG 6100</td>
<td>Information Design Studio 2: Dynamic Mapping and Models</td>
<td>4</td>
</tr>
<tr>
<td>ARTG 6110</td>
<td>Information Design Theory and Critical Thinking</td>
<td>4</td>
</tr>
<tr>
<td>ARTG 6200</td>
<td>Information Design Studio 3: Synthesis</td>
<td>4</td>
</tr>
</tbody>
</table>

Open Electives

In consultation with faculty advisor, complete four courses from the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARTG 5310</td>
<td>Visual Cognition</td>
</tr>
<tr>
<td>ARTG 5320</td>
<td>Statistics Basics for Designers</td>
</tr>
<tr>
<td>ARTG 6310</td>
<td>Design for Behavior and Experience</td>
</tr>
<tr>
<td>ARTG 6320</td>
<td>Design of Information-Rich Environments</td>
</tr>
<tr>
<td>ARTG 6330</td>
<td>Information Design Mapping Strategies</td>
</tr>
<tr>
<td>ARTG 6900</td>
<td>Special Topics in Design</td>
</tr>
<tr>
<td>DA 5020</td>
<td>Collecting, Storing, and Retrieving Data</td>
</tr>
<tr>
<td>DA 5030</td>
<td>Introduction to Data Mining/Machine Learning</td>
</tr>
<tr>
<td>PPUA 5301</td>
<td>Introduction to Computational Statistics</td>
</tr>
</tbody>
</table>

Thesis

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARTG 7100</td>
<td>Information Design Thesis Seminar</td>
<td>4</td>
</tr>
<tr>
<td>ARTG 7990</td>
<td>Thesis</td>
<td>8</td>
</tr>
</tbody>
</table>

Program Credit/GPA Requirements

60 total semester hours required

Plan of Study

Year 1

<table>
<thead>
<tr>
<th>Semester</th>
<th>Fall Hours</th>
<th>Spring Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>ARTG 5100</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>ARTG 5110</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>ARTG 5130</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>ARTG 5330</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Open elective</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>16</td>
</tr>
</tbody>
</table>

Year 2

<table>
<thead>
<tr>
<th>Semester</th>
<th>Fall Hours</th>
<th>Spring Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>ARTG 6200</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>ARTG 7100</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Open elective</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Open elective</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>16</td>
</tr>
</tbody>
</table>

Total Hours: 60

Interdisciplinary Arts, MFA

Minimum 3.000 GPA required

The Master of Fine Arts in Interdisciplinary Arts emphasizes the arts of social engagement, broadly conceived. 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.

Students have an opportunity to learn to use the tools and insights of contemporary creative practice to intervene in public discourse through media, research-, and/or community-based methods. The curriculum centers around a series of core critique seminars that provide a foundation and home base for students who then customize their education from a wide array of studio and academic courses. Regular workshops with visiting faculty emphasize hands-on engagement in the creative process of leading artists, while offsite and international summer residencies allow students to complete self-directed projects, supported by online faculty and peer mentoring. The MFA degree requires a minimum 3.000 GPA over 60 semester hours of study, with 64 semester hours recommended.

The program seeks to help students 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.

Requirements

Seminars Required Courses

Enrollment in a section of each course is required each term. The format of the course is critique-seminar.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARTD 5001</td>
<td>Art, Context, Action 1</td>
</tr>
<tr>
<td>ARTD 5002</td>
<td>Art, Context, Action 2</td>
</tr>
<tr>
<td>ARTD 6001</td>
<td>Art, Media, Participation 1</td>
</tr>
</tbody>
</table>
Year 1

<table>
<thead>
<tr>
<th>Fall</th>
<th>Hours</th>
<th>Spring</th>
<th>Hours</th>
<th>Summer 1</th>
<th>Hours</th>
<th>Summer 2</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARTD 5001</td>
<td>4</td>
<td>ARTD 5002</td>
<td>4</td>
<td>Studio elective or</td>
<td>4</td>
<td>ARTD 5301</td>
<td>4</td>
</tr>
<tr>
<td>History, theory, and critical studies elective</td>
<td>4</td>
<td>History, theory, and critical studies elective</td>
<td>4</td>
<td>Studio elective</td>
<td>4</td>
<td>Studio elective</td>
<td>4</td>
</tr>
</tbody>
</table>

Year 2

<table>
<thead>
<tr>
<th>Fall</th>
<th>Hours</th>
<th>Spring</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARTD 6001</td>
<td>4</td>
<td>ARTD 6002</td>
<td>4</td>
</tr>
<tr>
<td>ARTE 7100</td>
<td>4</td>
<td>ARTE 7990</td>
<td>4</td>
</tr>
<tr>
<td>History, theory, and critical studies elective</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Studio elective</td>
<td>4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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. 48) 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.

Requirements

<table>
<thead>
<tr>
<th>Required Courses</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ARTG 5600</td>
<td>Experience Design Studio 1—Principles</td>
</tr>
<tr>
<td>ARTG 5610</td>
<td>Design Systems</td>
</tr>
<tr>
<td>ARTG 5620</td>
<td>Notational Systems for Experience</td>
</tr>
<tr>
<td>ARTG 5630</td>
<td>Design for Behavior and Experience</td>
</tr>
<tr>
<td>ARTG 5640</td>
<td>Design Systems</td>
</tr>
<tr>
<td>ARTG 5650</td>
<td>Electives</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Year 1</th>
<th>Fall</th>
<th>Hours</th>
<th>Spring</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ARTG 5600</td>
<td>4</td>
<td>ARTG 6600</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ARTG 5620</td>
<td>4</td>
<td>ARTG 6310</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>ARTG 5610</td>
<td>4</td>
<td>Elective</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>ARTG 5630</td>
<td>4</td>
<td>Elective</td>
<td>4</td>
</tr>
</tbody>
</table>

Total Hours: 24

---

Arts Administration and Cultural Entrepreneurship, Graduate Certificate

The arts sector is more vital and dynamic than ever, flourishing in major arts institutions and “non-hierarchical organizations,” including artist-run spaces and community organizations. This context, paired with changes in the nonprofit funding climate of the past 30 years, has generated a need to transform leadership training in the arts sector. Increasingly, creative thinkers must be equipped with administrative, analytical, entrepreneurial, and technological skill sets to work within the complex, interdependent arts and cultural ecosystem. In response, the Graduate Certificate in Arts Administration and Cultural Entrepreneurship offers an interdisciplinary graduate program focused on leadership innovation in nonprofit performance, visual arts, cultural, and community organizations.

The Graduate Certificate in Arts Administration and Cultural Entrepreneurship 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 contains embedded experiential opportunities to explore and demonstrate transformational arts management approaches. This program is offered 100 percent online.

Program Requirements
Complete all courses and requirements listed below unless otherwise indicated.

Requirements

<table>
<thead>
<tr>
<th>Required Courses</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>AACE 6000</td>
<td>Arts and Culture Organizational Leadership</td>
</tr>
<tr>
<td>AACE 6010</td>
<td>Planning for Arts and Cultural Organizations</td>
</tr>
<tr>
<td>AACE 6020</td>
<td>Experiential Study in Arts Administration</td>
</tr>
<tr>
<td>Elective Course</td>
<td>Complete one of the following:</td>
</tr>
<tr>
<td>AACE 6110</td>
<td>Information Technology for Arts and Cultural Organizations</td>
</tr>
<tr>
<td>AACE 6200</td>
<td>Programming and Community Engagement for Cultural Entrepreneurs</td>
</tr>
<tr>
<td>AACE 6210 1</td>
<td></td>
</tr>
</tbody>
</table>

1 For course title, please see college administrator.

Program Credit/GPA Requirements
12 total semester hours required
Minimum 3.000 GPA required

Cultural Entrepreneurship, Graduate Certificate

Cultural entrepreneurs combine creative, cultural, social and entrepreneurial spirit to forward innovation goals that invest in culture while solving problems with market-based approaches for the greater good. Cultural entrepreneurship is closely related to social entrepreneurship in that both aim to bring about social change by devising a solution — be that a roving theater company or a smartphone app for artistic collaboration — that generates a positive impact on
The Graduate Certificate in Experience Design is designed to prepare 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

**Program Requirements**

Complete all courses and requirements listed below unless otherwise indicated.

**Requirements**

**Required Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AACE 6200</td>
<td>Programming and Community Engagement for Cultural Entrepreneurs</td>
<td>3</td>
</tr>
</tbody>
</table>

### 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. 48) 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.

**Requirements**

**Required Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARTG 5610</td>
<td>Design Systems</td>
<td>4</td>
</tr>
<tr>
<td>ARTG 5620</td>
<td>Notational Systems for Experience</td>
<td>4</td>
</tr>
<tr>
<td>ARTG 6310</td>
<td>Design for Behavior and Experience</td>
<td>4</td>
</tr>
</tbody>
</table>

**Elective**
Complete 4 semester hours of 5000 to 6000 level course work in the following subject area:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARTG</td>
<td></td>
</tr>
</tbody>
</table>

**Program Credit/GPA Requirements**
16 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.

**Requirements**

**Required Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARTG 5130</td>
<td>Visual Communication for Information Design</td>
<td>4</td>
</tr>
<tr>
<td>ARTG 5330</td>
<td>Visualization Technologies</td>
<td>4</td>
</tr>
</tbody>
</table>

**Electives**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARTG</td>
<td></td>
</tr>
</tbody>
</table>

**Program Credit/GPA Requirements**
16 total semester hours required
Minimum 3.000 GPA required

**Game Design**

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

**Tad Hirsch, PhD**
Chair

239 Ryder Hall
617.373.2347
Dara-Lynn Pelechatz, Administrative Officer, D.Pelechatz@northeastern.edu

**Casper Harteveld**
Assistant Professor and Graduate Coordinator
140 Meserve Hall
617.373.4027
c.harteveld@northeastern.edu

The game design program offers a Master of Science in Game Science and Design. The degree is joint between the College of Arts, Media and Design and the College of Computer and Information Science. This MS degree is focused on the science and design of game development. The degree will weave the design and technology necessary to build a game but focus on the playability and analytics to make the product successful, thus creating a coherent vision enabling students to understand the process of creating successful game products in a player-centric environment.

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

**Admissions Requirements**
Applicants must submit an official application, including the following documents: official transcripts, a statement of purpose projecting their career goals, a description of any experience in the games field and/or a portfolio if available, official GRE General Test, and three letters of recommendation. International students must also submit official scores of the TOEFL examination. Acceptance to the Master of Science in Game Science and Design program is granted upon recommendation.
from the master’s admissions committee after review of the completed application.

Applicants will be expected to have a minimum 3.000 undergraduate grade-point average (GPA). International applicants must have a minimum TOEFL score of 100 (internet based) or 250 (computer based) or a minimum IELTS of 6.0.

We will consider applications from students who hold a bachelor’s degree from any of the following fields or closely related fields:

- Computer science
- Information science
- Informatics
- Engineering
- Human computer interaction
- Psychology
- Social science
- Interaction design
- Game design

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.

Degree Requirement
This is a two-year, 34-semester-hour degree.

Programs

Master of Science (MS)

- Game Science and Design (p. 55)

Graduate Certificate

- Game Analytics (p. 56)

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

Program Requirements
Complete all courses and requirements listed below unless otherwise indicated.

Required Course Work

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GSND 5110</td>
<td>Game Design and Analysis</td>
<td>4</td>
</tr>
<tr>
<td>GSND 5111</td>
<td>Seminar for GSND 5110</td>
<td>1</td>
</tr>
<tr>
<td>GSND 5122</td>
<td>Business Models in the Game Industry</td>
<td>1</td>
</tr>
<tr>
<td>GSND 5130</td>
<td>Usability and Empirical User Research</td>
<td>4</td>
</tr>
<tr>
<td>or PPUA 5301</td>
<td>Introduction to Computational Statistics</td>
<td></td>
</tr>
</tbody>
</table>

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

GAME ANALYTICS
Complete three of the following: 12

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>DA 5020</td>
<td>Collecting, Storing, and Retrieving Data</td>
</tr>
<tr>
<td>DA 5030</td>
<td>Introduction to Data Mining/Machine Learning</td>
</tr>
<tr>
<td>GSND 6350</td>
<td>Game Analytics</td>
</tr>
<tr>
<td>PPUA 5302</td>
<td>Information Design and Visual Analytics</td>
</tr>
</tbody>
</table>

GAME USER RESEARCH
Complete three of the following: 12

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 5340</td>
<td>Computer/Human Interaction</td>
</tr>
<tr>
<td>GSND 6320</td>
<td>Psychology of Play</td>
</tr>
<tr>
<td>GSND 6330</td>
<td>Game User Research</td>
</tr>
<tr>
<td>GSND 6340</td>
<td>Advanced Game User Research</td>
</tr>
</tbody>
</table>

GAME DESIGN AND DEVELOPMENT
Complete three of the following: 12

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 5150</td>
<td>Game Artificial Intelligence</td>
</tr>
<tr>
<td>CS 5850</td>
<td>Building Game Engines</td>
</tr>
<tr>
<td>GSND 6240</td>
<td>Exploratory Concept Design</td>
</tr>
<tr>
<td>GSND 6250</td>
<td>Spatial and Temporal Design</td>
</tr>
</tbody>
</table>

Electives

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

Complete two of the following: 8

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 5150</td>
<td>Game Artificial Intelligence</td>
</tr>
<tr>
<td>CS 5340</td>
<td>Computer/Human Interaction</td>
</tr>
<tr>
<td>CS 5850</td>
<td>Building Game Engines</td>
</tr>
<tr>
<td>DA 5020</td>
<td>Collecting, Storing, and Retrieving Data</td>
</tr>
</tbody>
</table>
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.

Admissions Requirements
Students are considered based on their application package, which includes the following documents:

- Statement of purpose projecting career goals and/or relevant work experience
- A description of any experience in the games field and/or a portfolio, if available
- Transcripts of undergraduate degree with a minimum grade-point average (GPA) of 3.000
- General GRE scores
- Minimum TOEFL score of 100 (internet based) or 250 (computer based) or IELTS score of 6.0 for international students who have a bachelor’s degree from a non-English-speaking country
- Three letters of reference from individuals who understand the student’s potential for graduate study

Acceptance is based on an assessment of the student’s ability to succeed in the advanced course work of the program.

All admitted students meet with an advisor who helps them select a pathway with a coherent set of electives depending on their career goals. The advisor also monitors their progress throughout the course work.

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

Requirements
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 Game Analytics 4

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. 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. Moreover, the program offers...
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. 57)

### 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 Course**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>JRNL 6340</td>
<td>Fundamentals of Digital Journalism</td>
<td>4</td>
</tr>
</tbody>
</table>

**Tracks**

Complete one of the following two tracks:

**PROFESSIONAL TRACK**

*Required Course Work*

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>JRNL 6200</td>
<td>Enterprise Reporting 1</td>
<td>4</td>
</tr>
<tr>
<td>JRNL 6201</td>
<td>Enterprise Reporting 2</td>
<td>4</td>
</tr>
<tr>
<td>JRNL 6202</td>
<td>Perspective on Journalism Ethics</td>
<td>4</td>
</tr>
</tbody>
</table>

*Electives*

Complete 20 semester hours from the following areas:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>JRNL 5309 to JRNL 6305</td>
<td></td>
<td>20</td>
</tr>
<tr>
<td>JRNL 6310 to JRNL 7976</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

**MEDIA INNOVATION TRACK**

*Required Course Work*

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>JRNL 6306</td>
<td>Media Innovation Studio 1</td>
<td>4</td>
</tr>
<tr>
<td>JRNL 6307</td>
<td>Media Innovation Studio 2</td>
<td>4</td>
</tr>
</tbody>
</table>

**Program Credit/GPA Requirements**

<table>
<thead>
<tr>
<th>Credit Hours</th>
<th>Professional Track</th>
<th>Media Innovation Track</th>
</tr>
</thead>
<tbody>
<tr>
<td>32 total semester hours required for Professional Track</td>
<td>36 total semester hours required for Media Innovation Track</td>
<td></td>
</tr>
</tbody>
</table>

Minimum 3.000 GPA required

---

**Music**

Website ([http://www.northeastern.edu/camd/music](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 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. 58)

Dual Degree (JD/MS)
- Music Industry Leadership (p. 61)

Certificate
- NEC/NU Joint Certificate Program—General Certificate of Merit in Music Performance (24 credits)
- NEC/NU Joint Certificate Program—Professional Studies Certificate in Music Performance (48 credits)

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.

Requirements

Required Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MUSI 6000</td>
<td>Management of Music Organizations</td>
<td>3</td>
</tr>
<tr>
<td>MUSI 6100</td>
<td>Music Industry Research Methodology</td>
<td>3</td>
</tr>
<tr>
<td>MUSI 6200</td>
<td>Financial Management in the Music Industry</td>
<td>3</td>
</tr>
</tbody>
</table>

Electives
Complete 18 semester hours in the following subject areas:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MUSI 5000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AACE 6000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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.

NEC/NU Joint Certificate Program—General Certificate of Merit in Music Performance
The School of Continuing Education at the New England Conservatory (NEC) and the Department of Music at Northeastern University (NU) jointly offer a General Certificate of Merit in Music Performance (24 credits) and a Professional Studies Certificate in Music Performance (48 credits). These programs are geared toward Northeastern 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 11 credits of course work at Northeastern University as indicated below.

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:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MUSC 1119</td>
<td>Fundamentals of Western Music Theory</td>
<td>4</td>
</tr>
</tbody>
</table>

Credits for MUSC 1119 do not count toward the certificate.

Music Theory and Musicianship
Music theory and musicianship courses should be taken concurrently.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MUSC 1201</td>
<td>Music Theory 1</td>
<td>4</td>
</tr>
</tbody>
</table>

Music History
Complete one of the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MUSC 1104</td>
<td>Survey of African-American Music</td>
<td></td>
</tr>
<tr>
<td>MUSC 1105</td>
<td>Music of the USA</td>
<td></td>
</tr>
<tr>
<td>MUSC 1111</td>
<td>Rock Music</td>
<td></td>
</tr>
</tbody>
</table>
### Classes

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>MUSC 1112</td>
<td>Jazz</td>
</tr>
<tr>
<td>MUSC 1121</td>
<td>Medieval and Renaissance Music</td>
</tr>
<tr>
<td>MUSC 1122</td>
<td>Music of the Baroque Era</td>
</tr>
<tr>
<td>MUSC 1123</td>
<td>Music of the Classical Era</td>
</tr>
<tr>
<td>MUSC 1124</td>
<td>Music of the Romantic Era</td>
</tr>
<tr>
<td>MUSC 1125</td>
<td>20th-Century Music</td>
</tr>
</tbody>
</table>

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:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>MUSC 3550</td>
<td>Historical Traditions: Special Topics</td>
</tr>
</tbody>
</table>

### Ensembles

Complete two music ensembles:

- 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 World Fusion Ensemble

### New England Conservatory Requirements

Complete 13 credits of course work at New England Conservatory School of Continuing Education as indicated below.

#### Private Studio Instruction

Complete 8 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.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>MPNC 1102</td>
<td>Music Instruction</td>
</tr>
<tr>
<td>MPNC 1103</td>
<td>Music Instruction</td>
</tr>
<tr>
<td>MPNC 1104</td>
<td>Music Instruction</td>
</tr>
</tbody>
</table>

### Music Technology

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>MPNC 1201</td>
<td>Contemporary Music Production and Technology 1</td>
</tr>
</tbody>
</table>

#### Electives

Complete 3 credits from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>MPNC 1301</td>
<td>Build Your Voice: Art/Skillful Singing</td>
</tr>
<tr>
<td>MPNC 1401</td>
<td>Jazz Ear Training 1</td>
</tr>
</tbody>
</table>

1 Music majors with a concentration in music industry may substitute Music Theory for Music Industry 1 (MUSI 1203) and Musicianship 1 (MUSC 1241).
<table>
<thead>
<tr>
<th>NEC/NU Joint Certificate Program—Professional Studies Certificate in Music Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>The School of Continuing Education at the New England Conservatory (NEC) and the Department of Music at Northeastern University (NU) jointly offer a General Certificate of Merit in Music Performance (24 credits) and a Professional Studies Certificate in Music Performance (48 credits). These programs are geared toward Northeastern undergraduate and graduate students who are interested in improving their abilities to perform on an instrument or voice in the classical or jazz styles.</td>
</tr>
</tbody>
</table>

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.

#### 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:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MUSC 1119</td>
<td>Fundamentals of Western Music Theory</td>
<td>1</td>
</tr>
</tbody>
</table>

Credits for MUSC 1119 do not count toward the certificate.

#### Music Theory and Musicianship

Music theory and musicianship courses should be taken concurrently.  

### New England Conservatory Requirements

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

#### 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.

MPNC 1102  Music Instruction
MPNC 1103  Music Instruction
MPNC 1104  Music Instruction

**Musical Technology**

MPNC 1201  Contemporary Music Production and Technology 1

**Electives**

Complete 7 credits from the following:

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

**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. 58)
Year Three
Summer—music industry courses (p. 58)
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
Modern business faces many challenges from unprecedented political change and the effects of foreign policy, high technology, affirmative action regulations, and new economic policies. These challenges have increased the demand for highly trained individuals equipped to analyze and address our economy's complex social and legal problems.

Programs in the D'Amore-McKim School of Business (DMSB) are designed for students who are preparing to take on managerial responsibility. These programs seek to help students develop the ability to recognize and solve business and organizational problems and understand the role of business in the community, the nation, and the world. The college's goals are to help students develop ideals that are ethically sound and socially desirable; cultivate an awareness of the social, political, and economic developments to which businesses must adapt; develop sound judgment and effective communication skills; and develop their individual interests and talents.

**Master of Science**

Master of Science programs offer students the opportunity for in-depth study in a particular functional business area. Depending on a student's prior academic background, certain prerequisite courses of study may apply.

Designed for undergraduate accounting majors, the Master of Science in Accounting seeks to give you the advanced accounting knowledge and skills you need to sit for the CPA exam. No prior work experience is required.

With an MS in Taxation, you have an opportunity to learn to analyze the Internal Revenue Code, expand your professional network, and advance your career in taxation. Courses begin three times per year: in fall, spring, and summer.

Northeastern’s MS in Finance program emphasizes the skills that are essential for a successful career in finance. You can pursue study in either corporate finance or investments.

Northeastern’s MS in International Business (MSIB) is designed for globally focused individuals who want to begin careers in international business.

The Master of Science in Innovation is a one-year part-time cohort program for working professionals who want to dive into innovation as it applies to products, services, operations, and processes. The program is offered in two formats, 100% online with a May start and on campus with a September start.

The Master of Science in Technological Entrepreneurship is an intensive one-year (September to June) ten-course sequence that seeks to teach you the skills you need to know to effectively integrate technology and business.

**Programs**

**Master of Science (MS)**

- Innovation (p. 63)
- International Management (p. 64)
- Technological Entrepreneurship (p. 64)

**Master of Science in Accounting (MSA)**

- Accounting (p. 65)

**Master of Science in Finance (MSF)**

- Finance (p. 65)
- Finance—Evening/Part-Time Program (p. 66)
- Finance—Online Program (p. 66)

**Master of Science in International Business (MSIB)**

- International Business (p. 66)

**Master of Science in Taxation (MST)**

- Taxation (p. 67)
- Taxation—Online Program (p. 67)

**Innovation, MS**

The Master of Science in Innovation is a one-year, part-time program offered 100 percent online or on-campus and is designed specifically for working professionals who want to become innovation leaders. The 10-course program covers the fundamentals of innovation in business from multiple perspectives by using case studies and experiential innovation projects. The cohort-based Master of Science in Innovation starts in May
for online and in September for on-campus. The on-campus cohort meets primarily on Saturdays.

**Program Requirements**
Complete all courses and requirements listed below unless otherwise indicated.

### Core
Complete one of the following:

<table>
<thead>
<tr>
<th>On-campus only</th>
<th>Online only</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUSN 6280</td>
<td>ENTR 6225</td>
</tr>
<tr>
<td>How Executives Shape and Lead Innovation and Enterprise Growth</td>
<td>Corporate Entrepreneurship through Global Growth, Acquisitions, and Alliances</td>
</tr>
</tbody>
</table>

**Required Course Work**

#### FALL SEMESTER

**Required courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>FINA 6209</td>
<td>Introduction to International Accounting and Finance</td>
<td>3</td>
</tr>
<tr>
<td>MGSC 6209</td>
<td>Business Statistics</td>
<td>3</td>
</tr>
</tbody>
</table>

**Electives**

Complete three electives from the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTB 6201</td>
<td>International Business Management</td>
<td>3</td>
</tr>
<tr>
<td>MECN 6203</td>
<td>Global Managerial Economics</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 6206</td>
<td>International Marketing</td>
<td>3</td>
</tr>
<tr>
<td>ENTR 6220</td>
<td>Family Business Leadership and Governance</td>
<td>3</td>
</tr>
<tr>
<td>ENTR 6225</td>
<td>Corporate Entrepreneurship through Global Growth, Acquisitions, and Alliances</td>
<td>3</td>
</tr>
</tbody>
</table>

#### SPRING SEMESTER

**Required Courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>FINA 6204</td>
<td>International Finance Management</td>
<td>3</td>
</tr>
<tr>
<td>INTB 6226</td>
<td>Becoming a Global Leader</td>
<td>3</td>
</tr>
<tr>
<td>INTB 6260</td>
<td>Advanced Topics in Global Management and Strategy</td>
<td>3</td>
</tr>
</tbody>
</table>

**Electives**

Complete two electives from the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENTR 6200</td>
<td>Enterprise Growth and Innovation</td>
<td>3</td>
</tr>
<tr>
<td>STRT 6210</td>
<td>Workforce Metrics and Analytics</td>
<td>3</td>
</tr>
<tr>
<td>SCHM 6213</td>
<td>Global Supply Chain Strategy</td>
<td>3</td>
</tr>
</tbody>
</table>

**Program Credit/GPA Requirements**

30 total semester hours required
Minimum GPA 3.000 required

---

### Technological Entrepreneurship, MS

In collaboration with the International Partnership of Business Schools (IPBS), the Master of Science in International Management (MIM) is designed to prepare students for careers in global economy. The MIM offers an opportunity to study in two continents, in two very different countries, with very different educational systems. Students who study for their first or second semesters at Northeastern University take the courses listed under the Program Requirements tab. Students who study at Northeastern University during the fall semester at Northeastern University the spring semester are the Master of Science in International Management from the partner university where they study during their second semester. Students who study at Northeastern University during the spring semester are the Northeastern University Master of Science in International Management. Learn more about the IPBS MIM program (http://www.ipbsmim.com).

**Program Requirements**

Complete all courses and requirements listed below unless otherwise indicated.

### Required Course Work

#### Entrepreneurship

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENTR 6200</td>
<td>Enterprise Growth and Innovation</td>
<td>3</td>
</tr>
<tr>
<td>ENTR 6212</td>
<td>Business Planning for New Ventures</td>
<td>3</td>
</tr>
<tr>
<td>ENTR 6218</td>
<td>Business Model Design and Innovation</td>
<td>3</td>
</tr>
<tr>
<td>ENTR 6219</td>
<td>Financing Ventures from Early Stage to Exit</td>
<td>3</td>
</tr>
</tbody>
</table>

#### Technology
Northeastern University

Accounting, MSA

The D’Amore-McKim MS in Accounting program for accounting majors is designed to prepare you with the advanced knowledge of accounting necessary to take the CPA exam. Our program is approved by the State Board of Accountancy in Massachusetts. No prior work experience is required, so you can get started as soon as you have completed your undergraduate degree.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Course Work

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

Required Course Work

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

TAXATION TRACK

Required Course Work

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:

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

The Master of Science in Finance offers rigorous training in finance, helping you to develop your analytical and financial management skills. The curriculum is taught by faculty who are recognized as expert researchers by leading industry journals.

The full-time master’s 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, comprised of approximately 70 students, primarily international.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Requirements

Required Course Work

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

Complete four electives (course offerings are at the discretion of the finance department):

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 6260 Entrepreneurial Finance, Innovation Valuation, and Private Equity

Program Credit/GPA Requirements

30 total semester hours required
Minimum 3.000 GPA required
Finance—Evening/Part-Time Program, MSF

Program Credit/GPA Requirements
30 total semester hours required
Minimum 3.000 GPA required

Finance—Online Program, MSF

The practice-oriented curriculum of Northeastern University’s Online Master of Science in Finance (OMSF) 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 OMSF 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.

International Business, MSIB

The Master of Science in International Business is designed to expose talented, driven students to the global business environment that will distinguish them as they enter the workforce. This program, which can be completed in just one year of full-time study or two years of part-time study, 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.

Program Requirements
Complete all courses and requirements listed below unless otherwise indicated.

Required Course Work
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
Complete 6 semester hours from the following subject areas: 6
ACCT, BUSN, ENTR, FINARMG, INTSTR, TECENB, MECN, MKTG, MGMT, MGSC, SCHM, Students may also consider political science or sociology courses.

Program Credit/GPA Requirements
30 total semester hours required
Taxation, MST

The D’Amore-McKim MS in taxation program is designed with the working professional in mind. Courses begin three times per year: in fall, spring, and summer. The MST program is focused on teaching you to analyze the Internal Revenue Code. You can also expand your professional network by connecting with other tax professionals in Northeastern’s alumni and corporate communities.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Course Work

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 5230</td>
<td>Federal Tax Issues and Analysis</td>
<td>3</td>
</tr>
<tr>
<td>ACCT 5232</td>
<td>Estate and Gift Taxation</td>
<td>3</td>
</tr>
<tr>
<td>ACCT 6231</td>
<td>Corporations and Shareholders</td>
<td>3</td>
</tr>
<tr>
<td>ACCT 6233</td>
<td>Tax Research Methodology</td>
<td>1.5</td>
</tr>
<tr>
<td>ACCT 6234</td>
<td>Tax Practice, Procedure, and Ethics</td>
<td>1.5</td>
</tr>
<tr>
<td>ACCT 6235</td>
<td>Partners and Partnerships</td>
<td>3</td>
</tr>
</tbody>
</table>

Electives

Complete 15 semester hours from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 6236</td>
<td>Reorganizations</td>
</tr>
<tr>
<td>ACCT 6237</td>
<td>Consolidated Returns</td>
</tr>
<tr>
<td>ACCT 6238</td>
<td>Income Tax Accounting</td>
</tr>
<tr>
<td>ACCT 6239</td>
<td>State and Local Taxation</td>
</tr>
<tr>
<td>ACCT 6240</td>
<td>International Taxation: Inbound Transactions</td>
</tr>
<tr>
<td>ACCT 6241</td>
<td>International Taxation: Outbound Transactions</td>
</tr>
<tr>
<td>ACCT 6242</td>
<td>Taxation of Financial Instruments</td>
</tr>
<tr>
<td>ACCT 6243</td>
<td>Advanced Flow-Through Entities</td>
</tr>
<tr>
<td>ACCT 6244</td>
<td>Tax Exempt Entities</td>
</tr>
<tr>
<td>ACCT 6245</td>
<td>Strategic Tax Planning</td>
</tr>
<tr>
<td>ACCT 6246</td>
<td>Retirement Plans</td>
</tr>
<tr>
<td>ACCT 6247</td>
<td>Estate Planning</td>
</tr>
<tr>
<td>ACCT 6248</td>
<td>Income Taxation of Trusts and Estates</td>
</tr>
<tr>
<td>ACCT 6249</td>
<td>Financial Planning for Investments</td>
</tr>
<tr>
<td>ACCT 6250</td>
<td>Financial Planning for Insurance</td>
</tr>
<tr>
<td>ACCT 6251</td>
<td>Executive Compensation</td>
</tr>
<tr>
<td>ACCT 6252</td>
<td>Taxation of E-Commerce</td>
</tr>
<tr>
<td>ACCT 6256</td>
<td>Advanced Topics in Accounting</td>
</tr>
<tr>
<td>ACCT 6264</td>
<td>Planning for Estate Tax Issues</td>
</tr>
<tr>
<td>ACCT 6265</td>
<td>Tax Accounting for Income Taxes</td>
</tr>
</tbody>
</table>

Program Credit/GPA Requirements

30 total semester hours required
Minimum 3.000 GPA required

Taxation—Online Program, MST

Northeastern University’s 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 OMST 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.

Required Course Work

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 5230</td>
<td>Federal Tax Issues and Analysis</td>
<td>3</td>
</tr>
<tr>
<td>ACCT 5232</td>
<td>Estate and Gift Taxation</td>
<td>3</td>
</tr>
<tr>
<td>ACCT 6231</td>
<td>Corporations and Shareholders</td>
<td>3</td>
</tr>
<tr>
<td>ACCT 6235</td>
<td>Tax Research, Practice, and Ethics</td>
<td>3</td>
</tr>
</tbody>
</table>

Electives

Complete 15 semester hours from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 6239</td>
<td>State and Local Taxation</td>
</tr>
<tr>
<td>ACCT 6240</td>
<td>International Taxation: Inbound Transactions</td>
</tr>
<tr>
<td>ACCT 6241</td>
<td>International Taxation: Outbound Transactions</td>
</tr>
<tr>
<td>ACCT 6243</td>
<td>Advanced Flow-Through Entities</td>
</tr>
<tr>
<td>ACCT 6246</td>
<td>Retirement Plans</td>
</tr>
<tr>
<td>ACCT 6248</td>
<td>Income Taxation of Trusts and Estates</td>
</tr>
<tr>
<td>ACCT 6249</td>
<td>Financial Planning for Investments</td>
</tr>
<tr>
<td>ACCT 6250</td>
<td>Financial Planning for Insurance</td>
</tr>
<tr>
<td>ACCT 6264</td>
<td>Planning for Estate Tax Issues</td>
</tr>
<tr>
<td>ACCT 6265</td>
<td>Tax Accounting for Income Taxes</td>
</tr>
</tbody>
</table>

Program Credit/GPA Requirements

30 total semester hours required
Minimum 3.000 GPA required

Master of Business Administration

The D’Amore-McKim full-time MBA fully integrates world-class academics and meaningful business expertise, creating a powerful fusion that will inform you, inspire you, and fully connect you to the pulse of today’s business world.

It happens in just 24 months.

Advantages of the D’Amore-McKim corporate residency:

• Six months of in-depth business experience
• Work as a paid employee at a leading business in your area of interest
• Significant responsibilities with critical projects
• Unparalleled experience that will build your confidence
• A lifetime of valuable connections
• Develop expertise required for meaningful full-time employment

Transform your life with firsthand knowledge of global business, enhanced leadership and communication skills, and the confidence to hit the ground running. It’s waiting for you with the D’Amore-McKim full-time MBA.

The flexibility of our part-time MBA program allows you to complete your degree in as little as two or as long as seven years. You can commit
to courses just one night a week, or accelerate your degree by taking multiple classes that fit your schedule, including classes online and on Saturdays.

Beyond building a strong foundation of management and leadership skills, you can choose a concentration (http://www.damore-mckim.northeastern.edu/academic-programs/graduate-programs/mba/part-time/curriculum/concentrations) that meets your specific career objectives, such as marketing, corporate finance, investments, or supply chain management.

Earning your MBA from the D’Amore-McKim School of Business can help you build a strong peer-to-peer and alumni network to support you as an MBA student, in your current job, and throughout your career.

As a student in the online MBA program, you have an opportunity to build on your current career success, expand your managerial skills, and put new learning to use in your place of work. This program is offered completely online with no campus residency requirements; however, students can also elect to take certain elective courses on campus with program approval.

### Programs
- MBA—Full-Time Program (p. 68)
- MBA—Evening/Part-Time Program (p. 70)
- MBA—Online Program (p. 73)

### Business Administration, MBA—Full-Time Program

This is the MBA program unlike anything else out there.

The D’Amore-McKim full-time MBA fully integrates world-class academics and meaningful business expertise, creating a powerful fusion that will inform you, inspire you, and fully connect you to the pulse of today’s business world.

It happens in just twenty-four months.

#### Advantages of the D’Amore-McKim Corporate Residency:
- Six months of in-depth business experience
- Work as a paid employee at a leading business in your area of interest
- Significant responsibilities with critical projects
- Unparalleled experience that will build your confidence
- A lifetime of valuable connections
- Develop expertise required for meaningful full-time employment

Transform your life with firsthand knowledge of global business, enhanced leadership and communication skills, and the confidence to hit the ground running. It’s waiting for you with the D’Amore-McKim full-time MBA.

#### Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

#### Term GPA Requirement

A GPA of 3.000 or higher is required at the end of each term.

#### Required Course Work

<table>
<thead>
<tr>
<th>Term</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall Term</td>
<td></td>
</tr>
<tr>
<td>BUSN 6200</td>
<td>Career Management</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Spring Term</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 6208</td>
</tr>
<tr>
<td>BUSN 6200</td>
</tr>
<tr>
<td>ENTR 6208</td>
</tr>
<tr>
<td>FINA 6208</td>
</tr>
<tr>
<td>SCHM 6200</td>
</tr>
<tr>
<td>INTB 6238</td>
</tr>
<tr>
<td>Electives</td>
</tr>
<tr>
<td>Complete 9 semester hours from the following subject areas:</td>
</tr>
<tr>
<td>ACCT, ENTR, HRMG, INTB, MECN, MKTG, MGMT, SCHM, STRT, and TECE</td>
</tr>
</tbody>
</table>

### Concentration Options

Complete one of the following concentrations:

- Entrepreneurship (p. 68)
- Healthcare management (p. 69)
- Finance—corporate or investment track (p. 69)
- Marketing (p. 69)
- Operations and supply chain management (p. 69)

### CONCENTRATION IN ENTREPRENEURSHIP

#### Required Course Work

| ENTR 6212 | Business Planning for New Ventures | 3 |

#### Electives

Complete 12 semester hours from the following: 12

| 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 6224 | Intellectual Property and Other Legal Aspects of Business and Innovation |
ENTR 6225 Corporate Entrepreneurship through Global Growth, Acquisitions, and Alliances

ENTR 6293 Design Thinking for Market-Driven Innovation

FINA 6260 Entrepreneurial Finance, Innovation Valuation, and Private Equity

HRMG 6212 Creating an Innovative Organization

TECE 6222 Emerging and Disruptive Technologies

TECE 6230 Entrepreneur Marketing and Selling

TECE 6300 Managing a Technology-Based Business

TECE 6340 The Technical Entrepreneur as Leader

**CONCENTRATION IN HEALTHCARE MANAGEMENT**
**Required Course Work**
FINA 6220 Healthcare Finance 3

HINF 5105 The American Healthcare System 3

HRMG 6220 Health Organization Management 3

SCHM 6223 Managing Healthcare Supply Chain Operations 3

STRT 6220 Strategic Management for Healthcare Organizations 3

**Electives**
Complete 9 semester hours from the following: 9

HINF 5101 Introduction to Health Informatics and Health Information Systems

HINF 6202 Business of Healthcare Informatics

HINF 6205 Creation and Application of Medical Knowledge

PHTH 5232 Evaluating Healthcare Quality

**CONCENTRATION IN MARKETING**
**Required Course Work**
MKTG 6210 Marketing Research 3

**Electives**
Complete 12 semester hours from the following: 12

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

ENTR 6224 Intellectual Property and Other Legal Aspects of Business and Innovation

**CONCENTRATION IN FINANCE**
**Required Course Work**
FINA 6203 Investment Analysis 3

**Track**
Complete one of the following two tracks: 12

*Corporate Finance Track*

**FINA 6205 Financial Strategy**
FINA 6216 Valuation and Value Creation
FINA 6260 Entrepreneurial Finance, Innovation Valuation, and Private Equity

Complete 9 semester hours from the following: 9

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 6220 Healthcare Finance
FINA 6221 Entrepreneurial Finance
FINA 6222 Risk Management and Insurance
FINA 6231 Disrupting the Finance and Insurance Service Industries
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 9 semester hours from the following: 9

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 6231 Disrupting the Finance and Insurance Service Industries
FINA 6260 Entrepreneurial Finance, Innovation Valuation, and Private Equity
FINA 6360 Fund Management for Analysts
FINA 6361 Fund Management for Managers

**CONCENTRATION IN OPERATIONS AND SUPPLY CHAIN MANAGEMENT**
**Required Course Work**
SCHM 6213 Global Supply Chain Strategy 3

**Electives**
Complete 12 semester hours from the following: 12

SCHM 6211 Logistics and Transportation Management

SCHM 6212 Executive Roundtable in Supply Chain Management

SCHM 6214 Sourcing and Procurement

SCHM 6215 Supply Chain Analytics

SCHM 6216 Market-Driven Supply Chains

SCHM 6218 Offshore Outsourcing

SCHM 6221 Sustainability and Supply Chain Management

SCHM 6222 Managing Emerging Issues in Supply Chain Management
**Program Credit/GPA Requirements**

60 total semester hours required  
Minimum 3.00 GPA required

**Business Administration, MBA—Evening/Part-Time Program**

The flexibility of D’Amore-McKim’s part-time MBA program allows students to complete their degree in as little as two or as long as seven years. Students can commit to courses just one night a week or accelerate their studies by taking multiple classes that fit individual schedules, including classes online and on Saturdays.

Beyond building a strong foundation of management and leadership skills, students can choose a concentration that meets their specific career objectives, such as marketing, corporate finance, investments, or supply chain management.

Earning an MBA from the D’Amore-McKim School of Business can help you build a strong peer-to-peer and alumni network to support you as an MBA student, in your current job, and throughout your career. Learn more about the student and alumni experience [here](http://www.damore-mckim.northeastern.edu/academic-programs/graduate-programs/mba/part-time/student-experiences).

**Program Requirements**

Complete all courses and requirements listed below unless otherwise indicated.

**Required Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 6200</td>
<td>Financial Reporting and Managerial Decision Making</td>
<td>3</td>
</tr>
<tr>
<td>ACCT 6201</td>
<td>Financial Reporting and Managerial Decision Making</td>
<td>1.5</td>
</tr>
<tr>
<td>HRMG 6200</td>
<td>Managing People and Organizations</td>
<td>3</td>
</tr>
<tr>
<td>INTB 6200</td>
<td>Managing the Global Enterprise</td>
<td>3</td>
</tr>
<tr>
<td>MGSC 6204</td>
<td>Managing Information Resources</td>
<td>1.5</td>
</tr>
<tr>
<td>SCHM 6210</td>
<td>Supply Chain Management</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 6200</td>
<td>Creating and Sustaining Customer Markets</td>
<td>3</td>
</tr>
<tr>
<td>MECN 6200</td>
<td>Global Competition and Market Dominance</td>
<td>3</td>
</tr>
<tr>
<td>FINA 6200</td>
<td>Value Creation through Financial Decision Making</td>
<td>3</td>
</tr>
<tr>
<td>MGSC 6200</td>
<td>Information Analysis</td>
<td>3</td>
</tr>
<tr>
<td>STRT 6200</td>
<td>Strategic Decision Making in a Changing Environment</td>
<td>3</td>
</tr>
<tr>
<td>ENTR 6200</td>
<td>Enterprise Growth and Innovation</td>
<td>3</td>
</tr>
</tbody>
</table>

**Electives**

Note: students may opt to take an additional concentration in lieu of elective coursework

**Concentration Options**

This major requires a concentration. Complete one of the following concentrations:

- Corporate finance (p. 70)
- Corporate renewal (p. 71)
- Entrepreneurship (p. 71)
- Healthcare management (p. 71)
- International business (p. 71)
- Investments (p. 71)
- Marketing (p. 70)
- Mutual fund management (p. 72)
- Supply chain management (p. 70)
- Technical entrepreneurship (p. 71)

Consult your college administrator for more information.

**CONCENTRATION IN CORPORATE FINANCE**

**Required Course Work**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>FINA 6205</td>
<td>Financial Strategy</td>
<td>3</td>
</tr>
<tr>
<td>FINA 6200</td>
<td>Value Creation through Financial Decision Making</td>
<td>3</td>
</tr>
</tbody>
</table>

**Restricted Electives**

Complete two of the following: 6

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>FINA 6204</td>
<td>International Finance Management</td>
</tr>
<tr>
<td>FINA 6213</td>
<td>Investment Banking</td>
</tr>
<tr>
<td>FINA 6214</td>
<td>Mergers and Acquisitions</td>
</tr>
<tr>
<td>FINA 6215</td>
<td>Business Turnarounds</td>
</tr>
<tr>
<td>FINA 6216</td>
<td>Valuation and Value Creation</td>
</tr>
<tr>
<td>FINA 6221</td>
<td>Entrepreneurial Finance</td>
</tr>
<tr>
<td>FINA 6222</td>
<td>Risk Management and Insurance</td>
</tr>
<tr>
<td>FINA 6260</td>
<td>Entrepreneurial Finance, Innovation Valuation, and Private Equity</td>
</tr>
</tbody>
</table>

**CONCENTRATION IN MARKETING**

**Required Course Work**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MKTG 6200</td>
<td>Creating and Sustaining Customer Markets</td>
<td>3</td>
</tr>
</tbody>
</table>

**Restricted Electives**

Complete three of the following: 9

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>MKTG 6210</td>
<td>Marketing Research</td>
</tr>
<tr>
<td>MKTG 6212</td>
<td>International Marketing</td>
</tr>
<tr>
<td>MKTG 6214</td>
<td>New Product Development</td>
</tr>
<tr>
<td>MKTG 6216</td>
<td>Market Focused Strategy</td>
</tr>
<tr>
<td>MKTG 6218</td>
<td>Marketing in Service Sector</td>
</tr>
<tr>
<td>MKTG 6222</td>
<td>Digital Marketing</td>
</tr>
<tr>
<td>MKTG 6223</td>
<td>Brand and Advertising Management</td>
</tr>
<tr>
<td>MKTG 6224</td>
<td>B2B and Strategic Sales</td>
</tr>
<tr>
<td>MKTG 6226</td>
<td>Consumer Behavior</td>
</tr>
</tbody>
</table>

**CONCENTRATION IN SUPPLY CHAIN MANAGEMENT**

**Restricted Electives**

Complete three of the following: 9

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>MKTG 6220</td>
<td>Creating and Sustaining Customer Markets</td>
</tr>
<tr>
<td>MKTG 6212</td>
<td>International Marketing</td>
</tr>
<tr>
<td>MKTG 6214</td>
<td>New Product Development</td>
</tr>
<tr>
<td>MKTG 6216</td>
<td>Market Focused Strategy</td>
</tr>
<tr>
<td>MKTG 6218</td>
<td>Marketing in Service Sector</td>
</tr>
<tr>
<td>MKTG 6222</td>
<td>Digital Marketing</td>
</tr>
<tr>
<td>MKTG 6223</td>
<td>Brand and Advertising Management</td>
</tr>
<tr>
<td>MKTG 6224</td>
<td>B2B and Strategic Sales</td>
</tr>
<tr>
<td>MKTG 6226</td>
<td>Consumer Behavior</td>
</tr>
<tr>
<td>MKTG 6260</td>
<td>Special Topics in Marketing</td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Title</td>
</tr>
<tr>
<td>-------------</td>
<td>-------------------------------------------------------------</td>
</tr>
<tr>
<td>SCHM 6211</td>
<td>Logistics and Transportation Management</td>
</tr>
<tr>
<td>SCHM 6212</td>
<td>Executive Roundtable in Supply Chain Management</td>
</tr>
<tr>
<td>or SCHM 6222</td>
<td>Managing Emerging Issues in Supply Chain Management</td>
</tr>
<tr>
<td>SCHM 6213</td>
<td>Global Supply Chain Strategy</td>
</tr>
<tr>
<td>SCHM 6214</td>
<td>Sourcing and Procurement</td>
</tr>
<tr>
<td>SCHM 6215</td>
<td>Supply Chain Analytics</td>
</tr>
<tr>
<td>SCHM 6217</td>
<td>Sustainability and Supply Chain Management</td>
</tr>
<tr>
<td>SCHM 6223</td>
<td>Managing Healthcare Supply Chain Operations</td>
</tr>
<tr>
<td>SCHM 6224</td>
<td>Demand Planning and Forecasting</td>
</tr>
<tr>
<td>HINF 5105</td>
<td>The American Healthcare System</td>
</tr>
<tr>
<td>STRT 6220</td>
<td>Strategic Management for Healthcare Organizations</td>
</tr>
<tr>
<td>HRMG 6220</td>
<td>Health Organization Management</td>
</tr>
<tr>
<td>PHTH 5234</td>
<td>Economic Perspectives on Health Policy</td>
</tr>
<tr>
<td>PHTH 5232</td>
<td>Evaluating Healthcare Quality</td>
</tr>
<tr>
<td>HINF 5101</td>
<td>Introduction to Health Informatics and Health Information Systems</td>
</tr>
<tr>
<td>SCHM 6223</td>
<td>Managing Healthcare Supply Chain Operations</td>
</tr>
<tr>
<td>FINA 6200</td>
<td>Value Creation through Financial Decision Making</td>
</tr>
<tr>
<td>FINA 6203</td>
<td>Investment Analysis</td>
</tr>
<tr>
<td>FINA 6211</td>
<td>Financial Risk Management</td>
</tr>
<tr>
<td>FINA 6212</td>
<td>Fixed Income Securities and Risk</td>
</tr>
<tr>
<td>FINA 6213</td>
<td>Investment Banking</td>
</tr>
<tr>
<td>FINA 6217</td>
<td>Real Estate Finance and Investment</td>
</tr>
<tr>
<td>FINA 6218</td>
<td>Personal Financial Planning</td>
</tr>
<tr>
<td>FINA 6219</td>
<td>Portfolio Management</td>
</tr>
<tr>
<td>FINA 6222</td>
<td>Risk Management and Insurance</td>
</tr>
<tr>
<td>FINA 6292</td>
<td>Advanced Topics in Finance</td>
</tr>
<tr>
<td>FINA 6216</td>
<td>Valuation and Value Creation</td>
</tr>
<tr>
<td>HRMG 6212</td>
<td>Creating an Innovative Organization</td>
</tr>
<tr>
<td>HRMG 6213</td>
<td>Leadership</td>
</tr>
<tr>
<td>HRMG 6218</td>
<td>Great Companies</td>
</tr>
<tr>
<td>MGMT 6210</td>
<td>Law for Managers and Entrepreneurs</td>
</tr>
<tr>
<td>MGMT 6214</td>
<td>Negotiations</td>
</tr>
<tr>
<td>MKTG 6216</td>
<td>Market Focused Strategy</td>
</tr>
<tr>
<td>INTB 6200</td>
<td>Managing the Global Enterprise</td>
</tr>
<tr>
<td>INTB 6212</td>
<td>Cultural Aspects of International Business</td>
</tr>
<tr>
<td>ENTR 6225</td>
<td>Corporate Entrepreneurship through Global Growth, Acquisitions, and Alliances</td>
</tr>
<tr>
<td>FINA 6204</td>
<td>International Finance Management</td>
</tr>
<tr>
<td>INTB 6217</td>
<td>Creating Sustainable Competitive Advantage through Global Innovation</td>
</tr>
<tr>
<td>INTB 6226</td>
<td>Becoming a Global Leader</td>
</tr>
<tr>
<td>INTB 6230</td>
<td>International Field Study</td>
</tr>
<tr>
<td>INTB 6232</td>
<td>Doing Business in Emerging Markets</td>
</tr>
<tr>
<td>MKTG 6212</td>
<td>International Marketing</td>
</tr>
<tr>
<td>SCHM 6213</td>
<td>Global Supply Chain Strategy</td>
</tr>
<tr>
<td>ENTR 6200</td>
<td>Enterprise Growth and Innovation</td>
</tr>
<tr>
<td>ENTR 6212</td>
<td>Business Planning for New Ventures</td>
</tr>
<tr>
<td>ENTR 6214</td>
<td>Social Enterprise</td>
</tr>
<tr>
<td>ENTR 6218</td>
<td>Business Model Design and Innovation</td>
</tr>
<tr>
<td>ENTR 6219</td>
<td>Financing Ventures from Early Stage to Exit</td>
</tr>
<tr>
<td>ENTR 6220</td>
<td>Family Business Leadership and Governance</td>
</tr>
<tr>
<td>ENTR 6222</td>
<td>Competing in Dynamic, Innovation-Driven Markets</td>
</tr>
<tr>
<td>ENTR 6223</td>
<td>Cross-Cultural Innovation Management</td>
</tr>
<tr>
<td>ENTR 6225</td>
<td>Corporate Entrepreneurship through Global Growth, Acquisitions, and Alliances</td>
</tr>
<tr>
<td>ENTR 6293</td>
<td>Design Thinking for Market-Driven Innovation</td>
</tr>
<tr>
<td>MGMT 6210</td>
<td>Law for Managers and Entrepreneurs</td>
</tr>
<tr>
<td>MKTG 6214</td>
<td>New Product Development</td>
</tr>
<tr>
<td>TECE 6300</td>
<td>Managing a Technology-Based Business</td>
</tr>
<tr>
<td>ENTR 6200</td>
<td>Enterprise Growth and Innovation</td>
</tr>
</tbody>
</table>

**CONCENTRATION IN INTERNATIONAL BUSINESS**

**Required Course Work**
- INTB 6200  Managing the Global Enterprise  3
- 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 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 CORPORATE RENEWAL**

**Required Course Work**
- FINA 6200  Value Creation through Financial Decision Making  3

**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 6223  Cross-Cultural Innovation Management
  - ENTR 6225  Corporate Entrepreneurship through Global Growth, Acquisitions, and Alliances
  - ENTR 6293  Design Thinking for Market-Driven Innovation
  - MGMT 6210  Law for Managers and Entrepreneurs
  - MKTG 6214  New Product Development
  - TECE 6300  Managing a Technology-Based Business

**CONCENTRATION IN TECHNICAL ENTREPRENEURSHIP**

**Required Course Work**
- ENTR 6200  Enterprise Growth and Innovation  3

**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
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENTR 6212</td>
<td>Business Planning for New Ventures</td>
</tr>
<tr>
<td>ENTR 6222</td>
<td>Competing in Dynamic, Innovation-Driven Markets</td>
</tr>
<tr>
<td>FINA 6260</td>
<td>Entrepreneurial Finance, Innovation Valuation, and Private Equity</td>
</tr>
<tr>
<td>TECE 6222</td>
<td>Emerging and Disruptive Technologies</td>
</tr>
<tr>
<td>TECE 6240</td>
<td>Finance For Technology-Based Entrepreneurial Firms</td>
</tr>
<tr>
<td>TECE 6300</td>
<td>Managing a Technology-Based Business</td>
</tr>
<tr>
<td>TECE 6340</td>
<td>The Technical Entrepreneur as Leader</td>
</tr>
</tbody>
</table>

**CONCENTRATION IN MUTUAL FUND MANAGEMENT**

**Required Course Work**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>FINA 6200</td>
<td>Value Creation through Financial Decision Making</td>
</tr>
<tr>
<td>FINA 6203</td>
<td>Investment Analysis</td>
</tr>
<tr>
<td>FINA 6219</td>
<td>Portfolio Management</td>
</tr>
</tbody>
</table>

**Restricted Elective**

Complete 3 semester hours of restricted electives. At least one credit must be from FINA 6361.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>FINA 6360</td>
<td>Fund Management for Analysts</td>
</tr>
<tr>
<td>FINA 6361</td>
<td>Fund Management for Managers</td>
</tr>
</tbody>
</table>

**Electives**

**Marketing**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>MKTG 6210</td>
<td>Marketing Research</td>
</tr>
<tr>
<td>MKTG 6212</td>
<td>International Marketing</td>
</tr>
<tr>
<td>MKTG 6214</td>
<td>New Product Development</td>
</tr>
<tr>
<td>MKTG 6216</td>
<td>Market Focused Strategy</td>
</tr>
<tr>
<td>MKTG 6218</td>
<td>Marketing in Service Sector</td>
</tr>
<tr>
<td>MKTG 6222</td>
<td>Digital Marketing</td>
</tr>
<tr>
<td>MKTG 6223</td>
<td>Brand and Advertising Management</td>
</tr>
<tr>
<td>MKTG 6224</td>
<td>B2B and Strategic Sales</td>
</tr>
<tr>
<td>MKTG 6226</td>
<td>Consumer Behavior</td>
</tr>
<tr>
<td>MKTG 6260</td>
<td>Special Topics in Marketing</td>
</tr>
</tbody>
</table>

**Finance Group A**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>FINA 6203</td>
<td>Investment Analysis</td>
</tr>
<tr>
<td>FINA 6204</td>
<td>International Finance Management</td>
</tr>
<tr>
<td>FINA 6211</td>
<td>Financial Risk Management</td>
</tr>
<tr>
<td>FINA 6212</td>
<td>Fixed Income Securities and Risk</td>
</tr>
<tr>
<td>FINA 6213</td>
<td>Investment Banking</td>
</tr>
<tr>
<td>FINA 6217</td>
<td>Real Estate Finance and Investment</td>
</tr>
<tr>
<td>FINA 6218</td>
<td>Personal Financial Planning</td>
</tr>
<tr>
<td>FINA 6219</td>
<td>Portfolio Management</td>
</tr>
<tr>
<td>FINA 6222</td>
<td>Risk Management and Insurance</td>
</tr>
</tbody>
</table>

**Finance Group B**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>FINA 6205</td>
<td>Financial Strategy</td>
</tr>
<tr>
<td>FINA 6204</td>
<td>International Finance Management</td>
</tr>
<tr>
<td>FINA 6213</td>
<td>Investment Banking</td>
</tr>
<tr>
<td>FINA 6214</td>
<td>Mergers and Acquisitions</td>
</tr>
<tr>
<td>FINA 6215</td>
<td>Business Turnarounds</td>
</tr>
<tr>
<td>FINA 6216</td>
<td>Valuation and Value Creation</td>
</tr>
<tr>
<td>FINA 6221</td>
<td>Entrepreneurial Finance</td>
</tr>
<tr>
<td>FINA 6222</td>
<td>Risk Management and Insurance</td>
</tr>
<tr>
<td>FINA 6260</td>
<td>Entrepreneurial Finance, Innovation Valuation, and Private Equity</td>
</tr>
</tbody>
</table>

**Supply Chain Management**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCHM 6211</td>
<td>Logistics and Transportation Management</td>
</tr>
<tr>
<td>SCHM 6212</td>
<td>Executive Roundtable in Supply Chain Management</td>
</tr>
<tr>
<td>or SCHM 6222</td>
<td>Managing Emerging Issues in Supply Chain Management</td>
</tr>
<tr>
<td>SCHM 6213</td>
<td>Global Supply Chain Strategy</td>
</tr>
<tr>
<td>SCHM 6214</td>
<td>Sourcing and Procurement</td>
</tr>
<tr>
<td>SCHM 6215</td>
<td>Supply Chain Analytics</td>
</tr>
<tr>
<td>SCHM 6221</td>
<td>Sustainability and Supply Chain Management</td>
</tr>
<tr>
<td>SCHM 6223</td>
<td>Managing Healthcare Supply Chain Operations</td>
</tr>
</tbody>
</table>

**Entrepreneurship**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENTR 6212</td>
<td>Business Planning for New Ventures</td>
</tr>
<tr>
<td>ENTR 6214</td>
<td>Social Enterprise</td>
</tr>
<tr>
<td>ENTR 6218</td>
<td>Business Model Design and Innovation</td>
</tr>
<tr>
<td>ENTR 6219</td>
<td>Financing Ventures from Early Stage to Exit</td>
</tr>
<tr>
<td>ENTR 6220</td>
<td>Family Business Leadership and Governance</td>
</tr>
<tr>
<td>ENTR 6222</td>
<td>Competing in Dynamic, Innovation-Driven Markets</td>
</tr>
<tr>
<td>ENTR 6223</td>
<td>Cross-Cultural Innovation Management</td>
</tr>
<tr>
<td>ENTR 6293</td>
<td>Design Thinking for Market-Driven Innovation</td>
</tr>
<tr>
<td>MKTG 6210</td>
<td>Law for Managers and Entrepreneurs</td>
</tr>
<tr>
<td>MKTG 6214</td>
<td>New Product Development</td>
</tr>
<tr>
<td>TECE 6300</td>
<td>Managing a Technology-Based Business</td>
</tr>
</tbody>
</table>

**Technical Entrepreneurship**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>TECE 6222</td>
<td>Emerging and Disruptive Technologies</td>
</tr>
<tr>
<td>TECE 6230</td>
<td>Entrepreneurial Marketing and Selling</td>
</tr>
<tr>
<td>TECE 6250</td>
<td>Lean Design and Development</td>
</tr>
<tr>
<td>TECE 6300</td>
<td>Managing a Technology-Based Business</td>
</tr>
<tr>
<td>TECE 6340</td>
<td>The Technical Entrepreneur as Leader</td>
</tr>
<tr>
<td>ENTR 6212</td>
<td>Business Planning for New Ventures</td>
</tr>
<tr>
<td>ENTR 6222</td>
<td>Competing in Dynamic, Innovation-Driven Markets</td>
</tr>
<tr>
<td>FINA 6260</td>
<td>Entrepreneurial Finance, Innovation Valuation, and Private Equity</td>
</tr>
</tbody>
</table>

**Healthcare**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>HINF 5105</td>
<td>The American Healthcare System</td>
</tr>
<tr>
<td>HRMG 6220</td>
<td>Health Organization Management</td>
</tr>
<tr>
<td>STRT 6220</td>
<td>Strategic Management for Healthcare Organizations</td>
</tr>
<tr>
<td>HINF 5101</td>
<td>Introduction to Health Informatics and Health Information Systems</td>
</tr>
<tr>
<td>PHTH 5232</td>
<td>Evaluating Healthcare Quality</td>
</tr>
<tr>
<td>PHTH 5234</td>
<td>Economic Perspectives on Health Policy</td>
</tr>
</tbody>
</table>
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
HRMG 6218  Great Companies
MGMT 6214  Negotiations
MKTG 6214  New Product Development
MKTG 6216  Market Focused Strategy

Program Credit/GPA Requirements
60 total semester hours required
Minimum 3.00 GPA required

Business Administration, MBA—Online Program
The Northeastern University Online MBA (OMBA) is a fully 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 OMBA 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.

Required Course Work

Accounting
ACCT 6272  Financial Statement Preparation and Analysis 2.25
ACCT 6273  Identifying Strategic Implications in Accounting Data 2.25

Management
HRMG 6200  Managing People and Organizations 3
INTB 6200  Managing the Global Enterprise 3
MGSC 6204  Managing Information Resources 1.5

MGSC 6206  Management of Service and Manufacturing Operations 3
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
Choose 15 semester hours from the following subject areas: 15
ENTR, FINA, HRMG, INTB, MKTG, MGMT, MGSC, SCHM

Concentration Options
• Finance (p. 73)
• Healthcare management (p. 73)
• High-technology management (p. 73)
• Innovation entrepreneurship (p. 74)
• International management (p. 74)
• Marketing (p. 74)
• Operations and supply chain management (p. 74)
• Sustainability (p. 74)

CONCENTRATION IN FINANCE
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
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
Choose 9 semester hours from the following: 9
**CONCENTRATION IN INNOVATION ENTREPRENEURSHIP**
Choose 9 semester hours from the following:

- 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**
Choose 9 semester hours from the following:

- 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**
Choose 9 semester hours from the following:

- 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 6225 Sustainability and Innovation in Product Design

**CONCENTRATION IN OPERATIONS AND SUPPLY CHAIN MANAGEMENT**
Choose 9 semester hours from the following:

- SCHM 6210 Supply Chain Management
- SCHM 6211 Logistics and Transportation Management
- SCHM 6213 Global Supply Chain Strategy
- SCHM 6214 Sourcing and Procurement
- SCHM 6220 Growing and Protecting Business Value through the Supply Chain
- SCHM 6221 Sustainability and Supply Chain Management

**CONCENTRATION IN SUSTAINABILITY**
Choose 9 semester hours from the following:

- MECN 6205 Sustainability and the Economics of Markets
- MGMT 6225 Sustainability and Leadership
- MGMT 6226 Sustainability and the Business Environment
- MKTG 6225 Sustainability and Innovation in Product Design
- SCHM 6221 Sustainability and Supply Chain Management

**Program Credit/GPA Requirements**
50 total semester hours required
Minimum 3.000 GPA required

**Dual Degrees**
With an MSA/MBA from Northeastern, you can earn two degrees—an Master of Science in Accounting (MS) and a Master of Business Administration (MBA)—in just 15 months. This program is designed for liberal arts, nonaccounting majors. The program includes a 3-month, paid internship that may lead to full-time placement in public accounting upon completion.

The Master of Science in Finance/MBA (MSF/MBA) program is open to students admitted to the full-time MBA program, the evening MBA program, the online MBA program, or the MS in finance program.

Northeastern’s School of Nursing and D’Amore-McKim School of Business offer the MS/MBA in nursing program, linking graduate-level management education with specific clinical and organizational issues relevant to nurse managers. The MS/MBA program seeks to provide students with the knowledge, skills, and attitudes necessary to understand, shape, and respond to the dynamic forces at play in today’s healthcare environment.

The JD/MBA is a powerful combination that seeks to equip candidates to operate with equal facility in the increasingly interdependent legal and business spheres. Northeastern University offers an accelerated 45-month program in which students concurrently earn an MBA through the D’Amore-McKim School of Business and a JD through the School of Law. Northeastern’s dynamic co-op program gives students hands-on experience in combining the legal and business worlds.

**Programs**
- MS/MBA—Nursing and Business Administration (p. 74)
- MSA/MBA—Professional Accounting Program (p. 74)
- MSF/MBA—Full-Time Program (p. 75)
- MSF/MBA—Evening/Part-Time Program (p. 76)
- MSF/MBA—Online Program (p. 77)
- JD/MBA (p. 77)

**MS/MBA—Nursing and Business Administration**
See Bouvé College of Health Sciences Nursing MS/MBA program (p. 242) for curriculum information.

**MSA/MBA—Professional Accounting Program**
With an MSA/MBA from the D’Amore-McKim School of Business, you earn two degrees—an MS in Accounting and an MBA—in just fifteen
months. Our full-time program is specifically designed to get liberal arts and nonaccounting majors CPA ready.

**Program Requirements**

Complete all courses and requirements listed below unless otherwise indicated.

**Program Requirements**

**TERM 1—SUMMER A**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 6220</td>
<td>Corporate Financial Reporting and Decision Making</td>
<td>3</td>
</tr>
</tbody>
</table>

**Management**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HRMG 6200</td>
<td>Managing People and Organizations</td>
<td>3</td>
</tr>
</tbody>
</table>

**TERM 1—SUMMER B**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 6221</td>
<td>Corporate Financial Reporting and Decision Making</td>
<td>6</td>
</tr>
</tbody>
</table>

**Global Competition**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MECN 6200</td>
<td>Global Competition and Market Dominance</td>
<td>3</td>
</tr>
</tbody>
</table>

**Information Analysis**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MGSC 6200</td>
<td>Information Analysis</td>
<td>3</td>
</tr>
</tbody>
</table>

**Summer Term GPA Requirement**

A GPA of 2.500 or higher is required at the end of term 1.

**Term 2—Fall**

**Corporate Government**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 6217</td>
<td>Corporate Governance, Ethics, and Financial Reporting</td>
<td>3</td>
</tr>
<tr>
<td>ACCT 6222</td>
<td>Corporate and Governmental/Nonprofit Financial Reporting and Decision Making</td>
<td>6</td>
</tr>
</tbody>
</table>

**Audit**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 6223</td>
<td>Audit and Other Assurance Services</td>
<td>6</td>
</tr>
</tbody>
</table>

**Taxation**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 6224</td>
<td>Taxation of Individuals and Business Entities</td>
<td>6</td>
</tr>
</tbody>
</table>

**Information Systems**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MGSC 6201</td>
<td>Information Systems and Technology</td>
<td>3</td>
</tr>
</tbody>
</table>

**Fall Term GPA Requirement**

A GPA of 2.670 or higher is required at the end of term 2.

**TERM 3—SPRING**

**Internship**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUSN 6964</td>
<td>Co-op Work Experience</td>
<td>0</td>
</tr>
</tbody>
</table>

**Cost Management**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 6226</td>
<td>Strategic Cost Management</td>
<td>3</td>
</tr>
</tbody>
</table>

**Service and Manufacturing Operations**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCHM 6210</td>
<td>Supply Chain Management</td>
<td>3</td>
</tr>
</tbody>
</table>

**Spring Term GPA Requirement**

A GPA of 2.830 or higher is required at the end of term 3.

**TERM 4—SUMMER A**

**Accounting**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 6227</td>
<td>Accounting for Business Combinations</td>
<td>3</td>
</tr>
</tbody>
</table>

**Entrepreneurship**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENTR 6211</td>
<td>Entrepreneurship: Services and Retail Business Creation</td>
<td>3</td>
</tr>
</tbody>
</table>

**Financial Decision Making**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>FINA 6200</td>
<td>Value Creation through Financial Decision Making</td>
<td>3</td>
</tr>
</tbody>
</table>

**Customer Markets**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MKTG 6200</td>
<td>Creating and Sustaining Customer Markets</td>
<td>3</td>
</tr>
</tbody>
</table>

**TERM 4—SUMMER B**

**Accounting**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 6228</td>
<td>Contemporary Issues in Accounting Theory</td>
<td>3</td>
</tr>
</tbody>
</table>

**Business Law and Ethics**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MGMT 6211</td>
<td>Business Law and Professional Ethics</td>
<td>3</td>
</tr>
</tbody>
</table>

**Global Enterprise**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTB 6200</td>
<td>Managing the Global Enterprise</td>
<td>3</td>
</tr>
</tbody>
</table>

**Strategic Decision Making**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>STRT 6200</td>
<td>Strategic Decision Making in a Changing Environment</td>
<td>3</td>
</tr>
</tbody>
</table>

**Program Credit/GPA Requirements**

72 total semester hours required
Minimum 3.000 GPA required

**MSF/MBA—Full-Time Program**

Students may be admitted to the MSF/MBA program at the point of their initial enrollment in the D’Amore-McKim School of Business or may petition to change into the MSF/MBA program from either the MBA or the MSF programs. The MSF/MBA program requires 72 semester hours vs. 90 semester hours to earn the two degrees separately (MBA requires 60 semester hours, MSF requires 30 semester hours). Once either the MBA or the MSF has been awarded, it is not possible to apply for the joint degree.

The MSF/MBA program requirement of 72 semester hours consists of all the required courses in the full-time MBA program or the part-time MBA program, four of the six required courses in the MSF program, and electives.

Students may receive waiver and/or transfer credit of up to 20 semester hours (transfer credit is limited to 9 semester hours). A grade-point average of 3.000 is required for graduation.

**Program Requirements**

Complete all courses and requirements listed below unless otherwise indicated.

**Term 1—Fall**

**Management**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUSN 6200</td>
<td>Career Management</td>
<td>0</td>
</tr>
<tr>
<td>MGSC 6205</td>
<td>Management of Information Resources</td>
<td>2</td>
</tr>
<tr>
<td>BUSN 6950</td>
<td>MBA Skills Workshop</td>
<td>0</td>
</tr>
</tbody>
</table>

**Financial Reporting**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 6208</td>
<td>Financial Reporting and Managerial Decision Making</td>
<td>4</td>
</tr>
</tbody>
</table>

**Marketing**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MKTG 6208</td>
<td>Marketing and Customer Value</td>
<td>4</td>
</tr>
</tbody>
</table>

**Economics**

Program Requirements
### MSF/MBA—Evening/Part-Time Program

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MECN 6208</td>
<td>Economics for Managerial Decision Making</td>
<td>2</td>
</tr>
<tr>
<td>HRMG 6208</td>
<td>Effective Organizational and Human Behavior</td>
<td>3</td>
</tr>
</tbody>
</table>

#### Human Resources

**Term 1 GPA Requirement**

A GPA of 3.000 or higher is required at the end of term 1.

#### Term 2—Spring

**Analysis**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MGSC 6207</td>
<td>Data Analysis for Decision Making</td>
<td>2</td>
</tr>
<tr>
<td>STRT 6208</td>
<td>Strategic Decisions for Growth</td>
<td>3</td>
</tr>
</tbody>
</table>

**Management**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUSN 6200</td>
<td>Career Management</td>
<td>0</td>
</tr>
<tr>
<td>ENTR 6208</td>
<td>Innovation and Enterprise Growth</td>
<td>2</td>
</tr>
<tr>
<td>FINA 6208</td>
<td>Financial Management for Value Creation</td>
<td>4</td>
</tr>
<tr>
<td>SCHM 6200</td>
<td>Supply Chain and Operations Management</td>
<td>4</td>
</tr>
</tbody>
</table>

**Term 2 GPA Requirement**

A GPA of 3.000 or higher is required at the end of term 2.

### Additional Required Core Courses

#### Finance Core Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>FINA 6203</td>
<td>Investment Analysis</td>
<td>3</td>
</tr>
<tr>
<td>FINA 6204</td>
<td>International Finance Management</td>
<td>3</td>
</tr>
<tr>
<td>FINA 6205</td>
<td>Financial Strategy</td>
<td>3</td>
</tr>
<tr>
<td>FINA 6206</td>
<td>Finance Seminar</td>
<td>3</td>
</tr>
</tbody>
</table>

#### Global Project Course

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTB 6238</td>
<td>Global Project</td>
<td>3</td>
</tr>
</tbody>
</table>

#### Management

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTB 6208</td>
<td>Global Management</td>
<td>3</td>
</tr>
</tbody>
</table>

### Electives

#### Finance Electives

Complete 12 semester hours of FINA courses. 12

#### Business Electives

Complete 12 semester hours in the following subject areas. Note that these courses may be finance courses: ACCT, ENTR, FINA, HRMG, INTB, MECN, MKTG, MGMT, SCHM, STRT, and TECE 12

### Program Credit/GPA Requirements

72 total semester hours required
Minimum 3.000 GPA required

---

The MSF/MBA program requirement of 72 credits consists of all the required courses in the part-time MBA program, four of the six required courses in the MSF program, and electives.

Students may receive waiver and/or transfer credit of up to 20 credits (transfer credit is limited to 9 credits). A grade-point average of 3.000 is required for graduation.

### Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

#### Required Course Work

**Accounting**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 6200</td>
<td>Financial Reporting and Managerial Decision Making 1</td>
<td>3</td>
</tr>
<tr>
<td>ACCT 6201</td>
<td>Financial Reporting and Managerial Decision Making 2</td>
<td>1.5</td>
</tr>
</tbody>
</table>

**Management**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HRMG 6200</td>
<td>Managing People and Organizations</td>
<td>3</td>
</tr>
<tr>
<td>INTB 6200</td>
<td>Managing the Global Enterprise</td>
<td>3</td>
</tr>
<tr>
<td>MGSC 6204</td>
<td>Managing Information Resources</td>
<td>1.5</td>
</tr>
<tr>
<td>SCHM 6210</td>
<td>Supply Chain Management</td>
<td>3</td>
</tr>
</tbody>
</table>

**Marketing**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MKTG 6200</td>
<td>Creating and Sustaining Customer Markets</td>
<td>3</td>
</tr>
<tr>
<td>MECN 6200</td>
<td>Global Competition and Market Dominance</td>
<td>3</td>
</tr>
</tbody>
</table>

**Analysis**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>FINA 6200</td>
<td>Value Creation through Financial Decision Making</td>
<td>3</td>
</tr>
<tr>
<td>MGSC 6200</td>
<td>Information Analysis</td>
<td>3</td>
</tr>
<tr>
<td>STRT 6200</td>
<td>Strategic Decisions in a Changing Environment</td>
<td>3</td>
</tr>
</tbody>
</table>

**Entrepreneurship**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENTR 6200</td>
<td>Enterprise Growth and Innovation</td>
<td>3</td>
</tr>
</tbody>
</table>

#### Additional Required Finance Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>FINA 6203</td>
<td>Investment Analysis</td>
<td>3</td>
</tr>
<tr>
<td>FINA 6204</td>
<td>International Finance Management</td>
<td>3</td>
</tr>
<tr>
<td>FINA 6205</td>
<td>Financial Strategy</td>
<td>3</td>
</tr>
<tr>
<td>FINA 6206</td>
<td>Finance Seminar</td>
<td>3</td>
</tr>
</tbody>
</table>

### Electives

**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:

ACCT, ENTR, FINA, HRMG, INTB, MECN, MKTG, MGMT, SCHM, and STRT 15

### Program Credit/GPA Requirements

72 total semester hours required
Minimum 3.000 GPA required

---

Students may be admitted to the MSF/MBA program at the point of their initial enrollment in the D’Amore-McKim School of Business or may petition to change into the MSF/MBA program from either the MBA or the MSF programs. The MSF/MBA program requires 72 credits vs. 90 to earn the two degrees separately (MBA requires 60 credits and MSF requires 30 credits). Once either the MBA or the MSF has been awarded, it is not possible to apply for the joint degree.
MSF/MBA—Online Program

Our dual Master of Science in Finance/MBA (MSF/MBA) program, offered in a convenient online format, 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 program (OMBA/OMSF) is available to second-year online MBA students who have achieved a minimum of a 3.00 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). Students may apply to the dual program at any point during their second year. The OMBA/OMSF can be completed in as little as three years. The dual degree is listed on both the transcript and the diploma.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Course Work

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 6272</td>
<td>Financial Statement Preparation and Analysis</td>
<td>2.25</td>
</tr>
<tr>
<td>ACCT 6273</td>
<td>Identifying Strategic Implications in Accounting Data</td>
<td>2.25</td>
</tr>
<tr>
<td>HRMG 6200</td>
<td>Managing People and Organizations</td>
<td>3</td>
</tr>
<tr>
<td>INTB 6200</td>
<td>Managing the Global Enterprise</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 6213</td>
<td>Managing Ethics in the Workplace and Marketplace</td>
<td>2</td>
</tr>
<tr>
<td>MGSC 6204</td>
<td>Managing Information Resources</td>
<td>1.5</td>
</tr>
<tr>
<td>MGSC 6206</td>
<td>Management of Service and Manufacturing Operations</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 6200</td>
<td>Creating and Sustaining Customer Markets</td>
<td>3</td>
</tr>
<tr>
<td>MECN 6200</td>
<td>Global Competition and Market Dominance</td>
<td>3</td>
</tr>
<tr>
<td>FINA 6200</td>
<td>Value Creation through Financial Decision Making</td>
<td>3</td>
</tr>
<tr>
<td>FINA 6203</td>
<td>Investment Analysis</td>
<td>3</td>
</tr>
<tr>
<td>FINA 6204</td>
<td>International Finance Management</td>
<td>3</td>
</tr>
<tr>
<td>FINA 6205</td>
<td>Financial Strategy</td>
<td>3</td>
</tr>
<tr>
<td>MGSC 6200</td>
<td>Information Analysis</td>
<td>3</td>
</tr>
<tr>
<td>STRT 6200</td>
<td>Strategic Decision Making in a Changing Environment</td>
<td>3</td>
</tr>
<tr>
<td>ENTR 6200</td>
<td>Enterprise Growth and Innovation</td>
<td>3</td>
</tr>
<tr>
<td>FINA 6206</td>
<td>Finance Seminar</td>
<td>3</td>
</tr>
</tbody>
</table>

Electives

Finance Electives

Complete 9 semester hours of finance electives. 9

Business Electives

Complete 6 semester hours in the following subject areas. 6

Note that these courses may include finance courses:

MGSC, ENTR, FINA, HRMG, MKTG, MGMT, SCHM, SUST

Program Credit/GPA Requirements

62 total semester hours required
Minimum 3.000 GPA required

JD/MBA

The JD/MBA program offers students an opportunity to obtain both the JD and MBA degrees in a full-time, four-year course of study, which includes four one-quarter co-op work experiences arranged through the law school co-op office. Starting in the fall term, students are enrolled in the School of Law for a total of three years and the D’Amore-McKim School of Business for one year. 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. 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.

The course work for the MBA year consists of 49 semester credits, comprised of the established program plan for the first two semesters of the full-time MBA program (30 credits) with some changes in the program schedule. During spring semester, students will take one additional 3-credit elective. During summer, students will take Managing the Global Enterprise (INTB 6200), along with 13 credits of MBA electives.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

MBA Program Requirements

Concurrent degree candidates follow a set schedule, as follows:

FALL TERM

Management

MGSC 6205 Management of Information Resources 2

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

SPRING TERM

Analysis

MGSC 6207 Data Analysis for Decision Making 2

STRT 6208 Strategic Decisions for Growth 3

Management

ENTR 6208 Innovation and Enterprise Growth 2

FINA 6208 Financial Management for Value Creation 4

SCHM 6200 Supply Chain and Operations Management 4

Elective

Complete 3 semester hours of course work from the following subject areas:

ACCT, ENTR, FINA, HRMG, INTB, MECN, MKTG, MGMT, SCHM, STRT, and TECE
**SUMMER TERM**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTB 6200</td>
<td>Managing the Global Enterprise</td>
</tr>
</tbody>
</table>

**ELECTIVES**

Complete 13 semester hours from the following subject areas:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT, ENTR, FINA, HRMG, INTB, MECN, MKTG, MGMT, SCHM, STRT, and TECE</td>
<td></td>
</tr>
</tbody>
</table>

**Program Credit/GPA Requirements**

49 total semester hours required
Minimum 3.000 GPA required

---

**Program Requirements**

Complete all courses and requirements listed below unless otherwise indicated.

**Requirements**

**Required Courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 6200 and ACCT 6201</td>
<td>Financial Reporting and Managerial Decision Making 1 and Financial Reporting and Managerial Decision Making 2</td>
</tr>
<tr>
<td>MGSC 6200</td>
<td>Information Analysis</td>
</tr>
<tr>
<td>FINA 6200</td>
<td>Value Creation through Financial Decision Making</td>
</tr>
</tbody>
</table>

**Elective**

Complete one of the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>MGSC 6204</td>
<td>Managing Information Resources</td>
</tr>
<tr>
<td>Any MBA core course titled 6200 (see below):</td>
<td></td>
</tr>
<tr>
<td>HRMG 6200</td>
<td>Managing People and Organizations</td>
</tr>
<tr>
<td>ENTR 6200</td>
<td>Enterprise Growth and Innovation</td>
</tr>
<tr>
<td>INTB 6200</td>
<td>Managing the Global Enterprise</td>
</tr>
<tr>
<td>MKTG 6200</td>
<td>Creating and Sustaining Customer Markets</td>
</tr>
<tr>
<td>MECN 6200</td>
<td>Global Competition and Market Dominance</td>
</tr>
</tbody>
</table>

---

**Accounting and Financial Decision Making—Online Program, Graduate Certificate**

Business professionals are much like businesses themselves—as opportunities emerge and the marketplace evolves, their needs change. And sometimes, the best investment in your future is the one you can make now. D’Amore-McKim’s specialty graduate certificates are the perfect way to learn the specific skills you need to seize a new career opportunity. They’re also a great way to put an educational down payment on longer-term ambitions. Credits earned in this program can transfer into the part-time MBA or other master’s programs at Northeastern (check with advisor).

**Academic Standing/Progress**

Minimum 3.000 GPA required in order to complete certificate program.

**Program Requirements**

Complete all courses and requirements listed below unless otherwise indicated.

**Requirements**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 6272</td>
<td>Financial Statement Preparation and Analysis</td>
</tr>
<tr>
<td>ACCT 6273</td>
<td>Identifying Strategic Implications in Accounting Data</td>
</tr>
</tbody>
</table>
PART-TIME MBA TRACK

Complete one of the following three tracks. Note: The part-time MBA track and the international student track require an additional 3 semester hours.

**Program Requirements**

Complete all courses and requirements listed below unless otherwise indicated.

**Tracks**

Complete one of the following three tracks.

### INTERNATIONAL STUDENT TRACK

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 6201</td>
<td>Financial Reporting and Managerial Decision Making 2</td>
<td>1.5</td>
</tr>
<tr>
<td>FINA 6200</td>
<td>Value Creation through Financial Decision Making 2</td>
<td>3</td>
</tr>
<tr>
<td>HRMG 6200</td>
<td>Managing People and Organizations</td>
<td>3</td>
</tr>
<tr>
<td>MGSC 6200</td>
<td>Information Analysis</td>
<td>3</td>
</tr>
<tr>
<td>MGSC 6204</td>
<td>Managing Information Resources</td>
<td>1.5</td>
</tr>
</tbody>
</table>

**Program Credit/GPA Requirements**

12 total semester hours required

Minimum 3.000 GPA required

---

**Business Administration, Graduate Certificate**

Business professionals are much like businesses themselves—as opportunities emerge and the marketplace evolves, their needs change. And sometimes, the best investment in your future is the one you can make now. D’Amore-McKim’s specially graduate certificates are the perfect way to learn the specific skills you need to seize a new career opportunity. They’re also a great way to put an educational down payment on longer-term ambitions. With the advice of their academic advisors, students tailor their own course of study either within a specific discipline or across disciplines.

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 business courses. You may accelerate the curriculum and complete it in as little as eight months, or take up to three years to finish. You may choose to focus on one area of specialty or gain fundamental business knowledge by enrolling in a variety of courses.

There are three tracks within the Graduate Certificate of Business Administration:

**The part-time MBA track** is for students who are specifically interested in pursuing the part-time MBA upon completion of the certificate program. Upon successful completion of this track, students are eligible to waive the GMAT/GRE requirement for admission into the part-time MBA and part-time MBA/MS finance programs. To be eligible for the GMAT/GRE waiver, one must complete the track with a B or better in each course and earn a minimum cumulative GPA of 3.300.

**The international student** track is an opportunity for international students to study full-time, earning 15 graduate credits over two consecutive semesters. Students must take five core MBA courses as they become available for this particular section and must be enrolled full-time in their first semester of study.

Customize your schedule and **build your own track** by taking any 12 credits within the part-time MBA program assuming you meet prerequisites per course.

**Program Requirements**

Complete all courses and requirements listed below unless otherwise indicated.

**Tracks**

Complete one of the following three tracks.

### PART-TIME MBA TRACK

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 6200</td>
<td>Financial Reporting and Managerial Decision Making 1</td>
<td>3</td>
</tr>
</tbody>
</table>

---

**Business Administration—Online Program, Graduate Certificate**

Business professionals are much like businesses themselves—as opportunities emerge and the marketplace evolves, their needs change. And sometimes, the best investment in your future is the one you can make now. D’Amore-McKim’s Online Graduate Certificate in Business Administration offers a convenient way to learn the specific skills you need to seize a new career opportunity. With the advice of your advisor, you can tailor your own course of study within a specific discipline or across disciplines.

**Academic Standing/Progress**

Minimum 3.000 GPA required in order to complete certificate program.

**Program Requirements**

Complete all courses and requirements listed below unless otherwise indicated.

**Requirements**

Complete 12 semester hours from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>HRMG 6200</td>
<td>Managing People and Organizations</td>
<td>3</td>
</tr>
<tr>
<td>MGSC 6200</td>
<td>Information Analysis</td>
<td>3</td>
</tr>
<tr>
<td>MGSC 6204</td>
<td>Managing Information Resources</td>
<td>3</td>
</tr>
<tr>
<td>HRMG 6200</td>
<td>Managing People and Organizations</td>
<td>3</td>
</tr>
<tr>
<td>FINA 6200</td>
<td>Value Creation through Financial Decision Making</td>
<td>3</td>
</tr>
<tr>
<td>ACCT 6272</td>
<td>Financial Statement Preparation and Analysis</td>
<td>3</td>
</tr>
<tr>
<td>ACCT 6273</td>
<td>Identifying Strategic Implications in Accounting Data</td>
<td>3</td>
</tr>
<tr>
<td>MGSC 6200</td>
<td>Information Analysis</td>
<td>3</td>
</tr>
<tr>
<td>FINA 6203</td>
<td>Investment Analysis</td>
<td>3</td>
</tr>
<tr>
<td>FINA 6204</td>
<td>International Finance Management</td>
<td>3</td>
</tr>
<tr>
<td>FINA 6205</td>
<td>Financial Strategy</td>
<td>3</td>
</tr>
</tbody>
</table>
Corporate Finance—Graduate Certificate

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
MKTG 6225 Sustainability and Innovation in Product Design
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 6210 Supply Chain Management
SCHM 6211 Logistics and Transportation Management
SCHM 6214 Sourcing and Procurement
SCHM 6220 Growing and Protecting Business Value through the Supply Chain
SCHM 6221 Sustainability and Supply Chain Management

Corporate Finance, Graduate Certificate

12 total semester hours required
Minimum 3.000 GPA required

Program Credit/GPA Requirements
Business professionals are much like businesses themselves—as opportunities emerge and the marketplace evolves, their needs change. And sometimes, the best investment in your future is the one you can make now. D’Amore-McKim’s specialty graduate certificates are the perfect way to learn the specific skills you need to seize a new career opportunity. They’re also a great way to put an educational down payment on longer-term ambitions. Credits earned in this program can transfer into the part-time MBA or other master’s programs at Northeastern (check with advisor).

Program Requirements
Complete all courses and requirements listed below unless otherwise indicated.

Required Course
FINA 6205 Financial Strategy 3

Electives
Complete 9 semester hours from the following:
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 6221 Entrepreneurial Finance
FINA 6222 Risk Management and Insurance
FINA 6260 Entrepreneurial Finance, Innovation Valuation, and Private Equity
ACCT 6210 Analyzing Financial Statements to Assess Firm Performance, Strategy, and Value

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

Business professionals are much like businesses themselves—as opportunities emerge and the marketplace evolves, their needs change.
And sometimes, the best investment in your future is the one you can make now. D’Amore-McKim’s specialty graduate certificates are the perfect way to learn the specific skills you need to seize a new career opportunity. They’re also a great way to put an educational down payment on longer-term ambitions. Credits earned in this program can transfer into the part-time online MBA (check with advisor).

**Academic Standing/Progress**
Minimum 3.000 GPA required in order to complete certificate program.

**Program Requirements**
Complete all courses and requirements listed below unless otherwise indicated.

**Requirements**

**Required Course**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>FINA 6205</td>
<td>Financial Strategy</td>
<td>3</td>
</tr>
</tbody>
</table>

**Electives**

Complete 9 semester hours from the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>FINA 6211</td>
<td>Financial Risk Management</td>
<td></td>
</tr>
<tr>
<td>FINA 6213</td>
<td>Investment Banking</td>
<td></td>
</tr>
<tr>
<td>FINA 6214</td>
<td>Mergers and Acquisitions</td>
<td></td>
</tr>
<tr>
<td>FINA 6215</td>
<td>Business Turnarounds</td>
<td></td>
</tr>
<tr>
<td>FINA 6216</td>
<td>Valuation and Value Creation</td>
<td></td>
</tr>
</tbody>
</table>

**Program Credit/GPA Requirements**

12 total semester hours required
Minimum 3.000 GPA required

---

**Corporate Renewal, Graduate Certificate**

Business professionals are much like businesses themselves—as opportunities emerge and the marketplace evolves, their needs change. And sometimes, the best investment in your future is the one you can make now. D’Amore-McKim’s specialty graduate certificates are the perfect way to learn the specific skills you need to seize a new career opportunity. They’re also a great way to put an educational down payment on longer-term ambitions. Credits earned in this program can transfer into the part-time MBA or other master’s programs at Northeastern (check with advisor).

**Program Requirements**

Complete all courses and requirements listed below unless otherwise indicated.

**Requirements**

Complete 12 semester hours from the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENTR 6214</td>
<td>Social Enterprise</td>
<td></td>
</tr>
<tr>
<td>FINA 6215</td>
<td>Business Turnarounds</td>
<td></td>
</tr>
<tr>
<td>FINA 6216</td>
<td>Valuation and Value Creation</td>
<td></td>
</tr>
<tr>
<td>FINA 6221</td>
<td>Entrepreneurial Finance</td>
<td></td>
</tr>
<tr>
<td>HRMG 6212</td>
<td>Creating an Innovative Organization</td>
<td></td>
</tr>
<tr>
<td>HRMG 6218</td>
<td>Great Companies</td>
<td></td>
</tr>
<tr>
<td>MKTG 6214</td>
<td>New Product Development</td>
<td></td>
</tr>
<tr>
<td>MKTG 6216</td>
<td>Market Focused Strategy</td>
<td></td>
</tr>
<tr>
<td>MGMT 6214</td>
<td>Negotiations</td>
<td></td>
</tr>
</tbody>
</table>

**Program Credit/GPA Requirements**

12 total semester hours required
Minimum 3.000 GPA required

---

**Healthcare Administration and Policy, Graduate Certificate**

Business professionals are much like businesses themselves—as opportunities emerge and the marketplace evolves, their needs change. And sometimes, the best investment in your future is the one you can make now. D’Amore-McKim’s specialty graduate certificates are the perfect way to learn the specific skills you need to seize a new career opportunity. They’re also a great way to put an educational down payment on longer-term ambitions. Credits earned in this program can transfer into the part-time MBA or other master’s programs at Northeastern (check with advisor).

**Program Requirements**

Complete all courses and requirements listed below unless otherwise indicated.

**Requirements**

**Required Courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>HINF 5105</td>
<td>The American Healthcare System</td>
<td>3</td>
</tr>
<tr>
<td>STRT 6220</td>
<td>Strategic Management for Healthcare Organizations</td>
<td>3</td>
</tr>
<tr>
<td>HRMG 6220</td>
<td>Health Organization Management</td>
<td>3</td>
</tr>
</tbody>
</table>

**Elective**

Complete 3 semester hours from the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>HINF 5101</td>
<td>Introduction to Health Informatics and Health Information Systems</td>
<td>3</td>
</tr>
</tbody>
</table>
Innovation Management, Graduate Certificate

Program Credit/GPA Requirements
12 total semester hours required
Minimum 3.000 GPA required

Innovation Management, Graduate Certificate

Business professionals are much like businesses themselves—as opportunities emerge and the marketplace evolves, their needs change. And sometimes, the best investment in your future is the one you can make now. D’Amore-McKim’s specialty graduate certificates are the perfect way to learn the specific skills you need to seize a new career opportunity. They’re also a great way to put an educational down payment on longer-term ambitions. Credits earned in this program can transfer into the part-time MBA or other master’s programs at Northeastern (check with advisor).

Program Requirements
Complete all courses and requirements listed below unless otherwise indicated.

Requirements
Required Course
ENTR 6200 Enterprise Growth and Innovation 3

Electives
Complete 9 semester hours from the following:
ENTR 6212 Business Planning for New Ventures
ENTR 6214 Social Enterprise
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
ENTR 6293 Design Thinking for Market-Driven Innovation
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

International Business, Graduate Certificate

Business professionals are much like businesses themselves—as opportunities emerge and the marketplace evolves, their needs change. And sometimes, the best investment in your future is the one you can make now. D’Amore-McKim’s specialty graduate certificates are the perfect way to learn the specific skills you need to seize a new career opportunity. They’re also a great way to put an educational down payment on longer-term ambitions. Credits earned in this program can transfer into the part-time MBA or other master’s programs at Northeastern (check with advisor).

Program Requirements
Complete all courses and requirements listed below unless otherwise indicated.

Requirements
Required Courses
INTB 6200 Managing the Global Enterprise 3
INTB 6212 Cultural Aspects of International Business 3

Electives
Complete 6 semester hours from the following:
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

International Business—Online Program, Graduate Certificate

Business professionals are much like businesses themselves—as opportunities emerge and the marketplace evolves, their needs change. And sometimes, the best investment in your future is the one you can make now. D’Amore-McKim’s specialty graduate certificates are the perfect way to learn the specific skills you need to seize a new career opportunity. They’re also a great way to put an educational down payment on longer-term ambitions. Credits earned in this program can transfer into the part-time online MBA (check with advisor).

Academic Standing/Progress
Minimum 3.000 GPA required in order to complete certificate program.

Program Requirements
Complete all courses and requirements listed below unless otherwise indicated.

Requirements
Required Courses
INTB 6200 Managing the Global Enterprise 3
INTB 6212 Cultural Aspects of International Business 3
Electives
Complete 6 semester hours from the following:  
- 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

Program Requirements
Complete all courses and requirements listed below unless otherwise indicated.

Requirements
Required Course
FINA 6203 Investment Analysis 3

Electives
Complete 9 semester hours from the following:  
- 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 6222 Risk Management and Insurance
- ACCT 6210 Analyzing Financial Statements to Assess Firm Performance, Strategy, and Value

Program Credit/GPA Requirements
12 total semester hours required, may take a maximum of 15 credits
Minimum 3.000 GPA required

Business professionals are much like businesses themselves—as opportunities emerge and the marketplace evolves, their needs change. And sometimes, the best investment in your future is the one you can make now. D’Amore-McKim’s specialty graduate certificates are the perfect way to learn the specific skills you need to seize a new career opportunity. They’re also a great way to put an educational down payment on longer-term ambitions. Credits earned in this program can transfer into the part-time MBA or other master’s programs at Northeastern (check with advisor).

Program Requirements
Complete all courses and requirements listed below unless otherwise indicated.

Requirements
Required Course
HRMG 6200 Managing People and Organizations 3

Electives
Complete 9 semester hours from the following:  
- 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 6218 Great Companies
- 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

Business professionals are much like businesses themselves—as opportunities emerge and the marketplace evolves, their needs change. And sometimes, the best investment in your future is the one you can make now. D’Amore-McKim’s specialty graduate certificates are the perfect way to learn the specific skills you need to seize a new career opportunity. They’re also a great way to put an educational down payment on longer-term ambitions. Credits earned in this program can transfer into the part-time MBA or other master’s programs at Northeastern (check with advisor).

Program Requirements
Complete all courses and requirements listed below unless otherwise indicated.

Requirements
Required Course
MKTG 6200 Creating and Sustaining Customer Markets 3

Electives
Complete 9 semester hours from the following:  
- 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

Business professionals are much like businesses themselves—as opportunities emerge and the marketplace evolves, their needs change. And sometimes, the best investment in your future is the one you can make now. D’Amore-McKim’s specialty graduate certificates are the perfect way to learn the specific skills you need to seize a new career opportunity. They’re also a great way to put an educational down payment on longer-term ambitions. Credits earned in this program can transfer into the part-time MBA or other master’s programs at Northeastern (check with advisor).

Program Requirements
Complete all courses and requirements listed below unless otherwise indicated.

Requirements
Required Course
HRMG 6200 Managing People and Organizations 3

Electives
Complete 9 semester hours from the following:  
- 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 6218 Great Companies
- 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

Business professionals are much like businesses themselves—as opportunities emerge and the marketplace evolves, their needs change. And sometimes, the best investment in your future is the one you can make now. D’Amore-McKim’s specialty graduate certificates are the perfect way to learn the specific skills you need to seize a new career opportunity. They’re also a great way to put an educational down payment on longer-term ambitions. Credits earned in this program can transfer into the part-time MBA or other master’s programs at Northeastern (check with advisor).

Program Requirements
Complete all courses and requirements listed below unless otherwise indicated.

Requirements
Required Course
MKTG 6200 Creating and Sustaining Customer Markets 3

Electives
Complete 9 semester hours from the following:  
- 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
Program Credit/GPA Requirements
12 total semester hours required, may take a maximum of 15 credits
Minimum 3.000 GPA required

Requirements
Prerequisite Course Work
FINA 6200 Value Creation through Financial Decision Making (Required for admission)

Required Course Work
Complete 9 semester hours from the following:
- FINA 6202 Analysis of Financial Institutions and Markets
- FINA 6203 Investment Analysis
- FINA 6212 Fixed Income Securities and Risk
- FINA 6219 Portfolio Management
- FINA 6360 Fund Management for Analysts
  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—Online Program, Graduate Certificate

The dynamic field of supply chain management has become increasingly important as more companies use supply chain strategies as a means of market differentiation—and no certificate program better prepares you to thrive in this environment than D’Amore-McKim’s. We were one of the pioneers in supply chain research and education, and our supply chain faculty continues to be one of the largest and most experienced.

Academic Standing/Progress
Minimum 3.000 GPA required in order to complete certificate program

Program Requirements
Complete all courses and requirements listed below unless otherwise indicated.

Requirements
Required Courses
SCHM 6210 Supply Chain Management 3
SCHM 6213 Global Supply Chain Strategy 3

Electives
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

The Graduate Certificate in Technological Entrepreneurship is tailor-made for engineers, designers, and other technology professionals who want to lead entrepreneurial ventures within their current companies or have product ideas they’d like to develop on their own. Working with your classmates in multidisciplinary teams, you have an opportunity to examine technological and business issues from an integrative perspective and learn the marketing, planning, and product development principles essential to any successful new venture.

Credits earned in the certificate program may be applied toward the Master of Science in Technological Entrepreneurship, the part-time MBA, or other MS programs at Northeastern (check with advisor).

Program Requirements
Complete all courses and requirements listed below unless otherwise indicated.

Requirements
Required Courses
ENTR 6200 Enterprise Growth and Innovation 3
ENTR 6212 Business Planning for New Ventures 3

Electives
Complete 6 semester hours from the following: 6
ENTR 6218 Business Model Design and Innovation

Program Credit/GPA Requirements
12 total semester hours required, may take a maximum of 15 credits
Minimum 3.000 GPA required
products are created in a player-centric environment. Computer Science and Information Studies gives students a comprehensive understanding of how successful game modeling; and the Master of Science in Game Science and Design, which is designed to give students 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 the tools needed to analyze complex data sets, and the Master of Science in Information Assurance, which prepares students to succeed in an emerging field at the intersection of health informatics, data science, and computational modeling.

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, Information Assurance, or Health Informatics without backgrounds in these fields. 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.

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 Game Science and Design, which gives students a comprehensive understanding of how successful game products are created in a player-centric environment.
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.

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)**

- Computer Science (p. 87)
- Computer Science—Advanced Entry (p. 90)

**Master of Science (MS)**

- Data Science (p. 90)

**Master of Science in Computer Science (MSCS)**

- Computer Science (p. 92)
- Computer Science—ALIGN Program (p. 93)

**Graduate Certificate**

- Computer Science (p. 95)

**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 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 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 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 comprehensive examination, the student prepares a thesis proposal for the examination, which describes the proposed research, including the relevant background materials from the literature. The thesis proposal should clearly specify the research problems to be attacked, the techniques to be used, and a schedule of milestones toward completion. Normally, the thesis proposal should not exceed 15 pages, excluding appendices and bibliography.

The thesis proposal must be approved by the comprehensive committee. It is strongly recommended that the same members should serve on both the comprehensive and thesis committees. With the help of the advisor, a student selects the comprehensive committee, consisting of four members to be approved by the PhD committee. The four members must include the advisor, two other faculty members from the college, and an external examiner (optional for comprehensive committee).

To help the PhD committee to make an informed decision, a copy of the external examiner’s résumé should be submitted at the same time. 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 comprehensive committee. The student may take the comprehensive examination twice, at most.

Doctoral Dissertation
Upon successful completion of solving the research proposed in the thesis proposal, the candidate has an opportunity to prepare the dissertation for approval by the doctoral 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
If the thesis committee is the same as the comprehensive committee, no further approval is needed. If the thesis committee is changed in its composition, the approval process will follow that of the comprehensive committee.

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 doctoral 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.

Program Requirements
Complete all courses and requirements listed below unless otherwise indicated.

Milestones
Course requirements
Paper requirement
Comprehensive exam/dissertation proposal
Dissertation defense

Core Requirement
A grade of B or higher is required in each course. A cumulative 3.500 GPA is required for the core requirement.

Breadth Areas
Complete one course from four of the five following breadth areas: 16

<table>
<thead>
<tr>
<th>Artificial Intelligence and Data Science</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 6140 Machine Learning</td>
<td></td>
</tr>
<tr>
<td>CS XXXX (Applied Statistics)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Human-Centered Computing</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 5340 Computer/Human Interaction</td>
<td></td>
</tr>
<tr>
<td>CS 7295 Special Topics in Data Visualization</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Software</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 7400 Intensive Principles of Programming Languages</td>
<td></td>
</tr>
<tr>
<td>CS 6410 Compilers</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Systems</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 7600 Intensive Computer Systems</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Theory</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 7800 Advanced Algorithms</td>
<td></td>
</tr>
<tr>
<td>CS 7805 Theory of Computation</td>
<td></td>
</tr>
</tbody>
</table>

88 Computer Science, PhD
Specialization Courses
Complete 8 semester hours from the specialization course lists. (p. 89)

Electives
Complete 24 semester hours in the following:

Note: Consult faculty advisor for the other acceptable courses.

- CS 5100 to CS 5850
- CS 6110 to CS 6810
- CS 8982 Readings

Dissertation
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

**Artificial Intelligence**
- CS 5100 Foundations of Artificial Intelligence
- CS 5335 Robotic Science and Systems
- CS 6110 Knowledge-Based Systems
- CS 6120 Natural Language Processing
- CS 6140 Machine Learning
- CS 7140 Advanced Machine Learning
- CS 7170 Seminar in Artificial Intelligence
- CS 7180 Special Topics in Artificial Intelligence

**Computer-Human Interface**
- CS 5340 Computer/Human Interaction
- CS 5350 Applied Geometric Representation and Computation
- 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 7270 Seminar in Database Systems
- CS 7280 Special Topics in Database Management
- CS 7290 Special Topics in Data Science

**Graphics**
- CS 5310 Computer Graphics
- CS 5320 Digital Image Processing
- CS 5330 Pattern Recognition and Computer Vision
- CS 5520 Mobile Application Development
- CS 6310 Computational Imaging
- CS 7370 Seminar in Graphics/Image Processing
- CS 7380 Special Topics in Graphics/Image Processing

**Information Security**
- CS 5770 Software Vulnerabilities and Security
- CS 6540 Foundations of Formal Methods and Software Analysis
- 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 5750 Social Computing
- CS 6710 Wireless Network
- CS 6740 Network Security
- CS 6750 Cryptography and Communications Security
- CS 6760 Privacy, Security, and Usability
- CS 7770 Seminar in Computer Networks
- CS 7775 Seminar in Computer Security
- CS 7780 Special Topics in Networks

**Programming Languages**
- CS 5400 Principles of Programming Language
- CS 6410 Compilers
- CS 6412 Semantics of Programming Language
- CS 6510 Advanced Software Development
- CS 6515 Software Development
- CS 7470 Seminar in Programming Languages
- CS 7480 Special Topics in Programming Language
- CS 7485 Special Topics in Formal Methods
- CS 7570 Seminar in Software Development
- CS 7575 Seminar in Software Engineering
- CS 7580 Special Topics in Software Engineering

**Software Engineering**
- CS 5610 Web Development
- CS 6510 Advanced Software Development
- CS 6520 Methods of Software Development
- CS 6530 Analysis of Software Artifacts
- CS 6535 Engineering Reliable Software
- CS 6540 Foundations of Formal Methods and Software Analysis
- CS 7575 Seminar in Software Engineering
- CS 7580 Special Topics in Software Engineering

**Systems**
- CS 5620 Computer Architecture
- CS 5650 High Performance Computing
- CS 6610 Parallel Computing
- CS 6650 Building Scalable Distributed Systems
- CS 6740 Network Security
- CS 7670 Seminar in Computer Systems
- CS 7680 Special Topics in Computer Systems

**Theory**
- CS 6610 Parallel Computing
- CS 6750 Cryptography and Communications Security
### Computer Science, PhD—Advanced Entry

#### 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

### General 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
Upon achieving PhD candidacy, complete the following (repeatable) courses for two consecutive semesters:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 9990</td>
<td>Dissertation</td>
</tr>
<tr>
<td>CS 8982</td>
<td>Readings</td>
</tr>
</tbody>
</table>

For remaining semester(s), complete the following (repeatable) course until graduation:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 9996</td>
<td>Dissertation Continuation</td>
</tr>
</tbody>
</table>

### 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, modeling, analyzing, and reasoning about data. Students will engage in an extensive core intended to develop depth in computational modeling, data collection and integration, data storage and retrieval, data processing, modeling and analytics, and visualization. Students will also be given a variety of elective areas in CCIS, the College of Engineering (COE), and throughout the campus to explore key contextual areas or more complex technical 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.

The Master of Science in Data Science is comprised of eight courses; five core courses and three electives. The core courses are designed and developed by the CCIS and ECE faculty. Elective courses consist of graduate courses offered in CCIS, COE, and other partner colleges.

**Course Requirements**

The Master of Science in Data Science curriculum requires five core courses that represent the essential mathematical/statistical and technical knowledge for deep data analysis. These courses examine foundational programming concepts and languages, integration, collection, storage, retrieval, large-scale computing, mathematical concepts in statistics, linear algebra, and optimization, as well as visual and computational analysis, machine learning, and visualization. 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**

**Required Course Work**

A grade of B or higher is required in the following courses:

**Algorithms**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 5800</td>
<td>Algorithms</td>
<td>4</td>
</tr>
<tr>
<td>EECE 7205</td>
<td>Fundamentals of Computer Engineering</td>
<td>4</td>
</tr>
</tbody>
</table>

**Data Management and Processing**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>DS 5110</td>
<td>Introduction to Data Management and Processing</td>
<td>4</td>
</tr>
</tbody>
</table>

**Machine Learning and Data Mining**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>DS 5220</td>
<td>Supervised Machine Learning and Learning Theory</td>
<td>4</td>
</tr>
<tr>
<td>DS 5230</td>
<td>Unsupervised Machine Learning and Data Mining</td>
<td>4</td>
</tr>
</tbody>
</table>

**Presentation and Visualization**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>DS 5500</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Electives**

Complete 12 semester hours from the following:
<table>
<thead>
<tr>
<th>College of Computer and Information Science</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 6200 Information Retrieval</td>
<td></td>
</tr>
<tr>
<td>CS 5100 Foundations of Artificial Intelligence</td>
<td></td>
</tr>
<tr>
<td>CS 6120 Natural Language Processing</td>
<td></td>
</tr>
<tr>
<td>CS 5750 Social Computing</td>
<td></td>
</tr>
<tr>
<td>CS 6350 Empirical Research Methods</td>
<td></td>
</tr>
<tr>
<td>CS 7180 Special Topics in Artificial Intelligence</td>
<td></td>
</tr>
<tr>
<td>CS 7280 Special Topics in Database Management</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>College of Engineering</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CIVE 7388 Special Topics in Civil Engineering</td>
<td></td>
</tr>
<tr>
<td>EECE 5639 Computer Vision</td>
<td></td>
</tr>
<tr>
<td>EECE 5640 High-Performance Computing</td>
<td></td>
</tr>
<tr>
<td>EECE 7335 Detection and Estimation Theory</td>
<td></td>
</tr>
<tr>
<td>EECE 7337 Information Theory</td>
<td></td>
</tr>
<tr>
<td>EECE 7360 Combinatorial Optimization</td>
<td></td>
</tr>
<tr>
<td>EECE 7370 Advanced Computer Vision</td>
<td></td>
</tr>
<tr>
<td>EECE 7397 Advanced Machine Learning</td>
<td></td>
</tr>
<tr>
<td>IE 5640 Data Mining for Engineering Applications</td>
<td></td>
</tr>
<tr>
<td>IE 7275 Data Mining in Engineering</td>
<td></td>
</tr>
<tr>
<td>IE 7280 Statistical Methods in Engineering</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>College of Social Sciences and Humanities</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>PPUA 5261 Dynamic Modeling for Environmental Decision Making</td>
<td></td>
</tr>
<tr>
<td>PPUA 5262 Big Data for Cities</td>
<td></td>
</tr>
<tr>
<td>PPUA 5263 Geographic Information Systems for Urban and Regional Policy</td>
<td></td>
</tr>
<tr>
<td>PPUA 5266 Urban Theory and Science</td>
<td></td>
</tr>
<tr>
<td>PPUA 7237 Advanced Spatial Analysis of Urban Systems</td>
<td></td>
</tr>
<tr>
<td>POLS 7200 Perspectives on Social Science Inquiry</td>
<td></td>
</tr>
<tr>
<td>POLS 7201 Research Design</td>
<td></td>
</tr>
<tr>
<td>POLS 7202 Quantitative Techniques</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>D’Amore-McKim School of Business</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>BUSN 6320 Business Analytics Fundamentals</td>
<td></td>
</tr>
<tr>
<td>BUSN 6324 Predictive Analytics for Managers</td>
<td></td>
</tr>
<tr>
<td>BUSN 6326 Introduction to Big Data and Digital Marketing Analytics</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>College of Science</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 7340 Statistics for Bioinformatics</td>
<td></td>
</tr>
<tr>
<td>PHYS 5116 Complex Networks and Applications</td>
<td></td>
</tr>
<tr>
<td>PHYS 7305 Statistical Physics</td>
<td></td>
</tr>
<tr>
<td>PHYS 7321 Computational Physics</td>
<td></td>
</tr>
<tr>
<td>PHYS 7331 Network Science Data</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bouvé College of Health Sciences</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>NRSG 5121 Epidemiology and Population Health</td>
<td></td>
</tr>
<tr>
<td>PHTH 5202 Introduction to Epidemiology</td>
<td></td>
</tr>
<tr>
<td>PHTH 5210 Biostatistics in Public Health</td>
<td></td>
</tr>
<tr>
<td>PHTH 5224 Social Epidemiology</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>College of Arts, Media and Design</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>GSND 5110 Game Design and Analysis</td>
<td></td>
</tr>
<tr>
<td>GSND 6350 Game Analytics</td>
<td></td>
</tr>
</tbody>
</table>

Note: Students that take 3-credit-hour elective courses (i.e., Bouvé, CSSH courses) will register for an accompanying data science project course in the same semester (DS 8982). 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

| 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 interface, graphics, programming languages, software engineering, database management, 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.

**Required Core Courses**

A cumulative 3.000 GPA is required for the three core courses:

<table>
<thead>
<tr>
<th>Programming</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 5010 Programming Design Paradigm</td>
<td>4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Development</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 5500 Managing Software Development</td>
<td>4</td>
</tr>
<tr>
<td>or CS 5600 Computer Systems</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Algorithms</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 5800 Algorithms</td>
<td>4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Electives</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Complete 20 semester hours from the following. A minimum of 8 semester hours must be taken from the same specialization.</td>
<td></td>
</tr>
<tr>
<td>CS 5100 to CS 5850</td>
<td></td>
</tr>
<tr>
<td>CS 6110 to CS 6810</td>
<td></td>
</tr>
<tr>
<td>CS 8674 Master’s Project</td>
<td></td>
</tr>
<tr>
<td>CS 8982 Readings</td>
<td></td>
</tr>
<tr>
<td>CS 7990 Thesis</td>
<td></td>
</tr>
</tbody>
</table>

**Specializations**

Artificial Intelligence

| CS 5100 Foundations of Artificial Intelligence |  |

<p>| | |
|  |  |
|  |  |</p>
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 5335</td>
<td>Robotic Science and Systems</td>
</tr>
<tr>
<td>CS 6110</td>
<td>Knowledge-Based Systems</td>
</tr>
<tr>
<td>CS 6120</td>
<td>Natural Language Processing</td>
</tr>
<tr>
<td>CS 6140</td>
<td>Machine Learning</td>
</tr>
<tr>
<td>CS 7140</td>
<td>Advanced Machine Learning</td>
</tr>
<tr>
<td>CS 7170</td>
<td>Seminar in Artificial Intelligence</td>
</tr>
<tr>
<td>CS 7180</td>
<td>Special Topics in Artificial Intelligence</td>
</tr>
<tr>
<td>CS 5340</td>
<td>Computer/Human Interaction</td>
</tr>
<tr>
<td>CS 5350</td>
<td>Applied Geometric Representation and Computation</td>
</tr>
<tr>
<td>CS 6350</td>
<td>Empirical Research Methods</td>
</tr>
<tr>
<td>CS 7140</td>
<td>Advanced Machine Learning</td>
</tr>
<tr>
<td>CS 5200</td>
<td>Database Management Systems</td>
</tr>
<tr>
<td>CS 6140</td>
<td>Machine Learning</td>
</tr>
<tr>
<td>CS 6200</td>
<td>Information Retrieval</td>
</tr>
<tr>
<td>CS 6220</td>
<td>Data Mining Techniques</td>
</tr>
<tr>
<td>CS 6240</td>
<td>Large-Scale Parallel Data Processing</td>
</tr>
<tr>
<td>CS 7270</td>
<td>Seminar in Database Systems</td>
</tr>
<tr>
<td>CS 7280</td>
<td>Special Topics in Database Management</td>
</tr>
<tr>
<td>CS 5150</td>
<td>Game Artificial Intelligence</td>
</tr>
<tr>
<td>CS 5310</td>
<td>Computer Graphics</td>
</tr>
<tr>
<td>CS 5340</td>
<td>Computer/Human Interaction</td>
</tr>
<tr>
<td>CS 5850</td>
<td>Building Game Engines</td>
</tr>
<tr>
<td>CS 7140</td>
<td>Advanced Machine Learning</td>
</tr>
<tr>
<td>CS 5310</td>
<td>Computer Graphics</td>
</tr>
<tr>
<td>CS 5320</td>
<td>Digital Image Processing</td>
</tr>
<tr>
<td>CS 5330</td>
<td>Pattern Recognition and Computer Vision</td>
</tr>
<tr>
<td>CS 5520</td>
<td>Mobile Application Development</td>
</tr>
<tr>
<td>CS 6310</td>
<td>Computational Imaging</td>
</tr>
<tr>
<td>CS 7370</td>
<td>Seminar in Graphics/Image Processing</td>
</tr>
<tr>
<td>CS 7380</td>
<td>Special Topics in Graphics/Image Processing</td>
</tr>
<tr>
<td>CS 5770</td>
<td>Software Vulnerabilities and Security</td>
</tr>
<tr>
<td>CS 6540</td>
<td>Foundations of Formal Methods and Software Analysis</td>
</tr>
<tr>
<td>CS 6740</td>
<td>Network Security</td>
</tr>
<tr>
<td>CS 6750</td>
<td>Cryptography and Communications Security</td>
</tr>
<tr>
<td>CS 6760</td>
<td>Privacy, Security, and Usability</td>
</tr>
<tr>
<td>CS 7580</td>
<td>Special Topics in Software Engineering</td>
</tr>
<tr>
<td>CS 5700</td>
<td>Fundamentals of Computer Networking</td>
</tr>
<tr>
<td>CS 5750</td>
<td>Social Computing</td>
</tr>
<tr>
<td>CS 6710</td>
<td>Wireless Network</td>
</tr>
<tr>
<td>CS 6740</td>
<td>Network Security</td>
</tr>
<tr>
<td>CS 6750</td>
<td>Cryptography and Communications Security</td>
</tr>
<tr>
<td>CS 6760</td>
<td>Privacy, Security, and Usability</td>
</tr>
</tbody>
</table>

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:
Computer Science, MSCS—ALIGN Program

- 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.

**Required Course Work**

<table>
<thead>
<tr>
<th>Fundamentals</th>
<th>CS 5001</th>
<th>Intensive Foundations of Computer Science and Recitation for CS 5001</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 5003</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discrete Structures</td>
<td>CS 5002</td>
<td>Discrete and Data Structures</td>
<td>4</td>
</tr>
<tr>
<td>Object-Oriented Design</td>
<td>CS 5004</td>
<td>Object-Oriented Design and Recitation for CS 5004</td>
<td>4</td>
</tr>
<tr>
<td>and CS 5005</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Foundation Courses</td>
<td>CS 5006</td>
<td>Algorithms</td>
<td>2</td>
</tr>
<tr>
<td>Development</td>
<td>CS 5007</td>
<td>Computer Systems</td>
<td>2</td>
</tr>
<tr>
<td>A grade of B or higher is required:</td>
<td>CS 5500</td>
<td>Managing Software Development</td>
<td>4</td>
</tr>
<tr>
<td>or CS 5600</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Algorithms</td>
<td>CS 5800</td>
<td>Algorithms</td>
<td>4</td>
</tr>
<tr>
<td>Electives</td>
<td></td>
<td></td>
<td>20</td>
</tr>
<tr>
<td>Complete 20 semester hours from the following. A minimum of 8 semester hours must be taken from the same specialization.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CS 5100 to CS 5850</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CS 6110 to CS 6810</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CS 6745</td>
<td></td>
<td>Master’s Project</td>
<td></td>
</tr>
<tr>
<td>CS 8982</td>
<td></td>
<td>Readings</td>
<td></td>
</tr>
<tr>
<td>CS 7990</td>
<td></td>
<td>Thesis</td>
<td></td>
</tr>
</tbody>
</table>

**Specializations**

| Artificial Intelligence           | CS 5100 | Foundations of Artificial Intelligence                           |   |
|                                   | CS 5335 | Robotic Science and Systems                                      |   |
|                                   | CS 6110 | Knowledge-Based Systems                                          |   |
|                                   | CS 6120 | Natural Language Processing                                     |   |
|                                   | CS 6140 | Machine Learning                                                  |   |
|                                   | CS 6740 | Network Security                                                  |   |
|                                   | CS 6750 | Cryptography and Communications Security                         |   |
|                                   | CS 6760 | Privacy, Security, and Usability                                 |   |
|                                   | CS 7770 | Seminar in Computer Networks                                     |   |
|                                   | CS 7775 | Seminar in Computer Security                                     |   |
|                                   | CS 7780 | Special Topics in Networks                                       |   |
| Computer-Human Interface          | CS 5340 | Computer/Human Interaction                                       |   |

**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 7270 | Seminar in Database Systems |
| 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 5320 | Digital Image Processing     |
| CS 5330 | Pattern Recognition and Computer Vision |
| CS 5520 | Mobile Application Development |
| CS 6310 | Computational Imaging        |
| CS 7370 | Seminar in Graphics/Image Processing |
| CS 7380 | Special Topics in Graphics/Image Processing |

**Information Security**

| CS 5770 | Software Vulnerabilities and Security |
| CS 6540 | Foundations of Formal Methods and Software Analysis |
| 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 5750 | Social Computing                    |
| CS 6710 | Wireless Network                    |
| CS 6740 | Network Security                    |
| CS 6750 | Cryptography and Communications Security |
| CS 6760 | Privacy, Security, and Usability    |
| CS 7770 | Seminar in Computer Networks        |
| CS 7775 | Seminar in Computer Security        |
| CS 7780 | Special Topics in Networks          |

**Programming Languages**

| CS 5400 | Principles of Programming Language |
| CS 6410 | Compilers                           |
| CS 6412 | Semantics of Programming Language  |
| CS 6510 | Advanced Software Development       |
| CS 6515 | Software Development                |
CS 7470 Seminar in Programming Languages
CS 7480 Special Topics in Programming Language
CS 7570 Seminar in Software Development

Software Engineering
CS 5610 Web Development
CS 6510 Advanced Software Development
CS 6520 Methods of Software Development
CS 6530 Analysis of Software Artifacts
CS 6535 Engineering Reliable Software
CS 6540 Foundations of Formal Methods and Software Analysis
CS 6650 Building Scalable Distributed Systems
CS 7575 Seminar in Software Engineering
CS 7580 Special Topics in Software Engineering

Systems
CS 5620 Computer Architecture
CS 5650 High Performance Computing
CS 6610 Parallel Computing
CS 6740 Network Security
CS 7670 Seminar in Computer Systems
CS 7680 Special Topics in Computer Systems

Theory
CS 6610 Parallel Computing
CS 6750 Cryptography and Communications Security
CS 6800 Application of Information Theory
CS 6810 Distributed Algorithms
CS 7805 Theory of Computation
CS 7870 Seminar in Theoretical Computer Science
CS 7880 Special Topics in Theories of Computer Science

Program Credit/GPA Requirements
44 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.

Programs
Doctor of Philosophy (PhD)
• Personal Health Informatics (p. 96)

Master of Science (MS)
• Health Data Analytics (p. 98)
Graduate Certificate

- Health Informatics Management and Exchange (p. 267)
- Health Informatics Privacy and Security (p. 267)
- Health Informatics Software Engineering (p. 267)

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

**General Requirements**
**Foundations**
- HINF 5200 Theory of Personal Health Informatics (4)

**Program Design and Development**
- CS 5010 Programming Design Paradigm (4)
- CS 5340 Computer/Human Interaction (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**
Complete 6 to 8 semester hours in the following subject area:
(Note: Please see faculty advisor for other acceptable elective courses.)
- HINF

**Dissertation**
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**

<table>
<thead>
<tr>
<th>Year 1</th>
<th>Hours</th>
<th>Spring</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HINF 5200</td>
<td>4</td>
<td>CS 5010 or 5520</td>
<td>4</td>
</tr>
<tr>
<td>CS 5340</td>
<td>4</td>
<td>CS 6350</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Additionally, students should participate in the Personal Health Informatics Usability Evaluation Practicum</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Year 2</td>
<td>Hours</td>
<td>Spring</td>
<td>Hours</td>
</tr>
<tr>
<td>Fall</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HINF 5300</td>
<td>4</td>
<td>HINF 5301</td>
<td>4</td>
</tr>
<tr>
<td>PHTH 5210 (or PHTH 6210 or CAEP 7712 or CAEP 7716)</td>
<td>3</td>
<td>PHI elective</td>
<td>3-4</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>7-8</td>
<td></td>
</tr>
<tr>
<td>Year 3</td>
<td>Hours</td>
<td>Spring</td>
<td>Hours</td>
</tr>
<tr>
<td>Fall</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HINF 9990</td>
<td>2-4</td>
<td>HINF 9990</td>
<td>2-4</td>
</tr>
<tr>
<td>HINF 8982</td>
<td>1-8</td>
<td>PHI elective</td>
<td>3-4</td>
</tr>
<tr>
<td></td>
<td>3-12</td>
<td>5-8</td>
<td></td>
</tr>
<tr>
<td>Year 4</td>
<td>Hours</td>
<td>Spring</td>
<td>Hours</td>
</tr>
<tr>
<td>Fall</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HINF 9996</td>
<td>0</td>
<td>HINF 9996</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>
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.

Program Requirements
Complete all courses and requirements listed below unless otherwise indicated.

General Requirements

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>DA 5020</td>
<td>Collecting, Storing, and Retrieving Data</td>
<td>4</td>
</tr>
<tr>
<td>DA 5030</td>
<td>Introduction to Data Mining/Machine Learning</td>
<td>4</td>
</tr>
<tr>
<td>HINF 6400</td>
<td>Introduction to Health Data Analytics</td>
<td>3</td>
</tr>
<tr>
<td>PPUA 5301</td>
<td>Introduction to Computational Statistics</td>
<td>4</td>
</tr>
<tr>
<td>PPUA 5302</td>
<td>Information Design and Visual Analytics</td>
<td>4</td>
</tr>
<tr>
<td>HINF 5102</td>
<td>Data Management in Healthcare</td>
<td>3</td>
</tr>
<tr>
<td>HINF 5105</td>
<td>The American Healthcare System</td>
<td>3</td>
</tr>
<tr>
<td>HINF 5XXX</td>
<td>Predictive Analytics and Modeling</td>
<td>3</td>
</tr>
</tbody>
</table>

Thesis/Capstone

Complete either Thesis or Capstone:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>HINF XXXX</td>
<td>Health Data Analytics Thesis</td>
<td>3</td>
</tr>
</tbody>
</table>

1 Please see college administrator for course information.

Electives
At least one course must be chosen from the methods list.

Methods
Complete 3–6 semester hours from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHTH 5240</td>
<td>Evaluating Scientific Evidence</td>
</tr>
<tr>
<td>PHTH 6202</td>
<td>Intermediate Epidemiology</td>
</tr>
<tr>
<td>PHTH 6210</td>
<td>Applied Regression Analysis</td>
</tr>
<tr>
<td>PHTH 6440</td>
<td>Advanced Methods in Biostatistics</td>
</tr>
<tr>
<td>CS 6350</td>
<td>Empirical Research Methods</td>
</tr>
<tr>
<td>CAEP 7712</td>
<td>Intermediate Statistical Data Analysis Techniques</td>
</tr>
<tr>
<td>CAEP 7716</td>
<td>Advanced Research and Data Analyses</td>
</tr>
</tbody>
</table>

Other Electives
Complete 0–4 semester hours from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARTG 5330</td>
<td>Visualization Technologies</td>
</tr>
<tr>
<td>ARTG 6320</td>
<td>Design of Information-Rich Environments</td>
</tr>
<tr>
<td>HINF 5200</td>
<td>Theoretical Foundations in Personal Health Informatics</td>
</tr>
<tr>
<td>HINF 5300</td>
<td>Personal Health Interface Design and Development</td>
</tr>
<tr>
<td>HINF 6215</td>
<td>Project Management</td>
</tr>
<tr>
<td>HINF 6220</td>
<td>Database Design, Access, Modeling, and Security</td>
</tr>
<tr>
<td>PHTH 5226</td>
<td>Strategic Management and Leadership in Healthcare</td>
</tr>
<tr>
<td>PHTH 5232</td>
<td>Evaluating Healthcare Quality</td>
</tr>
<tr>
<td>PHTH 5234</td>
<td>Economic Perspectives on Health Policy</td>
</tr>
</tbody>
</table>

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.

**Requirements**
A grade of B– or higher is required in each course.

**Core Requirements**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HINF 5101</td>
<td>Introduction to Health Informatics and Health Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>HINF 5105</td>
<td>The American Healthcare System</td>
<td>3</td>
</tr>
<tr>
<td>HINF 7701</td>
<td>Health Informatics Capstone Project</td>
<td>3</td>
</tr>
</tbody>
</table>

**Business Management Core**
Complete two courses from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HINF 6202</td>
<td>Business of Healthcare Informatics</td>
<td></td>
</tr>
<tr>
<td>HINF 6215</td>
<td>Project Management</td>
<td></td>
</tr>
<tr>
<td>HINF 6335</td>
<td>Management Issues in Healthcare Information Technology</td>
<td></td>
</tr>
<tr>
<td>HINF 6240</td>
<td>Improving the Patient Experience through Informatics</td>
<td></td>
</tr>
<tr>
<td>PHTH 5226</td>
<td>Strategic Management and Leadership in Healthcare</td>
<td></td>
</tr>
</tbody>
</table>

**Health Informatics Core**
Complete two courses from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HINF 5102</td>
<td>Data Management in Healthcare</td>
<td></td>
</tr>
<tr>
<td>HINF 5110</td>
<td>Global Health Information Management</td>
<td></td>
</tr>
<tr>
<td>HINF 5200</td>
<td>Theoretical Foundations in Personal Health Informatics</td>
<td></td>
</tr>
<tr>
<td>HINF 6205</td>
<td>Creation and Application of Medical Knowledge</td>
<td></td>
</tr>
<tr>
<td>HINF 6350</td>
<td>Public Health Surveillance and Informatics</td>
<td></td>
</tr>
<tr>
<td>HINF 6404</td>
<td>Patient Engagement Informatics and Analytics</td>
<td></td>
</tr>
<tr>
<td>HINF 6405</td>
<td>Quantifying the Value of Informatics</td>
<td></td>
</tr>
<tr>
<td>PHTH 5232</td>
<td>Evaluating Healthcare Quality</td>
<td></td>
</tr>
</tbody>
</table>

**Technical Core**
Complete two courses from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HINF 6220</td>
<td>Database Design, Access, Modeling, and Security</td>
<td></td>
</tr>
</tbody>
</table>

**HINF 6230** Strategic Topics in Programming For Health Professionals

**HINF 6355** Key Standards in Health Informatics Systems

**PHTH 5210** Biostatistics in Public Health

**PHTH 5202** Introduction to Epidemiology

One course from the following may count toward the technical core requirement:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>DA 5020</td>
<td>Collecting, Storing, and Retrieving Data</td>
<td></td>
</tr>
<tr>
<td>DA 5030</td>
<td>Introduction to Data Mining/Machine Learning</td>
<td></td>
</tr>
<tr>
<td>PPUA 5301</td>
<td>Introduction to Computational Statistics</td>
<td></td>
</tr>
<tr>
<td>PPUA 5302</td>
<td>Information Design and Visual Analytics</td>
<td></td>
</tr>
</tbody>
</table>

**Electives**
Complete two courses from the following. Any course not taken to complete a core requirement may be taken as an elective.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PPHN 6325</td>
<td>Legal and Social Issues in Health Informatics</td>
<td></td>
</tr>
<tr>
<td>HINF 6330</td>
<td>Emerging Technologies in Healthcare</td>
<td></td>
</tr>
<tr>
<td>HINF 6345</td>
<td>Design for Usability in Healthcare</td>
<td></td>
</tr>
<tr>
<td>DA 5020</td>
<td>Collecting, Storing, and Retrieving Data</td>
<td></td>
</tr>
<tr>
<td>DA 5030</td>
<td>Introduction to Data Mining/Machine Learning</td>
<td></td>
</tr>
<tr>
<td>PPUA 5301</td>
<td>Introduction to Computational Statistics</td>
<td></td>
</tr>
<tr>
<td>PPUA 5302</td>
<td>Information Design and Visual Analytics</td>
<td></td>
</tr>
</tbody>
</table>

**Program Credit/GPA Requirements**
Minimum 33 total semester hours required
Minimum 3.00 GPA required

**Health Informatics, MS—ALIGN Program**
Our Master of Science in Health Informatics ALIGN program seeks to prepare students from diverse backgrounds to excel in the health informatics field. ALIGN’s custom master’s degree curricula are tailored to each student’s professional and educational background, allowing successful students to transition into careers in high-demand industries. Learn more at the ALIGN webpage (http://www.northeastern.edu/align).

**Program Requirements**
Complete all courses and requirements listed below unless otherwise indicated.

**Requirements**
A grade of B– or higher is required in each course.

**ALIGN Course Work**
Complete one or two courses from the following as assigned during admission:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HINF 0200</td>
<td>Health and Medicine for Nonclinicians</td>
<td></td>
</tr>
<tr>
<td>HINF 6230</td>
<td>Strategic Topics in Programming For Health Professionals</td>
<td></td>
</tr>
</tbody>
</table>

**Core Requirements**
Information Assurance

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 Core
Complete two courses from the following: 6
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
PTHT 5226 Strategic Management and Leadership in Healthcare

Health Informatics Core
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
PTHT 5232 Evaluating Healthcare Quality

Technical Core
Complete two courses from the following: 6
HINF 6220 Database Design, Access, Modeling, and Security
HINF 6230 Strategic Topics in Programming For Health Professionals
HINF 6355 Key Standards in Health Informatics Systems
PTHT 5210 Biostatistics in Public Health
PTHT 5202 Introduction to Epidemiology

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
Complete two courses from the following. Any course not taken to complete a core requirement may be taken as an elective. 6
HINF 6325 Legal and Social Issues in Health Informatics
HINF 6330 Emerging Technologies in Healthcare
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
39 total semester hours required
Minimum 3.00 GPA required

Information Assurance

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 Information Assurance and Cybersecurity degree. An industry-focused, interdisciplinary Master of Science in Information Assurance and 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 Information Assurance and 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 information assurance and 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 Information Assurance and 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. 101)
- Information Assurance—Advanced Entry (p. 102)
Master of Science in Information Assurance and Cybersecurity (MSIA)

- Information Assurance and Cybersecurity (p. 103)
- Information Assurance and Cybersecurity—ALIGN Program (p. 104)

Graduate Certificate

- Cybersecurity (p. 105)

**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 in 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/ms-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 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 cybercorps
  - 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 Requirement
A cumulative 3.400 GPA is required for the core requirement.

#### Fundamentals
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 5700</td>
<td>Fundamentals of Computer Networking</td>
<td>4</td>
</tr>
<tr>
<td>or EECE 7336</td>
<td>Digital Communications</td>
<td></td>
</tr>
</tbody>
</table>

#### Software
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 5770</td>
<td>Software Vulnerabilities and Security</td>
<td>4</td>
</tr>
</tbody>
</table>

#### Security and Cyberlaw
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IA 5200</td>
<td>Security Risk Management and Assessment</td>
<td>4</td>
</tr>
<tr>
<td>CS 6740</td>
<td>Network Security</td>
<td>4</td>
</tr>
<tr>
<td>or CS 6750</td>
<td>Cryptography and Communications Security</td>
<td></td>
</tr>
<tr>
<td>IA 5240</td>
<td>Cyberlaw: Privacy, Ethics, and Digital Rights</td>
<td>4</td>
</tr>
</tbody>
</table>

### Electives and Specializations
Complete 28 semester hours from the following:

**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
- CS 6540 Foundations of Formal Methods and Software Analysis
- IA 6120 Software Security Practices

**Track 3 Policy/Society**
- CRIM 7242 Terrorism and International Crime
- CRIM 7246 Security Management
- CRIM 7252 White-Collar Crime
- 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
- EECE 7339 Testing and Design for Testability
- EECE 7350 Software Engineering 1
- EECE 7351 Software Engineering 2
- EECE 7357 Fault-Tolerant Computers
- SOCL 7211 Research Methods
- or CS 6350 Empirical Research Methods

### Dissertation
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 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 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
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
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

Information Assurance and Cybersecurity, MSIA

Our Master of Science in Information Assurance and 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:

- Build core knowledge surrounding computer system security and network security practices
- Plan and implement security strategies to reduce risk and enhance protection of information assets and systems
- Understand legal and ethical issues associated with information security, privacy, and digital rights.
- Enhance communication skills for effective interaction with corporate management on information assurance/cybersecurity-related issues.

Program Requirements

General Requirements

Foundations
IA 5010  Foundations of Information Assurance  4

Technical Courses
Complete 8 semester hours from the following:

- IA 5120  Applied Cryptography
- IA 5130  Computer System Security
- IA 5150  Network Security Practices
- IA 6120  Software Security Practices

Contextual Courses
Complete 8 semester hours from the following:

- 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
Complete 8 semester hours from the following:

- IA 5040  Introduction to Cyberspace Programming
- IA 5050  Data Mining in Cyberspace
- 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
Information Assurance and Cybersecurity, MSIA—ALIGN Program

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>IA 6120</td>
<td>Software Security Practices</td>
</tr>
<tr>
<td>CS 5200</td>
<td>Database Management Systems</td>
</tr>
<tr>
<td>CS 5500</td>
<td>Managing Software Development</td>
</tr>
<tr>
<td>CS 5600</td>
<td>Computer Systems</td>
</tr>
<tr>
<td>CS 5700</td>
<td>Fundamentals of Computer Networking</td>
</tr>
<tr>
<td>CS 5770</td>
<td>Software Vulnerabilities and Security</td>
</tr>
<tr>
<td>CS 6540</td>
<td>Foundations of Formal Methods and Software Analysis</td>
</tr>
<tr>
<td>CS 6710</td>
<td>Wireless Network</td>
</tr>
<tr>
<td>CS 6740</td>
<td>Network Security 1</td>
</tr>
<tr>
<td>CS 6750</td>
<td>Cryptography and Communications Security</td>
</tr>
<tr>
<td>CS 7805</td>
<td>Theory of Computation</td>
</tr>
<tr>
<td>CRIM 7224</td>
<td>Law and Psychology</td>
</tr>
<tr>
<td>CRIM 7242</td>
<td>Terrorism and International Crime</td>
</tr>
<tr>
<td>CRIM 7252</td>
<td>White-Collar Crime</td>
</tr>
<tr>
<td>CRIM 7312</td>
<td>Special Topics in Criminology and Public Policy</td>
</tr>
<tr>
<td>PPUA 6503</td>
<td>Public Personnel Administration</td>
</tr>
<tr>
<td>PPUA 6505</td>
<td>Public Budgeting and Financial Management</td>
</tr>
<tr>
<td>PPUA 6507</td>
<td>Institutional Leadership and the Public Manager</td>
</tr>
<tr>
<td>POLS 7341</td>
<td>Security and Resilience Policy</td>
</tr>
</tbody>
</table>

Program Credit/GPA Requirements

32 total semester hours required
Minimum 3.00 GPA required

1 This course can only be taken for credit if the student has NOT also taken Network Security Practices (IA 5150). These courses cannot both be taken for credit.

Information Assurance and Cybersecurity, MSIA—ALIGN Program

The innovative ALIGN bridge program to the interdisciplinary Master of Science in Information Assurance and Cybersecurity is designed for students with a BS/BA degree from all backgrounds. During the first semester of year one, students are expected to take foundational courses in cyberspace technologies and discrete mathematics. Upon successful completion of the first semester, students are evaluated for admission to the MS program.

The Master of Science in Information Assurance and Cybersecurity combines computer systems and network security training with knowledge from the social sciences, law, criminology, and management, giving you an opportunity to obtain skills that are in high demand. Through this program, the successful student will learn to:

- Build core knowledge surrounding computer-system security and network practices, as well as relevant knowledge from the social sciences, law, criminology, and management
- Make strategic decisions about security issues and present recommendations to management
- Plan and implement security strategies to reduce risk and protect information assets and systems
- Understand the legal and ethical issues associated with information security, privacy, and digital rights

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

General Requirements

ALIGN Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>IA 5001</td>
<td>Cyberspace Technology and Applications</td>
</tr>
<tr>
<td>IA 5002</td>
<td>Concrete Mathematics</td>
</tr>
<tr>
<td>IA 5004</td>
<td>Introduction to Cyberspace Programming 1</td>
</tr>
</tbody>
</table>

Foundations

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>IA 5010</td>
<td>Foundations of Information Assurance</td>
</tr>
</tbody>
</table>

Technical Track

Complete 8 semester hours from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>IA 5120</td>
<td>Applied Cryptography</td>
</tr>
<tr>
<td>IA 5130</td>
<td>Computer System Security</td>
</tr>
<tr>
<td>IA 5150</td>
<td>Network Security Practices</td>
</tr>
<tr>
<td>IA 6120</td>
<td>Software Security Practices</td>
</tr>
</tbody>
</table>

Contextual Track

Complete 8 semester hours from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>IA 5200</td>
<td>Security Risk Management and Assessment</td>
</tr>
<tr>
<td>IA 5210</td>
<td>Information System Forensics</td>
</tr>
<tr>
<td>IA 5150</td>
<td>Network Security Practices</td>
</tr>
<tr>
<td>IA 5250</td>
<td>Decision Making for Critical Infrastructure</td>
</tr>
</tbody>
</table>

Capstone

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>IA 7900</td>
<td>Capstone Project/Seminar</td>
</tr>
</tbody>
</table>

Electives

Complete 8 semester hours from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>IA 5040</td>
<td>Introduction to Cyberspace Programming</td>
</tr>
<tr>
<td>IA 5050</td>
<td>Data Mining in Cyberspace</td>
</tr>
<tr>
<td>IA 5120</td>
<td>Applied Cryptography</td>
</tr>
<tr>
<td>IA 5130</td>
<td>Computer System Security</td>
</tr>
<tr>
<td>IA 5150</td>
<td>Network Security Practices</td>
</tr>
<tr>
<td>IA 5200</td>
<td>Security Risk Management and Assessment</td>
</tr>
<tr>
<td>IA 5210</td>
<td>Information System Forensics</td>
</tr>
<tr>
<td>IA 5240</td>
<td>Cyberlaw: Privacy, Ethics, and Digital Rights</td>
</tr>
<tr>
<td>IA 6120</td>
<td>Software Privacy Policy</td>
</tr>
<tr>
<td>CS 5200</td>
<td>Database Security Practices</td>
</tr>
<tr>
<td>CS 5500</td>
<td>Managing Software Development</td>
</tr>
<tr>
<td>CS 5600</td>
<td>Computer Systems</td>
</tr>
<tr>
<td>CS 5700</td>
<td>Fundamentals of Computer Networking</td>
</tr>
<tr>
<td>CS 5770</td>
<td>Software Vulnerabilities and Security</td>
</tr>
<tr>
<td>CS 6540</td>
<td>Foundations of Formal Methods and Software Analysis</td>
</tr>
<tr>
<td>CS 6710</td>
<td>Wireless Network</td>
</tr>
<tr>
<td>CS 6740</td>
<td>Network Security 1</td>
</tr>
</tbody>
</table>
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.

Requirements

Required Courses
IA 5010 Foundations of Information Assurance 4
IA 5130 Computer System Security 4
IA 5210 Information System Forensics 4

Elective
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
• Game Science and Design (p. 55)

Graduate Certificate
• Data Analytics (p. 106)

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, 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

Program Requirements
Complete all courses and requirements listed below unless otherwise indicated.

Required Course Work
GWND 5110 Game Design and Analysis 4
GWND 5111 Seminar for GWND 5110 1
GWND 5122 Business Models in the Game Industry 1
GWND 5130 Usability and Empirical User Research 4
or PPUA 5301 Introduction to Computational Statistics
**Specialization Options**

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

**GAME ANALYTICS**

Complete three of the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>DA 5020</td>
<td>Collecting, Storing, and Retrieving Data</td>
<td>4</td>
</tr>
<tr>
<td>DA 5030</td>
<td>Introduction to Data Mining/Machine Learning</td>
<td>4</td>
</tr>
<tr>
<td>GSND 6350</td>
<td>Game Analytics</td>
<td>4</td>
</tr>
<tr>
<td>PPUA 5302</td>
<td>Information Design and Visual Analytics</td>
<td>4</td>
</tr>
</tbody>
</table>

**GAME USER RESEARCH**

Complete three of the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 5340</td>
<td>Computer/Human Interaction</td>
<td>4</td>
</tr>
<tr>
<td>GSND 6320</td>
<td>Psychology of Play</td>
<td>4</td>
</tr>
<tr>
<td>GSND 6330</td>
<td>Game User Research</td>
<td>4</td>
</tr>
<tr>
<td>GSND 6340</td>
<td>Advanced Game User Research</td>
<td>4</td>
</tr>
</tbody>
</table>

**GAME DESIGN AND DEVELOPMENT**

Complete three of the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 5150</td>
<td>Game Artificial Intelligence</td>
<td>4</td>
</tr>
<tr>
<td>CS 5850</td>
<td>Building Game Engines</td>
<td>4</td>
</tr>
<tr>
<td>GSND 6240</td>
<td>Exploratory Concept Design</td>
<td>4</td>
</tr>
<tr>
<td>GSND 6250</td>
<td>Spatial and Temporal Design</td>
<td>4</td>
</tr>
</tbody>
</table>

**Electives**

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

Complete two of the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 5150</td>
<td>Game Artificial Intelligence</td>
<td>4</td>
</tr>
<tr>
<td>CS 5340</td>
<td>Computer/Human Interaction</td>
<td>4</td>
</tr>
<tr>
<td>CS 5850</td>
<td>Building Game Engines</td>
<td>4</td>
</tr>
<tr>
<td>DA 5020</td>
<td>Collecting, Storing, and Retrieving Data</td>
<td>4</td>
</tr>
<tr>
<td>DA 5030</td>
<td>Introduction to Data Mining/Machine Learning</td>
<td>4</td>
</tr>
<tr>
<td>GSND 6240</td>
<td>Exploratory Concept Design</td>
<td>4</td>
</tr>
<tr>
<td>GSND 6250</td>
<td>Spatial and Temporal Design</td>
<td>4</td>
</tr>
<tr>
<td>GSND 6330</td>
<td>Game User Research</td>
<td>4</td>
</tr>
<tr>
<td>GSND 6320</td>
<td>Psychology of Play</td>
<td>4</td>
</tr>
<tr>
<td>GSND 6340</td>
<td>Advanced Game User Research</td>
<td>4</td>
</tr>
<tr>
<td>GSND 6350</td>
<td>Game Analytics</td>
<td>4</td>
</tr>
<tr>
<td>PPUA 5302</td>
<td>Information Design and Visual Analytics</td>
<td>4</td>
</tr>
</tbody>
</table>

**Thesis/Project**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>GSND 7990</td>
<td>Thesis</td>
<td>4</td>
</tr>
<tr>
<td>or GSND 7995</td>
<td>Games Project</td>
<td></td>
</tr>
</tbody>
</table>

**Plan of Study**

**Year 1**

<table>
<thead>
<tr>
<th>Semester</th>
<th>Hours</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>4</td>
<td>GSND 5110</td>
<td>Concentration elective</td>
<td>4</td>
</tr>
<tr>
<td>Spring</td>
<td>4</td>
<td>GSND 5111</td>
<td>Concentration elective</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GSND 5130 or 6301</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Year 2**

<table>
<thead>
<tr>
<th>Semester</th>
<th>Hours</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>4</td>
<td>GSND 5122</td>
<td>General elective</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>GSND 7990 or 7995</td>
<td>Concentration elective</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>General elective</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**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.

**Requirements**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>DA 5020</td>
<td>Collecting, Storing, and Retrieving Data</td>
<td>4</td>
</tr>
<tr>
<td>DA 5030</td>
<td>Introduction to Data Mining/Machine Learning</td>
<td>4</td>
</tr>
<tr>
<td>PPUA 5301</td>
<td>Introduction to Computational Statistics</td>
<td>4</td>
</tr>
<tr>
<td>PPUA 5302</td>
<td>Information Design and Visual Analytics</td>
<td>4</td>
</tr>
</tbody>
</table>

**Program Credit/GPA Requirements**

16 total semester hours required
Minimum 3.000 GPA required

**Program Credit/GPA Requirements**

34 total semester hours required
Minimum 3.000 GPA required
The MS programs’ student learning outcome is:

**Master of Science**

The PhD programs’ student learning outcomes are:

**Doctor of Philosophy**

The PhD programs’ student learning outcomes are:

- Ability to use basic engineering concepts flexibly in a variety of contexts

**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.

Electrical and Computer Engineering

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>GPA</td>
<td>3.2</td>
</tr>
<tr>
<td>Minimum TOEFL requirement</td>
<td>90</td>
</tr>
<tr>
<td>Minimum IELTS requirement</td>
<td>7</td>
</tr>
<tr>
<td>Note: If below TOEFL/IELTS requirement at matriculation, a new TOEFL/IELTS meeting requirement is needed.</td>
<td></td>
</tr>
</tbody>
</table>

Required preparation courses ENCP 6100 or EECE 6000

Minimum number of semester hours completed 16 SH

Bioengineering, Chemical Engineering, Civil Engineering, Engineering and Public Policy, Environmental Engineering, Industrial Engineering, Data Analytics, Operations Research and Mechanical Engineering

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>GPA</td>
<td>3.2</td>
</tr>
<tr>
<td>Minimum TOEFL requirement</td>
<td>95</td>
</tr>
<tr>
<td>Minimum IELTS requirement</td>
<td>7</td>
</tr>
<tr>
<td>Note: If below TOEFL/IELTS requirement at matriculation, a new TOEFL/IELTS meeting requirement is needed</td>
<td></td>
</tr>
</tbody>
</table>

Required preparation course ENCP 6100

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 Campus MSIS Students Only

Seattle 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 access to the NUcareers co-op database.
2. Total co-op length for the two co-ops 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 (xxxx9990). 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 out of the course. Students should not expect that they will be added to the classes after the university course add deadline.

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 3.00 or higher each term to remain in good academic standing and to progress toward graduation. Students falling below a cumulative GPA of 3.00 are placed on academic probation for each academic term in which the cumulative GPA is below 3.00. 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 3.00 will have one academic term to raise the cumulative GPA greater than or equal to 3.00. Students whose cumulative GPA is below 3.00 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 3.00 after completion of 8 semester hours. Part-time students must raise the cumulative GPA to 3.00 or higher after completion of 8 additional semester hours to regain good academic standing status.

If the student's cumulative GPA remains below 3.00 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 3.00 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 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 director (if applicable), and by the Graduate School of Engineering.

**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
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.

## Bioengineering

Website (http://www.bioe.neu.edu)

Lee Makowski, PhD  
Professor and Chair  
206 Interdisciplinary Science and Engineering Complex  
617.373.3006  
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 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 in bioengineering 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. 212).

### GORDON INSTITUTE OF ENGINEERING LEADERSHIP OPTION

Students have the opportunity to pursue the Gordon Engineering Leadership Program (p. 204) in combination with the MS degree.

### Programs

**Doctor of Philosophy (PhD)**

- Bioengineering (p. 113)
- Bioengineering—Advanced Entry (p. 120)

---

**Master of Science in Bioengineering (MSBioE)**

- Bioengineering (p. 122)

### 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.

<table>
<thead>
<tr>
<th>Requirements</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required core courses</td>
<td>24 SH</td>
</tr>
<tr>
<td>Required and elective track courses</td>
<td>24 SH</td>
</tr>
<tr>
<td>Advanced seminar (register and complete four semesters)</td>
<td>0 SH</td>
</tr>
<tr>
<td>Dissertation</td>
<td>0 SH</td>
</tr>
<tr>
<td>Minimum semester hours required</td>
<td>48 SH</td>
</tr>
</tbody>
</table>

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**

**TRACK MANAGERS: DANA BROOKS AND DENIZ ERDOGMUS**

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**

**TRACK MANAGERS: SINAN MUFTU AND JEFFREY RUBERTI**

Biomechanics and mechanobiology are linked by the biological response to applied forces and stresses. 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**

**TRACK MANAGERS: EDGAR GOLUCH AND SHASHI MURTHY**

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  
**TRACK MANAGERS: REBECCA CARRIER AND APRIL GU**  
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  
**TRACK MANAGERS: RIFAT SIPAHI AND DAGMAR STERNAD**  
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  
**TRACK MANAGERS: STEFANO BASAGNI AND MIRIAM LEESER**  
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  
**TRACK MANAGERS: ANAND ASTHAGIRI AND ERIN CRAM**  
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  
**TRACK MANAGER: JEFFREY RUBERTI**

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

**General Requirements**

<table>
<thead>
<tr>
<th>Seminar</th>
<th>BIOE 7390</th>
<th>Seminar (Register and complete four semesters)</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Required Courses</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIOE 5100</td>
<td>Medical Physiology</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>BIOE 7000</td>
<td>Principles of Bioengineering</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td><strong>Additional Course Work</strong></td>
<td>Complete 12 semester hours from the following:</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>BIOE 5651</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIOE 7001</td>
<td>Biomaterials</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHME 5630</td>
<td>Biochemical Engineering</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EECE 5664</td>
<td>Biomedical Signal Processing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ME 5667</td>
<td>Solid Mechanics of Cells and Tissues</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Dissertation Courses</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIOE 9990</td>
<td>Dissertation</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Track Options**

Complete one of the following tracks:

- Biomedical Imaging and Signal Processing Track (p. 117)
- Biomechanics and Mechanobiology Track (p. 116)
- BioMEMs/BioNANO Track (p. 116)
- Biochemical and Bioenvironmental Engineering Track (p. 117)
- Motor Control Track (p. 117)
- Biocomputing Track (p. 117)
- Cell and Tissue Engineering Track (p. 117)
- General Bioengineering Studies Track (p. 117)

**BIOMEDICAL IMAGING AND SIGNAL PROCESSING TRACK**

**Required Courses**

| EECE 7200 | Linear Systems Analysis | 4 |
| EECE 7203 | Complex Variable Theory and Differential Equations | 4 |
| EECE 7204 | Applied Probability and Stochastic Processes | 4 |
| **Complete 16 semester hours from the following:** | | 16 |
| BIOE 5235 | Biomedical Imaging | |
**Bioengineering, PhD**

**BIOMECHANICS AND MECHANOBIOLGY TRACK**

**Required Courses**
- BIOE 5650: Multiscale Biomechanics 4
- CHME 5669: Special Topics in Chemical 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
- BIOE 5380: Advanced Biomolecular Dynamics and Control
- BIOE 5410: Molecular Bioengineering
- BIOE 5630: Physiological Fluid Mechanics
- BIOE 5651: Biomechanics
- BIOE 7300: Special Topics in Biomechanics
- BIOL 5601: Multidisciplinary Approaches in Motor Control
- EECE 7367: Robotics and Automation Systems
- 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 7240: Composite Materials
- ME 7245: Fracture Mechanics and Failure Analysis
- ME 7255: Continuum Mechanics
- ME 7275: Essentials of Fluid Dynamics
- ME 7280: Statistical Thermodynamics
- ME 7325: Two Phase Flow
- PT 5133: Kinesiology and Lab for PT 5133
- PT 5170: Motor Control and Lab for PT 5170
- PT 6215: Assistive Technology and Lab for PT 6215

**BIOMEMS/BIONANO TRACK**

**Required Course Work**
- EEE 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
- EEE 5606: Micro- and Nanofabrication
- ME 7262: Nanomanufacturing I
- NNMD 5470: Nano- and Biomedical Commercialization: From 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
PMST 6256  Advanced Pharmacokinetics

**BIOCHEMICAL AND BIOENVIRONMENTAL TRACK**

**Required Course Work**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 6300</td>
<td>Biochemistry</td>
</tr>
<tr>
<td>CHME 5630</td>
<td>Biochemical Engineering</td>
</tr>
<tr>
<td>CHME 7340</td>
<td>Chemical Engineering Kinetics</td>
</tr>
<tr>
<td>CHME 7350</td>
<td>Transport Phenomena</td>
</tr>
<tr>
<td>CIVE 7251</td>
<td>Environmental Biological Processes</td>
</tr>
</tbody>
</table>

**Mathematical Methods**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHME 7320</td>
<td>Chemical Engineering Mathematics</td>
</tr>
<tr>
<td>EECE 7200</td>
<td>Linear Systems Analysis</td>
</tr>
<tr>
<td>EECE 7203</td>
<td>Complex Variable Theory and Differential Equations</td>
</tr>
<tr>
<td>ME 7205</td>
<td>Advanced Mathematical Methods for Mechanical Engineers</td>
</tr>
</tbody>
</table>

**Electives**

Complete 16 semester hours from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 5581</td>
<td>Biological Imaging</td>
</tr>
<tr>
<td>BIOL 6301</td>
<td>Molecular Cell Biology</td>
</tr>
<tr>
<td>CHEM 5612</td>
<td>Principles of Mass Spectrometry</td>
</tr>
<tr>
<td>CHEM 5613</td>
<td>Optical Methods of Analysis</td>
</tr>
<tr>
<td>CHEM 5620</td>
<td>Protein Chemistry</td>
</tr>
<tr>
<td>CHEM 5621</td>
<td>Principles of Chemical Biology for Chemists</td>
</tr>
<tr>
<td>CHEM 5660</td>
<td>Analytical Biochemistry</td>
</tr>
<tr>
<td>CHEM 5686</td>
<td>Fundamentals of Molecular Structure and Electronics</td>
</tr>
<tr>
<td>CHEM 7317</td>
<td>Analytical Biotechnology</td>
</tr>
<tr>
<td>PHSC 5100</td>
<td>Concepts in Pharmaceutical Science</td>
</tr>
<tr>
<td>PHSC 6218</td>
<td>Biomedical Chemical Analysis</td>
</tr>
<tr>
<td>PHSC 6290</td>
<td>Biophysical Methods in Drug Discovery</td>
</tr>
<tr>
<td>PHYS 7731</td>
<td>Biological Physics 1</td>
</tr>
<tr>
<td>PMST 6252</td>
<td>Pharmacokinetics and Drug Metabolism</td>
</tr>
<tr>
<td>PMST 6254</td>
<td>Advanced Drug Delivery System</td>
</tr>
<tr>
<td>PMST 6256</td>
<td>Advanced Pharmacokinetics</td>
</tr>
</tbody>
</table>

**MOTOR CONTROL TRACK**

**Required Course Work**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 5601</td>
<td>Multidisciplinary Approaches in Motor Control</td>
</tr>
<tr>
<td>ME 5659</td>
<td>Control Systems Engineering</td>
</tr>
<tr>
<td>ME 5665</td>
<td>Musculoskeletal Biomechanics</td>
</tr>
</tbody>
</table>

**Mathematical Methods**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHME 7320</td>
<td>Chemical Engineering Mathematics</td>
</tr>
</tbody>
</table>

**Electives**

Complete 16 semester hours from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 5581</td>
<td>Biological Imaging</td>
</tr>
<tr>
<td>BIOL 6301</td>
<td>Molecular Cell Biology</td>
</tr>
<tr>
<td>CS 5100</td>
<td>Foundations of Artificial Intelligence</td>
</tr>
<tr>
<td>CS 5200</td>
<td>Database Management Systems</td>
</tr>
<tr>
<td>CS 5310</td>
<td>Computer Graphics</td>
</tr>
</tbody>
</table>

**BIOCOMPUTING TRACK**

**Required Course Work**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>EECE 7205</td>
<td>Fundamentals of Computer Engineering</td>
</tr>
<tr>
<td>EECE 7360</td>
<td>Combinatorial Optimization</td>
</tr>
</tbody>
</table>

**Mathematical Methods**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHME 7320</td>
<td>Chemical Engineering Mathematics</td>
</tr>
<tr>
<td>EECE 7200</td>
<td>Linear Systems Analysis</td>
</tr>
<tr>
<td>EECE 7203</td>
<td>Complex Variable Theory and Differential Equations</td>
</tr>
<tr>
<td>ME 7205</td>
<td>Advanced Mathematical Methods for Mechanical Engineers</td>
</tr>
</tbody>
</table>

**Electives**

Complete 16 semester hours from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 5581</td>
<td>Biological Imaging</td>
</tr>
<tr>
<td>BIOL 6301</td>
<td>Molecular Cell Biology</td>
</tr>
<tr>
<td>CS 5100</td>
<td>Foundations of Artificial Intelligence</td>
</tr>
<tr>
<td>CS 5200</td>
<td>Database Management Systems</td>
</tr>
<tr>
<td>CS 5310</td>
<td>Computer Graphics</td>
</tr>
</tbody>
</table>
### Bioengineering, PhD

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 5320</td>
<td>Digital Image Processing</td>
</tr>
<tr>
<td>CS 5330</td>
<td>Pattern Recognition and Computer Vision</td>
</tr>
<tr>
<td>CS 5400</td>
<td>Principles of Programming Language</td>
</tr>
<tr>
<td>CS 5600</td>
<td>Computer Systems</td>
</tr>
<tr>
<td>CS 5800</td>
<td>Algorithms</td>
</tr>
<tr>
<td>CS 6110</td>
<td>Knowledge-Based Systems</td>
</tr>
<tr>
<td>CS 6140</td>
<td>Machine Learning</td>
</tr>
<tr>
<td>CS 6200</td>
<td>Information Retrieval</td>
</tr>
<tr>
<td>CS 6410</td>
<td>Compilers</td>
</tr>
<tr>
<td>CS 6610</td>
<td>Parallel Computing</td>
</tr>
<tr>
<td>CS 6810</td>
<td>Distributed Algorithms</td>
</tr>
<tr>
<td>EECE 7200</td>
<td>Linear Systems Analysis</td>
</tr>
<tr>
<td>EECE 7203</td>
<td>Complex Variable Theory and Differential Equations</td>
</tr>
<tr>
<td>EECE 7204</td>
<td>Applied Probability and Stochastic Processes</td>
</tr>
<tr>
<td>EECE 7313</td>
<td>Pattern Recognition</td>
</tr>
<tr>
<td>EECE 7339</td>
<td>Testing and Design for Testability</td>
</tr>
<tr>
<td>EECE 7350</td>
<td>Software Engineering 1</td>
</tr>
<tr>
<td>EECE 7351</td>
<td>Software Engineering 2</td>
</tr>
<tr>
<td>EECE 7352</td>
<td>Computer Architecture</td>
</tr>
<tr>
<td>EECE 7353</td>
<td>VLSI Design</td>
</tr>
<tr>
<td>EECE 7354</td>
<td>VLSI Architecture</td>
</tr>
<tr>
<td>EECE 7357</td>
<td>Fault-Tolerant Computers</td>
</tr>
<tr>
<td>EECE 7358</td>
<td>Parallel Architecture for High-Performance</td>
</tr>
<tr>
<td>EECE 7359</td>
<td>Multiprocessor Architectures</td>
</tr>
<tr>
<td>EECE 7361</td>
<td>Digital Hardware Synthesis</td>
</tr>
<tr>
<td>EECE 7364</td>
<td>Mobile and Wireless Networking</td>
</tr>
<tr>
<td>EECE 7365</td>
<td>Distributed Systems</td>
</tr>
<tr>
<td>EECE 7367</td>
<td>Robotics and Automation Systems</td>
</tr>
<tr>
<td>EECE 7368</td>
<td>High-Level Design of Hardware-Software Systems</td>
</tr>
<tr>
<td>EECE 7389</td>
<td>Robot Vision and Sensors</td>
</tr>
<tr>
<td>OR 6205</td>
<td>Deterministic Operations Research</td>
</tr>
<tr>
<td>OR 7230</td>
<td>Probabilistic Operation Research</td>
</tr>
<tr>
<td>BIOE 5380</td>
<td>Advanced Biomolecular Dynamics and Control</td>
</tr>
<tr>
<td>BIOE 5410</td>
<td>Molecular Bioengineering</td>
</tr>
<tr>
<td>BIOE 5630</td>
<td>Physiological Fluid Mechanics</td>
</tr>
<tr>
<td>BIOE 7200</td>
<td>Special Topics in Cell and Tissue Engineering</td>
</tr>
<tr>
<td>BIOL 5307</td>
<td>Biological Electron Microscopy</td>
</tr>
<tr>
<td>BIOL 5543</td>
<td>Stem Cells and Regeneration</td>
</tr>
<tr>
<td>BIOL 5581</td>
<td>Biological Imaging</td>
</tr>
<tr>
<td>CHME 5699</td>
<td>Special Topics in Chemical Engineering</td>
</tr>
<tr>
<td>CHME 7340</td>
<td>Chemical Engineering Kinetics</td>
</tr>
<tr>
<td>CHME 7350</td>
<td>Transport Phenomena</td>
</tr>
<tr>
<td>EECE 5648</td>
<td>Biomedical Optics</td>
</tr>
<tr>
<td>ME 5667</td>
<td>Solid Mechanics of Cells and Tissues</td>
</tr>
<tr>
<td>NNMD 5470</td>
<td>Nano- and Biomedical Commercialization: From Concept to Market</td>
</tr>
<tr>
<td>PHYS 7741</td>
<td>Biological Physics 2</td>
</tr>
</tbody>
</table>

### GENERAL BIOENGINEERING STUDIES TRACK

**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 5651
- 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 5553 Biology of Muscle: Molecules to Movements
- 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

### CELL AND TISSUE TRACK

**Required Courses**

- 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

- BINF 6200 Bioinformatics Programming
- BINF 6308 Bioinformatics Computational Methods
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BINF 6309</td>
<td>Bioinformatics Computational Methods 2</td>
</tr>
<tr>
<td>CAEP 6202</td>
<td>Research, Evaluation, and Data Analysis</td>
</tr>
<tr>
<td>CHEM 5612</td>
<td>Principles of Mass Spectrometry</td>
</tr>
<tr>
<td>CHEM 5613</td>
<td>Optical Methods of Analysis</td>
</tr>
<tr>
<td>CHEM 5620</td>
<td>Protein Chemistry</td>
</tr>
<tr>
<td>CHEM 5621</td>
<td>Principles of Chemical Biology for Chemists</td>
</tr>
<tr>
<td>CHEM 5637</td>
<td>Foundations of Spectroscopy</td>
</tr>
<tr>
<td>CHEM 5638</td>
<td>Molecular Modeling</td>
</tr>
<tr>
<td>CHEM 5660</td>
<td>Analytical Biochemistry</td>
</tr>
<tr>
<td>CHEM 5686</td>
<td>Fundamentals of Molecular Structure and Electronics</td>
</tr>
<tr>
<td>CHEM 7247</td>
<td>Advances in Nanomaterials</td>
</tr>
<tr>
<td>CHEM 7317</td>
<td>Analytical Biotechnology</td>
</tr>
<tr>
<td>CHME 5630</td>
<td>Biochemical Engineering</td>
</tr>
<tr>
<td>CHME 5699</td>
<td>Special Topics in Chemical Engineering</td>
</tr>
<tr>
<td>CHME 7260</td>
<td>Special Topics in Chemical Engineering</td>
</tr>
<tr>
<td>CHME 7330</td>
<td>Chemical Engineering Thermodynamics</td>
</tr>
<tr>
<td>CHME 7340</td>
<td>Chemical Engineering Kinetics</td>
</tr>
<tr>
<td>CHME 7350</td>
<td>Transport Phenomena</td>
</tr>
<tr>
<td>CIVE 7251</td>
<td>Environmental Biological Processes</td>
</tr>
<tr>
<td>CS 5100</td>
<td>Foundations of Artificial Intelligence</td>
</tr>
<tr>
<td>CS 5200</td>
<td>Database Management Systems</td>
</tr>
<tr>
<td>CS 5310</td>
<td>Computer Graphics</td>
</tr>
<tr>
<td>CS 5320</td>
<td>Digital Image Processing</td>
</tr>
<tr>
<td>CS 5330</td>
<td>Pattern Recognition and Computer Vision</td>
</tr>
<tr>
<td>CS 5335</td>
<td>Robotic Science and Systems</td>
</tr>
<tr>
<td>CS 5336</td>
<td>Lab for CS 5335</td>
</tr>
<tr>
<td>CS 5600</td>
<td>Computer Systems</td>
</tr>
<tr>
<td>CS 5800</td>
<td>Algorithms</td>
</tr>
<tr>
<td>CS 6110</td>
<td>Knowledge-Based Systems</td>
</tr>
<tr>
<td>CS 6140</td>
<td>Machine Learning</td>
</tr>
<tr>
<td>CS 6200</td>
<td>Information Retrieval</td>
</tr>
<tr>
<td>CS 6410</td>
<td>Compilers</td>
</tr>
<tr>
<td>CS 6610</td>
<td>Parallel Computing</td>
</tr>
<tr>
<td>CS 6810</td>
<td>Distributed Algorithms</td>
</tr>
<tr>
<td>EECE 5606</td>
<td>Micro- and Nanofabrication</td>
</tr>
<tr>
<td>EECE 5648</td>
<td>Biomedical Optics</td>
</tr>
<tr>
<td>EECE 7200</td>
<td>Linear Systems Analysis</td>
</tr>
<tr>
<td>EECE 7202</td>
<td>Electromagnetic Theory 1</td>
</tr>
<tr>
<td>EECE 7203</td>
<td>Complex Variable Theory and Differential Equations</td>
</tr>
<tr>
<td>EECE 7204</td>
<td>Applied Probability and Stochastic Processes</td>
</tr>
<tr>
<td>EECE 7205</td>
<td>Fundamentals of Computer Engineering</td>
</tr>
<tr>
<td>EECE 7211</td>
<td>Nonlinear Control</td>
</tr>
<tr>
<td>EECE 7213</td>
<td>System Identification and Adaptive Control</td>
</tr>
<tr>
<td>EECE 7214</td>
<td>Optimal and Robust Control</td>
</tr>
<tr>
<td>EECE 7236</td>
<td>Special Topics in Control</td>
</tr>
<tr>
<td>EECE 7271</td>
<td>Computational Methods in Electromagnetics</td>
</tr>
<tr>
<td>EECE 7280</td>
<td>Fourier and Binary Optics</td>
</tr>
<tr>
<td>EECE 7281</td>
<td>Fourier Optics</td>
</tr>
<tr>
<td>EECE 7284</td>
<td>Optical Properties of Matter</td>
</tr>
<tr>
<td>EECE 7293</td>
<td>Modern Imaging</td>
</tr>
<tr>
<td>EECE 7310</td>
<td>Modern Signal Processing</td>
</tr>
<tr>
<td>EECE 7311</td>
<td>Two Dimensional Signal and Image Processing</td>
</tr>
<tr>
<td>EECE 7312</td>
<td>Statistical and Adaptive Signal Processing</td>
</tr>
<tr>
<td>EECE 7313</td>
<td>Pattern Recognition</td>
</tr>
<tr>
<td>EECE 7314</td>
<td>Auditory Signal Processing</td>
</tr>
<tr>
<td>EECE 7323</td>
<td>Numerical Optimization Methods</td>
</tr>
<tr>
<td>EECE 7335</td>
<td>Detection and Estimation Theory</td>
</tr>
<tr>
<td>EECE 7337</td>
<td>Information Theory</td>
</tr>
<tr>
<td>EECE 7339</td>
<td>Testing and Design for Testability</td>
</tr>
<tr>
<td>EECE 7350</td>
<td>Software Engineering 1</td>
</tr>
<tr>
<td>EECE 7351</td>
<td>Software Engineering 2</td>
</tr>
<tr>
<td>EECE 7352</td>
<td>Computer Architecture</td>
</tr>
<tr>
<td>EECE 7353</td>
<td>VLSI Design</td>
</tr>
<tr>
<td>EECE 7354</td>
<td>VLSI Architecture</td>
</tr>
<tr>
<td>EECE 7357</td>
<td>Fault-Tolerant Computers</td>
</tr>
<tr>
<td>EECE 7358</td>
<td>Parallel Architecture for High-Performance Computing</td>
</tr>
<tr>
<td>EECE 7359</td>
<td>Multiprocessor Architectures</td>
</tr>
<tr>
<td>EECE 7360</td>
<td>Combinatorial Optimization</td>
</tr>
<tr>
<td>EECE 7361</td>
<td>Digital Hardware Synthesis</td>
</tr>
<tr>
<td>EECE 7364</td>
<td>Mobile and Wireless Networking</td>
</tr>
<tr>
<td>EECE 7365</td>
<td>Distributed Systems</td>
</tr>
<tr>
<td>EECE 7367</td>
<td>Robotics and Automation Systems</td>
</tr>
<tr>
<td>EECE 7368</td>
<td>High-Level Design of Hardware-Software Systems</td>
</tr>
<tr>
<td>EECE 7389</td>
<td>Robot Vision and Sensors</td>
</tr>
<tr>
<td>EXSC 6263</td>
<td>Research Design and Methodology</td>
</tr>
<tr>
<td>IE 7280</td>
<td>Statistical Methods in Engineering</td>
</tr>
<tr>
<td>IE 7315</td>
<td>Human Factors Engineering</td>
</tr>
<tr>
<td>ME 5650</td>
<td>Advanced Mechanics of Materials</td>
</tr>
<tr>
<td>ME 5655</td>
<td>Dynamics and Mechanical Vibration</td>
</tr>
<tr>
<td>ME 5657</td>
<td>Finite Element Method</td>
</tr>
<tr>
<td>ME 5659</td>
<td>Control Systems Engineering</td>
</tr>
<tr>
<td>ME 5665</td>
<td>Musculoskeletal Biomechanics</td>
</tr>
<tr>
<td>ME 5667</td>
<td>Solid Mechanics of Cells and Tissues</td>
</tr>
<tr>
<td>ME 6200</td>
<td>Mathematical Methods for Mechanical Engineers 1</td>
</tr>
<tr>
<td>ME 6201</td>
<td>Mathematical Methods for Mechanical Engineers 2</td>
</tr>
<tr>
<td>ME 6260</td>
<td>Introduction to Microelectromechanical Systems (MEMS)</td>
</tr>
<tr>
<td>ME 7210</td>
<td>Elasticity and Plasticity</td>
</tr>
<tr>
<td>ME 7238</td>
<td>Advanced Finite Element Method</td>
</tr>
<tr>
<td>ME 7240</td>
<td>Composite Materials</td>
</tr>
<tr>
<td>ME 7245</td>
<td>Fracture Mechanics and Failure Analysis</td>
</tr>
<tr>
<td>ME 7255</td>
<td>Continuum Mechanics</td>
</tr>
<tr>
<td>ME 7262</td>
<td>Nanomanufacturing 1</td>
</tr>
<tr>
<td>ME 7275</td>
<td>Essentials of Fluid Dynamics</td>
</tr>
</tbody>
</table>
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

**Program Credit/GPA Requirements**

48 total semester hours required
Minimum 3.000 GPA required

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME 7280</td>
<td>Statistical Thermodynamics</td>
</tr>
<tr>
<td>ME 7325</td>
<td>Two Phase Flow</td>
</tr>
<tr>
<td>OR 6205</td>
<td>Deterministic Operations Research</td>
</tr>
<tr>
<td>OR 7230</td>
<td>Probabilistic Operation Research</td>
</tr>
<tr>
<td>NNMD 5470</td>
<td>Nano- and Biomedical Commercialization: From Concept to Market</td>
</tr>
<tr>
<td>PHSC 5100</td>
<td>Concepts in Pharmaceutical Science</td>
</tr>
<tr>
<td>PHSC 6210</td>
<td>Drug Design, Evaluation, and Development</td>
</tr>
<tr>
<td>PHSC 6218</td>
<td>Biomedical Chemical Analysis</td>
</tr>
<tr>
<td>PHSC 6290</td>
<td>Biophysical Methods in Drug Discovery</td>
</tr>
<tr>
<td>PHYS 5260</td>
<td>Introduction to Nanoscience and Nanotechnology</td>
</tr>
<tr>
<td>PHYS 7301</td>
<td>Classical Mechanics/Math Methods</td>
</tr>
<tr>
<td>PHYS 7321</td>
<td>Computational Physics</td>
</tr>
<tr>
<td>PHYS 7731</td>
<td>Biological Physics 1</td>
</tr>
<tr>
<td>PHYS 7735</td>
<td>Nonlinear Dynamics</td>
</tr>
<tr>
<td>PHYS 7741</td>
<td>Biological Physics 2</td>
</tr>
<tr>
<td>PMST 6250</td>
<td>Advanced Physical Pharmacy</td>
</tr>
<tr>
<td>PMST 6252</td>
<td>Pharmacokinetics and Drug Metabolism</td>
</tr>
<tr>
<td>PMST 6254</td>
<td>Advanced Drug Delivery System</td>
</tr>
<tr>
<td>PMST 6256</td>
<td>Advanced Pharmacokinetics</td>
</tr>
<tr>
<td>PSYC 5120</td>
<td>Proseminar in Sensation</td>
</tr>
<tr>
<td>PSYC 5130</td>
<td>Proseminar in Perception</td>
</tr>
<tr>
<td>PSYC 5180</td>
<td>Quantitative Methods 1</td>
</tr>
<tr>
<td>PSYC 5181</td>
<td>Quantitative Methods 2</td>
</tr>
<tr>
<td>PSYC 7220</td>
<td>Seminar in Sensation</td>
</tr>
<tr>
<td>PSYC 7230</td>
<td>Seminar in Perception</td>
</tr>
<tr>
<td>PSYC 7300</td>
<td>Advanced Quantitative Analysis</td>
</tr>
<tr>
<td>PT 5133</td>
<td>Kinesiology</td>
</tr>
<tr>
<td>PT 5134</td>
<td>Lab for PT 5133</td>
</tr>
<tr>
<td>PT 5138</td>
<td>Neuroscience</td>
</tr>
<tr>
<td>PT 5139</td>
<td>Lab for PT 5138</td>
</tr>
<tr>
<td>PT 5150</td>
<td>Motor Control, Development, and Learning</td>
</tr>
<tr>
<td>PT 5151</td>
<td>Lab for PT 5150</td>
</tr>
<tr>
<td>PT 5170</td>
<td>Motor Control</td>
</tr>
<tr>
<td>PT 5171</td>
<td>Lab for PT 5170</td>
</tr>
<tr>
<td>PT 6215</td>
<td>Assistive Technology</td>
</tr>
<tr>
<td>SLPA 5111</td>
<td>Anatomy and Physiology of the Auditory System</td>
</tr>
<tr>
<td>SLPA 6209</td>
<td>Psychoacoustics</td>
</tr>
<tr>
<td>SLPA 6301</td>
<td>Speech Science</td>
</tr>
</tbody>
</table>

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
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) 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 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**  
Track Managers: Dana Brooks and Deniz Erdogmus

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**  
Track Managers: Sinan Muftu and Jeffrey Ruberti

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**  
Track Managers: Edgar Goluch and Shashi Murthy

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**  
Track Managers: Rebecca Carrier and April Gu

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**  
Track Managers: Rifat Sipahi and Dagmar Sternad

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**

Track Managers: Stefano Basagni and Miriam Leeser

The biocomputing track draws on strengths in computer engineering and computation applied to bioengineering applications.

**TRACK 7: CELL AND TISSUE ENGINEERING**

Track Managers: Anand Asthagiri and Erin Cram

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**

Track Manager: Jeffrey Ruberti

**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

**General Requirements**

**Seminar**

BIOE 7390 Seminar (Register and complete four semesters) 0

**Approved Course Work**

Select courses in consultation with faculty advisor. 16

**Dissertation**

Complete the following (repeatable) course twice:

BIOE 9990 Dissertation

**Program Credit/GPA Requirements**

16 total semester hours required
Minimum 3.000 GPA required

Students accepted to the Master of Science in Bioengineering program have the option to carry out research or complete a course-only program of studies:

- Thesis option resulting in the preparation and defense of an MS thesis (BIOE 7990), 8 semester hours of research.
- MS project option (Master’s Project (BIOE 7890), 4 semester hours of research)
- Course-only option

Students are required to complete a total of 33 semester hours of courses with a minimum cumulative grade-point average (GPA) of 3.00 to graduate with an MS in bioengineering. All MS students are required to take two core courses (Medical Physiology (BIOE 5100), and Principles of Bioengineering (BIOE 6000)). Each student must select a concentration and complete two required courses specific to that concentration. In addition, each student needs to complete 12 semester hours of technical electives if they are completing the thesis option, 16 semester hours for the project option, or 20 semester hours for the course-only option. Courses are selected from an approved list of technical electives for their concentration. Enrollment in Seminar (BIOE 7390) is required each term.

Students 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 (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 5655).

**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), and Design, Manufacture, and Evaluation of Medical Devices (BIOE 5250), are required for all students in this concentration.

**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. 212).

**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. 205)

**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.

**General Requirements**

**Seminar**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOE 7390</td>
<td>Seminar</td>
<td>0</td>
</tr>
</tbody>
</table>

**Required Core**

A grade of C or higher is required in each course:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOE 5100</td>
<td>Medical Physiology</td>
<td>4</td>
</tr>
<tr>
<td>BIOE 6000</td>
<td>Principles of Bioengineering</td>
<td>1</td>
</tr>
</tbody>
</table>

**Concentrations**

Complete one of the following four concentrations:

- Bioimaging and Signal Processing (p. 123)
- Cell and Tissue Engineering (p. 123)
- Biomechanics (p. 124)
- Biomedical Devices (p. 124)

**Bioimaging and Signal Processing**

**Required Course Work**

A grade of C or higher is required.

**Course List**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EECE 7200</td>
<td>Linear Systems Analysis</td>
<td>4</td>
</tr>
<tr>
<td>EECE 7204</td>
<td>Applied Probability and Stochastic Processes</td>
<td>4</td>
</tr>
</tbody>
</table>

**Course Work Option**

Complete 20 semester hours from the course list.  20

**Project Option**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOE 7890</td>
<td>Master’s Project</td>
<td>4</td>
</tr>
</tbody>
</table>

**Electives**

Complete 16 semester hours from the course list.  16

**Thesis Option**

Complete the following (repeatable) course twice:  8

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOE 7990</td>
<td>Thesis</td>
<td>4</td>
</tr>
</tbody>
</table>

**Electives**

Complete 12 semester hours from the course list.  12

**Course List**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOE 5320</td>
<td>Advanced Biomedical Measurements and Instrumentation</td>
<td></td>
</tr>
<tr>
<td>BIOE 5235</td>
<td>Biomedical Imaging</td>
<td></td>
</tr>
<tr>
<td>BIOE 7100</td>
<td>Special Topics in Biomedical Imaging and Signal Processing</td>
<td></td>
</tr>
<tr>
<td>BIOL 5581</td>
<td>Biological Imaging</td>
<td></td>
</tr>
<tr>
<td>EECE 5639</td>
<td>Computer Vision</td>
<td></td>
</tr>
<tr>
<td>EECE 5648</td>
<td>Biomedical Optics</td>
<td></td>
</tr>
<tr>
<td>EECE 7203</td>
<td>Complex Variable Theory and Differential Equations</td>
<td></td>
</tr>
<tr>
<td>EECE 7204</td>
<td>Applied Probability and Stochastic Processes</td>
<td></td>
</tr>
<tr>
<td>EECE 7314</td>
<td>Auditory Signal Processing</td>
<td></td>
</tr>
<tr>
<td>PHSC 6226</td>
<td>Imaging in Medicine and Drug Discovery</td>
<td></td>
</tr>
</tbody>
</table>

**CELL AND TISSUE ENGINEERING**

**Required Course Work**

A grade of C or higher is required.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOE 5410</td>
<td>Molecular Bioengineering</td>
<td>4</td>
</tr>
<tr>
<td>BIOE 5420</td>
<td>Cellular Engineering</td>
<td>4</td>
</tr>
</tbody>
</table>

**Course Work Option**

Complete 20 semester hours from the course list.  20

**Project Option**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOE 7890</td>
<td>Master’s Project</td>
<td>4</td>
</tr>
</tbody>
</table>

**Electives**

Complete 16 semester hours from the course list.  16

**Thesis Option**

Complete the following (repeatable) course twice:  8

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOE 7990</td>
<td>Thesis</td>
<td>4</td>
</tr>
</tbody>
</table>

**Electives**

Complete 12 semester hours from the course list.  12

**Course List**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOE 5430</td>
<td>Principles and Applications of Tissue Engineering</td>
<td></td>
</tr>
<tr>
<td>BIOE 5820</td>
<td>Biomaterials</td>
<td></td>
</tr>
<tr>
<td>BIOL 5543</td>
<td>Stem Cells and Regeneration</td>
<td></td>
</tr>
<tr>
<td>BIOL 6301</td>
<td>Molecular Cell Biology</td>
<td></td>
</tr>
<tr>
<td>CHEM 5500</td>
<td>Introduction to Regulatory Science</td>
<td></td>
</tr>
<tr>
<td>ME 5667</td>
<td>Solid Mechanics of Cells and Tissues</td>
<td></td>
</tr>
</tbody>
</table>

**Note:** This major requires a concentration: biomechanics, biomedical devices, bioimaging and signal processing, or cell and tissue engineering. Consult your college administrator.
### BIOMECHANICS

**Required Course Work**

A grade of C or higher is required.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME 5665</td>
<td>Musculoskeletal Biomechanics</td>
<td>4</td>
</tr>
<tr>
<td>BIOE 5650</td>
<td>Multiscale Biomechanics</td>
<td>4</td>
</tr>
</tbody>
</table>

**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

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOE 7990</td>
<td>Thesis</td>
</tr>
</tbody>
</table>

**Electives**

Complete 12 semester hours from the course list. 12

**Course List**

- BIO 5630  Physiological Fluid Mechanics
- BIOE 5651  Biomaterials
- BIO 7001  Special Topics in Biomechanics
- BIOL 5553  Biology of Muscle: Molecules to Movements
- BIOL 5601  Multidisciplinary Approaches in Motor Control
- BIOL 7384  Topics in Integrative Biology
- EECE 7200  Linear Systems Analysis
- EECE 7203  Complex Variable Theory and Differential Equations
- EECE 7367  Robotics and Automation Systems
- 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 7240  Composite Materials
- ME 7245  Fracture Mechanics and Failure Analysis
- ME 7255  Continuum Mechanics

### BIOMEDICAL DEVICES

**Required Course Work**

A grade of C or higher is required.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOE 5810</td>
<td>Design of Biomedical Instrumentation</td>
<td>4</td>
</tr>
<tr>
<td>BIOE 5250</td>
<td>Design, Manufacture, and Evaluation of Medical Devices</td>
<td>4</td>
</tr>
</tbody>
</table>

**Course Work Option**

Complete 20 semester hours from the course list. 20

**Project Option**

**Electives**

Complete 16 semester hours from the course list. 16

**Thesis Option**

Complete the following (repeatable) course twice: 8

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOE 7990</td>
<td>Thesis</td>
</tr>
</tbody>
</table>

**Electives**

Complete 12 semester hours from the course list. 12

**Course List**

- BIOL 5587  Comparative Neurobiology
- BIOE 5850  Design of Implants
- BIOE 7001  Biomaterials
- BIOE 7400  Special Topics in Biomedical Devices
- CHEM 5500  Introduction to Regulatory Science
- 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
- ME 7262  Nanomanufacturing 1
- NNMD 5470  Nano- and Biomedical Commercialization: From Concept to Market
- NNMD 5370  Nanomedicine Research Techniques
- PHSC 6226  Imaging in Medicine and Drug Discovery

### Program Credit/GPA Requirements

- 33 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

Ming Su, PhD
Associate Professor and Associate Chair for Graduate Studies
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 in chemical engineering 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. 212).

**GORDON INSTITUTE OF ENGINEERING LEADERSHIP OPTION**

Students have the opportunity to pursue the Gordon Engineering Leadership Program (p. 204) in combination with the MS degree.

**Programs**

**Doctor of Philosophy (PhD)**

- Chemical Engineering (p. 125)
- Chemical Engineering—Advanced Entry (p. 126)

**Master of Science in Chemical Engineering (MSCHE)**

- Chemical Engineering (p. 127)

**Graduate Certificate**

- Process Safety Engineering (p. 129)

---

**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, he or she 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 three 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
Annual review
Dissertation proposal
Dissertation committee
Dissertation defense

General 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.

Core
A cumulative 3.500 GPA is required for the core.
CHME 7320 Chemical Engineering Mathematics 4
CHME 7330 Chemical Engineering Thermodynamics 4
CHME 7340 Chemical Engineering Kinetics 4
CHME 7350 Transport Phenomena 4

Seminar
Must be taken each semester:
CHME 7390 Seminar

Electives
Requires 8 semester hours. Consult your faculty advisor for acceptable courses.

Dissertation
Complete the following (repeatable) course twice:
CHME 9990 Dissertation

Program Credit/GPA Requirements
24 total semester hours required
Minimum 3.000 GPA required

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
Language Requirement
There is no foreign language requirement for the Doctor of Philosophy degree. However, each candidate must be proficient in technical writing and oral presentation in the English language. The graduate committee may require additional coursework 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 coursework (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, he or she 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 three 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
Annual review
Dissertation proposal

Dissertation committee
Dissertation defense

General 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.

Core
A cumulative 3.500 GPA is required for the core.
CHME 7320 Chemical Engineering Mathematics 4
CHME 7330 Chemical Engineering Thermodynamics 4
CHME 7340 Chemical Engineering Kinetics 4
CHME 7350 Transport Phenomena 4

Seminar
Must be taken each semester:
CHME 7390 Seminar

Electives
Requires 8 semester hours. Consult your faculty advisor for acceptable courses.

Dissertation
Complete the following (repeatable) course twice:
CHME 9990 Dissertation

Program Credit/GPA Requirements
24 total semester hours required
Minimum 3.000 GPA required

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. 112) 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. 128).

<table>
<thead>
<tr>
<th>Degree Requirements</th>
<th>Thesis Option</th>
<th>Nonthesis Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required core courses</td>
<td>16 SH</td>
<td>16 SH</td>
</tr>
<tr>
<td>Master of Science thesis</td>
<td>8 SH</td>
<td>N/A</td>
</tr>
<tr>
<td>Seminar</td>
<td>0 SH</td>
<td>N/A</td>
</tr>
<tr>
<td>Elective courses</td>
<td>8 SH</td>
<td>16 SH</td>
</tr>
<tr>
<td>Minimum semester hours required</td>
<td>32 SH</td>
<td>32 SH</td>
</tr>
</tbody>
</table>

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 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. 212).

**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. The integrated 32-semester-hour degree and certificate will require 16 hours of advisor-approved chemical engineering technical courses.

Engineering Leadership (p. 205)

**Program Requirements**

Complete all courses and requirements listed below unless otherwise indicated.

**General Requirements**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHME 7320</td>
<td>Chemical Engineering Mathematics</td>
<td>4</td>
</tr>
<tr>
<td>CHME 7330</td>
<td>Chemical Engineering Thermodynamics</td>
<td>4</td>
</tr>
<tr>
<td>CHME 7340</td>
<td>Chemical Engineering Kinetics</td>
<td>4</td>
</tr>
<tr>
<td>CHME 7350</td>
<td>Transport Phenomena</td>
<td>4</td>
</tr>
</tbody>
</table>

**Options**

Complete one of the following options:

**COURSE WORK OPTION**

Complete 16 semester hours from the course list below. (p. 128)

**THESIS OPTION**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHME 7990</td>
<td>Thesis</td>
<td>8</td>
</tr>
<tr>
<td>CHME 7990</td>
<td>Seminar</td>
<td>8</td>
</tr>
</tbody>
</table>

**Electives**

Complete 8 semester hours from the course list below. (p. 128)

**Course List**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHME 5204</td>
<td>Heterogeneous Catalysis</td>
</tr>
<tr>
<td>CHME 5510</td>
<td>Fundamentals in Process Safety Engineering</td>
</tr>
<tr>
<td>CHME 5520</td>
<td>Process Safety Engineering—Chemical Reactivity, Reliefs, and Hazards Analysis</td>
</tr>
<tr>
<td>CHME 5630</td>
<td>Biochemical Engineering</td>
</tr>
<tr>
<td>CHME 6610</td>
<td>Computational Programs in Process Safety for Relief and Scenario Modeling</td>
</tr>
<tr>
<td>CHME 7201</td>
<td>Fluid Mechanics</td>
</tr>
<tr>
<td>CHME 7202</td>
<td>Chemical Process Heat Transfer</td>
</tr>
</tbody>
</table>
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.

Requirements

Process Safety

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHME 5510</td>
<td>Fundamentals in Process Safety Engineering</td>
<td>4</td>
</tr>
<tr>
<td>CHME 5520</td>
<td>Process Safety Engineering—Chemical Reactivity, Reliefs, and Hazards Analysis</td>
<td>4</td>
</tr>
</tbody>
</table>

Relief and Scenario Modeling

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHME 6610</td>
<td>Computational Programs in Process Safety for Relief and Scenario Modeling</td>
<td>4</td>
</tr>
</tbody>
</table>

Special Topics

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHME 7262</td>
<td>Special Topics in Process Safety</td>
<td>4</td>
</tr>
</tbody>
</table>

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

400 Snell Engineering Center
617.373.2444
617.373.4419 (fax)
Jerome F. Hajjar, CDM Smith Professor and Chair, jf.hajjar@northeastern.edu

Having a range of teaching and research strengths, anchored by several multidisciplinary, multi-institutional centers and programs that are core to the activities of the department, our department’s strategic focus on urban engineering prepares future master’s and PhD graduates for many of the greatest challenges of our time. Also, building on current strengths and expanding into new and vital areas in civil and environmental engineering, three overarching themes are highlighted in our department, including environmental health, civil Infrastructure security, and sustainable resource engineering, all aligned with four premier departmental strengths in simulation (both computational and experimental), smart sensing, data and network science, and urban informatics.

The Department of Civil and Environmental Engineering offers research and educational programs at both MS and PhD levels. We offer graduate programs leading to the degrees of Master of Science in Civil Engineering, Master of Science in Environmental Engineering, Master of Science in Engineering and Public Policy, and Master of Science in Sustainable Building Systems. Our cutting-edge doctoral programs include a PhD in civil engineering and an interdisciplinary PhD. Both programs are flexible and may be adapted to any subject area in civil and environmental engineering, including interdisciplinary options within the department or across departments or colleges.

Master of Science Degree

Northeastern’s Department of Civil and Environmental Engineering’s strategic focus on urban engineering gives our graduates the opportunity to make a real-world impact on and make 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. All civil and environmental engineering master’s programs are available on a full-time or part-time basis. Options for a master’s thesis or report in place of course work are available. At the master’s level, the following degrees are offered:

1. Master of Science in Civil Engineering with concentration in:
   • Construction management
   • Environmental and water systems
   • Geotechnical/geoenvironmental engineering
   • Structural engineering
   • Transportation

2. Master of Science in Environmental Engineering

3. Master of Science in Engineering and Public Policy with concentration in:
4. Master of Science in Sustainable Building Systems

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 GPA of 3.000.

There are detailed course and degree requirements for different degree/concentration areas. Three types of courses fulfill the required semester hours, including required core courses, restricted electives, and other electives. Graduate courses that are not listed may also be considered as other electives; these courses require a petition approved by the concentration advisor via the Graduate School of Engineering petition system. Both full-time and part-time students should meet with a faculty advisor at least once during each semester of study to arrange for an appropriate sequence of courses to satisfy all degree requirements. Links to the individual concentrations may be found under the Programs 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. 212).

GORDON INSTITUTE OF ENGINEERING LEADERSHIP OPTION

Students have the opportunity to pursue the Gordon Engineering Leadership Program (p. 204) in combination with the MS degree.

Doctor of Philosophy (PhD) Degree

The Department of Civil and Environmental Engineering admits applicants to the PhD program either directly after earning a suitable bachelor’s degree (bachelor’s 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 area exams) and all the required course work.

The doctoral program is designed to be flexible with respect to subject area. Since the PhD is primarily a research degree, the program must be adaptable to changes in research needs. 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.

Programs

Doctor of Philosophy (PhD)

- Civil Engineering (p. 130)
- Civil Engineering—Advanced Entry (p. 131)

Master of Science (MS)

- Engineering and Public Policy with Concentration in Energy and Environment (p. 132)
- Engineering and Public Policy with Concentration in Infrastructure Resilience (p. 133)

Master of Science in Civil Engineering (MSCivE)

- Civil Engineering with Concentration in Construction Management (p. 135)
- Civil Engineering with Concentration in Environmental and Water Systems (p. 136)
- Civil Engineering with Concentration in Geotechnical/Geoenvironmental Engineering (p. 137)
- Civil Engineering with Concentration in Structural Engineering (p. 138)
- Civil Engineering with Concentration in Transportation (p. 139)

Master of Science in Environmental Engineering (MSENVE)

- Environmental Engineering (p. 140)

Master of Science in Sustainable Building Systems (MSSBS)

- Sustainable Building Systems (p. 141)

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

Each student’s mastery of subject matter is measured by a qualifying examination covering a subset of subjects 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 major'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 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 qualifying examination 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

Course Work Requirement
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 Courses
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

Each student’s mastery of subject matter is measured by a qualifying examination covering a subset of subjects 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 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 qualifying examination 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

### General 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 Courses

Complete the following (repeatable) course twice:

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIVE 9990</td>
<td>Dissertation</td>
<td>12 SH</td>
</tr>
</tbody>
</table>

### Program Credit/GPA Requirements

- Complete 20 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.

<table>
<thead>
<tr>
<th>Degree Requirements</th>
<th>With Report</th>
<th>With Thesis</th>
<th>Course Work Only</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required core courses</td>
<td>20 SH</td>
<td>20 SH</td>
<td>20 SH</td>
</tr>
<tr>
<td>Other electives</td>
<td>8 SH</td>
<td>4 SH</td>
<td>12 SH</td>
</tr>
<tr>
<td>Master of Science report/thesis</td>
<td>4 SH</td>
<td>8 SH</td>
<td></td>
</tr>
<tr>
<td>Minimum semester hours required</td>
<td>32 SH</td>
<td>32 SH</td>
<td>32 SH</td>
</tr>
</tbody>
</table>

### 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. 212).
GORDON INSTITUTE OF ENGINEERING LEadership

Master's Degree in Engineering and Public Policy with a Concentration in Energy and Environment with Graduate Certificate in Engineering Leadership

Students may complete a Master of Science in Engineering and Public Policy with a 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.

Required Core Courses

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 5275 Life Cycle Assessment of Materials, Products, and Infrastructure
CIVE 7388 Special Topics in Civil Engineering (Agent-Based Modeling)
CIVE 5261 Dynamic Modeling for Environmental Investment and Policymaking

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 Applied Time Series and Spatial Statistics
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
Complete 12 semester hours from the Energy and Environment Course List below.

REPORT OPTION
Complete 8 semester hours from the Energy and Environment Course List below.
CIVE 8674 Master's Report 4

THESIS OPTION
Complete 4 semester hours from the Energy and Environment Course List below.
CIVE 7990 Thesis 8

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.

CIVE 5270 Environmental Protection and Management
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 7263 Groundwater Quality Modeling
CIVE 7388 Special Topics in Civil Engineering (Urban Informatics)
CIVE 7392 Special Topics in Environmental Engineering (Hydraulic Engineering)
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 7235 Urban and Regional Policy and Planning in Developing Countries
PPUA 7237 Advanced Spatial Analysis of Urban Systems

Program Credit/GPA Requirements
32 total semester hours required
Minimum 3.000 GPA required

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

<table>
<thead>
<tr>
<th>Requirement</th>
<th>With Report</th>
<th>With Thesis</th>
<th>Course Work Only</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required core courses</td>
<td>20 SH</td>
<td>20 SH</td>
<td>20 SH</td>
</tr>
<tr>
<td>Other electives</td>
<td>8 SH</td>
<td>4 SH</td>
<td>12 SH</td>
</tr>
<tr>
<td>Master of Science report/thesis</td>
<td>4 SH</td>
<td>8 SH</td>
<td></td>
</tr>
<tr>
<td>Minimum semester hours required</td>
<td>32 SH</td>
<td>32 SH</td>
<td>32 SH</td>
</tr>
</tbody>
</table>

### 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. 212).

#### GORDON INSTITUTE OF ENGINEERING LEADERSHIP

**Master’s Degree in Engineering and Public Policy with a Concentration in Infrastructure Resilience with Graduate Certificate in Engineering Leadership**

Students may complete a Master of Science in Engineering and Public Policy with a 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. 205)

### Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

### Required Core Courses

#### Infrastructure Resilience

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIVE 7110</td>
<td>Critical Infrastructure Resilience</td>
<td>4</td>
</tr>
</tbody>
</table>

#### Environmental Systems Modeling

Complete 4 semester hours from the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIVE 5275</td>
<td>Life Cycle Assessment of Materials, Products, and Infrastructure</td>
<td>4</td>
</tr>
<tr>
<td>CIVE 5261</td>
<td>Dynamic Modeling for Environmental Investment and Policymaking</td>
<td></td>
</tr>
<tr>
<td>CIVE 5280</td>
<td>Remote Sensing of the Environment</td>
<td></td>
</tr>
<tr>
<td>CIVE 7388</td>
<td>Special Topics in Civil Engineering (Urban Informatics)</td>
<td></td>
</tr>
<tr>
<td>CIVE 7392</td>
<td>Special Topics in Environmental Engineering (Agent-Based Modeling)</td>
<td></td>
</tr>
</tbody>
</table>

#### Economics

Complete 4 semester hours from the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 7210</td>
<td>Applied Microeconomic Policy Analysis</td>
<td></td>
</tr>
<tr>
<td>LPSC 6313</td>
<td>Economic Analysis for Law, Policy, and Planning</td>
<td></td>
</tr>
</tbody>
</table>

### Public Policy and Analysis

Complete 4 semester hours from the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>LPSC 7311</td>
<td>Strategizing Public Policy</td>
<td>4</td>
</tr>
<tr>
<td>PPUA 6506</td>
<td>Techniques of Policy Analysis</td>
<td></td>
</tr>
<tr>
<td>PPUA 6509</td>
<td>Techniques of Program Evaluation</td>
<td></td>
</tr>
</tbody>
</table>

#### Statistics

Complete 4 semester hours from the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIVE 7100</td>
<td>Applied Time Series and Spatial Statistics</td>
<td></td>
</tr>
<tr>
<td>IE 6200</td>
<td>Engineering Probability and Statistics</td>
<td></td>
</tr>
<tr>
<td>IE 7280</td>
<td>Statistical Methods in Engineering</td>
<td></td>
</tr>
<tr>
<td>LPSC 7215</td>
<td>Advanced Quantitative Techniques</td>
<td></td>
</tr>
</tbody>
</table>

### Options

Complete one of the following options:

**COURSE WORK OPTION**

Complete 12 semester hours from the infrastructure course list below.

**REPORT OPTION**

Complete 8 semester hours from the infrastructure course list below.

**THESIS OPTION**

Complete 4 semester hours from the infrastructure course list below.

### Infrastructure Course List

Any required core course not used to meet the required core course requirement can be taken as a restricted elective.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMGT 6225</td>
<td>Economic Decision Making</td>
<td></td>
</tr>
<tr>
<td>ENVR 5260</td>
<td>Geographical Information Systems</td>
<td></td>
</tr>
<tr>
<td>IA 5250</td>
<td>Decision Making for Critical Infrastructure</td>
<td></td>
</tr>
<tr>
<td>IE 5500</td>
<td>Systems Engineering in Public Programs</td>
<td></td>
</tr>
<tr>
<td>IE 5640</td>
<td>Data Mining for Engineering Applications</td>
<td></td>
</tr>
<tr>
<td>IE 7290</td>
<td>Reliability Analysis and Risk Assessment</td>
<td></td>
</tr>
<tr>
<td>ME 5645</td>
<td>Environmental Issues in Manufacturing and Product Use</td>
<td></td>
</tr>
<tr>
<td>PPUA 5260</td>
<td>Ecological Economics</td>
<td></td>
</tr>
<tr>
<td>PPUA 5262</td>
<td>Big Data for Cities</td>
<td></td>
</tr>
<tr>
<td>PPUA 5263</td>
<td>Geographic Information Systems for Urban and Regional Policy</td>
<td></td>
</tr>
<tr>
<td>PPUA 6524</td>
<td>Case Studies in Policy Analysis</td>
<td></td>
</tr>
<tr>
<td>PPUA 7230</td>
<td>Housing Policy</td>
<td></td>
</tr>
<tr>
<td>PPUA 7231</td>
<td>Transportation Policy</td>
<td></td>
</tr>
<tr>
<td>PPUA 7234</td>
<td>Land Use and Urban Growth Policy</td>
<td></td>
</tr>
<tr>
<td>PPUA 7235</td>
<td>Urban and Regional Policy and Planning in Developing Countries</td>
<td></td>
</tr>
</tbody>
</table>
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.

Required Core Courses
- 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
    - Complete 14 semester hours from the course list below.
  - REPORT OPTION
    - CIVE 8674 Master's Report (4)
    - Complete 10 semester hours from the course list below.
  - THESIS OPTION
    - CIVE 7990 Thesis (8)
    - Complete 6 semester hours from the course list below.

Course List
- 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 5640 Data Mining for Engineering Applications
  or IE 7275 Data Mining in Engineering
- IE 7215 Simulation Analysis
- IE 7290 Reliability Analysis and Risk Assessment
- IE 7615 Neural Networks in Engineering
- 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

Program Requirements
- Complete all courses and requirements listed below unless otherwise indicated.
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

<table>
<thead>
<tr>
<th></th>
<th>With Report</th>
<th>With Thesis</th>
<th>Course Work Only</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required core</td>
<td>8 SH</td>
<td>8 SH</td>
<td>8 SH</td>
</tr>
<tr>
<td>Restricted electives</td>
<td>12 SH</td>
<td>12 SH</td>
<td>12 SH</td>
</tr>
<tr>
<td>Other electives</td>
<td>8 SH</td>
<td>4 SH</td>
<td>12 SH</td>
</tr>
<tr>
<td>Master of Science report/thesis</td>
<td>4 SH</td>
<td>8 SH</td>
<td></td>
</tr>
<tr>
<td>Minimum semester hours required</td>
<td>32 SH</td>
<td>32 SH</td>
<td>32 SH</td>
</tr>
</tbody>
</table>

### 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. 212).

### GORDON INSTITUTE OF ENGINEERING LEADERSHIP

**Master’s Degree in Civil Engineering with a Concentration in Environmental and Water Systems with Graduate Certificate in Engineering Leadership**

Students may complete a Master of Science in Civil Engineering with a 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. 205)

### Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

### Required Core Courses

Complete two of the following:

- CIVE 7250 Environmental Chemistry
- CIVE 7251 Environmental Biological Processes
- CIVE 7260 Hydrologic Modeling
- CIVE 7261 Surface Water Quality Modeling
- CIVE 7262 Groundwater 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

- Complete 12 semester hours from the Restricted Elective List below. 12
- Complete 12 semester hours from the Other Elective List below. 12

#### REPORT OPTION

- 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

- 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.

- CIVE 5250 Organic Pollutants in the Environment
- CIVE 5260 Environmental Fluid Mechanics
- CIVE 5261 Dynamic Modeling for Environmental Investment and Policymaking
- CIVE 5270 Environmental Protection and Management
- 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 5321 Geoenvironmental Engineering
- CIVE 5536 Hydrologic Engineering
- CIVE 6777 Climate Hazards and Resilient Cities Abroad
- CIVE 6778 Climate Adaptation and Policy Abroad
- CIVE 7100 Applied Time Series and Spatial Statistics
- 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.

EECE 5626  Image Processing and Pattern Recognition
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.

<table>
<thead>
<tr>
<th>Degree Requirements</th>
<th>With Report</th>
<th>With Thesis</th>
<th>Course Work Only</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required core courses</td>
<td>8 SH</td>
<td>8 SH</td>
<td>8 SH</td>
</tr>
<tr>
<td>Elective courses</td>
<td>20 SH</td>
<td>16 SH</td>
<td>24 SH</td>
</tr>
<tr>
<td>Master of Science report/thesis</td>
<td>4 SH</td>
<td>8 SH</td>
<td></td>
</tr>
<tr>
<td>Minimum semester hours required</td>
<td>32 SH</td>
<td>32 SH</td>
<td>32 SH</td>
</tr>
</tbody>
</table>

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 MSc degree. For more information please refer to Graduate Certificate Programs (p. 212).

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.

Program Requirements
Complete all courses and requirements listed below unless otherwise indicated.

Required Core Courses
CIVE 7301  Advanced Soil Mechanics  4
CIVE 7302  Advanced Foundation Engineering  4

Options
Complete one of the following options:

COURSE WORK OPTION
Complete 24 semester hours from the Elective Course List below.

REPORT OPTION
CIVE 8674  Master's Report  4
Complete 20 semester hours from the Elective Course List below.

THESIS OPTION
CIVE 7990  Thesis  8
Complete 16 semester hours from the Elective Course List below.

Elective Course List
CIVE 5270  Environmental Protection and Management
CIVE 5271  Solid and Hazardous Waste Management
CIVE 5321  Geoenvironmental Engineering
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 7263  Groundwater Quality 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
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.

Degrees

<table>
<thead>
<tr>
<th>Degree Requirements</th>
<th>With Report</th>
<th>With Thesis</th>
<th>Course Work Only</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required core courses</td>
<td>8 SH</td>
<td>8 SH</td>
<td>8 SH</td>
</tr>
<tr>
<td>Restricted electives</td>
<td>12 SH</td>
<td>12 SH</td>
<td>12 SH</td>
</tr>
<tr>
<td>Other electives</td>
<td>8 SH</td>
<td>4 SH</td>
<td>12 SH</td>
</tr>
<tr>
<td>Master of Science report/thesis</td>
<td>4 SH</td>
<td>8 SH</td>
<td></td>
</tr>
<tr>
<td>Minimum semester hours required</td>
<td>32 SH</td>
<td>32 SH</td>
<td>32 SH</td>
</tr>
</tbody>
</table>

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. 212).

GORDON INSTITUTE OF ENGINEERING LEADERSHIP

Master’s Degree in Civil Engineering with a Concentration in Structural Engineering with Graduate Certificate in Engineering Leadership

Students may complete a Master of Science in Civil Engineering with a 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.

Engineering Leadership (p. 205)

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Core Courses

- CIVE 7330 Advanced Structural Analysis 4
- CIVE 7331 Structural Dynamics 4

Options

Complete one of the following options:

**COURSE WORK OPTION**

- Complete 12 semester hours from the Restricted Elective List below.
- Complete 12 semester hours from the Other Elective List below.

**REPORT OPTION**

- CIVE 8674 Master’s Report 4
- Complete 12 semester hours from the Restricted Elective List below.
- Complete 8 semester hours from the Other Elective List below.

**THESIS OPTION**

- CIVE 7990 Thesis 8
- Complete 12 semester hours from the Restricted Elective List below.
- Complete 4 semester hours from the Other Elective List below.

Course Lists

**RESTRICTED ELECTIVE LIST**

- CIVE 5522 Structural Analysis 2
- 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 7396 Special Topics in Structural Engineering (Advanced Structural Mechanics)

**OTHER ELECTIVE LIST**

Any restricted elective not used to meet the restricted elective requirement can be taken as another elective.

- 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
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

<table>
<thead>
<tr>
<th></th>
<th>With Report</th>
<th>With Thesis</th>
<th>Course Work Only</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required core courses</td>
<td>12 SH</td>
<td>12 SH</td>
<td>12 SH</td>
</tr>
<tr>
<td>Restricted electives</td>
<td>8 SH</td>
<td>8 SH</td>
<td>12 SH</td>
</tr>
<tr>
<td>Other electives</td>
<td>8 SH</td>
<td>4 SH</td>
<td>8 SH</td>
</tr>
<tr>
<td>Master of Science report/thesis</td>
<td>4 SH</td>
<td>8 SH</td>
<td></td>
</tr>
<tr>
<td>Minimum semester hours required</td>
<td>32 SH</td>
<td>32 SH</td>
<td>32 SH</td>
</tr>
</tbody>
</table>

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. 212).

GORDON INSTITUTE OF ENGINEERING LEADERSHIP
Master’s Degree in Civil Engineering with a Concentration in Transportation with Graduate Certificate in Engineering Leadership
Students may complete a Master of Science in Civil Engineering with a 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. 205)

Program Requirements
Complete all courses and requirements listed below unless otherwise indicated.

Required Core Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIVE 5373</td>
<td>Transportation Planning and Engineering</td>
<td>4</td>
</tr>
<tr>
<td>CIVE 5376</td>
<td>Traffic Engineering</td>
<td>4</td>
</tr>
<tr>
<td>IE 6200</td>
<td>Engineering Probability and Statistics</td>
<td>4</td>
</tr>
</tbody>
</table>

Options
Complete one of the following options:

COURSE WORK OPTION
Complete 12 semester hours from the Restricted Elective List below.
Complete 8 semester hours from the Other Elective List below.

REPORT OPTION
Complete 8 semester hours from the Restricted Elective List below.
Complete 8 semester hours from the Other Elective List below.

THESIS OPTION
Complete 8 semester hours from the Restricted Elective List below.
Complete 4 semester hours from the Other Elective List below.

Course Lists

RESTRICTED ELECTIVE LIST

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIVE 6566</td>
<td>Sustainable Urban Transportation: Netherlands</td>
</tr>
<tr>
<td>CIVE 7380</td>
<td>Transportation Performance and Simulation Models</td>
</tr>
<tr>
<td>CIVE 7381</td>
<td>Transportation Demand Models</td>
</tr>
<tr>
<td>CIVE 7385</td>
<td>Public Transportation</td>
</tr>
<tr>
<td>CIVE 7387</td>
<td>Design Aspects of Roadway Safety</td>
</tr>
<tr>
<td>CIVE 7388</td>
<td>Special Topics in Civil Engineering (Informatics in Civil Engineering)</td>
</tr>
<tr>
<td>IE 7215</td>
<td>Simulation Analysis</td>
</tr>
<tr>
<td>IE 7280</td>
<td>Statistical Methods in Engineering</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>EECE 7313</td>
<td>Pattern Recognition</td>
</tr>
<tr>
<td>IE 7275</td>
<td>Data Mining in Engineering</td>
</tr>
<tr>
<td>IE 7290</td>
<td>Reliability Analysis and Risk Assessment</td>
</tr>
<tr>
<td>INFO 6210</td>
<td>Data Management and Database Design</td>
</tr>
<tr>
<td>MATH 7343</td>
<td>Applied Statistics</td>
</tr>
</tbody>
</table>
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 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. 212).

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. 205)

Program Requirements
Complete all courses and requirements listed below unless otherwise indicated.

Required Core Courses
Complete three of the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIVE 7250</td>
<td>Environmental Chemistry</td>
</tr>
<tr>
<td>CIVE 7251</td>
<td>Environmental Biological Processes</td>
</tr>
<tr>
<td>CIVE 7252</td>
<td>Water Engineering, Resources, and Energy Recovery</td>
</tr>
<tr>
<td>CIVE 7255</td>
<td>Environmental Physical/Chemical Processes</td>
</tr>
<tr>
<td>CIVE 7260</td>
<td>Hydrologic Modeling</td>
</tr>
</tbody>
</table>

Options
Complete one of the following options:

COURSE WORK OPTION
Complete 12 semester hours from the Restricted Electives List below.
Complete 8 semester hours from the Other Electives List below.

REPORT OPTION
CIVE 8674 Master’s Report
Complete 8 semester hours from the Restricted Electives List below.
Complete 8 semester hours from the Other Electives List below.

THESIS OPTION
CIVE 7990 Thesis
Complete 8 semester hours from the Restricted Electives List below.
Complete 4 semester hours from the Other Electives List below.

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.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIVE 5250</td>
<td>Organic Pollutants in the Environment</td>
</tr>
<tr>
<td>CIVE 5260</td>
<td>Environmental Fluid Mechanics</td>
</tr>
<tr>
<td>CIVE 5261</td>
<td>Dynamic Modeling for Environmental Investment and Policymaking</td>
</tr>
<tr>
<td>CIVE 5270</td>
<td>Environmental Protection and Management</td>
</tr>
<tr>
<td>CIVE 5271</td>
<td>Solid and Hazardous Waste Management</td>
</tr>
<tr>
<td>CIVE 5275</td>
<td>Life Cycle Assessment of Materials, Products, and Infrastructure</td>
</tr>
<tr>
<td>CIVE 5280</td>
<td>Remote Sensing of the Environment</td>
</tr>
<tr>
<td>CIVE 5300</td>
<td>Environmental Engineering Laboratory</td>
</tr>
<tr>
<td>CIVE 5321</td>
<td>Geoenvironmental Engineering</td>
</tr>
<tr>
<td>CIVE 5536</td>
<td>Hydrologic Engineering</td>
</tr>
<tr>
<td>CIVE 6777</td>
<td>Climate Hazards and Resilient Cities Abroad</td>
</tr>
<tr>
<td>CIVE 6778</td>
<td>Climate Adaptation and Policy Abroad</td>
</tr>
<tr>
<td>CIVE 7261</td>
<td>Surface Water Quality Modeling</td>
</tr>
</tbody>
</table>
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.

**Master's Degree in Sustainable Building Systems**

**Sample Curriculum**

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.

<table>
<thead>
<tr>
<th>Degree Requirements</th>
<th>Full-Time Study</th>
<th>Part-Time Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core courses</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Restricted electives</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Open elective</td>
<td>12</td>
<td>12</td>
</tr>
</tbody>
</table>

**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. 212).

**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. 205)

**Program Requirements**

Complete all courses and requirements listed below unless otherwise indicated.

**Core Requirements**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARCH 5210</td>
<td>Environmental Systems</td>
</tr>
<tr>
<td>and ARCH 5211</td>
<td>Recitation for ARCH 5210</td>
</tr>
<tr>
<td>SBSY 5100</td>
<td>Sustainable Design and Technologies in Construction</td>
</tr>
<tr>
<td>SBSY 5200</td>
<td>Sustainable Engineering Systems for Buildings</td>
</tr>
</tbody>
</table>

**Electives**

**RESTRICTED ELECTIVE LIST**

Complete 8 semester hours from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARCH 5220</td>
<td>Integrated Building Systems</td>
</tr>
<tr>
<td>CIVE 5221</td>
<td>Construction Project Control and Organization</td>
</tr>
<tr>
<td>CIVE 5231</td>
<td>Alternative Project Delivery Systems in Construction</td>
</tr>
<tr>
<td>CIVE 5275</td>
<td>Life Cycle Assessment of Materials, Products, and Infrastructure</td>
</tr>
<tr>
<td>CIVE 7220 or EMGT 5220</td>
<td>Construction Management</td>
</tr>
<tr>
<td>CIVE 7230</td>
<td>Legal Aspects of Civil Engineering</td>
</tr>
</tbody>
</table>

**Program Credit/GPA Requirements**

32 total semester hours required
Minimum 3.000 GPA required

**Sustainable Building Systems, MSSBS**

Website (http://www.northeastern.edu/camd/architecture/academic-programs/master-science-sustainable-building-systems)

**Sara Wadia-Fascetti, PhD**

Associate Dean for Graduate Education, Graduate School of Engineering
130 Snell Engineering Center
617.373.2711
mssusbuild@coe.neu.edu
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.

Complete 12 semester hours from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 6200</td>
<td>Financial Reporting and Managerial Decision Making 1</td>
</tr>
<tr>
<td>ACCT 6201</td>
<td>Financial Reporting and Managerial Decision Making 2</td>
</tr>
<tr>
<td>CIVE 5270</td>
<td>Environmental Protection and Management</td>
</tr>
<tr>
<td>CIVE 7350</td>
<td>Behavior of Concrete Structures</td>
</tr>
<tr>
<td>CIVE 7351</td>
<td>Behavior of Steel Structures</td>
</tr>
<tr>
<td>FINA 6200</td>
<td>Value Creation through Financial Decision Making</td>
</tr>
<tr>
<td>FINA 6216</td>
<td>Valuation and Value Creation</td>
</tr>
<tr>
<td>FINA 6217</td>
<td>Real Estate Finance and Investment</td>
</tr>
<tr>
<td>LPSC 7312</td>
<td>Cities, Sustainability, and Climate Change</td>
</tr>
<tr>
<td>ME 5645</td>
<td>Environmental Issues in Manufacturing and Product Use</td>
</tr>
</tbody>
</table>

**Program Credit/GPA Requirements**
32 total semester hours required
Minimum 3.000 GPA required

**Electrical and Computer Engineering**

Website (http://www.ece.neu.edu)

Miriam Leeser, PhD, Professor and Interim Chair

Waleed Meleis, PhD, Associate Professor and Associate Chair

409 Dana Research Center
617.373.7529
617.373.4431 (fax)
Jesse Marsh, Student Services Coordinator, ece-studentservices@ece.neu.edu

The Department of Electrical and Computer Engineering (ECE) offers the following graduate degree programs:

- Master of Science in Electrical and Computer Engineering (MSEECE)
- Master of Science in Electrical and Computer Engineering Leadership (MSECCEL)
- 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)

MSEECE students pursue their degree by selecting one of the two tracks—MSEECE with thesis and course track (MST) or MSEECE course-only track (MSC). 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. Full- and part-time students should follow the same curriculum requirements.

**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.

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-fall_2016.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 Theses (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-fall_2016.pdf).

**Graduate Certificate Options**
Students enrolled in a master’s degree in electrical and computer engineering 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. 212).

**GORDON INSTITUTE OF ENGINEERING LEADERSHIP OPTION**
Students have the opportunity to pursue the Master of Science in Electrical and Computer Engineering Leadership (MSECCEL) (p. 167) along with the Graduate Certificate in Engineering Leadership.
In addition, students have the opportunity to pursue the Gordon Engineering Leadership Program (p. 204) 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.

**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.

**Programs**

**Doctor of Philosophy (PhD)**

- Computer Engineering (p. 143)
- Computer Engineering—Advanced Entry (p. 144)
- Electrical Engineering (p. 145)
- Electrical Engineering—Advanced Entry (p. 146)

**Master of Science (MS)**

- Applied Physics and Engineering (p. 147)
- Data Science (p. 90)

**Master of Science in Electrical and Computer Engineering (MSECE)**

- Concentration in Communications, Control, and Signal Processing (p. 150)
- Concentration in Computer Systems and Software (p. 152)
- Concentration in Computer Networks and Security (p. 155)
- Concentration in Computer Vision, Machine Learning, and Algorithms (p. 157)
- Concentration in Electromagnetics, Plasma, and Optics (p. 160)
- Concentration in Microsystems, Materials, and Devices (p. 162)
- Concentration in Power Systems (p. 165)

**Master of Science in Electrical and Computer Engineering Leadership (MSECEL)**

- Electrical and Computer Engineering Leadership (p. 167)

**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-fall_2016.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.

**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 you are in the program for at least one year)
Qualifying examination
Dissertation committee
Proposal stage review
Dissertation defense

**General 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**
Complete the following (repeatable) course twice:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>EECE 9990</td>
<td>Dissertation</td>
</tr>
</tbody>
</table>

**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-fall_2016.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.

**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 you are in the program for at least one year)
Qualifying examination
Dissertation committee
Proposal stage review
Dissertation defense

General 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
Complete the following (repeatable) course twice:

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EECE 9990</td>
<td>Dissertation</td>
</tr>
</tbody>
</table>

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-fall_2016.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 subject matter knowledge satisfactory for the award of the degree.

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.

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 you are in the program for at least one year)
Qualifying examination
Dissertation committee
Proposal stage review
Dissertation defense
General 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
Complete the following (repeatable) course twice:

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EECE 9990</td>
<td>Dissertation</td>
</tr>
</tbody>
</table>

Program Credit/GPA Requirements
48 total semester hours required
Minimum 3.000 GPA required

Electrical Engineering, PhD—Advanced Entry

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-fall_2016.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.

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 you are in the program for at least one year)
Qualifying examination
Dissertation committee
Proposal stage review
Dissertation defense

General 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
Complete the following (repeatable) course twice:

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EECE 9990</td>
<td>Dissertation</td>
</tr>
</tbody>
</table>
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. 147)
- Electromagnetics, Plasma, and Optics (p. 147)
- Analysis, Modeling, and Computation (p. 147)

MICROSYSTEMS, MATERIALS, AND DEVICES
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 5696 Energy Harvesting Systems
EECE 7204 Applied Probability and Stochastic Processes
EECE 7240 Analog Integrated Circuit Design
EECE 7241 Advanced Solid State Devices
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 7246 Design and Analysis of Digital Integrated Circuits
EECE 7247 Radio Frequency Integrated Circuit Design
EECE 7353 VLSI Design
EECE 7354 VLSI Architecture
EECE 7269 Special Topics in Electronics, Semiconductor Devices, and Microfabrication

Physics Course Work
Complete 12 semester hours from the following: 12
PHYS 5114 Physics of Advanced Materials
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
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 7274 Propagation in Artificial Structures
EECE 7275 Antennas and Radiation
EECE 7276 Microwave Properties of Materials
EECE 7284 Optical Properties of Matter
EECE 7285 Opto-electronics and Fiber Optics
EECE 7287 Optical Detection
EECE 7293 Modern Imaging
EECE 7309 Special Topics in Electromagnetics, Plasma, and Optics

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
Core Courses
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, modeling, analyzing, and reasoning about data. Students will engage in an extensive core intended to develop depth in computational modeling, data collection and integration, data storage and retrieval, data processing, modeling and analytics, and visualization. Students will also be given a variety of elective areas in CCIS, the College of Engineering (COE), and throughout the campus to explore key contextual areas or more complex technical 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.

The Master of Science in Data Science is comprised of eight courses; five core courses and three electives. The core courses are designed and developed by the CCIS and ECE faculty. Elective courses consist of graduate courses offered in CCIS, COE, and other partner colleges.

### Course Requirements

The Master of Science in Data Science curriculum requires five core courses that represent the essential mathematical/statistical and technical knowledge for deep data analysis. These courses examine foundational programming concepts and languages, integration, collection, storage, retrieval, large-scale computing, mathematical concepts in statistics, linear algebra, and optimization, as well as visual and computational analysis, machine learning, and visualization. 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 non-data 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 fundamentals 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

Required Course Work
A grade of B or higher is required in the following courses:

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

Electives
Complete 12 semester hours from the following: 12

College of Computer and Information Science
CS 6200 Information Retrieval
CS 5100 Foundations of Artificial Intelligence
CS 6120 Natural Language Processing
CS 5750 Social Computing
CS 6350 Empirical Research Methods
CS 7180 Special Topics in Artificial Intelligence

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 7280</td>
<td>Special Topics in Database Management</td>
</tr>
</tbody>
</table>

College of Engineering

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIVE 7388</td>
<td>Special Topics in Civil Engineering</td>
</tr>
<tr>
<td>EECE 5639</td>
<td>Computer Vision</td>
</tr>
<tr>
<td>EECE 5640</td>
<td>High-Performance Computing</td>
</tr>
<tr>
<td>EECE 7335</td>
<td>Detection and Estimation Theory</td>
</tr>
<tr>
<td>EECE 7337</td>
<td>Information Theory</td>
</tr>
<tr>
<td>EECE 7360</td>
<td>Combinatorial Optimization</td>
</tr>
<tr>
<td>EECE 7370</td>
<td>Advanced Computer Vision</td>
</tr>
<tr>
<td>EECE 7397</td>
<td>Advanced Machine Learning</td>
</tr>
<tr>
<td>IE 5640</td>
<td>Data Mining for Engineering Applications</td>
</tr>
<tr>
<td>IE 7275</td>
<td>Data Mining in Engineering</td>
</tr>
<tr>
<td>IE 7280</td>
<td>Statistical Methods in Engineering</td>
</tr>
</tbody>
</table>

College of Social Sciences and Humanities

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>PPUA 5261</td>
<td>Dynamic Modeling for Environmental Decision Making</td>
</tr>
<tr>
<td>PPUA 5262</td>
<td>Big Data for Cities</td>
</tr>
<tr>
<td>PPUA 5263</td>
<td>Geographic Information Systems for Urban and Regional Policy</td>
</tr>
<tr>
<td>PPUA 5266</td>
<td>Urban Theory and Science</td>
</tr>
<tr>
<td>PPUA 7237</td>
<td>Advanced Spatial Analysis of Urban Systems</td>
</tr>
<tr>
<td>POLS 7200</td>
<td>Perspectives on Social Science Inquiry</td>
</tr>
<tr>
<td>POLS 7201</td>
<td>Research Design</td>
</tr>
<tr>
<td>POLS 7202</td>
<td>Quantitative Techniques</td>
</tr>
</tbody>
</table>

D’Amore-McKim School of Business

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUSN 6320</td>
<td>Business Analytics Fundamentals</td>
</tr>
<tr>
<td>BUSN 6324</td>
<td>Predictive Analytics for Managers</td>
</tr>
<tr>
<td>BUSN 6326</td>
<td>Introduction to Big Data and Digital Marketing Analytics</td>
</tr>
</tbody>
</table>

College of Science

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 7340</td>
<td>Statistics for Bioinformatics</td>
</tr>
<tr>
<td>PHYS 5116</td>
<td>Complex Networks and Applications</td>
</tr>
<tr>
<td>PHYS 7305</td>
<td>Statistical Physics</td>
</tr>
<tr>
<td>PHYS 7321</td>
<td>Computational Physics</td>
</tr>
<tr>
<td>PHYS 7331</td>
<td>Network Science Data</td>
</tr>
</tbody>
</table>

Bouvé College of Health Sciences

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>NRSG 5121</td>
<td>Epidemiology and Population Health</td>
</tr>
<tr>
<td>PHTH 5202</td>
<td>Introduction to Epidemiology</td>
</tr>
<tr>
<td>PHTH 5210</td>
<td>Biostatistics in Public Health</td>
</tr>
<tr>
<td>PHTH 5224</td>
<td>Social Epidemiology</td>
</tr>
</tbody>
</table>

College of Arts, Media and Design

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>GSND 5110</td>
<td>Game Design and Analysis</td>
</tr>
<tr>
<td>GSND 6350</td>
<td>Game Analytics</td>
</tr>
</tbody>
</table>

Note: Students that take 3-credit-hour elective courses (i.e., Bouvé, CSSH courses) will register for an accompanying data science project course in the same semester (DS 8982). 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 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. 212).

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. 205)

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Options

Complete one of the following options:

COURSE WORK OPTION

Depth Courses
Complete 20 semester hours from the depth course list below. (p. 150)

Breadth Courses
Complete 8 semester hours from the breadth course list below. (p. 151)

Elective
Complete 4 additional semester hours from either the depth or breadth course lists below.

THESIS OPTION

Thesis
EECE 7990 Thesis 8

Depth Courses
Complete 12 semester hours from the depth course list below. (p. 150)

Breadth Courses
Complete 4 semester hours from the breadth course list below. (p. 151)

Note: Depth courses cannot be taken for breadth.

Elective
Complete 8 additional semester hours from either the depth or breadth course lists below.

Course Lists

DEPTH COURSES

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>EECE 5576</td>
<td>Wireless Communication Systems</td>
</tr>
<tr>
<td>EECE 5580</td>
<td>Classical Control Systems</td>
</tr>
<tr>
<td>EECE 5610</td>
<td>Digital Control Systems</td>
</tr>
<tr>
<td>EECE 5626</td>
<td>Image Processing and Pattern Recognition</td>
</tr>
<tr>
<td>EECE 5664</td>
<td>Biomedical Signal Processing</td>
</tr>
<tr>
<td>EECE 5666</td>
<td>Digital Signal Processing</td>
</tr>
<tr>
<td>EECE 5698</td>
<td>Special Topics in Electrical and Computer Engineering (Mobile Robotics)</td>
</tr>
<tr>
<td>EECE 5698</td>
<td>Special Topics in Electrical and Computer Engineering (Principles of Assistive Robotics)</td>
</tr>
<tr>
<td>EECE 7200</td>
<td>Linear Systems Analysis</td>
</tr>
<tr>
<td>EECE 7204</td>
<td>Applied Probability and Stochastic Processes</td>
</tr>
<tr>
<td>EECE 7211</td>
<td>Nonlinear Control</td>
</tr>
<tr>
<td>EECE 7213</td>
<td>System Identification and Adaptive Control</td>
</tr>
<tr>
<td>EECE 7214</td>
<td>Optimal and Robust Control</td>
</tr>
<tr>
<td>EECE 7310</td>
<td>Modern Signal Processing</td>
</tr>
<tr>
<td>EECE 7311</td>
<td>Two Dimensional Signal and Image Processing</td>
</tr>
<tr>
<td>EECE 7312</td>
<td>Statistical and Adaptive Signal Processing</td>
</tr>
<tr>
<td>EECE 7323</td>
<td>Numerical Optimization Methods</td>
</tr>
<tr>
<td>EECE 7332</td>
<td>Error Correcting Codes</td>
</tr>
<tr>
<td>EECE 7335</td>
<td>Detection and Estimation Theory</td>
</tr>
<tr>
<td>EECE 7336</td>
<td>Digital Communications</td>
</tr>
<tr>
<td>EECE 7337</td>
<td>Information Theory</td>
</tr>
<tr>
<td>EECE 7263</td>
<td>Humanoid Robotics</td>
</tr>
<tr>
<td>EECE 7398</td>
<td>Special Topics (Probabilistic System Modeling and Analysis)</td>
</tr>
<tr>
<td>EECE 7398</td>
<td>Special Topics (Big Data and Sparsity in Control, Machine Learning, and Signal Processing)</td>
</tr>
<tr>
<td>EECE 7400</td>
<td>Special Problems in Electrical Engineering</td>
</tr>
<tr>
<td>BREADTH COURSES</td>
<td></td>
</tr>
<tr>
<td>-----------------</td>
<td>---</td>
</tr>
<tr>
<td>EECE 5155</td>
<td>Wireless Sensor Networks and the Internet of Things</td>
</tr>
<tr>
<td>EECE 5161</td>
<td>Thin Film Technologies</td>
</tr>
<tr>
<td>EECE 5606</td>
<td>Micro- and Nanofabrication</td>
</tr>
<tr>
<td>EECE 5627</td>
<td>Arithmetic and Circuit Design for Inexact Computing with Nanoscaled CMOS</td>
</tr>
<tr>
<td>EECE 5639</td>
<td>Computer Vision</td>
</tr>
<tr>
<td>EECE 5640</td>
<td>High-Performance Computing</td>
</tr>
<tr>
<td>EECE 5642</td>
<td>Data Visualization</td>
</tr>
<tr>
<td>EECE 5643</td>
<td>Simulation and Performance Evaluation</td>
</tr>
<tr>
<td>EECE 5644</td>
<td>Introduction to Machine Learning and Pattern Recognition</td>
</tr>
<tr>
<td>EECE 5647</td>
<td>Nanophotonics</td>
</tr>
<tr>
<td>EECE 5648</td>
<td>Biomedical Optics</td>
</tr>
<tr>
<td>EECE 5649</td>
<td>Design of Analog Integrated Circuits with Complementary Metal-Oxide-Semiconductor Technology</td>
</tr>
<tr>
<td>EECE 5680</td>
<td>Electric Drives</td>
</tr>
<tr>
<td>EECE 5684</td>
<td>Power Electronics</td>
</tr>
<tr>
<td>EECE 5686</td>
<td>Electrical Machines</td>
</tr>
<tr>
<td>EECE 5688</td>
<td>Analysis of Unbalanced Power Grids</td>
</tr>
<tr>
<td>EECE 5694</td>
<td>Electromagnetic Photonic Devices</td>
</tr>
<tr>
<td>EECE 5695</td>
<td>Radio-Frequency and Optical Antennas</td>
</tr>
<tr>
<td>EECE 5696</td>
<td>Energy Harvesting Systems</td>
</tr>
<tr>
<td>EECE 5697</td>
<td>Acoustics and Sensing</td>
</tr>
<tr>
<td>EECE 5698</td>
<td>Special Topics in Electrical and Computer Engineering (Networks: Technology, Economics, Social Interactions)</td>
</tr>
<tr>
<td>EECE 5698</td>
<td>Special Topics in Electrical and Computer Engineering (Software Security)</td>
</tr>
<tr>
<td>EECE 5698</td>
<td>Special Topics in Electrical and Computer Engineering (Advanced Network Management)</td>
</tr>
<tr>
<td>EECE 5698</td>
<td>Special Topics in Electrical and Computer Engineering (Robotics Sensing and Navigation)</td>
</tr>
<tr>
<td>EECE 5698</td>
<td>Special Topics in Electrical and Computer Engineering (Parallel Processing for Data Analytics)</td>
</tr>
<tr>
<td>EECE 5698</td>
<td>Special Topics in Electrical and Computer Engineering (Introduction to Multiferroic Materials and Systems)</td>
</tr>
<tr>
<td>EECE 7105</td>
<td>Optics for Engineers</td>
</tr>
<tr>
<td>EECE 7201</td>
<td>Solid State Devices</td>
</tr>
<tr>
<td>EECE 7202</td>
<td>Electromagnetic Theory 1</td>
</tr>
<tr>
<td>EECE 7203</td>
<td>Complex Variable Theory and Differential Equations</td>
</tr>
<tr>
<td>EECE 7205</td>
<td>Fundamentals of Computer Engineering</td>
</tr>
<tr>
<td>EECE 7220</td>
<td>Power System Analysis 2</td>
</tr>
<tr>
<td>EECE 7221</td>
<td>Power System Operation and Control</td>
</tr>
<tr>
<td>EECE 7224</td>
<td>Power Systems State Estimation</td>
</tr>
<tr>
<td>EECE 7226</td>
<td>Modeling and Simulation of Power System Transients</td>
</tr>
<tr>
<td>EECE 7238</td>
<td>Special Topics in Electric Drives</td>
</tr>
<tr>
<td>EECE 7228</td>
<td>Advanced Power Electronics (Advanced Power Electronics)</td>
</tr>
<tr>
<td>EECE 7239</td>
<td>Special Topics in Power Systems</td>
</tr>
<tr>
<td>EECE 7240</td>
<td>Analog Integrated Circuit Design</td>
</tr>
<tr>
<td>EECE 7242</td>
<td>Integrated Circuits for Mixed Signals and Data Communication</td>
</tr>
<tr>
<td>EECE 7243</td>
<td>Integrated Circuit Fabrication</td>
</tr>
<tr>
<td>EECE 7244</td>
<td>Introduction to Microelectromechanical Systems (MEMS)</td>
</tr>
<tr>
<td>EECE 7245</td>
<td>Microwave Circuit Design for Wireless Communication</td>
</tr>
<tr>
<td>EECE 7246</td>
<td>Design and Analysis of Digital Integrated Circuits</td>
</tr>
<tr>
<td>EECE 7247</td>
<td>Radio Frequency Integrated Circuit Design</td>
</tr>
<tr>
<td>EECE 7250</td>
<td>Power Management Integrated Circuits</td>
</tr>
<tr>
<td>EECE 7258</td>
<td>(Human Centered Computing – former Special Topics)</td>
</tr>
<tr>
<td>EECE 7270</td>
<td>Electromagnetic Theory 2</td>
</tr>
<tr>
<td>EECE 7271</td>
<td>Computational Methods in Electromagnetics</td>
</tr>
<tr>
<td>EECE 7275</td>
<td>Antennas and Radiation</td>
</tr>
<tr>
<td>EECE 7276</td>
<td>Microwave Properties of Materials</td>
</tr>
<tr>
<td>EECE 7284</td>
<td>Optical Properties of Matter</td>
</tr>
<tr>
<td>EECE 7285</td>
<td>Opto-electronics and Fiber Optics</td>
</tr>
<tr>
<td>EECE 7287</td>
<td>Optical Detection</td>
</tr>
<tr>
<td>EECE 7293</td>
<td>Modern Imaging</td>
</tr>
<tr>
<td>EECE 7295</td>
<td>Applied Magnetism</td>
</tr>
<tr>
<td>EECE 7296</td>
<td>Electronic Materials</td>
</tr>
<tr>
<td>EECE 7297</td>
<td>Advanced Magnetic Materials—Magnetic Devices</td>
</tr>
<tr>
<td>EECE 7298</td>
<td>Magnetic Materials—Fundamentals and Measurements</td>
</tr>
<tr>
<td>EECE 7309</td>
<td>Special Topics in Electromagnetics, Plasma, and Optics</td>
</tr>
<tr>
<td>EECE 7313</td>
<td>Pattern Recognition</td>
</tr>
<tr>
<td>EECE 7352</td>
<td>Computer Architecture</td>
</tr>
<tr>
<td>EECE 7353</td>
<td>VLSI Design</td>
</tr>
<tr>
<td>EECE 7357</td>
<td>Fault-Tolerant Computers</td>
</tr>
<tr>
<td>EECE 7360</td>
<td>Combinatorial Optimization</td>
</tr>
<tr>
<td>EECE 7364</td>
<td>Mobile and Wireless Networking</td>
</tr>
<tr>
<td>EECE 7368</td>
<td>High-Level Design of Hardware-Software Systems</td>
</tr>
<tr>
<td>EECE 7370</td>
<td>Advanced Computer Vision</td>
</tr>
<tr>
<td>EECE 7374</td>
<td>Fundamentals of Computer Networks</td>
</tr>
<tr>
<td>EECE 7376</td>
<td>Operating Systems: Interface and Implementation</td>
</tr>
<tr>
<td>EECE 7390</td>
<td>Computer Hardware Security</td>
</tr>
<tr>
<td>EECE 7393</td>
<td>Analysis and Design of Data Networks</td>
</tr>
<tr>
<td>EECE 7397</td>
<td>Advanced Machine Learning</td>
</tr>
<tr>
<td>EECE 7398</td>
<td>Special Topics (Analysis and Design of Data Networks)</td>
</tr>
<tr>
<td>EECE 7398</td>
<td>Special Topics (Compilers)</td>
</tr>
<tr>
<td>EECE 7398</td>
<td>Special Topics (Advanced Computer Architecture)</td>
</tr>
</tbody>
</table>
Electrical and Computer Engineering with Concentration in Computer Systems and Software, MSECE

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 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. 212).

GORDON INSTITUTE OF ENGINEERING LEADERSHIP
Master’s Degree in Electrical and Computer Engineering with a 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 a 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.

Program Requirements
Complete all courses and requirements listed below unless otherwise indicated.

Options
Complete one of the following options:

COURSE WORK OPTION

Depth Courses
Complete 20 semester hours from the depth course list below. (p. 153)

Breadth Courses
Complete 8 semester hours from the breadth course list below or other EECE courses chosen in consultation with a faculty advisor. (p. 153)

Note: Depth courses cannot be taken for breadth.

Elective
Complete 4 semester hours of either depth or breadth courses.

Program Credit/GPA Requirements
32 total semester hours required
Minimum 3.000 GPA required
**THESIS OPTION**

**Depth Courses**
Complete 12 semester hours from the depth course list below. (p. 153)

**Breadth Courses**
Complete 8 semester hours from the breadth course list below or other EECE courses chosen in consultation with a faculty advisor. (p. 153)

Note: Depth courses cannot be taken for breadth.

**Elective**
Complete 4 additional semester hours from either depth or breadth courses.

**Thesis**
EECE 7990 Thesis 8

**Course Lists**

**DEPTH COURSES**

EECE 5627 Arithmetic and Circuit Design for Inexact Computing with Nanoscaled CMOS
EECE 5640 High-Performance Computing
EECE 5643 Simulation and Performance Evaluation
EECE 5698 Special Topics in Electrical and Computer Engineering (Principles of Assistive Robotics)
EECE 7205 Fundamentals of Computer Engineering
EECE 7352 Computer Architecture
EECE 7353 VLSI Design
EECE 7357 Fault-Tolerant Computers
EECE 7368 High-Level Design of Hardware-Software Systems
EECE 7376 Operating Systems: Interface and Implementation
EECE 7390 Computer Hardware Security
EECE 7398 Special Topics (Compilers)
EECE 7398 Special Topics (Advanced Computer Architecture)
EECE 7398 Special Topics (Advanced Topics in Scalable and Sustainable System Design)
EECE 7400 Special Problems in Electrical Engineering
CS 5200 Database Management Systems
CS 5600 Computer Systems
CS 6410 Compilers
CS 6510 Advanced Software Development
CS 6520 Methods of Software Development
CS 6610 Parallel Computing
CS 6810 Distributed Algorithms

**BREADTH COURSES**

EECE 5155 Wireless Sensor Networks and the Internet of Things
EECE 5161 Thin Film Technologies
EECE 5576 Wireless Communication Systems
EECE 5580 Classical Control Systems
EECE 5606 Micro- and Nanofabrication

EECE 5610 Digital Control Systems
EECE 5626 Image Processing and Pattern Recognition
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 5664 Biomedical Signal Processing
EECE 5666 Digital Signal Processing
EECE 5680 Electric Drives
EECE 5682 Power Systems Analysis 1
EECE 5684 Power Electronics
EECE 5686 Electrical Machines
EECE 5688 Analysis of Unbalanced Power Grids
EECE 5694 Electromagnetic Photonic Devices
EECE 5695 Radio-Frequency and Optical Antennas
EECE 5696 Energy Harvesting Systems
EECE 5697 Acoustics and Sensing
EECE 5698 Special Topics in Electrical and Computer Engineering (Mobile Robotics)
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 (Mobile Robotics)
EECE 5698 Special Topics in Electrical and Computer Engineering (Robotics Sensing and Navigation)
EECE 5698 Special Topics in Electrical and Computer Engineering (Parallel Processing for Data Analytics)
EECE 5698 Special Topics in Electrical and Computer Engineering (Introduction to Multiferroic Materials and Systems)
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 7204 Applied Probability and Stochastic Processes
EECE 7211 Nonlinear Control
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>EECE 7213</td>
<td>System Identification and Adaptive Control</td>
</tr>
<tr>
<td>EECE 7214</td>
<td>Optimal and Robust Control</td>
</tr>
<tr>
<td>EECE 7220</td>
<td>Power System Analysis 2</td>
</tr>
<tr>
<td>EECE 7221</td>
<td>Power System Operation and Control</td>
</tr>
<tr>
<td>EECE 7224</td>
<td>Power Systems State Estimation</td>
</tr>
<tr>
<td>EECE 7226</td>
<td>Modeling and Simulation of Power System Transients</td>
</tr>
<tr>
<td>EECE 7228</td>
<td>Advanced Power Electronics</td>
</tr>
<tr>
<td>EECE 7238</td>
<td>Special Topics in Electric Drives</td>
</tr>
<tr>
<td>EECE 7239</td>
<td>Special Topics in Power Systems</td>
</tr>
<tr>
<td>EECE 7240</td>
<td>Analog Integrated Circuit Design</td>
</tr>
<tr>
<td>EECE 7242</td>
<td>Integrated Circuits for Mixed Signals and Data Communication</td>
</tr>
<tr>
<td>EECE 7243</td>
<td>Integrated Circuit Fabrication</td>
</tr>
<tr>
<td>EECE 7244</td>
<td>Introduction to Microelectromechanical Systems (MEMS)</td>
</tr>
<tr>
<td>EECE 7245</td>
<td>Microwave Circuit Design for Wireless Communication</td>
</tr>
<tr>
<td>EECE 7246</td>
<td>Design and Analysis of Digital Integrated Circuits</td>
</tr>
<tr>
<td>EECE 7247</td>
<td>Radio Frequency Integrated Circuit Design</td>
</tr>
<tr>
<td>EECE 7250</td>
<td>Power Management Integrated Circuits</td>
</tr>
<tr>
<td>EECE 7258</td>
<td></td>
</tr>
<tr>
<td>EECE 7263</td>
<td>Humanoid Robotics</td>
</tr>
<tr>
<td>EECE 7270</td>
<td>Electromagnetic Theory 2</td>
</tr>
<tr>
<td>EECE 7271</td>
<td>Computational Methods in Electromagnetics</td>
</tr>
<tr>
<td>EECE 7275</td>
<td>Antennas and Radiation</td>
</tr>
<tr>
<td>EECE 7276</td>
<td>Microwave Properties of Materials</td>
</tr>
<tr>
<td>EECE 7284</td>
<td>Optical Properties of Matter</td>
</tr>
<tr>
<td>EECE 7285</td>
<td>Opto-electronics and Fiber Optics</td>
</tr>
<tr>
<td>EECE 7287</td>
<td>Optical Detection</td>
</tr>
<tr>
<td>EECE 7293</td>
<td>Modern Imaging</td>
</tr>
<tr>
<td>EECE 7295</td>
<td>Applied Magnetism</td>
</tr>
<tr>
<td>EECE 7296</td>
<td>Electronic Materials</td>
</tr>
<tr>
<td>EECE 7297</td>
<td>Advanced Magnetic Materials—Magnetic Devices</td>
</tr>
<tr>
<td>EECE 7298</td>
<td>Magnetic Materials—Fundamentals and Measurements</td>
</tr>
<tr>
<td>EECE 7309</td>
<td>Special Topics in Electromagnetics, Plasma, and Optics</td>
</tr>
<tr>
<td>EECE 7310</td>
<td>Modern Signal Processing</td>
</tr>
<tr>
<td>EECE 7311</td>
<td>Two Dimensional Signal and Image Processing</td>
</tr>
<tr>
<td>EECE 7312</td>
<td>Statistical and Adaptive Signal Processing</td>
</tr>
<tr>
<td>EECE 7313</td>
<td>Pattern Recognition</td>
</tr>
<tr>
<td>EECE 7323</td>
<td>Numerical Optimization Methods</td>
</tr>
<tr>
<td>EECE 7322</td>
<td>Error Correcting Codes</td>
</tr>
<tr>
<td>EECE 7335</td>
<td>Detection and Estimation Theory</td>
</tr>
<tr>
<td>EECE 7336</td>
<td>Digital Communications</td>
</tr>
<tr>
<td>EECE 7337</td>
<td>Information Theory</td>
</tr>
<tr>
<td>EECE 7360</td>
<td>Combinatorial Optimization</td>
</tr>
<tr>
<td>EECE 7364</td>
<td>Mobile and Wireless Networking</td>
</tr>
<tr>
<td>EECE 7370</td>
<td>Advanced Computer Vision</td>
</tr>
<tr>
<td>EECE 7374</td>
<td>Fundamentals of Computer Networks</td>
</tr>
<tr>
<td>EECE 7393</td>
<td>Analysis and Design of Data Networks</td>
</tr>
<tr>
<td>EECE 7397</td>
<td>Advanced Machine Learning</td>
</tr>
<tr>
<td>EECE 7398</td>
<td>Special Topics (Probabilistic System Modeling and Analysis)</td>
</tr>
<tr>
<td>EECE 7398</td>
<td>Special Topics (Big Data and Sparsity in Control, Machine Learning, and Signal Processing)</td>
</tr>
<tr>
<td>EECE 7399</td>
<td>Preparing High-Stakes Written and Oral Materials</td>
</tr>
<tr>
<td>ENGR 5670</td>
<td>Sustainable Energy: Materials, Conversion, Storage, and Usage</td>
</tr>
<tr>
<td>MATH 7233</td>
<td>Graph Theory</td>
</tr>
<tr>
<td>MATH 7232</td>
<td>Combinatorial Analysis</td>
</tr>
<tr>
<td>CS 5100</td>
<td>Foundations of Artificial Intelligence</td>
</tr>
<tr>
<td>CS 5770</td>
<td>Software Vulnerabilities and Security</td>
</tr>
<tr>
<td>CS 6110</td>
<td>Knowledge-Based Systems</td>
</tr>
<tr>
<td>CS 6200</td>
<td>Information Retrieval</td>
</tr>
<tr>
<td>CS 6220</td>
<td>Data Mining Techniques</td>
</tr>
<tr>
<td>CS 6310</td>
<td>Computational Imaging</td>
</tr>
<tr>
<td>CS 6740</td>
<td>Network Security</td>
</tr>
<tr>
<td>CS 6750</td>
<td>Cryptography and Communications Security</td>
</tr>
<tr>
<td>CS 6754</td>
<td>Secure Wireless Ad-hoc Robots on Mission (SWARM) 1</td>
</tr>
<tr>
<td>CS 6760</td>
<td>Privacy, Security, and Usability</td>
</tr>
<tr>
<td>CS 7785</td>
<td>Special Topics in Network Science</td>
</tr>
<tr>
<td>CS 7800</td>
<td>Advanced Algorithms</td>
</tr>
</tbody>
</table>

**EXCLUDED COURSES FOR ALL MSECE CONCENTRATIONS**
Please see your college administrator for more information.

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 Digital Image Processing
- 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 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. 212).

Gordon Institute of Engineering Leadership

Master’s Degree in Electrical and Computer Engineering with a 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 a 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. 205)

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Options

Complete one of the following options:

COURSE WORK OPTION

Depth Courses
Complete 20 semester hours from the depth course list below. (p. 155) 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. 155) 8

Note: Depth courses cannot be taken for breadth.

Elective
Complete 4 semester hours of either depth or breadth courses. 4

THESIS OPTION

Depth Courses
Complete 12 semester hours from the depth course list below. (p. 155) 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. 155) 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

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>EECE 5155</td>
<td>Wireless Sensor Networks and the Internet of Things</td>
</tr>
<tr>
<td>EECE 5576</td>
<td>Wireless Communication Systems</td>
</tr>
<tr>
<td>EECE 5640</td>
<td>High-Performance Computing</td>
</tr>
<tr>
<td>EECE 5698</td>
<td>Special Topics in Electrical and Computer Engineering (Networks: Technology, Economics, Social Interactions)</td>
</tr>
<tr>
<td>EECE 5698</td>
<td>Special Topics in Electrical and Computer Engineering (Software Security)</td>
</tr>
<tr>
<td>EECE 5698</td>
<td>Special Topics in Electrical and Computer Engineering (Advanced Network Management)</td>
</tr>
<tr>
<td>EECE 7204</td>
<td>Applied Probability and Stochastic Processes</td>
</tr>
<tr>
<td>EECE 7205</td>
<td>Fundamentals of Computer Engineering</td>
</tr>
<tr>
<td>EECE 7364</td>
<td>Mobile and Wireless Networking</td>
</tr>
<tr>
<td>EECE 7374</td>
<td>Fundamentals of Computer Networks</td>
</tr>
<tr>
<td>EECE 7390</td>
<td>Computer Hardware Security</td>
</tr>
<tr>
<td>EECE 7393</td>
<td>Analysis and Design of Data Networks</td>
</tr>
<tr>
<td>EECE 7398</td>
<td>Special Topics (Probabilistic System Modeling and Analysis)</td>
</tr>
<tr>
<td>EECE 7400</td>
<td>Special Problems in Electrical Engineering</td>
</tr>
<tr>
<td>CS 5770</td>
<td>Software Vulnerabilities and Security</td>
</tr>
<tr>
<td>CS 6610</td>
<td>Parallel Computing</td>
</tr>
<tr>
<td>CS 6740</td>
<td>Network Security</td>
</tr>
<tr>
<td>CS 6750</td>
<td>Cryptography and Communications Security</td>
</tr>
<tr>
<td>CS 6754</td>
<td>Secure Wireless Ad-hoc Robots on Mission (SWARM) 1</td>
</tr>
<tr>
<td>CS 6760</td>
<td>Privacy, Security, and Usability</td>
</tr>
<tr>
<td>CS 6810</td>
<td>Distributed Algorithms</td>
</tr>
<tr>
<td>CS 7785</td>
<td>Special Topics in Network Science</td>
</tr>
</tbody>
</table>

BREADTH COURSES

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>EECE 5580</td>
<td>Classical Control Systems</td>
</tr>
<tr>
<td>EECE 5606</td>
<td>Micro- and Nanofabrication</td>
</tr>
<tr>
<td>EECE 5610</td>
<td>Digital Control Systems</td>
</tr>
</tbody>
</table>
Electrical and Computer Engineering with Concentration in Computer Networks and Security, MSECE

EECE 5626 Image Processing and Pattern Recognition
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 Electric Drives
EECE 5682 Power Systems Analysis 1
EECE 5684 Power Electronics
EECE 5686 Electrical Machines
EECE 5688 Analysis of Unbalanced Power Grids
EECE 5694 Electromagnetic Photonic Devices
EECE 5695 Radio-Frequency and Optical Antennas
EECE 5696 Energy Harvesting Systems
EECE 5697 Acoustics and Sensing
EECE 5698 Special Topics in Electrical and Computer Engineering (Principles of Assistive Robotics)
EECE 5698 Special Topics in Electrical and Computer Engineering (Mobile Robotics)
EECE 5698 Special Topics in Electrical and Computer Engineering (Robotics Sensing and Navigation)
EECE 5698 Special Topics in Electrical and Computer Engineering (Parallel Processing for Data Analytics)
EECE 5698 Special Topics in Electrical and Computer Engineering (Introduction to Multiferroic Materials and Systems)
EECE 7105 Optics for Engineers
EECE 7200 Linear Systems Analysis
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 7220 Power System Analysis 2
EECE 7221 Power System Operation and Control
EECE 7224 Power Systems State Estimation
EECE 7226 Modeling and Simulation of Power System Transients
EECE 7322 Error Correcting Codes
EECE 7228 Advanced Power Electronics
EECE 7238 Special Topics in Electric Drives
EECE 7239 Special Topics in Power Systems
EECE 7240 Analog Integrated Circuit Design
EECE 7242 Integrated Circuits for Mixed Signals and Data Communication
EECE 7243 Integrated Circuit Fabrication
EECE 7244 Introduction to Microelectromechanical Systems (MEMS)
EECE 7245 Microwave Circuit Design for Wireless Communication
EECE 7246 Design and Analysis of Digital Integrated Circuits
EECE 7247 Radio Frequency Integrated Circuit Design
EECE 7258 Electromagnetic Theory 2
EECE 7261 Computational Methods in Electromagnetics
EECE 7275 Antennas and Radiation
EECE 7276 Microwave Properties of Materials
EECE 7284 Optical Properties of Matter
EECE 7285 Opto-electronics and Fiber Optics
EECE 7287 Optical Detection
EECE 7293 Modern Imaging
EECE 7295 Applied Magnetism
EECE 7296 Electronic Materials
EECE 7297 Advanced Magnetic Materials—Magnetic Devices
EECE 7298 Magnetic Materials—Fundamentals and Measurements
EECE 7309 Special Topics in Electromagnetics, Plasma, and Optics
EECE 7310 Modern Signal Processing
EECE 7311 Two Dimensional Signal and Image Processing
EECE 7312 Statistical and Adaptive Signal Processing
EECE 7313 Pattern Recognition
EECE 7323 Numerical Optimization Methods
EECE 7335 Detection and Estimation Theory
EECE 7336 Digital Communications
EECE 7337 Information Theory
EECE 7352 Computer Architecture
EECE 7353 VLSI Design
EECE 7357 Fault-Tolerant Computers
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 7397 Advanced Machine Learning
Program Credit/GPA Requirements

32 total semester hours required
Minimum 3.000 GPA required
**THESIS OPTION**

**Depth Courses**
Complete 12 semester hours from the depth course list below. (p. 158)

**Breadth Courses**
Complete 8 semester hours from the breadth course list below or other EECE courses chosen in consultation with a faculty advisor. (p. 158)

- Note: Depth courses cannot be taken for breadth.

**Elective**
Complete 4 additional semester hours from either depth or breadth courses.

**Thesis**
EECE 7990 Thesis 8

---

**Course Lists**

**DEPTH COURSES**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>EECE 5626</td>
<td>Image Processing and Pattern Recognition</td>
</tr>
<tr>
<td>EECE 5639</td>
<td>Computer Vision</td>
</tr>
<tr>
<td>EECE 5640</td>
<td>High-Performance Computing</td>
</tr>
<tr>
<td>EECE 5642</td>
<td>Data Visualization</td>
</tr>
<tr>
<td>EECE 5644</td>
<td>Introduction to Machine Learning and Pattern Recognition</td>
</tr>
<tr>
<td>EECE 5698</td>
<td>Special Topics in Electrical and Computer Engineering (Mobile Robotics)</td>
</tr>
<tr>
<td>EECE 5698</td>
<td>Special Topics in Electrical and Computer Engineering (Robotics Sensing and Navigation)</td>
</tr>
<tr>
<td>EECE 5698</td>
<td>Special Topics in Electrical and Computer Engineering (Parallel Processing for Data Analytics)</td>
</tr>
<tr>
<td>EECE 7204</td>
<td>Applied Probability and Stochastic Processes</td>
</tr>
<tr>
<td>EECE 7205</td>
<td>Fundamentals of Computer Engineering</td>
</tr>
<tr>
<td>EECE 7258</td>
<td>Pattern Recognition</td>
</tr>
<tr>
<td>EECE 7323</td>
<td>Numerical Optimization Methods</td>
</tr>
<tr>
<td>EECE 7325</td>
<td>Computer Architecture</td>
</tr>
<tr>
<td>EECE 7360</td>
<td>Combinatorial Optimization</td>
</tr>
<tr>
<td>EECE 7370</td>
<td>Advanced Computer Vision</td>
</tr>
<tr>
<td>EECE 7397</td>
<td>Advanced Machine Learning</td>
</tr>
<tr>
<td>EECE 7398</td>
<td>Special Topics (Big Data and Sparsity in Control, Machine Learning and Signal Processing)</td>
</tr>
<tr>
<td>EECE 7400</td>
<td>Special Problems in Electrical Engineering</td>
</tr>
<tr>
<td>CS 5100</td>
<td>Foundations of Artificial Intelligence</td>
</tr>
<tr>
<td>CS 6110</td>
<td>Knowledge-Based Systems</td>
</tr>
<tr>
<td>CS 6200</td>
<td>Information Retrieval</td>
</tr>
<tr>
<td>CS 6220</td>
<td>Data Mining Techniques</td>
</tr>
<tr>
<td>CS 6310</td>
<td>Computational Imaging</td>
</tr>
<tr>
<td>CS 6810</td>
<td>Distributed Algorithms</td>
</tr>
<tr>
<td>CS 7800</td>
<td>Advanced Algorithms</td>
</tr>
<tr>
<td>MATH 7232</td>
<td>Combinatorial Analysis</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 7233</td>
<td>Graph Theory</td>
</tr>
</tbody>
</table>

**BREADTH COURSES**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>EECE 5155</td>
<td>Wireless Sensor Networks and the Internet of Things (Wireless Sensor Networks and the Internet of Things -- former special topics course)</td>
</tr>
<tr>
<td>EECE 5161</td>
<td>Thin Film Technologies (Thin Film Technologies -- former special topics course)</td>
</tr>
<tr>
<td>EECE 5576</td>
<td>Wireless Communication Systems</td>
</tr>
<tr>
<td>EECE 5580</td>
<td>Classical Control Systems</td>
</tr>
<tr>
<td>EECE 5606</td>
<td>Micro- and Nanofabrication</td>
</tr>
<tr>
<td>EECE 5610</td>
<td>Digital Control Systems</td>
</tr>
<tr>
<td>EECE 5627</td>
<td>Arithmetic and Circuit Design for Inexact Computing with Nanoscaled CMOS</td>
</tr>
<tr>
<td>EECE 5643</td>
<td>Simulation and Performance Evaluation</td>
</tr>
<tr>
<td>EECE 5647</td>
<td>Nanophotonics</td>
</tr>
<tr>
<td>EECE 5648</td>
<td>Biomedical Optics</td>
</tr>
<tr>
<td>EECE 5649</td>
<td>Design of Analog Integrated Circuits with Complementary Metal-Oxide-Semiconductor Technology</td>
</tr>
<tr>
<td>EECE 5664</td>
<td>Biomedical Signal Processing</td>
</tr>
<tr>
<td>EECE 5666</td>
<td>Digital Signal Processing</td>
</tr>
<tr>
<td>EECE 5680</td>
<td>Electric Drives</td>
</tr>
<tr>
<td>EECE 5682</td>
<td>Power Systems Analysis 1</td>
</tr>
<tr>
<td>EECE 5684</td>
<td>Power Electronics</td>
</tr>
<tr>
<td>EECE 5686</td>
<td>Electrical Machines</td>
</tr>
<tr>
<td>EECE 5688</td>
<td>Analysis of Unbalanced Power Grids</td>
</tr>
<tr>
<td>EECE 5694</td>
<td>Electromagnetic Photonic Devices</td>
</tr>
<tr>
<td>EECE 5695</td>
<td>Radio-Frequency and Optical Antennas</td>
</tr>
<tr>
<td>EECE 5696</td>
<td>Energy Harvesting Systems</td>
</tr>
<tr>
<td>EECE 5697</td>
<td>Acoustics and Sensing</td>
</tr>
<tr>
<td>EECE 5698</td>
<td>Special Topics in Electrical and Computer Engineering (Software Security)</td>
</tr>
<tr>
<td>EECE 5698</td>
<td>Special Topics in Electrical and Computer Engineering (Principles of Assistive Robotics)</td>
</tr>
<tr>
<td>EECE 5698</td>
<td>Special Topics in Electrical and Computer Engineering (Networks: Technology, Economics, Social Interactions)</td>
</tr>
<tr>
<td>EECE 5698</td>
<td>Special Topics in Electrical and Computer Engineering (Advanced Network Management)</td>
</tr>
<tr>
<td>EECE 5698</td>
<td>Special Topics in Electrical and Computer Engineering (Principles of Assistive Robotics)</td>
</tr>
<tr>
<td>EECE 5698</td>
<td>Special Topics in Electrical and Computer Engineering (Introduction to Multiferroic Materials and Systems)</td>
</tr>
<tr>
<td>EECE 7105</td>
<td>Optics for Engineers</td>
</tr>
<tr>
<td>EECE 7200</td>
<td>Linear Systems Analysis</td>
</tr>
<tr>
<td>EECE 7201</td>
<td>Solid State Devices</td>
</tr>
<tr>
<td>EECE 7202</td>
<td>Electromagnetic Theory 1</td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Title</td>
</tr>
<tr>
<td>-------------</td>
<td>--------------</td>
</tr>
<tr>
<td>EECE 7203</td>
<td>Complex Variable Theory and Differential Equations</td>
</tr>
<tr>
<td>EECE 7211</td>
<td>Nonlinear Control</td>
</tr>
<tr>
<td>EECE 7213</td>
<td>System Identification and Adaptive Control</td>
</tr>
<tr>
<td>EECE 7214</td>
<td>Optimal and Robust Control</td>
</tr>
<tr>
<td>EECE 7220</td>
<td>Power System Analysis 2</td>
</tr>
<tr>
<td>EECE 7221</td>
<td>Power System Operation and Control</td>
</tr>
<tr>
<td>EECE 7224</td>
<td>Power Systems State Estimation</td>
</tr>
<tr>
<td>EECE 7226</td>
<td>Modeling and Simulation of Power System Transients</td>
</tr>
<tr>
<td>EECE 7228</td>
<td>Advanced Power Electronics (Advanced Power Electronics – former special topics course)</td>
</tr>
<tr>
<td>EECE 7238</td>
<td>Special Topics in Electric Drives</td>
</tr>
<tr>
<td>EECE 7239</td>
<td>Special Topics in Power Systems</td>
</tr>
<tr>
<td>EECE 7240</td>
<td>Analog Integrated Circuit Design</td>
</tr>
<tr>
<td>EECE 7242</td>
<td>Integrated Circuits for Mixed Signals and Data Communication</td>
</tr>
<tr>
<td>EECE 7243</td>
<td>Integrated Circuit Fabrication</td>
</tr>
<tr>
<td>EECE 7244</td>
<td>Introduction to Microelectromechanical Systems (MEMS)</td>
</tr>
<tr>
<td>EECE 7245</td>
<td>Microwave Circuit Design for Wireless Communication</td>
</tr>
<tr>
<td>EECE 7246</td>
<td>Design and Analysis of Digital Integrated Circuits</td>
</tr>
<tr>
<td>EECE 7247</td>
<td>Radio Frequency Integrated Circuit Design</td>
</tr>
<tr>
<td>EECE 7250</td>
<td>Power Management Integrated Circuits (Power Management Integrated Circuits – former special topics course)</td>
</tr>
<tr>
<td>EECE 7263</td>
<td>Humanoid Robotics (Humanoid Robotics – former special topics course)</td>
</tr>
<tr>
<td>EECE 7270</td>
<td>Electromagnetic Theory 2</td>
</tr>
<tr>
<td>EECE 7271</td>
<td>Computational Methods in Electromagnetics</td>
</tr>
<tr>
<td>EECE 7275</td>
<td>Antennas and Radiation</td>
</tr>
<tr>
<td>EECE 7276</td>
<td>Microwave Properties of Materials</td>
</tr>
<tr>
<td>EECE 7284</td>
<td>Optical Properties of Matter</td>
</tr>
<tr>
<td>EECE 7285</td>
<td>Opto-electronics and Fiber Optics</td>
</tr>
<tr>
<td>EECE 7287</td>
<td>Optical Detection</td>
</tr>
<tr>
<td>EECE 7293</td>
<td>Modern Imaging</td>
</tr>
<tr>
<td>EECE 7295</td>
<td>Applied Magnetism</td>
</tr>
<tr>
<td>EECE 7296</td>
<td>Electronic Materials</td>
</tr>
<tr>
<td>EECE 7297</td>
<td>Advanced Magnetic Materials—Magnetic Devices</td>
</tr>
<tr>
<td>EECE 7298</td>
<td>Magnetic Materials—Fundamentals and Measurements</td>
</tr>
<tr>
<td>EECE 7309</td>
<td>Special Topics in Electromagnetics, Plasma, and Optics</td>
</tr>
<tr>
<td>EECE 7310</td>
<td>Modern Signal Processing</td>
</tr>
<tr>
<td>EECE 7311</td>
<td>Two Dimensional Signal and Image Processing</td>
</tr>
<tr>
<td>EECE 7312</td>
<td>Statistical and Adaptive Signal Processing</td>
</tr>
<tr>
<td>EECE 7332</td>
<td>Error Correcting Codes</td>
</tr>
<tr>
<td>EECE 7335</td>
<td>Detection and Estimation Theory</td>
</tr>
<tr>
<td>EECE 7336</td>
<td>Digital Communications</td>
</tr>
<tr>
<td>EECE 7337</td>
<td>Information Theory</td>
</tr>
<tr>
<td>EECE 7353</td>
<td>VLSI Design</td>
</tr>
<tr>
<td>EECE 7357</td>
<td>Fault-Tolerant Computers</td>
</tr>
<tr>
<td>EECE 7364</td>
<td>Mobile and Wireless Networking</td>
</tr>
<tr>
<td>EECE 7368</td>
<td>High-Level Design of Hardware-Software Systems</td>
</tr>
<tr>
<td>EECE 7374</td>
<td>Fundamentals of Computer Networks</td>
</tr>
<tr>
<td>EECE 7376</td>
<td>Operating Systems: Interface and Implementation</td>
</tr>
<tr>
<td>EECE 7390</td>
<td>Computer Hardware Security</td>
</tr>
<tr>
<td>EECE 7393</td>
<td>Analysis and Design of Data Networks</td>
</tr>
<tr>
<td>EECE 7398</td>
<td>Special Topics (Compilers)</td>
</tr>
<tr>
<td>EECE 7399</td>
<td>Preparing High-Stakes Written and Oral Materials</td>
</tr>
<tr>
<td>ENGR 5670</td>
<td>Sustainable Energy: Materials, Conversion, Storage, and Usage</td>
</tr>
<tr>
<td>CS 5200</td>
<td>Database Management Systems</td>
</tr>
<tr>
<td>CS 5600</td>
<td>Computer Systems</td>
</tr>
<tr>
<td>CS 5770</td>
<td>Software Vulnerabilities and Security</td>
</tr>
<tr>
<td>CS 6410</td>
<td>Compilers</td>
</tr>
<tr>
<td>CS 6510</td>
<td>Advanced Software Development</td>
</tr>
<tr>
<td>CS 6520</td>
<td>Methods of Software Development</td>
</tr>
<tr>
<td>CS 6610</td>
<td>Parallel Computing</td>
</tr>
<tr>
<td>CS 6740</td>
<td>Network Security</td>
</tr>
<tr>
<td>CS 6750</td>
<td>Cryptography and Communications Security</td>
</tr>
<tr>
<td>CS 6754</td>
<td>Secure Wireless Ad-hoc Robots on Mission (SWARM) 1</td>
</tr>
<tr>
<td>CS 6760</td>
<td>Privacy, Security, and Usability</td>
</tr>
<tr>
<td>CS 6810</td>
<td>Distributed Algorithms</td>
</tr>
<tr>
<td>CS 7785</td>
<td>Special Topics in Network Science</td>
</tr>
</tbody>
</table>

**EXCLUDED COURSES FOR ALL MSECE CONCENTRATIONS**

Please see your college administrator for more information.

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:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 5010</td>
<td>Programming Design Paradigm</td>
</tr>
<tr>
<td>CS 5320</td>
<td>Digital Image Processing</td>
</tr>
<tr>
<td>CS 5330</td>
<td>Pattern Recognition and Computer Vision</td>
</tr>
<tr>
<td>CS 5340</td>
<td>Computer/Human Interaction</td>
</tr>
<tr>
<td>CS 5520</td>
<td>Mobile Application Development</td>
</tr>
<tr>
<td>CS 5610</td>
<td>Web Development</td>
</tr>
<tr>
<td>CS 5700</td>
<td>Fundamentals of Computer Networking</td>
</tr>
</tbody>
</table>
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 Electromagnetics, Plasma, and Optics, 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 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. 212).

Gordon Institute of Engineering Leadership
Master's Degree in Electrical and Computer Engineering with a 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 a 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. 205)

Program Requirements
Complete all courses and requirements listed below unless otherwise indicated.

Options
Complete one of the following options:

COURSE WORK OPTION
Depth Courses
Complete 20 semester hours from the depth course list below. (p. 160)
Breadth Courses
Complete 8 semester hours from the breadth course list below. (p. 160)
Note: Depth courses cannot be taken for breadth.
Elective
Complete 4 additional semester hours from either depth or breadth courses.

THESIS OPTION
Depth Courses
Complete 12 semester hours from the depth course list below. (p. 160)
Breadth Courses
Complete 8 semester hours from the breadth course list below. (p. 160)
Note: Depth courses cannot be taken for breadth.
Elective
Complete 4 additional semester hours from either depth or breadth courses.

Thesis
EECE 7990  Thesis 8

Course Lists

DEPTH COURSES
EECE 5648  Biomedical Optics
EECE 5694  Electromagnetic Photonic Devices
EECE 5695  Radio-Frequency and Optical Antennas
EECE 5697  Acoustics and Sensing
EECE 5698  Special Topics in Electrical and Computer Engineering (Introduction to Multiferroic Materials and Systems)
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 7276  Microwave Properties of Materials
EECE 7284  Optical Properties of Matter
EECE 7285  Opto-electronics and Fiber Optics
EECE 7287  Optical Detection
EECE 7293  Modern Imaging
EECE 7295  Applied Magnetism
EECE 7296  Electronic Materials
EECE 7297  Advanced Magnetic Materials—Magnetic Devices
EECE 7298  Magnetic Materials—Fundamentals and Measurements
EECE 7309  Special Topics in Electromagnetics, Plasma, and Optics
EECE 7400  Special Problems in Electrical Engineering

BREADTH COURSES
EECE 5155  Wireless Sensor Networks and the Internet of Things
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>EECE 5161</td>
<td>Thin Film Technologies</td>
</tr>
<tr>
<td>EECE 5576</td>
<td>Wireless Communication Systems</td>
</tr>
<tr>
<td>EECE 5580</td>
<td>Classical Control Systems</td>
</tr>
<tr>
<td>EECE 5606</td>
<td>Micro- and Nanofabrication</td>
</tr>
<tr>
<td>EECE 5610</td>
<td>Digital Control Systems</td>
</tr>
<tr>
<td>EECE 5626</td>
<td>Image Processing and Pattern Recognition</td>
</tr>
<tr>
<td>EECE 5627</td>
<td>Arithmetic and Circuit Design for Inexact Computing with Nanoscaled CMOS</td>
</tr>
<tr>
<td>EECE 5639</td>
<td>Computer Vision</td>
</tr>
<tr>
<td>EECE 5640</td>
<td>High-Performance Computing</td>
</tr>
<tr>
<td>EECE 5642</td>
<td>Data Visualization</td>
</tr>
<tr>
<td>EECE 5643</td>
<td>Simulation and Performance Evaluation</td>
</tr>
<tr>
<td>EECE 5644</td>
<td>Introduction to Machine Learning and Pattern Recognition</td>
</tr>
<tr>
<td>EECE 5647</td>
<td>Nanophotonics</td>
</tr>
<tr>
<td>EECE 5649</td>
<td>Design of Analog Integrated Circuits with Complementary Metal-Oxide-Semiconductor Technology</td>
</tr>
<tr>
<td>EECE 5664</td>
<td>Biomedical Signal Processing</td>
</tr>
<tr>
<td>EECE 5666</td>
<td>Digital Signal Processing</td>
</tr>
<tr>
<td>EECE 5680</td>
<td>Electric Drives</td>
</tr>
<tr>
<td>EECE 5682</td>
<td>Power Systems Analysis 1</td>
</tr>
<tr>
<td>EECE 5684</td>
<td>Power Electronics</td>
</tr>
<tr>
<td>EECE 5686</td>
<td>Electrical Machines</td>
</tr>
<tr>
<td>EECE 5688</td>
<td>Analysis of Unbalanced Power Grids</td>
</tr>
<tr>
<td>EECE 5696</td>
<td>Energy Harvesting Systems</td>
</tr>
<tr>
<td>EECE 5698</td>
<td>Special Topics in Electrical and Computer Engineering (Mobile Robotics)</td>
</tr>
<tr>
<td>EECE 5698</td>
<td>Special Topics in Electrical and Computer Engineering (Principles of Assistive Robotics)</td>
</tr>
<tr>
<td>EECE 5698</td>
<td>Special Topics in Electrical and Computer Engineering (Networks: Technology, Economics, Social Interactions)</td>
</tr>
<tr>
<td>EECE 5698</td>
<td>Special Topics in Electrical and Computer Engineering (Software Security)</td>
</tr>
<tr>
<td>EECE 5698</td>
<td>Special Topics in Electrical and Computer Engineering (Advanced Network Management)</td>
</tr>
<tr>
<td>EECE 5698</td>
<td>Special Topics in Electrical and Computer Engineering (Robotics Sensing and Navigation)</td>
</tr>
<tr>
<td>EECE 5698</td>
<td>Special Topics in Electrical and Computer Engineering (Parallel Processing for Data Analytics)</td>
</tr>
<tr>
<td>EECE 7200</td>
<td>Linear Systems Analysis</td>
</tr>
<tr>
<td>EECE 7201</td>
<td>Solid State Devices</td>
</tr>
<tr>
<td>EECE 7204</td>
<td>Applied Probability and Stochastic Processes</td>
</tr>
<tr>
<td>EECE 7205</td>
<td>Fundamentals of Computer Engineering</td>
</tr>
<tr>
<td>EECE 7211</td>
<td>Nonlinear Control</td>
</tr>
<tr>
<td>EECE 7213</td>
<td>System Identification and Adaptive Control</td>
</tr>
<tr>
<td>EECE 7214</td>
<td>Optimal and Robust Control</td>
</tr>
<tr>
<td>EECE 7220</td>
<td>Power System Analysis 2</td>
</tr>
<tr>
<td>EECE 7221</td>
<td>Power System Operation and Control</td>
</tr>
<tr>
<td>EECE 7224</td>
<td>Power Systems State Estimation</td>
</tr>
<tr>
<td>EECE 7226</td>
<td>Modeling and Simulation of Power System Transients</td>
</tr>
<tr>
<td>EECE 7228</td>
<td>Advanced Power Electronics</td>
</tr>
<tr>
<td>EECE 7238</td>
<td>Special Topics in Electric Drives</td>
</tr>
<tr>
<td>EECE 7239</td>
<td>Special Topics in Power Systems</td>
</tr>
<tr>
<td>EECE 7240</td>
<td>Analog Integrated Circuit Design</td>
</tr>
<tr>
<td>EECE 7242</td>
<td>Integrated Circuits for Mixed Signals and Data Communication</td>
</tr>
<tr>
<td>EECE 7243</td>
<td>Integrated Circuit Fabrication</td>
</tr>
<tr>
<td>EECE 7244</td>
<td>Introduction to Microelectromechanical Systems (MEMS)</td>
</tr>
<tr>
<td>EECE 7245</td>
<td>Microwave Circuit Design for Wireless Communication</td>
</tr>
<tr>
<td>EECE 7246</td>
<td>Design and Analysis of Digital Integrated Circuits</td>
</tr>
<tr>
<td>EECE 7247</td>
<td>Radio Frequency Integrated Circuit Design</td>
</tr>
<tr>
<td>EECE 7250</td>
<td>Power Management Integrated Circuits</td>
</tr>
<tr>
<td>EECE 7258</td>
<td></td>
</tr>
<tr>
<td>EECE 7263</td>
<td>Humanoid Robotics</td>
</tr>
<tr>
<td>EECE 7276</td>
<td>Microwave Properties of Materials</td>
</tr>
<tr>
<td>EECE 7284</td>
<td>Optical Properties of Matter</td>
</tr>
<tr>
<td>EECE 7295</td>
<td>Applied Magnetism</td>
</tr>
<tr>
<td>EECE 7296</td>
<td>Electronic Materials</td>
</tr>
<tr>
<td>EECE 7297</td>
<td>Advanced Magnetic Materials—Magnetic Devices</td>
</tr>
<tr>
<td>EECE 7298</td>
<td>Magnetic Materials—Fundamentals and Measurements</td>
</tr>
<tr>
<td>EECE 7310</td>
<td>Modern Signal Processing</td>
</tr>
<tr>
<td>EECE 7311</td>
<td>Two Dimensional Signal and Image Processing</td>
</tr>
<tr>
<td>EECE 7312</td>
<td>Statistical and Adaptive Signal Processing</td>
</tr>
<tr>
<td>EECE 7313</td>
<td>Pattern Recognition</td>
</tr>
<tr>
<td>EECE 7323</td>
<td>Numerical Optimization Methods</td>
</tr>
<tr>
<td>EECE 7332</td>
<td>Error Correcting Codes</td>
</tr>
<tr>
<td>EECE 7335</td>
<td>Detection and Estimation Theory</td>
</tr>
<tr>
<td>EECE 7336</td>
<td>Digital Communications</td>
</tr>
<tr>
<td>EECE 7337</td>
<td>Information Theory</td>
</tr>
<tr>
<td>EECE 7352</td>
<td>Computer Architecture</td>
</tr>
<tr>
<td>EECE 7353</td>
<td>VLSI Design</td>
</tr>
<tr>
<td>EECE 7357</td>
<td>Fault-Tolerant Computers</td>
</tr>
<tr>
<td>EECE 7360</td>
<td>Combinatorial Optimization</td>
</tr>
<tr>
<td>EECE 7364</td>
<td>Mobile and Wireless Networking</td>
</tr>
<tr>
<td>EECE 7368</td>
<td>High-Level Design of Hardware-Software Systems</td>
</tr>
<tr>
<td>EECE 7370</td>
<td>Advanced Computer Vision</td>
</tr>
<tr>
<td>EECE 7374</td>
<td>Fundamentals of Computer Networks</td>
</tr>
<tr>
<td>EECE 7376</td>
<td>Operating Systems: Interface and Implementation</td>
</tr>
</tbody>
</table>
Please see your college administrator for more information.

**Excluded Courses for All MSECE Concentrations**

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 5610
- CS 5520
- CS 5340
- CS 5330
- CS 5010
- CS 5770
- CS 5600
- CS 5200
- CS 5100
- MATH 7232
- MATH 7233
- ENGR 5670
- EECE 7390
- EECE 7393
- EECE 7397
- EECE 7398
- EECE 7399
- CS 7800
- CS 7785
- CS 6810
- CS 6760
- CS 6754
- CS 6750
- CS 6740
- CS 6610
- CS 6510
- CS 6310
- CS 6220
- CS 6200
- CS 6110
- CS 6010
- CS 6000
- CS 5700
- CS 5800
- CS 5350
- CS 5700
- CS 5610
- CS 5500
- ENGR 5670
- EECE 7399
- EECE 7398
- EECE 7397
- EECE 7396
- EECE 7395
- EECE 7394
- EECE 7393
- EECE 7392
- EECE 7391
- EECE 7390
- EECE 7389
- EECE 7388
- EECE 7387
- EECE 7386
- EECE 7385
- EECE 7384
- EECE 7383
- EECE 7382
- EECE 7381
- EECE 7380
- EECE 7379
- EECE 7378
- EECE 7377
- EECE 7376
- EECE 7375
- EECE 7374
- EECE 7373
- EECE 7372
- EECE 7371
- EECE 7370
- EECE 7369
- EECE 7368
- EECE 7367
- EECE 7366
- EECE 7365
- EECE 7364
- EECE 7363
- EECE 7362
- EECE 7361
- EECE 7360
- EECE 7359
- EECE 7358
- EECE 7357
- EECE 7356
- EECE 7355
- EECE 7354
- EECE 7353
- EECE 7352
- EECE 7351
- EECE 7350
- EECE 7349
- EECE 7348
- EECE 7347
- EECE 7346
- EECE 7345
- EECE 7344
- EECE 7343
- EECE 7342
- EECE 7341
- EECE 7340
- EECE 7339
- EECE 7338
- EECE 7337
- EECE 7336
- EECE 7335
- EECE 7334
- EECE 7333
- EECE 7332
- EECE 7331
- EECE 7330
- EECE 7329
- EECE 7328
- EECE 7327
- EECE 7326
- EECE 7325
- EECE 7324
- EECE 7323
- EECE 7322
- EECE 7321
- EECE 7320
- EECE 7319
- EECE 7318
- EECE 7317
- EECE 7316
- EECE 7315
- EECE 7314
- EECE 7313
- EECE 7312
- EECE 7311
- EECE 7310
- EECE 7309
- EECE 7308
- EECE 7307
- EECE 7306
- EECE 7305
- EECE 7304
- EECE 7303
- EECE 7302
- EECE 7301
- EECE 7300

**Program Credit/GPA Requirements**

32 total semester hours required

Minimum 3.00 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 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. 212).

**Gordon Institute of Engineering Leadership**

**Master’s Degree in Electrical and Computer Engineering with a 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 a 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. 205)**

**Program Requirements**

Complete all courses and requirements listed below unless otherwise indicated.

**Options**

Complete one of the following options:

**COURSE WORK OPTION**

**Depth Courses**

Complete 20 semester hours from the depth course list below. (p. 163)
Breadth Courses
Complete 8 semester hours from the breadth course list (p. 163)
Note: Depth courses cannot be taken for breadth.

Elective
Complete 4 additional semester hours from either depth or breadth courses.

**THESIS OPTION**
Depth Courses
Complete 12 semester hours from the depth course list (p. 163)

Breadth Courses
Complete 8 semester hours from the breadth course list (p. 163)
Note: Depth courses cannot be taken for breadth.

Elective
Complete 4 additional semester hours from either depth or breadth courses.

**Thesis**
EECE 7990  Thesis  8

---

**Course Lists**

**DEPTH COURSES**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>EECE 5161</td>
<td>Thin Film Technologies (Thin Film Technologies -- former special topics course)</td>
</tr>
<tr>
<td>EECE 5606</td>
<td>Micro- and Nanofabrication</td>
</tr>
<tr>
<td>EECE 5647</td>
<td>Nanophotonics</td>
</tr>
<tr>
<td>EECE 5649</td>
<td>Design of Analog Integrated Circuits with Complementary Metal-Oxide-Semiconductor Technology</td>
</tr>
<tr>
<td>EECE 5696</td>
<td>Energy Harvesting Systems</td>
</tr>
<tr>
<td>EECE 7201</td>
<td>Solid State Devices</td>
</tr>
<tr>
<td>EECE 7240</td>
<td>Analog Integrated Circuit Design</td>
</tr>
<tr>
<td>EECE 7242</td>
<td>Integrated Circuits for Mixed Signals and Data Communication</td>
</tr>
<tr>
<td>EECE 7243</td>
<td>Integrated Circuit Fabrication</td>
</tr>
<tr>
<td>EECE 7244</td>
<td>Introduction to Microelectromechanical Systems (MEMS)</td>
</tr>
<tr>
<td>EECE 7245</td>
<td>Microwave Circuit Design for Wireless Communication</td>
</tr>
<tr>
<td>EECE 7246</td>
<td>Design and Analysis of Digital Integrated Circuits</td>
</tr>
<tr>
<td>EECE 7247</td>
<td>Radio Frequency Integrated Circuit Design</td>
</tr>
<tr>
<td>EECE 7250</td>
<td>Power Management Integrated Circuits (Power Management Integrated Circuits -- former special topics course)</td>
</tr>
<tr>
<td>EECE 7276</td>
<td>Microwave Properties of Materials</td>
</tr>
<tr>
<td>EECE 7284</td>
<td>Optical Properties of Matter</td>
</tr>
<tr>
<td>EECE 7295</td>
<td>Applied Magnetism</td>
</tr>
<tr>
<td>EECE 7296</td>
<td>Electronic Materials</td>
</tr>
<tr>
<td>EECE 7297</td>
<td>Advanced Magnetic Materials—Magnetic Devices</td>
</tr>
<tr>
<td>EECE 7298</td>
<td>Magnetic Materials—Fundamentals and Measurements</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>EECE 7353</td>
<td>VLSI Design</td>
</tr>
<tr>
<td>EECE 7400</td>
<td>Special Problems in Electrical Engineering</td>
</tr>
</tbody>
</table>

**BREADTH COURSES**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>EECE 5155</td>
<td>Wireless Sensor Networks and the Internet of Things</td>
</tr>
<tr>
<td>EECE 5576</td>
<td>Wireless Communication Systems</td>
</tr>
<tr>
<td>EECE 5580</td>
<td>Classical Control Systems</td>
</tr>
<tr>
<td>EECE 5610</td>
<td>Digital Control Systems</td>
</tr>
<tr>
<td>EECE 5626</td>
<td>Image Processing and Pattern Recognition</td>
</tr>
<tr>
<td>EECE 5627</td>
<td>Arithmetic and Circuit Design for Inexact Computing with Nanoscaled CMOS</td>
</tr>
<tr>
<td>EECE 5639</td>
<td>Computer Vision</td>
</tr>
<tr>
<td>EECE 5640</td>
<td>High-Performance Computing</td>
</tr>
<tr>
<td>EECE 5642</td>
<td>Data Visualization</td>
</tr>
<tr>
<td>EECE 5643</td>
<td>Simulation and Performance Evaluation</td>
</tr>
<tr>
<td>EECE 5648</td>
<td>Biomedical Optics</td>
</tr>
<tr>
<td>EECE 5644</td>
<td>Introduction to Machine Learning and Pattern Recognition</td>
</tr>
<tr>
<td>EECE 5664</td>
<td>Biomedical Signal Processing</td>
</tr>
<tr>
<td>EECE 5666</td>
<td>Digital Signal Processing</td>
</tr>
<tr>
<td>EECE 5680</td>
<td>Electric Drives</td>
</tr>
<tr>
<td>EECE 5682</td>
<td>Power Systems Analysis 1</td>
</tr>
<tr>
<td>EECE 5684</td>
<td>Power Electronics</td>
</tr>
<tr>
<td>EECE 5686</td>
<td>Electrical Machines</td>
</tr>
<tr>
<td>EECE 5688</td>
<td>Analysis of Unbalanced Power Grids</td>
</tr>
<tr>
<td>EECE 5694</td>
<td>Electromagnetic Photonic Devices</td>
</tr>
<tr>
<td>EECE 5695</td>
<td>Radio-Frequency and Optical Antennas</td>
</tr>
<tr>
<td>EECE 5697</td>
<td>Acoustics and Sensing</td>
</tr>
<tr>
<td>EECE 5698</td>
<td>Special Topics in Electrical and Computer Engineering (Mobile Robotics)</td>
</tr>
<tr>
<td>EECE 5698</td>
<td>Special Topics in Electrical and Computer Engineering (Principles of Assistive Robotics)</td>
</tr>
<tr>
<td>EECE 5698</td>
<td>Special Topics in Electrical and Computer Engineering (Networks: Technology, Economics, Social Interactions)</td>
</tr>
<tr>
<td>EECE 5698</td>
<td>Special Topics in Electrical and Computer Engineering (Software Security)</td>
</tr>
<tr>
<td>EECE 5698</td>
<td>Special Topics in Electrical and Computer Engineering (Advanced Network Management)</td>
</tr>
<tr>
<td>EECE 5698</td>
<td>Special Topics in Electrical and Computer Engineering (Robotics Sensing and Navigation)</td>
</tr>
<tr>
<td>EECE 5698</td>
<td>Special Topics in Electrical and Computer Engineering (Parallel Processing for Data Analytics)</td>
</tr>
<tr>
<td>EECE 5698</td>
<td>Special Topics in Electrical and Computer Engineering (Introduction to Multiferroic Materials and Systems)</td>
</tr>
<tr>
<td>EECE 7105</td>
<td>Optics for Engineers</td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Title</td>
</tr>
<tr>
<td>-------------</td>
<td>--------------</td>
</tr>
<tr>
<td>EECE 7200</td>
<td>Linear Systems Analysis</td>
</tr>
<tr>
<td>EECE 7202</td>
<td>Electromagnetic Theory 1</td>
</tr>
<tr>
<td>EECE 7203</td>
<td>Complex Variable Theory and Differential Equations</td>
</tr>
<tr>
<td>EECE 7204</td>
<td>Applied Probability and Stochastic Processes</td>
</tr>
<tr>
<td>EECE 7205</td>
<td>Fundamentals of Computer Engineering</td>
</tr>
<tr>
<td>EECE 7211</td>
<td>Nonlinear Control</td>
</tr>
<tr>
<td>EECE 7213</td>
<td>System Identification and Adaptive Control</td>
</tr>
<tr>
<td>EECE 7214</td>
<td>Optimal and Robust Control</td>
</tr>
<tr>
<td>EECE 7220</td>
<td>Power System Analysis 2</td>
</tr>
<tr>
<td>EECE 7221</td>
<td>Power System Operation and Control</td>
</tr>
<tr>
<td>EECE 7222</td>
<td>Power Systems State Estimation</td>
</tr>
<tr>
<td>EECE 7224</td>
<td>Modeling and Simulation of Power System Transients</td>
</tr>
<tr>
<td>EECE 7226</td>
<td>Advanced Power Electronics</td>
</tr>
<tr>
<td>EECE 7238</td>
<td>Special Topics in Electric Drives</td>
</tr>
<tr>
<td>EECE 7239</td>
<td>Special Topics in Power Systems</td>
</tr>
<tr>
<td>EECE 7258</td>
<td>Humanoid Robotics</td>
</tr>
<tr>
<td>EECE 7270</td>
<td>Electromagnetic Theory 2</td>
</tr>
<tr>
<td>EECE 7271</td>
<td>Computational Methods in Electromagnetics</td>
</tr>
<tr>
<td>EECE 7275</td>
<td>Antennas and Radiation</td>
</tr>
<tr>
<td>EECE 7285</td>
<td>Opto-electronics and Fiber Optics</td>
</tr>
<tr>
<td>EECE 7287</td>
<td>Optical Detection</td>
</tr>
<tr>
<td>EECE 7309</td>
<td>Special Topics in Electromagnetics, Plasma, and Optics</td>
</tr>
<tr>
<td>EECE 7310</td>
<td>Modern Signal Processing</td>
</tr>
<tr>
<td>EECE 7311</td>
<td>Two Dimensional Signal and Image Processing</td>
</tr>
<tr>
<td>EECE 7312</td>
<td>Statistical and Adaptive Signal Processing</td>
</tr>
<tr>
<td>EECE 7313</td>
<td>Pattern Recognition</td>
</tr>
<tr>
<td>EECE 7323</td>
<td>Numerical Optimization Methods</td>
</tr>
<tr>
<td>EECE 7332</td>
<td>Error Correcting Codes</td>
</tr>
<tr>
<td>EECE 7335</td>
<td>Detection and Estimation Theory</td>
</tr>
<tr>
<td>EECE 7336</td>
<td>Digital Communications</td>
</tr>
<tr>
<td>EECE 7337</td>
<td>Information Theory</td>
</tr>
<tr>
<td>EECE 7352</td>
<td>Computer Architecture</td>
</tr>
<tr>
<td>EECE 7357</td>
<td>Fault-Tolerant Computers</td>
</tr>
<tr>
<td>EECE 7360</td>
<td>Combinatorial Optimization</td>
</tr>
<tr>
<td>EECE 7364</td>
<td>Mobile and Wireless Networking</td>
</tr>
<tr>
<td>EECE 7368</td>
<td>High-Level Design of Hardware-Software Systems</td>
</tr>
<tr>
<td>EECE 7370</td>
<td>Advanced Computer Vision</td>
</tr>
<tr>
<td>EECE 7374</td>
<td>Fundamentals of Computer Networks</td>
</tr>
<tr>
<td>EECE 7376</td>
<td>Operating Systems: Interface and Implementation</td>
</tr>
<tr>
<td>EECE 7390</td>
<td>Computer Hardware Security</td>
</tr>
<tr>
<td>EECE 7393</td>
<td>Analysis and Design of Data Networks</td>
</tr>
<tr>
<td>EECE 7397</td>
<td>Advanced Machine Learning</td>
</tr>
<tr>
<td>EECE 7398</td>
<td>Special Topics (Probabilistic System Modeling and Analysis)</td>
</tr>
<tr>
<td>EECE 7398</td>
<td>Special Topics (Big Data and Sparsity in Control, Machine Learning, and Signal Processing)</td>
</tr>
<tr>
<td>EECE 7398</td>
<td>Special Topics (Compilers)</td>
</tr>
<tr>
<td>EECE 7398</td>
<td>Special Topics (Advanced Computer Architecture)</td>
</tr>
<tr>
<td>EECE 7398</td>
<td>Special Topics (Advanced Topics in Scalable and Sustainable System Design)</td>
</tr>
<tr>
<td>EECE 7399</td>
<td>Preparing High-Stakes Written and Oral Materials</td>
</tr>
<tr>
<td>ENGR 5670</td>
<td>Sustainable Energy: Materials, Conversion, Storage, and Usage</td>
</tr>
<tr>
<td>MATH 7232</td>
<td>Combinatorial Analysis</td>
</tr>
<tr>
<td>MATH 7233</td>
<td>Graph Theory</td>
</tr>
<tr>
<td>CS 5100</td>
<td>Foundations of Artificial Intelligence</td>
</tr>
<tr>
<td>CS 5200</td>
<td>Database Management Systems</td>
</tr>
<tr>
<td>CS 5600</td>
<td>Computer Systems</td>
</tr>
<tr>
<td>CS 5770</td>
<td>Software Vulnerabilities and Security</td>
</tr>
<tr>
<td>CS 6110</td>
<td>Knowledge-Based Systems</td>
</tr>
<tr>
<td>CS 6200</td>
<td>Information Retrieval</td>
</tr>
<tr>
<td>CS 6220</td>
<td>Data Mining Techniques</td>
</tr>
<tr>
<td>CS 6310</td>
<td>Computational Imaging</td>
</tr>
<tr>
<td>CS 6410</td>
<td>Compilers</td>
</tr>
<tr>
<td>CS 6510</td>
<td>Advanced Software Development</td>
</tr>
<tr>
<td>CS 6520</td>
<td>Methods of Software Development</td>
</tr>
<tr>
<td>CS 6610</td>
<td>Parallel Computing</td>
</tr>
<tr>
<td>CS 6740</td>
<td>Network Security</td>
</tr>
<tr>
<td>CS 6750</td>
<td>Cryptography and Communications Security</td>
</tr>
<tr>
<td>CS 6754</td>
<td>Secure Wireless Ad-hoc Robots on Mission (SWARM) 1</td>
</tr>
<tr>
<td>CS 6760</td>
<td>Privacy, Security, and Usability</td>
</tr>
<tr>
<td>CS 6810</td>
<td>Distributed Algorithms</td>
</tr>
<tr>
<td>CS 7785</td>
<td>Special Topics in Network Science</td>
</tr>
<tr>
<td>CS 7800</td>
<td>Advanced Algorithms</td>
</tr>
</tbody>
</table>

**EXCLUDED COURSES FOR ALL MSECE CONCENTRATIONS**

Please see your college administrator for more information.

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 Digital Image Processing
- 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 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. 212).

Gordon Institute of Engineering Leadership

Master's Degree in Electrical and Computer Engineering with a Concentration in Power Systems with Graduate Certificate in Engineering Leadership

Students may complete a Master of Science in Electrical and Computer Engineering with a 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. 205)

Program Requirements
Complete all courses and requirements listed below unless otherwise indicated.

Options
Complete one of the following options:

COURSE WORK OPTION

Depth Courses
Complete 20 semester hours from the depth course list below. (p. 165) 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

THEESIS OPTION

Depth Courses
Complete 12 semester hours from the depth course list below. (p. 165) 12

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 depth or breadth courses. 4

Thesis
EECE 7990 Thesis 8

Course Lists

DEPTH COURSES
EECE 5580 Classical Control Systems
EECE 5610 Digital Control Systems
EECE 5680 Electric Drives
EECE 5682 Power Systems Analysis 1
EECE 5684 Power Electronics
EECE 5686 Electrical Machines
EECE 5688 Analysis of Unbalanced Power Grids
EECE 5696 Energy Harvesting Systems
EECE 7200 Linear Systems Analysis
EECE 7211 Nonlinear Control
EECE 7213 System Identification and Adaptive Control
EECE 7214 Optimal and Robust Control
EECE 7220 Power System Analysis 2
EECE 7221 Power System Operation and Control
EECE 7224 Power Systems State Estimation
EECE 7226 Modeling and Simulation of Power System Transients
EECE 7228 Advanced Power Electronics
EECE 7238 Special Topics in Electric Drives
EECE 7239 Special Topics in Power Systems
EECE 7250 Power Management Integrated Circuits
EECE 7323 Numerical Optimization Methods
EECE 7400 Special Problems in Electrical Engineering
ENGR 5670 Sustainable Energy: Materials, Conversion, Storage, and Usage

BREADTH COURSES
EECE 5155 Wireless Sensor Networks and the Internet of Things
EECE 5161 Thin Film Technologies
EECE 5576 Wireless Communication Systems
EECE 5606 Micro- and Nanofabrication
EECE 5626 Image Processing and Pattern Recognition
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>EECE 5627</td>
<td>Arithmetic and Circuit Design for Inexact Computing with Nanoscaled CMOS</td>
</tr>
<tr>
<td>EECE 5639</td>
<td>Computer Vision</td>
</tr>
<tr>
<td>EECE 5640</td>
<td>High-Performance Computing</td>
</tr>
<tr>
<td>EECE 5642</td>
<td>Data Visualization</td>
</tr>
<tr>
<td>EECE 5643</td>
<td>Simulation and Performance Evaluation</td>
</tr>
<tr>
<td>EECE 5644</td>
<td>Introduction to Machine Learning and Pattern Recognition</td>
</tr>
<tr>
<td>EECE 5647</td>
<td>Nanophotonics</td>
</tr>
<tr>
<td>EECE 5648</td>
<td>Biomedical Optics</td>
</tr>
<tr>
<td>EECE 5649</td>
<td>Design of Analog Integrated Circuits with Complementary Metal-Oxide-Semiconductor Technology</td>
</tr>
<tr>
<td>EECE 5664</td>
<td>Biomedical Signal Processing</td>
</tr>
<tr>
<td>EECE 5666</td>
<td>Digital Signal Processing</td>
</tr>
<tr>
<td>EECE 5694</td>
<td>Electromagnetic Photonic Devices</td>
</tr>
<tr>
<td>EECE 5695</td>
<td>Radio-Frequency and Optical Antennas</td>
</tr>
<tr>
<td>EECE 5697</td>
<td>Acoustics and Sensing</td>
</tr>
<tr>
<td>EECE 5698</td>
<td>Special Topics in Electrical and Computer Engineering (Mobile Robotics)</td>
</tr>
<tr>
<td>EECE 5698</td>
<td>Special Topics in Electrical and Computer Engineering (Principles of Assistive Robotics)</td>
</tr>
<tr>
<td>EECE 5698</td>
<td>Special Topics in Electrical and Computer Engineering (Networks: Technology, Economics, Social Interactions)</td>
</tr>
<tr>
<td>EECE 5698</td>
<td>Special Topics in Electrical and Computer Engineering (Software Security)</td>
</tr>
<tr>
<td>EECE 5698</td>
<td>Special Topics in Electrical and Computer Engineering (Advanced Network Management)</td>
</tr>
<tr>
<td>EECE 5698</td>
<td>Special Topics in Electrical and Computer Engineering (Robotics Sensing and Navigation)</td>
</tr>
<tr>
<td>EECE 5698</td>
<td>Special Topics in Electrical and Computer Engineering (Parallel Processing for Data Analytics)</td>
</tr>
<tr>
<td>EECE 5698</td>
<td>Special Topics in Electrical and Computer Engineering (Introduction to Multiferroic Materials and Systems)</td>
</tr>
<tr>
<td>EECE 7105</td>
<td>Optics for Engineers</td>
</tr>
<tr>
<td>EECE 7201</td>
<td>Solid State Devices</td>
</tr>
<tr>
<td>EECE 7202</td>
<td>Electromagnetic Theory 1</td>
</tr>
<tr>
<td>EECE 7203</td>
<td>Complex Variable Theory and Differential Equations</td>
</tr>
<tr>
<td>EECE 7204</td>
<td>Applied Probability and Stochastic Processes</td>
</tr>
<tr>
<td>EECE 7205</td>
<td>Fundamentals of Computer Engineering</td>
</tr>
<tr>
<td>EECE 7240</td>
<td>Analog Integrated Circuit Design</td>
</tr>
<tr>
<td>EECE 7242</td>
<td>Integrated Circuits for Mixed Signals and Data Communication</td>
</tr>
<tr>
<td>EECE 7243</td>
<td>Integrated Circuit Fabrication</td>
</tr>
<tr>
<td>EECE 7244</td>
<td>Introduction to Microelectromechanical Systems (MEMS)</td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Title</td>
</tr>
<tr>
<td>------------</td>
<td>-------------------------------------------------------</td>
</tr>
<tr>
<td>EECE 7398</td>
<td>Special Topics (Advanced Computer Architecture)</td>
</tr>
<tr>
<td>EECE 7398</td>
<td>Special Topics (Advanced Topics in Scalable and Sustainable System Design)</td>
</tr>
<tr>
<td>EECE 7399</td>
<td>Preparing High-Stakes Written and Oral Materials</td>
</tr>
<tr>
<td>MATH 7232</td>
<td>Combinatorial Analysis</td>
</tr>
<tr>
<td>MATH 7233</td>
<td>Graph Theory</td>
</tr>
<tr>
<td>CS 5100</td>
<td>Foundations of Artificial Intelligence</td>
</tr>
<tr>
<td>CS 5200</td>
<td>Database Management Systems</td>
</tr>
<tr>
<td>CS 5600</td>
<td>Computer Systems</td>
</tr>
<tr>
<td>CS 5770</td>
<td>Software Vulnerabilities and Security</td>
</tr>
<tr>
<td>CS 6110</td>
<td>Knowledge-Based Systems</td>
</tr>
<tr>
<td>CS 6200</td>
<td>Information-Based Systems</td>
</tr>
<tr>
<td>CS 6220</td>
<td>Data Mining Techniques</td>
</tr>
<tr>
<td>CS 6310</td>
<td>Computational Imaging</td>
</tr>
<tr>
<td>CS 6410</td>
<td>Compilers</td>
</tr>
<tr>
<td>CS 6510</td>
<td>Advanced Software Development</td>
</tr>
<tr>
<td>CS 6520</td>
<td>Methods of Software Development</td>
</tr>
<tr>
<td>CS 6610</td>
<td>Parallel Computing</td>
</tr>
<tr>
<td>CS 6740</td>
<td>Network Security</td>
</tr>
<tr>
<td>CS 6750</td>
<td>Cryptography and Communications Security</td>
</tr>
<tr>
<td>CS 6754</td>
<td>Secure Wireless Ad-hoc Robots on Mission (SWARM) 1</td>
</tr>
<tr>
<td>CS 6760</td>
<td>Privacy, Security, and Usability</td>
</tr>
<tr>
<td>CS 6810</td>
<td>Distributed Algorithms</td>
</tr>
<tr>
<td>CS 7785</td>
<td>Special Topics in Network Science</td>
</tr>
<tr>
<td>CS 7800</td>
<td>Advanced Algorithms</td>
</tr>
</tbody>
</table>

**EXCLUDED COURSES FOR ALL MSECE CONCENTRATIONS**

Please see your college administrator for more information.

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 Digital Image Processing
- 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.

### General Requirements

**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.

**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
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 MS 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 (see table below). Students may pursue any program either on a full-time or part-time basis; however, certain restrictions may apply.

<table>
<thead>
<tr>
<th>Degree Requirements</th>
<th>Course Work Only</th>
<th>With Project</th>
<th>With Thesis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required and elective courses</td>
<td>32 SH</td>
<td>28 SH</td>
<td>24 SH</td>
</tr>
<tr>
<td>MEIE 6800 Technical Writing (not required for BS/MS students)</td>
<td>N/A</td>
<td>0 SH</td>
<td>0 SH</td>
</tr>
<tr>
<td>MEIE 6850 Research Seminar in Mechanical and Industrial Engineering</td>
<td>N/A</td>
<td>0 SH</td>
<td>0 SH</td>
</tr>
<tr>
<td>Project/Thesis</td>
<td>0 SH</td>
<td>4 SH</td>
<td>8 SH</td>
</tr>
</tbody>
</table>

The MIE department offers MS degrees in both industrial engineering and operation research. The MIE department also offers an MS degree in mechanical engineering with one of the following five concentrations:

- General mechanical engineering
- Material science
- Mechanics and design
- Mechatronics
- Thermofluids

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. 212).

GORDON INSTITUTE OF ENGINEERING LEADERSHIP OPTION

Students have the opportunity to pursue the Gordon Engineering Leadership Program (p. 204) in combination with the MS degree.

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 area 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.

Programs

Doctor of Philosophy (PhD)

- Industrial Engineering (p. 169)
- Industrial Engineering—Advanced Entry (p. 171)
- Mechanical Engineering (p. 174)
- Mechanical Engineering—Advanced Entry (p. 176)

Master of Science (MS)

- Data Analytics Engineering (p. 179)

Master of Science in Industrial Engineering (MSIE)

- Industrial Engineering (p. 181)

Master of Science in Mechanical Engineering (MSME)

- Mechanical Engineering with Concentration in General Mechanical Engineering (p. 183)
- Mechanical Engineering with Concentration in Mechanics and Design (p. 187)
- Mechanical Engineering with Concentration in Material Science (p. 185)
- Mechanical Engineering with Concentration in Mechatronics (p. 188)
• Mechanical Engineering with Concentration in Thermofluids (p. 190)

Master of Science in Operations Research (MSOR)
• Operations Research (p. 192)

Graduate Certificate
• Data Analytics Engineering (p. 194)
• Data Mining Engineering (p. 194)

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 area 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 48 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 56 semester hours (32 semester hours to earn a master’s degree and an additional 24 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.

All MIE PhD students must complete Technical Writing (MEIE 6800) and Research Seminar in Mechanical and Industrial Engineering (MEIE 6850), preferably during their first year of full-time study. If appropriate, part-time students may petition the Graduate Affairs Committee to waive these requirements.

All MIE graduate students are also required to complete a brief online session on Responsible Conduct of Research and Plagiarism in one of these courses. The outcome of this online session will be filed with the student's records.

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 area examining committee, who will add the program of study to the student's record upon admission to doctoral candidacy.

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.

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 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 exam.
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) at 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.

**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

**General Requirements**

**Seminars**

- MEIE 6800 Technical Writing 0
- MEIE 6850 Research Seminar in Mechanical and Industrial Engineering 0

**Approved Course Work**

Requires 48 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 56 semester hours (32 semester hours toward the sought master’s degree and 24 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.

**Dissertation Courses**

Complete the following (repeatable) course twice. Must register in two consecutive semesters (may include full summer term).

<table>
<thead>
<tr>
<th>ME 9990</th>
<th>Dissertation</th>
</tr>
</thead>
</table>

**Program Credit/GPA Requirements**

48 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 advanced course work and submit and defend an ordshow 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 area 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 24 semester hours of course work beyond a master’s degree. All MIE PhD students must complete Technical Writing (MEIE 6800) and Research Seminar in Mechanical and Industrial Engineering (MEIE 6850), preferably during their first year of full-time study. If appropriate, part-time students may petition the Graduate Affairs Committee to waive these requirements.
All MIE graduate students are also required to complete a brief online session on Responsible Conduct of Research and Plagiarism in one of these courses. The outcome of the online session will be filed with the student’s records.

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 approval of the area examining committee that will add the program of study to the student’s record upon admission to doctoral candidacy.

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.

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:

- 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.

**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 Continuation (IE 9996). 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 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**

**Seminars**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MEIE 6800</td>
<td>Technical Writing</td>
<td>0</td>
</tr>
<tr>
<td>MEIE 6850</td>
<td>Research Seminar in Mechanical and Industrial Engineering</td>
<td>0</td>
</tr>
</tbody>
</table>

**Approved Course Work**
Requires 24 semester hours of course work, including up to 4 semester hours of Independent Study (IE 7978). Please consult your faculty advisor for acceptable courses.
Dissertation Courses
Complete the following (repeatable) course twice. Must register in two consecutive semesters (may include full summer term):

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME 9990</td>
<td>Dissertation</td>
</tr>
</tbody>
</table>

Program Credit/GPA Requirements
24 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 area 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 48 semester hours of course work beyond a bachelor’s degree. Those students who choose to get an MS degree along the way to PhD, must complete a total of 56 semester hours (32 semester hours to earn an MS degree and 24 semester hours beyond the earned MS). The 32 semester hours of course work applied toward the master’s degree may include up to 8 semester hours of MS thesis or 4 semester hours of project or approved independent study.

All MIE PhD students must complete Technical Writing (MEIE 6800) and Research Seminar in Mechanical and Industrial Engineering (MEIE 6850), preferably during their first year of full-time study. If appropriate, part-time students may petition the Graduate Affairs Committee to waive these requirements.

All MIE graduate students are also required to complete a brief online session on Responsible Conduct of Research and Plagiarism in one of these courses. Outcome of the online session will be filed with the student’s records.

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 area examining committee, who will add the program of study to the student’s record upon admission to doctoral candidacy.

Students may petition the MIE Graduate Affairs Committee to substitute up to a 4-semester-hour Independent Study (ME 7978) as part of their required course work. An independent study must be approved by the research advisor.

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. 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 a College of Engineering 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.

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
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 24 semester hours of course work beyond the master’s degree. All MIE PhD students must complete Technical Writing (MEIE 6800) and Research Seminar in Mechanical and Industrial Engineering (MEIE 6850), preferably during their first year of full-time study. If appropriate, part-time students may petition the Graduate Affairs Committee to waive these requirements.

All MIE graduate students are also required to complete a brief online session on Responsible Conduct of Research and Plagiarism in one of these courses. The outcome of online session will be filed with the student’s records.

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 area examining committee, who will add the program of study to the student’s record upon admission to doctoral candidacy.

Students may petition the MIE Graduate Affairs Committee to substitute up to a 4-semester-hour Independent Study (ME 7978) as part of their required course work. An independent study must be approved by the research advisor.

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)
- Dynamic Systems (DSC2)
- Thermodynamics (TFS1)
- Thermodynamics of Materials (MSE2)
- Mechanics of Deformable Media (MEC1)
- Process, Structure, Property, and Performance of Materials (MSE3)
- Heat Transfer (TFS3)

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 a College of Engineering 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.

**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.
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:

- 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 any 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 Course Requirements

All MIE MS students doing thesis or project options (excluding MS students in engineering management and Gordon Engineering Leadership programs) must complete Technical Writing (MEIE 6800) and Research Seminar in Mechanical and Industrial Engineering (MEIE 6850), preferably during the first year of their full-time study. If appropriate, part-time students may petition the graduate affairs committee to waive these requirements. Students in combined BS/MS programs pursuing thesis or project options must take Research Seminar in Mechanical and Industrial Engineering (MEIE 6850) as part of their course work requirement, while Research Seminar in Mechanical and Industrial Engineering (MEIE 6850) is optional for these students.

All MIE graduate students are also required to complete a brief online session on Responsible Conduct of Research and Plagiarism in one...
of these courses. 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). 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). 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, 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 end of their first 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 course work at Northeastern. See here (p. 112) 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. 212).

**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. 205)

**Program Requirements**

Complete all courses and requirements listed below unless otherwise indicated.

**General Requirements**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EECE 5642</td>
<td>Data Visualization</td>
<td>4</td>
</tr>
<tr>
<td>IE 6200</td>
<td>Engineering Probability and Statistics</td>
<td>4</td>
</tr>
<tr>
<td>IE 7275</td>
<td>Data Mining in Engineering</td>
<td>4</td>
</tr>
<tr>
<td>IE 7280</td>
<td>Statistical Methods in Engineering</td>
<td>4</td>
</tr>
<tr>
<td>INFO 6210</td>
<td>Data Management and Database Design</td>
<td>4</td>
</tr>
<tr>
<td>OR 6205</td>
<td>Deterministic Operations Research</td>
<td>4</td>
</tr>
</tbody>
</table>

**Options**

Complete one of the following options:

**COURSE WORK OPTION**

Complete 8 semester hours from the course list below. 8

**PROJECT OPTION**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME 7945</td>
<td>Master’s Project</td>
<td>4</td>
</tr>
</tbody>
</table>

Complete 4 semester hours from the course list below. 4
THESS OPTION
ME 7990 Thesis 1 8

Course List

Bouvé College of Health Sciences Electives
HINF 5102 Data Management in Healthcare
HINF 6220 Database Design, Access, Modeling, and Security

College of Computer and Information Science Electives
CS 6140 Machine Learning
CS 6200 Information Retrieval
CS 6240 Large-Scale Parallel Data Processing
DA 5020 Collecting, Storing, and Retrieving Data
DA 5030 Introduction to Data Mining/Machine Learning
IA 5050 Data Mining in Cyberspace

College of Engineering Electives
CIVE 7100 Applied Time Series and Spatial Statistics
CSYE 7200 Big-Data System Engineering Using Scala
CSYE 7245 Big-Data Systems and Intelligence Analytics
CSYE 7270 Building Virtual Environments
EECE 5644 Introduction to Machine Learning and Pattern Recognition
EECE 7313 Pattern Recognition
EECE 7397 Advanced Machine Learning
EMGT 5220 Engineering Project Management
IE 5630 Biosensor and Human Behavior Measurement
IE 7270 Intelligent Manufacturing
IE 7615 Neural Networks in Engineering
INFO 7250 Engineering of Big-Data Systems
INFO 7290 Data Warehousing and Business Intelligence
OR 7245 Network Analysis and Advanced Optimization
OR 7250 Multi-Criteria Decision Making

College of Science Electives
MATH 7341 Probability 2
MATH 7342 Mathematical Statistics
MATH 7343 Applied Statistics
MATH 7344 Regression, ANOVA, and Design
PHYS 5116 Complex Networks and Applications
PHYS 7331 Network Science Data

College of Social Sciences and Humanities Electives
PPUA 5262 Big Data for Cities
PPUA 7237 Advanced Spatial Analysis of Urban Systems

D’Amore-McKim School of Business Electives
BUSN 6320 Business Analytics Fundamentals
BUSN 6324 Predictive Analytics for Managers
BUSN 6326 Introduction to Big Data and Digital Marketing Analytics

Program Credit/GPA Requirements
32 total semester hours required
Minimum 3.00 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.

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. 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 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. Also, students can complete their master’s degree either on a full-time or part-time basis; however, certain restrictions may apply.

Special Course Requirements
All MS students in thesis or project options (excluding MS students in engineering management and Gordon Engineering Leadership programs) must complete Technical Writing (MEIE 6800) and Research Seminar in Mechanical and Industrial Engineering (MEIE 6850), preferably during the first year of their full-time study. If appropriate, part-time students may petition the Graduate Affairs Committee to waive these requirements. Students in combined BS/MS programs pursuing thesis or project options, must take Research Seminar in Mechanical and Industrial Engineering (MEIE 6850) as part of their course work requirement, while Technical Writing (MEIE 6800) is optional for these students.

All MIE graduate students are also required to complete a brief online session on Responsible Conduct of Research and Plagiarism in one of these courses. 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 up to a 4-semester-hour industry-based challenge project with multiple mentors. The integrated 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.

**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 end of their first 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 course work at Northeastern. See here (p. 112) 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. 212).

**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. 205)**

**Program Requirements**

Complete all courses and requirements listed below unless otherwise indicated.

**General Requirements**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>IE 6200</td>
<td>Engineering Probability and Statistics</td>
<td>4</td>
</tr>
<tr>
<td>OR 6205</td>
<td>Deterministic Operations Research</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Complete 8 semester hours from the following:</td>
<td></td>
</tr>
<tr>
<td>IE 5400</td>
<td>Healthcare Systems Modeling and Analysis</td>
<td>8</td>
</tr>
<tr>
<td>IE 7200</td>
<td>Supply Chain Engineering</td>
<td></td>
</tr>
<tr>
<td>IE 7215</td>
<td>Simulation Analysis</td>
<td></td>
</tr>
<tr>
<td>IE 7315</td>
<td>Human Factors Engineering</td>
<td></td>
</tr>
<tr>
<td>IE 7275</td>
<td>Data Mining in Engineering</td>
<td></td>
</tr>
</tbody>
</table>

**Options**

Complete one of the following options:

**COURSE WORK OPTION**

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**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>IE 7945</td>
<td>Master’s Project</td>
<td>4</td>
</tr>
<tr>
<td>MEIE 6800</td>
<td>Technical Writing</td>
<td>0</td>
</tr>
<tr>
<td>MEIE 6850</td>
<td>Research Seminar in Mechanical and Industrial Engineering</td>
<td>0</td>
</tr>
</tbody>
</table>

Complete 12 semester hours from the course list below. 12
Minimum 3.000 GPA required

32 total semester hours required

Note: Other approved courses may be chosen in consultation with a faculty advisor.

THESIS OPTION

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

MEIE 6800 Technical Writing 0

MEIE 6850 Research Seminar in Mechanical and Industrial Engineering 0

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

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSYE 6200</td>
<td>Concepts of Object-Oriented Design</td>
</tr>
<tr>
<td>CSYE 6205</td>
<td>Concepts of Object-Oriented Design with C++</td>
</tr>
<tr>
<td>CSYE 6210</td>
<td>Component Software Development</td>
</tr>
<tr>
<td>CSYE 6220</td>
<td>Enterprise Software Design</td>
</tr>
<tr>
<td>CSYE 7230</td>
<td>Software Engineering</td>
</tr>
<tr>
<td>CSYE 7270</td>
<td>Building Virtual Environments</td>
</tr>
<tr>
<td>CSYE 7280</td>
<td>User Experience Design and Testing</td>
</tr>
<tr>
<td>GE 5010</td>
<td>Customer-Driven Technical Innovation for Engineers</td>
</tr>
<tr>
<td>GE 5100</td>
<td>Product Development for Engineers</td>
</tr>
<tr>
<td>EMT 5220</td>
<td>Engineering Project Management</td>
</tr>
<tr>
<td>EMT 5300</td>
<td>Engineering/Organizational Psychology</td>
</tr>
<tr>
<td>EMT 6225</td>
<td>Economic Decision Making</td>
</tr>
<tr>
<td>EMT 6305</td>
<td>Financial Management for Engineers</td>
</tr>
<tr>
<td>IE 5617</td>
<td>Lean Concepts and Applications</td>
</tr>
<tr>
<td>IE 5620</td>
<td>Mass Customization</td>
</tr>
<tr>
<td>IE 5630</td>
<td>Biosensor and Human Behavior Measurement</td>
</tr>
<tr>
<td>IE 6300</td>
<td>Manufacturing Methods and Processes</td>
</tr>
<tr>
<td>IE 7255</td>
<td>Manufacturing Processes</td>
</tr>
<tr>
<td>IE 7270</td>
<td>Intelligent Manufacturing</td>
</tr>
<tr>
<td>IE 7275</td>
<td>Data Mining in Engineering</td>
</tr>
<tr>
<td>IE 7280</td>
<td>Statistical Methods in Engineering</td>
</tr>
<tr>
<td>IE 7285</td>
<td>Statistical Quality Control</td>
</tr>
<tr>
<td>IE 7290</td>
<td>Reliability Analysis and Risk Assessment</td>
</tr>
<tr>
<td>IE 7315</td>
<td>Human Factors Engineering</td>
</tr>
<tr>
<td>OR 7230</td>
<td>Probabilistic Operation Research</td>
</tr>
<tr>
<td>OR 7235</td>
<td>Inventory Theory</td>
</tr>
<tr>
<td>OR 7240</td>
<td>Integer and Nonlinear Optimization</td>
</tr>
<tr>
<td>OR 7245</td>
<td>Network Analysis and Advanced Optimization</td>
</tr>
<tr>
<td>OR 7250</td>
<td>Multi-Criteria Decision Making</td>
</tr>
<tr>
<td>OR 7260</td>
<td>Constraint Programming</td>
</tr>
<tr>
<td>OR 7310</td>
<td>Logistics, Warehousing, and Scheduling</td>
</tr>
</tbody>
</table>

Program Credit/GPA Requirements

32 total semester hours required
Minimum 3.000 GPA required

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 Course Requirements

All mechanical and industrial engineering (MIE) MS students in thesis or project options (excluding MS students in engineering management and Gordon Engineering Leadership programs) must complete Technical Writing (MEIE 6800) and Research Seminar in Mechanical and Industrial Engineering (MEIE 6850), preferably during the first year of their full-time study. If appropriate, part-time students may petition the Graduate Affairs Committee to waive these requirements. Students in combined BS/MS programs pursuing thesis or project options must take Research Seminar in Mechanical and Industrial Engineering (MEIE 6850) as part of their course work requirement, while Technical Writing (MEIE 6800) is optional for these students.

All MIE graduate students are also required to complete a brief online session on Responsible Conduct of Research and Plagiarism in one of these courses. 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 end of their first 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 coursework at Northeastern. See here (p. 112) 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. 212).

GORDON INSTITUTE OF ENGINEERING LEADERSHIP
Master’s Degree in Mechanical Engineering with a Concentration in General Mechanical Engineering with Graduate Certificate in Engineering Leadership

Students may complete a Master of Science in Mechanical Engineering with a 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. 205)

Program Requirements
Complete all courses and requirements listed below unless otherwise indicated.

General Requirements

Mathematics Competency
Complete 4 semester hours from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME 6200</td>
<td>Mathematical Methods for Mechanical Engineers 1</td>
</tr>
<tr>
<td>ME 6201</td>
<td>Mathematical Methods for Mechanical Engineers 2</td>
</tr>
</tbody>
</table>

Thermofluids Competency
Complete 4 semester hours from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME 5685</td>
<td>Solar Thermal Engineering</td>
</tr>
<tr>
<td>ME 5690</td>
<td>Gas Turbine Combustion</td>
</tr>
<tr>
<td>ME 5695</td>
<td>Aerodynamics</td>
</tr>
<tr>
<td>ME 7280</td>
<td>Statistical Thermodynamics</td>
</tr>
<tr>
<td>ME 7295</td>
<td>Multiscale Flow and Transport Phenomena</td>
</tr>
<tr>
<td>ME 7300</td>
<td>Combustion and Air Pollution</td>
</tr>
<tr>
<td>ME 7305</td>
<td>Fundamentals of Combustion</td>
</tr>
<tr>
<td>ME 7310</td>
<td>Computational Fluid Dynamics with Heat Transfer</td>
</tr>
<tr>
<td>ME 7330</td>
<td>Turbulent Flow</td>
</tr>
<tr>
<td>ME 7340</td>
<td>Turbomachinery Design</td>
</tr>
</tbody>
</table>

Mechanics/Mechatronics Combined Competency
Complete 4 semester hours from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>EECE 5610</td>
<td>Digital Control Systems</td>
</tr>
<tr>
<td>EECE 5666</td>
<td>Digital Signal Processing</td>
</tr>
<tr>
<td>ME 5245</td>
<td>Mechatronic Systems</td>
</tr>
<tr>
<td>ME 5650</td>
<td>Advanced Mechanics of Materials</td>
</tr>
<tr>
<td>ME 5655</td>
<td>Dynamics and Mechanical Vibration</td>
</tr>
<tr>
<td>ME 5657</td>
<td>Finite Element Method</td>
</tr>
<tr>
<td>ME 5659</td>
<td>Control Systems Engineering</td>
</tr>
<tr>
<td>ME 7210</td>
<td>Elasticity and Plasticity</td>
</tr>
</tbody>
</table>

Materials Competency
Complete 4 semester hours from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME 7280</td>
<td>Fundamentals of Combustion</td>
</tr>
<tr>
<td>ME 7295</td>
<td>Multiscale Flow and Transport Phenomena</td>
</tr>
<tr>
<td>ME 7300</td>
<td>Combustion and Air Pollution</td>
</tr>
<tr>
<td>ME 7305</td>
<td>Fundamentals of Combustion</td>
</tr>
<tr>
<td>ME 7310</td>
<td>Computational Fluid Dynamics with Heat Transfer</td>
</tr>
<tr>
<td>ME 7330</td>
<td>Turbulent Flow</td>
</tr>
<tr>
<td>ME 7340</td>
<td>Turbomachinery Design</td>
</tr>
</tbody>
</table>

Elasticity and Plasticity
ME 5600  Materials Processing and Process Selection  
ME 5645  Environmental Issues in Manufacturing and Product Use
MATL

**Options**
Complete one of the following options:

**COURSE WORK OPTION**
Complete 16 semester hours in the following subject areas:  
ME, MATL, or other graduate engineering courses

**PROJECT OPTION**
ME 7945  Master’s Project 4  
MEIE 6800  Technical Writing 0  
MEIE 6850  Research Seminar in Mechanical and Industrial Engineering 0

**Electives**
Complete 12 semester hours in the following subject areas:  
ME, MATL, or other graduate engineering courses

**THESIS OPTION**
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

MEIE 6800  Technical Writing 0
MEIE 6850  Research Seminar in Mechanical and Industrial Engineering 0

**Electives**
Complete 8 semester hours in the following subject areas:  
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 Material Science, MSME**

While pursuing a Master of Science (MS) in Mechanical Engineering, students may choose material science as a concentration. Material 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 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 Course Requirements**
All MIE MS students in thesis or project options (excluding students doing MS in engineering management and Gordon Engineering Leadership programs) must complete Technical Writing (MEIE 6800) and Research Seminar in Mechanical and Industrial Engineering (MEIE 6850), preferably during the first year of their full-time study. If appropriate, part-time students may petition the Graduate Affairs Committee to waive these requirements. Students in combined BS/MS programs pursuing thesis or project options must take Research Seminar in Mechanical and Industrial Engineering (MEIE 6850) as part of their course work requirement, while Technical Writing (MEIE 6800) is optional for these students.

All MIE graduate students are also required to complete a brief online session on Responsible Conduct of Research and Plagiarism in one of these courses. 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 9778). 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 end of their first 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 course work at Northeastern. See here (p. 112) 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. 212).

GORDON INSTITUTE OF ENGINEERING LEADERSHIP

Master’s Degree in Mechanical Engineering with a Concentration in Material Science with Graduate Certificate in Engineering Leadership

Students may complete a Master of Science in Mechanical Engineering with a Concentration in Material 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 material science technical courses.

Engineering Leadership (p. 205)

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

General Requirements

Complete 16 semester hours from the following: 16

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATL 6250</td>
<td>Soft Matter</td>
</tr>
<tr>
<td>MATL 6285</td>
<td>Structure, Properties, and Processing of Polymeric Materials</td>
</tr>
<tr>
<td>MATL 7350</td>
<td>Mechanical Behavior and Strengthening Mechanisms</td>
</tr>
<tr>
<td>MATL 7355</td>
<td>Thermodynamics of Materials</td>
</tr>
<tr>
<td>MATL 7360</td>
<td>Kinetics of Phase Transformations</td>
</tr>
<tr>
<td>ME 5600</td>
<td>Materials Processing and Process Selection</td>
</tr>
<tr>
<td>ME 5645</td>
<td>Environmental Issues in Manufacturing and Product Use</td>
</tr>
</tbody>
</table>

Options

Complete one of the following options:

COURSE WORK OPTION

Electives

Complete 16 semester hours in the following subject areas: 16

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME, MATL, or other graduate engineering courses</td>
<td></td>
</tr>
</tbody>
</table>

PROJECT OPTION

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATL 7945</td>
<td>Master’s Project</td>
</tr>
<tr>
<td>MEIE 6800</td>
<td>Technical Writing</td>
</tr>
<tr>
<td>MEIE 6850</td>
<td>Research Seminar in Mechanical and Industrial Engineering</td>
</tr>
</tbody>
</table>

Electives

Complete 12 semester hours in the following subject areas: 12

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME, MATL, or other graduate engineering courses</td>
<td></td>
</tr>
</tbody>
</table>

THESIS OPTION

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME 7990</td>
<td>Thesis</td>
</tr>
<tr>
<td>MEIE 6800</td>
<td>Technical Writing</td>
</tr>
<tr>
<td>MEIE 6850</td>
<td>Research Seminar in Mechanical and Industrial Engineering</td>
</tr>
</tbody>
</table>

Electives

Complete 8 semester hours in the following subject areas: 8

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME, MATL, or other graduate engineering courses</td>
<td></td>
</tr>
</tbody>
</table>
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, students may choose mechanics and design as a concentration. Advances in mechanics enable key engineering innovations. Using complementary computational, experimental, and design tools, the area of mechanics is addressing challenges from nanoscale actuators and human health to energy systems and bridges. For example, our biomechanics research is creating robotic rehabilitation aids and a new understanding of cellular biomechanics and the assembly and degradation of biomaterials. At the tiniest 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 goals also include understanding, design, and creation of piezoelectric sensors and actuators as well as the stability assessment and control of dynamical 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 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 Course Requirements**

All mechanical and industrial engineering (MIE) MS students in thesis or project options (excluding students doing MS in engineering management and Gordon Engineering Leadership programs) must complete Technical Writing (MEIE 6800) and Research Seminar in Mechanical and Industrial Engineering (MEIE 6850), preferably during the first year of their full-time study. If appropriate, part-time students may petition the Graduate Affairs Committee to waive these requirements. Students in combined BS/MS programs pursuing thesis or project options must take Research Seminar in Mechanical and Industrial Engineering (MEIE 6850) as part of their course work requirement, while Technical Writing (MEIE 6800) is optional for these students.

All MIE graduate students are also required to complete a brief online session on Responsible Conduct of Research and Plagiarism in one of these courses. 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). 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 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 end of their first 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 course work at Northeastern. See here (p. 112) 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. 212).

**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. 205)

### Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

### General Requirements

#### Core

Complete 4 semester hours from the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME 6200</td>
<td>Mathematical Methods for Mechanical Engineers 1</td>
<td>4</td>
</tr>
<tr>
<td>ME 6201</td>
<td>Mathematical Methods for Mechanical Engineers 2</td>
<td></td>
</tr>
</tbody>
</table>

#### Mechanics

Complete 12 semester hours from the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME 5650</td>
<td>Advanced Mechanics of Materials</td>
<td></td>
</tr>
<tr>
<td>ME 5655</td>
<td>Dynamics and Mechanical Vibration</td>
<td></td>
</tr>
<tr>
<td>ME 5657</td>
<td>Finite Element Method</td>
<td></td>
</tr>
<tr>
<td>ME 5659</td>
<td>Control Systems Engineering</td>
<td></td>
</tr>
<tr>
<td>ME 7210</td>
<td>Elasticity and Plasticity</td>
<td></td>
</tr>
</tbody>
</table>

### Options

Complete one of the following options:

#### COURSE WORK OPTION

Complete 16 semester hours in the following subject areas:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME, MATL,</td>
<td>ME, MATL, or other graduate engineering courses</td>
<td></td>
</tr>
</tbody>
</table>

#### PROJECT OPTION

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME 7945</td>
<td>Master's Project</td>
<td>4</td>
</tr>
<tr>
<td>MEIE 6800</td>
<td>Technical Writing</td>
<td>0</td>
</tr>
<tr>
<td>MEIE 6850</td>
<td>Research Seminar in Mechanical and Industrial Engineering</td>
<td>0</td>
</tr>
</tbody>
</table>

#### Electives

Complete 12 semester hours in the following subject areas:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME, MATL,</td>
<td>ME, MATL, or other graduate engineering courses</td>
<td></td>
</tr>
</tbody>
</table>

#### THESIS OPTION

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME 7990</td>
<td>Thesis ¹</td>
<td>8</td>
</tr>
<tr>
<td>MEIE 6800</td>
<td>Technical Writing</td>
<td>0</td>
</tr>
<tr>
<td>MEIE 6850</td>
<td>Research Seminar in Mechanical and Industrial Engineering</td>
<td>0</td>
</tr>
</tbody>
</table>

#### Electives

Complete 8 semester hours in the following subject areas:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME, MATL,</td>
<td>ME, MATL, or other graduate engineering courses</td>
<td></td>
</tr>
</tbody>
</table>

### 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 in Mechanical Engineering, students may choose mechatronics as a concentration. The term mechatronics stems from the combination of words mechanical and electronics. Mechatronics is a multidisciplinary approach to product design and development, merging the principles of electrical, mechanical, computer, material, chemical, and industrial engineering. Mechatronic systems are typically composed of traditional mechanical and electrical components but are referred to as "intelligent" devices due to the incorporation of sensors, actuators, and computer control systems. Mechatronics can be viewed as a "modern engineering process" that deals with the design and manufacturing of intelligent products or systems involving hybrid mechanical and electronic functions. Our primary focus in mechatronic 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 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 master’s program either on a full-time or part-time basis; however, certain restrictions may apply.
Special Course Requirements
All mechanical and industrial engineering (MIE) MS students doing thesis or project options (excluding MS students in engineering management and Gordon Engineering Leadership programs) must complete Technical Writing (MEIE 6800) and Research Seminar in Mechanical and Industrial Engineering (MEIE 6850), preferably during the first year of their full-time study. If appropriate, part-time students may petition the Graduate Affairs Committee to waive these requirements. Students in combined BS/MS programs pursuing thesis or project options, must take Research Seminar in Mechanical and Industrial Engineering (MEIE 6890) as part of their course work requirement, while Technical Writing (MEIE 6800) is optional for these students.

All MIE graduate students are also required to complete a brief online session on Responsible Conduct of Research and Plagiarism in one of these courses. 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 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.

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 end of their first 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 course work at Northeastern. See here (p. 112) 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. 212).

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. 205)

Program Requirements
Complete all courses and requirements listed below unless otherwise indicated.
General Requirements

Mathematics Competency
Complete 4 semester hours from the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME 6200</td>
<td>Mathematical Methods for Mechanical Engineers 1</td>
</tr>
<tr>
<td>ME 6201</td>
<td>Mathematical Methods for Mechanical Engineers 2</td>
</tr>
</tbody>
</table>

Mechanics Competency
Complete 4 semester hours from the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME 5650</td>
<td>Advanced Mechanics of Materials</td>
</tr>
<tr>
<td>ME 5655</td>
<td>Dynamics and Mechanical Vibration</td>
</tr>
<tr>
<td>ME 5657</td>
<td>Finite Element Method</td>
</tr>
</tbody>
</table>

Mechatronics Concentration
Complete 4 semester hours from the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME 5245</td>
<td>Mechatronic Systems</td>
</tr>
<tr>
<td>ME 5659</td>
<td>Control Systems Engineering</td>
</tr>
</tbody>
</table>

Electrical Competency
Complete 4 semester hours from the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>EECE 5610</td>
<td>Digital Control Systems</td>
</tr>
<tr>
<td>EECE 5666</td>
<td>Digital Signal Processing</td>
</tr>
</tbody>
</table>

Options
Complete one of the following options:

**COURSE WORK OPTION**
Complete 12 semester hours from the course list.

**PROJECT OPTION**
Complete 8 semester hours from the course list.

**THESIS OPTION**
Complete 4 semester hours from the course list.

Course List

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHME 7231</td>
<td>Chemical Process Dynamics and Control</td>
</tr>
<tr>
<td>CS 5320</td>
<td>Digital Image Processing</td>
</tr>
<tr>
<td>EECE 5606</td>
<td>Micro- and Nanofabrication</td>
</tr>
<tr>
<td>EECE 5576</td>
<td>Wireless Communication Systems</td>
</tr>
<tr>
<td>EECE 5686</td>
<td>Electrical Machines</td>
</tr>
<tr>
<td>EECE 7242</td>
<td>Integrated Circuits for Mixed Signals and Data Communication</td>
</tr>
<tr>
<td>EECE 7359</td>
<td>Multiprocessor Architectures</td>
</tr>
<tr>
<td>EECE 7367</td>
<td>Robotics and Automation Systems</td>
</tr>
<tr>
<td>IE 5630</td>
<td>Biosensor and Human Behavior Measurement</td>
</tr>
<tr>
<td>ME 5250</td>
<td>Robot Mechanics and Control</td>
</tr>
<tr>
<td>ME 6260</td>
<td>Introduction to Microelectromechanical Systems (MEMS)</td>
</tr>
<tr>
<td>ME 7247</td>
<td>Advanced Control Engineering</td>
</tr>
<tr>
<td>ME 7253</td>
<td>Advanced Vibrations</td>
</tr>
<tr>
<td>ME 7315</td>
<td>Heat Transfer Processes in Microelectronic Devices</td>
</tr>
</tbody>
</table>

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 MS degree

Minimum 3.000 GPA required

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 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, 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; 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 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 Course Requirements

All mechanical and industrial engineering (MIE) MS students in thesis or project options (excluding MS students in engineering management and Gordon Engineering Leadership programs) must complete Technical Writing (MEIE 6800) and Research Seminar in Mechanical and Industrial Engineering (MEIE 6850), preferably during the first year of their full-time study. If appropriate, part-time students may petition the Graduate Affairs Committee to waive these requirements. Students in combined BS/MS programs pursuing thesis or project options must take Research Seminar in Mechanical and Industrial Engineering (MEIE 6850) as part of their course work requirement, while Technical Writing (MEIE 6800) is optional for these students.

All MIE graduate students are also required to complete a brief online session on Responsible Conduct of Research and Plagiarism in one
of these courses. 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 end of their first 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 course work at Northeastern. See here (p. 112) 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. 212).

**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. 205)

**Program Requirements**

Complete all courses and requirements listed below unless otherwise indicated.

**General Requirements**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME 6200</td>
<td>Mathematical Methods for Mechanical Engineers 1</td>
<td>4</td>
</tr>
<tr>
<td>or ME 6201</td>
<td>Mathematical Methods for Mechanical Engineers 2</td>
<td></td>
</tr>
<tr>
<td>ME 7270</td>
<td>General Thermodynamics</td>
<td>4</td>
</tr>
<tr>
<td>ME 7275</td>
<td>Essentials of Fluid Dynamics</td>
<td>4</td>
</tr>
<tr>
<td>ME 7285</td>
<td>Heat Conduction and Thermal Radiation</td>
<td>4</td>
</tr>
<tr>
<td>or ME 7290</td>
<td>Convective Heat Transfer</td>
<td></td>
</tr>
</tbody>
</table>

**Thermofluids Concentration Course**

Complete 4 semester hours from the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME 5685</td>
<td>Solar Thermal Engineering</td>
<td>4</td>
</tr>
<tr>
<td>ME 5690</td>
<td>Gas Turbine Combustion</td>
<td></td>
</tr>
</tbody>
</table>
Options

Complete one of the following options:

### COURSE WORK OPTION

Complete 8 semester hours from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME 5685</td>
<td>Solar Thermal Engineering</td>
</tr>
<tr>
<td>ME 5690</td>
<td>Gas Turbine Combustion</td>
</tr>
<tr>
<td>ME 5695</td>
<td>Aerodynamics</td>
</tr>
<tr>
<td>ME 7280</td>
<td>Statistical Thermodynamics</td>
</tr>
<tr>
<td>ME 7295</td>
<td>Multiscale Flow and Transport Phenomena</td>
</tr>
<tr>
<td>ME 7300</td>
<td>Combustion and Air Pollution</td>
</tr>
<tr>
<td>ME 7305</td>
<td>Fundamentals of Combustion</td>
</tr>
<tr>
<td>ME 7310</td>
<td>Computational Fluid Dynamics with Heat Transfer</td>
</tr>
<tr>
<td>ME 7330</td>
<td>Turbulent Flow</td>
</tr>
<tr>
<td>ME 7340</td>
<td>Turbomachinery Design</td>
</tr>
</tbody>
</table>

Complete 4 semester hours from the following:

- ME, MATL, or other graduate engineering course

### PROJECT OPTION

Complete 4 semester hours from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME 7945</td>
<td>Master’s Project</td>
</tr>
<tr>
<td>MEIE 6800</td>
<td>Technical Writing</td>
</tr>
<tr>
<td>MEIE 6850</td>
<td>Research Seminar in Mechanical and Industrial Engineering</td>
</tr>
</tbody>
</table>

Complete 4 semester hours from the following:

- 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
- ME 7330 Turbulent Flow
- ME 7340 Turbomachinery Design

### THESIS OPTION

Complete 8 semester hours from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME 7990</td>
<td>Thesis</td>
</tr>
<tr>
<td>MEIE 6800</td>
<td>Technical Writing</td>
</tr>
<tr>
<td>MEIE 6850</td>
<td>Research Seminar in Mechanical and Industrial Engineering</td>
</tr>
</tbody>
</table>

#### 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.

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). 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 any 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 Course Requirements

All MIE MS students pursuing thesis or project options (excluding MS students in engineering management and Gordon Engineering Leadership programs) must complete Technical Writing (MEIE 6800) and Research Seminar in Mechanical and Industrial Engineering (MEIE 6850), preferably during the first year of full-time study. If appropriate, part-time students may petition the Graduate Affairs Committee to waive these requirements. Students in combined BS/MS programs pursuing thesis or project options must take Research Seminar in Mechanical and Industrial Engineering (MEIE 6850) as part of their course work requirement, while Technical Writing (MEIE 6800) is optional for these students.

All MIE graduate students are also required to complete a brief online session on Responsible Conduct of Research and Plagiarism in one of these courses. 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...
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 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 end of their first 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 course work at Northeastern. See here 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. 212).

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.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

General Requirements

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>IE 6200</td>
<td>Engineering Probability and Statistics</td>
<td>4</td>
</tr>
<tr>
<td>or MATH 7241</td>
<td>Probability 1</td>
<td></td>
</tr>
<tr>
<td>OR 7245</td>
<td>Network Analysis and Advanced Optimization</td>
<td>4</td>
</tr>
<tr>
<td>or MATH 7234</td>
<td>Optimization and Complexity</td>
<td></td>
</tr>
<tr>
<td>OR 7230</td>
<td>Probabilistic Operation Research</td>
<td>4</td>
</tr>
<tr>
<td>or MATH 7341</td>
<td>Probability 2</td>
<td></td>
</tr>
<tr>
<td>OR 6205</td>
<td>Deterministic Operations Research</td>
<td>4</td>
</tr>
</tbody>
</table>

Options

Select one of the following options:

COURSE WORK OPTION

Complete 16 semester hours from the course list below. 16

PROJECT OPTION

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>OR 7945</td>
<td>Master’s Project</td>
<td>4</td>
</tr>
<tr>
<td>MEIE 6800</td>
<td>Technical Writing</td>
<td>0</td>
</tr>
<tr>
<td>MEIE 6850</td>
<td>Research Seminar in Mechanical and Industrial Engineering</td>
<td>0</td>
</tr>
</tbody>
</table>

Complete 12 semester hours from the course list below. 12

THESIS OPTION

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>OR 7990</td>
<td>Thesis (required for all students who receive financial support from the university in the form of a research, teaching, or tuition assistantship)</td>
<td>8</td>
</tr>
<tr>
<td>MEIE 6800</td>
<td>Technical Writing</td>
<td>0</td>
</tr>
<tr>
<td>MEIE 6850</td>
<td>Research Seminar in Mechanical and Industrial Engineering</td>
<td>0</td>
</tr>
</tbody>
</table>

Complete 8 semester hours from the course list below. 8
Course List

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 5800</td>
<td>Algorithms</td>
<td></td>
</tr>
<tr>
<td>CS 6140</td>
<td>Machine Learning</td>
<td></td>
</tr>
<tr>
<td>CS 7805</td>
<td>Theory of Computation</td>
<td></td>
</tr>
<tr>
<td>CSYE 6200</td>
<td>Concepts of Object-Oriented Design</td>
<td></td>
</tr>
<tr>
<td>CSYE 6205</td>
<td>Concepts of Object-Oriented Design with C++</td>
<td></td>
</tr>
<tr>
<td>CSYE 6210</td>
<td>Component Software Development</td>
<td></td>
</tr>
<tr>
<td>GE 5010</td>
<td>Customer-Driven Technical Innovation for Engineers</td>
<td></td>
</tr>
<tr>
<td>GE 5100</td>
<td>Product Development</td>
<td></td>
</tr>
<tr>
<td>ECEE 7313</td>
<td>Pattern Recognition</td>
<td></td>
</tr>
<tr>
<td>ECEE 7360</td>
<td>Combinatorial Optimization</td>
<td></td>
</tr>
<tr>
<td>EMGT 5220</td>
<td>Engineering Project Management</td>
<td></td>
</tr>
<tr>
<td>EMGT 5300</td>
<td>Engineering/Organizational Psychology</td>
<td></td>
</tr>
<tr>
<td>EMGT 6225</td>
<td>Economic Decision Making</td>
<td></td>
</tr>
<tr>
<td>EMGT 6305</td>
<td>Financial Management for Engineers</td>
<td></td>
</tr>
<tr>
<td>IE 5400</td>
<td>Healthcare Systems Modeling and Analysis</td>
<td></td>
</tr>
<tr>
<td>IE 5500</td>
<td>Systems Engineering in Public Programs</td>
<td></td>
</tr>
<tr>
<td>IE 5617</td>
<td>Lean Concepts and Applications</td>
<td></td>
</tr>
<tr>
<td>IE 5620</td>
<td>Mass Customization</td>
<td></td>
</tr>
<tr>
<td>IE 5630</td>
<td>Biosensor and Human Behavior Measurement</td>
<td></td>
</tr>
<tr>
<td>IE 6300</td>
<td>Manufacturing Methods and Processes</td>
<td></td>
</tr>
<tr>
<td>IE 7200</td>
<td>Supply Chain Engineering</td>
<td></td>
</tr>
<tr>
<td>IE 7215</td>
<td>Simulation Analysis</td>
<td></td>
</tr>
<tr>
<td>IE 7275</td>
<td>Data Mining in Engineering</td>
<td></td>
</tr>
<tr>
<td>IE 7280</td>
<td>Statistical Methods in Engineering</td>
<td></td>
</tr>
<tr>
<td>IE 7285</td>
<td>Statistical Quality Control</td>
<td></td>
</tr>
<tr>
<td>IE 7290</td>
<td>Reliability Analysis and Risk Assessment</td>
<td></td>
</tr>
<tr>
<td>IE 7315</td>
<td>Human Factors Engineering</td>
<td></td>
</tr>
<tr>
<td>IE 7615</td>
<td>Neural Networks in Engineering</td>
<td></td>
</tr>
<tr>
<td>INFO 5100</td>
<td>Application Engineering and Development</td>
<td></td>
</tr>
<tr>
<td>INFO 6205</td>
<td>Program Structure and Algorithms</td>
<td></td>
</tr>
<tr>
<td>INFO 6210</td>
<td>Data Management and Database Design</td>
<td></td>
</tr>
<tr>
<td>MATH 7232</td>
<td>Combinatorial Analysis</td>
<td></td>
</tr>
<tr>
<td>MATH 7233</td>
<td>Graph Theory</td>
<td></td>
</tr>
<tr>
<td>MATH 7342</td>
<td>Mathematical Statistics</td>
<td></td>
</tr>
<tr>
<td>MATH 7346</td>
<td>Time Series</td>
<td></td>
</tr>
<tr>
<td>MATH 7347</td>
<td>Statistical Decision Theory</td>
<td></td>
</tr>
<tr>
<td>MATH 7349</td>
<td>Stochastic Calculus and Introduction to No-Arbitrage Finance</td>
<td></td>
</tr>
<tr>
<td>OR 7235</td>
<td>Inventory Theory</td>
<td></td>
</tr>
<tr>
<td>OR 7240</td>
<td>Integer and Nonlinear Optimization</td>
<td></td>
</tr>
<tr>
<td>OR 7250</td>
<td>Multi-Criteria Decision Making</td>
<td></td>
</tr>
<tr>
<td>OR 7260</td>
<td>Constraint Programming</td>
<td></td>
</tr>
<tr>
<td>OR 7310</td>
<td>Logistics, Warehousing, and Scheduling</td>
<td></td>
</tr>
</tbody>
</table>

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.

Requirements

Required Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EECE 5642</td>
<td>Data Visualization</td>
<td>4</td>
</tr>
<tr>
<td>IE 7275</td>
<td>Data Mining in Engineering</td>
<td>4</td>
</tr>
<tr>
<td>IE 7280</td>
<td>Statistical Methods in Engineering</td>
<td>4</td>
</tr>
<tr>
<td>INFO 6210</td>
<td>Data Management and Database Design</td>
<td>4</td>
</tr>
</tbody>
</table>

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.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Requirements

Complete three of the following: 12

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IE 5640</td>
<td>Data Mining for Engineering Applications</td>
<td></td>
</tr>
<tr>
<td>or IE 7275</td>
<td>Data Mining in Engineering</td>
<td></td>
</tr>
<tr>
<td>INFO 5100</td>
<td>Application Engineering and Development</td>
<td></td>
</tr>
<tr>
<td>or CSYE 6200</td>
<td>Concepts of Object-Oriented Design</td>
<td></td>
</tr>
<tr>
<td>INFO 6210</td>
<td>Data Management and Database Design</td>
<td></td>
</tr>
</tbody>
</table>

Program Credit/GPA Requirements

32 total semester hours required
Minimum 3.000 GPA required
Master of Science in Information Systems (MSIS)
- Information Systems (p. 201)

Master of Science in Telecommunications Systems Management (MSTSM)
- Telecommunications Systems Management (p. 202)

Graduate Certificates
- Broadband Wireless Systems (http://catalog.northeastern.edu/graduate/engineering/multidisciplinary/broadband-wireless-systems-graduate-certificate)
- Business Intelligence and Data Analytics (http://catalog.northeastern.edu/graduate/engineering/multidisciplinary/business-intelligence-data-analytics-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)

Programs

Master of Science in Computer Systems Engineering (MSCSE)
- Computer Systems Engineering with Concentration in Software Design Engineering (p. 195)

Master of Science in Engineering Management (MSEM)
- Engineering Management (p. 196)

Master of Science in Energy Systems (MSENES)
- Energy Systems (p. 199)
- Energy Systems—ALIGN Program (p. 200)
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.

Degree Requirements
A minimum of 32 semester hours must be earned toward completion of the Master of Science in Computer Systems Engineering degree. A minimum grade-point average (GPA) of 3.000 is required in all courses applied toward the degree.

The program does not accept any transfer credit. All 32 credits must be completed from the IS and CSYE program course work specified.

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. 212).

GORDON INSTITUTE OF ENGINEERING LEADERSHIP
Master’s Degree in Computer Systems Engineering with a Concentration in Software Design Engineering with Graduate Certificate in Engineering Leadership

Students may complete a Master of Science in Computer Systems Engineering with a 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.

Engineering Leadership (p. 205)

Program Requirements
Complete all courses and requirements listed below unless otherwise indicated.

General Requirements
CSYE 6200 Concepts of Object-Oriented Design 4
CSYE 6220 Enterprise Software Design 4

Options
Complete one of the following options:

COURSE WORK OPTION
Complete 24 semester hours in the following subject areas: 24
INFO (INFO 6250 excluded), CSYE

THESIS OPTION
CSYE 7990 Thesis 8
Complete 16 semester hours in the following subject areas: 16
INFO (except INFO 6250), CSYE

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.

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
504A 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 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.”

A minimum of 32 semester hours must be earned toward the completion of the Master of Science in Engineering Management and a minimum grade-point average (GPA) of 3.000 is required over all the courses applied toward the degree. Students can earn their master’s degree by pursuing one of the following tracks:

- **Course work option**: When pursuing this track, a student needs to complete four core courses (also known as required courses) and four elective courses.
- **Project option**: This track requires a student to complete a 4-semester-hour master’s project in addition to completing four core courses and three electives. The student works with a faculty advisor to develop a master’s project. The project is intended to allow a student to demonstrate the ability to identify a problem, apply his or her engineering skill set to solve that problem, and write an engineering report.
- **Thesis option**: A student pursuing this track needs to complete an 8-semester-hour thesis, four core courses, and two electives. In addition, the student will work with a faculty advisor to formulate a research area that will lead to the discovery of new tools and techniques for solving engineering problems. The criterion for acceptability of a thesis is whether a cutting-edge and innovative technology is developed.
- **Online option**: Students pursuing this track complete their four core courses online and then choose 16 semester hours of online elective courses.

### Degree Requirements

<table>
<thead>
<tr>
<th>Degree Requirements</th>
<th>Course Work Only With Project</th>
<th>With Thesis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required and elective courses</td>
<td>32 SH</td>
<td>28 SH</td>
</tr>
<tr>
<td>Project/thesis</td>
<td>0 SH</td>
<td>4 SH</td>
</tr>
<tr>
<td>Minimum semester hours required</td>
<td>32 SH</td>
<td>32 SH</td>
</tr>
</tbody>
</table>

### 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. 212).

**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. 205)

### Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

### General Requirements

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>OR 6205</td>
<td>Deterministic Operations Research</td>
<td>4</td>
</tr>
<tr>
<td>EMGT 5220</td>
<td>Engineering Project Management</td>
<td>4</td>
</tr>
</tbody>
</table>
**Options**

Complete one of the following options:

**COURSE WORK OPTION**

Complete 16 semester hours from the course list below. (p. 198)  

Note: Other approved courses may be selected in consultation with an academic advisor.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMGT 6225</td>
<td>Economic Decision Making</td>
<td>4</td>
</tr>
<tr>
<td>IE 6200</td>
<td>Engineering Probability and Statistics</td>
<td>4</td>
</tr>
<tr>
<td>CSYE 6200</td>
<td>Concepts of Object-Oriented Design</td>
<td></td>
</tr>
<tr>
<td>CSYE 6205</td>
<td>Component Software Development</td>
<td></td>
</tr>
<tr>
<td>CSYE 6210</td>
<td>Enterprise Software Design</td>
<td></td>
</tr>
<tr>
<td>CSYE 7230</td>
<td>Software Engineering</td>
<td></td>
</tr>
<tr>
<td>CSYE 7270</td>
<td>Building Virtual Environments</td>
<td></td>
</tr>
<tr>
<td>CSYE 7280</td>
<td>User Experience Design and Testing</td>
<td></td>
</tr>
<tr>
<td>ENSY 5000</td>
<td>Fundamentals of Energy System Integration</td>
<td></td>
</tr>
<tr>
<td>EMGT 5300</td>
<td>Engineering/Organizational Psychology</td>
<td></td>
</tr>
<tr>
<td>EMGT 6305</td>
<td>Financial Management for Engineers</td>
<td></td>
</tr>
<tr>
<td>EMGT 7978</td>
<td>Independent Study</td>
<td></td>
</tr>
<tr>
<td>GE 5010</td>
<td>Customer-Driven Technical Innovation for Engineers</td>
<td></td>
</tr>
<tr>
<td>GE 5100</td>
<td>Product Development for Engineers</td>
<td></td>
</tr>
<tr>
<td>IE 5400</td>
<td>Healthcare Systems Modeling and Analysis</td>
<td></td>
</tr>
<tr>
<td>IE 5500</td>
<td>Systems Engineering in Public Programs</td>
<td></td>
</tr>
<tr>
<td>IE 5617</td>
<td>Lean Concepts and Applications</td>
<td></td>
</tr>
<tr>
<td>IE 5620</td>
<td>Mass Customization</td>
<td></td>
</tr>
<tr>
<td>IE 5640</td>
<td>Data Mining for Engineering Applications</td>
<td></td>
</tr>
<tr>
<td>IE 6300</td>
<td>Manufacturing Methods and Processes</td>
<td></td>
</tr>
<tr>
<td>IE 7200</td>
<td>Supply Chain Engineering</td>
<td></td>
</tr>
<tr>
<td>IE 7215</td>
<td>Simulation Analysis</td>
<td></td>
</tr>
<tr>
<td>IE 7270</td>
<td>Intelligent Manufacturing</td>
<td></td>
</tr>
<tr>
<td>IE 7275</td>
<td>Data Mining in Engineering</td>
<td></td>
</tr>
<tr>
<td>IE 7280</td>
<td>Statistical Methods in Engineering</td>
<td></td>
</tr>
<tr>
<td>IE 7285</td>
<td>Statistical Quality Control</td>
<td></td>
</tr>
<tr>
<td>IE 7290</td>
<td>Reliability Analysis and Risk Assessment</td>
<td></td>
</tr>
<tr>
<td>IE 7315</td>
<td>Human Factors Engineering</td>
<td></td>
</tr>
<tr>
<td>IE 7615</td>
<td>Neural Networks in Engineering</td>
<td></td>
</tr>
<tr>
<td>INFO 6210</td>
<td>Data Management and Database Design</td>
<td></td>
</tr>
<tr>
<td>INFO 6215</td>
<td>Business Analysis and Information Engineering</td>
<td></td>
</tr>
<tr>
<td>INFO 6245</td>
<td>Planning and Managing Information Systems Development</td>
<td></td>
</tr>
<tr>
<td>INFO 7245</td>
<td>Agile Software Development</td>
<td></td>
</tr>
<tr>
<td>INFO 7260</td>
<td>Business Process Engineering</td>
<td></td>
</tr>
<tr>
<td>INFO 7275</td>
<td>Advanced Database Management Systems</td>
<td></td>
</tr>
<tr>
<td>INFO 7285</td>
<td>Organizational Change and IT</td>
<td></td>
</tr>
<tr>
<td>INFO 7290</td>
<td>Data Warehousing and Business Intelligence</td>
<td></td>
</tr>
<tr>
<td>INFO 7330</td>
<td>Information Systems for Healthcare-Services Delivery</td>
<td></td>
</tr>
<tr>
<td>INFO 7365</td>
<td>Enterprise Architecture Planning and Management</td>
<td></td>
</tr>
<tr>
<td>INFO 7390</td>
<td>Advances in Data Sciences and Architecture</td>
<td></td>
</tr>
<tr>
<td>OR 7230</td>
<td>Probabilistic Operation Research</td>
<td></td>
</tr>
</tbody>
</table>

**PROJECT OPTION**

Complete 12 semester hours from the course list below. (p. 198)  

Note: Other approved courses may be selected in consultation with an academic advisor.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMGT 7945</td>
<td>Master’s Project</td>
</tr>
<tr>
<td>CSYE 6200</td>
<td>Concepts of Object-Oriented Design</td>
</tr>
<tr>
<td>CSYE 6205</td>
<td>Component Software Development</td>
</tr>
<tr>
<td>CSYE 6210</td>
<td>Enterprise Software Design</td>
</tr>
<tr>
<td>CSYE 7230</td>
<td>Software Engineering</td>
</tr>
<tr>
<td>CSYE 7270</td>
<td>Building Virtual Environments</td>
</tr>
<tr>
<td>CSYE 7280</td>
<td>User Experience Design and Testing</td>
</tr>
<tr>
<td>ENSY 5000</td>
<td>Fundamentals of Energy System Integration</td>
</tr>
<tr>
<td>EMGT 5300</td>
<td>Engineering/Organizational Psychology</td>
</tr>
<tr>
<td>EMGT 6305</td>
<td>Financial Management for Engineers</td>
</tr>
<tr>
<td>EMGT 7978</td>
<td>Independent Study</td>
</tr>
<tr>
<td>GE 5010</td>
<td>Customer-Driven Technical Innovation for Engineers</td>
</tr>
<tr>
<td>GE 5100</td>
<td>Product Development for Engineers</td>
</tr>
<tr>
<td>IE 5400</td>
<td>Healthcare Systems Modeling and Analysis</td>
</tr>
<tr>
<td>IE 5500</td>
<td>Systems Engineering in Public Programs</td>
</tr>
<tr>
<td>IE 5617</td>
<td>Lean Concepts and Applications</td>
</tr>
<tr>
<td>IE 5620</td>
<td>Mass Customization</td>
</tr>
<tr>
<td>IE 5640</td>
<td>Data Mining for Engineering Applications</td>
</tr>
<tr>
<td>IE 6300</td>
<td>Manufacturing Methods and Processes</td>
</tr>
<tr>
<td>IE 7200</td>
<td>Supply Chain Engineering</td>
</tr>
<tr>
<td>IE 7215</td>
<td>Simulation Analysis</td>
</tr>
<tr>
<td>IE 7270</td>
<td>Intelligent Manufacturing</td>
</tr>
<tr>
<td>IE 7275</td>
<td>Data Mining in Engineering</td>
</tr>
<tr>
<td>IE 7280</td>
<td>Statistical Methods in Engineering</td>
</tr>
<tr>
<td>IE 7285</td>
<td>Statistical Quality Control</td>
</tr>
<tr>
<td>IE 7290</td>
<td>Reliability Analysis and Risk Assessment</td>
</tr>
<tr>
<td>IE 7315</td>
<td>Human Factors Engineering</td>
</tr>
<tr>
<td>IE 7615</td>
<td>Neural Networks in Engineering</td>
</tr>
<tr>
<td>INFO 6210</td>
<td>Data Management and Database Design</td>
</tr>
<tr>
<td>INFO 6215</td>
<td>Business Analysis and Information Engineering</td>
</tr>
<tr>
<td>INFO 6245</td>
<td>Planning and Managing Information Systems Development</td>
</tr>
<tr>
<td>INFO 7245</td>
<td>Agile Software Development</td>
</tr>
<tr>
<td>INFO 7260</td>
<td>Business Process Engineering</td>
</tr>
<tr>
<td>INFO 7275</td>
<td>Advanced Database Management Systems</td>
</tr>
<tr>
<td>INFO 7285</td>
<td>Organizational Change and IT</td>
</tr>
<tr>
<td>INFO 7290</td>
<td>Data Warehousing and Business Intelligence</td>
</tr>
<tr>
<td>INFO 7330</td>
<td>Information Systems for Healthcare-Services Delivery</td>
</tr>
<tr>
<td>INFO 7365</td>
<td>Enterprise Architecture Planning and Management</td>
</tr>
<tr>
<td>INFO 7390</td>
<td>Advances in Data Sciences and Architecture</td>
</tr>
<tr>
<td>OR 7230</td>
<td>Probabilistic Operation Research</td>
</tr>
</tbody>
</table>

**THESIS OPTION**

Complete 8 semester hours from the course list below. (p. 198)  

Note: Other approved courses may be selected in consultation with an academic advisor.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMGT 7990</td>
<td>Thesis</td>
</tr>
<tr>
<td>CSYE 6200</td>
<td>Concepts of Object-Oriented Design</td>
</tr>
<tr>
<td>CSYE 6205</td>
<td>Component Software Development</td>
</tr>
<tr>
<td>CSYE 6210</td>
<td>Enterprise Software Design</td>
</tr>
<tr>
<td>CSYE 7230</td>
<td>Software Engineering</td>
</tr>
<tr>
<td>CSYE 7270</td>
<td>Building Virtual Environments</td>
</tr>
<tr>
<td>CSYE 7280</td>
<td>User Experience Design and Testing</td>
</tr>
<tr>
<td>ENSY 5000</td>
<td>Fundamentals of Energy System Integration</td>
</tr>
<tr>
<td>EMGT 5300</td>
<td>Engineering/Organizational Psychology</td>
</tr>
<tr>
<td>EMGT 6305</td>
<td>Financial Management for Engineers</td>
</tr>
<tr>
<td>EMGT 7978</td>
<td>Independent Study</td>
</tr>
<tr>
<td>GE 5010</td>
<td>Customer-Driven Technical Innovation for Engineers</td>
</tr>
<tr>
<td>GE 5100</td>
<td>Product Development for Engineers</td>
</tr>
<tr>
<td>IE 5400</td>
<td>Healthcare Systems Modeling and Analysis</td>
</tr>
<tr>
<td>IE 5500</td>
<td>Systems Engineering in Public Programs</td>
</tr>
<tr>
<td>IE 5617</td>
<td>Lean Concepts and Applications</td>
</tr>
<tr>
<td>IE 5620</td>
<td>Mass Customization</td>
</tr>
<tr>
<td>IE 5640</td>
<td>Data Mining for Engineering Applications</td>
</tr>
<tr>
<td>IE 6300</td>
<td>Manufacturing Methods and Processes</td>
</tr>
<tr>
<td>IE 7200</td>
<td>Supply Chain Engineering</td>
</tr>
<tr>
<td>IE 7215</td>
<td>Simulation Analysis</td>
</tr>
<tr>
<td>IE 7270</td>
<td>Intelligent Manufacturing</td>
</tr>
<tr>
<td>IE 7275</td>
<td>Data Mining in Engineering</td>
</tr>
<tr>
<td>IE 7280</td>
<td>Statistical Methods in Engineering</td>
</tr>
<tr>
<td>IE 7285</td>
<td>Statistical Quality Control</td>
</tr>
<tr>
<td>IE 7290</td>
<td>Reliability Analysis and Risk Assessment</td>
</tr>
<tr>
<td>IE 7315</td>
<td>Human Factors Engineering</td>
</tr>
<tr>
<td>IE 7615</td>
<td>Neural Networks in Engineering</td>
</tr>
<tr>
<td>INFO 6210</td>
<td>Data Management and Database Design</td>
</tr>
<tr>
<td>INFO 6215</td>
<td>Business Analysis and Information Engineering</td>
</tr>
<tr>
<td>INFO 6245</td>
<td>Planning and Managing Information Systems Development</td>
</tr>
<tr>
<td>INFO 7245</td>
<td>Agile Software Development</td>
</tr>
<tr>
<td>INFO 7260</td>
<td>Business Process Engineering</td>
</tr>
<tr>
<td>INFO 7275</td>
<td>Advanced Database Management Systems</td>
</tr>
<tr>
<td>INFO 7285</td>
<td>Organizational Change and IT</td>
</tr>
<tr>
<td>INFO 7290</td>
<td>Data Warehousing and Business Intelligence</td>
</tr>
<tr>
<td>INFO 7330</td>
<td>Information Systems for Healthcare-Services Delivery</td>
</tr>
<tr>
<td>INFO 7365</td>
<td>Enterprise Architecture Planning and Management</td>
</tr>
<tr>
<td>INFO 7390</td>
<td>Advances in Data Sciences and Architecture</td>
</tr>
<tr>
<td>OR 7230</td>
<td>Probabilistic Operation Research</td>
</tr>
</tbody>
</table>

**ONLINE OPTION**

Complete 16 semester hours from the following list of online elective courses. (p. 198)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIVE 5270</td>
<td>Environmental Protection and Management</td>
</tr>
<tr>
<td>EMGT 5300</td>
<td>Engineering/Organizational Psychology</td>
</tr>
<tr>
<td>EMGT 6305</td>
<td>Financial Management for Engineers</td>
</tr>
<tr>
<td>ENSY 5000</td>
<td>Fundamentals of Energy System Integration</td>
</tr>
<tr>
<td>IE 5620</td>
<td>Mass Customization</td>
</tr>
<tr>
<td>IE 5640</td>
<td>Data Mining for Engineering Applications</td>
</tr>
<tr>
<td>IE 6300</td>
<td>Manufacturing Methods and Processes</td>
</tr>
<tr>
<td>IE 7200</td>
<td>Supply Chain Engineering</td>
</tr>
<tr>
<td>IE 7215</td>
<td>Simulation Analysis</td>
</tr>
<tr>
<td>IE 7270</td>
<td>Intelligent Manufacturing</td>
</tr>
<tr>
<td>IE 7275</td>
<td>Data Mining in Engineering</td>
</tr>
<tr>
<td>IE 7280</td>
<td>Statistical Methods in Engineering</td>
</tr>
<tr>
<td>IE 7285</td>
<td>Statistical Quality Control</td>
</tr>
<tr>
<td>IE 7290</td>
<td>Reliability Analysis and Risk Assessment</td>
</tr>
<tr>
<td>IE 7315</td>
<td>Human Factors Engineering</td>
</tr>
<tr>
<td>IE 7615</td>
<td>Neural Networks in Engineering</td>
</tr>
<tr>
<td>INFO 6210</td>
<td>Data Management and Database Design</td>
</tr>
<tr>
<td>INFO 6215</td>
<td>Business Analysis and Information Engineering</td>
</tr>
<tr>
<td>INFO 6245</td>
<td>Planning and Managing Information Systems Development</td>
</tr>
<tr>
<td>INFO 7245</td>
<td>Agile Software Development</td>
</tr>
<tr>
<td>INFO 7260</td>
<td>Business Process Engineering</td>
</tr>
<tr>
<td>INFO 7275</td>
<td>Advanced Database Management Systems</td>
</tr>
<tr>
<td>INFO 7285</td>
<td>Organizational Change and IT</td>
</tr>
<tr>
<td>INFO 7290</td>
<td>Data Warehousing and Business Intelligence</td>
</tr>
<tr>
<td>INFO 7330</td>
<td>Information Systems for Healthcare-Services Delivery</td>
</tr>
<tr>
<td>INFO 7365</td>
<td>Enterprise Architecture Planning and Management</td>
</tr>
<tr>
<td>INFO 7390</td>
<td>Advances in Data Sciences and Architecture</td>
</tr>
<tr>
<td>OR 7230</td>
<td>Probabilistic Operation Research</td>
</tr>
</tbody>
</table>
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
334 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 heat and power strategies, energy renewal, sustainable energy solutions, and energy storage. 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 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. 212).

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. 205)

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMGT 6225</td>
<td>Economic Decision Making</td>
</tr>
</tbody>
</table>
Options
Complete one of the following options:

GENERAL OPTION
Complete 16 semester hours from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 5651</td>
<td>Materials Chemistry of Renewable Energy</td>
<td></td>
</tr>
<tr>
<td>CHEM 5652</td>
<td>Fundamental Science of Photovoltaics</td>
<td></td>
</tr>
<tr>
<td>CHME 5630</td>
<td>Biochemical Engineering</td>
<td></td>
</tr>
<tr>
<td>CIVE 5270</td>
<td>Environmental Protection and Management</td>
<td></td>
</tr>
<tr>
<td>EECE 5680</td>
<td>Electric Drives</td>
<td></td>
</tr>
<tr>
<td>EECE 5682</td>
<td>Power Systems Analysis 1</td>
<td></td>
</tr>
<tr>
<td>EECE 5684</td>
<td>Power Electronics</td>
<td></td>
</tr>
<tr>
<td>EECE 5686</td>
<td>Electrical Machines</td>
<td></td>
</tr>
<tr>
<td>ENSY 5585</td>
<td>Wind Energy Systems</td>
<td></td>
</tr>
<tr>
<td>ENSY 7374</td>
<td>Special Topics in Energy Systems</td>
<td></td>
</tr>
<tr>
<td>ENSY 7978</td>
<td>Independent Study</td>
<td></td>
</tr>
<tr>
<td>EMGT 5220</td>
<td>Engineering Project Management</td>
<td></td>
</tr>
<tr>
<td>ENGR 5670</td>
<td>Sustainable Energy: Materials, Conversion, Storage, and Usage</td>
<td></td>
</tr>
<tr>
<td>ENSY 5000</td>
<td>Fundamentals of Energy System Integration</td>
<td></td>
</tr>
<tr>
<td>ME 5645</td>
<td>Environmental Issues in Manufacturing and Product Use</td>
<td></td>
</tr>
<tr>
<td>ME 5685</td>
<td>Solar Thermal Engineering</td>
<td></td>
</tr>
<tr>
<td>ME 5690</td>
<td>Gas Turbine Combustion</td>
<td></td>
</tr>
<tr>
<td>ME 7270</td>
<td>General Thermodynamics</td>
<td></td>
</tr>
<tr>
<td>ME 7300</td>
<td>Combustion and Air Pollution</td>
<td></td>
</tr>
<tr>
<td>ME 7305</td>
<td>Fundamentals of Combustion</td>
<td></td>
</tr>
<tr>
<td>OR 6205</td>
<td>Deterministic Operations Research</td>
<td></td>
</tr>
<tr>
<td>SBSY 5200</td>
<td>Sustainable Engineering Systems for Buildings</td>
<td></td>
</tr>
</tbody>
</table>

Non Technical Electives
A maximum of 5 semester hours may be taken from the following list toward the elective requirement:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARCH 5210</td>
<td>Environmental Systems</td>
<td></td>
</tr>
<tr>
<td>ARCH 5211</td>
<td>Recitation for ARCH 5210</td>
<td></td>
</tr>
<tr>
<td>FINA 6203</td>
<td>Investment Analysis</td>
<td></td>
</tr>
<tr>
<td>FINA 6205</td>
<td>Financial Strategy</td>
<td></td>
</tr>
<tr>
<td>FINA 6215</td>
<td>Business Turnarounds</td>
<td></td>
</tr>
<tr>
<td>PPUA 7238</td>
<td>Climate Change and Urbanization in Developing Countries</td>
<td></td>
</tr>
<tr>
<td>or LPSC 7312</td>
<td>Cities, Sustainability, and Climate Change</td>
<td></td>
</tr>
</tbody>
</table>

ONLINE/HYBRID OPTION
Complete 16 semester hours from the following. Electives outside this list may be chosen in consultation with faculty advisor.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIVE 5270</td>
<td>Environmental Protection and Management</td>
<td></td>
</tr>
<tr>
<td>EECE 5682</td>
<td>Power Systems Analysis 1</td>
<td></td>
</tr>
<tr>
<td>EECE 7398</td>
<td>Special Topics</td>
<td></td>
</tr>
<tr>
<td>EMGT 5220</td>
<td>Engineering Project Management</td>
<td></td>
</tr>
<tr>
<td>IE 6200</td>
<td>Engineering Probability and Statistics</td>
<td></td>
</tr>
<tr>
<td>OR 6205</td>
<td>Deterministic Operations Research</td>
<td></td>
</tr>
<tr>
<td>ME 5645</td>
<td>Environmental Issues in Manufacturing and Product Use</td>
<td></td>
</tr>
<tr>
<td>ME 5685</td>
<td>Solar Thermal Engineering</td>
<td></td>
</tr>
<tr>
<td>ME 7270</td>
<td>General Thermodynamics</td>
<td></td>
</tr>
</tbody>
</table>

Program Credit/GPA Requirements
32 total semester hours required
Minimum 3.000 GPA required

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 ALIGN program is meant to provide students of all disciplines 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.

The ALIGN 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 ALIGN 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.

Program Requirements
Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements
ALIGN Course Work
Complete the following (repeatable) course twice:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENSY 7374</td>
<td>Special Topics in Energy Systems</td>
<td></td>
</tr>
</tbody>
</table>

Core

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMGT 6225</td>
<td>Economic Decision Making</td>
<td></td>
</tr>
<tr>
<td>ENSY 5000</td>
<td>Fundamentals of Energy System Integration</td>
<td></td>
</tr>
</tbody>
</table>
Options
Complete one of the following options:

GENERAL OPTION
Complete 16 semester hours from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 5651</td>
<td>Materials Chemistry of Renewable Energy</td>
<td></td>
</tr>
<tr>
<td>CHEM 5652</td>
<td>Fundamental Science of Photovoltaics</td>
<td></td>
</tr>
<tr>
<td>CHME 5204</td>
<td>Heterogeneous Catalysis</td>
<td></td>
</tr>
<tr>
<td>CHME 5630</td>
<td>Biochemical Engineering</td>
<td></td>
</tr>
<tr>
<td>CIVE 5270</td>
<td>Environmental Protection and Management</td>
<td></td>
</tr>
<tr>
<td>EECE 5650</td>
<td>Electric Drives</td>
<td></td>
</tr>
<tr>
<td>EECE 5682</td>
<td>Power Systems Analysis 1</td>
<td></td>
</tr>
<tr>
<td>EECE 5684</td>
<td>Power Electronics</td>
<td></td>
</tr>
<tr>
<td>EECE 5686</td>
<td>Electrical Machines</td>
<td></td>
</tr>
<tr>
<td>EECE 7239</td>
<td>Special Topics in Power Systems</td>
<td></td>
</tr>
<tr>
<td>EECE 7398</td>
<td>Special Topics</td>
<td></td>
</tr>
<tr>
<td>EMGT 5220</td>
<td>Engineering Project Management</td>
<td></td>
</tr>
<tr>
<td>ENGR 5670</td>
<td>Sustainable Energy: Materials, Conversion, Storage, and Usage</td>
<td></td>
</tr>
<tr>
<td>ENSY 5585</td>
<td>Wind Energy Systems</td>
<td></td>
</tr>
<tr>
<td>ENSY 7374</td>
<td>Special Topics in Energy Systems</td>
<td></td>
</tr>
<tr>
<td>ENSY 7978</td>
<td>Independent Study</td>
<td></td>
</tr>
<tr>
<td>ME 5645</td>
<td>Environmental Issues in Manufacturing and Product Use</td>
<td></td>
</tr>
<tr>
<td>ME 5685</td>
<td>Solar Thermal Engineering</td>
<td></td>
</tr>
<tr>
<td>ME 5690</td>
<td>Gas Turbine Combustion</td>
<td></td>
</tr>
<tr>
<td>ME 7270</td>
<td>General Thermodynamics</td>
<td></td>
</tr>
<tr>
<td>ME 7300</td>
<td>Combustion and Air Pollution</td>
<td></td>
</tr>
<tr>
<td>ME 7305</td>
<td>Fundamentals of Combustion</td>
<td></td>
</tr>
<tr>
<td>OR 6205</td>
<td>Deterministic Operations Research</td>
<td></td>
</tr>
<tr>
<td>SBSY 5200</td>
<td>Sustainable Engineering Systems for Buildings</td>
<td></td>
</tr>
</tbody>
</table>

Non Technical Electives
A maximum of 5 semester hours may be taken from the following list toward the elective requirement:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARCH 5210</td>
<td>Environmental Systems and Recitation for ARCH 5210</td>
<td></td>
</tr>
<tr>
<td>FINA 6203</td>
<td>Investment Analysis</td>
<td></td>
</tr>
<tr>
<td>FINA 6205</td>
<td>Financial Strategy</td>
<td></td>
</tr>
<tr>
<td>FINA 6215</td>
<td>Business Turnarounds</td>
<td></td>
</tr>
<tr>
<td>PPUA 7238</td>
<td>Climate Change and Urbanization in Developing Countries</td>
<td></td>
</tr>
<tr>
<td>or LPSC 7312</td>
<td>Cities, Sustainability, and Climate Change</td>
<td></td>
</tr>
</tbody>
</table>

Online/Hybrid Option
Complete 16 semester hours from the following. Electives outside this list may be chosen in consultation with faculty advisor.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIVE 5270</td>
<td>Environmental Protection and Management</td>
<td></td>
</tr>
</tbody>
</table>

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
617.373.4448
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 number of specializations 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

Degree Requirements
A minimum of 32 semester hours must be earned toward completion of the MSIS degree. A minimum grade-point average of 3.000 is required over all courses applied toward the degree.

Students may not register for more than 9 semester hours in the fall and spring terms and 4 semester hours in each of the three summer terms.

Any exception must be approved by the Program Director.
The IS program does not accept any transfer credit. All 32 credits must be completed from the IS and CSYE program course work specified.

**Seattle Campus**

Students can complete this degree at our Seattle campus. Students will have the option to choose from a continually expanding list of electives that are offered strategically to meet industry demand in Seattle.

**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. 212).

**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.

Engineering Leadership (p. 205)

**Program Requirements**

Complete all courses and requirements listed below unless otherwise indicated.

**General Requirements**

INFO 5100 and INFO 5101 Application Engineering and Development and Lab for INFO 5100

**Options**

Complete one of the following options:

**GENERAL OPTION**

Complete 28 semester hours from the following subject areas:

INFO, CSYE (except CSYE 6220)

**SEATTLE CAMPUS OPTION**

Students pursuing the Seattle Campus Option may also take INFO and CSYE courses offered online.

Complete 28 semester hours from the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSYE 6225</td>
<td>Network Structures and Cloud Computing</td>
<td>4</td>
</tr>
<tr>
<td>INFO 6150</td>
<td>Web Design and User Experience Engineering</td>
<td>4</td>
</tr>
<tr>
<td>INFO 6205</td>
<td>Program Structure and Algorithms</td>
<td>4</td>
</tr>
<tr>
<td>INFO 6210</td>
<td>Data Management and Database Design</td>
<td>4</td>
</tr>
<tr>
<td>INFO 6215</td>
<td>Business Analysis and Information Engineering</td>
<td>4</td>
</tr>
<tr>
<td>INFO 6250</td>
<td>Web Development Tools and Methods</td>
<td>4</td>
</tr>
<tr>
<td>INFO 6350</td>
<td>Smartphones-Based Web Development</td>
<td>4</td>
</tr>
</tbody>
</table>

There are four core courses and a wide range of technical and business electives available. The core courses each carry 4 semester hours of credit. Students must receive a grade of at least a B− in each core course, otherwise they will need to repeat the course. 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.

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.

Special topics courses, as well as other courses from outside the program, may be used as electives with prior approval of the program director.

All transfer credits must be approved by petition before course enrollment.

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 of Science in Telecommunications Systems Management 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. 212).

GORDON INSTITUTE OF ENGINEERING LEADERSHIP

Master's Degree in Telecommunications Systems Management with Graduate Certificate in Engineering Leadership

Students may complete a Master of Science in Telecommunications Systems 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 require 12 hours of technical core courses from the telecommunications systems management program and 4 hours from the technical course list provided for this program.

Engineering Leadership (p. 205)

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Required Core

A grade of B— or higher is required in all core courses.

**TELE 5330** Data Networking
and **TELE 5331** 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.

Complete a minimum of 16 semester hours from the course lists below (p. 203)

**BUSINESS COURSE LIST**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMGT 5220</td>
<td>Engineering Project Management</td>
</tr>
<tr>
<td>EMGT 6225</td>
<td>Economic Decision Making</td>
</tr>
<tr>
<td>EMGT 6305</td>
<td>Financial Management for Engineers</td>
</tr>
<tr>
<td>ENTR 6200</td>
<td>Enterprise Growth and Innovation</td>
</tr>
<tr>
<td>ENTR 6212</td>
<td>Business Planning for New Ventures</td>
</tr>
<tr>
<td>ENTR 6218</td>
<td>Business Model Design and Innovation</td>
</tr>
<tr>
<td>ENTR 6219</td>
<td>Financing Ventures from Early Stage to Exit</td>
</tr>
<tr>
<td>HRMG 6200</td>
<td>Managing People and Organizations</td>
</tr>
<tr>
<td>INFO 6245</td>
<td>Planning and Managing Information Systems Development</td>
</tr>
<tr>
<td>MGMT 6214</td>
<td>Negotiations</td>
</tr>
<tr>
<td>MGSC 6206</td>
<td>Management of Service and Manufacturing Operations</td>
</tr>
<tr>
<td>MKTG 6200</td>
<td>Creating and Sustaining Customer Markets</td>
</tr>
<tr>
<td>TECE 6222</td>
<td>Emerging and Disruptive Technologies</td>
</tr>
<tr>
<td>TECE 6230</td>
<td>Entrepreneurial Marketing and Selling</td>
</tr>
<tr>
<td>TECE 6250</td>
<td>Lean Design and Development</td>
</tr>
<tr>
<td>TECE 6300</td>
<td>Managing a Technology-Based Business</td>
</tr>
<tr>
<td>TELE 6370</td>
<td>Perspectives in Telecommunications Policy</td>
</tr>
<tr>
<td>TELE 6380</td>
<td>Consulting Project in Telecommunications</td>
</tr>
<tr>
<td>TELE 6600</td>
<td>Special Topics—Telecommunication Policy</td>
</tr>
<tr>
<td>TELE 6602</td>
<td>Special Topics—Business</td>
</tr>
</tbody>
</table>

**TECHNICAL COURSE LIST**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 5520</td>
<td>Mobile Application Development</td>
</tr>
<tr>
<td>CS 6710</td>
<td>Wireless Network</td>
</tr>
</tbody>
</table>
Their company.

GEL accelerates Gordon Fellows' careers, making them more valuable to engineering projects from concept to market success. Participation in GEL stands out from their peers in their ability to invent, innovate, and implement the attitudes required to successfully lead engineering teams. They stand as Gordon Fellows, have an opportunity to gain the knowledge, skills, and 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.

REQUIREMENTS

Complete all courses and requirements listed below unless otherwise indicated.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENLR 5121</td>
<td>Engineering Leadership 1</td>
<td>2</td>
</tr>
<tr>
<td>ENLR 5122</td>
<td>Engineering Leadership 2</td>
<td>2</td>
</tr>
<tr>
<td>ENLR 5131</td>
<td>Scientific Foundations of Engineering 1</td>
<td>2</td>
</tr>
<tr>
<td>ENLR 5132</td>
<td>Scientific Foundations of Engineering 2</td>
<td>2</td>
</tr>
<tr>
<td>ENLR 7440</td>
<td>Engineering Leadership Challenge Project 1</td>
<td>4</td>
</tr>
<tr>
<td>ENLR 7442</td>
<td>Engineering Leadership Challenge Project 2</td>
<td>4</td>
</tr>
</tbody>
</table>

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 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 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 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 Systems Management (http://www.northeastern.edu/gordonleadership/degree/ms-in-telecommunication-systems-management)

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. 205).

**Program Requirements**

Complete all courses and requirements listed below unless otherwise indicated.

**Requirements**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENLR 5121</td>
<td>Engineering Leadership 1</td>
<td>2</td>
</tr>
<tr>
<td>ENLR 5122</td>
<td>Engineering Leadership 2</td>
<td>2</td>
</tr>
<tr>
<td>ENLR 5131</td>
<td>Scientific Foundations of Engineering 1</td>
<td>2</td>
</tr>
<tr>
<td>ENLR 5132</td>
<td>Scientific Foundations of Engineering 2</td>
<td>2</td>
</tr>
<tr>
<td>ENLR 7440</td>
<td>Engineering Leadership Challenge Project 1</td>
<td>4</td>
</tr>
<tr>
<td>ENLR 7442</td>
<td>Engineering Leadership Challenge Project 2</td>
<td>4</td>
</tr>
</tbody>
</table>

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 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 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 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 Systems Management (http://www.northeastern.edu/gordonleadership/degree/ms-in-telecommunication-systems-management)

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 3.00 GPA required

---

**Interdisciplinary PhD Programs**

Sara Wadia-Fascetti, PhD
Associate Dean for Graduate Education

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 (p. 101)
- Information Assurance—Advanced Entry (p. 102)
- Interdisciplinary Engineering (p. 209)
- Network Science (p. 209)
- Population Health (p. 211)
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 Requirement
A cumulative 3.400 GPA is required for the core requirement.

Fundamentals
Minimum 3.000 GPA required

48 total semester hours required

Program Credit/GPA Requirements

Electives and Specializations

Complete 28 semester hours from the following:

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
- CS 6540 Foundations of Formal Methods and Software Analysis
- IA 6120 Software Security Practices

Track 3 Policy/Society
- CRIM 7242 Terrorism and International Crime
- CRIM 7246 Security Management
- CRIM 7252 White-Collar Crime
- 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
- EECE 7339 Testing and Design for Testability
- EECE 7350 Software Engineering 1
- EECE 7351 Software Engineering 2
- EECE 7357 Fault-Tolerant Computers
- SOCL 7211 Research Methods
  or CS 6350 Empirical Research Methods

Dissertation

Complete the following (repeatable) course twice:
- IA 9990 Dissertation

Complete the following (repeatable) course until graduation:
- IA 9996 Dissertation Continuation

- 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
Complete the following (repeatable) course twice:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>IA 9990</td>
<td>Dissertation</td>
</tr>
</tbody>
</table>

Complete the following (repeatable) course until graduation:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>IA 9996</td>
<td>Dissertation Continuation</td>
</tr>
</tbody>
</table>

Program Credit/GPA Requirements
16 total semester hours required
Minimum 3.000 GPA required

Interdisciplinary Engineering, PhD

Sara Wadia-Fascetti, PhD
Associate Dean for Graduate Education
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

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)
Website (http://www.networkscienceinstitute.org)
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 concentration 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 Dynamical Processes in Complex Networks (PHYS 7335); one of two approved courses (Social Network Analysis or Network Data Mining); 12 semester hours of elective course work defined by their specific track; 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. The dissertation committee must be approved by the graduate program committee and constituted no later than the end of the spring semester of the first year of the program. 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 Course Work

<table>
<thead>
<tr>
<th>Networks</th>
<th>Data Mining Techniques</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 6220</td>
<td>Data Mining Techniques</td>
<td>4</td>
</tr>
<tr>
<td>or POLS 7334</td>
<td>Social Networks</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 5116</td>
<td>Complex Networks and Applications</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 7331</td>
<td>Network Science Data</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 7335</td>
<td>Dynamical Processes in Complex Networks</td>
<td>4</td>
</tr>
</tbody>
</table>

Research
Complete the following (repeatable) course twice:

NETS 8984 Research 1-4

Specialization
Complete 12 semester hours of course work. Areas of specialization include:

**Computer Science**

| CS 6140 | Machine Learning |
| CS 6220 | Data Mining Techniques |
| CS 6240 | Large-Scale Parallel Data Processing |
| CS 7800 | Advanced Algorithms |
| NETS 7341 | Network Economics |

**Political Science**

| POLS 7200 | Perspectives on Social Science Inquiry |
| POLS 7201 | Research Design |
Program Credit/GPA Requirements
32 total semester hours required
Minimum 3.00 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 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 context
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

Requirements

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

PHTH 5224  Social Epidemiology 3
PHTH 6440  Advanced Methods in Biostatistics 3
PHTH 6800  Causal Inference in Public Health Research

Electives 2-4

HEALTH SERVICES AND POLICY OPTION

ECON 5110  Microeconomic Theory 4
PHTH 5234  Economic Perspectives on Health Policy 3

Electives 2-4

Electives

CS 6220  Data Mining Techniques
CS 7280  Special Topics in Database Management
ECON 5110  Microeconomic Theory
ECON 5140  Applied Econometrics
In order to be considered admissible to an engineering graduate certificate, current GSE students must be in good academic standing.

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.

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 TSM 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. 212) for detailed information regarding College of Engineering graduate certificates.

**Chemical Engineering**
- Process Safety Engineering (p. 129)

**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 Management**
- 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)
- 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**
- Engineering Leadership (p. 205)

**Industrial Engineering**
- Data Mining Engineering (p. 194)
- Data Analytics Engineering (p. 194)

**Telecommunication Systems Management**
- 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)
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, experiential learning, access to educational opportunity, and a strong professional orientation. Each of the programs within the college supports these aims both individually and collectively.

Graduate programs in the Schools of Nursing and Pharmacy (pharmaceutical sciences and PharmD) and the health professions (including audiology, applied psychology, exercise sciences, physical therapy, physician assistant, public health, speech-language pathology, population health, occupational ergonomics and health) and the interdisciplinary programs of health informatics, data analytics, and personal health informatics incorporate experience in the related field of study. Students have an opportunity to interact with faculty contributing to research advances, as well as with Boston's world-class healthcare and educational institutions, and study in a comprehensive health-sciences college, where interdisciplinary approaches to complex issues reflect professional practice.

The result: 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. 214)
- Practicum/Internship Policies (p. 214)
- Background Checks (p. 215)
- Liability Insurance (p. 215)
- Grading (p. 215)
- Transfer of Credit (p. 215)
- Course Waiver (p. 215)
- Academic Progression (p. 216)
- Student’s Academic Standing (p. 216)

---

### Health Certification

All new students must complete the University Health Report form following acceptance to the university. These forms 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). Graduate students may additionally be expected to provide UHCS with proof of a physical exam or statement of good health prior to registration; this may vary among programs.

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. The health center will block the registration of those who do not file correct forms. All documentation must be signed by a medical doctor, nurse practitioner, or physician assistant.

The Commonwealth of Massachusetts requires all university students to provide documentation of immunity to the following:

- Hepatitis B (series of three immunizations or one positive titre)
- Measles (two immunizations or positive antibody titre)
- Mumps (one immunization or positive antibody titre)
- Rubella (one immunization or positive antibody titre)
- Meningitis (optional; students may decline immunization)
- Tetanus/Diphtheria (immunization within last 10 years)

Graduate students in the Bouvé College of Health Sciences are additionally required to provide documentation of immunity to the following:

- Varicella/chicken pox
- Tuberculin skin test (PPD): within six months of registration

Refer to page two of the University Health Report for further clarification. The University Health Report is to be completed once prior to students beginning their graduate studies; however, some programs in the Bouvé College of Health Sciences may require that students provide proof of physical examination annually. Similarly, some programs may require proof of additional immunities. Consult your program handbook or your program advisor for more information. Medical documentation and health certification are maintained by UHCS. Additional clinical clearance may be required by some programs prior to your presence in any clinical setting.

---

### Practicum/Internship Policies

Students taking practicum courses or doing internships in their field of study may be required to submit certification of health status to each of their clinical placement coordinators. Each program has its own regulations for practicum health clearance. Students should consult their program handbooks or clinical placement coordinator for these requirements. Students who do not present the appropriate health
certification will be blocked from registering for, or attending, practicum until satisfactory evidence is provided. An annual update of the student’s health certification is also required in some internships and practica.

Students taking practicum courses may also be required to submit to and successfully clear criminal history/background checks (CORI (p. 215)). International nursing students must have a current U.S. nursing license and Social Security number.

### Background Checks

An increasing number of clinical sites require background checks for employees as well as students who come to their facilities. Northeastern University students will need to have background checks done only if their assigned clinical agency requires it. The most common background check required is the Massachusetts Criminal Offender Record Information (CORI), although some clinical sites require other types of checks, such as drug testing.

Bouvé College contracts with a national company, CastleBranch (https://www.castlebranch.com), to perform these checks. The company provides this service for universities nationwide. Log onto their website to learn more about them.

CastleBranch (https://www.castlebranch.com) charges fees to conduct background checks. The fee varies 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 sent to the designated clearance officer for Bouvé College, who is the only person who has access to the results. A student will be contacted by the clearance officer only if there is a question about the results. Neither the student nor the clearance officer is required to reveal the actual results of a background check to an on-campus clinical coordinator/clinical placement officer, a clinical site, or anyone else at the university.

If an assigned clinical site requires students to have a background check, the on-campus clinical coordinator/clinical placement officer will inform the student of the requirements and provide the student with instructions and a deadline for completing the check. It is crucial that the student complete the check by the deadline given to assure adequate processing time prior to the start of a clinical experience. Failure to complete the check in a timely manner could jeopardize the student’s progression in the program.

### Liability Insurance

All students on practicum/internship must register each semester while on practicum/internship to be covered by liability insurance. As long as they are registered, all Northeastern University matriculated students in fields of study requiring malpractice insurance are covered under a professional liability insurance for which they pay a yearly fee. This insurance covers injury to third parties by students doing work or professional studies outside Northeastern University premises that are clearly part of their duties. It does not cover willful misconduct. Students or the clinical placement coordinator can request that the institutional audit, compliance, and risk services office send evidence-confirming coverage to their field site. Students should consult their practicum 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 Institutional Audit, Compliance and Risk Services (http://www.northeastern.edu/risk_services) at extension x5997.

### Grading

Only letter grades are included in the grade-point average (GPA) of the program. Grades listed as S/U, I, and IP are not included in the GPA.

A course retaken due to failure is included in the GPA if it is passable. The failure grade remains on the Northeastern University transcript but is excluded from the GPA.

Although credit can be transferred, grades transferred from another institution are not calculated in the GPA on the Northeastern University transcript. Therefore, courses repeated due to failure must be completed at Northeastern.

### Transfer of Credit

A maximum of 9 semester/12 quarter hours of credit 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 3.00 or better, have been earned at an accredited institution, have not been used toward any other degree, and are completed prior to the last semester of graduate study. These courses must have been taken within five years prior to the transfer and cannot be taken in the last semester prior to graduation.

The exact requirements for fulfillment of a degree in the Bouvé College of Health Sciences graduate school vary by program. Students must consult their individual academic program catalogs and policies, as well as program directors, if applicable, for specific credit and noncredit requirements necessary to achieve a specific degree.

If the course had been taken prior to matriculation at Bouvé, the student must submit to his or her academic advisor a petition requesting transfer along with the official transcript indicating successful completion of the course to be transferred. Upon obtaining the advisor’s approval, the student submits the documentation to the Bouvé graduate office on the appropriate petition form. A student may petition to transfer credit only after matriculation in Bouvé. The Graduate Petition to Transfer Credit form can be found on the Office of the Registrar’s website (http://www.northeastern.edu/registrar/form-gs-xfer-cred.pdf).

Courses that have not been taken but will be taken for transfer from another institution must receive preapproval from the student’s academic advisor. Students should submit the petition with the course description attached to their advisor for approval and then submit the completed petition to the Bouvé graduate school office.

Graduate courses at the Northeastern University College of Professional Studies (CPS) can be considered for transfer only with prior approval of the academic advisor. Courses taken in the 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 Waiver

A student must obtain approval from their academic advisor to waive a course that was taken for credit toward a prior degree. To obtain approval by the academic advisor, the student must provide an official transcript...
and a syllabus of the content of the course to the program director, in order to verify equivalency with the course to be waived. The student must submit the signed appropriate petition form to the Bouvé graduate office. If approved to waive the course, the student must take another course in its place for equivalent credit.

**Deficiency Information by Program**

- Audiology: 3.000 GPA and B lowest grade approved
- Applied Psychology: 3.000 GPA and B– lowest grade approved
- Doctor of Pharmacy: 3.000 GPA and C lowest grade approved
- Exercise science: 3.000 GPA and B lowest grade approved
- Health Informatics: 3.000 GPA and B– lowest grade approved
- Nursing: 3.000 GPA and B lowest grade approved (direct entry has exceptions for undergraduate courses taken during the program)
- Physical therapy: 3.000 GPA and C lowest grade approved
- Physician assistant: 3.000 GPA and C lowest grade approved
- Public health: 3.000 GPA and B– lowest grade approved
- Pharmaceutical sciences: 3.000 GPA and C– lowest grade approved
- Speech: 3.000 GPA and B lowest grade approved

**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 by the 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 his or her advisor. The plan should document how the deficiency will be remediated and it must also include a date by which the deficiency will be cleared. The action plan must be signed by the advisor and the student and returned to the Office of Graduate Student Services (123 BK) within one month from the date of the written notification of probation. The student’s failure to submit an action plan may be cause for dismissal from the program. The Academic Probation Contract/Plan form will be sent to the student along with the probationary letter via email, but a printed copy can also be picked up at the Office of Graduate Student Services (123 BK). Students may be placed on academic probation based on but not limited to the following deficiencies:

- A cumulative grade-point average (GPA) below 3.000. Students who remain on academic probation for two semesters are subject to termination from their current graduate program.
- In some programs, a grade of B– or lower in a specified course.
- Unsatisfactory final grade in a clinical course, practicum, internship, research course, etc.

A Bouvé College of Health Sciences (BCHS) graduate student may repeat a course only once to achieve a passing grade and may only repeat two courses for the entirety of their program of study. A student may be on probation for only one semester, 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-upon 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 he or she is subject to dismissal from BCHS. Note that individual graduate programs may have additional requirements that must be included in the probation action plan.

Once the student has regained a GPA of 3.000, earned a grade of B or better in a repeated course, and/or demonstrated satisfactory performance in a clinical course, he or she will be removed from probation.

**Deficiency Information by Program**

- Audiology: 3.000 GPA and B lowest grade approved
- Applied psychology: 3.000 GPA and B– lowest grade approved
• Exercise science: 3.00 GPA and B lowest grade approved
• Health informatics: 3.00 GPA and B– lowest grade approved
• Nursing: 3.00 GPA and B lowest grade approved (Direct Entry has exceptions for undergraduate courses taken during the program)
• Physical therapy: 3.00 GPA and C lowest grade approved
• Physician assistant: 3.00 GPA and C lowest grade approved
• Public health: 3.00 GPA and B– lowest grade approved
• Pharmaceutical sciences: 3.00 GPA and C– lowest grade approved
• Speech: 3.00 GPA and B lowest grade approved

**Applied Psychology**

Website (http://www.northeastern.edu/bouve/ap)

Robert 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)**

• Counseling Psychology (p. 217)
• School Psychology (p. 218)

**Certificate of Advanced Graduate Studies (CAGS)**

• Applied Behavior Analysis (p. 219)
• Counseling Psychology (p. 220)
• School Psychology (p. 222)

**Master of Science (MS)**

• Applied Behavior Analysis (p. 220)
• College Student Development and Counseling (p. 221)
• School Psychology (p. 222)

**Master of Science in Counseling Psychology (MSCP)**

• Counseling Psychology (p. 221)

**Graduate Certificate**

• Applied Behavior Analysis (p. 223)
• Early Intervention (p. 223)

**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**

Four qualifying examinations—research, ethics, assessment, and intervention
Annual review
Research team
Dissertation proposal
Dissertation defense

**Requirements**

A grade of B or higher is required in all course work.

**Basic Core**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAEP 6390</td>
<td>History and Systems of Psychology</td>
<td>3</td>
</tr>
<tr>
<td>CAEP 6394</td>
<td>Advanced Multicultural Psychology</td>
<td>3</td>
</tr>
<tr>
<td>CAEP 7750</td>
<td>Biological Bases of Behavior</td>
<td>3</td>
</tr>
<tr>
<td>CAEP 7755</td>
<td>Cognitive and Affective Bases of Behavior</td>
<td>3</td>
</tr>
<tr>
<td>CAEP 7756</td>
<td>Social Psychology in an Organizational and Ecological Context</td>
<td>3</td>
</tr>
</tbody>
</table>

**Fieldwork**

Complete 8 semester hours from the following: 8

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAEP 7741</td>
<td>Advanced Fieldwork 1</td>
<td></td>
</tr>
<tr>
<td>CAEP 7742</td>
<td>Advanced Fieldwork 2</td>
<td></td>
</tr>
<tr>
<td>CAEP 7743</td>
<td>Advanced Fieldwork 3</td>
<td></td>
</tr>
<tr>
<td>CAEP 7744</td>
<td>Advanced Fieldwork 4</td>
<td></td>
</tr>
</tbody>
</table>

**Clinical Core**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAEP 6350</td>
<td>Introduction to Cognitive Assessment</td>
<td>3</td>
</tr>
<tr>
<td>CAEP 6352</td>
<td>Personality Assessment</td>
<td>3</td>
</tr>
<tr>
<td>CAEP 7710</td>
<td>Advanced Clinical Assessment</td>
<td>3</td>
</tr>
</tbody>
</table>
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 Core
Complete 3 semester hours from the following. Other electives or alternatives may be chosen in consultation with faculty advisor:

- CAEP 5200  Motivational Interviewing in a Healthcare Setting
- CAEP 7751  Advanced Clinical Neuropsychology
- CAEP 7723
- CAEP 7771  Research Team Experience 1
- CAEP 7772  Research Team Experience 2
- CAEP 7773  Research Team Experience 3
- CAEP 7774  Research Team Experience 4
- CAEP 7775  Research Team Experience 5
- CAEP 7776  Research Team Experience 6
- CAEP 7976  Directed Study
- CAEP 8553  Advanced Counseling Practicum

Professional Core
Complete 6 semester hours from the following:

- CAEP 7701  Doctoral Seminar in Counseling Psychology (repeatable)
- CAEP 7732  Legal and Ethical Issues in Community and Educational Settings

Research Core

- CAEP 7711  Measurement: Advanced Psychometric Principles
- CAEP 7712  Intermediate Statistical Data Analysis Techniques
- CAEP 7716  Advanced Research and Data Analyses

Doctoral Internship
Complete 3 semester hours from the following:

- CAEP 7798  Doctoral Internship 1
- CAEP 7799  Doctoral Internship 2

Dissertation
Complete the following (repeatable) course twice:

- CAEP 9990  Dissertation

Program Credit/GPA Requirements
62 total semester hours required
Minimum 3.000 GPA required

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

Requirements
A grade of B or higher is required in all course work.

Professional Core
- CAEP 6365  Seminar in School Psychology  3
- CAEP 7732  Legal and Ethical Issues in Community and Educational Settings

Basic Core
- 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 Core
- CAEP 6203  Understanding Culture and Diversity  3
- CAEP 6394  Advanced Multicultural Psychology  3

Assessment and Intervention Core

Course Work
- CAEP 6247  Child and Adolescent 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  3
- CAEP 6402  Counseling Children and Adolescents in Schools  3
- CAEP 7770  Advanced Clinical Assessment  3
- CAEP 7720  Advanced Clinical Interventions  3

Practicum
- CAEP 6400  Prepracticum in School Psychology  1
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 approved 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 course 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 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.

**Requirements**
A grade of B or higher is required in each course.

**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

**Advanced Core**
- 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

**Specialization Area**
Complete specialization area in consultation with your faculty advisor.
Intensive Practicum

Note: The intensive practicum is optional. Consult your faculty advisor.

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.

Requirements
A grade of B or higher is required in all course work.

Core Courses
In consultation with faculty advisor, complete 24 semester hours in the following subject area:

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 approved 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

Requirements
A grade of B or higher is required in each course.

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
Advanced Core
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

Intensive Practicum
Note: The intensive practicum is optional. Consult your faculty advisor.
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. It 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

Requirements
A grade of B or higher is required in each course.

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 and complies with licensing regulations for mental health counselors in the Commonwealth of Massachusetts. The program is unique in that within the general Master of Science program we offer students a choice of specific specializations in which students have an opportunity to gain additional depth in selected areas.

Program Requirements
Complete all courses and requirements listed below unless otherwise indicated.

Requirements
A grade of B– or higher is required in all course work.

Required Course Work
Course Work
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
CAEP 6380 Seminar in Feminist Psychology 3

Research
CAEP 6202 Research, Evaluation, and Data Analysis 3

Clinical Course Work
Course Work
School Psychology, MS/CAGS

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
Complete 9 semester hours from the following. Other electives or alternatives may be chosen in consultation with faculty advisor:

CAEP 6215  Groups: Dynamics and Leadership
CAEP 6218  Infant, Child, and Adolescent Development
CAEP 6222  Human Sexuality
CAEP 6230  Health Issues in Counseling
CAEP 6286  Family Counseling Interventions
CAEP 6247  Child and Adolescent Psychopathology
CAEP 6275  Counseling Strategies for Children and Adolescents
CAEP 6283  Brief Therapies
CAEP 6290  Reality Therapy
CAEP 6370  Seminar in Health Psychology
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

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.

Clinical/Applied

CAEP 6201  Introduction to Assessment  3
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 Adolescent 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.

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

Internship
CAEP 8501  Internship in School Psychology 1  3
CAEP 8502  Internship in School Psychology 2  3

Research

Practicum
CAEP 8415  Practicum in School Psychology 1  2
CAEP 8416  Practicum in School Psychology 2  2

Optional Concentration

APPLIED BEHAVIOR ANALYSIS

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

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
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 approved 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.

**Requirements**
A grade of B or higher is required in each course.

**Basic Core**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAEP 6327</td>
<td>Behavior Assessment</td>
<td>3</td>
</tr>
<tr>
<td>CAEP 6328</td>
<td>Research and Design Methods</td>
<td>3</td>
</tr>
<tr>
<td>CAEP 6329</td>
<td>Service Administration</td>
<td>3</td>
</tr>
<tr>
<td>CAEP 6331</td>
<td>Advanced Learning Seminar 1</td>
<td>3</td>
</tr>
<tr>
<td>CAEP 6334</td>
<td>Applied Programming Seminar 1</td>
<td>3</td>
</tr>
<tr>
<td>CAEP 6336</td>
<td>Systematic Inquiry 1</td>
<td>3</td>
</tr>
</tbody>
</table>

**Intensive Practicum**
Note: The intensive practicum is optional. Consult your faculty advisor.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAEP 8417</td>
<td>Intensive Practicum in Applied Behavior Analysis 1</td>
<td>2</td>
</tr>
<tr>
<td>CAEP 8418</td>
<td>Intensive Practicum in Applied Behavior Analysis 2</td>
<td>2</td>
</tr>
</tbody>
</table>

**Program Credit/GPA Requirements**
18 total semester hours required

Northeastern University’s Graduate Certificate in Early Intervention program 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 students from school psychology, counseling psychology, physical therapy, speech and language pathology, human services, psychology, and other disciplines who participate in the program.

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

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 alternative arrangements (e.g., Master of Science/Certificate of Advanced Graduate Study in School Psychology, Master of Science in Speech-Language Pathology, Master of Science in Counseling Psychology), meaning that some classes stand in place for others. These program plans are worked out with your advisors.

**Program Requirements**
Complete all courses and requirements listed below unless otherwise indicated.

**Requirements**
A grade of B or higher is required in all courses.

**Early Intervention**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAEP 5150</td>
<td>Early Intervention: Family Systems</td>
<td>3</td>
</tr>
<tr>
<td>CAEP 5151</td>
<td>Early Intervention: Infant and Toddler Development, Risk, and Disability</td>
<td>3</td>
</tr>
<tr>
<td>CAEP 5152</td>
<td>Early Intervention: Planning and Evaluating Services</td>
<td>3</td>
</tr>
<tr>
<td>SLPA 6335</td>
<td>Early Intervention: Assessment and Intervention</td>
<td>3</td>
</tr>
</tbody>
</table>

**Practicum**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAEP 8425</td>
<td>Early Intervention Practicum 1</td>
<td>2</td>
</tr>
<tr>
<td>CAEP 8426</td>
<td>Early Intervention Practicum 2</td>
<td>2</td>
</tr>
</tbody>
</table>
Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Requirements

A grade of B or higher is required in each course.

Speech-Language Disorders

Requires 31 semester hours:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SLPA 5201</td>
<td>Diagnostic Testing in Speech-Language Pathology</td>
<td>1</td>
</tr>
<tr>
<td>SLPA 6219</td>
<td>Aural Rehabilitation (or elective)</td>
<td>3-4</td>
</tr>
<tr>
<td>SLPA 6303</td>
<td>Stuttering</td>
<td>3</td>
</tr>
<tr>
<td>SLPA 6304</td>
<td>Augmentative and Alternative Communication</td>
<td>3</td>
</tr>
<tr>
<td>SLPA 6305</td>
<td>Articulation and Phonology</td>
<td>3</td>
</tr>
<tr>
<td>SLPA 6306</td>
<td>Speech-Language Disorders in Children</td>
<td>3</td>
</tr>
<tr>
<td>SLPA 6307</td>
<td>Voice Disorders</td>
<td>3</td>
</tr>
<tr>
<td>SLPA 6308</td>
<td>Dysphagia</td>
<td>3</td>
</tr>
<tr>
<td>SLPA 6309</td>
<td>Speech-Language Disorders in Adults</td>
<td>3</td>
</tr>
<tr>
<td>SLPA 6312</td>
<td>Motor Speech Disorders</td>
<td>3</td>
</tr>
<tr>
<td>SLPA 6330</td>
<td>Language Literacy 1</td>
<td>0.5</td>
</tr>
<tr>
<td>SLPA 6337</td>
<td>Language Literacy Experiential Program</td>
<td>0.5</td>
</tr>
<tr>
<td>SLPA 6338</td>
<td>Language Literacy 2</td>
<td>2</td>
</tr>
</tbody>
</table>

Speech-Language Science

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SLPA 5109</td>
<td>Neurology of Communication</td>
<td>3</td>
</tr>
<tr>
<td>SLPA 6301</td>
<td>Speech Science</td>
<td>3</td>
</tr>
</tbody>
</table>

Research

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SLPA 6211</td>
<td>Research and Evidence-Based Practice</td>
<td>3</td>
</tr>
<tr>
<td>SLPA 6420</td>
<td>Practical Statistics for Speech-Language Pathology and Audiology</td>
<td>3</td>
</tr>
</tbody>
</table>

Clinical Practicum

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SLPA 6415</td>
<td>Speech-Language Pathology Advanced Clinical Practicum 1</td>
<td>3</td>
</tr>
<tr>
<td>SLPA 6416</td>
<td>Speech-Language Pathology Advanced Clinical Practicum 2</td>
<td>2</td>
</tr>
<tr>
<td>SLPA 6417</td>
<td>Speech-Language Pathology Advanced Clinical Practicum 3</td>
<td>2</td>
</tr>
<tr>
<td>SLPA 6418</td>
<td>Speech-Language Pathology Advanced Clinical Practicum 4</td>
<td>2</td>
</tr>
</tbody>
</table>

Program Credit/GPA Requirements

52 total semester hours required
Minimum 3.000 GPA required
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 focusing 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, 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 and Practice (IUHRP), 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.

Programs

**Doctor of Philosophy (PhD)**
- Population Health (p. 211)

**Master of Science (MS)**
- Exercise Science with Concentration in Physical Activity and Public Health (p. 227)

**Master of Public Health (MPH)**
- Master of Public Health (p. 226)

**Dual Degree**
- Law and Urban Public Health, JD/MPH (p. 264)
- Pharmacy and Public Health, PharmD/MPH (p. 228)
- Physician Assistant Studies and Master in Public Health, MS/MPH (p. 229)

**Graduate Certificate**
- Exercise Science for Clinicians (p. 230)

---

**Population Health, PhD**

Beth E. Molnar, ScD, SM
Director of the Population Health Program

This program seeks to train students to become public health 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 context
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

**Requirements**

**Health Services**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHTH 5232</td>
<td>Evaluating Healthcare Quality</td>
<td>3</td>
</tr>
<tr>
<td>or PHTH 5234</td>
<td>Economic Perspectives on Health Policy</td>
<td>3</td>
</tr>
</tbody>
</table>

**Population Health**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHTH 6400</td>
<td>Principles of Population Health 1</td>
<td>3</td>
</tr>
<tr>
<td>PHTH 6410</td>
<td>Principles of Population Health 2</td>
<td>3</td>
</tr>
</tbody>
</table>

**Epidemiology**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHTH 5202</td>
<td>Introduction to Epidemiology</td>
<td>3</td>
</tr>
<tr>
<td>PHTH 6202</td>
<td>Intermediate Epidemiology</td>
<td>3</td>
</tr>
</tbody>
</table>

**Research Ethics**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 6381</td>
<td>Ethics in Biological Research</td>
<td>2</td>
</tr>
<tr>
<td>or PHSC 6212</td>
<td>Research Skills and Ethics</td>
<td>2</td>
</tr>
</tbody>
</table>

**Research and Analysis**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHTH 5210</td>
<td>Biostatistics in Public Health</td>
<td>3</td>
</tr>
<tr>
<td>PHTH 6210</td>
<td>Applied Regression Analysis</td>
<td>3</td>
</tr>
</tbody>
</table>

**Options**

Complete one of the following options:

**SOCIAL AND ENVIRONMENTAL DETERMINANTS OF HEALTH OPTION**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHTH 5224</td>
<td>Social Epidemiology</td>
<td>3</td>
</tr>
<tr>
<td>PHTH 6440</td>
<td>Advanced Methods in Biostatistics</td>
<td>3</td>
</tr>
<tr>
<td>PHTH 6800</td>
<td>Causal Inference in Public Health Research</td>
<td>3</td>
</tr>
</tbody>
</table>

**Electives** | 2-4 |
HEALTH SERVICES AND POLICY OPTION

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 5110</td>
<td>Microeconomic Theory</td>
<td>4</td>
</tr>
<tr>
<td>PHTH 5234</td>
<td>Economic Perspectives on Health Policy</td>
<td>3</td>
</tr>
<tr>
<td>Electives</td>
<td></td>
<td>2-4</td>
</tr>
</tbody>
</table>

Electives

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 6220</td>
<td>Data Mining Techniques</td>
</tr>
<tr>
<td>CS 7280</td>
<td>Special Topics in Database Management</td>
</tr>
<tr>
<td>ECON 5110</td>
<td>Microeconomic Theory</td>
</tr>
<tr>
<td>ECON 5140</td>
<td>Applied Econometrics</td>
</tr>
<tr>
<td>ECON 7200</td>
<td>Topics in Applied Economics</td>
</tr>
<tr>
<td>EXSC 5200</td>
<td>Cardiopulmonary Physiology</td>
</tr>
<tr>
<td>EXSC 5220</td>
<td>Advanced Exercise Physiology</td>
</tr>
<tr>
<td>EXSC 5230</td>
<td>Physical Activity and Exercise: Effects on Musculoskeletal Health and Disease</td>
</tr>
<tr>
<td>HINF 5200</td>
<td>Theoretical Foundations in Personal Health Informatics</td>
</tr>
<tr>
<td>HRMG 6220</td>
<td>Health Organization Management</td>
</tr>
<tr>
<td>PHSC 6216</td>
<td>Human Physiology and Pathophysiology</td>
</tr>
<tr>
<td>PHTH 5212</td>
<td>Public Health Administration and Policy</td>
</tr>
<tr>
<td>PHTH 5214</td>
<td>Environmental Health</td>
</tr>
<tr>
<td>PHTH 5226</td>
<td>Strategic Management and Leadership in Healthcare</td>
</tr>
<tr>
<td>PHTH 5228</td>
<td>Advances in Measuring Behavior</td>
</tr>
<tr>
<td>PHTH 5230</td>
<td>Global Health</td>
</tr>
<tr>
<td>PHTH 5440</td>
<td>Community-Based Participatory Research: Environmental Health</td>
</tr>
<tr>
<td>PHTH 5540</td>
<td>Health Education and Program Planning</td>
</tr>
<tr>
<td>PHTH 6200</td>
<td>Principles and History of Urban Health</td>
</tr>
<tr>
<td>PHTH 6204</td>
<td>Society, Behavior, and Health</td>
</tr>
<tr>
<td>PHTH 6208</td>
<td>Urban Community Health Assessment</td>
</tr>
<tr>
<td>PHTH 6232</td>
<td>Neighborhood and Public Health</td>
</tr>
<tr>
<td>PHTH 6320</td>
<td>Qualitative Methods in Health and Illness</td>
</tr>
<tr>
<td>PPUA 7247</td>
<td>Seminar in U.S. Health Policy and Management</td>
</tr>
<tr>
<td>SOCL 7257</td>
<td>Contemporary Issues in Sociology</td>
</tr>
<tr>
<td>SOCL 7287</td>
<td>Social Movements in Health</td>
</tr>
<tr>
<td>STRT 6220</td>
<td>Strategic Management for Healthcare Organizations</td>
</tr>
</tbody>
</table>

Dissertation Courses

Complete the following (repeatable) course twice:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHTH 9990</td>
<td>Dissertation</td>
</tr>
</tbody>
</table>

Program Credit/GPA Requirements

33 total semester hours required
Minimum 3.00 GPA required

Shan Mohammed, MD, MPH
Program Director
316 Robinson Hall
617.373.7729

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.

Requirements

A grade of B– or higher is required in each required course.

Required Courses

Requires 30 semester hours:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHTH 5120</td>
<td>Race, Ethnicity, and Health in the United States</td>
<td>3</td>
</tr>
<tr>
<td>PHTH 5202</td>
<td>Introduction to Epidemiology</td>
<td>3</td>
</tr>
<tr>
<td>PHTH 5210</td>
<td>Biostatistics in Public Health</td>
<td>3</td>
</tr>
<tr>
<td>PHTH 5212</td>
<td>Public Health Administration and Policy</td>
<td>3</td>
</tr>
<tr>
<td>PHTH 5214</td>
<td>Environmental Health</td>
<td>3</td>
</tr>
<tr>
<td>PHTH 5540</td>
<td>Health Education and Program Planning</td>
<td>3</td>
</tr>
<tr>
<td>or PPUA 6509</td>
<td>Techniques of Program Evaluation</td>
<td>3</td>
</tr>
<tr>
<td>PHTH 6200</td>
<td>Principles and History of Urban Health</td>
<td>3</td>
</tr>
<tr>
<td>PHTH 6204</td>
<td>Society, Behavior, and Health</td>
<td>3</td>
</tr>
<tr>
<td>PHTH 6208</td>
<td>Urban Community Health Assessment</td>
<td>3</td>
</tr>
<tr>
<td>PHTH 6966</td>
<td>Practicum</td>
<td>3</td>
</tr>
</tbody>
</table>

Capstone

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHTH 6910</td>
<td>Public Health Capstone</td>
</tr>
<tr>
<td>PHTH 6910</td>
<td>Public Health Capstone</td>
</tr>
</tbody>
</table>

Electives

Complete 9 semester hours from the following. In consultation with your faculty advisor, you may complete electives from another discipline:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHTH 5220</td>
<td>Health and Human Rights</td>
</tr>
<tr>
<td>PHTH 5222</td>
<td>Health Advocacy</td>
</tr>
<tr>
<td>PHTH 5224</td>
<td>Social Epidemiology</td>
</tr>
</tbody>
</table>

Website (http://www.northeastern.edu/mph)
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.

Requirements

A grade of B or higher is required in all course work.

Exercise Science Core

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EXSC 5200</td>
<td>Cardiopulmonary Physiology</td>
<td>3</td>
</tr>
<tr>
<td>EXSC 5210</td>
<td>Physical Activity and Exercise: Prescription, Measurement, and Testing</td>
<td>3</td>
</tr>
<tr>
<td>EXSC 5220</td>
<td>Advanced Exercise Physiology</td>
<td>3</td>
</tr>
<tr>
<td>EXSC 5230</td>
<td>Physical Activity and Exercise: Effects on Musculoskeletal Health and Disease</td>
<td>3</td>
</tr>
</tbody>
</table>

Public Health Core

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHTH 5540</td>
<td>Health Education and Program Planning</td>
<td>3</td>
</tr>
<tr>
<td>PHTH 6208</td>
<td>Urban Community Health Assessment</td>
<td>3</td>
</tr>
</tbody>
</table>

Research Core

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHTH 5202</td>
<td>Introduction to Epidemiology</td>
<td>3</td>
</tr>
<tr>
<td>PHTH 5210</td>
<td>Biostatistics in Public Health</td>
<td>3</td>
</tr>
<tr>
<td>EXSC 6400</td>
<td>Applied Research Methods</td>
<td>3</td>
</tr>
</tbody>
</table>

Electives

Complete 6 semester hours from the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>HSCI 5230</td>
<td>Clinical Nutrition Applications in Health and Disease</td>
<td>3</td>
</tr>
<tr>
<td>EXSC 5000 to EXSC 6402</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>PHTH 5000 to PHTH 6800</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

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.

Program Requirements
Complete all courses and requirements listed below unless otherwise indicated.

General Requirements
Complete all courses and requirements listed below unless otherwise indicated.

### Analytics/Modeling/Statistics

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>DA 5020</td>
<td>Collecting, Storing, and Retrieving Data</td>
<td>4</td>
</tr>
<tr>
<td>DA 5030</td>
<td>Introduction to Data Mining/Machine Learning</td>
<td>4</td>
</tr>
<tr>
<td>HINF 6400</td>
<td>Introduction to Health Data Analytics</td>
<td>3</td>
</tr>
<tr>
<td>PPUA 5301</td>
<td>Introduction to Computational Statistics</td>
<td>4</td>
</tr>
<tr>
<td>PPUA 5302</td>
<td>Information Design and Visual Analytics</td>
<td>4</td>
</tr>
</tbody>
</table>

**Healthcare**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>HINF 5102</td>
<td>Data Management in Healthcare</td>
<td>3</td>
</tr>
<tr>
<td>HINF 5105</td>
<td>The American Healthcare System</td>
<td>3</td>
</tr>
</tbody>
</table>

**Predictive Analytics and Modeling**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHTH 5240</td>
<td>Evaluating Scientific Evidence</td>
<td>3</td>
</tr>
<tr>
<td>PHTH 6202</td>
<td>Intermediate Epidemiology</td>
<td>3</td>
</tr>
<tr>
<td>PHTH 6210</td>
<td>Applied Regression Analysis</td>
<td>3</td>
</tr>
<tr>
<td>PHTH 6440</td>
<td>Advanced Methods in Biostatistics</td>
<td>3</td>
</tr>
<tr>
<td>CS 6350</td>
<td>Empirical Research Methods</td>
<td>3</td>
</tr>
</tbody>
</table>

**Intermediate Statistical Data Analysis Techniques**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAEP 7712</td>
<td>Intermediate Statistical Data Analysis Techniques</td>
<td>2</td>
</tr>
<tr>
<td>CAEP 7716</td>
<td>Advanced Research and Data Analyses</td>
<td>2</td>
</tr>
</tbody>
</table>

### Other Electives

Complete 0–4 semester hours from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARTG 5330</td>
<td>Visualization Technologies</td>
<td>3</td>
</tr>
<tr>
<td>ARTG 6320</td>
<td>Design of Information-Rich Environments</td>
<td>3</td>
</tr>
<tr>
<td>HINF 5200</td>
<td>Theoretical Foundations in Personal Health Informatics</td>
<td>3</td>
</tr>
<tr>
<td>HINF 5300</td>
<td>Personal Health Interface Design and Development</td>
<td>3</td>
</tr>
<tr>
<td>HINF 6215</td>
<td>Project Management</td>
<td>3</td>
</tr>
<tr>
<td>HINF 6220</td>
<td>Database Design, Access, Modeling, and Security</td>
<td>3</td>
</tr>
<tr>
<td>PHTH 5226</td>
<td>Strategic Management and Leadership in Healthcare</td>
<td>3</td>
</tr>
<tr>
<td>PHTH 5232</td>
<td>Evaluating Healthcare Quality</td>
<td>3</td>
</tr>
<tr>
<td>PHTH 5234</td>
<td>Economic Perspectives on Health Policy</td>
<td>3</td>
</tr>
</tbody>
</table>

### Program Credit/GPA Requirements

37 total semester hours required
Minimum 3.00 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.

Requirements

**DOCTOR OF PHARMACY REQUIREMENTS**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHMD 1201</td>
<td>Introduction to Pharmacy Practice</td>
<td>2.5</td>
</tr>
<tr>
<td>PHMD 1202</td>
<td>Lab for PHMD 1201</td>
<td>0.5</td>
</tr>
<tr>
<td>PHMD 2350</td>
<td>Healthcare Systems</td>
<td>3</td>
</tr>
<tr>
<td>PHSC 4501</td>
<td>Pharmacology/Medicinal Chemistry 1</td>
<td>5</td>
</tr>
<tr>
<td>PHSC 3411</td>
<td>Pharmaceutics 1</td>
<td>4</td>
</tr>
<tr>
<td>PHMD 2310</td>
<td>Educational and Behavioral Interventions in Pharmacy Practice</td>
<td>2</td>
</tr>
<tr>
<td>PHMD 2311</td>
<td>Lab for PHMD 2310</td>
<td>0.5</td>
</tr>
<tr>
<td>PHSC 4502</td>
<td>Pharmacology/Medicinal Chemistry 2</td>
<td>5</td>
</tr>
<tr>
<td>PHSC 3412</td>
<td>Pharmaceutics 2</td>
<td>4</td>
</tr>
<tr>
<td>PHSC 3419</td>
<td>Pharmaceutics Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>PHMD 5250</td>
<td>Pharmacy Care Management</td>
<td>3</td>
</tr>
<tr>
<td>PHSC 3430</td>
<td>Pharmacokinetics and Biopharmaceutics</td>
<td>3</td>
</tr>
<tr>
<td>PHSC 2330</td>
<td>Immunology</td>
<td>3</td>
</tr>
<tr>
<td>PHMD 4611</td>
<td>Comprehensive Disease Management 1</td>
<td>6</td>
</tr>
<tr>
<td>PHMD 4612</td>
<td>Comprehensive Disease Management 1 Seminar</td>
<td>1</td>
</tr>
<tr>
<td>PHSC 5360</td>
<td>Anti-Infectives</td>
<td>4</td>
</tr>
<tr>
<td>PHMD 5330</td>
<td>Jurisprudence</td>
<td>3</td>
</tr>
<tr>
<td>PHMD 4621</td>
<td>Comprehensive Disease Management 2</td>
<td>6</td>
</tr>
<tr>
<td>PHMD 4622</td>
<td>Comprehensive Disease Management 2 Seminar</td>
<td>1</td>
</tr>
<tr>
<td>PHMD 4623</td>
<td>Comprehensive Disease Management 2 Skills Lab</td>
<td>0.5</td>
</tr>
<tr>
<td>PHMD 4631</td>
<td>Comprehensive Disease Management 3</td>
<td>6</td>
</tr>
<tr>
<td>PHMD 4632</td>
<td>Comprehensive Disease Management 3 Seminar</td>
<td>1</td>
</tr>
<tr>
<td>PHMD 4633</td>
<td>Comprehensive Disease Management 3 Skills Lab</td>
<td>0.5</td>
</tr>
<tr>
<td>PHMD 5223</td>
<td>Evidence-Based Medicine</td>
<td>2</td>
</tr>
<tr>
<td>PHMD 5438</td>
<td>Advanced Pharmacy Practice Experience Preparatory Seminar 1</td>
<td>0.5</td>
</tr>
<tr>
<td>PHMD 4641</td>
<td>Comprehensive Disease Management 4</td>
<td>6</td>
</tr>
<tr>
<td>PHMD 4642</td>
<td>Comprehensive Disease Management 4 Seminar</td>
<td>1</td>
</tr>
<tr>
<td>PHMD 4643</td>
<td>Comprehensive Disease Management 4 Skills Lab</td>
<td>0.5</td>
</tr>
<tr>
<td>PHMD 5270</td>
<td>Economic Evaluation of Pharmaceuticals and Pharmacy Practice</td>
<td>2</td>
</tr>
<tr>
<td>PHMD 5439</td>
<td>Advanced Pharmacy Practice Experience Preparatory Seminar 2</td>
<td>0.5</td>
</tr>
<tr>
<td>PHMD 4641</td>
<td>Comprehensive Disease Management 4</td>
<td>6</td>
</tr>
<tr>
<td>PHMD 4642</td>
<td>Comprehensive Disease Management 4 Seminar</td>
<td>1</td>
</tr>
<tr>
<td>PHMD 4643</td>
<td>Comprehensive Disease Management 4 Skills Lab</td>
<td>0.5</td>
</tr>
<tr>
<td>PHMD 5270</td>
<td>Economic Evaluation of Pharmaceuticals and Pharmacy Practice</td>
<td>2</td>
</tr>
</tbody>
</table>

**MASTER OF PUBLIC HEALTH REQUIREMENTS**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHTH 5120</td>
<td>Race, Ethnicity, and Health in the United States</td>
<td>3</td>
</tr>
<tr>
<td>PHTH 5202</td>
<td>Introduction to Epidemiology</td>
<td>3</td>
</tr>
<tr>
<td>PHTH 5210</td>
<td>Biostatistics in Public Health</td>
<td>3</td>
</tr>
<tr>
<td>PHTH 5212</td>
<td>Public Health Administration and Policy</td>
<td>3</td>
</tr>
<tr>
<td>PHTH 5214</td>
<td>Environmental Health</td>
<td>3</td>
</tr>
<tr>
<td>PHTH 5540</td>
<td>Health Education and Program Planning</td>
<td>3</td>
</tr>
<tr>
<td>PHTH 6200</td>
<td>Principles and History of Urban Health</td>
<td>3</td>
</tr>
<tr>
<td>PHTH 6204</td>
<td>Society, Behavior, and Health</td>
<td>3</td>
</tr>
<tr>
<td>PHTH 6208</td>
<td>Urban Community Health Assessment</td>
<td>3</td>
</tr>
<tr>
<td>PHTH 6966</td>
<td>Practicum</td>
<td>3</td>
</tr>
<tr>
<td>PHTH 6910</td>
<td>Public Health Capstone</td>
<td>3</td>
</tr>
</tbody>
</table>

**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 would be 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.

**Didactic Courses**
- PA 6200 Anatomy and Physiology 1 3
- PA 6201 Anatomy and Physiology 2 3
- PA 6203 Physical Diagnosis and Patient Evaluation 1 3
- PA 6204 Physical Diagnosis and Patient Evaluation 2 3
- PA 6205 Pharmacology 1 2
- PA 6206 Pharmacology 2 2
- PA 6207 Clinical Laboratory and Diagnostic Methods 4
- PA 6208 Professional Issues for Physician Assistants 2
- 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
- PA 6326 Aspects of Primary Care 4
- PA 6327 Emergency Medicine and Critical Care 2
- PA 6328 Aging and Rehabilitation Medicine 2

**Clinical Courses**
- 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.

- 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 6200 Principles and History of Urban Health 3
- PHTH 6204 Society, Behavior, and Health 3
- PHTH 6208 Urban Community Health Assessment 3
- PHTH 6966 Practicum 3
- PHTH 6910 Public Health Capstone 3

**Electives**
Complete 3 semester hours of approved elective course work.

**Program Credit/GPA Requirements**
133 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.

**Requirements**

**Advanced Physiology**
- EXSC 5200 Cardiopulmonary Physiology 3
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. U.S. News & World Report ranked our nurse anesthesia graduate program in the top 10 in the United States.

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 (p. 232)
- Nursing—Advanced Entry (p. 232)

Doctor of Nursing Practice (DNP)

- Doctor of Nursing Practice (p. 233)
- Doctor of Nursing Practice with Concentration in Nurse Anesthesia (p. 233)

Certificate of Advanced Graduate Study (CAGS)

- Adult-Gerontology Nurse Practitioner, Acute Care (p. 234)
- Family Psychiatric Nurse Practitioner (p. 235)
- Neonatal Nurse Practitioner (p. 235)
- Nurse Anesthesia (p. 235)
- Pediatric Nurse Practitioner, Acute Care (p. 236)
- Pediatric Nurse Practitioner, Acute and Primary Care (p. 236)
- Pediatric Nurse Practitioner, Primary Care (p. 236)
- Adult-Gerontology Nurse Practitioner, Primary Care (p. 234)

Master of Science (MS)

- Nursing—Adult-Gerontology Nurse Practitioner, Acute Care (p. 237)
- Nursing—Family Psychiatric Nurse Practitioner (p. 238)
- Nursing—Neonatal Nurse Practitioner (p. 239)
- Nursing—Pediatric Nurse Practitioner, Acute and Primary Care (p. 239)
- Nursing—Pediatric Nurse Practitioner, Primary Care (p. 240)
- Nursing—Adult-Gerontology Nurse Practitioner, Primary Care (p. 237)
- Nursing—Family Nurse Practitioner, Primary Care (p. 238)
- Nursing—Direct Entry (p. 240)
- Nursing Administration (p. 241)
- Nursing Anesthesia (p. 241)

Dual Degree

- Nursing and Business Administration, MS/MBA (p. 242)
Overview
Research
The PhD in nursing program seeks to prepare scholars to be research scientists, educators, and leaders who improve health across the life span with a concentration on urban, vulnerable, and underserved populations. Graduates are expected to lead interdisciplinary research initiatives that advance nursing science through knowledge development and scholarly inquiry.

Students will study with nursing faculty whose research programs address questions that extend across the broad health spectrum, from illness and self-management through health promotion. Collectively, the faculty have expertise in a variety of research interests, such as health issues of women, children, and families; HIV; cancer; mental health; depression; substance abuse; and perinatal injury.

In addition, students will have an opportunity to study with faculty from other Northeastern departments. Our close collaborations with the university’s Institute on Urban Health Research, School of Public Policy and Urban Affairs, as well as with several Boston area academic health centers, provide opportunities 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

Requirements
A grade of B or higher is required in all course work.

Core Courses
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 7709 Qualitative Research Methods 3
NRSG 7712 Quantitative Research Methods 3
NRSG 7715 Measurement in Clinical Research 3
NRSG 7750 Healthcare of Urban Populations 3
NRSG 7770 Research Colloquium 1
NRSG 7755 Intervention Research: Development, Implementation, and Evaluation 3

Statistics
PHTH 5210 Biostatistics in Public Health 3
NRSG 5121 Epidemiology and Population Health 3
PHTH 6210 Applied Regression Analysis 3

Research Practicum
Complete the following (repeatable) course twice: 6

Cognate Courses
NRSG 9984 Research 3
Complete two cognate courses in consultation with your faculty advisor. 6

Electives
Complete two elective courses in consultation with your faculty advisor. 6

Dissertation
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 the School 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
The PhD program in nursing is designed to prepare scholars to be research scientists, educators, and leaders who seek to improve health across the life span with a concentration on urban, vulnerable, and underserved populations. Graduates are expected to lead interdisciplinary research initiatives that advance nursing science through knowledge development and scholarly inquiry.

Students will study with nursing faculty whose research programs address questions that extend across the broad health spectrum, from illness and self-management through health promotion. Collectively, the faculty have expertise in a variety of research interests, such as health issues of women, children, and families; HIV; cancer; mental health; depression; substance abuse; and perinatal injury.

In addition, students will have an opportunity to study with faculty from other Northeastern departments. Our close collaborations with the university’s Institute on Urban Health Research, School of Public Policy and Urban Affairs, as well as with several Boston area academic health centers, provide opportunities 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
**Requirements**

A grade of B or higher is required in all course work.

**Core Courses**

- NRSG 7700: The Science of Nursing 3
- NRSG 7705: Theoretical and Conceptual Foundations in Nursing Science 3
- NRSG 7709: Qualitative Research Methods 3
- NRSG 7712: Quantitative Research Methods 3
- NRSG 7715: Measurement in Clinical Research 3
- NRSG 7750: Healthcare of Urban Populations 3
- NRSG 7770: Research Colloquium 1
- NRSG 7755: Intervention Research: Development, Implementation, and Evaluation 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 Practicum**

Complete the following (repeatable) course twice: 6
- NRSG 9984: Research

**Dissertation Courses**

- 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 3.00 GPA required

1 Cognates are graduate-level courses that are taken outside the School of Nursing and should provide depth and breadth to the student's area of interest.

---

**Nursing Practice, DNP**

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 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 leadership.

The Northeastern University 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 a hybrid format.

If you are a registered nurse with at least two years of 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. Applicants do not hold national certification in one of the four advanced practice registered nurse (APRN) roles must provide evidence of the equivalent of 500 practicum hours in a previous master’s program and/or complete a gap analysis.

**Program Requirements**

Complete all courses and requirements listed below unless otherwise indicated.

**Requirements**

A grade of B or higher is required in each course.

**Core Courses**

- 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
- NRSG 7925: Health Policy and Advocacy 3

**Capstone Courses**

- 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**

Complete 3 semester hours, selected in consultation with faculty advisor. 3

**Program Credit/GPA Requirements**

30 total semester hours required
Minimum 3.00 GPA required

---

**Nursing Practice with Concentration in Nurse Anesthesia, DNP**

Restricted to students in the United States Army Graduate Program in Anesthesia Nursing (USAGPAN).

**Program Requirements**

Complete all courses and requirements listed below unless otherwise indicated.

**Requirements**

A grade of B or higher is required in each course.

**Core Courses**

- NRSG 5127: Scientific Inquiry and Epidemiological Concepts 3
- NRSG 5170: Statistics in Nursing 2
- NRSG 5182: Physical Examination and Differential Diagnosis 4
- NRSG 5184: Biochemistry for Nurse Anesthesia 4
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 in Nursing. Students may pursue either full-time or part-time study. Nurses who possess a Master of Science in Nursing 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.

Requirements
A grade of B or higher is required in each course.

Acute-Care Theory
- NRSG 6220 Nursing Management: Acute Episodic Illness
- NRSG 6221 Nursing Management: Critical and Chronic Illness
- NRSG 6241 Acute-Care Concepts in Nursing Practice

Acute-Care Practicum
- NRSG 6420 Adult-Gerontology Acute-Care Nursing Practicum 1
- NRSG 6421 Adult-Gerontology Acute-Care Nursing Practicum 2
- NRSG 6422 Adult-Gerontology Acute-Care Nursing Practicum 3

Electives
Complete 5 semester hours in the following subject area:
- NRSG

Program Credit/GPA Requirements
24 total semester hours required
Minimum 3.000 GPA required

This specialization offers nurse practitioners 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
Requirements
A grade of B or higher is required in each course.

Adult-Gerontology Core
- NRSG 6249 Health Promotion of Adult/Older Adult
- NRSG 6253 Primary Care of Adult/Older Adult Health Problems
- NRSG 6254 Primary Care of Adult/Older Adult Complex Patients

Clinical Core
- NRSG 5117 Advanced Pharmacology
- NRSG 5126 Pathophysiology for Advanced Practice

Nursing—Adult-Gerontology Nurse Practitioner, Primary 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 in Nursing. Students may pursue either full-time or part-time study. Nurses who possess a Master of Science in Nursing 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.

Requirements
A grade of B or higher is required in each course.

Acute-Care Theory
- NRSG 6220 Nursing Management: Acute Episodic Illness
- NRSG 6221 Nursing Management: Critical and Chronic Illness
- NRSG 6241 Acute-Care Concepts in Nursing Practice

Acute-Care Practicum
- NRSG 6420 Adult-Gerontology Acute-Care Nursing Practicum 1
- NRSG 6421 Adult-Gerontology Acute-Care Nursing Practicum 2
- NRSG 6422 Adult-Gerontology Acute-Care Nursing Practicum 3

Electives
Complete 5 semester hours in the following subject area:
- NRSG

Program Credit/GPA Requirements
24 total semester hours required
Minimum 3.000 GPA required

This specialization offers nurse practitioners 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
Requirements
A grade of B or higher is required in each course.

Adult-Gerontology Core
- NRSG 6249 Health Promotion of Adult/Older Adult
- NRSG 6253 Primary Care of Adult/Older Adult Health Problems
- NRSG 6254 Primary Care of Adult/Older Adult Complex Patients

Clinical Core
- NRSG 5117 Advanced Pharmacology
- NRSG 5126 Pathophysiology for Advanced Practice

Nursing—Adult-Gerontology Nurse Practitioner, Primary 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 in Nursing. Students may pursue either full-time or part-time study. Nurses who possess a Master of Science in Nursing 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.

Requirements
A grade of B or higher is required in each course.

Acute-Care Theory
- NRSG 6220 Nursing Management: Acute Episodic Illness
- NRSG 6221 Nursing Management: Critical and Chronic Illness
- NRSG 6241 Acute-Care Concepts in Nursing Practice

Acute-Care Practicum
- NRSG 6420 Adult-Gerontology Acute-Care Nursing Practicum 1
- NRSG 6421 Adult-Gerontology Acute-Care Nursing Practicum 2
- NRSG 6422 Adult-Gerontology Acute-Care Nursing Practicum 3

Electives
Complete 5 semester hours in the following subject area:
- NRSG

Program Credit/GPA Requirements
24 total semester hours required
Minimum 3.000 GPA required

This specialization offers nurse practitioners 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
Requirements
A grade of B or higher is required in each course.

Adult-Gerontology Core
- NRSG 6249 Health Promotion of Adult/Older Adult
- NRSG 6253 Primary Care of Adult/Older Adult Health Problems
- NRSG 6254 Primary Care of Adult/Older Adult Complex Patients

Clinical Core
- NRSG 5117 Advanced Pharmacology
- NRSG 5126 Pathophysiology for Advanced Practice

Nursing—Adult-Gerontology Nurse Practitioner, Primary 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 in Nursing. Students may pursue either full-time or part-time study. Nurses who possess a Master of Science in Nursing 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.

Requirements
A grade of B or higher is required in each course.

Acute-Care Theory
- NRSG 6220 Nursing Management: Acute Episodic Illness
- NRSG 6221 Nursing Management: Critical and Chronic Illness
- NRSG 6241 Acute-Care Concepts in Nursing Practice

Acute-Care Practicum
- NRSG 6420 Adult-Gerontology Acute-Care Nursing Practicum 1
- NRSG 6421 Adult-Gerontology Acute-Care Nursing Practicum 2
- NRSG 6422 Adult-Gerontology Acute-Care Nursing Practicum 3

Electives
Complete 5 semester hours in the following subject area:
- NRSG

Program Credit/GPA Requirements
24 total semester hours required
Minimum 3.000 GPA required

This specialization offers nurse practitioners 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.
**Northeastern University**

**NRSG 6115** Health Assessment 3  
**NRSG 6222** Pharmacology of Adults and Older Adults 2  

**Adult-Gerontology Nurse 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.

**Requirements**  
A grade of B or higher is required in each course.

**Family Psychiatric 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  

**Family Psychiatric Practicum**  
**NRSG 6480** Psychiatric Practicum across the Life Span 1 5  
**NRSG 6481** Psychiatric Practicum across the Life Span 2 5  

**Elective**  
Complete 2 semester hours from the following subject area. 2  
**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.

**NRSG 5117** Advanced Pharmacology 2  
**NRSG 5126** Pathophysiology for Advanced Practice 3  

**Requirements**  
A grade of B or higher is required in all course work.

**Clinical Core**  
**NRSG 6115** Health Assessment 3  
**NRSG 6222** Pharmacology of Adults and Older Adults 2  

---

**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**  
A grade of B or higher is required in each course.

**NRSG 5117** Advanced Pharmacology 2  
**NRSG 5126** Pathophysiology for Advanced Practice 3  

**Requirements**  
A grade of B or higher is required in all course work.

**Clinical Core**  
**NRSG 6115** Health Assessment 3  
**NRSG 6222** Pharmacology of Adults and Older Adults 2  

---

**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
### Requirements
A grade of B or higher is required in each course.

#### Anesthesia Didactic Courses
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>NRSG 6320</td>
<td>Role/Practice Issues in Nurse Anesthesia</td>
<td>3</td>
</tr>
<tr>
<td>NRSG 6321</td>
<td>Conceptual Basis of Nurse Anesthesia Practice 1</td>
<td>3</td>
</tr>
<tr>
<td>NRSG 6322</td>
<td>Conceptual Basis of Nurse Anesthesia Practice 2</td>
<td>3</td>
</tr>
<tr>
<td>NRSG 6324</td>
<td>Chemistry and Physics in Anesthesia</td>
<td>3</td>
</tr>
<tr>
<td>NRSG 6325</td>
<td>Pharmacotherapeutics in Anesthesia and Critical Care Nursing</td>
<td>2</td>
</tr>
<tr>
<td>NRSG 6333</td>
<td>Conceptual Basis of Nurse Anesthesia Practice 3</td>
<td>3</td>
</tr>
<tr>
<td>NRSG 6336</td>
<td>Advanced Concepts in Nurse Anesthesia Practice</td>
<td>3</td>
</tr>
</tbody>
</table>

#### Nurse Anesthesia Clinical Courses
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>NRSG 6530</td>
<td>Nurse Anesthesia Practicum 1</td>
<td>2</td>
</tr>
<tr>
<td>NRSG 6534</td>
<td>Nurse Anesthesia Practicum 2</td>
<td>4</td>
</tr>
<tr>
<td>NRSG 6535</td>
<td>Nurse Anesthesia Practicum 3</td>
<td>4</td>
</tr>
<tr>
<td>NRSG 6540</td>
<td>Advanced Clinical Experiences in Nurse Anesthesia 1</td>
<td>1</td>
</tr>
<tr>
<td>NRSG 6541</td>
<td>Advanced Clinical Experiences in Nurse Anesthesia 2</td>
<td>1</td>
</tr>
<tr>
<td>NRSG 6542</td>
<td>Advanced Clinical Experiences in Nurse Anesthesia 3</td>
<td>1</td>
</tr>
</tbody>
</table>

### 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.

### Requirements
A grade of B or higher is required in all course work.

#### Acute-Care Core
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>NRSG 6116</td>
<td>Advanced Health Assessment of the Neonate and Infant</td>
<td>3</td>
</tr>
<tr>
<td>NRSG 6262</td>
<td>Pediatric Pharmacology</td>
<td>2</td>
</tr>
<tr>
<td>NRSG 6267</td>
<td>Care of the Critically Ill Child</td>
<td>4</td>
</tr>
<tr>
<td>NRSG 6265</td>
<td>Care of Child/Adolescent Health Problems</td>
<td>4</td>
</tr>
</tbody>
</table>

#### Acute-Care Practicum
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>NRSG 6461</td>
<td>Child/Adolescent Health Problems Practicum</td>
<td>4</td>
</tr>
<tr>
<td>NRSG 6463</td>
<td>Care of the Critically Ill Child Practicum</td>
<td>4</td>
</tr>
</tbody>
</table>

---

### 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.

### Requirements
A grade of B or higher is required in each course.

#### Acute and Primary Care Core
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>NRSG 5117</td>
<td>Advanced Pharmacology</td>
<td>2</td>
</tr>
<tr>
<td>NRSG 6116</td>
<td>Advanced Health Assessment of the Neonate and Infant</td>
<td>3</td>
</tr>
<tr>
<td>NRSG 6262</td>
<td>Pediatric Pharmacology</td>
<td>2</td>
</tr>
<tr>
<td>NRSG 6267</td>
<td>Care of the Critically Ill Child</td>
<td>4</td>
</tr>
<tr>
<td>NRSG 6265</td>
<td>Care of Child/Adolescent Health Problems</td>
<td>4</td>
</tr>
</tbody>
</table>

#### Acute and Primary Care Practicum
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>NRSG 6460</td>
<td>Care of Well Child/Adolescent Health Promotion Practicum</td>
<td>4</td>
</tr>
<tr>
<td>NRSG 6461</td>
<td>Child/Adolescent Health Problems Practicum</td>
<td>4</td>
</tr>
<tr>
<td>NRSG 6463</td>
<td>Care of the Critically Ill Child Practicum</td>
<td>4</td>
</tr>
</tbody>
</table>

#### Primary Care
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>NRSG 5126</td>
<td>Pathophysiology for Advanced Practice</td>
<td>3</td>
</tr>
<tr>
<td>NRSG 6115</td>
<td>Health Assessment</td>
<td>3</td>
</tr>
<tr>
<td>NRSG 6264</td>
<td>Care of Well Child/Adolescent Health Promotion</td>
<td>4</td>
</tr>
<tr>
<td>NRSG 6275</td>
<td>Urban Families at Risk: A Primary Care Approach</td>
<td>4</td>
</tr>
</tbody>
</table>

### 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.

### Requirements
A grade of B or higher is required in each course.

#### Pediatric Primary Care Core
- **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

#### Pediatric Care Practicum
- **NRSG 6460** Care of Well Child/Adolescent Health Promotion Practicum 4
- **NRSG 6461** Child/Adolescent Health Problems Practicum 4

### Elective
Complete 4 semester hours from the following subject area:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NRSG 5118</td>
<td>Healthcare System and Professional Role Development</td>
<td>3</td>
</tr>
<tr>
<td>NRSG 5121</td>
<td>Epidemiology and Population Health</td>
<td>3</td>
</tr>
<tr>
<td>NRSG 5117</td>
<td>Advanced Pharmacology</td>
<td>2</td>
</tr>
<tr>
<td>NRSG 5126</td>
<td>Pathophysiology for Advanced Practice</td>
<td>3</td>
</tr>
<tr>
<td>NRSG 6115</td>
<td>Health Assessment</td>
<td>3</td>
</tr>
<tr>
<td>NRSG 6325</td>
<td>Pharmacotherapeutics in Anesthesia and Critical Care Nursing</td>
<td>2</td>
</tr>
<tr>
<td>or NRSG 6222</td>
<td>Pharmacology of Adults and Older Adults</td>
<td></td>
</tr>
</tbody>
</table>

### 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 in Nursing. Students may pursue either full-time or part-time study. Nurses who possess an MS in Nursing 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.

### Requirements
A grade of B or higher is required in each course.

#### Professional Core
- **NRSG 5118** Healthcare System and Professional Role Development 3
- **NRSG 5121** Epidemiology and Population Health 3

#### Clinical Core
- **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

#### Acute-Care 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

#### Acute-Care 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 Core
- **NRSG 7105** Translating Research Evidence into Practice 3
- **NRSG 7110** Evidence-Based Practice Research Application 2

#### Elective
Complete 3 semester hours in the following subject area:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NRSG 5118</td>
<td>Healthcare System and Professional Role Development</td>
<td>3</td>
</tr>
<tr>
<td>NRSG 5121</td>
<td>Epidemiology and Population Health</td>
<td>3</td>
</tr>
<tr>
<td>NRSG 5117</td>
<td>Advanced Pharmacology</td>
<td>2</td>
</tr>
<tr>
<td>NRSG 5126</td>
<td>Pathophysiology for Advanced Practice</td>
<td>3</td>
</tr>
<tr>
<td>NRSG 6115</td>
<td>Health Assessment</td>
<td>3</td>
</tr>
</tbody>
</table>

### Program Credit/GPA Requirements
43 total semester hours required  
Minimum 3.000 GPA required
NRSG 6222  Pharmacology of Adults and Older Adults  2

**Adult-Gerontology Nurse 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 Core**

NRSG 7105  Translating Research Evidence into Practice  3
NRSG 7110  Evidence-Based Practice Research Application  2

**Elective**

Complete 2 semester hours from the following subject area:  2

**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.

**Requirements**

A grade of B or higher is required in each course.

<table>
<thead>
<tr>
<th>Professional Core</th>
<th>Family Psychiatric Core</th>
</tr>
</thead>
<tbody>
<tr>
<td>NRSG 5117  Advanced Pharmacology  2</td>
<td></td>
</tr>
<tr>
<td>NRSG 5118  Healthcare System and Professional Role Development  3</td>
<td></td>
</tr>
<tr>
<td>NRSG 5121  Epidemiology and Population Health  3</td>
<td></td>
</tr>
<tr>
<td>NRSG 6390  Family Care of the Adult/Older Adult Patient  4</td>
<td></td>
</tr>
<tr>
<td>NRSG 6392  Family Theory  2</td>
<td></td>
</tr>
<tr>
<td>NRSG 6393  Family Care of the Pediatric and Adolescent Patient  4</td>
<td></td>
</tr>
<tr>
<td>NRSG 6395  Healthcare of Women in Family Practice  2</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Clinical Core Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>NRSG 6222  Pharmacology of Adults and Older Adults  2</td>
</tr>
<tr>
<td>NRSG 6262  Pediatric Pharmacology  2</td>
</tr>
</tbody>
</table>

---

**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.

**Requirements**

A grade of B or higher is required in each course.

<table>
<thead>
<tr>
<th>Professional Core Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>NRSG 5117  Advanced Pharmacology  2</td>
</tr>
<tr>
<td>NRSG 5118  Healthcare System and Professional Role Development  3</td>
</tr>
<tr>
<td>NRSG 5121  Epidemiology and Population Health  3</td>
</tr>
<tr>
<td>NRSG 5126  Pathophysiology for Advanced Practice  3</td>
</tr>
<tr>
<td>NRSG 6115  Health Assessment  3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Family Core Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>NRSG 6390  Family Care of the Adult/Older Adult Patient  4</td>
</tr>
<tr>
<td>NRSG 6392  Family Theory  2</td>
</tr>
<tr>
<td>NRSG 6393  Family Care of the Pediatric and Adolescent Patient  4</td>
</tr>
<tr>
<td>NRSG 6395  Healthcare of Women in Family Practice  2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Clinical Core Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>NRSG 6222  Pharmacology of Adults and Older Adults  2</td>
</tr>
<tr>
<td>NRSG 6262  Pediatric Pharmacology  2</td>
</tr>
</tbody>
</table>
Family Nurse Practicum
NRSG 6391 Practicum for NRSG 6390 4
NRSG 6394 Practicum for NRSG 6393 4
NRSG 6396 Practicum for NRSG 6395 4

Research Core Courses
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.

Requirements
A grade of B or higher is required in each course.

Professional Core
<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>NRSG 5117</td>
<td>Advanced Pharmacology</td>
<td>2</td>
</tr>
<tr>
<td>NRSG 5118</td>
<td>Healthcare System and Professional Role Development</td>
<td>3</td>
</tr>
<tr>
<td>NRSG 5121</td>
<td>Epidemiology and Population Health</td>
<td>3</td>
</tr>
<tr>
<td>NRSG 5126</td>
<td>Pathophysiology for Advanced Practice</td>
<td>3</td>
</tr>
</tbody>
</table>

Clinical Core
<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>NRSG 6116</td>
<td>Advanced Health Assessment of the Neonate and Infant</td>
<td>3</td>
</tr>
<tr>
<td>NRSG 6230</td>
<td>Nursing Management: Critically Ill Neonatal 1</td>
<td>3</td>
</tr>
<tr>
<td>NRSG 6231</td>
<td>Nursing Management: Critically Ill Neonatal 2</td>
<td>3</td>
</tr>
<tr>
<td>NRSG 6232</td>
<td>Neonatal Pharmacology</td>
<td>2</td>
</tr>
</tbody>
</table>

Neonatal Practicum
<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>NRSG 6430</td>
<td>Neonatal Clinical Practicum 1</td>
<td>4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>NRSG 6431</td>
<td>Neonatal Clinical Practicum 2</td>
<td>4</td>
</tr>
<tr>
<td>NRSG 6432</td>
<td>Neonatal Clinical Practicum 3</td>
<td>2</td>
</tr>
</tbody>
</table>

Research Core
<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>NRSG 7105</td>
<td>Translating Research Evidence into Practice</td>
<td>3</td>
</tr>
<tr>
<td>NRSG 7110</td>
<td>Evidence-Based Practice Research Application</td>
<td>2</td>
</tr>
</tbody>
</table>

Elective
Complete 4 semester hours from the following subject area:
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.

Requirements
A grade of B or higher is required in each course.

Professional Core
<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>NRSG 5118</td>
<td>Healthcare System and Professional Role Development</td>
<td>3</td>
</tr>
<tr>
<td>NRSG 5121</td>
<td>Epidemiology and Population Health</td>
<td>3</td>
</tr>
</tbody>
</table>

Acute and Primary Care Core
<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>NRSG 6116</td>
<td>Advanced Health Assessment of the Neonate and Infant</td>
<td>3</td>
</tr>
<tr>
<td>NRSG 6264</td>
<td>Care of Well Child/Adolescent Health Promotion</td>
<td>4</td>
</tr>
<tr>
<td>NRSG 6265</td>
<td>Care of Child/Adolescent Health Problems</td>
<td>4</td>
</tr>
<tr>
<td>NRSG 6267</td>
<td>Care of the Critically Ill Child</td>
<td>4</td>
</tr>
<tr>
<td>NRSG 6275</td>
<td>Urban Families at Risk: A Primary Care Approach</td>
<td>4</td>
</tr>
</tbody>
</table>

Clinical Core
<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>NRSG 5117</td>
<td>Advanced Pharmacology</td>
<td>2</td>
</tr>
<tr>
<td>NRSG 5126</td>
<td>Pathophysiology for Advanced Practice</td>
<td>3</td>
</tr>
<tr>
<td>NRSG 6115</td>
<td>Health Assessment</td>
<td>3</td>
</tr>
<tr>
<td>NRSG 6262</td>
<td>Pediatric Pharmacology</td>
<td>2</td>
</tr>
</tbody>
</table>

Acute and Primary Care Practicum
<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>NRSG 6460</td>
<td>Care of Well Child/Adolescent Health Promotion Practicum</td>
<td>4</td>
</tr>
<tr>
<td>NRSG 6461</td>
<td>Child/Adolescent Health Problems Practicum</td>
<td>4</td>
</tr>
<tr>
<td>NRSG 6463</td>
<td>Care of the Critically Ill Child Practicum</td>
<td>4</td>
</tr>
</tbody>
</table>
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.

Requirements
A grade of B or higher is required in each course.

Professional Core
Nursing—Pediatric Nurse Practitioner, Primary Care, MS

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NRSG 5118</td>
<td>Healthcare System and Professional Role Development</td>
<td>3</td>
</tr>
<tr>
<td>NRSG 5121</td>
<td>Epidemiology and Population Health</td>
<td>3</td>
</tr>
</tbody>
</table>

Pediatric Primary Care Core

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NRSG 6264</td>
<td>Care of Well Child/Adolescent Health Promotion</td>
<td>4</td>
</tr>
<tr>
<td>NRSG 6265</td>
<td>Care of Child/Adolescent Health Problems</td>
<td>4</td>
</tr>
<tr>
<td>NRSG 6275</td>
<td>Urban Families at Risk: A Primary Care Approach</td>
<td>4</td>
</tr>
</tbody>
</table>

Clinical Core

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NRSG 5117</td>
<td>Advanced Pharmacology</td>
<td>2</td>
</tr>
<tr>
<td>NRSG 5126</td>
<td>Pathophysiology for Advanced Practice</td>
<td>3</td>
</tr>
<tr>
<td>NRSG 6115</td>
<td>Health Assessment</td>
<td>3</td>
</tr>
<tr>
<td>NRSG 6262</td>
<td>Pediatric Pharmacology</td>
<td>2</td>
</tr>
</tbody>
</table>

Pediatric Care Practicum

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NRSG 6460</td>
<td>Care of Well Child/Adolescent Health Promotion</td>
<td>4</td>
</tr>
<tr>
<td>NRSG 6461</td>
<td>Child/Adolescent Health Problems Practicum</td>
<td>4</td>
</tr>
</tbody>
</table>

Research Core

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NRSG 7105</td>
<td>Translating Research Evidence into Practice</td>
<td>3</td>
</tr>
<tr>
<td>NRSG 7110</td>
<td>Evidence-Based Practice Research Application</td>
<td>2</td>
</tr>
</tbody>
</table>

Program Credit/GPA Requirements

<table>
<thead>
<tr>
<th>Requirements</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>52 total semester hours required</td>
<td></td>
</tr>
<tr>
<td>Minimum 3.00 GPA required</td>
<td></td>
</tr>
</tbody>
</table>

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 advanced pharmacology prior to the required one to two years of RN experience with approval from the program director and if it is in their plan of study. 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.

Requirements
A 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 B or better is required in graduate-level courses: Advanced Pharmacology (NRSG 5117), Pathophysiology for Advanced Practice (NRSG 5126), and Health Informatics (NRSG 6306).

Core Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NRSG 2210</td>
<td>Influences on Health and Illness: A Nursing Perspective</td>
<td>3</td>
</tr>
<tr>
<td>NRSG 2220</td>
<td>Nursing Interventions, Assessment, and Community Care and Lab for NRSG 2220</td>
<td>5</td>
</tr>
<tr>
<td>NRSG 3302</td>
<td>Nursing with Women and Families</td>
<td>5</td>
</tr>
<tr>
<td>NRSG 3303</td>
<td>and Clinical for NRSG 3302</td>
<td></td>
</tr>
</tbody>
</table>
**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.

**Requirements**

A grade of B or higher required in all course work.

<table>
<thead>
<tr>
<th>Professional Core</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>NRSG 5118</td>
<td>Healthcare System and Professional Role Development</td>
<td>3</td>
</tr>
<tr>
<td>NRSG 5121</td>
<td>Epidemiology and Population Health</td>
<td>3</td>
</tr>
<tr>
<td>NRSG 7105</td>
<td>Translating Research Evidence into Practice</td>
<td>3</td>
</tr>
<tr>
<td>NRSG 7110</td>
<td>Evidence-Based Practice Research Application</td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Program Core</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>NRSG 6300</td>
<td>Healthcare Finance and Marketing</td>
<td>3</td>
</tr>
<tr>
<td>NRSG 6302</td>
<td>Health Policy and Law</td>
<td>3</td>
</tr>
<tr>
<td>NRSG 6306</td>
<td>Health Informatics</td>
<td>3</td>
</tr>
<tr>
<td>NRSG 6344</td>
<td>Healthcare Quality Improvement</td>
<td>3</td>
</tr>
<tr>
<td>NRSG 6444</td>
<td>Healthcare Systems and Quality Patient Care</td>
<td>3</td>
</tr>
<tr>
<td>NRSG 6510</td>
<td>Nursing Leadership Role Practicum 1</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Electives</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>NRSG 6520</td>
<td>Nursing Leadership Role Practicum 2</td>
<td>3</td>
</tr>
</tbody>
</table>

**Electives**

Complete 6 semester hours from the following:

- 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), a Certificate of Advanced Graduate Study (CAGS), and participation in the U.S. Army Graduate Program in Nurse Anesthesia.

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.

Northeastern University is accredited by the New England Association of Schools and Colleges, Inc. The School of Nursing is accredited by the Commission on Collegiate Nursing Education (CCNE). The nurse anesthesia program is accredited by the Council on Accreditation of Nurse Anesthesia Educational Programs (COA) for the maximum allowable 10 years through May 2024 (Council on Accreditation of Nurse Anesthesia Educational Programs, 222 South Prospect Avenue, Park Ridge, IL 60068-4001).

- Pass rate for first-time test takers on the National Certification Exam (NCE) offered through the National Board of Certification and Recertification for Nurse Anesthetists (NBCRNA) for the graduating class in 2016 was 80 percent.
- The employment rate for the class that graduated in 2016 was 100 percent within three months of graduation.
- The attrition rate for the class that graduated in 2016 was 4 percent.

**Program Requirements**

Complete all courses and requirements listed below unless otherwise indicated.

**Requirements**

A grade of B or higher required in all course work.

<table>
<thead>
<tr>
<th>Core Courses</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>NRSG 5118</td>
<td>Healthcare System and Professional Role Development</td>
<td>3</td>
</tr>
<tr>
<td>NRSG 5121</td>
<td>Epidemiology and Population Health</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Anesthesia Didactic Courses</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>NRSG 6320</td>
<td>Role/Practice Issues in Nurse Anesthesia</td>
<td>3</td>
</tr>
</tbody>
</table>
Nursing and Business Administration, MS/MBA

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 Courses
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

Nurse Anesthesia Clinical Courses
NRSG 6530  Nurse Anesthesia Practicum 1 2
NRSG 6534  Nurse Anesthesia Practicum 2 4
NRSG 6535  Nurse Anesthesia Practicum 3 4
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 Core
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

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.

Professional Core Courses
NRSG 5118  Healthcare System and Professional Role Development 3
NRSG 5121  Epidemiology and Population Health 3

Research Core Courses
NRSG 7105  Translating Research Evidence into Practice 3
NRSG 7110  Evidence-Based Practice Research Application 2

Administrative Theory Courses
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

Administrative Practicum Courses
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

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)
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. 243)
- Medicinal Chemistry (p. 243)
- Pharmaceutical Sciences (p. 244)
- Pharmacology (p. 245)

Doctor of Pharmacy (PharmD)
- Doctor of Pharmacy (p. 245)
- Doctor of Pharmacy—Direct Entry (p. 246)

Master of Science (MS)
- Biomedical Nanotechnology (p. 248)
- Biomedical Sciences (p. 249)
- Medicinal Chemistry (p. 249)
- Pharmaceutical Sciences (p. 250)
- Pharmacology (p. 250)

Dual Degree
- Pharmacy and Public Health, PharmD/MPH (p. 228)

PharmDadmissions@northeastern.edu

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 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

Required Course Work
A grade of C– or higher is required in each course.

Required Core
Complete 13–18 semester hours from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHSC 5100</td>
<td>Concepts in Pharmaceutical Science</td>
</tr>
<tr>
<td>PHSC 5300</td>
<td>Pharmaceutical Biochemistry</td>
</tr>
<tr>
<td>PHSC 7010</td>
<td>Pharmaceutical Sciences Laboratory</td>
</tr>
<tr>
<td>PHSC 5310</td>
<td>Cellular Physiology</td>
</tr>
<tr>
<td>PHSC 6210</td>
<td>Drug Design, Evaluation, and Development</td>
</tr>
<tr>
<td>PHSC 6214</td>
<td>Experimental Design and Biostatistics</td>
</tr>
<tr>
<td>PHSC 6216</td>
<td>Human Physiology and Pathophysics</td>
</tr>
<tr>
<td>PHSC 6212</td>
<td>Research Skills and Ethics</td>
</tr>
<tr>
<td>BIOL 6381</td>
<td>Ethics in Biological Research</td>
</tr>
</tbody>
</table>

Pharmaceutics Core

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>PMST 6252</td>
<td>Pharmacokinetics and Drug Metabolism</td>
</tr>
<tr>
<td>PMST 6250</td>
<td>Advanced Physical Pharmacy</td>
</tr>
<tr>
<td>PMST 6254</td>
<td>Advanced Drug Delivery System</td>
</tr>
</tbody>
</table>

Electives
Complete 7–12 semester hours in the following subject areas:

<table>
<thead>
<tr>
<th>Subject Areas</th>
<th>Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHSC, PMCL, PMST, BIOL, CHEM, NNMD, BIOT</td>
<td></td>
</tr>
</tbody>
</table>

Seminar and Colloquium

Seminar
Complete the following (repeatable) course twice:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHSC 6300</td>
<td>Pharmaceutical Science Seminar</td>
</tr>
</tbody>
</table>

Colloquium

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHSC 6810</td>
<td>Pharmaceutical Science Colloquium</td>
</tr>
</tbody>
</table>

Research and Dissertation

Qualifying Exam

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHSC 8940</td>
<td>Doctoral Training and Research</td>
</tr>
</tbody>
</table>

Proposal Preparation

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHSC 9681</td>
<td>Doctoral Proposal</td>
</tr>
</tbody>
</table>

Dissertation
Complete the following (repeatable) course twice:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHSC 9990</td>
<td>Dissertation</td>
</tr>
</tbody>
</table>

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

Requirements
A grade of C– or higher is required in each course.

Core Courses
- PHSC 5100 Concepts in Pharmaceutical Science 2
- PHSC 6210 Drug Design, Evaluation, and Development 2
- BIOL 6381 Ethics in Biological Research or PHSC 6212 Research Skills and Ethics 2

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 6222 The Chemistry and Biology of Drugs of Abuse 2
- PHSC 6224 Behavioral Pharmacology and Drug Discovery 2
- PHSC 5400 Principles of Drug Design 3

Electives
Complete 6–7 semester hours in the following subject areas: BIOL, BIOT, CHEM, NNMD, PHSC, PMCL, PMST.

Seminar and Colloquium
Seminar
Complete the following (repeatable) course twice:
- PHSC 6300 Pharmaceutical Science Seminar 1

Colloquium
- PHSC 6810 Pharmaceutical Science Colloquium 1

Research and Dissertation
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

Degree Requirements
Complete all courses and requirements listed below unless otherwise indicated.

Milestones
Qualifying examination
Annual review
Dissertation committee
Dissertation proposal
Dissertation defense

Required Course Work
A grade of C– or higher is required in each course.

Required Core
Complete 13–18 semester hours from the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHSC 5100</td>
<td>Concepts in Pharmaceutical Science</td>
</tr>
<tr>
<td>PHSC 5310</td>
<td>Cellular Physiology</td>
</tr>
<tr>
<td>PHSC 6210</td>
<td>Drug Design, Evaluation, and Development</td>
</tr>
<tr>
<td>PHSC 6214</td>
<td>Experimental Design and Biostatistics</td>
</tr>
<tr>
<td>PHSC 6216</td>
<td>Human Physiology and Pathophysiology</td>
</tr>
<tr>
<td>PHSC 5300</td>
<td>Pharmaceutical Biochemistry</td>
</tr>
<tr>
<td>or PHSC 7010</td>
<td>Pharmaceutical Sciences Laboratory</td>
</tr>
<tr>
<td>PHSC 6212</td>
<td>Research Skills and Ethics</td>
</tr>
</tbody>
</table>
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

Pharmacology Requirements
A grade of C– or higher is required in each course.

Required Core
Complete 13–18 semester hours from the following: 13-18

Research and Dissertation
PhD Sc 6210 Drug Design, Evaluation, and Development
PhD Sc 6214 Experimental Design and Biostatistics
PhD Sc 6216 Human Physiology and Pathophysiology
PhD Sc 5300 Pharmaceutical Biochemistry
or PhD Sc 7010 Pharmaceutical Sciences Laboratory
PhD Sc 5310 Cellular Physiology
PhD Sc 6212 Research Skills and Ethics
or BIOL 6381 Ethics in Biological Research

Seminar and Colloquium
Seminar
Complete the following (repeatable) course twice: 2
PHSC 6300 Pharmaceutical Science Seminar
Colloquium
PHSC 6810 Pharmaceutical Science Colloquium 1

Program Credit/GPA Requirements
45 total semester hours required
Minimum 3.000 GPA required

Program Requirements
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.

Requirements
YEAR 1
Summer Term
Complete 12 semester hours in the following range: 12
PHMD 6440 to PHMD 6474

Fall Term
Complete 12 semester hours in the following range: 12
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 and with a preferred prerequisite grade-point average (GPA) of 3.00. The following prerequisite courses and credits are required:

<table>
<thead>
<tr>
<th>Requirements</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry 1 with lab</td>
<td>4</td>
</tr>
<tr>
<td>Chemistry 2 with lab</td>
<td>4</td>
</tr>
<tr>
<td>General Biology 1 with lab</td>
<td>4</td>
</tr>
<tr>
<td>General Biology 2 with lab</td>
<td>4</td>
</tr>
<tr>
<td>Calculus</td>
<td>4</td>
</tr>
<tr>
<td>Organic Chemistry 1 with lab</td>
<td>4</td>
</tr>
<tr>
<td>Organic Chemistry 2 with lab</td>
<td>4</td>
</tr>
<tr>
<td>Biochemistry</td>
<td>4</td>
</tr>
<tr>
<td>General Psychology</td>
<td>4</td>
</tr>
<tr>
<td>English—writing-intensive</td>
<td>4</td>
</tr>
<tr>
<td>Human Physiology 1 with lab</td>
<td>4</td>
</tr>
<tr>
<td>Human Physiology 2 with lab</td>
<td>4</td>
</tr>
<tr>
<td>Physics with lab</td>
<td>4</td>
</tr>
<tr>
<td>Arts or humanities electives</td>
<td>4</td>
</tr>
</tbody>
</table>

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 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 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 (total internship hours of up to 1,740).

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 APPEs

1. Successful completion of all required and elective didactic course work in the pharmacy curriculum.
2. Successful completion of the APPE preparatory courses Advanced Pharmacy Practice Experience Preparatory Seminar 1 (PHMD 5438)
and Advanced Pharmacy Practice Experience Preparatory Seminar 2 (PHMD 5439).

3. Evidence of health clearance from University Health and Counseling Services before placements at any APPE site.

4. 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.

5. Adherence to the university's code of conduct policies while off-campus.

6. Successful completion of six, six-week APPEs: four required APPEs (i.e., ambulatory care, community, internal/general medicine, and one health system experience); and two electives that may be patient-care or non-patient-care focused.

7. Maintenance of sufficient knowledge of 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.

8. Maintenance of an APPE portfolio throughout the APPE year and completion of all portfolio submission requirements within specified deadlines.

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 the university’s Graduate Catalog.

• 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.

• 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. 31).
Program Requirements
Complete all courses and requirements listed below unless otherwise indicated.

Program Requirements

YEAR 1

Fall Term
ENGW 3306 Advanced Writing in the Health Professions 4
PHMD 1201 and PHMD 1202 Introduction to Pharmacy Practice and Lab for PHMD 1201 3
PHSC 3411 Pharmaceutics 1 4
PHSC 4501 Pharmacology/Medicinal Chemistry 1 5

Spring Term
Advanced Practice Experience

Summer Term
PHMD 2310 and PHMD 2311 Educational and Behavioral Interventions in Pharmacy Practice and Lab for PHMD 2310 2.5
PHMD 2350 Healthcare Systems 3
PHSC 3412 Pharmaceutics 2 4
PHSC 3419 Pharmaceutics Laboratory 1
PHSC 4502 Pharmacology/Medicinal Chemistry 2 5

YEAR 2

Fall Term
Advanced Practice Experience

Spring Term
PHMD 3450 Research Methodology and Biostatistics 3
PHMD 4611 and PHMD 4612 Comprehensive Disease Management 1 and Comprehensive Disease Management 1 Seminar 7
PHSC 2330 Immunology 3
PHSC 3430 Pharmaceutics

Summer Term
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 5223 Evidence-Based Medicine 2
PHMD 5330 Jurisprudence 3
PHSC 5360 Anti-Infectives 4

YEAR 3

Fall Term
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 5250 Pharmacy Care Management 3
PHMD 5438 Advanced Pharmacy Practice Experience Preparatory Seminar 1 0.5
PHSC 4501 Pharmacology/Medicinal Chemistry 1 5

Spring Term
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
PHMD 5270 Economic Evaluation of Pharmaceuticals and Pharmacy Practice 2
PHMD 5439 Advanced Pharmacy Practice Experience Preparatory Seminar 2 0.5

Summer Term
Complete 12 semester hours in the following range: 12
PHMD 6440 to PHMD 6474

YEAR 4

Fall Term
Complete 12 semester hours in the following range: 12
PHMD 6440 to PHMD 6474

Spring Term
Complete 12 semester hours in the following range: 12
PHMD 6440 to PHMD 6474

Program Credit/GPA Requirements
132 total semester hours required
Minimum 3.000 GPA required

Biomedical Nanotechnology, MS

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.

Requirements
A grade of C– or higher is required in each course.

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
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.

Requirements
A grade of C– or higher is required in each course.

Required Core
Complete 13–18 semester hours from the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHSC 5100</td>
<td>Concepts in Pharmaceutical Science</td>
<td>2</td>
</tr>
<tr>
<td>PHSC 5300 or PHSC 7010</td>
<td>Pharmaceutical Biochemistry or Pharmaceutical Sciences Laboratory</td>
<td>2</td>
</tr>
<tr>
<td>PHSC 5310</td>
<td>Cellular Physiology</td>
<td>3</td>
</tr>
<tr>
<td>PHSC 6210</td>
<td>Drug Design, Evaluation, and Development</td>
<td>3</td>
</tr>
<tr>
<td>PHSC 6214</td>
<td>Experimental Design and Biostatistics</td>
<td>3</td>
</tr>
<tr>
<td>PHSC 6216</td>
<td>Human Physiology and Pathophysiology</td>
<td>3</td>
</tr>
<tr>
<td>PHSC 6212 or BIOL 6381</td>
<td>Research Skills and Ethics or Ethics in Biological Research</td>
<td>3</td>
</tr>
</tbody>
</table>

Pharmaceutics Core

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>PMST 6252</td>
<td>Pharmacokinetics and Drug Metabolism</td>
<td>3</td>
</tr>
<tr>
<td>PMST 6250</td>
<td>Advanced Physical Pharmacy</td>
<td>2</td>
</tr>
<tr>
<td>PMST 6254</td>
<td>Advanced Drug Delivery System</td>
<td>3</td>
</tr>
</tbody>
</table>

Electives
Complete 7–12 semester hours in the following subject areas:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHSC, PMCL, PMST, BIOL, CHEM, NNMD, BIOT</td>
<td></td>
<td>7-12</td>
</tr>
</tbody>
</table>

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.

Requirements
A grade of C– or higher is required in each course.

Required Core
Complete 13–18 semester hours from the following: 13–18

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHSC 5100</td>
<td>Concepts in Pharmaceutical Science</td>
<td>2</td>
</tr>
<tr>
<td>PHSC 6210</td>
<td>Drug Design, Evaluation, and Development</td>
<td>2</td>
</tr>
<tr>
<td>PHSC 6214</td>
<td>Experimental Design and Biostatistics</td>
<td>2</td>
</tr>
<tr>
<td>PHSC 6216</td>
<td>Human Physiology and Pathophysiology</td>
<td>2</td>
</tr>
<tr>
<td>PHSC 6212</td>
<td>Research Skills and Ethics or BIOL 6381</td>
<td>1</td>
</tr>
<tr>
<td>PHSC 5300</td>
<td>Pharmaceutical Biochemistry</td>
<td>2</td>
</tr>
<tr>
<td>PHSC 7010</td>
<td>Pharmaceutical Sciences Laboratory</td>
<td>2</td>
</tr>
<tr>
<td>PHSC 5310</td>
<td>Cellular Physiology</td>
<td>2</td>
</tr>
</tbody>
</table>

Pharmaceutics Core
Complete 3 semester hours from the following: 3

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>PMST 6252</td>
<td>Pharmacokinetics and Drug Metabolism</td>
</tr>
<tr>
<td>PMST 6250</td>
<td>Advanced Physical Pharmacy</td>
</tr>
<tr>
<td>PMST 6254</td>
<td>Advanced Drug Delivery System</td>
</tr>
</tbody>
</table>

Electives
Complete 7–12 semester hours from the following subject areas: 7–12

<table>
<thead>
<tr>
<th>Subject Areas</th>
<th>Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHSC, PMCL, PMST, BIOL, CHEM, NNMD, BIOT</td>
<td></td>
</tr>
</tbody>
</table>

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.

Requirements
A grade of C– or higher is required in each course.

Required Core
Complete 13–18 semester hours from the following: 13–18

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHSC 5100</td>
<td>Concepts in Pharmaceutical Science</td>
</tr>
<tr>
<td>PHSC 6210</td>
<td>Drug Design, Evaluation, and Development</td>
</tr>
<tr>
<td>PHSC 6214</td>
<td>Experimental Design and Biostatistics</td>
</tr>
<tr>
<td>PHSC 6216</td>
<td>Human Physiology and Pathophysiology</td>
</tr>
<tr>
<td>PHSC 5300</td>
<td>Pharmaceutical Biochemistry</td>
</tr>
<tr>
<td>or PHSC 7010</td>
<td>Pharmaceutical Sciences Laboratory</td>
</tr>
<tr>
<td>PHSC 5310</td>
<td>Cellular Physiology</td>
</tr>
<tr>
<td>PHSC 6212</td>
<td>Research Skills and Ethics</td>
</tr>
</tbody>
</table>

250 Pharmaceutical Sciences, MS
Northeastern University

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.

Requirements

| DOCTOR OF PHARMACY REQUIREMENTS | PHMD 1201 | Introduction to Pharmacy Practice | 2.5 |
| | PHMD 1202 | Lab for PHMD 1201 | 0.5 |
| | PHMD 2350 | Healthcare Systems | 3 |
| | PHSC 4501 | Pharmacology/Medicinal Chemistry 1 | 5 |
| | PHSC 3411 | Pharmacetics 1 | 4 |
| | PHMD 2310 | Educational and Behavioral Interventions in Pharmacy Practice | 2 |
| | PHMD 2311 | Lab for PHMD 2310 | 0.5 |
| | PHSC 4502 | Pharmacology/Medicinal Chemistry 2 | 5 |
| | PHSC 3412 | Pharmacetics 2 | 4 |
| | PHSC 3419 | Pharmacetics Laboratory | 1 |
| | PHMD 5250 | Pharmacy Care Management | 3 |
| | PHSC 3430 | Pharmacokinetics and Biopharmaceutics | 3 |
| | PHSC 2330 | Immunology | 3 |
| | PHMD 4611 | Comprehensive Disease Management 1 | 6 |
| | PHMD 4612 | Comprehensive Disease Management 1 Seminar | 1 |
| | PHSC 5360 | Anti-Infectives | 4 |
| | PHMD 5330 | Jurisprudence | 3 |

| MASTER OF PUBLIC HEALTH REQUIREMENTS |
| Core Requirements |
| 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 6200 | Principles and History of Urban Health | 3 |
| PHTH 6204 | Society, Behavior, and Health | 3 |
| PHTH 6208 | Urban Community Health Assessment | 3 |
| PHTH 6966 | Practicum | 3 |
| PHTH 6910 | Public Health Capstone | 3 |

| Electives |
| Complete 9 semester hours in the following subject area: |
| 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

Anne Golub Victor, PT DPT, MPH  
Clinical Professor and Interim Associate Chair

Sonya Larrieux, PT, MA, PhD, C/NDT  
Director, Postbaccalaureate Admissions

Diane Fitzpatrick, PT, DPT, MS, GCS, CEEAA  
Associate Director, Postbaccalaureate Admissions

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 11 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
- Musculoskeletal Epidemiology and Biomechanics Laboratory
- Cadaver Lab
- Neuroscience Wet Lab

**Programs**

**Doctor of Physical Therapy (DPT)**

- Physical Therapy (p. 252)
- Physical Therapy—Postbaccalaureate Entry (p. 253)
- Transitional Doctor of Physical Therapy (p. 285)

**Master of Science (MS)**

- Occupational Ergonomics and Health (p. 254)

**Graduate Certificate**

- Advanced Study in Orthopedics (p. 323)
- Disability Studies (p. 255)
- Early Intervention (p. 223)
- Occupational Ergonomics and Health (p. 256)

**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.

**Requirements**

A grade of C or higher is required in all courses.

**Summer Term 1**
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. 223) 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 Strength and Conditioning 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 11 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, Neuropsychology Lab, Teaching and Learning Innovation Lab, Musculoskeletal Epidemiology and Biomechanics 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.

Requirements
A grade of C or higher is required in all courses.

YEAR 1

Spring Term

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HLTH 5450</td>
<td>Healthcare Research</td>
<td>4</td>
</tr>
<tr>
<td>and HLTH 5451</td>
<td>and Recitation for HLTH 5450</td>
<td></td>
</tr>
<tr>
<td>PT 5101</td>
<td>Foundations of Physical Therapy</td>
<td>4</td>
</tr>
<tr>
<td>and PT 5102</td>
<td>and Lab for PT 5101</td>
<td></td>
</tr>
<tr>
<td>PT 5131</td>
<td>Gross Anatomy</td>
<td>5</td>
</tr>
<tr>
<td>and PT 5132</td>
<td>and Lab for PT 5131</td>
<td></td>
</tr>
<tr>
<td>PT 5160</td>
<td>Psychosocial Aspects of Healthcare</td>
<td>4</td>
</tr>
<tr>
<td>and PT 5161</td>
<td>Psychosocial Aspects of Healthcare Seminar</td>
<td></td>
</tr>
</tbody>
</table>

Program Requirements
Complete all courses and requirements listed below unless otherwise indicated.

Requirements
A grade of C or higher is required in all courses.

YEAR 1

Spring Term

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HLTH 5450</td>
<td>Healthcare Research</td>
<td>4</td>
</tr>
<tr>
<td>and HLTH 5451</td>
<td>and Recitation for HLTH 5450</td>
<td></td>
</tr>
<tr>
<td>PT 5101</td>
<td>Foundations of Physical Therapy</td>
<td>4</td>
</tr>
<tr>
<td>and PT 5102</td>
<td>and Lab for PT 5101</td>
<td></td>
</tr>
<tr>
<td>PT 5131</td>
<td>Gross Anatomy</td>
<td>5</td>
</tr>
<tr>
<td>and PT 5132</td>
<td>and Lab for PT 5131</td>
<td></td>
</tr>
<tr>
<td>PT 5160</td>
<td>Psychosocial Aspects of Healthcare</td>
<td>4</td>
</tr>
<tr>
<td>and PT 5161</td>
<td>Psychosocial Aspects of Healthcare Seminar</td>
<td></td>
</tr>
</tbody>
</table>

Program Requirements
Complete all courses and requirements listed below unless otherwise indicated.

Requirements
A grade of C or higher is required in all courses.
### Summer Term

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PT 5133</td>
<td>Kinesiology and Lab for PT 5133</td>
<td>4</td>
</tr>
<tr>
<td>PT 5138</td>
<td>Neuroscience and Lab for PT 5138</td>
<td>5</td>
</tr>
<tr>
<td>PT 5140</td>
<td>Pathology and Recitation for PT 5140</td>
<td>4</td>
</tr>
<tr>
<td>PT 5145</td>
<td>Introduction to the Healthcare System</td>
<td>2</td>
</tr>
</tbody>
</table>

### YEAR 2

#### Fall Term

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PT 5111</td>
<td>Professional Development for Bouvé Graduate Co-op</td>
<td>1</td>
</tr>
<tr>
<td>PT 5500</td>
<td>Pharmacology for Physical Therapy</td>
<td>4</td>
</tr>
<tr>
<td>PT 5150</td>
<td>Motor Control, Development, and Learning and Lab for PT 5150</td>
<td>5</td>
</tr>
<tr>
<td>PT 5503</td>
<td>Cardiovascular and Pulmonary Management and Lab for PT 5503</td>
<td>5</td>
</tr>
</tbody>
</table>

#### Spring Term

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PT 6964</td>
<td>Co-op Work Experience</td>
<td>0</td>
</tr>
</tbody>
</table>

#### Summer Term 1

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PT 5515</td>
<td>Integumentary Systems and Advanced Modalities and Lab for PT 5515</td>
<td>3</td>
</tr>
<tr>
<td>PT 5540</td>
<td>Clinical Integration 1: Evidence and Practice</td>
<td>2</td>
</tr>
<tr>
<td>PT 6243</td>
<td>Health Education, Promotion, and Wellness and Recitation for PT 6243</td>
<td>3</td>
</tr>
</tbody>
</table>

### YEAR 3

#### Fall Term

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PT 5209</td>
<td>Neurological Rehabilitation 1 and Lab for PT 5209</td>
<td>5</td>
</tr>
<tr>
<td>PT 5227</td>
<td>Physical Therapy Project 1</td>
<td>3</td>
</tr>
<tr>
<td>PT 5505</td>
<td>Musculoskeletal Management 1 and Lab for PT 5505</td>
<td>5</td>
</tr>
<tr>
<td>PT 6000</td>
<td>Leadership, Administration, and Management</td>
<td>2</td>
</tr>
<tr>
<td>PT 6241</td>
<td>Screening for Medical Conditions in Physical Therapy Practice</td>
<td>4</td>
</tr>
</tbody>
</table>

#### Spring Term

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PT 5226</td>
<td>Physical Therapy Professional Seminar 2</td>
<td>2</td>
</tr>
<tr>
<td>PT 5229</td>
<td>Physical Therapy Project 2</td>
<td>2</td>
</tr>
<tr>
<td>PT 5230</td>
<td>Pediatric and Geriatric Aspects of Life Span Management</td>
<td>3</td>
</tr>
<tr>
<td>PT 6221</td>
<td>Neurological Rehabilitation 2 and Lab for PT 6221</td>
<td>5</td>
</tr>
<tr>
<td>PT 6223</td>
<td>Musculoskeletal Management 2 and Lab for PT 6223</td>
<td>5</td>
</tr>
</tbody>
</table>

#### Summer Term 1

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PT 6441</td>
<td>Clinical Education 1</td>
<td>6</td>
</tr>
</tbody>
</table>

#### Summer Term 2

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PT 6215 Assistive Technology and Lab for PT 6215</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>PT 6250 Clinical Integration 2: Evidence and Practice</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Complete 2 semester hours in the following range:</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>PT 6231 to PT 6237</td>
<td></td>
</tr>
</tbody>
</table>

### YEAR 4

#### Fall Term

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PT 6251</td>
<td>Diagnostic Imaging</td>
<td>3</td>
</tr>
<tr>
<td>PT 6442</td>
<td>Clinical Education 2</td>
<td>6</td>
</tr>
</tbody>
</table>

#### Spring Term

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PT 6448</td>
<td>Clinical Education 3</td>
<td>9</td>
</tr>
</tbody>
</table>

### Program Credit/GPA Requirements

- 123 total semester hours required
- Minimum 3.000 GPA required

---

**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.

Requirements

| Research | | |
| PHTH 5202 | Introduction to Epidemiology | 3 |
| PHTH 5210 | Biostatistics in Public Health | 3 |
| Occupational Health | | |
| 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 |

Electives
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 5240 Evaluating Scientific Evidence

Program Credit/GPA Requirements

| | |
| PHTH 6320 | Qualitative Methods in Health and Illness |
| PT 6243 | Health Education, Promotion, and Wellness |
| SOCL 7270 | Sociology of Work and Employment |

Disability Studies, Graduate Certificate
People with disabilities constitute the largest minority group living in the United States today. They face the same discrimination, marginalization, and bias that affect individuals from other minority groups. These factors create a social climate where people with disabilities are unable to fully integrate and participate in activities that are important for all individuals and to make contributions to their communities. This occurs because people with disabilities are often disadvantaged in the receipt of education, social services, healthcare, and opportunities for employment.

Disability studies allows for a broad range of disciplines—including the social sciences, education, healthcare, the sciences, law, and public policy—to work together to create equity and social justice for the diverse group of people with disabilities. A key focus of disability studies is to remove barriers to the participation and inclusion of people in society. These goals can be accomplished through research, public policy and educational initiatives, advocacy, and by enhancing the capacity of the medical profession to provide high-quality care.

The purpose of this certificate is to educate an interdisciplinary cohort of professionals to become leaders who are able to work collaboratively to create changes in the social, economic, political, educational, medical, and physical environments. Successful graduates are able to create changes that support people with disabilities to live satisfying lives of inclusion and integration within the community at large.

Program Description
The Graduate Certificate in Disability Studies program (http://www.northeastern.edu/bouve/physical-therapy/programs/disability-studies) requires 16 semester hours of course work. The four required courses are offered exclusively online.

An optional directed study on advocacy is available to students in place of PT 5730, Global Perspectives in Disability and Health. It will occur under the auspices of an agency or organization that is currently filling a need for people with disabilities in the community. This directed study will be developed collaboratively by the student, community agency, and faculty.

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.

Requirements

| | |
| PT 5710 | Psychosocial Aspects of Disability |
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.

Requirements
A grade of B or higher is required in each course.

Required Courses
- 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
  Complete 3 semester hours from the following: 3
  - PHTH 5214 Environmental Health

Program Credit/GPA Requirements
16 total semester hours required
Minimum 3.00 GPA required

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)
- Physician Assistant Studies (p. 256)

Dual Degree
- Physician Assistant Studies and Health Informatics, MS/MS (p. 257)
- Physician Assistant Studies and Public Health, MS/MPH (p. 229)

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.

Didactic Year Required Courses
A grade of C or higher is required in each course.

- PA 6200 Anatomy and Physiology 1 3
- PA 6201 Anatomy and Physiology 2 3
- PA 6203 Physical Diagnosis and Patient Evaluation 1 3
- PA 6204 Physical Diagnosis and Patient Evaluation 2 3
- PA 6205 Pharmacology 1 2
- PA 6206 Pharmacology 2 2
- PA 6207 Clinical Laboratory and Diagnostic Methods 4
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 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.

---

**Program Credit/GPA Requirements**

103 total semester hours required

Minimum 3.000 GPA required

**Physician Assistant Requirements**

A grade of C or higher is required in each course.

**Didactic Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>PA 6200</td>
<td>Anatomy and Physiology 1</td>
<td>3</td>
</tr>
<tr>
<td>PA 6201</td>
<td>Anatomy and Physiology 2</td>
<td>3</td>
</tr>
<tr>
<td>PA 6203</td>
<td>Physical Diagnosis and Patient Evaluation 1</td>
<td>3</td>
</tr>
<tr>
<td>PA 6204</td>
<td>Physical Diagnosis and Patient Evaluation 2</td>
<td>3</td>
</tr>
<tr>
<td>PA 6205</td>
<td>Pharmacology 1</td>
<td>2</td>
</tr>
<tr>
<td>PA 6206</td>
<td>Pharmacology 2</td>
<td>2</td>
</tr>
<tr>
<td>PA 6207</td>
<td>Clinical Laboratory and Diagnostic Methods</td>
<td>4</td>
</tr>
<tr>
<td>PA 6208</td>
<td>Professional Issues for Physician Assistants</td>
<td>2</td>
</tr>
<tr>
<td>PA 6311</td>
<td>Principles of Medicine 1</td>
<td>4</td>
</tr>
<tr>
<td>PA 6312</td>
<td>Principles of Medicine 2</td>
<td>4</td>
</tr>
<tr>
<td>PA 6320</td>
<td>Principles of Obstetrics and Gynecology</td>
<td>2</td>
</tr>
<tr>
<td>PA 6321</td>
<td>Principles of Surgery</td>
<td>2</td>
</tr>
<tr>
<td>PA 6322</td>
<td>Principles of Orthopedics</td>
<td>2</td>
</tr>
<tr>
<td>PA 6323</td>
<td>Clinical Neurology</td>
<td>2</td>
</tr>
<tr>
<td>PA 6324</td>
<td>Principles of Pediatrics</td>
<td>2</td>
</tr>
<tr>
<td>PA 6325</td>
<td>Principles of Psychiatry</td>
<td>2</td>
</tr>
<tr>
<td>PA 6326</td>
<td>Aspects of Primary Care</td>
<td>4</td>
</tr>
<tr>
<td>PA 6327</td>
<td>Emergency Medicine and Critical Care</td>
<td>2</td>
</tr>
<tr>
<td>PA 6328</td>
<td>Aging and Rehabilitation Medicine</td>
<td>2</td>
</tr>
<tr>
<td>PA 6329</td>
<td>Healthcare Delivery</td>
<td>2</td>
</tr>
<tr>
<td>PA 6330</td>
<td>Research Design</td>
<td>2</td>
</tr>
</tbody>
</table>

**Clinical Year Required Courses**

A grade of C or higher is required in each course.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>PA 6400</td>
<td>Applied Study in Medicine</td>
<td>5</td>
</tr>
<tr>
<td>PA 6401</td>
<td>Applied Study in Ambulatory Medicine</td>
<td>5</td>
</tr>
<tr>
<td>PA 6402</td>
<td>Applied Study in Family Practice</td>
<td>5</td>
</tr>
<tr>
<td>PA 6403</td>
<td>Applied Study in Emergency Medicine</td>
<td>5</td>
</tr>
<tr>
<td>PA 6404</td>
<td>Applied Study in Obstetrics and Gynecology</td>
<td>5</td>
</tr>
<tr>
<td>PA 6405</td>
<td>Applied Study in Pediatrics</td>
<td>5</td>
</tr>
<tr>
<td>PA 6406</td>
<td>Applied Study in Surgery</td>
<td>5</td>
</tr>
<tr>
<td>PA 6407</td>
<td>Applied Study in Mental Health</td>
<td>5</td>
</tr>
<tr>
<td>PA 6408</td>
<td>Applied Study Elective</td>
<td>5</td>
</tr>
</tbody>
</table>

**Program Assistant Studies and Health Informatics, MS/MS**

---

**Health Informatics Requirements**

A grade of B– or higher is required in each course.

**Core Requirement**

HINF 7701  Health Informatics Capstone Project  3

**Business Management Core**

Complete two courses from the following:  6

- 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
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 would be 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.

**Didactic Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PA 6200</td>
<td>Anatomy and Physiology 1</td>
<td>3</td>
</tr>
<tr>
<td>PA 6201</td>
<td>Anatomy and Physiology 2</td>
<td>3</td>
</tr>
<tr>
<td>PA 6203</td>
<td>Physical Diagnosis and Patient Evaluation 1</td>
<td>3</td>
</tr>
<tr>
<td>PA 6204</td>
<td>Physical Diagnosis and Patient Evaluation 2</td>
<td>3</td>
</tr>
<tr>
<td>PA 6205</td>
<td>Pharmacology 1</td>
<td>2</td>
</tr>
<tr>
<td>PA 6206</td>
<td>Pharmacology 2</td>
<td>2</td>
</tr>
<tr>
<td>PA 6207</td>
<td>Clinical Laboratory and Diagnostic Methods</td>
<td>4</td>
</tr>
<tr>
<td>PA 6208</td>
<td>Professional Issues for Physician Assistants</td>
<td>2</td>
</tr>
<tr>
<td>PA 6311</td>
<td>Principles of Medicine 1</td>
<td>4</td>
</tr>
<tr>
<td>PA 6312</td>
<td>Principles of Medicine 2</td>
<td>4</td>
</tr>
<tr>
<td>PA 6313</td>
<td>Principles of Medicine 3</td>
<td>4</td>
</tr>
<tr>
<td>PA 6320</td>
<td>Principles of Obstetrics and Gynecology</td>
<td>2</td>
</tr>
<tr>
<td>PA 6321</td>
<td>Principles of Surgery</td>
<td>2</td>
</tr>
<tr>
<td>PA 6322</td>
<td>Principles of Orthopedics</td>
<td>2</td>
</tr>
<tr>
<td>PA 6323</td>
<td>Clinical Neurology</td>
<td>2</td>
</tr>
<tr>
<td>PA 6324</td>
<td>Principles of Pediatrics</td>
<td>2</td>
</tr>
<tr>
<td>PA 6325</td>
<td>Principles of Psychiatry</td>
<td>2</td>
</tr>
<tr>
<td>PA 6326</td>
<td>Aspects of Primary Care</td>
<td>4</td>
</tr>
<tr>
<td>PA 6327</td>
<td>Emergency Medicine and Critical Care</td>
<td>2</td>
</tr>
<tr>
<td>PA 6328</td>
<td>Aging and Rehabilitation Medicine</td>
<td>2</td>
</tr>
</tbody>
</table>

**Clinical Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PA 6400</td>
<td>Applied Study in Medicine</td>
<td>5</td>
</tr>
<tr>
<td>PA 6401</td>
<td>Applied Study in Ambulatory Medicine</td>
<td>5</td>
</tr>
<tr>
<td>PA 6402</td>
<td>Applied Study in Family Practice</td>
<td>5</td>
</tr>
<tr>
<td>PA 6403</td>
<td>Applied Study in Emergency Medicine</td>
<td>5</td>
</tr>
<tr>
<td>PA 6404</td>
<td>Applied Study in Obstetrics and Gynecology</td>
<td>5</td>
</tr>
<tr>
<td>PA 6405</td>
<td>Applied Study in Pediatrics</td>
<td>5</td>
</tr>
<tr>
<td>PA 6406</td>
<td>Applied Study in Surgery</td>
<td>5</td>
</tr>
<tr>
<td>PA 6407</td>
<td>Applied Study in Mental Health</td>
<td>5</td>
</tr>
</tbody>
</table>

**Master’s of Public Health Requirements**

A grade of B– or higher is required in each course.

---

**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...
Programs

**Doctor of Philosophy (PhD)**
- Personal Health Informatics (p. 259)

**Master of Science (MS)**
- Biotechnology (p. 259)
- Health Data Analytics (p. 98)
- Health Informatics (p. 98)

---

**Interdisciplinary**

Website ([http://www.northeastern.edu/bouve/interdisciplinary](http://www.northeastern.edu/bouve/interdisciplinary))

Daniel A. Feinberg, MBA
Assistant Clinical Instructor and Program Director, Health Informatics Program

Health Informatics Program
312 Robinson Hall
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)**
- Personal Health Informatics (p. 259)

**Master of Science (MS)**
- Biotechnology (p. 259)
- Health Data Analytics (p. 98)
- Health Informatics (p. 98)

---

**Personal Health Informatics, PhD**

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. 96).
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 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.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

General Core

<table>
<thead>
<tr>
<th>Course No.</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOT 5120</td>
<td>Introduction to Biotechnology</td>
<td>3</td>
</tr>
<tr>
<td>BIOT 5219</td>
<td>The Biotechnology Enterprise</td>
<td>2</td>
</tr>
<tr>
<td>BIOT 5631</td>
<td>Cell Culture Processes for Biopharmaceutical Production</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 6299</td>
<td>Molecular Cell Biology for Biotechnology</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 5620</td>
<td>Protein Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 7317</td>
<td>Analytical Biotechnology</td>
<td>3</td>
</tr>
<tr>
<td>PHSC 6214</td>
<td>Experimental Design and Biostatistics</td>
<td>2</td>
</tr>
</tbody>
</table>

Co-op

<table>
<thead>
<tr>
<th>Course No.</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOT 6500</td>
<td>Professional Development for Co-op</td>
<td>0</td>
</tr>
<tr>
<td>BIOT 6964</td>
<td>Co-op Work Experience</td>
<td>0</td>
</tr>
</tbody>
</table>

Concentrations

Complete one of the following five concentrations:

- Biopharmaceutical Analytical Sciences Concentration (p. 260)
- Biotechnology Enterprise Concentration (p. 260)
- Molecular Biotechnology Concentration (p. 260)
- Pharmaceutical Technologies Concentration (p. 260)

Select one concentration:

- Process Sciences Concentration (p. 260)

BIOPHARMACEUTICAL ANALYTICAL SCIENCES CONCENTRATION

<table>
<thead>
<tr>
<th>Course No.</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOT 5145</td>
<td>Basic Biotechnology Lab Skills</td>
<td>1</td>
</tr>
<tr>
<td>BIOT 7245</td>
<td>Biotechnology Applications Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 5550</td>
<td>Introduction to Glycobiology and Glycoprotein Analysis</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 5616</td>
<td>Protein Mass Spectrometry</td>
<td>3</td>
</tr>
<tr>
<td>Electives</td>
<td>(p. 260)</td>
<td>5</td>
</tr>
</tbody>
</table>

BIOTECHNOLOGY ENTERPRISE CONCENTRATION

<table>
<thead>
<tr>
<th>Course No.</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOT 5225</td>
<td>Managing and Leading a Biotechnology Company</td>
<td>3</td>
</tr>
<tr>
<td>BIOT 5226</td>
<td>Biotechnology Entrepreneurship</td>
<td>3</td>
</tr>
<tr>
<td>BIOT 5227</td>
<td>Economics and Marketing for Biotechnology Managers</td>
<td>3</td>
</tr>
<tr>
<td>Electives</td>
<td>(p. 260)</td>
<td>6</td>
</tr>
</tbody>
</table>

MOLECULAR BIOTECHNOLOGY CONCENTRATION

<table>
<thead>
<tr>
<th>Course No.</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOT 5145</td>
<td>Basic Biotechnology Lab Skills</td>
<td>1</td>
</tr>
<tr>
<td>BIOT 5810</td>
<td>Cutting-Edge Applications in Molecular Biotechnology</td>
<td>3</td>
</tr>
<tr>
<td>BIOT 5850</td>
<td>Higher-Order Structure Analytics</td>
<td>3</td>
</tr>
<tr>
<td>BIOT 7245</td>
<td>Biotechnology Applications Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>Electives</td>
<td>(p. 260)</td>
<td>5</td>
</tr>
</tbody>
</table>

PHARMACEUTICAL TECHNOLOGIES CONCENTRATION

<table>
<thead>
<tr>
<th>Course No.</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOT 5145</td>
<td>Basic Biotechnology Lab Skills</td>
<td>1</td>
</tr>
<tr>
<td>BIOT 5640</td>
<td>Drug Product Processes for Biopharmaceuticals</td>
<td>3</td>
</tr>
<tr>
<td>BIOT 5700</td>
<td>Molecular Interactions of Proteins in Biopharmaceutical Formulations</td>
<td>3</td>
</tr>
<tr>
<td>BIOT 7245</td>
<td>Biotechnology Applications Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>Electives</td>
<td>(p. 260)</td>
<td>5</td>
</tr>
</tbody>
</table>

PROCESS SCIENCES CONCENTRATION

<table>
<thead>
<tr>
<th>Course No.</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOT 5145</td>
<td>Basic Biotechnology Lab Skills</td>
<td>1</td>
</tr>
<tr>
<td>BIOT 5560</td>
<td>Bioprocess Fundamentals</td>
<td>3</td>
</tr>
<tr>
<td>BIOT 5635</td>
<td>Downstream Processes for Biopharmaceutical Production</td>
<td>3</td>
</tr>
<tr>
<td>BIOT 7245</td>
<td>Biotechnology Applications Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>Electives</td>
<td>(p. 260)</td>
<td>5</td>
</tr>
</tbody>
</table>

Elective List

Electives not on this list may be chosen with faculty advisor approval.

<table>
<thead>
<tr>
<th>Course No.</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BINF 6308</td>
<td>Bioinformatics Computational Methods</td>
<td>1</td>
</tr>
<tr>
<td>BIOL 5100</td>
<td>Biology Colloquium</td>
<td></td>
</tr>
<tr>
<td>BIOL 5307</td>
<td>Biological Electron Microscopy</td>
<td></td>
</tr>
<tr>
<td>BIOL 5499</td>
<td>Plant Biotechnology</td>
<td></td>
</tr>
<tr>
<td>BIOL 5543</td>
<td>Stem Cells and Regeneration</td>
<td></td>
</tr>
<tr>
<td>BIOL 5549</td>
<td>Microbial Biotechnology</td>
<td></td>
</tr>
<tr>
<td>BIOL 5569</td>
<td>Advanced Microbiology</td>
<td></td>
</tr>
<tr>
<td>BIOL 5573</td>
<td>Medical Microbiology</td>
<td></td>
</tr>
<tr>
<td>BIOL 5581</td>
<td>Biological Imaging</td>
<td></td>
</tr>
<tr>
<td>BIOL 5583</td>
<td>Immunology</td>
<td></td>
</tr>
<tr>
<td>BIOL 6381</td>
<td>Ethics in Biological Research</td>
<td></td>
</tr>
</tbody>
</table>
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.

Program Requirements
Complete all courses and requirements listed below unless otherwise indicated.
General Requirements

Analytics/Modeling/Statistics

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>DA 5020</td>
<td>Collecting, Storing, and Retrieving Data</td>
<td>4</td>
</tr>
<tr>
<td>DA 5030</td>
<td>Introduction to Data Mining/Machine Learning</td>
<td>4</td>
</tr>
<tr>
<td>HINF 6400</td>
<td>Introduction to Health Data Analytics</td>
<td>3</td>
</tr>
<tr>
<td>PPUA 5301</td>
<td>Introduction to Computational Statistics</td>
<td>4</td>
</tr>
<tr>
<td>PPUA 5302</td>
<td>Information Design and Visual Analytics</td>
<td>4</td>
</tr>
</tbody>
</table>

Healthcare

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HINF 5102</td>
<td>Data Management in Healthcare</td>
<td>3</td>
</tr>
<tr>
<td>HINF 5105</td>
<td>The American Healthcare System</td>
<td>3</td>
</tr>
<tr>
<td>HINF 5XXX</td>
<td>Predictive Analytics and Modeling</td>
<td>3</td>
</tr>
</tbody>
</table>

Thesis/Capstone

Complete either Thesis or Capstone:

- Thesis
  - HINF XXXX Health Data Analytics Thesis
- Capstone
  - HINF 7701 Health Informatics Capstone Project

Please see college administrator for course information.

Electives

At least one course must be chosen from the methods list.

Methods

Complete 3–6 semester hours from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHTH 5240</td>
<td>Evaluating Scientific Evidence</td>
</tr>
<tr>
<td>PHTH 6202</td>
<td>Intermediate Epidemiology</td>
</tr>
<tr>
<td>PHTH 6210</td>
<td>Applied Regression Analysis</td>
</tr>
<tr>
<td>PHTH 6440</td>
<td>Advanced Methods in Biostatistics</td>
</tr>
<tr>
<td>CS 6350</td>
<td>Empirical Research Methods</td>
</tr>
<tr>
<td>CAEP 7712</td>
<td>Intermediate Statistical Data Analysis Techniques</td>
</tr>
<tr>
<td>CAEP 7716</td>
<td>Advanced Research and Data Analyses</td>
</tr>
</tbody>
</table>

Other Electives

Complete 0–4 semester hours from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARTG 5330</td>
<td>Visualization Technologies</td>
</tr>
<tr>
<td>ARTG 6320</td>
<td>Design of Information-Rich Environments</td>
</tr>
<tr>
<td>HINF 5200</td>
<td>Theoretical Foundations in Personal Health Informatics</td>
</tr>
<tr>
<td>HINF 5300</td>
<td>Personal Health Interface Design and Development</td>
</tr>
<tr>
<td>HINF 6215</td>
<td>Project Management</td>
</tr>
<tr>
<td>HINF 6220</td>
<td>Database Design, Access, Modeling, and Security</td>
</tr>
<tr>
<td>PHTH 5226</td>
<td>Strategic Management and Leadership in Healthcare</td>
</tr>
<tr>
<td>PHTH 5232</td>
<td>Evaluating Healthcare Quality</td>
</tr>
<tr>
<td>PHTH 5234</td>
<td>Economic Perspectives on Health Policy</td>
</tr>
</tbody>
</table>

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.

Requirements

A grade of B– or higher is required in each course.

Core Requirements

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HINF 5101</td>
<td>Introduction to Health Informatics and Health Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>HINF 5105</td>
<td>The American Healthcare System</td>
<td>3</td>
</tr>
<tr>
<td>HINF 7701</td>
<td>Health Informatics Capstone Project</td>
<td>3</td>
</tr>
</tbody>
</table>

Business Management Core

Complete two courses from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>HINF 6202</td>
<td>Business of Healthcare Informatics</td>
</tr>
<tr>
<td>HINF 6215</td>
<td>Project Management</td>
</tr>
<tr>
<td>HINF 6335</td>
<td>Management Issues in Healthcare Information Technology</td>
</tr>
<tr>
<td>HINF 6240</td>
<td>Improving the Patient Experience through Informatics</td>
</tr>
<tr>
<td>PHTH 5226</td>
<td>Strategic Management and Leadership in Healthcare</td>
</tr>
</tbody>
</table>

Program Credit/GPA Requirements

37 total semester hours required
Health Informatics Core
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 Core
Complete two courses from the following: 6
HINF 6220  Database Design, Access, Modeling, and Security
HINF 6230  Strategic Topics in Programming For Health Professionals
HINF 6355  Key Standards in Health Informatics Systems
PHTH 5210  Biostatistics in Public Health
PHTH 5202  Introduction to Epidemiology

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
Complete two courses from the following. Any course not taken to complete a core requirement may be taken as an elective.
HINF 6325  Legal and Social Issues in Health Informatics
HINF 6330  Emerging Technologies in Healthcare
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 3.00 GPA required

Health Informatics, MS—ALIGN Program
Our Master of Science in Health Informatics ALIGN program seeks to prepare students from diverse backgrounds to excel in the health informatics field. ALIGN’s custom master’s degree curricula are tailored to each student’s professional and educational background, allowing successful students to transition into careers in high-demand industries. Learn more at the ALIGN webpage (http://www.northeastern.edu/align).

Program Requirements
Complete all courses and requirements listed below unless otherwise indicated.

Requirements
A grade of B− or higher is required in each course.

ALIGN Course Work
Complete one or two courses from the following as assigned during admission: 3-6
HINF 0200  Health and Medicine for Nonclinicians
HINF 6230  Strategic Topics in Programming For Health Professionals

Core Requirements
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 Core
Complete two courses from the following: 6
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 Core
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 Core
Complete two courses from the following: 6
HINF 6220  Database Design, Access, Modeling, and Security
HINF 6230  Strategic Topics in Programming For Health Professionals
HINF 6355  Key Standards in Health Informatics Systems

Electives
Complete two courses from the following. Any course not taken to complete a core requirement may be taken as an elective.
HINF 6325  Legal and Social Issues in Health Informatics
HINF 6330  Emerging Technologies in Healthcare
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 3.00 GPA required

Health Informatics, MS—ALIGN Program
Our Master of Science in Health Informatics ALIGN program seeks to prepare students from diverse backgrounds to excel in the health informatics field. ALIGN’s custom master’s degree curricula are tailored to each student’s professional and educational background, allowing successful students to transition into careers in high-demand industries. Learn more at the ALIGN webpage (http://www.northeastern.edu/align).
Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Requirements

A grade of B– or higher is required in each required course.

Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHTH 5120</td>
<td>Race, Ethnicity, and Health in the United States</td>
<td>3</td>
</tr>
<tr>
<td>PHTH 5202</td>
<td>Introduction to Epidemiology</td>
<td>3</td>
</tr>
</tbody>
</table>

Electives

Complete two courses from the following. Any course not taken to complete a core requirement may be taken as an elective.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>HINF 6325</td>
<td>Legal and Social Issues in Health Informatics</td>
</tr>
<tr>
<td>HINF 6330</td>
<td>Emerging Technologies in Healthcare</td>
</tr>
<tr>
<td>HINF 6345</td>
<td>Design for Usability in Healthcare</td>
</tr>
<tr>
<td>DA 5020</td>
<td>Collecting, Storing, and Retrieving Data</td>
</tr>
<tr>
<td>DA 5030</td>
<td>Introduction to Data Mining/Machine Learning</td>
</tr>
<tr>
<td>PPUA 5301</td>
<td>Introduction to Computational Statistics</td>
</tr>
<tr>
<td>PPUA 5302</td>
<td>Information Design and Visual Analytics</td>
</tr>
</tbody>
</table>

Capstone

PHTH 6910 Public Health Capstone 3

Electives

Complete 9 semester hours from the following. In consultation with your faculty advisor, you may complete electives from another discipline.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAW 7300</td>
<td>Administrative Law</td>
</tr>
<tr>
<td>LAW 7329</td>
<td>Environmental Law</td>
</tr>
<tr>
<td>LAW 7335</td>
<td>Health Law</td>
</tr>
<tr>
<td>LAW 7350</td>
<td>Negotiation</td>
</tr>
<tr>
<td>LAW 7351</td>
<td>Prisoners' Rights Clinic</td>
</tr>
<tr>
<td>LAW 7362</td>
<td>Poverty Law and Practice Clinic</td>
</tr>
<tr>
<td>LAW 7410</td>
<td>Domestic Violence Clinic</td>
</tr>
<tr>
<td>LAW 7422</td>
<td>Human Rights Seminar: Race, Gender, and Culture</td>
</tr>
<tr>
<td>LAW 7428</td>
<td>State Local Government</td>
</tr>
<tr>
<td>LAW 7463</td>
<td>Non-Profit Organizations</td>
</tr>
<tr>
<td>LAW 7469</td>
<td>Disability Law</td>
</tr>
<tr>
<td>LAW 7491</td>
<td>International Human Rights and the Global Economy</td>
</tr>
<tr>
<td>LAW 7494</td>
<td>Bioethics and the Law</td>
</tr>
<tr>
<td>LAW 7512</td>
<td>Problems in Public Health Law</td>
</tr>
<tr>
<td>LAW 7514</td>
<td>Natural Resources Law</td>
</tr>
<tr>
<td>LAW 7518</td>
<td>Affordable Resources Law—Theory and Practice</td>
</tr>
<tr>
<td>LAW 7525</td>
<td>Law and Economic Development</td>
</tr>
<tr>
<td>LAW 7527</td>
<td>Public Health Legal Clinic</td>
</tr>
<tr>
<td>LAW 7526</td>
<td>Juvenile Courts: Delinquency, Abuse, Neglect</td>
</tr>
<tr>
<td>LAW 7550</td>
<td>Refugee and Asylum Law</td>
</tr>
<tr>
<td>LAW 7555</td>
<td>Communications Law</td>
</tr>
<tr>
<td>LAW 7561</td>
<td>Private Litigation in the Public Interest</td>
</tr>
<tr>
<td>LAW 7582</td>
<td>Elder Law</td>
</tr>
<tr>
<td>LAW 7588</td>
<td>Reproductive and Sexual Rights and Health</td>
</tr>
<tr>
<td>LAW 7589</td>
<td>International Law: Governance, Development, and Human Rights</td>
</tr>
<tr>
<td>LAW 7600</td>
<td>Current Issues in Health Law and Policy</td>
</tr>
<tr>
<td>LAW 7602</td>
<td>Bioproperty</td>
</tr>
<tr>
<td>LAW 7606</td>
<td>Drug Law and Policy</td>
</tr>
<tr>
<td>LAW 7617</td>
<td>Economic Perspectives on Health Policy</td>
</tr>
<tr>
<td>LAW 7630</td>
<td>Global Health</td>
</tr>
</tbody>
</table>

Program Credit/GPA Requirements

39 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 Credit/GPA Requirements**

42 total semester hours required for MPH. Please contact the School of Law [here](https://www.northeastern.edu/law/academics/jd/dual-degrees) for JD requirements.

Minimum 3.00 GPA required

**Plan of Study**

<table>
<thead>
<tr>
<th>Year 1</th>
<th>Fall</th>
<th>Hours</th>
<th>Spring</th>
<th>Hours</th>
<th>Summer Full Semester</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First-year law courses</td>
<td>First-year law courses</td>
<td></td>
<td></td>
<td></td>
<td>Law co-op</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year 2</th>
<th>Fall</th>
<th>Hours</th>
<th>Spring</th>
<th>Hours</th>
<th>Summer Full Semester</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PHTH 5202</td>
<td>3</td>
<td>PHTH 5212</td>
<td>3</td>
<td>PHTH 5540</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>PHTH 5210</td>
<td>3</td>
<td>PHTH 5214</td>
<td>3</td>
<td>LAW 7443</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>PHTH 6200</td>
<td>3</td>
<td>PHTH 5220</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PHTH 6204</td>
<td>3</td>
<td>PHTH 6208</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>12</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year 3</th>
<th>Fall</th>
<th>Hours</th>
<th>Spring</th>
<th>Hours</th>
<th>Summer Full Semester</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PHTH 6966</td>
<td>3</td>
<td>Law school courses</td>
<td>Law school courses</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Law co-op</td>
<td>Law co-op</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year 4</th>
<th>Fall</th>
<th>Hours</th>
<th>Spring</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PHTH 6910</td>
<td>3</td>
<td>February bar exam</td>
<td></td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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.

**Didactic Courses**

- PA 6200: Anatomy and Physiology 1 3
- PA 6201: Anatomy and Physiology 2 3
- PA 6203: Physical Diagnosis and Patient Evaluation 1 3
- PA 6204: Physical Diagnosis and Patient Evaluation 2 3
- PA 6205: Pharmacology 1 2
- PA 6206: Pharmacology 2 2
- PA 6207: Clinical Laboratory and Diagnostic Methods 4
- PA 6208: Professional Issues for Physician Assistants 2
- 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
- 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

**Clinical Courses**

- 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.

**Core Requirement**

- HINF 7701: Health Informatics Capstone Project 3

**Business Management Core**

Complete two courses from the following: 6

- HINF 6202: Business of Healthcare Informatics
- HINF 6215: Project Management
Aging, Graduate Certificate

The purpose of this program is to provide interprofessional education to meet the specific healthcare needs of older adults. The interprofessional aging certificate program will consist of four graduate courses. As an interactive online program, the interprofessional certificate program in healthy aging is designed for the 21st-century professional requiring the flexibility that online education allows.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Requirements

A grade of B– or higher is required in each course.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HLTH 5005</td>
<td>Introduction to Health and Aging</td>
<td>3</td>
</tr>
</tbody>
</table>

Program Credit/GPA Requirements

128 total semester hours required
Minimum 3.000 GPA required
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

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 alternative arrangements (e.g., Master of Science/Certificate of Advanced Graduate Study in School Psychology, Master of Science in Speech-Language Pathology, Master of Science in Counseling Psychology), meaning that some classes stand in place for others. These program plans are worked out with your advisors.

**Program Requirements**

Complete all courses and requirements listed below unless otherwise indicated.

**Requirements**

A grade of B or higher is required in all courses.

**Early Intervention**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAEP 5150</td>
<td>Early Intervention: Family Systems</td>
<td>3</td>
</tr>
<tr>
<td>CAEP 5151</td>
<td>Early Intervention: Infant and Toddler Development, Risk, and Disability</td>
<td>3</td>
</tr>
<tr>
<td>CAEP 5152</td>
<td>Early Intervention: Planning and Evaluating Services</td>
<td>3</td>
</tr>
<tr>
<td>SLPA 6335</td>
<td>Early Intervention: Assessment and Intervention</td>
<td>3</td>
</tr>
</tbody>
</table>

**Practicum**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAEP 8425</td>
<td>Early Intervention Practicum 1</td>
<td>2</td>
</tr>
<tr>
<td>CAEP 8426</td>
<td>Early Intervention Practicum 2</td>
<td>2</td>
</tr>
</tbody>
</table>

**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.

**Requirements**

A grade of B– or higher is required in all course work.

**Health Informatics Core**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HINF 5101</td>
<td>Introduction to Health Informatics and Health Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>HINF 5102</td>
<td>Data Management in Healthcare</td>
<td>3</td>
</tr>
</tbody>
</table>

**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.

**Requirements**

A grade of B– or higher is required in all course work.

**Health Informatics Core**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HINF 5101</td>
<td>Introduction to Health Informatics and Health Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>HINF 5102</td>
<td>Data Management in Healthcare</td>
<td>3</td>
</tr>
</tbody>
</table>

**Privacy and Security**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IA 5130</td>
<td>Computer System Security</td>
<td>4</td>
</tr>
<tr>
<td>IA 5150</td>
<td>Network Security Practices</td>
<td>4</td>
</tr>
<tr>
<td>IA 5200</td>
<td>Security Risk Management and Assessment</td>
<td>4</td>
</tr>
</tbody>
</table>

**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.

**Requirements**
A grade of B– or higher is required in all course work.

**Health Informatics Core**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>HINF 5101</td>
<td>Introduction to Health Informatics and Health Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>HINF 5102</td>
<td>Data Management in Healthcare</td>
<td>3</td>
</tr>
</tbody>
</table>

**Management and Exchange**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>HINF 6205</td>
<td>Creation and Application of Medical Knowledge</td>
<td>3</td>
</tr>
<tr>
<td>HINF 6355</td>
<td>Key Standards in Health Informatics Systems</td>
<td>3</td>
</tr>
<tr>
<td>HINF 6345</td>
<td>Design for Usability in Healthcare</td>
<td>3</td>
</tr>
</tbody>
</table>

**Program Credit/GPA Requirements**
15 total semester hours required
Minimum 3.000 GPA required
Programs

Master of Legal Studies (MLS)
- Legal Studies—Online (p. 269)

Graduate Certificate
- Business Law (p. 270)
- Health Law (p. 271)
- Human Resources Law (p. 271)
- Intellectual Property Law (p. 272)

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

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>LS 6101</td>
<td>Introduction to Legal Studies 1: Law and Legal Reasoning</td>
<td>3</td>
</tr>
<tr>
<td>LS 6102</td>
<td>Introduction to Legal Studies 2</td>
<td>3</td>
</tr>
</tbody>
</table>

Core Courses

Complete at least four of the following: 12-15

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>LS 6110</td>
<td>Law of Information and Records</td>
<td>3</td>
</tr>
<tr>
<td>LS 6120</td>
<td>Law and Strategy</td>
<td>3</td>
</tr>
<tr>
<td>LS 6130</td>
<td>Negotiation and Advocacy</td>
<td>3</td>
</tr>
<tr>
<td>LS 6140</td>
<td>Regulation and Compliance</td>
<td>3</td>
</tr>
<tr>
<td>LS 6150</td>
<td>Law and Organizational Management</td>
<td>3</td>
</tr>
</tbody>
</table>

Specialization Elective Courses

Complete three or four of the following: 9-12

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>LS 6160</td>
<td>Regulation and Global Business Strategies</td>
<td>3</td>
</tr>
<tr>
<td>LS 6170</td>
<td>Financial Transactions</td>
<td>3</td>
</tr>
<tr>
<td>LS 6180</td>
<td>Health Law Survey</td>
<td>3</td>
</tr>
<tr>
<td>LS 6181</td>
<td>Healthcare Regulation and Compliance</td>
<td>3</td>
</tr>
<tr>
<td>LS 6182</td>
<td>Patient Records, Privacy, and Security</td>
<td>3</td>
</tr>
<tr>
<td>LS 6210</td>
<td>Special Topics in Employee Rights and Employer Obligations</td>
<td>3</td>
</tr>
<tr>
<td>LS 6211</td>
<td>Antidiscrimination Law</td>
<td>3</td>
</tr>
<tr>
<td>LS 6212</td>
<td>Wages and Benefits</td>
<td>3</td>
</tr>
<tr>
<td>LS 6230</td>
<td>Intellectual Property Survey</td>
<td>3</td>
</tr>
</tbody>
</table>

Program Credit/GPA Requirements

30 total semester hours required
Minimum 3.000 GPA required

Business Law, Graduate Certificate

**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 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

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>LS 6102</td>
<td>Introduction to Legal Studies 2</td>
<td>3</td>
</tr>
<tr>
<td>LS 6170</td>
<td>Financial Transactions</td>
<td>3</td>
</tr>
</tbody>
</table>
Complete one of the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>LS 6160</td>
<td>Regulation and Global Business Strategies</td>
<td>3</td>
</tr>
<tr>
<td>LS 6230</td>
<td>Intellectual Property Survey</td>
<td>3</td>
</tr>
<tr>
<td>LS 6210</td>
<td>Special Topics in Employee Rights and Employer Obligations</td>
<td>3</td>
</tr>
</tbody>
</table>

**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 A
- Fall B
- Spring A
- Spring B
- Summer A
- 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**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>LS 6102</td>
<td>Introduction to Legal Studies 2</td>
<td>3</td>
</tr>
<tr>
<td>LS 6180</td>
<td>Health Law Survey</td>
<td>3</td>
</tr>
<tr>
<td>LS 6181</td>
<td>Healthcare Regulation and Compliance</td>
<td>3</td>
</tr>
<tr>
<td>LS 6182</td>
<td>Patient Records, Privacy, and Security</td>
<td>3</td>
</tr>
</tbody>
</table>

**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
Intellectual Property Law, Graduate Certificate

• 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
<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>LS 6102</td>
<td>Introduction to Legal Studies 2</td>
<td>3</td>
</tr>
<tr>
<td>LS 6210</td>
<td>Special Topics in Employee Rights and Employer Obligations</td>
<td>3</td>
</tr>
<tr>
<td>LS 6211</td>
<td>Antidiscrimination Law</td>
<td>3</td>
</tr>
<tr>
<td>LS 6212</td>
<td>Wages and Benefits</td>
<td>3</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>LS 6102</td>
<td>Introduction to Legal Studies 2</td>
<td>3</td>
</tr>
<tr>
<td>LS 6230</td>
<td>Intellectual Property Survey</td>
<td>3</td>
</tr>
<tr>
<td>LS XXXX</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>LS XXXX</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

Program Credit/GPA Requirements
12 total semester hours required
Minimum 3.000 GPA required
Website (http://www.cps.neu.edu/degree-programs/graduate)

Mary Loeffelholz, PhD, Interim Dean of the College of Professional Studies and Vice President of Professional Education

David Fields, PhD, Assistant Dean of Faculty and Academic Affairs
Lydia Young, PhD, Interim 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. 274)
• Transfer Credit Policies (p. 274)
• Special Student Status (p. 274)
• Personal Professional Enrichment (PPE) (p. 275)
• New Student Orientation (On-Ground and Online) (p. 275)
• Academic Resources (p. 275)
• Attendance Requirements (p. 275)
• Reentry to Program (p. 276)
• Readmission to Program (p. 276)
• Full-Time Status (p. 276)
• Active-Duty Military Personnel (p. 277)
• Registration and Taking Courses (p. 277)
• Student Evaluation of Courses (EvaluationKit) (p. 278)
• Academic Progression Standards (p. 279)
• Reinstatement after Academic Dismissal (p. 279)
• Completing Degree Requirements (p. 279)
• Degrees, Majors, and Concentrations (p. 280)
• Seeking more than One Certificate or Degree (p. 280)
• Graduation Requirements (p. 281)
• Global Partnership Programs (p. 281)
• Accommodations for Students with Disabilities (p. 281)
• Personal Information (p. 281)
• Graduate Campus (p. 282)

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 programmatical 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 two 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 (nondotal) 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 a PPE student. Once approved, students will be able to register through their myNEU 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)**

All newly accepted College of Professional Studies students are required to attend the on-ground orientation or participate in online 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.

Students are encouraged to use the online orientation, accessed via NU Online, as a resource throughout their career at the College of Professional Studies.

For additional information, visit the College of Professional Studies webpage (http://www.cps.neu.edu/student-resources/orientation.php).

**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 NU Online 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 twelve-week term, with no more than 8 credits per six-week session.

To be eligible for a course overload (greater than 16 credits per twelve-week term or greater than 8 credits per six-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 student success specialist (http://cps.neu.edu/student-resources/OAA-Staff.php). 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 International Student and Scholar Institute (ISSI) 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 two weeks 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 four quarters that make up each academic year. Each twelve-week quarter (term) in fall, winter, and spring is made up of Parts of Term (courses that are scheduled for less than twelve weeks). Some courses are scheduled for the entire twelve weeks of a quarter, while others are scheduled for either the first six weeks or the last six weeks. A full summer term is eight 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 blended or hybrid format. Students may not take classes on campus for just the first or second six weeks of an eight or twelve-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. Students may not take classes on campus for just the first or second six weeks of an eight or twelve-week quarter and then take only online courses during the other half of the term.

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 myNEU 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 and Student Support Services 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 myNEU 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 student success specialist 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 myNEU 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 myNEU 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 myNEU 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 myNEU 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 myNEU 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 academic advisor 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

A graduate or doctoral student must maintain a minimum cumulative grade-point average (GPA) of 3.000 on a 4.000 scale to be in good academic standing. 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 myNEU 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.

### Graduate (Nondoctoral) Students

With exception as specified by the program, a graduate (nondoctoral) student is placed on academic warning for low academic performance if his or her cumulative GPA is below 3.000 after he or she attempts 6 to 11 credits. At this point, the student is strongly encouraged to consult with his or her student success specialist or academic program designee to develop an action plan to improve his or her academic standing. Attempted credits include all credits/courses for which the student registered and did not drop.

A student is placed on academic probation if his or her cumulative GPA is below 3.000 after he or she attempts 12 to 17 credits. The student is required to consult with his or her student success specialist or academic program designee to develop an individualized education plan 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 after attempting 18 or more credits will be academically dismissed. A student who has been academically dismissed from the college is automatically dismissed from his or her program of study.

A student must make consistent satisfactory academic progress toward his or her program. A student who attempts but does not complete credits and earns one or more F, I, IP, NE, or W grades for two or more consecutive terms may be placed on academic probation, which may then result in academic dismissal.

#### Doctoral Students

A doctoral student whose cumulative GPA is below 3.000 is placed on academic warning after attempting 3 credits; academic probation for the second time after attempting 4 to 6 credits; and academic dismissal after attempting 12 or more credits.

A doctoral student must make consistent satisfactory academic progress toward his or her program. A student who attempts but does not complete credits and earns one or more I, IP, NE, or W grades for two or more consecutive terms may be placed on academic probation, which may then result in academic dismissal.

Doctoral students should consult with their individual program areas for additional guidance with respect to academic standing.

#### 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 myNEU 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, adjusting course requirements, adding/adjusting courses, and 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 (nondocentral) student matriculated in a certificate/degree program who would like to enroll in a different graduate program, after consulting with their academic advisor, must apply to the intended program by submitting the following:

1. New personal statement
2. Updated résumé, if applicable
3. At least one letter of reference (for degree applicants only)

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 student success specialist 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://www.cps.neu.edu/coop) 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://www.cps.neu.edu/coop) for guidelines, academic requirements, and opportunities.

#### Seeking more than One Certificate or Degree
A graduate (nondocentral) student can be enrolled in only one graduate program at a time.

Graduate (nondocentral) 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 two 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 (nondocentral) 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
The following information is for degree-seeking students only. Certificate students should refer to the “Certificate” section, below.

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 myNEU 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 myNEU 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 student success 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.

Certificate
The College of Professional Studies confers graduate certificates the same time degrees are conferred each year: winter, spring, fall, and summer. Students must submit the appropriate form to their career and academic coach in order to have their academic record audited to receive their certificate. Deadlines apply. All certificates will be mailed to the address provided on the form.

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.
Professional Studies have the following admission requirements:

Note that all Doctor of Education degrees offered through the College of Admission Requirements

through empirical research culminating in a doctoral thesis that examines a compelling educational challenge.

Through rigorous course work and collaborative experiences, you have

ability to think critically about today's educational challenges.

practitioners, exposing you to global perspectives and strengthening your

change in your organization. As a Doctor of Education student, you have

cultivate the skills and knowledge necessary to effect meaningful

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

Students enrolled in a Northeastern University graduate (regional) campus are also required to abide by the policies and procedures specific to that campus.

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. 282)

Doctor of Law and Policy (DLP)
• Law And Policy (p. 284)

Transitional Doctor of Physical Therapy (DPT)
• Physical Therapy (p. 285)
• Physical Therapy—Direct Entry (p. 285)

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)
Organizational Leadership Studies Concentration

The Doctor of Education with Concentration in Organizational Leadership Studies prepares 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 systematically 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

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDU 7209</td>
<td>Introduction to Doctoral Studies</td>
<td>3</td>
</tr>
<tr>
<td>EDU 7214</td>
<td>Changing Conceptions of Learning and Human Development: Research and Practice</td>
<td>3</td>
</tr>
<tr>
<td>EDU 7202</td>
<td>Transforming Human Systems</td>
<td>3</td>
</tr>
<tr>
<td>EDU 7210</td>
<td>Leadership Theory and Research</td>
<td>3</td>
</tr>
</tbody>
</table>

Required Research Courses

<table>
<thead>
<tr>
<th>Research Courses</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDU 7280 Fundamentals of Research</td>
<td>3</td>
</tr>
<tr>
<td>EDU 7281 Research Design</td>
<td>3</td>
</tr>
</tbody>
</table>

Proposal Development

Complete one of the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDU 7282</td>
<td>Quantitative Research</td>
<td>3</td>
</tr>
<tr>
<td>EDU 7283</td>
<td>Qualitative Research</td>
<td>3</td>
</tr>
</tbody>
</table>

Concentration

Complete one of the following three concentrations:

Concentration in Curriculum, Teaching, Learning, and Leadership

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDU 7216</td>
<td>Social Justice and Educational Equity</td>
<td>3</td>
</tr>
<tr>
<td>EDU 7217</td>
<td>Educational Systems: The Dynamics between Policy, Values, and Practice</td>
<td>3</td>
</tr>
<tr>
<td>EDU 7213</td>
<td>Education Entrepreneurship</td>
<td>3</td>
</tr>
<tr>
<td>EDU 7242</td>
<td>Situated Leadership</td>
<td>3</td>
</tr>
<tr>
<td>EDU 7244</td>
<td>Curriculum Theory and Practice Over Time: Implications for Educational Leadership</td>
<td>3</td>
</tr>
</tbody>
</table>

Elective Courses

Complete 12 quarter hours in the following range:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDU 7000 to EDU 7999</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Doctoral Thesis Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDU 8796</td>
<td>Thesis Proposal and the Internal Review Board</td>
<td>0</td>
</tr>
<tr>
<td>EDU 8797</td>
<td>Thesis Data Collection, Initial Analysis, and Management</td>
<td>0</td>
</tr>
<tr>
<td>EDU 8798</td>
<td>Thesis Data Analysis and Presentation</td>
<td>0</td>
</tr>
<tr>
<td>EDU 8799</td>
<td>Thesis Findings and Discussion</td>
<td>12</td>
</tr>
</tbody>
</table>

Concentration in Higher Education Administration

Complete the following five courses for the higher education concentration (15 quarter hours):

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDU 7204</td>
<td>Global and Historical Perspectives on Higher Education</td>
<td>3</td>
</tr>
<tr>
<td>EDU 7250</td>
<td>Organizational Systems and Institutional Governance</td>
<td>3</td>
</tr>
<tr>
<td>EDU 7253</td>
<td>The Legal Environment of Higher Education</td>
<td>3</td>
</tr>
<tr>
<td>EDU 7256</td>
<td>Financial Decision Making in Higher Education</td>
<td>3</td>
</tr>
<tr>
<td>EDU 7258</td>
<td>Strategic Management in Higher Education</td>
<td>3</td>
</tr>
</tbody>
</table>

Complete the following courses for the international higher education track within the higher education concentration (15 quarter hours):

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDU 7204</td>
<td>Global and Historical Perspectives on Higher Education</td>
<td>3</td>
</tr>
<tr>
<td>EDU 7250</td>
<td>Organizational Systems and Institutional Governance</td>
<td>3</td>
</tr>
<tr>
<td>EDU 7253</td>
<td>The Legal Environment of Higher Education</td>
<td>3</td>
</tr>
</tbody>
</table>

Complete two of the following courses. You may also take more than two of the following courses as elective offerings:
EDU 7260 Comparative International/Global Higher Education 3
EDU 7261 International Student Markets 3
EDU 7264 Educating Global Students: Issues and Practices 3

Elective Courses
Complete 12 quarter hours in the following range:
EDU 7000 to EDU 7999

Doctoral Thesis Courses
Complete 12 quarter hours in the following range:
EDU 7000 to EDU 7999

Program Credit/GPA Requirements
60 total quarter hours required
Minimum 3.000 GPA required

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
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 6425  Methods and Theory as Applied to Doctoral Research  2
LWP 6500  Doctoral Research Design 1  2
LWP 6450  Public Policy Theory and Practice 1  4
LWP 6501  Doctoral Research Design 2  2
LWP 6451  Public Policy Theory and Practice 2  4
LWP 6502  Doctoral Research Design 3  2
LWP 6503  Doctoral Research Design 4  2

**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.

**Required Courses for All Students**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTH 6100</td>
<td>Differential Diagnosis and Medical Screening</td>
<td>4</td>
</tr>
<tr>
<td>PTH 6110</td>
<td>Diagnostic Imaging</td>
<td>4</td>
</tr>
<tr>
<td>PTH 6130</td>
<td>Pharmacology</td>
<td>3</td>
</tr>
<tr>
<td>PTH 6900</td>
<td>Comprehensive Case Analysis</td>
<td>4</td>
</tr>
<tr>
<td>PTH 6140</td>
<td>Motor Control</td>
<td>4</td>
</tr>
</tbody>
</table>

**Required Nutrition Course**
Complete one of the following: 3-4

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTH 6120</td>
<td>Clinical Nutrition</td>
</tr>
<tr>
<td>NTR 6120</td>
<td>Healthy Aging: Nutrition Strategies for Optimal Longevity</td>
</tr>
<tr>
<td>NTR 6119</td>
<td>Pediatric Nutrition</td>
</tr>
<tr>
<td>NTR 7147</td>
<td>Sports and Fitness Nutrition</td>
</tr>
</tbody>
</table>

**Elective Course**
Complete one of the following: 4-5

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTH 6430</td>
<td>Educational Strategies for Effective Healthcare Delivery</td>
</tr>
<tr>
<td>PTH 6400</td>
<td>Orthopedics: Shoulder</td>
</tr>
<tr>
<td>PTH 6480</td>
<td>Evidence-Based Exercise for the Older Adult</td>
</tr>
<tr>
<td>PTH 6490</td>
<td>Pediatric Physical Therapy: Emerging Topics and Evidence-Based Practice</td>
</tr>
<tr>
<td>PTH 6985</td>
<td>Psychosocial and Emotional Challenges Facing Older Adults</td>
</tr>
<tr>
<td>PTH 6200</td>
<td>Research Methods and Statistical Analysis</td>
</tr>
<tr>
<td>PTH 6235</td>
<td>Administrative and Management Keys for Contemporary Physical Therapist Practice</td>
</tr>
<tr>
<td>PTH 6220</td>
<td>Fostering Change in Health Behavior</td>
</tr>
<tr>
<td>PTH 6561</td>
<td>Evidence-Based Examination and Outcomes for the Cervical-Thoracic Spine and Temporomandibular Joint</td>
</tr>
<tr>
<td>PTH 6562</td>
<td>Evidence-Based Examination and Outcomes for Upper Extremity: Shoulder, Elbow, and Hand</td>
</tr>
<tr>
<td>PTH 6563</td>
<td>Evidence-Based Examination and Outcomes for Lumbar Spine and Sacroiliac Joint</td>
</tr>
<tr>
<td>PTH 6564</td>
<td>Evidence-Based Examination and Outcomes for Lower Extremity: Hip, Knee, Foot, and Ankle</td>
</tr>
</tbody>
</table>

**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/find-a-degree-program/healthcare/transitional-doctor-of-physical).

Program Requirements
Complete all courses and requirements listed below unless otherwise indicated.

Note: 35 quarter hours are required for students entering with a Bachelor of Science in Physical Therapy.

Required Courses for all Students

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTH 6100</td>
<td>Differential Diagnosis and Medical Screening</td>
<td>4</td>
</tr>
<tr>
<td>PTH 6110</td>
<td>Diagnostic Imaging</td>
<td>4</td>
</tr>
<tr>
<td>PTH 6130</td>
<td>Pharmacology</td>
<td>3</td>
</tr>
<tr>
<td>PTH 6900</td>
<td>Comprehensive Case Analysis</td>
<td>4</td>
</tr>
<tr>
<td>PTH 6140</td>
<td>Motor Control</td>
<td>4</td>
</tr>
<tr>
<td>PTH 6200</td>
<td>Research Methods and Statistical Analysis</td>
<td>5</td>
</tr>
</tbody>
</table>

Required Nutrition Course
Complete one of the following: 3-4

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTH 6120</td>
<td>Clinical Nutrition</td>
</tr>
<tr>
<td>NTR 6120</td>
<td>Healthy Aging: Nutrition Strategies for Optimal Longevity</td>
</tr>
<tr>
<td>NTR 6119</td>
<td>Pediatric Nutrition</td>
</tr>
<tr>
<td>NTR 7147</td>
<td>Sports and Fitness Nutrition</td>
</tr>
</tbody>
</table>

Additional Required Elective for BS Entry Students
Complete one of the following: 4

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTH 6235</td>
<td>Administrative and Management Keys for Contemporary Physical Therapist Practice</td>
</tr>
<tr>
<td>PTH 6220</td>
<td>Fostering Change in Health Behavior</td>
</tr>
<tr>
<td>PTH 6430</td>
<td>Educational Strategies for Effective Healthcare Delivery</td>
</tr>
</tbody>
</table>

Elective Course
Complete one of the following: 4-5

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTH 6430</td>
<td>Educational Strategies for Effective Healthcare Delivery</td>
</tr>
<tr>
<td>PTH 6400</td>
<td>Orthopedics: Shoulder</td>
</tr>
<tr>
<td>PTH 6480</td>
<td>Evidence-Based Exercise for the Older Adult</td>
</tr>
<tr>
<td>PTH 6490</td>
<td>Pediatric Physical Therapy: Emerging Topics and Evidence-Based Practice</td>
</tr>
</tbody>
</table>

Program Credit/GPA Requirements
35 total quarter hours required
Minimum 3.000 GPA required

Master’s Degree Programs
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)
- Homeland Security (p. 287)

Master of Arts in Teaching (MAT)
- Teaching, Elementary Licensure (p. 288)
- Teaching, Secondary Licensure (p. 289)

Master of Education (MEd)
- Education (p. 290)

Master of Professional Studies (MPS)
- Analytics (p. 292)
- Digital Media (p. 293)
- Digital Media (p. 294)—ALIGN Program (p. 93)
- Geospatial Services (p. 295)
- Informatics (p. 296)

Master of Science (MS)
- Applied Nutrition (p. 298)
- Commerce and Economic Development (p. 298)
- Corporate and Organizational Communication (p. 299)
- Criminal Justice (p. 301)
- Global Studies and International Relations (p. 304)
- Human Services (p. 307)
- Leadership (p. 308)
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

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HLS 6000</td>
<td>Introduction to Homeland Security</td>
<td>3</td>
</tr>
<tr>
<td>HLS 6010</td>
<td>The Unconventional Threat to Homeland Security</td>
<td>3</td>
</tr>
<tr>
<td>HLS 6020</td>
<td>Technology for Homeland Security</td>
<td>3</td>
</tr>
<tr>
<td>HLS 6030</td>
<td>Intelligence for Homeland Security</td>
<td>3</td>
</tr>
<tr>
<td>HLS 6040</td>
<td>Critical Infrastructure: Vulnerability Analysis and Protection</td>
<td>3</td>
</tr>
<tr>
<td>HLS 6050</td>
<td>Multidisciplinary Approaches to Homeland Security</td>
<td>3</td>
</tr>
<tr>
<td>CMN 6050</td>
<td>Crisis Communication</td>
<td>3</td>
</tr>
</tbody>
</table>

### Elective Courses

Complete two of the following: 6-8

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>HLS 6035</td>
<td>Advanced Intelligence Applications for Homeland Security</td>
</tr>
<tr>
<td>HLS 6983</td>
<td>Topics in Homeland Security</td>
</tr>
<tr>
<td>CJS 6015</td>
<td>Crisis Management</td>
</tr>
<tr>
<td>CJS 6125</td>
<td>Issues in National Security</td>
</tr>
<tr>
<td>CJS 6000</td>
<td>Management for Security Professionals</td>
</tr>
<tr>
<td>CJS 6010</td>
<td>Advanced Principles of Security Management and Threat Assessment</td>
</tr>
<tr>
<td>CJS 6005</td>
<td>Legal and Regulatory Issues for Security Management</td>
</tr>
<tr>
<td>CJS 6430</td>
<td>Risk Management</td>
</tr>
<tr>
<td>GST 6720</td>
<td>Emerging Infectious Diseases and Health Impacts of Social and Environmental Changes</td>
</tr>
<tr>
<td>GST 6300</td>
<td>Security and Terrorism</td>
</tr>
<tr>
<td>CMN 6060</td>
<td>Negotiation, Mediation, and Facilitation</td>
</tr>
<tr>
<td>CJS 6964</td>
<td>Co-op</td>
</tr>
<tr>
<td>INT 6943</td>
<td>Integrative Experiential Learning</td>
</tr>
<tr>
<td>CJS 5978</td>
<td>Independent Study</td>
</tr>
</tbody>
</table>

### Concentration

Complete one of the following concentrations:

**Concentration in Emergency Management**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HLS 6070</td>
<td>Emergency Management and Geographic Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>HLS 6060</td>
<td>Strategic Planning and Budgeting</td>
<td>3</td>
</tr>
<tr>
<td>HLS 6080</td>
<td>Continuity of Operations and Planning</td>
<td>3</td>
</tr>
<tr>
<td>GIS 5101</td>
<td>Introduction to Geographic Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>GIS 5102</td>
<td>Fundamentals of GIS Analysis</td>
<td>3</td>
</tr>
<tr>
<td>GIS 6394</td>
<td>Crisis Mapping for Humanitarian Action</td>
<td>3</td>
</tr>
</tbody>
</table>

**Concentration in Organization and Infrastructure Continuity**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CJS 6430</td>
<td>Risk Management</td>
<td>3</td>
</tr>
<tr>
<td>HLS 6090</td>
<td>Organization and Structural Continuity Planning</td>
<td>3</td>
</tr>
<tr>
<td>GIS 5101</td>
<td>Introduction to Geographic Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>GIS 5102</td>
<td>Fundamentals of GIS Analysis</td>
<td>3</td>
</tr>
<tr>
<td>ITC 6315</td>
<td>Information Security Risk Management</td>
<td>3</td>
</tr>
<tr>
<td>ITC 6310</td>
<td>Information Security Governance</td>
<td>3</td>
</tr>
</tbody>
</table>

**Concentration in Port Security**

Students selecting this concentration are only required to take 4 quarter hours of electives:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HLS 6100</td>
<td>Maritime and Port Security 1</td>
<td>4</td>
</tr>
<tr>
<td>HLS 6110</td>
<td>Maritime and Port Security 2</td>
<td>4</td>
</tr>
<tr>
<td>HLS 6120</td>
<td>Aviation Security 1</td>
<td>4</td>
</tr>
<tr>
<td>HLS 6130</td>
<td>Aviation Security 2</td>
<td>4</td>
</tr>
<tr>
<td>HLS 6140</td>
<td>Port Security Capstone</td>
<td>4</td>
</tr>
</tbody>
</table>

### 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) 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.

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

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDU 6051</td>
<td>Culture, Equity, Power, and Influence</td>
<td>4</td>
</tr>
<tr>
<td>EDU 6086</td>
<td>Foundations of Literacy Development and Instruction</td>
<td>4</td>
</tr>
<tr>
<td>EDU 6104</td>
<td>Child and Adolescent Development, Learning, and Teaching</td>
<td>4</td>
</tr>
<tr>
<td>EDU 6107</td>
<td>Inclusion, Equity, and Diversity</td>
<td>4</td>
</tr>
<tr>
<td>EDU 6154</td>
<td>Inquiry in the Sciences and Humanities</td>
<td>4</td>
</tr>
<tr>
<td>EDU 6155</td>
<td>Inquiry in Mathematics</td>
<td>4</td>
</tr>
<tr>
<td>EDU 6185</td>
<td>English-Language Learners in the General Education Classroom</td>
<td>4</td>
</tr>
<tr>
<td>EDU 6183</td>
<td>Collaborative Strategies for Effective Classroom Management</td>
<td>1</td>
</tr>
<tr>
<td>EDU 6866</td>
<td>Teaching Practicum and Seminar</td>
<td>1-8</td>
</tr>
</tbody>
</table>

Elective Courses
Complete 8 quarter hours from the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDU 6023</td>
<td>Institute in Creating a Community of Learners/Behaviors</td>
<td></td>
</tr>
<tr>
<td>EDU 6300</td>
<td>Introduction to Language and Linguistics</td>
<td></td>
</tr>
<tr>
<td>EDU 6425</td>
<td>Special Education: Role of Special Educators in an Inclusive School</td>
<td></td>
</tr>
<tr>
<td>EDU 6426</td>
<td>Developmental Language, Literacy, and Writing: Assessment and Instruction</td>
<td></td>
</tr>
<tr>
<td>EDU 6429</td>
<td>Variations in Child and Adolescent Development</td>
<td></td>
</tr>
<tr>
<td>EDU 6436</td>
<td>Best Practices for the 21st-Century Education</td>
<td></td>
</tr>
<tr>
<td>EDU 6437</td>
<td>Assessment in Education</td>
<td></td>
</tr>
<tr>
<td>EDU 6438</td>
<td>Teachers as Curriculum Leaders</td>
<td></td>
</tr>
<tr>
<td>EDU 6452</td>
<td>Critical Scholarly Investigation: On Location</td>
<td></td>
</tr>
<tr>
<td>EDU 6462</td>
<td>Children's Literature</td>
<td></td>
</tr>
<tr>
<td>EDU 6465</td>
<td>Critical and Creative Thinking</td>
<td></td>
</tr>
<tr>
<td>EDU 6472</td>
<td>Advanced Special Education Strategies</td>
<td></td>
</tr>
</tbody>
</table>

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:

- 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:

- 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) 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

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDU 6051</td>
<td>Culture, Equity, Power, and Influence</td>
<td>4</td>
</tr>
<tr>
<td>EDU 6064</td>
<td>Curriculum and Assessment</td>
<td>4</td>
</tr>
<tr>
<td>EDU 6104</td>
<td>Child and Adolescent Development, Learning, and Teaching</td>
<td>4</td>
</tr>
<tr>
<td>EDU 6107</td>
<td>Inclusion, Equity, and Diversity</td>
<td>4</td>
</tr>
<tr>
<td>EDU 6162</td>
<td>Language, Culture, and Literacy in Middle and High Schools</td>
<td>4</td>
</tr>
<tr>
<td>EDU 6185</td>
<td>English-Language Learners in the General Education Classroom</td>
<td>4</td>
</tr>
<tr>
<td>EDU 6183</td>
<td>Collaborative Strategies for Effective Classroom Management</td>
<td>1</td>
</tr>
<tr>
<td>EDU 6866</td>
<td>Teaching Practicum and Seminar</td>
<td>1-8</td>
</tr>
</tbody>
</table>

Elective Courses

Complete 8 quarter hours from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDU 6023</td>
<td>Institute in Creating a Community of Learners/Behaviors</td>
<td></td>
</tr>
<tr>
<td>EDU 6300</td>
<td>Introduction to Language and Linguistics</td>
<td></td>
</tr>
<tr>
<td>EDU 6425</td>
<td>Special Education: Role of Special Educators in an Inclusive School</td>
<td></td>
</tr>
<tr>
<td>EDU 6426</td>
<td>Developmental Language, Literacy, and Writing: Assessment and Instruction</td>
<td></td>
</tr>
<tr>
<td>EDU 6429</td>
<td>Variations in Child and Adolescent Development</td>
<td></td>
</tr>
</tbody>
</table>

EDU 6436   Best Practices for the 21st-Century Education
EDU 6437   Assessment in Education
EDU 6438   Teachers as Curriculum Leaders
EDU 6452   Critical Scholarly Investigation: On Location
EDU 6462   Children’s Literature
EDU 6465   Critical and Creative Thinking
EDU 6472   Advanced Special Education Strategies
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 6530   Beyond Behavior Management
EDU 6569   Differentiated Instruction and Assessment in Mathematics
EDU 6570   Advanced Strategies in Literacy: Readers and Writers Who Struggle

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:
Advanced special education course 4
Advanced literacy course 4
Advanced behavior management course 4
Assessment course 4
EDU 6874   Practicum, Portfolio, and Panel Review

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:
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

**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 a 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 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 a 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 a 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**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDU 6050</td>
<td>Education as an Advanced Field of Study</td>
<td>5</td>
</tr>
<tr>
<td>EDU 6051</td>
<td>Culture, Equity, Power, and Influence</td>
<td>4</td>
</tr>
</tbody>
</table>

**Concentration**

Complete one of the following five concentrations:

**Concentration in eLearning and Instructional Design**

**Required Courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDU 6319</td>
<td>How People Learn</td>
<td>4</td>
</tr>
<tr>
<td>EDU 6321</td>
<td>Models for Learning Design</td>
<td>4</td>
</tr>
<tr>
<td>EDU 6323</td>
<td>Technology as a Medium for Learning</td>
<td>4</td>
</tr>
<tr>
<td>EDU 6324</td>
<td>Competencies, Assessment, and Learning Analytics</td>
<td>4</td>
</tr>
<tr>
<td>EDU 6331</td>
<td>E-Learning Design as a Collaborative Profession</td>
<td>4</td>
</tr>
</tbody>
</table>

Complete the following course last:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDU 6225</td>
<td>Capstone</td>
<td>4</td>
</tr>
</tbody>
</table>

Complete three of the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDU 6332</td>
<td>Open Learning</td>
<td></td>
</tr>
<tr>
<td>EDU 6333</td>
<td>Social Media and Beyond</td>
<td></td>
</tr>
<tr>
<td>EDU 6558</td>
<td>Issues in Education</td>
<td></td>
</tr>
<tr>
<td>EDU 6202</td>
<td>Faculty, Curriculum, and Academic Community</td>
<td></td>
</tr>
</tbody>
</table>
**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

**Concentration in Higher Education Administration**

**Required Courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDU 6201</td>
<td>The Landscape of Higher Education</td>
<td>4</td>
</tr>
<tr>
<td>EDU 6447</td>
<td>The Demographics of Higher Education</td>
<td>4</td>
</tr>
</tbody>
</table>

**Complete one of the following:**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDU 6202</td>
<td>Faculty, Curriculum, and Academic Community</td>
<td>4</td>
</tr>
<tr>
<td>EDU 6203</td>
<td>Education Law, Policy, and Finance</td>
<td></td>
</tr>
<tr>
<td>EDU 6221</td>
<td>Enrollment, Retention, Graduation, Success</td>
<td></td>
</tr>
</tbody>
</table>

**Complete one of the following:**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDU 6450</td>
<td>The Globalization of Education</td>
<td>4</td>
</tr>
<tr>
<td>INT 6900</td>
<td>International Field Study Experience</td>
<td></td>
</tr>
</tbody>
</table>

**Elective Courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDU 6520</td>
<td>Learning and the Brain: Translating Research into Practice</td>
<td></td>
</tr>
<tr>
<td>EDU 6319</td>
<td>How People Learn</td>
<td></td>
</tr>
<tr>
<td>EDU 6322</td>
<td>Open Learning</td>
<td></td>
</tr>
<tr>
<td>EDU 6300</td>
<td>Digital Media Literacy</td>
<td></td>
</tr>
<tr>
<td>EDU 6558</td>
<td>Issues in Education</td>
<td></td>
</tr>
<tr>
<td>EDU 6303</td>
<td>Introduction to Language and Linguistics</td>
<td></td>
</tr>
<tr>
<td>EDU 6534</td>
<td>Bilingualism, Second Language, and Literacy Development</td>
<td></td>
</tr>
<tr>
<td>EDU 6182</td>
<td>Educational Statistics</td>
<td></td>
</tr>
</tbody>
</table>

**Complete the following course last:**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDU 6225</td>
<td>Capstone</td>
<td>4</td>
</tr>
</tbody>
</table>

**Concentration in Learning Analytics**

**Required Courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDU 6340</td>
<td>Learning Analytics Concepts and Theories</td>
<td>4</td>
</tr>
<tr>
<td>EDU 6341</td>
<td>Introduction to Data Mining in Education</td>
<td>4</td>
</tr>
<tr>
<td>EDU 6343</td>
<td>Predictive Modeling for Learning Analytics</td>
<td>4</td>
</tr>
<tr>
<td>EDU 6344</td>
<td>Data Visualization for Learning Analytics</td>
<td>4</td>
</tr>
<tr>
<td>EDU 6345</td>
<td>Text Mining for Learning Analytics</td>
<td>4</td>
</tr>
<tr>
<td>EDU 6324</td>
<td>Competencies, Assessment, and Learning Analytics</td>
<td>4</td>
</tr>
<tr>
<td>EDU 6182</td>
<td>Educational Statistics</td>
<td>4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDU 6319</td>
<td>How People Learn</td>
<td>4</td>
</tr>
</tbody>
</table>

**Complete the following course last:**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDU 6225</td>
<td>Capstone</td>
<td>4</td>
</tr>
</tbody>
</table>

**Concentration in Learning and Instruction**

**Required Courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDU 6330</td>
<td>Digital Media Literacy</td>
<td>4</td>
</tr>
<tr>
<td>EDU 6328</td>
<td>Policy and Leadership</td>
<td>4</td>
</tr>
<tr>
<td>EDU 6437</td>
<td>Assessment in Education</td>
<td>4</td>
</tr>
</tbody>
</table>

**Complete the following course last:**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDU 6225</td>
<td>Capstone</td>
<td>4</td>
</tr>
</tbody>
</table>

**Complete one of the following:**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDU 6465</td>
<td>Critical and Creative Thinking</td>
<td></td>
</tr>
<tr>
<td>EDU 6520</td>
<td>Learning and the Brain: Translating Research into Practice</td>
<td></td>
</tr>
<tr>
<td>EDU 6319</td>
<td>How People Learn</td>
<td></td>
</tr>
</tbody>
</table>

**Complete four courses (16 quarter hours) from any other concentration:**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDU 6201</td>
<td>The Landscape of Higher Education</td>
<td></td>
</tr>
<tr>
<td>EDU 6447</td>
<td>The Demographics of Higher Education</td>
<td></td>
</tr>
<tr>
<td>EDU 6221</td>
<td>Enrollment, Retention, Graduation, Success</td>
<td></td>
</tr>
<tr>
<td>EDU 6450</td>
<td>The Globalization of Education</td>
<td></td>
</tr>
<tr>
<td>EDU 6332</td>
<td>Open Learning</td>
<td></td>
</tr>
<tr>
<td>EDU 6323</td>
<td>Technology as a Medium for Learning</td>
<td></td>
</tr>
<tr>
<td>EDU 6426</td>
<td>Developmental Language, Literacy, and Writing: Assessment and Instruction</td>
<td></td>
</tr>
<tr>
<td>EDU 6528</td>
<td>Adaptive Learning/Behavior Management Strategies: Consultation and Collaboration</td>
<td></td>
</tr>
<tr>
<td>EDU 6429</td>
<td>Variations in Child and Adolescent Development</td>
<td></td>
</tr>
<tr>
<td>EDU 6431</td>
<td>Developing Skills and Accessing Ideas: Curriculum</td>
<td></td>
</tr>
<tr>
<td>EDU 6558</td>
<td>Issues in Education</td>
<td></td>
</tr>
<tr>
<td>EDU 6185</td>
<td>English-Language Learners in the General Education Classroom</td>
<td></td>
</tr>
<tr>
<td>EDU 6300</td>
<td>Introduction to Language and Linguistics</td>
<td></td>
</tr>
<tr>
<td>EDU 6534</td>
<td>Bilingualism, Second Language, and Literacy Development</td>
<td></td>
</tr>
<tr>
<td>EDU 6182</td>
<td>Educational Statistics</td>
<td></td>
</tr>
<tr>
<td>EDU 6438</td>
<td>Teachers as Curriculum Leaders</td>
<td></td>
</tr>
</tbody>
</table>

**Concentration in Special Education**

**Required Courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDU 6425</td>
<td>Special Education: Role of Special Educators in an Inclusive School</td>
<td></td>
</tr>
<tr>
<td>EDU 6426</td>
<td>Developmental Language, Literacy, and Writing: Assessment and Instruction</td>
<td></td>
</tr>
<tr>
<td>EDU 6528</td>
<td>Adaptive Learning/Behavior Management Strategies: Consultation and Collaboration</td>
<td></td>
</tr>
<tr>
<td>EDU 6569</td>
<td>Differentiated Instruction and Assessment in Mathematics</td>
<td></td>
</tr>
<tr>
<td>EDU 6874</td>
<td>Practicum, Portfolio, and Panel Review</td>
<td>4</td>
</tr>
</tbody>
</table>

**Electives**
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

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALY 6000</td>
<td>Introduction to Analytics</td>
<td>3</td>
</tr>
<tr>
<td>ALY 6010</td>
<td>Probability Theory and Introductory Statistics</td>
<td>3</td>
</tr>
<tr>
<td>ALY 6015</td>
<td>Intermediate Analytics</td>
<td>3</td>
</tr>
<tr>
<td>ALY 6050</td>
<td>Introduction to Enterprise Analytics</td>
<td>3</td>
</tr>
<tr>
<td>ALY 6070</td>
<td>Communication and Visualization for Data Analytics</td>
<td>3</td>
</tr>
</tbody>
</table>

Concentration
Complete one of the following three concentrations:

Concentration in Statistical Modeling

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALY 6110</td>
<td>Data Management and Big Data</td>
<td>3</td>
</tr>
<tr>
<td>ALY 6020</td>
<td>Predictive Analytics</td>
<td>3</td>
</tr>
<tr>
<td>ALY 6040</td>
<td>Data Mining Applications</td>
<td>3</td>
</tr>
<tr>
<td>ALY 6983</td>
<td>Topics</td>
<td>3</td>
</tr>
<tr>
<td>GIS 5102</td>
<td>Fundamentals of GIS Analysis</td>
<td>3</td>
</tr>
</tbody>
</table>

Concentration in Evidence-Based Modeling

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALY 6060</td>
<td>Decision Support and Business Intelligence</td>
<td>3</td>
</tr>
<tr>
<td>ALY 6100</td>
<td>Data-Driven Decision Making</td>
<td>3</td>
</tr>
<tr>
<td>ALY 6120</td>
<td>Leadership in Analytics</td>
<td>3</td>
</tr>
<tr>
<td>ALY 6040</td>
<td>Data Mining Applications</td>
<td>3</td>
</tr>
<tr>
<td>ALY 6130</td>
<td>Risk Management for Analytics</td>
<td>3</td>
</tr>
</tbody>
</table>

Concentration in Informational Design

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALY 6030</td>
<td>Data Warehousing and SQL</td>
<td>3</td>
</tr>
<tr>
<td>ALY 6040</td>
<td>Data Mining Applications</td>
<td>3</td>
</tr>
<tr>
<td>ITC 6015</td>
<td>Enterprise Information Architecture</td>
<td>3</td>
</tr>
<tr>
<td>ITC 6020</td>
<td>Information Systems Design and Development</td>
<td>3</td>
</tr>
<tr>
<td>ALY 6060</td>
<td>Decision Support and Business Intelligence</td>
<td>3</td>
</tr>
</tbody>
</table>

Experiential Learning Course

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALY 6080</td>
<td>Integrated Experiential Learning</td>
<td>3</td>
</tr>
</tbody>
</table>

Experiential Capstone Course

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALY 6980</td>
<td>Capstone</td>
<td>3</td>
</tr>
</tbody>
</table>

Electives
Complete three of the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITC 6015</td>
<td>Enterprise Information Architecture</td>
<td></td>
</tr>
<tr>
<td>ITC 6045</td>
<td>Information Technology Policy, Ethics, and Social Responsibility</td>
<td></td>
</tr>
<tr>
<td>ITC 6310</td>
<td>Information Security Policy, Ethics, Social Responsibility</td>
<td></td>
</tr>
<tr>
<td>INPS 5184</td>
<td>Interdisciplinary Professional Foundations</td>
<td></td>
</tr>
<tr>
<td>GIS 5101</td>
<td>Introduction to Geographic Information Systems</td>
<td></td>
</tr>
<tr>
<td>GIS 5201</td>
<td>Advanced Spatial Analysis</td>
<td></td>
</tr>
<tr>
<td>ITC 6020</td>
<td>Information Systems Design and Development</td>
<td></td>
</tr>
<tr>
<td>LDR 6110</td>
<td>Leading Teams</td>
<td></td>
</tr>
<tr>
<td>ALY 6020</td>
<td>Predictive Analytics</td>
<td></td>
</tr>
<tr>
<td>ALY 6110</td>
<td>Data-Driven Decision Making</td>
<td></td>
</tr>
<tr>
<td>ALY 6110</td>
<td>Data Management and Big Data</td>
<td></td>
</tr>
<tr>
<td>ALY 6983</td>
<td>Topics</td>
<td></td>
</tr>
<tr>
<td>ALY 6120</td>
<td>Leadership in Analytics</td>
<td></td>
</tr>
</tbody>
</table>

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
Complete 22 quarter hours:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>DGM 6122</td>
<td>Foundations of Digital Storytelling</td>
</tr>
<tr>
<td>DGM 6145</td>
<td>Information Technology and Creative Practice</td>
</tr>
<tr>
<td>DGM 6521</td>
<td>Web Creation for Content Management Systems</td>
</tr>
<tr>
<td>DGM 6140</td>
<td>Sound Design</td>
</tr>
<tr>
<td>DGM 6168</td>
<td>Usability and Human Interaction</td>
</tr>
<tr>
<td>DGM 6890</td>
<td>Thesis Proposal Development</td>
</tr>
<tr>
<td>DGM 7990</td>
<td>Thesis</td>
</tr>
<tr>
<td>DGM 7980</td>
<td>Capstone</td>
</tr>
</tbody>
</table>

Complete one of the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>TCC 6110</td>
<td>Information Architecture</td>
</tr>
<tr>
<td>TCC 6710</td>
<td>Content Strategy</td>
</tr>
</tbody>
</table>

Complete one pair of the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>DGM 6451</td>
<td>Web Development</td>
</tr>
<tr>
<td>DGM 6450</td>
<td>Animation Basics</td>
</tr>
<tr>
<td>DGM 6458</td>
<td>Game Design Algorithms and Data Structures</td>
</tr>
<tr>
<td>DGM 6508</td>
<td>Game Development Intensive</td>
</tr>
<tr>
<td>DGM 6525</td>
<td>Research Methods for Global User Experiences</td>
</tr>
<tr>
<td>CMN 6045</td>
<td>Leveraging Digital Technologies: Strategy, Assessment, and Governance</td>
</tr>
<tr>
<td>CMN 6065</td>
<td>Implementation and Management of Social Media Channels and Online Communities</td>
</tr>
<tr>
<td>DGM 6285</td>
<td>Interactive Marketing Fundamentals</td>
</tr>
</tbody>
</table>
In addition to their concentration electives, students are encouraged to explore new areas within the digital media space offered both by the program and through related master’s programs in the College of Professional Studies. Students are also able to request another digital media course offering as their free elective, as long as they met its prerequisite.

Free Elective
In addition to their concentration electives, students are encouraged to explore new areas within the digital media space offered both by the program and through related master’s programs in the College of Professional Studies. Students are also able to request another digital media course offering as their free elective, as long as they met its prerequisite.

Complete one of the following:

- ALY 6110 Data Management and Big Data 3
- DGM 6322 Advanced Digital Storytelling 4
- DGM 6550 Search Engine Optimization: Strategy and Implementation 4
- INPS 5184 Interdisciplinary Professional Foundations 3
- ITC 6410 Fundamentals of Human Behaviors for Interactive Systems 3

Or, with approval, complete one course from a digital media concentration.

Workshops
Optional digital media workshops are designed to provide valuable technical skills and tools for students in all graduate degree programs. Students may complete one of the following:

- DGM 6501 Web Creation Boot Camp 2
- DGM 6505 Modeling and Rendering (Intensive) 2
- DGM 6506 Introduction to Digital Video 2
- DGM 6508 Game Development Intensive 2
- DGM 6509 Integrated Suite Workshop 2
- DGM 6511 Web Creation Bootcamp 2 2
- DGM 6513 Single-Lens Reflex Camera Workshop 2
- DGM 6515 Introduction to After Effects 2
- DGM 6518 Game Programming Intensive 1 2
- DGM 6519 Game Programming Intensive 2 2
- TCC 6620 Collecting User Data 2

Program Credit/GPA Requirements
45 total quarter hours required
Minimum 3.000 GPA required
<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>DGM 6435</td>
<td>Digital Video Production</td>
</tr>
<tr>
<td>DGM 6440</td>
<td>Editing in the Digital Studio</td>
</tr>
<tr>
<td>DGM 6520</td>
<td>Lighting for the Camera</td>
</tr>
<tr>
<td>DGM 6540</td>
<td>Compositing</td>
</tr>
<tr>
<td>DGM 6545</td>
<td>Documentary and Nonfiction Production</td>
</tr>
<tr>
<td>DGM 6540</td>
<td>Screenwriting: Linear and Interactive</td>
</tr>
</tbody>
</table>

**Concentration in Game Design**

Complete 20 quarter hours from the following: 20

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>DGM 6308</td>
<td>Intermediate Programming for Digital Media</td>
</tr>
<tr>
<td>DGM 6400</td>
<td>Game Design Fundamentals</td>
</tr>
<tr>
<td>DGM 6405</td>
<td>Game Development</td>
</tr>
<tr>
<td>DGM 6408</td>
<td>Game Design Algorithms and Data Structures</td>
</tr>
<tr>
<td>DGM 6410</td>
<td>Game Design Technology Lab</td>
</tr>
<tr>
<td>DGM 6508</td>
<td>Game Development Intensive</td>
</tr>
</tbody>
</table>

**Concentration in Interactive Design**

Complete 20 quarter hours from the following: 20

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>DGM 6461</td>
<td>Interactive Information Design 1</td>
</tr>
</tbody>
</table>

Complete four courses from one of the following tracks:

**Design Track**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>DGM 6217</td>
<td>Typography for Interactivity</td>
</tr>
<tr>
<td>DGM 6463</td>
<td>Interactive Information Design 2</td>
</tr>
<tr>
<td>DGM 6317</td>
<td>Screen-Based Publication Design</td>
</tr>
<tr>
<td>DGM 6471</td>
<td>Designing Infographics</td>
</tr>
<tr>
<td>DGM 6895</td>
<td>Digital Portfolio Capstone</td>
</tr>
</tbody>
</table>

**Usability and Development Track**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>DGM 6451</td>
<td>Web Development</td>
</tr>
<tr>
<td>DGM 6268</td>
<td>Usable Design for Mobile Digital Media</td>
</tr>
<tr>
<td>DGM 6308</td>
<td>Intermediate Programming for Digital Media</td>
</tr>
<tr>
<td>DGM 6525</td>
<td>Research Methods for Global User Experiences</td>
</tr>
<tr>
<td>TCC 6110</td>
<td>Information Architecture</td>
</tr>
<tr>
<td>TCC 6710</td>
<td>Content Strategy</td>
</tr>
</tbody>
</table>

**Concentration in Social Media**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMN 6035</td>
<td>Legal, Policy, and Ethical Issues in the Digital Era</td>
</tr>
<tr>
<td>CMN 6045</td>
<td>Leveraging Digital Technologies: Strategy, Assessment, and Governance</td>
</tr>
<tr>
<td>CMN 6065</td>
<td>Implementation and Management of Social Media Channels and Online Communities</td>
</tr>
<tr>
<td>DGM 6285</td>
<td>Interactive Marketing Fundamentals</td>
</tr>
<tr>
<td>DGM 6290</td>
<td>Social Media and Brand Strategy Implementation</td>
</tr>
<tr>
<td>TCC 6710</td>
<td>Content Strategy</td>
</tr>
</tbody>
</table>

**Free Electives**

Complete one of the following: 3-4

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALY 6110</td>
<td>Data Management and Big Data</td>
</tr>
<tr>
<td>DGM 6125</td>
<td>Time-Based Media</td>
</tr>
<tr>
<td>DGM 6300</td>
<td>Digital Capture and Output</td>
</tr>
<tr>
<td>DGM 6322</td>
<td>Advanced Digital Storytelling</td>
</tr>
<tr>
<td>DGM 6530</td>
<td>Character Animation</td>
</tr>
<tr>
<td>DGM 6943</td>
<td>Integrative Experiential Learning</td>
</tr>
<tr>
<td>INPS 5184</td>
<td>Interdisciplinary Professional Foundations</td>
</tr>
<tr>
<td>ITC 6410</td>
<td>Fundamentals of Human Behaviors for Interactive Systems</td>
</tr>
</tbody>
</table>

**Workshops**

Optional digital media workshops are designed to provide valuable technical skills and tools for students in all graduate degree programs. Students may complete one of the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>DGM 6506</td>
<td>Introduction to Digital Video</td>
</tr>
<tr>
<td>DGM 6509</td>
<td>Integrated Suite Workshop</td>
</tr>
<tr>
<td>DGM 6515</td>
<td>Introduction to After Effects</td>
</tr>
<tr>
<td>DGM 6518</td>
<td>Game Programming Intensive 1</td>
</tr>
<tr>
<td>DGM 6519</td>
<td>Game Programming Intensive 2</td>
</tr>
<tr>
<td>TCC 6620</td>
<td>Collecting User Data</td>
</tr>
<tr>
<td>TCC 6630</td>
<td>Introduction to XML</td>
</tr>
</tbody>
</table>

**Program Credit/GPA Requirements**

56 total quarter hours required
Minimum 3.00 GPA required

---

**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**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>GIS 5101</td>
<td>Introduction to Geographic Information Systems</td>
</tr>
<tr>
<td>GIS 5102</td>
<td>Fundamentals of GIS Analysis</td>
</tr>
<tr>
<td>RMS 5105</td>
<td>Fundamentals of Remote Sensing</td>
</tr>
<tr>
<td>GIS 5201</td>
<td>Advanced Spatial Analysis</td>
</tr>
<tr>
<td>GIS 6980</td>
<td>Capstone</td>
</tr>
</tbody>
</table>

---

*Northeastern University*
Complete two of the following: 6-7
- LDR 6100 Developing Your Leadership Capability
- PJM 5900 Foundations of Project Management
- ITC 6045 Information Technology Policy, Ethics, and Social Responsibility
- ITC 6020 Information Systems Design and Development

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

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

Required Course
- RMS 6110 Digital Image Processing 3

Complete five of the following: 15
- RMS 6210 Technology, Operations, and Requirements for Drones, Helicopters, and Airplanes
- RMS 6230 Remote Sensing and Global Change
- RMS 6240 Introduction to Radar and LIDAR Remote Sensing
- RMS 6250 Remote Sensing of Vegetation
- 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

Statistical Analytics

- 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.

- COP 6940 Personal and Career Development 3-4
- INT 6943 Integrative Experiential Learning 3

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

- 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

Required Capstone and Experiential Learning Courses

- ITC 6040 Informatics Capstone 3
- INT 6940 Experiential Learning Projects for Professionals 1-4

Concentration Courses

Students are not required to complete one of the concentrations below, but they must complete 24 credit hours of course work approved by their career and academic coach.

Concentration in Information Security Management

- ITC 6300 Foundations of Information Security 3
- ITC 6305 IT Infrastructure (Systems, Networks, Telecom) 3
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITC 6310</td>
<td>Information Security Governance</td>
<td>3</td>
</tr>
<tr>
<td>ITC 6315</td>
<td>Information Security Risk Management</td>
<td>3</td>
</tr>
<tr>
<td>ITC 6320</td>
<td>Information Security Technology (Complete three of the following courses)</td>
<td>3</td>
</tr>
</tbody>
</table>

Complete three of the following:
- ITC 6325 CISA Preparation
- ITC 6330 CISSP Preparation
- ITC 6345 Systems and Network Administration
- MIS 6080 Network Security Concepts
- MIS 6082 Network Protection

**Concentration in Geographic Information Systems**
- 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 |

Complete two of the following:
- 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

**Concentration in Leading and Managing Technical Projects**
- 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 |
- ITC 6305 IT Infrastructure (Systems, Networks, Telecom) | 3 |

**Concentration in Program and Portfolio Management**
- 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 |

**Concentration in Analytics**
- 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 |
- ALY6070 Complete three of the following:
  - 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

**Concentration in Human-Centered Informatics**
- 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 three of the following:
- DGM 6463 Interactive Information Design 2
- DGM 6525 Research Methods for Global User Experiences
- ALY 6070 Communication and Visualization for Data Analytics
- ITC 6355 Web Application Design and Development
- ITC 7120 Healthcare Information Systems
- DGM 6145 Information Technology and Creative Practice
- GIS 6370 Internet-Based GIS

**Concentration in Cloud Computing Application and Management**
- ITC 6420 Introduction to Cloud Computing Applications and Management | 3 |
- ITC 6430 Enterprise Information Technology Service Management | 3 |
- ITC 6015 Enterprise Information Architecture | 3 |
- ITC 6320 Information Security Technology | 3 |
- ITC 6355 Web Application Design and Development | 3 |

Complete three of the following:
- ALY 6050 Introduction to Enterprise Analytics
- PJM 6205 Leading and Managing Technical Projects
- DGM 6145 Information Technology and Creative Practice
- MIS 6080 Network Security Concepts
- MIS 6082 Network Protection

**Elective Courses**
Select sufficient elective credits (if necessary) to reach minimum credit requirements for the degree.

- DGM 6500 Working with Digital Images | 2 |
- DGM 6501 Web Creation Boot Camp | 2 |
- DGM 6511 Web Creation Bootcamp 2 | 2 |
- INPS 5184 Interdisciplinary Professional Foundations | 2-3 |
or EDU 6184  Interdisciplinary Foundations
ITC 6030  Computer Systems and Networks  3
ITC 6340  Mobile and Wireless Networks and Applications  3
ITC 6045  Information Technology Policy, Ethics, and Social Responsibility  3
GIS 5101  Introduction to Geographic Information Systems  3
GIS 5102  Fundamentals of GIS Analysis  3
GIS 6360  Spatial Databases  3
PJM 6000  Project Management Practices  3
TCC 6110  Information Architecture  4

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
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:

Concentration in Business and Entrepreneurship in Nutrition
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

Concentration in Nutrition Education
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

Concentration in Nutrition and Fitness
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

Concentration in Obesity and Nutritional Health
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

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
CED 6010  Applied Microeconomic Theory  4
CED 6020  Applied Macroeconomic Theory  4
CED 6030  Applied Mathematics and Statistics for Economics  4
CED 6040  Applied Econometrics  4
CED 6050  Commerce and Economic Development  4
CED 6910  Capstone: Master’s Project  5

Elective Courses
Complete five of the following: 19-20
CED 6070  Economics of Human Capital
CED 6080  Commerce, Institutions, and Innovation
CED 6090  Cultural Economic Development
CED 6110  Law and Economics
CED 6120  Environmental Economics
CED 6130  Sustainable Economic Development
CED 6140  Economics of E-Commerce
COP 6940  Personal and Career Development
INPS 5184  Interdisciplinary Professional Foundations

Program Credit/GPA Requirements
45 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):

- CMN 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 Course Options
Complete one of the following:  3
- CMN 6943  Integrative Experiential Learning
- CMN 6940  Projects for Professionals

Elective Courses
Note: Students who take Introduction to Organizational Communication (CMN 6000) are only required to take two courses in this section.

Complete three of the following:  5-10
- 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
- INPS 5184  Interdisciplinary Professional Foundations
- INT 6943  Integrative Experiential Learning
- INT 6900  International Field Study Experience
- INT 6940  Experiential Learning Projects for Professionals

Concentration
Complete one of the following eight concentrations:

Concentration in Human Resource Management
HRM 6005  Creating a High-Performance Organization: Strategic Organizational and HRM Choices  3
### Corporate and Organizational Communication, MS

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>HRM 6010</td>
<td>Total Compensation</td>
<td>3</td>
</tr>
<tr>
<td>HRM 6020</td>
<td>Strategic Recruitment, Training, and Performance Management</td>
<td>3</td>
</tr>
<tr>
<td>HRM 6030</td>
<td>Employee Rights and Employer Obligations</td>
<td>3</td>
</tr>
<tr>
<td>HRM 6040</td>
<td>High-Performance Human Resources Systems and Development</td>
<td>3</td>
</tr>
</tbody>
</table>

#### Concentration in Public and Media Relations

**Required Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>PBR 6100</td>
<td>Introduction to Public Relations</td>
<td>3</td>
</tr>
<tr>
<td>PBR 6130</td>
<td>Public Relations Writing Seminar 1</td>
<td>3</td>
</tr>
<tr>
<td>PBR 6140</td>
<td>Public Relations Writing Seminar 2</td>
<td>3</td>
</tr>
<tr>
<td>PBR 6710</td>
<td>Public Relations Research: Understanding External Audiences</td>
<td>3</td>
</tr>
</tbody>
</table>

**Public and Media Relations Electives**

Complete two of the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMN 6025</td>
<td>Digital Era Skills: Platforms, Tools, and Techniques</td>
<td>6-7</td>
</tr>
<tr>
<td>CMN 6035</td>
<td>Legal, Policy, and Ethical Issues in the Digital Era</td>
<td></td>
</tr>
<tr>
<td>CMN 6045</td>
<td>Leveraging Digital Technologies: Strategy, Assessment, and Governance</td>
<td></td>
</tr>
<tr>
<td>DGM 6290</td>
<td>Social Media and Brand Strategy Implementation</td>
<td></td>
</tr>
<tr>
<td>PBR 6120</td>
<td>Public Relations Legal Issues</td>
<td></td>
</tr>
<tr>
<td>PBR 6125</td>
<td>Community Relations and Corporate Social Responsibility</td>
<td></td>
</tr>
</tbody>
</table>

#### Concentration in Leadership

**Required Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>LDR 6100</td>
<td>Developing Your Leadership Capability</td>
<td>3-6</td>
</tr>
<tr>
<td>LDR 6110</td>
<td>Leading Teams</td>
<td>3-6</td>
</tr>
<tr>
<td>LDR 6120</td>
<td>Organizational Leadership</td>
<td>3-6</td>
</tr>
<tr>
<td>LDR 6150</td>
<td>Transforming Organizations</td>
<td>3</td>
</tr>
</tbody>
</table>

**Leadership Elective**

Complete one of the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>LDR 6135</td>
<td>Ethical Leadership</td>
<td></td>
</tr>
<tr>
<td>LDR 6140</td>
<td>Strategic Leadership</td>
<td></td>
</tr>
</tbody>
</table>

#### Concentration in Project Management

**Required Courses**

*Note: Students with project management experience are not required to take PJM 5900.*

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>PJM 6000</td>
<td>Project Management Practices</td>
<td>3</td>
</tr>
<tr>
<td>PJM 5900</td>
<td>Foundations of Project Management</td>
<td>4</td>
</tr>
<tr>
<td>PJM 6025</td>
<td>Project Scheduling and Cost Planning</td>
<td>3</td>
</tr>
<tr>
<td>PJM 6015</td>
<td>Project Risk Management</td>
<td>3</td>
</tr>
</tbody>
</table>

**Project Management Electives**

*Note: Students who take PJM 5900 are required to take only one course in this section.*

Complete two of the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>PJM 5900</td>
<td>Foundations of Project Management</td>
<td></td>
</tr>
<tr>
<td>PJM 6125</td>
<td>Project Evaluation and Assessment</td>
<td></td>
</tr>
<tr>
<td>PJM 6135</td>
<td>Project Quality Management</td>
<td></td>
</tr>
<tr>
<td>PJM 6140</td>
<td>Managing Troubled Projects</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>PJM 6710</td>
<td>Introduction to Program and Portfolio Management</td>
<td></td>
</tr>
</tbody>
</table>

#### Concentration in Social Media and Online Communication

Complete five of the following (CMN 6025, 6045, and 6065 are required):

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMN 6015</td>
<td>Introduction to the Digital Era: The Power of Social Media</td>
<td></td>
</tr>
<tr>
<td>CMN 6025</td>
<td>Digital Era Skills: Platforms, Tools, and Techniques</td>
<td></td>
</tr>
<tr>
<td>CMN 6045</td>
<td>Leveraging Digital Technologies: Strategy, Assessment, and Governance</td>
<td></td>
</tr>
<tr>
<td>CMN 6065</td>
<td>Implementation and Management of Social Media Channels and Online Communities</td>
<td></td>
</tr>
</tbody>
</table>

Complete one (or two, if CMN 6015 has been waived) of the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMN 6035</td>
<td>Legal, Policy, and Ethical Issues in the Digital Era</td>
<td></td>
</tr>
<tr>
<td>DGM 6285</td>
<td>Interactive Marketing Fundamentals</td>
<td></td>
</tr>
<tr>
<td>DGM 6290</td>
<td>Social Media and Brand Strategy Implementation</td>
<td></td>
</tr>
<tr>
<td>TCC 6710</td>
<td>Content Strategy</td>
<td></td>
</tr>
<tr>
<td>CMN 6040</td>
<td>Consumer Behaviors in the Online Environment</td>
<td></td>
</tr>
</tbody>
</table>

#### Concentration in Usability/User Experience

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>TCC 6710</td>
<td>Content Strategy</td>
<td>4</td>
</tr>
<tr>
<td>TCC 6470</td>
<td>Web Accessibility for Technical Communicators</td>
<td>4</td>
</tr>
<tr>
<td>TCC 6490</td>
<td>Usability Testing for Technical Communicators</td>
<td>4</td>
</tr>
<tr>
<td>DGM 6268</td>
<td>Usable Design for Mobile Digital Media</td>
<td>4</td>
</tr>
<tr>
<td>TCC 6610</td>
<td>Prototyping</td>
<td>2</td>
</tr>
<tr>
<td>TCC 6620</td>
<td>Collecting User Data</td>
<td>2</td>
</tr>
</tbody>
</table>

#### Concentration in Cross-Cultural Communication

**Required Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMN 6082</td>
<td>Strategies for Cross-Cultural Facilitation and Negotiation</td>
<td></td>
</tr>
<tr>
<td>CMN 6085</td>
<td>Strategies for Cross-Cultural Facilitation and Negotiation</td>
<td>3</td>
</tr>
</tbody>
</table>

Complete 12 quarter hours from one of the following:

**Social Justice Track (suggested)**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>PBR 6100</td>
<td>Introduction to Public Relations</td>
<td>3</td>
</tr>
<tr>
<td>HSV 6120</td>
<td>Social Inequality, Social Change, and Community Building</td>
<td>3</td>
</tr>
<tr>
<td>ITC 6045</td>
<td>Information Technology Policy, Ethics, and Social Responsibility</td>
<td>3</td>
</tr>
<tr>
<td>HRM 6040</td>
<td>High-Performance Human Resources Systems and Development</td>
<td>3</td>
</tr>
</tbody>
</table>

**International Track (suggested)**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>GST 6100</td>
<td>Globalization and Global Politics and Economics</td>
<td>4</td>
</tr>
<tr>
<td>GST 6101</td>
<td>Global Literacy, Culture, and Community</td>
<td>4</td>
</tr>
</tbody>
</table>
Northeastern University

301

LDR 6145  Global Leadership  3
INT 6900  International Field Study Experience  3,4

Concentration in Leading Communication Strategy and Talent Development

**Required Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMN 6200</td>
<td>Strategic Communications Advisor: Roles and Responsibilities</td>
<td>3</td>
</tr>
<tr>
<td>CMN 6201</td>
<td>Managing Communication Resources</td>
<td>3</td>
</tr>
<tr>
<td>CMN 6202</td>
<td>Management Symposium</td>
<td>3</td>
</tr>
</tbody>
</table>

Complete 9 quarter hours:  9

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HRM 6020</td>
<td>Strategic Recruitment, Training, and Performance Management</td>
<td>3</td>
</tr>
<tr>
<td>LDR 6120</td>
<td>Organizational Leadership</td>
<td>3</td>
</tr>
<tr>
<td>PJM 6000</td>
<td>Project Management Practices</td>
<td>3</td>
</tr>
<tr>
<td>PJM 6215</td>
<td>Leading Remote Project Teams</td>
<td>3</td>
</tr>
<tr>
<td>CMN 6045</td>
<td>Leveraging Digital Technologies: Strategy, Assessment, and Governance</td>
<td>3</td>
</tr>
</tbody>
</table>

Concentration in Community and Family Justice

**Community and Family Justice Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CJS 6300</td>
<td>Communities and Crime</td>
<td>3</td>
</tr>
<tr>
<td>CJS 6330</td>
<td>Youth Justice and Crime</td>
<td>3</td>
</tr>
<tr>
<td>CJS 6340</td>
<td>Substance Abuse and Addictions</td>
<td>3</td>
</tr>
<tr>
<td>CJS 6305</td>
<td>Criminal Behavior and the Family</td>
<td>3</td>
</tr>
<tr>
<td>CJS 6135</td>
<td>Intimate Partner Violence</td>
<td>3</td>
</tr>
</tbody>
</table>

**Elective**

Complete 3 quarter hours from the following:  3

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CJS 6005</td>
<td>Legal and Regulatory Issues for Security Management</td>
<td>3</td>
</tr>
<tr>
<td>CJS 6010</td>
<td>Advanced Principles of Security Management and Threat Assessment</td>
<td>3</td>
</tr>
<tr>
<td>CJS 6025</td>
<td>Genocide and War Crimes</td>
<td>3</td>
</tr>
<tr>
<td>CJS 6030</td>
<td>Organized Crime</td>
<td>3</td>
</tr>
<tr>
<td>CJS 6035</td>
<td>Corruption, Integrity, and Accountability</td>
<td>3</td>
</tr>
<tr>
<td>CJS 6040</td>
<td>Human Trafficking and Exploitation</td>
<td>3</td>
</tr>
<tr>
<td>CJS 6045</td>
<td>Policing Issues around the Globe</td>
<td>3</td>
</tr>
<tr>
<td>CJS 6050</td>
<td>Models of Intelligence-Led Policing</td>
<td>3</td>
</tr>
<tr>
<td>CJS 6105</td>
<td>Domestic and International Terrorism</td>
<td>3</td>
</tr>
<tr>
<td>CJS 6110</td>
<td>Management of Service Industries</td>
<td>3</td>
</tr>
<tr>
<td>CJS 6120</td>
<td>Preventing Service Industries Losses</td>
<td>3</td>
</tr>
<tr>
<td>CJS 6125</td>
<td>Issues in National Security</td>
<td>3</td>
</tr>
<tr>
<td>CJS 6135</td>
<td>Intimate Partner Violence</td>
<td>3</td>
</tr>
<tr>
<td>CJS 6140</td>
<td>Security Role: Safety and Environment Protection</td>
<td>3</td>
</tr>
<tr>
<td>CJS 6145</td>
<td>Correctional Rehabilitation</td>
<td>3</td>
</tr>
<tr>
<td>CJS 6205</td>
<td>Law Enforcement Management and Planning</td>
<td>3</td>
</tr>
<tr>
<td>CJS 6300</td>
<td>Communities and Crime</td>
<td>3</td>
</tr>
<tr>
<td>CJS 6305</td>
<td>Criminal Behavior and the Family</td>
<td>3</td>
</tr>
<tr>
<td>CJS 6315</td>
<td>Administration of the Adult and Juvenile Correction Systems</td>
<td>3</td>
</tr>
<tr>
<td>CJS 6320</td>
<td>Community Corrections</td>
<td>3</td>
</tr>
<tr>
<td>CJS 6325</td>
<td>Probation and Parole</td>
<td>3</td>
</tr>
<tr>
<td>CJS 6330</td>
<td>Youth Justice and Crime</td>
<td>3</td>
</tr>
<tr>
<td>CJS 6340</td>
<td>Substance Abuse and Addictions</td>
<td>3</td>
</tr>
<tr>
<td>CJS 6420</td>
<td>U.S. Policing in the 21st Century</td>
<td>3</td>
</tr>
<tr>
<td>GST 6300</td>
<td>Security and Terrorism</td>
<td>3</td>
</tr>
<tr>
<td>LDR 6110</td>
<td>Leading Teams</td>
<td>3</td>
</tr>
<tr>
<td>LDR 6120</td>
<td>Organizational Leadership</td>
<td>3</td>
</tr>
<tr>
<td>LDR 6140</td>
<td>Strategic Leadership</td>
<td>3</td>
</tr>
<tr>
<td>LDR 6360</td>
<td>Dynamics of Change at the Community and Social Level</td>
<td>3</td>
</tr>
<tr>
<td>INT 6943</td>
<td>Integrative Experiential Learning</td>
<td>3</td>
</tr>
</tbody>
</table>

Program Credit/GPA Requirements

45 total quarter hours required
Minimum 3.000 GPA required

**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**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CJS 6020</td>
<td>Contemporary Issues in Criminal Justice Policy</td>
<td>3</td>
</tr>
<tr>
<td>CJS 6400</td>
<td>Administration of Justice</td>
<td>3</td>
</tr>
<tr>
<td>CJS 6405</td>
<td>Criminological Theory for Criminal Justice Leaders</td>
<td>3</td>
</tr>
<tr>
<td>CJS 6415</td>
<td>Legal Decision Making and Leadership</td>
<td>3</td>
</tr>
<tr>
<td>CJS 6470</td>
<td>Criminal Justice Capstone</td>
<td>3</td>
</tr>
</tbody>
</table>

(Recommended as the last course)

**Operations Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CJS 6425</td>
<td>Research Methods</td>
<td>3</td>
</tr>
<tr>
<td>CJS 6435</td>
<td>Program Evaluations</td>
<td>3</td>
</tr>
</tbody>
</table>
Complete five of the following: 15

CJS 6145 Correctional Rehabilitation
CJS 6300 Communities and Crime
CJS 6315 Administration of the Adult and Juvenile Correction Systems
CJS 6325 Probation and Parole
CJS 6320 Community Corrections
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 6010 Advanced Principles of Security Management and Threat Assessment
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 6050 Models of Intelligence-Led Policing
CJS 6105 Domestic and International Terrorism
CJS 6110 Management of Service Industries Security Department
CJS 6120 Preventing Service Industries Losses
CJS 6125 Issues in National Security
CJS 6135 Intimate Partner Violence
CJS 6140 Security Role: Safety and Environment Protection
CJS 6145 Correctional Rehabilitation
CJS 6205 Law Enforcement Rehabilitation
CJS 6300 Communities and Crime
CJS 6305 Criminal Behavior and the Family
CJS 6315 Administration of the Adult and Juvenile Correction Systems
CJS 6320 Community Corrections
CJS 6325 Probation and Parole
CJS 6330 Youth Justice and Crime
CJS 6340 Substance Abuse and Addictions
CJS 6420 U.S. Policing in the 21st Century
GST 6300 Security and Terrorism
LDR 6110 Leading Teams
LDR 6120 Organizational Leadership
LDR 6140 Strategic Leadership
LDR 6360 Dynamics of Change at the Community and Social Level
INT 6943 Integrative Experiential Learning

Concentration in Global Criminal Justice

Global Criminal Justice 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

Elective

Complete 3 quarter hours from the following: 3

CJS 6005 Legal and Regulatory Issues for Security Management
CJS 6010 Advanced Principles of Security Management and Threat Assessment
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 6050 Models of Intelligence-Led Policing
CJS 6105 Domestic and International Terrorism
CJS 6110 Management of Service Industries Security Department
CJS 6120 Preventing Service Industries Losses
CJS 6125 Issues in National Security
CJS 6135 Intimate Partner Violence
CJS 6140 Security Role: Safety and Environment Protection
CJS 6145 Correctional Rehabilitation
CJS 6205 Law Enforcement Rehabilitation
CJS 6300 Communities and Crime
CJS 6305 Criminal Behavior and the Family
CJS 6315 Administration of the Adult and Juvenile Correction Systems
CJS 6320 Community Corrections
CJS 6325 Probation and Parole
CJS 6330 Youth Justice and Crime
CJS 6340 Substance Abuse and Addictions
CJS 6420 U.S. Policing in the 21st Century
GST 6300 Security and Terrorism
LDR 6110 Leading Teams
LDR 6120 Organizational Leadership
LDR 6140 Strategic Leadership
LDR 6360 Dynamics of Change at the Community and Social Level
INT 6943 Integrative Experiential Learning

Concentration in Leadership

Leadership Courses

LDR 6110 Leading Teams 3-6
LDR 6120 Organizational Leadership 3-6
LDR 6140 Strategic Leadership 3-6
LDR 6150 Transforming Organizations 3

Elective

Complete 3 quarter hours from the following: 3

LDR 6135 Ethical Leadership
LDR 6140 Strategic Leadership
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CJS 6005</td>
<td>Legal and Regulatory Issues for Security Management</td>
</tr>
<tr>
<td>CJS 6010</td>
<td>Advanced Principles of Security Management and Threat Assessment</td>
</tr>
<tr>
<td>CJS 6025</td>
<td>Genocide and War Crimes</td>
</tr>
<tr>
<td>CJS 6035</td>
<td>Corruption, Integrity, and Accountability</td>
</tr>
<tr>
<td>CJS 6040</td>
<td>Human Trafficking and Exploitation</td>
</tr>
<tr>
<td>CJS 6045</td>
<td>Policing Issues around the Globe</td>
</tr>
<tr>
<td>CJS 6050</td>
<td>Models of Intelligence-Led Policing</td>
</tr>
<tr>
<td>CJS 6060</td>
<td>Domestic and International Terrorism</td>
</tr>
<tr>
<td>CJS 6070</td>
<td>Management of Service Industries Security Department</td>
</tr>
<tr>
<td>CJS 6080</td>
<td>Preventing Service Industries Losses</td>
</tr>
<tr>
<td>CJS 6090</td>
<td>Issues in National Security</td>
</tr>
<tr>
<td>CJS 6100</td>
<td>Intimate Partner Violence</td>
</tr>
<tr>
<td>CJS 6110</td>
<td>Security Role: Safety and Environment Protection</td>
</tr>
<tr>
<td>CJS 6120</td>
<td>Correctional Rehabilitation</td>
</tr>
<tr>
<td>CJS 6130</td>
<td>Law Enforcement Management and Planning</td>
</tr>
<tr>
<td>CJS 6140</td>
<td>Communities and Crime</td>
</tr>
<tr>
<td>CJS 6150</td>
<td>Criminal Behavior and the Family</td>
</tr>
<tr>
<td>CJS 6160</td>
<td>Administration of the Adult and Juvenile Correction Systems</td>
</tr>
<tr>
<td>CJS 6170</td>
<td>Community Corrections</td>
</tr>
<tr>
<td>CJS 6180</td>
<td>Probation and Parole</td>
</tr>
<tr>
<td>GST 6300</td>
<td>Security and Terrorism</td>
</tr>
<tr>
<td>LDR 6110</td>
<td>Leading Teams</td>
</tr>
<tr>
<td>LDR 6120</td>
<td>Organizational Leadership</td>
</tr>
<tr>
<td>LDR 6130</td>
<td>Strategic Leadership</td>
</tr>
<tr>
<td>LDR 6140</td>
<td>Dynamics of Change at the Community and Social Level</td>
</tr>
<tr>
<td>INT 6943</td>
<td>Integrative Experiential Learning</td>
</tr>
</tbody>
</table>

**Concentration in Security**

**Security Courses**

Complete five of the following: 15-16

- CJS 6005 Legal and Regulatory Issues for Security Management
- CJS 6010 Advanced Principles of Security Management and Threat Assessment
- CJS 6025 Genocide and War Crimes
- CJS 6035 Corruption, Integrity, and Accountability
- CJS 6040 Human Trafficking and Exploitation
- CJS 6045 Policing Issues around the Globe
- CJS 6050 Models of Intelligence-Led Policing
- CJS 6060 Domestic and International Terrorism
- CJS 6070 Management of Service Industries Security Department
- CJS 6080 Preventing Service Industries Losses
- CJS 6090 Issues in National Security
- CJS 6100 Intimate Partner Violence
- CJS 6110 Security Role: Safety and Environment Protection
- CJS 6120 Correctional Rehabilitation
- CJS 6130 Law Enforcement Management and Planning
- CJS 6140 Communities and Crime
- CJS 6150 Criminal Behavior and the Family
- CJS 6160 Administration of the Adult and Juvenile Correction Systems
- CJS 6170 Community Corrections
- CJS 6180 Probation and Parole
- GST 6300 Security and Terrorism
- LDR 6110 Leading Teams
- LDR 6120 Organizational Leadership
- LDR 6130 Strategic Leadership
- LDR 6140 Dynamics of Change at the Community and Social Level
- INT 6943 Integrative Experiential Learning

**Concentration in Policing**

**Policing Courses**

Complete five of the following: 15

- CJS 6005 Legal and Regulatory Issues for Security Management
- CJS 6010 Advanced Principles of Security Management and Threat Assessment
- CJS 6025 Genocide and War Crimes
- CJS 6035 Corruption, Integrity, and Accountability
- CJS 6040 Human Trafficking and Exploitation
- CJS 6045 Policing Issues around the Globe
- CJS 6050 Models of Intelligence-Led Policing
- CJS 6060 Domestic and International Terrorism
- CJS 6070 Management of Service Industries Security Department
- CJS 6080 Preventing Service Industries Losses
- CJS 6090 Issues in National Security
- CJS 6100 Intimate Partner Violence
- CJS 6110 Security Role: Safety and Environment Protection
- CJS 6120 Correctional Rehabilitation
- CJS 6130 Law Enforcement Management and Planning
- CJS 6140 Communities and Crime
- CJS 6150 Criminal Behavior and the Family
- CJS 6160 Administration of the Adult and Juvenile Correction Systems
- CJS 6170 Community Corrections
- CJS 6180 Probation and Parole
- GST 6300 Security and Terrorism
- LDR 6110 Leading Teams
- LDR 6120 Organizational Leadership
- LDR 6130 Strategic Leadership
- LDR 6140 Dynamics of Change at the Community and Social Level
- INT 6943 Integrative Experiential Learning

**Elective**

Complete three quarter hours from the following: 3

- CJS 6005 Legal and Regulatory Issues for Security Management
- CJS 6010 Advanced Principles of Security Management and Threat Assessment
- CJS 6025 Genocide and War Crimes
- CJS 6035 Corruption, Integrity, and Accountability
- CJS 6040 Human Trafficking and Exploitation
- CJS 6045 Policing Issues around the Globe
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.
### Concentrations

Complete one of the following five concentrations:

#### Concentration in Conflict Resolution

Complete five of the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>GST 6324</td>
<td>Divided Societies in the Modern World</td>
</tr>
<tr>
<td>GST 6326</td>
<td>International Conflict and Cooperation</td>
</tr>
<tr>
<td>GST 6327</td>
<td>Conflict and Postconflict Development</td>
</tr>
<tr>
<td>GST 6300</td>
<td>Security and Terrorism</td>
</tr>
<tr>
<td>GST 6360</td>
<td>Nuclear Nonproliferation</td>
</tr>
</tbody>
</table>

One of five courses may be a global studies concentration course from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>GST 6102</td>
<td>Global Corporate and Social Responsibility</td>
</tr>
<tr>
<td>GST 6200</td>
<td>The Funders</td>
</tr>
<tr>
<td>GST 6210</td>
<td>The Developers</td>
</tr>
<tr>
<td>GST 6220</td>
<td>Globalization of Emerging Economies</td>
</tr>
<tr>
<td>GST 6310</td>
<td>Immigration and Labor</td>
</tr>
<tr>
<td>GST 6340</td>
<td>Poverty and Wealth</td>
</tr>
<tr>
<td>GST 6350</td>
<td>Global Economics of Food and Agriculture</td>
</tr>
<tr>
<td>GST 6410</td>
<td>Global Education in the Internet Age</td>
</tr>
<tr>
<td>GST 6430</td>
<td>Leadership and Management</td>
</tr>
<tr>
<td>GST 6360</td>
<td>Nuclear Nonproliferation</td>
</tr>
<tr>
<td>GST 6501</td>
<td>Regional Studies: East Asia</td>
</tr>
<tr>
<td>GST 6502</td>
<td>Regional Studies: Middle East</td>
</tr>
<tr>
<td>GST 6503</td>
<td>Regional Studies: Sub-Saharan Africa</td>
</tr>
<tr>
<td>GST 6504</td>
<td>Regional Studies: Europe</td>
</tr>
<tr>
<td>GST 6505</td>
<td>Regional Studies: Southwest and Central Asia</td>
</tr>
<tr>
<td>GST 6506</td>
<td>Regional Studies: Latin America</td>
</tr>
<tr>
<td>GST 6540</td>
<td>Politics of the European Union</td>
</tr>
<tr>
<td>GST 6550</td>
<td>U.S. Foreign Policy</td>
</tr>
<tr>
<td>GST 6560</td>
<td>Multilateral Diplomacy</td>
</tr>
<tr>
<td>GST 6580</td>
<td>Opportunities in International Consulting</td>
</tr>
<tr>
<td>GST 6590</td>
<td>Public Diplomacy</td>
</tr>
<tr>
<td>GST 6600</td>
<td>The Practice of Diplomacy</td>
</tr>
<tr>
<td>GST 6610</td>
<td>Sustainable Development</td>
</tr>
</tbody>
</table>

#### Concentration in Development Global Health

Complete five of the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>GST 6210</td>
<td>The Developers</td>
</tr>
<tr>
<td>GST 6340</td>
<td>Poverty and Wealth</td>
</tr>
<tr>
<td>GST 6350</td>
<td>Global Economics of Food and Agriculture</td>
</tr>
<tr>
<td>GST 6610</td>
<td>Sustainable Development</td>
</tr>
<tr>
<td>GST 6700</td>
<td>Global Health Perspectives, Politics, and Experiences in International Development</td>
</tr>
<tr>
<td>GST 6710</td>
<td>Critical Issues and Challenges in the Practice of Global Health</td>
</tr>
</tbody>
</table>

One of five courses may be a global studies concentration course from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>GST 6102</td>
<td>Global Corporate and Social Responsibility</td>
</tr>
<tr>
<td>GST 6200</td>
<td>The Funders</td>
</tr>
<tr>
<td>GST 6220</td>
<td>Globalization of Emerging Economies</td>
</tr>
<tr>
<td>GST 6300</td>
<td>Security and Terrorism</td>
</tr>
<tr>
<td>GST 6310</td>
<td>Immigration and Labor</td>
</tr>
<tr>
<td>GST 6324</td>
<td>Divided Societies in the Modern World</td>
</tr>
<tr>
<td>GST 6326</td>
<td>International Conflict and Cooperation</td>
</tr>
<tr>
<td>GST 6327</td>
<td>Conflict and Postconflict Development</td>
</tr>
<tr>
<td>GST 6360</td>
<td>Nuclear Nonproliferation</td>
</tr>
<tr>
<td>GST 6410</td>
<td>Global Education in the Internet Age</td>
</tr>
<tr>
<td>GST 6430</td>
<td>Leadership and Management</td>
</tr>
<tr>
<td>GST 6501</td>
<td>Regional Studies: East Asia</td>
</tr>
<tr>
<td>GST 6502</td>
<td>Regional Studies: Middle East</td>
</tr>
<tr>
<td>GST 6503</td>
<td>Regional Studies: Sub-Saharan Africa</td>
</tr>
<tr>
<td>GST 6504</td>
<td>Regional Studies: Europe</td>
</tr>
<tr>
<td>GST 6505</td>
<td>Regional Studies: Southwest and Central Asia</td>
</tr>
<tr>
<td>GST 6506</td>
<td>Regional Studies: Latin America</td>
</tr>
<tr>
<td>GST 6540</td>
<td>Politics of the European Union</td>
</tr>
<tr>
<td>GST 6550</td>
<td>U.S. Foreign Policy</td>
</tr>
<tr>
<td>GST 6560</td>
<td>Multilateral Diplomacy</td>
</tr>
<tr>
<td>GST 6580</td>
<td>Opportunities in International Consulting</td>
</tr>
<tr>
<td>GST 6590</td>
<td>Public Diplomacy</td>
</tr>
<tr>
<td>GST 6600</td>
<td>The Practice of Diplomacy</td>
</tr>
<tr>
<td>GST 6610</td>
<td>Sustainable Development</td>
</tr>
<tr>
<td>GST 6740</td>
<td>Human Rights</td>
</tr>
<tr>
<td>GST 6810</td>
<td>International Higher Education</td>
</tr>
<tr>
<td>GST 6820</td>
<td>Managing Study Abroad</td>
</tr>
</tbody>
</table>
GST 6830  Managing International Students
GST 6840  The Business of International Education
GST 6850  Immigration and Legal Issues in International Higher Education

**Concentration in Diplomacy**

Complete five of the following: 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

One of five courses may be a global studies concentration course from the following:

- GST 6102  Global Corporate and Social Responsibility
- GST 6200  The Funders
- GST 6210  The Developers
- GST 6220  Globalization of Emerging Economies
- GST 6300  Security and Terrorism
- GST 6310  Immigration and Labor
- GST 6324  Divided Societies in the Modern World
- GST 6326  International Conflict and Cooperation
- GST 6327  Conflict and Postconflict Development
- GST 6340  Poverty and Wealth
- GST 6350  Global Economics of Food and Agriculture
- GST 6360  Nuclear Nonproliferation
- GST 6410  Global Education in the Internet Age
- 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
- GST 6540  Politics of the European Union
- GST 6550  U.S. Foreign Policy
- GST 6560  Multilateral Diplomacy
- GST 6590  Public Diplomacy
- GST 6600  The Practice of Diplomacy
- 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
- GST 6740  Human Rights
- 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

**Concentration in Global Student Mobility**

Complete five of the following: 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

**Concentration in International Economics and Consulting**

Complete five of the following: 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
One of five courses may be a global studies concentration course from the following:

- GST 6210  The Developers
- GST 6300  Security and Terrorism
- GST 6324  Divided Societies in the Modern World
- GST 6326  International Conflict and Cooperation
- GST 6327  Conflict and Postconflict Development
- GST 6350  Global Economics of Food and Agriculture
- GST 6360  Nuclear Nonproliferation
- GST 6410  Global Education in the Internet Age
- 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
- GST 6540  Politics of the European Union
- GST 6550  U.S. Foreign Policy
- GST 6560  Multilateral Diplomacy
- GST 6590  Public Diplomacy
- GST 6600  The Practice of Diplomacy
- 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
- GST 6740  Human Rights
- 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
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
- 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
- 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 1-4

Elective Courses
Complete three of the following:
- NPM 6120 Financial Management for Nonprofit Organizations
- NPM 6130 Fund-Raising 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

Concentrations
Complete one of the following three concentrations:

Concentration in Global Studies

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
Leadership, MS

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

**Concentration in Leadership**

Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>LDR 6100</td>
<td>Developing Your Leadership Capability</td>
<td>3-6</td>
</tr>
<tr>
<td>LDR 6110</td>
<td>Leading Teams</td>
<td>3-6</td>
</tr>
<tr>
<td>LDR 6120</td>
<td>Organizational Leadership</td>
<td>3-6</td>
</tr>
<tr>
<td>LDR 6150</td>
<td>Transforming Organizations</td>
<td>3</td>
</tr>
</tbody>
</table>

Choose one of the following courses:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>LDR 6135</td>
<td>Ethical Leadership</td>
<td>3</td>
</tr>
<tr>
<td>LDR 6140</td>
<td>Strategic Leadership</td>
<td>3</td>
</tr>
</tbody>
</table>

**Concentration in Organizational Communication**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMN 6000</td>
<td>Introduction to Organizational Communication and Writing Lab</td>
<td>3-4</td>
</tr>
<tr>
<td>CMN 6020</td>
<td>Ethical Issues in Organizational Communication</td>
<td>3</td>
</tr>
<tr>
<td>CMN 6050</td>
<td>Crisis Communication</td>
<td>3</td>
</tr>
<tr>
<td>CMN 6090</td>
<td>Organizational Culture, Climate, and Communication</td>
<td>3</td>
</tr>
<tr>
<td>CMN 6110</td>
<td>Group Dynamics and Interpersonal Conflict: Meeting Management</td>
<td>3</td>
</tr>
</tbody>
</table>

**Program Credit/GPA Requirements**

45 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**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>LDR 6100</td>
<td>Developing Your Leadership Capability</td>
<td>3-6</td>
</tr>
<tr>
<td>LDR 6110</td>
<td>Leading Teams</td>
<td>3-6</td>
</tr>
</tbody>
</table>

**Required Elective Course**

Complete one of the following: 3-4

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMN 6060</td>
<td>Negotiation, Mediation, and Facilitation</td>
<td></td>
</tr>
<tr>
<td>COP 6940</td>
<td>Personal and Career Development</td>
<td></td>
</tr>
<tr>
<td>INPS 5184</td>
<td>Interdisciplinary Professional Foundations</td>
<td></td>
</tr>
<tr>
<td>INT 6943</td>
<td>Integrative Experiential Learning</td>
<td></td>
</tr>
<tr>
<td>INT 6900</td>
<td>International Field Study Experience</td>
<td></td>
</tr>
</tbody>
</table>

**Concentration**

Complete one of the following seven concentrations:

**Concentration in Health Management**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HMG 6110</td>
<td>Organization, Administration, Financing, and History of Healthcare</td>
<td>3</td>
</tr>
<tr>
<td>HMG 6130</td>
<td>Healthcare Strategic Management</td>
<td>3</td>
</tr>
<tr>
<td>HMG 6140</td>
<td>Principles of Population-Based Management</td>
<td>3</td>
</tr>
<tr>
<td>HMG 6160</td>
<td>Healthcare Information Systems Management</td>
<td>3</td>
</tr>
<tr>
<td>HMG 6170</td>
<td>Health Law, Politics, and Policy</td>
<td>3</td>
</tr>
</tbody>
</table>

**Concentration in Human Resources**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HRM 6005</td>
<td>Creating a High-Performance Organization: Strategic Organizational and HRM Choices</td>
<td>3</td>
</tr>
<tr>
<td>HRM 6010</td>
<td>Total Compensation</td>
<td>3</td>
</tr>
<tr>
<td>HRM 6020</td>
<td>Strategic Recruitment, Training, and Performance Management</td>
<td>3</td>
</tr>
<tr>
<td>HRM 6030</td>
<td>Employee Rights and Employer Obligations</td>
<td>3</td>
</tr>
<tr>
<td>HRM 6040</td>
<td>High-Performance Human Resources Systems and Development</td>
<td>3</td>
</tr>
</tbody>
</table>

**Concentration in Leading and Managing Technical Projects**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PJM 6000</td>
<td>Project Management Practices</td>
<td>3</td>
</tr>
<tr>
<td>PJM 6205</td>
<td>Leading and Managing Technical Projects</td>
<td>3</td>
</tr>
<tr>
<td>PJM 6210</td>
<td>Communication Skills for Project Managers</td>
<td>3</td>
</tr>
<tr>
<td>PJM 6215</td>
<td>Leading Remote Project Teams</td>
<td>3</td>
</tr>
<tr>
<td>PJM 6220</td>
<td>Planning and Scheduling Technical Projects</td>
<td>3</td>
</tr>
</tbody>
</table>

**Concentration in Nonprofit Management**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NPM 6110</td>
<td>Legal and Governance Issues in Nonprofit Organizations</td>
<td>3</td>
</tr>
<tr>
<td>NPM 6120</td>
<td>Financial Management for Nonprofit Organizations</td>
<td>3</td>
</tr>
<tr>
<td>NPM 6125</td>
<td>Promoting Nonprofit Organizations</td>
<td>3</td>
</tr>
</tbody>
</table>
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. This nonprofit degree program seeks to produce graduates well-equipped to embark on a career in nonprofit management—prepared, and inspired, to make a meaningful impact.

**Program Requirements**

Complete all courses and requirements listed below unless otherwise indicated.

**Required Courses**

- LDR 6100 Developing Your Leadership Capability 3-6
- 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 Fund-Raising 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

**Electives**

Complete two of the following: 6-7

- 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
- INPS 5184 Interdisciplinary Professional Foundations
- INT 6943 Integrative Experiential Learning

**Concentration**

Complete one of the following seven concentrations:

**Concentration in Global Studies**

- GST 6100 Globalization and Global Politics and Economics 4
- GST 6101 Global Literacy, Culture, and Community 4
- GST 6320 Peace and Conflict 4

**Elective Course**

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

**Concentration in Human Services**

- HSV 6100 Theory and Practice of Human Services 3
Complete five of the following:

Concentration in Social Media and Online Communication

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMN 6015</td>
<td>Introduction to the Digital Era: The Power of Social Media</td>
<td>3</td>
</tr>
<tr>
<td>CMN 6025</td>
<td>Digital Era Skills: Platforms, Tools, and Techniques</td>
<td>3</td>
</tr>
<tr>
<td>CMN 6035</td>
<td>Legal, Policy, and Ethical Issues in the Digital Era</td>
<td>3</td>
</tr>
<tr>
<td>CMN 6045</td>
<td>Leveraging Digital Technologies: Strategy, Assessment, and Governance</td>
<td>3</td>
</tr>
<tr>
<td>CMN 6065</td>
<td>Implementation and Management of Social Media Channels and Online Communities</td>
<td>3</td>
</tr>
<tr>
<td>DGM 6285</td>
<td>Interactive Marketing Fundamentals</td>
<td>3</td>
</tr>
<tr>
<td>DGM 6290</td>
<td>Social Media and Brand Strategy Implementation</td>
<td>3</td>
</tr>
</tbody>
</table>

Complete two of the following:

Concentration in Project Management

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PJM 5900</td>
<td>Foundations of Project Management</td>
<td>4</td>
</tr>
<tr>
<td>PJM 6000</td>
<td>Project Management Practices</td>
<td>3</td>
</tr>
<tr>
<td>PJM 6025</td>
<td>Project Scheduling and Cost Planning</td>
<td>3</td>
</tr>
<tr>
<td>PJM 6015</td>
<td>Project Risk Management</td>
<td>3</td>
</tr>
</tbody>
</table>

Project Management Electives

Complete two of the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PJM 6125</td>
<td>Project Evaluation and Assessment</td>
<td>3</td>
</tr>
<tr>
<td>PJM 6135</td>
<td>Project Quality Management</td>
<td>3</td>
</tr>
<tr>
<td>PJM 6140</td>
<td>Managing Troubled Projects</td>
<td>3</td>
</tr>
<tr>
<td>PJM 6710</td>
<td>Introduction to Program and Portfolio Management</td>
<td>3</td>
</tr>
</tbody>
</table>

Concentration in Leadership

LDR 6100         | Developing Your Leadership Capability                                  | 3-6     |
LDR 6110         | Leading Teams                                                         | 3-6     |
LDR 6120         | Organizational Leadership                                              | 3-6     |
LDR 6150         | Transforming Organizations                                             | 3       |
Complete one of the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>LDR 6135</td>
<td>Ethical Leadership</td>
<td>3-6</td>
</tr>
<tr>
<td>LDR 6140</td>
<td>Strategic Leadership</td>
<td>3-6</td>
</tr>
</tbody>
</table>

Concentration in Organizational Communication

CMN 6000         | Introduction to Organizational Communication and Writing Lab           | 3-4     |
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       |

Concentration in Sport and Social Change

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       |

45 total quarter hours required

Minimum 3.000 GPA required

Program Credit/GPA Requirements

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

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PJM 6000</td>
<td>Project Management Practices</td>
<td>3</td>
</tr>
<tr>
<td>PJM 6710</td>
<td>Introduction to Program and Portfolio Management</td>
<td>3</td>
</tr>
<tr>
<td>PJM 6715</td>
<td>Advanced Program Management</td>
<td>3</td>
</tr>
<tr>
<td>PJM 6720</td>
<td>Advanced Portfolio Management</td>
<td>3</td>
</tr>
</tbody>
</table>
Agile Project Management

Organizational Communication

Leadership

Students must choose one of the following concentrations:

LEADERSHIP

LDR 6100 Developing Your Leadership Capability 3-6
LDR 6110 Leading Teams 3-6
LDR 6120 Organizational Leadership 3-6
LDR 6150 Transforming Organizations 3

Complete one of the following: 3-6
LDR 6135 Ethical Leadership
LDR 6140 Strategic Leadership

ORGANIZATIONAL COMMUNICATION

CMN 6000 Introduction to Organizational Communication 2,3

INT 6000 Writing Lab 1

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

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

Complete one of the following: 3

PJM 6205 Leading and Managing Technical Projects

CMN 6060 Negotiation, Mediation, and Facilitation

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):

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

Complete two of the following. Note: Students who take PJM 5900 are required to take only one course in this section:
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

Requirements: 36 semester hours
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PJM 6125</td>
<td>Project Evaluation and Assessment</td>
<td></td>
</tr>
<tr>
<td>PJM 6140</td>
<td>Managing Troubled Projects</td>
<td></td>
</tr>
<tr>
<td>PJM 6145</td>
<td>Global Project Management</td>
<td></td>
</tr>
<tr>
<td>PJM 6710</td>
<td>Introduction to Program and Portfolio Management</td>
<td></td>
</tr>
</tbody>
</table>

**Electives**

Complete two of the following: 5-6

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMN 6000</td>
<td>Introduction to Organizational Communication</td>
<td></td>
</tr>
<tr>
<td>CMN 6060</td>
<td>Negotiation, Mediation, and Facilitation</td>
<td></td>
</tr>
<tr>
<td>CMN 6090</td>
<td>Organizational Culture, Climate, and Communication</td>
<td></td>
</tr>
<tr>
<td>CMN 6110</td>
<td>Group Dynamics and Interpersonal Conflict: Meeting Management</td>
<td></td>
</tr>
<tr>
<td>COP 6940</td>
<td>Personal and Career Development</td>
<td></td>
</tr>
<tr>
<td>INPS 5184</td>
<td>Interdisciplinary Professional Foundations</td>
<td></td>
</tr>
<tr>
<td>INT 6943</td>
<td>Integrative Experiential Learning</td>
<td></td>
</tr>
<tr>
<td>INT 6940</td>
<td>Experiential Learning Projects for Professionals</td>
<td></td>
</tr>
<tr>
<td>PJM 6205</td>
<td>Leading and Managing Technical Projects</td>
<td></td>
</tr>
<tr>
<td>PJM 6210</td>
<td>Communication Skills for Project Managers</td>
<td></td>
</tr>
<tr>
<td>PJM 6215</td>
<td>Leading Remote Project Teams</td>
<td></td>
</tr>
</tbody>
</table>

**Concentrations**

Complete one of the following nine concentrations:

**Concentration in Clinical Trial Design**

Complete one of the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>RGA 6210</td>
<td>Strategic Planning and Project Management for Regulatory Affairs</td>
<td>4</td>
</tr>
<tr>
<td>BTC 6210</td>
<td>Human Experimentation: Methodological Issues Fundamentals</td>
<td>4</td>
</tr>
</tbody>
</table>

**Required Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BTC 6211</td>
<td>Validation and Auditing of Clinical Trial Information</td>
<td>4</td>
</tr>
<tr>
<td>BTC 6213</td>
<td>Clinical Trial Design Optimization and Problem Solving</td>
<td>4</td>
</tr>
<tr>
<td>PMC 6212</td>
<td>Clinical Drug Development Data Analysis: Concepts</td>
<td>4</td>
</tr>
</tbody>
</table>

**Concentration in Construction Management**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMG 6400</td>
<td>Introduction to Construction Management</td>
<td>4</td>
</tr>
<tr>
<td>CMG 6402</td>
<td>Alternative Project Delivery Methods and Project Controls</td>
<td>4</td>
</tr>
<tr>
<td>CMG 6403</td>
<td>Safety, Project Risk, and Quality Management</td>
<td>4</td>
</tr>
<tr>
<td>CMG 6405</td>
<td>Construction Law</td>
<td>4</td>
</tr>
</tbody>
</table>

**Concentration in Geographic Information Systems**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GIS 5101</td>
<td>Introduction to Geographic Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>GIS 5102</td>
<td>Fundamentals of GIS Analysis</td>
<td>3</td>
</tr>
<tr>
<td>RMS 5105</td>
<td>Fundamentals of Remote Sensing</td>
<td>3</td>
</tr>
<tr>
<td>GIS 5201</td>
<td>Advanced Spatial Analysis</td>
<td></td>
</tr>
</tbody>
</table>

**Concentration in Information Security Management**

Complete one of the following: 3

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITC 6300</td>
<td>Foundations of Information Security</td>
<td>3</td>
</tr>
<tr>
<td>ITC 6315</td>
<td>Information Security Risk Management</td>
<td>3</td>
</tr>
<tr>
<td>ITC 6310</td>
<td>Information Security Governance</td>
<td>3</td>
</tr>
<tr>
<td>ITC 6320</td>
<td>Information Security Technology</td>
<td>3</td>
</tr>
</tbody>
</table>

**Concentration in Leadership**

Complete one of the following: 3-6

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>LDR 6100</td>
<td>Developing Your Leadership Capability</td>
<td>3-6</td>
</tr>
<tr>
<td>LDR 6110</td>
<td>Leading Teams</td>
<td>3-6</td>
</tr>
<tr>
<td>LDR 6120</td>
<td>Organizational Leadership</td>
<td>3-6</td>
</tr>
<tr>
<td>LDR 6150</td>
<td>Transforming Organizations</td>
<td>3</td>
</tr>
</tbody>
</table>

**Concentration in Organizational Communication**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMN 6000</td>
<td>Introduction to Organizational Communication and Writing Lab</td>
<td>3-4</td>
</tr>
</tbody>
</table>

**Electives**

Complete four of the following: 12

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMN 6020</td>
<td>Ethical Issues in Organizational Communication</td>
<td></td>
</tr>
<tr>
<td>CMN 6050</td>
<td>Crisis Communication</td>
<td></td>
</tr>
<tr>
<td>CMN 6060</td>
<td>Negotiation, Mediation, and Facilitation</td>
<td></td>
</tr>
<tr>
<td>CMN 6080</td>
<td>Intercultural Communication</td>
<td></td>
</tr>
<tr>
<td>CMN 6090</td>
<td>Organizational Culture, Climate, and Communication</td>
<td></td>
</tr>
</tbody>
</table>
CMN 6110 Group Dynamics and Interpersonal Conflict: Meeting Management

Concentration in Agile Project Management
Students in this concentration will only have one required elective course:
PJM 6810 Principles of Agile Project Management 3
PJM 6815 Advanced Agile Project Management 3
PJM 6820 Agile Implementation and Governance 3
PJM 6205 Leading and Managing Technical Projects 3
CMN 6060 Negotiation, Mediation, and Facilitation 3

Concentration in Program and Portfolio Management
Students in this concentration will only have one required elective course:
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
45–48 total quarter hours required
Minimum 3.000 GPA required

Program Credit/GPA Requirements
45–48 total quarter hours required
Minimum 3.000 GPA required

Northeastern University

RGA 6207 FDA and the Electronic Common Technical Document (eCTD) 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
Complete at least one of the following:
BTC 6211 Validation and Auditing of Clinical Trial Information 3-4
RGA 6000 Introduction to Food and Drug Administration (FDA) Pharmaceutical Regulation
RGA 6001 Introduction to Food and Drug Administration Medical Device Regulation
RGA 6208 Introduction to Safety Sciences
RGA 6212 Clinical Laboratory Management in Clinical Trials
RGA 6310 Regulatory Documentation Processes
RGA 6280 Advanced Writing on International Biomedical Topics

REGULATORY PERSPECTIVE: PRODUCT DEVELOPMENT, BUSINESS, AND STRATEGY
Complete at least one of the following:
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 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.)
INPS 5184 Interdisciplinary Professional Foundations
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

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>RGA 6000</td>
<td>Introduction to Food and Drug Administration (FDA) Pharmaceutical Regulation</td>
<td>2</td>
</tr>
<tr>
<td>RGA 6001</td>
<td>Introduction to Food and Drug Administration Medical Device Regulation</td>
<td>2</td>
</tr>
<tr>
<td>BTC 6210</td>
<td>Human Experimentation: Methodological Issues Fundamentals</td>
<td>4</td>
</tr>
<tr>
<td>RGA 6101</td>
<td>Therapeutic Product Development: A Regulatory Overview</td>
<td>4</td>
</tr>
<tr>
<td>RGA 6202</td>
<td>Medical Device Development: A Regulatory Overview</td>
<td>4</td>
</tr>
<tr>
<td>RGA 6203</td>
<td>Food, Drug, and Medical Device Law: Topics and Cases</td>
<td>5</td>
</tr>
<tr>
<td>RGA 6207</td>
<td>FDA and the Electronic Common Technical Document (eCTD)</td>
<td>4</td>
</tr>
<tr>
<td>RGA 6300</td>
<td>Practical Applications in Biomedical Product Global Regulatory Affairs</td>
<td>4</td>
</tr>
</tbody>
</table>

### Required Electives

**REGULATORY AND CLINICAL OPERATIONS**

Complete at least one of the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BTC 6211</td>
<td>Validation and Auditing of Clinical Trial Information</td>
<td>3-4</td>
</tr>
<tr>
<td>BTC 6213</td>
<td>Clinical Trial Design Optimization and Problem Solving</td>
<td></td>
</tr>
<tr>
<td>RGA 6208</td>
<td>Introduction to Safety Sciences</td>
<td></td>
</tr>
<tr>
<td>RGA 6212</td>
<td>Clinical Laboratory Management in Clinical Trials</td>
<td></td>
</tr>
<tr>
<td>RGA 6230</td>
<td>Advanced Writing on International Biomedical Topics</td>
<td></td>
</tr>
<tr>
<td>RGA 6310</td>
<td>Regulatory Documentation Processes</td>
<td></td>
</tr>
<tr>
<td>RGA 6370</td>
<td>Regulatory Writing: Medical Device Submissions</td>
<td></td>
</tr>
<tr>
<td>RGA 6380</td>
<td>Regulatory Writing: New Drug Applications</td>
<td></td>
</tr>
<tr>
<td>RGA 6383</td>
<td>Application of Quality System Regulation in Medical Device Design and Manufacturing</td>
<td></td>
</tr>
<tr>
<td>RGA 6234</td>
<td>Drug and Device Supplier Risk Management: Compliance and Processes</td>
<td></td>
</tr>
</tbody>
</table>

**REGULATORY PERSPECTIVE: PRODUCT DEVELOPMENT, BUSINESS, AND STRATEGY**

Complete at least one of the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BTC 6260</td>
<td>The Business of Medicine and Biotechnology</td>
<td>2-4</td>
</tr>
<tr>
<td>RGA 6215</td>
<td>Project Management in Early Drug Discovery and Development</td>
<td></td>
</tr>
<tr>
<td>RGA 6216</td>
<td>The Medical, Social, and Financial Dimensions of Orphan Drugs</td>
<td></td>
</tr>
<tr>
<td>RGA 6217</td>
<td>Biomedical Product Development: From Biotech to Boardroom to Market</td>
<td></td>
</tr>
<tr>
<td>RGA 6219</td>
<td>The Advertising and Promotion of Drug and Medical Device Products</td>
<td></td>
</tr>
<tr>
<td>PMC 6212</td>
<td>Clinical Drug Development Data Analysis: Concepts</td>
<td></td>
</tr>
<tr>
<td>RGA 6112</td>
<td>Biomedical Intellectual Property Management: Patents</td>
<td></td>
</tr>
<tr>
<td>RGA 6205</td>
<td>Emerging Trends and Issues in the Medical Device Industry</td>
<td></td>
</tr>
<tr>
<td>RGA 6210</td>
<td>Strategic Planning and Project Management for Regulatory Affairs</td>
<td></td>
</tr>
<tr>
<td>RGA 6211</td>
<td>Combination Products and Convergence</td>
<td></td>
</tr>
<tr>
<td>RGA 6245</td>
<td>Regulation of Generic Pharmaceutical and Biosimilar Products</td>
<td></td>
</tr>
</tbody>
</table>
#### Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

### Required Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>RGA 6000</td>
<td>Introduction to Food and Drug Administration (FDA) Pharmaceutical Regulation</td>
<td>2</td>
</tr>
<tr>
<td>RGA 6001</td>
<td>Introduction to Food and Drug Administration Medical Device Regulation</td>
<td>2</td>
</tr>
<tr>
<td>RGA 6101</td>
<td>Therapeutic Product Development: A Regulatory Overview</td>
<td>4</td>
</tr>
<tr>
<td>RGA 6202</td>
<td>Medical Device Development: A Regulatory Overview</td>
<td>4</td>
</tr>
<tr>
<td>RGA 6207</td>
<td>FDA and the Electronic Common Technical Document (eCTD)</td>
<td>4</td>
</tr>
<tr>
<td>RGA 6220</td>
<td>Global Biotechnology Product Registration: E.U., U.S. Product Regulation</td>
<td>5</td>
</tr>
<tr>
<td>RGA 6223</td>
<td>Introduction to Canadian, Asian, and Latin American Regulatory Affairs</td>
<td>4</td>
</tr>
<tr>
<td>RGA 6300</td>
<td>Practical Applications in Biomedical Product Global Regulatory Affairs</td>
<td>4</td>
</tr>
</tbody>
</table>

### 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

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BTC 6211</td>
<td>Validation and Auditing of Clinical Trial Information</td>
</tr>
<tr>
<td>BTC 6213</td>
<td>Clinical Trial Design Optimization and Problem Solving</td>
</tr>
<tr>
<td>RGA 6208</td>
<td></td>
</tr>
<tr>
<td>RGA 6212</td>
<td>Introduction to Safety Sciences</td>
</tr>
<tr>
<td>RGA 6370</td>
<td>Regulatory Writing: Medical Device Submissions</td>
</tr>
<tr>
<td>RGA 6380</td>
<td>Regulatory Writing: New Drug Applications</td>
</tr>
<tr>
<td>RGA 6280</td>
<td>Advanced Writing on International Biomedical Topics</td>
</tr>
</tbody>
</table>

#### REGULATORY PERSPECTIVE

Complete at least one of the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>RGA 6203</td>
<td>Food, Drug, and Medical Device Law: Topics and Cases</td>
</tr>
<tr>
<td>BTC 6260</td>
<td>The Business of Medicine and Biotechnology</td>
</tr>
<tr>
<td>RGA 6217</td>
<td>Biomedical Product Development: From Biotech to Boardroom to Market</td>
</tr>
<tr>
<td>RGA 6235</td>
<td>Emerging Product Categories in the Regulation of Drugs and Biologics</td>
</tr>
<tr>
<td>RGA 6205</td>
<td>Emerging Trends and Issues in the Medical Device Industry</td>
</tr>
<tr>
<td>RGA 6210</td>
<td>Strategic Planning and Project Management for Regulatory Affairs</td>
</tr>
</tbody>
</table>

---

### 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.
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.
**Northeastern University**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>COP 6940</td>
<td>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.)</td>
</tr>
<tr>
<td>INPS 5184 or EDU 6184</td>
<td>Interdisciplinary Professional Foundations or Interdisciplinary Foundations</td>
</tr>
<tr>
<td>INT 6943 and RGA 6920</td>
<td>Integrative Experiential Learning and Internship Reflection</td>
</tr>
<tr>
<td>RGA 6220</td>
<td>Global Biotechnology Product Registration: E.U., U.S. Product Regulation</td>
</tr>
<tr>
<td>RGA 6221</td>
<td>European Union Compliance Process and Regulatory Affairs</td>
</tr>
<tr>
<td>RGA 6222</td>
<td>European Medical Device Regulations</td>
</tr>
<tr>
<td>RGA 6224</td>
<td>Regulation of Biomedical Product Commercialization by Health Canada</td>
</tr>
<tr>
<td>RGA 6223</td>
<td>Introduction to Canadian, Asian, and Latin American Regulatory Affairs</td>
</tr>
<tr>
<td>RGA 6225</td>
<td>Japanese Medical Device Regulations and Registration</td>
</tr>
<tr>
<td>RGA 6226</td>
<td>Canadian and Australian Medical Device Regulations</td>
</tr>
<tr>
<td>RGA 6000</td>
<td>Introduction to Food and Drug Administration (FDA) Pharmaceutical Regulation</td>
</tr>
<tr>
<td>RGA 6001</td>
<td>Introduction to Food and Drug Administration Medical Device Regulation</td>
</tr>
<tr>
<td>RGA 6101</td>
<td>Therapeutic Product Development: A Regulatory Overview</td>
</tr>
<tr>
<td>RGA 6202</td>
<td>Medical Device Development: A Regulatory Overview</td>
</tr>
<tr>
<td>RGA 6203</td>
<td>Food, Drug, and Medical Device Law: Topics and Cases</td>
</tr>
<tr>
<td>RGA 6207</td>
<td>FDA and the Electronic Common Technical Document (eCTD)</td>
</tr>
<tr>
<td>RGA 6300</td>
<td>Practical Applications in Biomedical Product Global Regulatory Affairs</td>
</tr>
<tr>
<td>RGA 6212</td>
<td>Introduction to Safety Sciences</td>
</tr>
<tr>
<td>RGA 6208</td>
<td>Clinical Trial Design Optimization and Problem Solving</td>
</tr>
<tr>
<td>BTC 6211</td>
<td>Validation and Auditing of Clinical Trial Information</td>
</tr>
<tr>
<td>RGA 6230</td>
<td>Clinical Laboratory Management in Clinical Trials</td>
</tr>
<tr>
<td>RGA 6234</td>
<td>Drug and Device Supplier Risk Management: Compliance and Processes</td>
</tr>
<tr>
<td>RGA 6280</td>
<td>Advanced Writing on International Biomedical Topics</td>
</tr>
<tr>
<td>BTC 6260</td>
<td>The Business of Medicine and Biotechnology</td>
</tr>
<tr>
<td>RGA 6217</td>
<td>Biomedical Product Development: From Biotech to Boardroom to Market</td>
</tr>
<tr>
<td>RGA 6235</td>
<td>Emerging Product Categories in the Regulation of Drugs and Biologics</td>
</tr>
<tr>
<td>RGA 6210</td>
<td>Strategic Planning and Project Management for Regulatory Affairs</td>
</tr>
<tr>
<td>RGA 6245</td>
<td>Regulation of Generic Pharmaceutical and Biosimilar Products</td>
</tr>
<tr>
<td>RGA 6205</td>
<td>Emerging Trends and Issues in the Medical Device Industry</td>
</tr>
<tr>
<td>RGA 6211</td>
<td>Combination Products and Convergence</td>
</tr>
</tbody>
</table>

**Required Electives**

Students must earn a minimum of 20 quarter hours by choosing at least one course from each elective category.

**REGULATORY AND CLINICAL OPERATIONS**

Complete at least one of the following:

- RGA 6212 Introduction to Safety Sciences
- RGA 6208 Clinical Trial Design Optimization and Problem Solving
- BTC 6211 Validation and Auditing of Clinical Trial Information
- RGA 6230 Clinical Laboratory Management in Clinical Trials
- RGA 6234 Drug and Device Supplier Risk Management: Compliance and Processes
- RGA 6280 Advanced Writing on International Biomedical Topics

**REGULATORY PERSPECTIVE: PRODUCT DEVELOPMENT, BUSINESS, AND STRATEGY**

Complete at least one of the following:

- 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

**Program Requirements**

Complete all courses and requirements listed below unless otherwise indicated.

**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.
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.)

INPS 5184 Interdisciplinary Professional Foundations
or EDU 6184 Interdisciplinary Foundations

INT 6943 and RGA 6920 Integrative Experiential Learning and Internship Reflection

**INTERNATIONAL**
Complete at least one of the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>RGA 6221</td>
<td>European Union Compliance Process and Regulatory Affairs</td>
</tr>
<tr>
<td>RGA 6222</td>
<td>European Medical Device Regulations</td>
</tr>
<tr>
<td>RGA 6223</td>
<td>Introduction to Canadian, Asian, and Latin American Regulatory Affairs</td>
</tr>
<tr>
<td>RGA 6224</td>
<td>Regulation of Biomedical Product Commercialization by Health Canada</td>
</tr>
<tr>
<td>RGA 6225</td>
<td>Japanese Medical Device Regulations and Registration</td>
</tr>
<tr>
<td>RGA 6226</td>
<td>Canadian and Australian Medical Device Regulations</td>
</tr>
</tbody>
</table>

**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**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>RGA 6201</td>
<td>New Drug Development: A Regulatory Overview</td>
<td>4</td>
</tr>
<tr>
<td>RGA 6101</td>
<td>Therapeutic Product Development: A Regulatory Overview</td>
<td>4</td>
</tr>
<tr>
<td>RGA 6203</td>
<td>Food, Drug, and Medical Device Law: Topics and Cases</td>
<td>5</td>
</tr>
<tr>
<td>RGA 6207</td>
<td>FDA and the Electronic Common Technical Document (eCTD)</td>
<td>4</td>
</tr>
<tr>
<td>RGA 6217</td>
<td>Biomedical Product Development: From Biotech to Boardroom to Market</td>
<td>4</td>
</tr>
<tr>
<td>RGA 6300</td>
<td>Practical Applications in Biomedical Product Global Regulatory Affairs</td>
<td>4</td>
</tr>
</tbody>
</table>

**Required Electives**
Students must earn a minimum of 20 quarter hours by choosing at least one course from each elective category.

**REGULATORY AND CLINICAL OPERATIONS**
Complete one of the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>RGA 6280</td>
<td>Advanced Writing on International Biomedical Topics</td>
</tr>
<tr>
<td>RGA 6208</td>
<td>Introduction to Safety Sciences</td>
</tr>
<tr>
<td>BTC 6211</td>
<td>Validation and Auditing of Clinical Trial Information</td>
</tr>
<tr>
<td>BTC 6213</td>
<td>Clinical Trial Design Optimization and Problem Solving</td>
</tr>
<tr>
<td>BTC 6210</td>
<td>Human Experimentation: Methodological Issues Fundamentals</td>
</tr>
</tbody>
</table>

**REGULATORY PERSPECTIVE: PRODUCT DEVELOPMENT, BUSINESS, AND STRATEGY**
Complete one of the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BTC 6260</td>
<td>The Business of Medicine and Biotechnology</td>
</tr>
<tr>
<td>RGA 6216</td>
<td>The Medical, Social, and Financial Dimensions of Orphan Drugs</td>
</tr>
<tr>
<td>RGA 6235</td>
<td>Emerging Product Categories in the Regulation of Drugs and Biologics</td>
</tr>
<tr>
<td>RGA 6112</td>
<td>Biomedical Intellectual Property Management: Patents</td>
</tr>
<tr>
<td>RGA 6205</td>
<td>Emerging Trends and Issues in the Medical Device Industry</td>
</tr>
<tr>
<td>RGA 6245</td>
<td>Regulation of Generic Pharmaceutical and Biosimilar Products</td>
</tr>
<tr>
<td>RGA 6250</td>
<td>Financing and Reimbursement in Biomedical Product Development</td>
</tr>
<tr>
<td>RGA 6210</td>
<td>Strategic Planning and Project Management for Regulatory Affairs</td>
</tr>
<tr>
<td>RGA 6211</td>
<td>Combination Products and Convergence</td>
</tr>
<tr>
<td>COP 6940</td>
<td>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.)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>INPS 5184</td>
<td>Interdisciplinary Professional Foundations</td>
</tr>
<tr>
<td>or EDU 6184</td>
<td>Interdisciplinary Foundations</td>
</tr>
</tbody>
</table>
Complete one of the following: 4-5

- RGA 6220 Global Biotechnology Product Registration: E.U., U.S. Product Regulation
- 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

Program Credit/GPA Requirements
45 total quarter hours required
Minimum 3.000 GPA required

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

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>RFA 6100</td>
<td>Introduction to Regulatory Affairs of Food and Food Industries</td>
<td>3</td>
</tr>
<tr>
<td>RFA 6110</td>
<td>From Farm to Family Table: Understanding the Food Regulatory Life Cycle</td>
<td>3</td>
</tr>
<tr>
<td>RFA 6120</td>
<td>Economic and Social Aspects of Food</td>
<td>3</td>
</tr>
<tr>
<td>RFA 6130</td>
<td>Food Law in the United States</td>
<td>3</td>
</tr>
<tr>
<td>RFA 6200</td>
<td>Comparing U.S. Regulatory Systems and Agencies</td>
<td>3</td>
</tr>
</tbody>
</table>
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
RPT 7200  Advanced Cardiopulmonary Physiology 3
RPT 7205  The Evolving Roles of Respiratory Care Professionals 3
RPT 7210  Research Design 4
RPT 7215  Applied Research in Respiratory Care 3
RPT 7300  Development of Clinical Practice Guidelines and Respiratory Care Protocols 4
RPT 7302  Respiratory Therapist Education 4

Required Leadership Courses
Complete two of the following: 6-12
LDR 6100  Developing Your Leadership Capability
LDR 6110  Leading Teams
LDR 6135  Ethical Leadership
LDR 6140  Strategic Leadership

Concentration
Complete one of the following four concentrations:

Concentration in Adult and Organizational Learning
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

Concentration in Clinical Trial Design
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 6100  Introduction to Drug and Medical Device Regulation
RGA 6202  Medical Device Development: A Regulatory Overview
RGA 6205  Emerging Trends and Issues in the Medical Device Industry

Concentration in Health Management
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  Fund-Raising and Development for Nonprofit Organizations

Concentration in Respiratory Specialty Practice
Complete two of the following: 8
RPT 7400  Pulmonary Diseases and Disorders
RPT 7401  Cardiopulmonary Assessment and Diagnostics
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

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

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>TCC 6100</td>
<td>Introduction to Technical and Professional Writing</td>
<td>4</td>
</tr>
<tr>
<td>TCC 6102</td>
<td>Editing Technical Content</td>
<td>4</td>
</tr>
<tr>
<td>TCC 6110</td>
<td>Information Architecture</td>
<td>4</td>
</tr>
<tr>
<td>TCC 6120</td>
<td>Usability and User Experience</td>
<td>4</td>
</tr>
</tbody>
</table>

The following course should be taken last:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>TCC 6850</td>
<td>Technical Communications Capstone Project</td>
<td>4</td>
</tr>
</tbody>
</table>

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 (listed at the end of the curriculum) 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.

Concentration in Computer Industry Writing

Complete four of the following: 16

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>TCC 6430</td>
<td>Writing for the Computer Industry</td>
<td></td>
</tr>
<tr>
<td>TCC 6440</td>
<td>Advanced Writing for the Computer Industry</td>
<td></td>
</tr>
<tr>
<td>TCC 6400</td>
<td>Structured Documentation</td>
<td></td>
</tr>
<tr>
<td>TCC 6450</td>
<td>Managing Technical Publications</td>
<td></td>
</tr>
<tr>
<td>TCC 6410</td>
<td>Online Documentation</td>
<td></td>
</tr>
</tbody>
</table>

Concentration in Social Media and Online Communities

Required Course

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>TCC 6710</td>
<td>Content Strategy</td>
<td>4</td>
</tr>
</tbody>
</table>

Complete 12–14 quarter hours from the following: 12-14

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMN 6035</td>
<td>Legal, Policy, and Ethical Issues in the Digital Era</td>
<td></td>
</tr>
<tr>
<td>CMN 6045</td>
<td>Leveraging Digital Technologies: Strategy, Assessment, and Governance</td>
<td></td>
</tr>
<tr>
<td>CMN 6065</td>
<td>Implementation and Management of Social Media Channels and Online Communities</td>
<td></td>
</tr>
<tr>
<td>DGM 6285</td>
<td>Interactive Marketing Fundamentals</td>
<td></td>
</tr>
<tr>
<td>DGM 6290</td>
<td>Social Media and Brand Strategy Implementation</td>
<td></td>
</tr>
</tbody>
</table>

Concentration in Usability/User Experience

Choose any combination of the following courses to complete 16 quarter hours:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>TCC 6710</td>
<td>Content Strategy</td>
<td></td>
</tr>
<tr>
<td>TCC 6470</td>
<td>Web Accessibility for Technical Communicators</td>
<td></td>
</tr>
<tr>
<td>DGM 6268</td>
<td>Usable Design for Mobile Digital Media</td>
<td></td>
</tr>
<tr>
<td>TCC 6610</td>
<td>Prototyping</td>
<td></td>
</tr>
<tr>
<td>TCC 6620</td>
<td>Collecting User Data</td>
<td></td>
</tr>
</tbody>
</table>

Open Electives
Choose a combination of 8–10 quarter hours of electives from the list below and any concentration courses above: 8-10

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>TCC 6480</td>
<td>Instructional Design for Technical Communicators</td>
<td></td>
</tr>
<tr>
<td>TCC 6630</td>
<td>Introduction to XML</td>
<td></td>
</tr>
<tr>
<td>TCC 6640</td>
<td>Wiki-Based Documentation</td>
<td></td>
</tr>
<tr>
<td>TCC 6495</td>
<td>Document Design</td>
<td></td>
</tr>
<tr>
<td>TCC 6150</td>
<td>Writing Portfolio</td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>LDR 6100</td>
<td>Developing Your Leadership Capability</td>
<td>3-6</td>
</tr>
<tr>
<td>LDR 6135</td>
<td>Ethical Leadership</td>
<td>3</td>
</tr>
<tr>
<td>LDR 6405</td>
<td>Sport in Society</td>
<td>3</td>
</tr>
<tr>
<td>LDR 6410</td>
<td>Leadership and Organization in Sport</td>
<td>3</td>
</tr>
<tr>
<td>LDR 6430</td>
<td>Sports Law</td>
<td>3</td>
</tr>
<tr>
<td>LDR 6441</td>
<td>Sports Media Relations</td>
<td>3</td>
</tr>
</tbody>
</table>

Complete one of the following. This course should be the last course taken and requires faculty advisor approval: 1-4

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>LDR 6961</td>
<td>Internship</td>
<td></td>
</tr>
<tr>
<td>LDR 6980</td>
<td>Capstone</td>
<td></td>
</tr>
</tbody>
</table>

Elective Courses

Choose two of the following: 18

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMN 6015</td>
<td>Introduction to the Digital Era: The Power of Social Media</td>
<td></td>
</tr>
<tr>
<td>LDR 6443</td>
<td>Ticket Sales and Strategies</td>
<td></td>
</tr>
</tbody>
</table>
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

- 3-D Animation (p. 322)
- Adult and Organizational Learning (p. 323)
- Advanced Study in Orthopedics (p. 323)
- Agile Project Management (p. 323)
- Biopharmaceutical (p. 326)Domestic (p. 326) Regulatory Affairs (p. 326)
- Cloud Computing Application and Management (p. 324)
- Collegiate Athletics Administration (p. 324)
- Construction Management (p. 324)
- Cross-Cultural Communication (p. 325)
- Digital Media Management (p. 325)
- Digital Video (p. 325)
- E-Learning and Instructional Design (p. 326)
- Financial Markets and Institutions (p. 327)
- Forensic Accounting (p. 327)
- Game Design (p. 327)
- Geographic Information Systems (p. 327)
- Global Student Mobility (p. 328)
- Global Studies and International Relations (p. 328)
- Health Management (p. 329)
- Higher Education Administration (p. 329)
- Human-Centered Informatics (p. 330)
- Human Resources Management (p. 330)
- Information Security Management (p. 330)
- Interactive Design (p. 331)
- Interdisciplinary Professional Studies (p. 331)
- International Biopharmaceutical Regulatory Affairs (p. 332)
- Leadership (p. 333)
- Leading and Managing Technical Projects (p. 333)
- Leading Communication Strategy and Talent Development (p. 333)
- Learning Analytics (p. 334)
- Medical Devices Regulatory Affairs (p. 334)
- Nonprofit Management (p. 335)
- Organizational Communication (p. 335)
- Port Security (p. 335)
- Professional Sports Administration (p. 336)
- Program and Portfolio Management (p. 336)
- Project Management (p. 336)
- Public and Media Relations (p. 337)
- Remote Sensing (p. 337)
- Respiratory Specialty Practice (p. 338)
- Social Media and Online Communities (p. 338)
- Teaching English to Speakers Of Other Languages (p. 338)

### 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 composting.

### Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

#### Core Course

*Complete one of the following. Note: For students with a portfolio waiver, DGM 6450 is the core course:*

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>DGM 6105</td>
<td>Visual Communications Foundation</td>
</tr>
<tr>
<td>DGM 6450</td>
<td>Animation Basics</td>
</tr>
</tbody>
</table>

#### Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>DGM 6122</td>
<td>Foundations of Digital Storytelling</td>
</tr>
<tr>
<td>DGM 6510</td>
<td>3-D Modelling</td>
</tr>
<tr>
<td>DGM 6530</td>
<td>Character Animation</td>
</tr>
<tr>
<td>DGM 6540</td>
<td>Compositing</td>
</tr>
</tbody>
</table>

Minimum 3.000 GPA required

<table>
<thead>
<tr>
<th>Program Credit/GPA Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>45 total quarter hours required</td>
</tr>
<tr>
<td>Minimum 3.000 GPA required</td>
</tr>
</tbody>
</table>
Program Objectives:
- 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.

Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTH 6560</td>
<td>Patient Management Models and Evidence-Based Practice in Orthopedics</td>
<td>2</td>
</tr>
<tr>
<td>PTH 6561</td>
<td>Evidence-Based Examination and Outcomes for the Cervical-Thoracic Spine and Temporomandibular Joint</td>
<td>4</td>
</tr>
<tr>
<td>PTH 6562</td>
<td>Evidence-Based Examination and Outcomes for Upper Extremity: Shoulder, Elbow, and Hand</td>
<td>4</td>
</tr>
<tr>
<td>PTH 6563</td>
<td>Evidence-Based Examination and Outcomes for Lumbar Spine and Sacroiliac Joint</td>
<td>4</td>
</tr>
<tr>
<td>PTH 6564</td>
<td>Evidence-Based Examination and Outcomes for Lower Extremity: Hip, Knee, Foot, and Ankle</td>
<td>4</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PJM 6810</td>
<td>Principles of Agile Project Management</td>
<td>3</td>
</tr>
<tr>
<td>PJM 6815</td>
<td>Advanced Agile Project Management</td>
<td>3</td>
</tr>
<tr>
<td>PJM 6820</td>
<td>Agile Implementation and Governance</td>
<td>3</td>
</tr>
<tr>
<td>PJM 6825</td>
<td>Agile Lean Product Development</td>
<td>3</td>
</tr>
<tr>
<td>PJM 6205</td>
<td>Leading and Managing Technical Projects</td>
<td>3</td>
</tr>
<tr>
<td>CMN 6060</td>
<td>Negotiation, Mediation, and Facilitation</td>
<td>3</td>
</tr>
</tbody>
</table>

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.

Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITC 6430</td>
<td>Enterprise Information Technology Service Management</td>
<td>3</td>
</tr>
<tr>
<td>ITC 6015</td>
<td>Enterprise Information Architecture</td>
<td>3</td>
</tr>
<tr>
<td>ITC 6320</td>
<td>Information Security Technology</td>
<td>3</td>
</tr>
<tr>
<td>ITC 6355</td>
<td>Web Application Design and Development</td>
<td>3</td>
</tr>
</tbody>
</table>

Complete three of the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALY 6050</td>
<td>Introduction to Enterprise Analytics</td>
<td>3</td>
</tr>
<tr>
<td>PJM 6205</td>
<td>Leading and Managing Technical Projects</td>
<td>3</td>
</tr>
<tr>
<td>DGM 6145</td>
<td>Information Technology and Creative Practice</td>
<td>3</td>
</tr>
<tr>
<td>MIS 6080</td>
<td>Network Security Concepts</td>
<td>3</td>
</tr>
<tr>
<td>MIS 6082</td>
<td>Network Protection</td>
<td>3</td>
</tr>
</tbody>
</table>

Program Credit/GPA Requirements
25 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. 321) program.

Program Requirements
Complete all courses and requirements listed below unless otherwise indicated.

Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>LDR 6400</td>
<td>Sports Management</td>
<td>3</td>
</tr>
<tr>
<td>LDR 6427</td>
<td>Gender and Diversity in Sport</td>
<td>3</td>
</tr>
<tr>
<td>LDR 6442</td>
<td>Athletic Fund-Raising</td>
<td>3</td>
</tr>
<tr>
<td>LDR 6455</td>
<td>NCAA Compliance</td>
<td>3</td>
</tr>
<tr>
<td>LDR 6465</td>
<td>Title IX</td>
<td>3</td>
</tr>
<tr>
<td>LDR 6615</td>
<td>Academic Advising for Student-Athletes</td>
<td>3</td>
</tr>
</tbody>
</table>

Program Credit/GPA Requirements
18 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.

Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITC 6420</td>
<td>Introduction to Cloud Computing Applications and Management</td>
<td>3</td>
</tr>
</tbody>
</table>
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**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMG 6400</td>
<td>Introduction to Construction Management</td>
<td>4</td>
</tr>
<tr>
<td>CMG 6402</td>
<td>Alternative Project Delivery Methods and Project Controls</td>
<td>4</td>
</tr>
<tr>
<td>CMG 6403</td>
<td>Safety, Project Risk, and Quality Management</td>
<td>4</td>
</tr>
<tr>
<td>CMG 6405</td>
<td>Construction Law</td>
<td>4</td>
</tr>
</tbody>
</table>

**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**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMN 6082</td>
<td>Strategies for Cross-Cultural Facilitation and Negotiation</td>
<td>3</td>
</tr>
</tbody>
</table>

**Required Electives**

Students must earn a minimum of 12 quarter hours.

**SOCIAL JUSTICE TRACK**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PBR 6100</td>
<td>Introduction to Public Relations</td>
<td>3</td>
</tr>
<tr>
<td>HSV 6120</td>
<td>Social Inequality, Social Change, and Community Building</td>
<td>3</td>
</tr>
</tbody>
</table>

**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. 293) curriculum combined with existing concentration courses.

**Program Requirements**

Complete all courses and requirements listed below unless otherwise indicated.

**Required Courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>DGM 6145</td>
<td>Information Technology and Creative Practice</td>
<td>4</td>
</tr>
<tr>
<td>DGM 6279</td>
<td>Project Management for Digital Media</td>
<td>4</td>
</tr>
<tr>
<td>DGM 6280</td>
<td>Managing for Digital Media</td>
<td>4</td>
</tr>
<tr>
<td>DGM 6285</td>
<td>Interactive Marketing Fundamentals</td>
<td>4</td>
</tr>
</tbody>
</table>

**Electives**

Complete one of the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>DGM 6230</td>
<td>Digital Media Entrepreneurship</td>
<td></td>
</tr>
<tr>
<td>DGM 6290</td>
<td>Social Media and Brand Strategy Implementation</td>
<td></td>
</tr>
</tbody>
</table>

**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**
- DGM 6105 Visual Communications Foundation 4
- DGM 6122 Foundations of Digital Storytelling 4
- DGM 6880 Portfolio 2

**Electives**
Complete two of the following: 8
- DGM 6435 Digital Video Production
- DGM 6440 Editing in the Digital Studio
- DGM 6520 Lighting for the Camera

**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**
- RGA 6000 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

Complete one of the following: 4-5
- RGA 6203 Food, Drug, and Medical Device Law: Topics and Cases
- RGA 6210 Strategic Planning and Project Management for Regulatory Affairs
- RGA 6211 Combination Products and Convergence
- RGA 6212 Introduction to Safety Sciences
- RGA 6214
- RGA 6216 The Medical, Social, and Financial Dimensions of Orphan Drugs
- RGA 6217 Biomedical Product Development: From Biotech to Boardroom to Market
- RGA 6370 Regulatory Writing: Medical Device Submissions
- RGA 6380 Regulatory Writing: New Drug Applications

**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**
- EDU 6319 How People Learn 4
- EDU 6321 Models for Learning Design 4
- EDU 6323 Technology as a Medium for Learning 4

**Elective**
Complete one of the following: 4
Program Credit/GPA Requirements
16 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

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIN 6101</td>
<td>Accounting Fundamentals for Financial Institutions</td>
<td>3-4</td>
</tr>
<tr>
<td>FIN 6161</td>
<td>Investment Analysis</td>
<td>4</td>
</tr>
<tr>
<td>FIN 6102</td>
<td>Asset and Liability Management</td>
<td>3-4</td>
</tr>
<tr>
<td>FIN 6120</td>
<td>Building Financial Relationships</td>
<td>3-4</td>
</tr>
</tbody>
</table>

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:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACC 6210</td>
<td>Forensic Accounting Principles</td>
<td>4</td>
</tr>
<tr>
<td>ACC 6220</td>
<td>Dissecting Financial Statements</td>
<td>4</td>
</tr>
<tr>
<td>ACC 6230</td>
<td>Investigative Accounting and Fraud Examination</td>
<td>4</td>
</tr>
<tr>
<td>ACC 6240</td>
<td>Litigation Support</td>
<td>4</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>DGM 6308</td>
<td>Intermediate Programming for Digital Media</td>
<td>4</td>
</tr>
<tr>
<td>DGM 6400</td>
<td>Game Design Fundamentals</td>
<td>4</td>
</tr>
<tr>
<td>DGM 6405</td>
<td>Game Development</td>
<td>4</td>
</tr>
<tr>
<td>DGM 6408</td>
<td>Game Design Algorithms and Data Structures</td>
<td>4</td>
</tr>
<tr>
<td>DGM 6410</td>
<td>Game Design Technology Lab</td>
<td>4</td>
</tr>
</tbody>
</table>

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**
- 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**
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

**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**
- GST 6810: International Higher Education 4
- GST 6820: Managing Study Abroad 4
- GST 6830: Managing International Students 4

**Elective**
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

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GST 6100</td>
<td>Globalization and Global Politics and Economics</td>
<td>4</td>
</tr>
<tr>
<td>GST 6101</td>
<td>Global Literacy, Culture, and Community</td>
<td>4</td>
</tr>
<tr>
<td>GST 6320</td>
<td>Peace and Conflict</td>
<td>4</td>
</tr>
<tr>
<td>GST 6501</td>
<td>Regional Studies: East Asia</td>
<td></td>
</tr>
<tr>
<td>GST 6502</td>
<td>Regional Studies: Middle East</td>
<td></td>
</tr>
<tr>
<td>GST 6503</td>
<td>Regional Studies: Sub-Saharan Africa</td>
<td></td>
</tr>
<tr>
<td>GST 6504</td>
<td>Regional Studies: Europe</td>
<td></td>
</tr>
<tr>
<td>GST 6505</td>
<td>Regional Studies: Southwest and Central Asia</td>
<td></td>
</tr>
<tr>
<td>GST 6506</td>
<td>Regional Studies: Latin America</td>
<td></td>
</tr>
</tbody>
</table>

Elective
Complete one of the following: 4

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>GST 6501</td>
<td>Regional Studies: East Asia</td>
</tr>
<tr>
<td>GST 6502</td>
<td>Regional Studies: Middle East</td>
</tr>
<tr>
<td>GST 6503</td>
<td>Regional Studies: Sub-Saharan Africa</td>
</tr>
<tr>
<td>GST 6504</td>
<td>Regional Studies: Europe</td>
</tr>
<tr>
<td>GST 6505</td>
<td>Regional Studies: Southwest and Central Asia</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HMG 6100</td>
<td>Organization, Administration, Financing, and History of Healthcare</td>
<td>3</td>
</tr>
<tr>
<td>HMG 6120</td>
<td>Human Resource Management in Healthcare</td>
<td>3</td>
</tr>
</tbody>
</table>

Elective Courses
Complete two of the following (minimum of 6 quarter hours): 6

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NPM 6110</td>
<td>Legal and Governance Issues in Nonprofit Organizations</td>
<td>3</td>
</tr>
<tr>
<td>NPM 6150</td>
<td>Human Resources Management in Nonprofit Organizations</td>
<td>3</td>
</tr>
<tr>
<td>HMG 6140</td>
<td>Principles of Population-Based Management</td>
<td>3</td>
</tr>
<tr>
<td>HMG 6150</td>
<td>Seminar in Health Services Research: Issues and Research</td>
<td>3</td>
</tr>
<tr>
<td>HMG 6160</td>
<td>Healthcare Information Systems Management</td>
<td>3</td>
</tr>
<tr>
<td>HMG 6170</td>
<td>Health Law, Politics, and Policy</td>
<td>3</td>
</tr>
<tr>
<td>HRM 6020</td>
<td>Strategic Recruitment, Training, and Performance Management</td>
<td>3</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDU 6201</td>
<td>The Landscape of Higher Education</td>
<td>4</td>
</tr>
<tr>
<td>EDU 6202</td>
<td>Faculty, Curriculum, and Academic Community</td>
<td>4</td>
</tr>
</tbody>
</table>
Human-Centered Informatics, Graduate Certificate

EDU 6203 Education Law, Policy, and Finance 4

Elective

Complete one of the following: 4

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDU 6520</td>
<td>Learning and the Brain: Translating Research into Practice</td>
</tr>
<tr>
<td>EDU 6319</td>
<td>How People Learn</td>
</tr>
<tr>
<td>EDU 6332</td>
<td>Open Learning</td>
</tr>
<tr>
<td>EDU 6330</td>
<td>Digital Media Literacy</td>
</tr>
<tr>
<td>EDU 6558</td>
<td>Issues in Education</td>
</tr>
</tbody>
</table>

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.

Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITC 6410</td>
<td>Fundamentals of Human Behaviors for Interactive Systems</td>
</tr>
<tr>
<td>DGM 6461</td>
<td>Interactive Information Design 1</td>
</tr>
<tr>
<td>DGM 6168</td>
<td>Usability and Human Interaction</td>
</tr>
<tr>
<td>DGM 6268</td>
<td>Usable Design for Mobile Digital Media</td>
</tr>
<tr>
<td>DGM 6463</td>
<td>Interactive Information Design 2</td>
</tr>
<tr>
<td>DGM 6525</td>
<td>Research Methods for Global User Experiences</td>
</tr>
<tr>
<td>ALY 6070</td>
<td>Communication and Visualization for Data Analytics</td>
</tr>
<tr>
<td>ITC 6355</td>
<td>Web Application Design and Development</td>
</tr>
<tr>
<td>ITC 7120</td>
<td>Healthcare Information Systems</td>
</tr>
<tr>
<td>DGM 6145</td>
<td>Information Technology and Creative Practice</td>
</tr>
<tr>
<td>GIS 6370</td>
<td>Internet-Based GIS</td>
</tr>
</tbody>
</table>

Program Credit/GPA Requirements

25 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

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>HRM 6005</td>
<td>Creating a High-Performance Organization: Strategic Organizational and HRM Choices</td>
</tr>
<tr>
<td>HRM 6010</td>
<td>Total Compensation</td>
</tr>
<tr>
<td>HRM 6020</td>
<td>Strategic Recruitment, Training, and Performance Management</td>
</tr>
<tr>
<td>HRM 6030</td>
<td>Employee Rights and Employer Obligations</td>
</tr>
<tr>
<td>HRM 6040</td>
<td>High-Performance Human Resources Systems and Development</td>
</tr>
<tr>
<td>HRM 6045</td>
<td>Change, Challenge, and Competence</td>
</tr>
</tbody>
</table>

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

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

Information Security Management Electives
Complete two of the following:  6-8
- ITC 6325  CISA Preparation
- ITC 6330  CISSP Preparation
- MIS 6082  Network Protection
- MIS 6080  Network Security Concepts

Program Credit/GPA Requirements
18–20 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.

Required Courses

DGM 6105  Visual Communications Foundation  4
DGM 6108  Programming Foundations for Digital Media  4
DGM 6168  Usability and Human Interaction  4
DGM 6217  Typography for Interactivity  4
DGM 6461  Interactive Information Design 1  4
DGM 6880  Portfolio  2

Program Credit/GPA Requirements
22 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

EDU 6184  Interdisciplinary Foundations  2
EDU 6980  Interdisciplinary Capstone  2

Choose a minimum of 12 quarter hours from the following:

CORPORATE AND ORGANIZATIONAL COMMUNICATION
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
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
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
HLS 6000  Introduction to Homeland Security  3

HUMAN SERVICES
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
LDR 6100  Developing Your Leadership Capability  3-6
LDR 6110  Leading Teams  3-6
LDR 6120  Organizational Leadership  3-6

NONPROFIT MANAGEMENT
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
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
LDR 6400  Sports Management  3

TECHNICAL COMMUNICATION
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

RGA 6220  Global Biotechnology Product Registration: E.U., U.S. Product Regulation  5
RGA 6227  Emerging Medical Device Markets  4
Complete two of the following:  8
RGA 6228  Managing International Clinical Trials
RGA 6221  European Union Compliance Process and Regulatory Affairs
RGA 6222  European Medical Device Regulations
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
- LDR 6100 Developing Your Leadership Capability 3-6
- LDR 6110 Leading Teams 3-6
- LDR 6120 Organizational Leadership 3-6
- LDR 6140 Strategic Leadership 3-6

Leadership Electives
Complete two of the following:
- LDR 6135 Ethical Leadership
- HRM 6005 Creating a High-Performance Organization: Strategic Organizational and HRM Choices
- LDR 6150 Transforming Organizations
- CMN 6010 Strategic Communication Management

18 total quarter hours required
Minimum 3.000 GPA required
Learning Analytics, Graduate Certificate

- 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

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMN 6200</td>
<td>Strategic Communications Advisor: Roles and Responsibilities</td>
<td>3</td>
</tr>
<tr>
<td>CMN 6201</td>
<td>Managing Communication Resources</td>
<td>3</td>
</tr>
<tr>
<td>CMN 6202</td>
<td>Management Symposium</td>
<td>3</td>
</tr>
</tbody>
</table>

Electives
Complete three of the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>HRM 6020</td>
<td>Strategic Recruitment, Training, and Performance Management</td>
</tr>
<tr>
<td>LDR 6120</td>
<td>Organizational Leadership</td>
</tr>
<tr>
<td>PJM 6000</td>
<td>Project Management Practices</td>
</tr>
<tr>
<td>PJM 6215</td>
<td>Leading Remote Project Teams</td>
</tr>
<tr>
<td>CMN 6045</td>
<td>Leveraging Digital Technologies: Strategy, Assessment, and Governance</td>
</tr>
</tbody>
</table>

Program Credit/GPA Requirements

18 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.

Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>RGA 6202</td>
<td>Medical Device Development: A Regulatory Overview</td>
</tr>
<tr>
<td>RGA 6205</td>
<td>Emerging Trends and Issues in the Medical Device Industry</td>
</tr>
<tr>
<td>RGA 6000</td>
<td>Introduction to Food and Drug Administration (FDA) Pharmaceutical Regulation</td>
</tr>
<tr>
<td>RGA 6001</td>
<td>Introduction to Food and Drug Administration Medical Device Regulation</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDU 6340</td>
<td>Learning Analytics Concepts and Theories</td>
</tr>
<tr>
<td>EDU 6341</td>
<td>Introduction to Data Mining in Education</td>
</tr>
<tr>
<td>EDU 6182</td>
<td>Educational Statistics</td>
</tr>
<tr>
<td>EDU 6343</td>
<td>Predictive Modeling for Learning Analytics</td>
</tr>
</tbody>
</table>

Program Credit/GPA Requirements

16 total quarter hours required
Minimum 3.000 GPA required
Medical Devices Regulatory Affairs Electives
Complete one of the following: 4-5

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BTC 6260</td>
<td>The Business of Medicine and Biotechnology</td>
</tr>
<tr>
<td>RGA 6211</td>
<td>Combination Products and Convergence</td>
</tr>
<tr>
<td>RGA 6112</td>
<td>Biomedical Intellectual Property Management: Patents</td>
</tr>
<tr>
<td>RGA 6222</td>
<td>European Medical Device Regulations</td>
</tr>
<tr>
<td>RGA 6225</td>
<td>Japanese Medical Device Regulations and Registration</td>
</tr>
<tr>
<td>RGA 6226</td>
<td>Canadian and Australian Medical Device Regulations</td>
</tr>
<tr>
<td>RGA 6227</td>
<td>Emerging Medical Device Markets</td>
</tr>
<tr>
<td>RGA 6203</td>
<td>Food, Drug, and Medical Device Law: Topics and Cases</td>
</tr>
<tr>
<td>RGA 6370</td>
<td>Regulatory Writing: Medical Device Submissions</td>
</tr>
</tbody>
</table>

Program Credit/GPA Requirements
16 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

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMN 6010</td>
<td>Strategic Communication Management</td>
</tr>
<tr>
<td>CMN 6020</td>
<td>Ethical Issues in Organizational Communication</td>
</tr>
<tr>
<td>CMN 6910</td>
<td>Organizational Communication Assessment</td>
</tr>
</tbody>
</table>

Complete two of the following: 6

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMN 6061</td>
<td>Personal Branding</td>
</tr>
<tr>
<td>CMN 6050</td>
<td>Crisis Communication</td>
</tr>
<tr>
<td>CMN 6060</td>
<td>Negotiation, Mediation, and Facilitation</td>
</tr>
</tbody>
</table>

Complete one of the following: 3

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMN 6080</td>
<td>Intercultural Communication</td>
</tr>
<tr>
<td>CMN 6090</td>
<td>Organizational Culture, Climate, and Communication</td>
</tr>
<tr>
<td>CMN 6100</td>
<td>Communication Networks and Managing Information</td>
</tr>
<tr>
<td>CMN 6110</td>
<td>Group Dynamics and Interpersonal Conflict: Meeting Management</td>
</tr>
<tr>
<td>CMN 6015</td>
<td>Introduction to the Digital Era: The Power of Social Media</td>
</tr>
</tbody>
</table>

Program Credit/GPA Requirements
18 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

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>NPM 6110</td>
<td>Legal and Governance Issues in Nonprofit Organizations</td>
</tr>
<tr>
<td>NPM 6120</td>
<td>Financial Management for Nonprofit Organizations</td>
</tr>
<tr>
<td>NPM 6125</td>
<td>Promoting Nonprofit Organizations</td>
</tr>
<tr>
<td>NPM 6130</td>
<td>Fund-Raising and Development for Nonprofit Organizations</td>
</tr>
<tr>
<td>NPM 6140</td>
<td>Grant and Report Writing</td>
</tr>
<tr>
<td>NPM 6150</td>
<td>Human Resources Management in Nonprofit Organizations</td>
</tr>
</tbody>
</table>

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**
- HLS 6100  Maritime and Port Security 1  4
- HLS 6110  Maritime and 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. 321) program.

**Program Requirements**
Complete all courses and requirements listed below unless otherwise indicated.

**Required Courses**
- 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

---

**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**
- 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

---

**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**
- 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
familiar with professional project work. Students with two years or more of professional project experience should not take this course:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PJM 5900</td>
<td>Foundations of Project Management</td>
<td>4</td>
</tr>
<tr>
<td>PJM 6000</td>
<td>Project Management Practices</td>
<td>3</td>
</tr>
<tr>
<td>PJM 6025</td>
<td>Project Scheduling and Cost Planning</td>
<td>3</td>
</tr>
<tr>
<td>PJM 6015</td>
<td>Project Risk Management</td>
<td>3</td>
</tr>
</tbody>
</table>

**Project Management Electives**

Complete three of the following. Note: Students who take PJM 5900 are required to take only two courses in this section:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PJM 6125</td>
<td>Project Evaluation and Assessment</td>
<td>3</td>
</tr>
<tr>
<td>PJM 6135</td>
<td>Project Quality Management</td>
<td>3</td>
</tr>
<tr>
<td>PJM 6140</td>
<td>Managing Troubled Projects</td>
<td>3</td>
</tr>
<tr>
<td>PJM 6705</td>
<td>Portfolio Management in the Enterprise Environment</td>
<td>3</td>
</tr>
</tbody>
</table>

**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. 299).

**Program Requirements**

Complete all courses and requirements listed below unless otherwise indicated.

**Required Courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PBR 6100</td>
<td>Introduction to Public Relations</td>
<td>3</td>
</tr>
<tr>
<td>PBR 6710</td>
<td>Public Relations Research: Understanding External Audiences</td>
<td>3</td>
</tr>
<tr>
<td>PBR 6130</td>
<td>Public Relations Writing Seminar 1</td>
<td>3</td>
</tr>
<tr>
<td>PBR 6140</td>
<td>Public Relations Writing Seminar 2</td>
<td>3</td>
</tr>
</tbody>
</table>

**Elective Courses**

Complete two of the following: 6-7

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMN 6025</td>
<td>Digital Era Skills: Platforms, Tools, and Techniques</td>
<td></td>
</tr>
<tr>
<td>CMN 6035</td>
<td>Legal, Policy, and Ethical Issues in the Digital Era</td>
<td></td>
</tr>
<tr>
<td>CMN 6045</td>
<td>Leveraging Digital Technologies: Strategy, Assessment, and Governance</td>
<td></td>
</tr>
<tr>
<td>DGM 6290</td>
<td>Social Media and Brand Strategy Implementation</td>
<td></td>
</tr>
<tr>
<td>PBR 6120</td>
<td>Public Relations Legal Issues</td>
<td></td>
</tr>
<tr>
<td>PBR 6125</td>
<td>Community Relations and Corporate Social Responsibility</td>
<td></td>
</tr>
</tbody>
</table>

**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**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>RMS 5105</td>
<td>Fundamentals of Remote Sensing</td>
<td>3</td>
</tr>
<tr>
<td>RMS 6110</td>
<td>Digital Image Processing</td>
<td>3</td>
</tr>
</tbody>
</table>

**Remote Sensing Electives**

Complete four of the following: 12

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>RMS 6210</td>
<td>Technology, Operations, and Requirements for Drones, Helicopters, and Airplanes</td>
<td></td>
</tr>
<tr>
<td>RMS 6230</td>
<td>Remote Sensing and Global Change</td>
<td></td>
</tr>
<tr>
<td>RMS 6240</td>
<td>Introduction to Radar and LIDAR Remote Sensing</td>
<td></td>
</tr>
<tr>
<td>RMS 6250</td>
<td>Remote Sensing of Vegetation</td>
<td></td>
</tr>
<tr>
<td>RMS 6270</td>
<td>Remote Sensing for Disaster Management</td>
<td></td>
</tr>
</tbody>
</table>
Respiratory Specialty Practice, Graduate Certificate

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
RPT 7400 Pulmonary Diseases and Disorders 4
RPT 7401 Cardiopulmonary Assessment and Diagnostics 4

Electives
Select two of the following courses:
RPT 7402 Adult Critical Care 4
RPT 7403 Neonatal and Pediatric Care 4
RPT 7404 Pulmonary Wellness Education and Coordination 4
RPT 7405 Development of Patient Management Plans 4

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.

Program Requirements
Required Courses
Complete six of the following (CMN 6025, CMN 6035, CMN 6045, and CMN 6065 are required):
CMN 6015 Introduction to the Digital Era: The Power of Social Media (Students may waive CMN 6015 if they have social media experience. Please consult with your academic advisor.)
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

Select one or two (if CMN 6015 has been waived) of the following:
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

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

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDU 6300</td>
<td>Introduction to Language and Linguistics</td>
<td>4</td>
</tr>
<tr>
<td>EDU 6534</td>
<td>Bilingualism, Second Language, and Literacy Development</td>
<td>4</td>
</tr>
<tr>
<td>EDU 6558</td>
<td>Issues in Education</td>
<td>1-4</td>
</tr>
<tr>
<td>EDU 6302</td>
<td>Teaching, Learning, and Assessment: How English Is Learned and Used</td>
<td>4</td>
</tr>
<tr>
<td>EDU 6312</td>
<td>TESOL Practicum and Seminar</td>
<td>5</td>
</tr>
</tbody>
</table>

Program Credit/GPA Requirements

18 total quarter hours required
Minimum 3.00 GPA required
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 (p. 340)
- Course Registration (p. 340)
- Transfer Credit (p. 340)
- Awards (p. 340)
- Satisfactory Progress (p. 340)
- Time Limitation (p. 341)
- Changes in Requirements (p. 341)
- The Doctor of Philosophy Degree (PhD) (p. 341)
- The Master's Degree Academic Requirements (p. 342)

### 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 3.00 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. 27)”).

**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 academic affairs 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 coordinator 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.

**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 (3.00) 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.

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 biology PhD program seeks to provide a broad 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.

The Master of Science in Bioinformatics is a professional program that consists of four parts: fundamental courses, core courses, an internship, and electives. All courses are available in the late afternoon or evening to accommodate those who are employed during the day.

Programs

Doctor of Philosophy (PhD)
- Biology (p. 342)
- Biology—Advanced Entry (p. 343)

Master of Science (MS)
- Bioinformatics (p. 343)
- Bioinformatics—ALIGN Program (p. 344)

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

General Requirements

Research Ethics

<table>
<thead>
<tr>
<th>Course</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 7399</td>
<td>Research Problem Solving, Ethics, and Communication Skills</td>
<td>4</td>
</tr>
</tbody>
</table>

Colloquium

Complete the following (repeatable) course twice:

BIOL 5100 Biology Colloquium (2)

Dissertation Courses

Complete the following (repeatable) course twice:

BIOL 9990 Dissertation (2)

BIOLGY PHD WITHOUT CONCENTRATION

Required Course Work
Complete 8 semester hours from the following:  
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  
EEMB 6402 Concepts and Trends in Evolution and Ecology  

Electives  
Complete 16 semester hours from the following:  
BIOL 5103 to BIOL 8674  

Concentrations  
• Cell and Molecular Biology (p. 343)  
• Molecular Microbiology (p. 343)  

CELL AND MOLECULAR BIOLOGY CONCENTRATION  
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:  
BIOL 5103 to BIOL 8674  

MOLECULAR MICROBIOLOGY CONCENTRATION  
Required Course Work  
Complete 8 semester hours from the following:  
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:  
BIOL 5103 to BIOL 8674  

Program Credit/GPA Requirements  
30 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. Students in the MS program gain professional work experience via co-op. The program offers students an opportunity to become equipped to apply bioinformatics and computational methods to biological problems.  
The program entails a required core of 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  
Computational Methods  
<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>BINF 6308</td>
<td>Bioinformatics Computational Methods</td>
<td>4</td>
</tr>
<tr>
<td>BINF 6309</td>
<td>Bioinformatics Computational Methods</td>
<td>4</td>
</tr>
</tbody>
</table>

Research and Seminar  
<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 6381</td>
<td>Ethics in Biological Research</td>
<td>2</td>
</tr>
<tr>
<td>BINF 7385</td>
<td>Bioinformatics Seminar</td>
<td>2</td>
</tr>
</tbody>
</table>

Statistics and Programming
### Bioinformatics, MS—ALIGN Program

**Core Requirements**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BINF 6200</td>
<td>Bioinformatics Programming</td>
<td>4</td>
</tr>
<tr>
<td>MATH 7340</td>
<td>Statistics for Bioinformatics</td>
<td>4</td>
</tr>
</tbody>
</table>

**Co-op**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BINF 6964</td>
<td>Co-op Work Experience</td>
<td>0</td>
</tr>
</tbody>
</table>

**Electives**

Complete 12 semester hours from the following. Electives outside this list may be chosen in consultation with faculty advisor.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 5543</td>
<td>Stem Cells and Regeneration</td>
</tr>
<tr>
<td>BIOL 5549</td>
<td>Microbial Biotechnology</td>
</tr>
<tr>
<td>BIOL 5569</td>
<td>Advanced Microbiology</td>
</tr>
<tr>
<td>BIOL 5571</td>
<td>Microbial Ecology</td>
</tr>
<tr>
<td>BIOL 5573</td>
<td>Medical Microbiology</td>
</tr>
<tr>
<td>BIOL 5581</td>
<td>Biological Imaging</td>
</tr>
<tr>
<td>BIOL 5583</td>
<td>Immunology</td>
</tr>
<tr>
<td>BIOL 5585</td>
<td>Evolution</td>
</tr>
<tr>
<td>BIOL 5587</td>
<td>Comparative Neurobiology</td>
</tr>
<tr>
<td>BIOL 5591</td>
<td>Advanced Genomics</td>
</tr>
<tr>
<td>BIOL 5593</td>
<td>Cell and Molecular Biology of Aging</td>
</tr>
<tr>
<td>BIOL 6299</td>
<td>Molecular Cell Biology for Biotechnology</td>
</tr>
<tr>
<td>BIOL 6300</td>
<td>Biochemistry</td>
</tr>
<tr>
<td>BIOL 6301</td>
<td>Molecular Cell Biology</td>
</tr>
<tr>
<td>BIOL 6303</td>
<td>Neurobiology and Behavior</td>
</tr>
<tr>
<td>BIOL 6399</td>
<td>Dynamics of Microbial Ecology</td>
</tr>
<tr>
<td>BIOL 6407</td>
<td>Biochemistry for Molecular Biologists</td>
</tr>
<tr>
<td>BIOT 5219</td>
<td>The Biotechnology Enterprise</td>
</tr>
<tr>
<td>CHEM 5638</td>
<td>Molecular Modeling</td>
</tr>
<tr>
<td>CS 5010</td>
<td>Programming Design Paradigm</td>
</tr>
<tr>
<td>CS 5100</td>
<td>Foundations of Artificial Intelligence</td>
</tr>
<tr>
<td>CS 5200</td>
<td>Database Management Systems</td>
</tr>
<tr>
<td>CS 5400</td>
<td>Principles of Programming Language</td>
</tr>
<tr>
<td>CS 5500</td>
<td>Managing Software Development</td>
</tr>
<tr>
<td>CS 5600</td>
<td>Computer Systems</td>
</tr>
<tr>
<td>CS 5610</td>
<td>Web Development</td>
</tr>
<tr>
<td>CS 5700</td>
<td>Fundamentals of Computer Networking</td>
</tr>
<tr>
<td>CS 5800</td>
<td>Algorithms</td>
</tr>
<tr>
<td>CS 6140</td>
<td>Machine Learning</td>
</tr>
<tr>
<td>CS 6200</td>
<td>Information Retrieval</td>
</tr>
<tr>
<td>CS 6220</td>
<td>Data Mining Techniques</td>
</tr>
<tr>
<td>DA 5020</td>
<td>Collecting, Storing, and Retrieving Data</td>
</tr>
<tr>
<td>DA 5030</td>
<td>Introduction to Data Mining/Machine Learning</td>
</tr>
<tr>
<td>EEMB 5130</td>
<td>Ecological Dynamics</td>
</tr>
<tr>
<td>MATH 5104</td>
<td>Basics and Probability and Statistics</td>
</tr>
<tr>
<td>MATH 5121</td>
<td>Topology 1</td>
</tr>
<tr>
<td>MATH 5122</td>
<td>Geometry 1</td>
</tr>
<tr>
<td>MATH 5131</td>
<td>Introduction to Mathematical Methods and Modeling</td>
</tr>
<tr>
<td>PHYS 5116</td>
<td>Complex Networks and Applications</td>
</tr>
<tr>
<td>PHYS 7331</td>
<td>Network Science Data</td>
</tr>
<tr>
<td>PPUA 5301</td>
<td>Introduction to Computational Statistics</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>PPUA 5302</td>
<td>Information Design and Visual Analytics</td>
</tr>
</tbody>
</table>

**Program Credit/GPA Requirements**

- 32 total semester hours required
- Minimum 3.000 GPA required

---

**Bioinformatics, MS—ALIGN Program**

The Master of Science in Bioinformatics through the ALIGN program combines core course work in bioinformatics computerized methods, programming, and statistics with graduate electives that offer you the flexibility to specialize and build broader knowledge in both the life sciences and computer sciences. A co-op, frequently completed with leading employers in academia and industry, rounds out the program and assures graduates a competitive edge in the dynamic field of bioinformatics.

**Program Requirements**

Complete all courses and requirements listed below unless otherwise indicated.

### Core Requirements

**ALIGN Course Work**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 6301</td>
<td>Molecular Cell Biology</td>
<td>4</td>
</tr>
</tbody>
</table>

**Computational Methods**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BINF 6308</td>
<td>Bioinformatics Computational Methods</td>
<td>4</td>
</tr>
<tr>
<td>BINF 6309</td>
<td>Bioinformatics Computational Methods</td>
<td>4</td>
</tr>
</tbody>
</table>

**Research and Seminar**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BINF 7385</td>
<td>Bioinformatics Seminar</td>
<td>2</td>
</tr>
</tbody>
</table>

**Statistics and Programming**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BINF 6200</td>
<td>Bioinformatics Programming</td>
<td>4</td>
</tr>
<tr>
<td>MATH 7340</td>
<td>Statistics for Bioinformatics</td>
<td>4</td>
</tr>
</tbody>
</table>

**Co-op**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BINF 6964</td>
<td>Co-op Work Experience</td>
<td>0</td>
</tr>
</tbody>
</table>

**Electives**

Complete 12 semester hours of graduate electives. You may choose electives outside this list in consultation with your faculty advisor.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 5543</td>
<td>Stem Cells and Regeneration</td>
</tr>
<tr>
<td>BIOL 5549</td>
<td>Microbial Biotechnology</td>
</tr>
<tr>
<td>BIOL 5569</td>
<td>Advanced Microbiology</td>
</tr>
<tr>
<td>BIOL 5571</td>
<td>Microbial Ecology</td>
</tr>
<tr>
<td>BIOL 5573</td>
<td>Medical Microbiology</td>
</tr>
<tr>
<td>BIOL 5581</td>
<td>Biological Imaging</td>
</tr>
<tr>
<td>BIOL 5583</td>
<td>Immunology</td>
</tr>
<tr>
<td>BIOL 5585</td>
<td>Evolution</td>
</tr>
<tr>
<td>BIOL 5587</td>
<td>Comparative Neurobiology</td>
</tr>
<tr>
<td>BIOL 5591</td>
<td>Advanced Genomics</td>
</tr>
<tr>
<td>BIOL 5593</td>
<td>Cell and Molecular Biology of Aging</td>
</tr>
<tr>
<td>BIOL 6299</td>
<td>Molecular Cell Biology for Biotechnology</td>
</tr>
<tr>
<td>BIOL 6300</td>
<td>Biochemistry</td>
</tr>
<tr>
<td>BIOL 6301</td>
<td>Molecular Cell Biology</td>
</tr>
<tr>
<td>BIOL 6303</td>
<td>Neurobiology and Behavior</td>
</tr>
<tr>
<td>BIOL 6399</td>
<td>Dynamics of Microbial Ecology</td>
</tr>
<tr>
<td>BIOL 6407</td>
<td>Biochemistry for Molecular Biologists</td>
</tr>
<tr>
<td>BIOT 5219</td>
<td>The Biotechnology Enterprise</td>
</tr>
<tr>
<td>CHEM 5638</td>
<td>Molecular Modeling</td>
</tr>
<tr>
<td>CS 5010</td>
<td>Programming Design Paradigm</td>
</tr>
<tr>
<td>CS 5100</td>
<td>Foundations of Artificial Intelligence</td>
</tr>
<tr>
<td>CS 5200</td>
<td>Database Management Systems</td>
</tr>
<tr>
<td>CS 5400</td>
<td>Principles of Programming Language</td>
</tr>
<tr>
<td>CS 5500</td>
<td>Managing Software Development</td>
</tr>
<tr>
<td>CS 5600</td>
<td>Computer Systems</td>
</tr>
<tr>
<td>CS 5610</td>
<td>Web Development</td>
</tr>
<tr>
<td>CS 5700</td>
<td>Fundamentals of Computer Networking</td>
</tr>
<tr>
<td>CS 5800</td>
<td>Algorithms</td>
</tr>
<tr>
<td>CS 6140</td>
<td>Machine Learning</td>
</tr>
<tr>
<td>CS 6200</td>
<td>Information Retrieval</td>
</tr>
<tr>
<td>CS 6220</td>
<td>Data Mining Techniques</td>
</tr>
<tr>
<td>DA 5020</td>
<td>Collecting, Storing, and Retrieving Data</td>
</tr>
<tr>
<td>DA 5030</td>
<td>Introduction to Data Mining/Machine Learning</td>
</tr>
<tr>
<td>EEMB 5130</td>
<td>Ecological Dynamics</td>
</tr>
<tr>
<td>MATH 5104</td>
<td>Basics and Probability and Statistics</td>
</tr>
<tr>
<td>MATH 5121</td>
<td>Topology 1</td>
</tr>
<tr>
<td>MATH 5122</td>
<td>Geometry 1</td>
</tr>
<tr>
<td>MATH 5131</td>
<td>Introduction to Mathematical Methods and Modeling</td>
</tr>
<tr>
<td>PHYS 5116</td>
<td>Complex Networks and Applications</td>
</tr>
<tr>
<td>PHYS 7331</td>
<td>Network Science Data</td>
</tr>
<tr>
<td>PPUA 5301</td>
<td>Introduction to Computational Statistics</td>
</tr>
<tr>
<td>PPUA 5302</td>
<td>Information Design and Visual Analytics</td>
</tr>
</tbody>
</table>
Northeastern University

BIOL 6301 Molecular Cell Biology (may count towards core and elective requirement)
BIOL 6303 Neurobiology and Behavior
BIOL 6399 Dynamics of Microbial Ecology
BIOL 6407 Biochemistry for Molecular Biologists
BIOT 5219 The Biotechnology Enterprise
CHEM 5638 Molecular Modeling
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 Ecological Dynamics
MATH 5104 Basics and Probability and Statistics
MATH 5121 Topology 1
MATH 5122 Geometry 1
MATH 5131 Introduction to Mathematical Methods and Modeling
PHYS 5116 Complex Networks and Applications
PHYS 7331 Network Science Data
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

Chemistry and Chemical Biology

Website (http://www.northeastern.edu/chemistry)

Michael P. Pollastri, PhD
Associate Professor and Chair
102 Hurtig Hall
617.373.2822

Carla Mattos, PhD
Professor and Director of Graduate Studies for Chemistry and Chemical Biology, c.mattos@northeastern.edu

Cara Shockley
Graduate Administrative Officer for Chemistry and Chemical Biology c.shockley@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 department offers thesis- and non-thesis-based advanced degrees with concentrations in analytical, inorganic, organic, and physical chemistry and in interdisciplinary fields such as polymers, materials, and chemical biology.

The PhD program 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. The program of study includes some course work, but the primary emphasis is on the completion of an original research project, its articulation in a well-written thesis, and its subsequent defense before the thesis (oral examination) committee.

The Master of Science in Biotechnology, a Professional Master of Science degree program, seeks to provide students with a common core of knowledge in biotechnology, with particular emphasis on their ability to integrate knowledge across disciplinary boundaries. Specific objectives are to provide students with didactic and practical knowledge in genomics, proteomics, and other bioanalytical approaches; drug discovery, development, and delivery; and bioprocess development and optimization.

Programs

Doctor of Philosophy (PhD)
• Chemistry (p. 345)
• Chemistry—Advanced Entry (p. 346)

Master of Science (MS)
• Biotechnology (p. 259)
• Chemistry (p. 348)

Graduate Certificate
• Biopharmaceutical Analytical Sciences (p. 266)
• Biotechnology (p. 349)
• Biotechnology Enterprise (p. 349)
• Experimental Biotechnology (p. 349)
• Molecular Biotechnology (p. 350)
• Pharmaceutical Technologies (p. 350)
• Process Science (p. 350)

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

**General Requirements**

**Required Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 5600</td>
<td>Research Skills and Ethics in Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 7730</td>
<td>Advanced Laboratory Methods</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 7750</td>
<td>Advanced Problem Solving</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 8504</td>
<td>Graduate Seminar (repeatable)</td>
<td>1</td>
</tr>
</tbody>
</table>

At least one seminar must be taken for a letter grade.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 8984</td>
<td>Research</td>
<td>1-6</td>
</tr>
</tbody>
</table>

**Chemistry Course Work**
Complete 18 semester hours from the following:

- CHEM 5550, CHEM 5570, or within the range of CHEM 5610 to CHEM 7320

**Dissertation**
Complete the following (repeatable) course twice:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 9990</td>
<td>Dissertation</td>
<td>0</td>
</tr>
</tbody>
</table>

**Program Credit/GPA Requirements**
33 total semester hours required
Minimum 3.000 GPA required

### Biotechnology, MS

**Overview**
The Master of Science in Biotechnology is a Professional Master of Science (PSM) degree, an innovative graduate degree designed to allow students to pursue advanced training and excel in science while simultaneously developing highly valued business skills without acquiring a PhD or MBA. PSM programs are characterized by instruction in advanced science or mathematics, business courses, and a graduate co-op providing a real-world work experience. Graduates are referred to as "T-shaped" professionals with both deep knowledge of a specific discipline and broad knowledge of the communications and relational skills necessary to excel in any business and adapt to a changing workplace. The PSM is a nonthesis degree.

**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 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.

**Program Requirements**

Complete all courses and requirements listed below unless otherwise indicated.

**Core Requirements**

**General Core**

- BIOT 5120  Introduction to Biotechnology  3
- BIOT 5219  The Biotechnology Enterprise  2
- BIOT 5631  Cell Culture Processes for Biopharmaceutical Production  3
- BIOL 6299  Molecular Cell Biology for Biotechnology  3
- CHEM 5620  Protein Chemistry  3
- CHEM 7317  Analytical Biotechnology  3
- PHSC 6214  Experimental Design and Biostatistics  2

**Co-op**

- BIOT 6500  Professional Development for Co-op  0
- BIOT 6964  Co-op Work Experience  0

**Concentrations**

Complete one of the following five concentrations:

- Biopharmaceutical Analytical Sciences Concentration (p. 260)
- Biotechnology Enterprise Concentration (p. 260)
- Molecular Biotechnology Concentration (p. 260)
- Pharmaceutical Technologies Concentration (p. 260)
- Process Sciences Concentration (p. 260)

**BIOPHARMACEUTICAL ANALYTICAL SCIENCES CONCENTRATION**

- 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. 260)  5

**BIOTECHNOLOGY ENTERPRISE CONCENTRATION**

- 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. 260)  6

**MOLECULAR BIOTECHNOLOGY CONCENTRATION**

- 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. 260)  5

**PHARMACEUTICAL TECHNOLOGIES CONCENTRATION**

- 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. 260)  5

**PROCESS SCIENCES CONCENTRATION**

- 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. 260)  5

**Elective List**

Electives not on this list may be chosen with faculty advisor approval.

- BINF 6308  Bioinformatics Computational Methods  1
- BIOL 5100  Biology Colloquium
- 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
Program Credit/GPA Requirements
34 total semester hours required
Minimum 3.000 GPA required

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
Complete 30 semester hours from the following courses: 30

CHEM 5550–CHEM 7750

THESIS OPTION
Course Work
Complete 18 semester hours from the following: 18

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
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.

Requirements

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 5616</td>
<td>Protein Mass Spectrometry</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 5617</td>
<td>Protein Mass Spectrometry Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 5550</td>
<td>Introduction to Glycobiology and Glycoprotein Analysis</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 5660</td>
<td>Analytical Biochemistry</td>
<td>3</td>
</tr>
</tbody>
</table>

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

Requirements

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOT 5120</td>
<td>Introduction to Biotechnology</td>
<td>3</td>
</tr>
<tr>
<td>BIOT 5631</td>
<td>Cell Culture Processes for Biopharmaceutical Production</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 5549</td>
<td>Microbial Biotechnology</td>
<td>4</td>
</tr>
<tr>
<td>BIOT 5219</td>
<td>The Biotechnology Enterprise</td>
<td>2</td>
</tr>
<tr>
<td>BIOT 5145</td>
<td>Basic Biotechnology Lab Skills</td>
<td>1</td>
</tr>
<tr>
<td>BIOT 7245</td>
<td>Biotechnology Applications Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>PHSC 6214</td>
<td>Experimental Design and Biostatistics</td>
<td>2</td>
</tr>
</tbody>
</table>

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-oriented roll.

Program Requirements
Complete all courses and requirements listed below unless otherwise indicated.

Requirements

A grade of C- or higher is required in all courses.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOT 5225</td>
<td>Managing and Leading a Biotechnology Company</td>
<td>3</td>
</tr>
<tr>
<td>BIOT 5226</td>
<td>Biotechnology Entrepreneurship</td>
<td>3</td>
</tr>
<tr>
<td>BIOT 5227</td>
<td>Economics and Marketing for Biotechnology Managers</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 7317</td>
<td>Analytical Biotechnology</td>
<td>3</td>
</tr>
</tbody>
</table>

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.

Requirements

A grade of C– or higher is required in all courses.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOT 5120</td>
<td>Introduction to Biotechnology</td>
<td>3</td>
</tr>
<tr>
<td>BIOT 5631</td>
<td>Cell Culture Processes for Biopharmaceutical Production</td>
<td>3</td>
</tr>
</tbody>
</table>

Program Credit/GPA Requirements
12 total semester hours required
Minimum 3.000 GPA required

CHEM 7730 Advanced Laboratory Methods 4

Research

CHEM 5984 Research 4

CHEM 5620 Protein Chemistry 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 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.

Requirements
A grade of C- or higher is required in all courses.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOT 5700</td>
<td>Molecular Interactions of Proteins in Biopharmaceutical Formulations</td>
<td>3</td>
</tr>
<tr>
<td>BIOT 5810</td>
<td>Cutting-Edge Applications in Molecular Biotechnology</td>
<td>3</td>
</tr>
<tr>
<td>BIOT 5850</td>
<td>Higher-Order Structure Analytics</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 7317</td>
<td>Analytical Biotechnology</td>
<td>3</td>
</tr>
</tbody>
</table>

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.

Requirements
A grade of C- or higher is required in all courses.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOT 5640</td>
<td>Drug Product Processes for Biopharmaceuticals</td>
<td>3</td>
</tr>
<tr>
<td>BIOT 5700</td>
<td>Molecular Interactions of Proteins in Biopharmaceutical Formulations</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 5550</td>
<td>Introduction to Glycobiology and Glycoprotein Analysis</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 7317</td>
<td>Analytical Biotechnology</td>
<td>3</td>
</tr>
</tbody>
</table>

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.

Requirements
A grade of C- or higher is required in all courses.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOT 5560</td>
<td>Bioprocess Fundamentals</td>
<td>3</td>
</tr>
<tr>
<td>BIOT 5635</td>
<td>Downstream Processes for Biopharmaceutical Production</td>
<td>3</td>
</tr>
<tr>
<td>BIOT 5640</td>
<td>Drug Product Processes for Biopharmaceuticals</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 7317</td>
<td>Analytical Biotechnology</td>
<td>3</td>
</tr>
</tbody>
</table>

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)
grdmes@northeastern.edu

Jonathan Grabowski, PhD
Associate Professor and Director of Graduate Studies,
j.grabowski@northeastern.edu

David Dawson, Academic Program Assistant,
d.dawson@northeastern.edu (c.shockley@northeastern.edu)
617.373.2059

The Department of Marine and Environmental Sciences graduate program offerings include core capacities in marine biology, ecology, and evolution. Students benefit from top-notch research facilities at both the Marine Science Center and the main campus in Boston. The MS program in marine biology seeks to prepare students for entry- and mid-level careers in marine research. The PhD program in ecology, evolution, and marine biology is designed to prepare graduates for careers in academia, government agencies, and the private sector.
Programs

Doctor of Philosophy (PhD)
- Ecology, Evolution, and Marine Biology (p. 351)
- Ecology, Evolution, and Marine Biology—Advanced Entry (p. 351)

Master of Science (MS)
- Marine Biology—Three Seas Program (p. 352)

Ecology, Evolution, and Marine Biology, PhD

The PhD in Ecology, Evolution, and Marine Biology (EEMB) program provides students with advanced course work and training in ecology, evolution, and marine biology. For students entering with a bachelor's degree, EEMB program completion requires 30 semester hours of graduate-level course work, of which 20 semester hours must carry a letter grade. The remaining 10 semester hours must consist of colloquia, 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. A written examination consisting of questions posed by the student's written examination committee.
2. An oral examination by the student's dissertation committee consisting of an oral presentation and defense of the student's dissertation proposal and including questions about 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.

Students who are admitted to the PhD program, complete the course work component of the curriculum, and prepare and defend a written thesis (as opposed to a more comprehensive dissertation) may, at the discretion of the graduate committee and their dissertation committee, be awarded a master's degree (Master of Science in Ecology, Evolution, and Marine Biology). The MS degree will only be awarded in rare instances when students and/or their dissertation committee, after communication with the graduate committee, determine that the PhD is untenable.

Program Requirements

Bachelor's Degree Entrance
Complete all courses and requirements listed below unless otherwise indicated.

Milestones
Qualifying examination
Annual review
Candidacy
Dissertation committee
Dissertation proposal
First-author publication

Dissertation defense

Required Course Work

Colloquium
Complete the following (repeatable) course twice: 2
EEMB 7100 Colloquium

Approved Graduate-Level Courses
Complete 28 semester hours from the following; 20 semester hours must carry a letter grade:
- BIOL 5000 to BIOL 9000
- ENVR 5000 to ENVR 9000
- EEMB 5000 to EEMB 9000
- EEMB 8982 Readings
- EEMB 8984 Research

Dissertation
Complete the following (repeatable) course twice:
EEMB 9990 Dissertation

Program Credit/GPA Requirements

30 total semester hours required
Minimum 3.000 GPA required

Ecology, Evolution, and Marine Biology, PhD—Advanced Entry

The PhD in Ecology, Evolution, and Marine Biology (EEMB) program provides students with advanced course work and training in ecology, evolution, and marine biology. Students admitted with a master's degree must take two semesters of colloquium. 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. A written examination consisting of questions posed by the student's written examination committee.
2. An oral examination by the student's dissertation committee consisting of an oral presentation and defense of the student's dissertation proposal and including questions about 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
Qualifying examination
Annual review
Candidacy
Dissertation committee
Dissertation proposal
Dissertation proposal defense
First-author publication
Dissertation defense

Requirements
Complete the following (repeatable) course twice:
- EEMB 7100 Colloquium

Program Credit/GPA Requirements
2 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.

Requirements
YEAR 1
Students register for International Study—Three Seas Program (ABRS 5120) for the fall and spring terms of year 1.

Fall Term
- EEMB 5303 Marine Biology Careers Seminar 1
- EEMB 5516 Oceanography 5
  and EEMB 5517
- EEMB 5522 Experimental Design Marine Ecology 5
  and EEMB 5523

YEAR 2
Fall Term
- EEMB 8674 Marine Biology Research Project 1

Program Credit/GPA Requirements
43 total semester hours required
Minimum 3.000 GPA required

Mathematics
Website (http://www.northeastern.edu/cos/mathematics)

Christopher K. King, PhD
Professor and Chair
567 Lake Hall
617.373.2450
617.373.5658 (fax)

Maxim Braverman, PhD
Professor and Director of Graduate Studies,
m.braverman@northeastern.edu

Chantal Cardona, Administrative Assistant, c.cardona@northeastern.edu
(c.shockley@northeastern.edu), 617.373.2454

Graduate Programs Website (http://www.math.neu.edu/graduate-programs)

The graduate programs offer MS and PhD degrees in mathematics, as well as an MS degree in operations research and an MS degree in applied mathematics. The programs are designed to provide students with a broad overview of current mathematics and a strong command of an area of specialization.

The Master of Science Degree
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.

The Doctor of Philosophy Degree
TRACKS
- Pure mathematics
- Discrete mathematics
• Probability/statistics

Programs

Doctor of Philosophy (PhD)

• Mathematics (p. 353)
• Mathematics—Advanced Entry (p. 355)

Master of Science (MS)

• Applied Mathematics (p. 358)
• Mathematics (p. 358)

Master of Science in Operations Research (MSOR)

• Operations Research (p. 359)

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 3.00 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

Algebra and Analysis
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 5101</td>
<td>Analysis 1: Functions of One Variable</td>
<td>4</td>
</tr>
<tr>
<td>MATH 5111</td>
<td>Algebra 1</td>
<td>4</td>
</tr>
</tbody>
</table>

**Tracks**

Complete one of the following three tracks:

- Pure Track (p. 354)
- Discrete Track (p. 354)
- Probability and Statistics Track (p. 354)

**PURE TRACK**

**Analysis**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 5102</td>
<td>Analysis 2: Functions of Several Variables</td>
<td>4</td>
</tr>
<tr>
<td>or MATH 7232</td>
<td>Combinatorial Analysis</td>
<td></td>
</tr>
</tbody>
</table>

**Algebra**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 5112</td>
<td>Algebra 2</td>
<td>4</td>
</tr>
<tr>
<td>or MATH 7314</td>
<td>Algebraic Geometry 1</td>
<td></td>
</tr>
</tbody>
</table>

**Foundational Courses**

Complete up to 16 semester hours from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 5104</td>
<td>Basics and Probability and Statistics</td>
<td></td>
</tr>
<tr>
<td>MATH 5105</td>
<td>Basics of Statistics and Stochastic Processes</td>
<td></td>
</tr>
<tr>
<td>MATH 5106</td>
<td>Basics of Complex Analysis</td>
<td></td>
</tr>
<tr>
<td>MATH 5107</td>
<td>Basics of Number Theory</td>
<td></td>
</tr>
<tr>
<td>MATH 5108</td>
<td>Methods for Teaching Math</td>
<td></td>
</tr>
<tr>
<td>MATH 5121</td>
<td>Topology 1</td>
<td></td>
</tr>
<tr>
<td>MATH 5122</td>
<td>Geometry 1</td>
<td></td>
</tr>
<tr>
<td>MATH 5976</td>
<td>Directed Study</td>
<td></td>
</tr>
<tr>
<td>MATH 5978</td>
<td>Independent Study</td>
<td></td>
</tr>
<tr>
<td>MATH 5984</td>
<td>Research</td>
<td></td>
</tr>
<tr>
<td>MATH 7201</td>
<td>Ordinary Differential Equations</td>
<td></td>
</tr>
<tr>
<td>MATH 7203</td>
<td>Numerical Analysis 1</td>
<td></td>
</tr>
<tr>
<td>MATH 7205</td>
<td>Numerical Analysis 2</td>
<td></td>
</tr>
<tr>
<td>MATH 7211</td>
<td>Topology 2</td>
<td></td>
</tr>
<tr>
<td>MATH 7222</td>
<td>Geometry 2</td>
<td></td>
</tr>
<tr>
<td>MATH 7232</td>
<td>Combinatorial Analysis</td>
<td></td>
</tr>
<tr>
<td>MATH 7233</td>
<td>Graph Theory</td>
<td></td>
</tr>
<tr>
<td>MATH 7235</td>
<td>Discrete Geometry 1</td>
<td></td>
</tr>
<tr>
<td>MATH 7241</td>
<td>Probability 1</td>
<td></td>
</tr>
<tr>
<td>MATH 7245</td>
<td>Statistics for Health Sciences</td>
<td></td>
</tr>
<tr>
<td>MATH 7260</td>
<td>History of Mathematics</td>
<td></td>
</tr>
<tr>
<td>MATH 7314</td>
<td>Algebraic Geometry 1</td>
<td></td>
</tr>
<tr>
<td>MATH 7341</td>
<td>Probability 2</td>
<td></td>
</tr>
<tr>
<td>MATH 7342</td>
<td>Mathematical Statistics</td>
<td></td>
</tr>
<tr>
<td>MATH 7343</td>
<td>Applied Statistics</td>
<td></td>
</tr>
</tbody>
</table>

**Advanced Course Work**

Complete 32 semester hours from the advanced course work list. Only two readings and three topics courses are allowed.

**DISCRETE TRACK**

**Algebra**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 5112</td>
<td>Algebra 2</td>
<td>4</td>
</tr>
<tr>
<td>or MATH 7232</td>
<td>Combinatorial Analysis</td>
<td></td>
</tr>
</tbody>
</table>

**Probability**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
</table>

**Foundational Courses**

Complete up to 16 semester hours from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 5102</td>
<td>Analysis 2: Functions of Several Variables</td>
<td></td>
</tr>
<tr>
<td>MATH 5104</td>
<td>Basics and Probability and Statistics</td>
<td></td>
</tr>
<tr>
<td>MATH 5105</td>
<td>Basics of Statistics and Stochastic Processes</td>
<td></td>
</tr>
<tr>
<td>MATH 5106</td>
<td>Basics of Complex Analysis</td>
<td></td>
</tr>
<tr>
<td>MATH 5107</td>
<td>Basics of Number Theory</td>
<td></td>
</tr>
<tr>
<td>MATH 5108</td>
<td>Methods for Teaching Math</td>
<td></td>
</tr>
<tr>
<td>MATH 5111</td>
<td>Algebra 1</td>
<td></td>
</tr>
<tr>
<td>MATH 5112</td>
<td>Algebra 2</td>
<td></td>
</tr>
<tr>
<td>MATH 5121</td>
<td>Topology 1</td>
<td></td>
</tr>
<tr>
<td>MATH 5122</td>
<td>Geometry 1</td>
<td></td>
</tr>
<tr>
<td>MATH 5976</td>
<td>Directed Study</td>
<td></td>
</tr>
<tr>
<td>MATH 5978</td>
<td>Independent Study</td>
<td></td>
</tr>
<tr>
<td>MATH 5984</td>
<td>Research</td>
<td></td>
</tr>
<tr>
<td>MATH 7201</td>
<td>Ordinary Differential Equations</td>
<td></td>
</tr>
<tr>
<td>MATH 7203</td>
<td>Numerical Analysis 1</td>
<td></td>
</tr>
<tr>
<td>MATH 7205</td>
<td>Numerical Analysis 2</td>
<td></td>
</tr>
<tr>
<td>MATH 7222</td>
<td>Geometry 2</td>
<td></td>
</tr>
<tr>
<td>MATH 7232</td>
<td>Combinatorial Analysis</td>
<td></td>
</tr>
<tr>
<td>MATH 7233</td>
<td>Graph Theory</td>
<td></td>
</tr>
<tr>
<td>MATH 7235</td>
<td>Discrete Geometry 1</td>
<td></td>
</tr>
<tr>
<td>MATH 7241</td>
<td>Probability 1</td>
<td></td>
</tr>
<tr>
<td>MATH 7245</td>
<td>Statistics for Health Sciences</td>
<td></td>
</tr>
<tr>
<td>MATH 7260</td>
<td>History of Mathematics</td>
<td></td>
</tr>
<tr>
<td>MATH 7314</td>
<td>Algebraic Geometry 1</td>
<td></td>
</tr>
<tr>
<td>MATH 7341</td>
<td>Probability 2</td>
<td></td>
</tr>
<tr>
<td>MATH 7342</td>
<td>Mathematical Statistics</td>
<td></td>
</tr>
<tr>
<td>MATH 7343</td>
<td>Applied Statistics</td>
<td></td>
</tr>
</tbody>
</table>

**PROBABILITY AND STATISTICS TRACK**

**Analysis**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 5102</td>
<td>Analysis 2: Functions of Several Variables</td>
<td></td>
</tr>
<tr>
<td>MATH 7203</td>
<td>Numerical Analysis 1</td>
<td></td>
</tr>
<tr>
<td>MATH 7232</td>
<td>Combinatorial Analysis</td>
<td></td>
</tr>
</tbody>
</table>

**Probability**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 7241</td>
<td>Probability 1</td>
<td>4</td>
</tr>
<tr>
<td>or MATH 7342</td>
<td>Mathematical Statistics</td>
<td></td>
</tr>
</tbody>
</table>

**Foundational Courses**

Complete up to 16 semester hours from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 5102</td>
<td>Analysis 2: Functions of Several Variables</td>
<td></td>
</tr>
<tr>
<td>MATH 5104</td>
<td>Basics and Probability and Statistics</td>
<td></td>
</tr>
<tr>
<td>MATH 5105</td>
<td>Basics of Statistics and Stochastic Processes</td>
<td></td>
</tr>
<tr>
<td>MATH 5106</td>
<td>Basics of Complex Analysis</td>
<td></td>
</tr>
<tr>
<td>MATH 5107</td>
<td>Basics of Number Theory</td>
<td></td>
</tr>
<tr>
<td>MATH 5108</td>
<td>Methods for Teaching Math</td>
<td></td>
</tr>
<tr>
<td>MATH 5111</td>
<td>Algebra 1</td>
<td></td>
</tr>
<tr>
<td>MATH 5112</td>
<td>Algebra 2</td>
<td></td>
</tr>
<tr>
<td>MATH 5121</td>
<td>Topology 1</td>
<td></td>
</tr>
<tr>
<td>MATH 5122</td>
<td>Geometry 1</td>
<td></td>
</tr>
<tr>
<td>MATH 5976</td>
<td>Directed Study</td>
<td></td>
</tr>
<tr>
<td>MATH 5978</td>
<td>Independent Study</td>
<td></td>
</tr>
<tr>
<td>MATH 5984</td>
<td>Research</td>
<td></td>
</tr>
<tr>
<td>MATH 7201</td>
<td>Ordinary Differential Equations</td>
<td></td>
</tr>
<tr>
<td>MATH 7203</td>
<td>Numerical Analysis 1</td>
<td></td>
</tr>
<tr>
<td>MATH 7205</td>
<td>Numerical Analysis 2</td>
<td></td>
</tr>
<tr>
<td>MATH 7222</td>
<td>Geometry 2</td>
<td></td>
</tr>
<tr>
<td>MATH 7232</td>
<td>Combinatorial Analysis</td>
<td></td>
</tr>
<tr>
<td>MATH 7233</td>
<td>Graph Theory</td>
<td></td>
</tr>
<tr>
<td>MATH 7235</td>
<td>Discrete Geometry 1</td>
<td></td>
</tr>
<tr>
<td>MATH 7241</td>
<td>Probability 1</td>
<td></td>
</tr>
<tr>
<td>MATH 7245</td>
<td>Statistics for Health Sciences</td>
<td></td>
</tr>
<tr>
<td>MATH 7260</td>
<td>History of Mathematics</td>
<td></td>
</tr>
<tr>
<td>MATH 7314</td>
<td>Algebraic Geometry 1</td>
<td></td>
</tr>
<tr>
<td>MATH 7341</td>
<td>Probability 2</td>
<td></td>
</tr>
<tr>
<td>MATH 7342</td>
<td>Mathematical Statistics</td>
<td></td>
</tr>
<tr>
<td>MATH 7343</td>
<td>Applied Statistics</td>
<td></td>
</tr>
</tbody>
</table>
Advanced Course Work List

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 5107</td>
<td>Basics of Number Theory</td>
</tr>
<tr>
<td>MATH 5108</td>
<td>Methods for Teaching Math</td>
</tr>
<tr>
<td>MATH 5112</td>
<td>Algebra 2</td>
</tr>
<tr>
<td>MATH 5121</td>
<td>Topology 1</td>
</tr>
<tr>
<td>MATH 5122</td>
<td>Geometry 1</td>
</tr>
<tr>
<td>MATH 5976</td>
<td>Directed Study</td>
</tr>
<tr>
<td>MATH 5978</td>
<td>Independent Study</td>
</tr>
<tr>
<td>MATH 5984</td>
<td>Research</td>
</tr>
<tr>
<td>MATH 7201</td>
<td>Ordinary Differential Equations</td>
</tr>
<tr>
<td>MATH 7203</td>
<td>Numerical Analysis 1</td>
</tr>
<tr>
<td>MATH 7205</td>
<td>Numerical Analysis 2</td>
</tr>
<tr>
<td>MATH 7221</td>
<td>Topology 2</td>
</tr>
<tr>
<td>MATH 7222</td>
<td>Geometry 2</td>
</tr>
<tr>
<td>MATH 7232</td>
<td>Combinatorial Analysis</td>
</tr>
<tr>
<td>MATH 7233</td>
<td>Graph Theory</td>
</tr>
<tr>
<td>MATH 7235</td>
<td>Discrete Geometry 1</td>
</tr>
<tr>
<td>MATH 7241</td>
<td>Probability 1</td>
</tr>
<tr>
<td>MATH 7245</td>
<td>Statistics for Health Sciences</td>
</tr>
<tr>
<td>MATH 7260</td>
<td>History of Mathematics</td>
</tr>
<tr>
<td>MATH 7314</td>
<td>Algebraic Geometry 1</td>
</tr>
<tr>
<td>MATH 7341</td>
<td>Probability 2</td>
</tr>
<tr>
<td>MATH 7342</td>
<td>Mathematical Statistics</td>
</tr>
<tr>
<td>MATH 7343</td>
<td>Applied Statistics</td>
</tr>
</tbody>
</table>

Advanced Course Work

Complete 32 semester hours from the advanced course work list. Only two readings and three topics courses are allowed. (p. 355)

Dissertation

Complete the following (repeatable) course twice:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 9990</td>
<td>Dissertation</td>
</tr>
</tbody>
</table>

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

Complete 0–16 semester hours of the following courses:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 5101</td>
<td>Analysis 1: Functions of One Variable</td>
<td>4</td>
</tr>
<tr>
<td>MATH 5102</td>
<td>Analysis 2: Functions of Several Variables</td>
<td>4</td>
</tr>
<tr>
<td>MATH 5111</td>
<td>Algebra 1</td>
<td>4</td>
</tr>
<tr>
<td>MATH 5112</td>
<td>Algebra 2</td>
<td>4</td>
</tr>
</tbody>
</table>

Tracks
Complete one of the following three tracks:

- Pure Track (p. 356)
- Discrete Track (p. 357)
- Probability and Statistics Track (p. 357)

PURE TRACK

Fundational Courses
Complete 0–16 semester hours from the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 5104</td>
<td>Basics and Probability and Statistics</td>
<td>4</td>
</tr>
<tr>
<td>MATH 5105</td>
<td>Basics of Statistics and Stochastic Processes</td>
<td></td>
</tr>
<tr>
<td>MATH 5106</td>
<td>Basics of Complex Analysis</td>
<td></td>
</tr>
<tr>
<td>MATH 5107</td>
<td>Basics of Number Theory</td>
<td></td>
</tr>
<tr>
<td>MATH 5108</td>
<td>Methods for Teaching Math</td>
<td></td>
</tr>
<tr>
<td>MATH 5121</td>
<td>Topology 1</td>
<td></td>
</tr>
<tr>
<td>MATH 5122</td>
<td>Geometry 1</td>
<td></td>
</tr>
<tr>
<td>MATH 5976</td>
<td>Directed Study</td>
<td></td>
</tr>
<tr>
<td>MATH 5978</td>
<td>Independent Study</td>
<td></td>
</tr>
<tr>
<td>MATH 5984</td>
<td>Research</td>
<td></td>
</tr>
<tr>
<td>MATH 7201</td>
<td>Ordinary Differential Equations</td>
<td></td>
</tr>
<tr>
<td>MATH 7203</td>
<td>Numerical Analysis 1</td>
<td></td>
</tr>
<tr>
<td>MATH 7205</td>
<td>Numerical Analysis 2</td>
<td></td>
</tr>
<tr>
<td>MATH 7221</td>
<td>Topology 2</td>
<td></td>
</tr>
<tr>
<td>MATH 7222</td>
<td>Geometry 2</td>
<td></td>
</tr>
<tr>
<td>MATH 7232</td>
<td>Combinatorial Analysis</td>
<td></td>
</tr>
<tr>
<td>MATH 7233</td>
<td>Graph Theory</td>
<td></td>
</tr>
<tr>
<td>MATH 7235</td>
<td>Discrete Geometry 1</td>
<td></td>
</tr>
<tr>
<td>MATH 7241</td>
<td>Probability 1</td>
<td></td>
</tr>
<tr>
<td>MATH 7245</td>
<td>Statistics for Health Sciences</td>
<td></td>
</tr>
<tr>
<td>MATH 7260</td>
<td>History of Mathematics</td>
<td></td>
</tr>
<tr>
<td>MATH 7314</td>
<td>Algebraic Geometry 1</td>
<td></td>
</tr>
<tr>
<td>MATH 7341</td>
<td>Probability 2</td>
<td></td>
</tr>
<tr>
<td>MATH 7342</td>
<td>Mathematical Statistics</td>
<td></td>
</tr>
</tbody>
</table>
**Northeastern University**

**Advanced Course Work**
Complete 32 semester hours from the advanced course work list. Only two readings and three topics courses are allowed. (p. 357)

### DISCRETE TRACK

**Foundational Courses**
Complete 0–16 semester hours from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 5102</td>
<td>Analysis 2: Functions of Several Variables</td>
</tr>
<tr>
<td>MATH 5104</td>
<td>Basics and Probability and Statistics</td>
</tr>
<tr>
<td>MATH 5105</td>
<td>Basics of Statistics and Stochastic Processes</td>
</tr>
<tr>
<td>MATH 5106</td>
<td>Basics of Complex Analysis</td>
</tr>
<tr>
<td>MATH 5107</td>
<td>Basics of Number Theory</td>
</tr>
<tr>
<td>MATH 5108</td>
<td>Methods for Teaching Math</td>
</tr>
<tr>
<td>MATH 5111</td>
<td>Algebra 1</td>
</tr>
<tr>
<td>MATH 5112</td>
<td>Algebra 2</td>
</tr>
<tr>
<td>MATH 5121</td>
<td>Topology 1</td>
</tr>
<tr>
<td>MATH 5122</td>
<td>Geometry 1</td>
</tr>
<tr>
<td>MATH 5976</td>
<td>Directed Study</td>
</tr>
<tr>
<td>MATH 5978</td>
<td>Independent Study</td>
</tr>
<tr>
<td>MATH 5984</td>
<td>Research</td>
</tr>
<tr>
<td>MATH 7201</td>
<td>Ordinary Differential Equations</td>
</tr>
<tr>
<td>MATH 7203</td>
<td>Numerical Analysis 1</td>
</tr>
<tr>
<td>MATH 7205</td>
<td>Numerical Analysis 2</td>
</tr>
<tr>
<td>MATH 7221</td>
<td>Topology 2</td>
</tr>
<tr>
<td>MATH 7222</td>
<td>Geometry 2</td>
</tr>
<tr>
<td>MATH 7232</td>
<td>Combinatorial Analysis</td>
</tr>
<tr>
<td>MATH 7233</td>
<td>Graph Theory</td>
</tr>
<tr>
<td>MATH 7235</td>
<td>Discrete Geometry 1</td>
</tr>
<tr>
<td>MATH 7241</td>
<td>Probability 1</td>
</tr>
<tr>
<td>MATH 7245</td>
<td>Statistics for Health Sciences</td>
</tr>
<tr>
<td>MATH 7260</td>
<td>History of Mathematics</td>
</tr>
<tr>
<td>MATH 7314</td>
<td>Algebraic Geometry 1</td>
</tr>
<tr>
<td>MATH 7341</td>
<td>Probability 2</td>
</tr>
<tr>
<td>MATH 7342</td>
<td>Mathematical Statistics</td>
</tr>
<tr>
<td>MATH 7343</td>
<td>Applied Statistics</td>
</tr>
</tbody>
</table>

**Advanced Course Work**
Complete 32 semester hours from the advanced course work list. Only two readings and three topics courses are allowed. (p. 357)

### PROBABILITY AND STATISTICS TRACK

**Foundational Courses**
Complete 0–16 semester hours from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 5102</td>
<td>Analysis 2: Functions of Several Variables</td>
</tr>
<tr>
<td>MATH 5104</td>
<td>Basics and Probability and Statistics</td>
</tr>
<tr>
<td>MATH 5105</td>
<td>Basics of Statistics and Stochastic Processes</td>
</tr>
<tr>
<td>MATH 5106</td>
<td>Basics of Complex Analysis</td>
</tr>
<tr>
<td>MATH 5107</td>
<td>Basics of Number Theory</td>
</tr>
<tr>
<td>MATH 5108</td>
<td>Methods for Teaching Math</td>
</tr>
<tr>
<td>MATH 5112</td>
<td>Algebra 2</td>
</tr>
<tr>
<td>MATH 5121</td>
<td>Topology 1</td>
</tr>
</tbody>
</table>

**Advanced Course Work**
Complete 32 semester hours from the advanced course work list. Only two readings and three topics courses are allowed. (p. 357)

### Advanced Course Work List

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 7204</td>
<td>Complex Analysis</td>
</tr>
<tr>
<td>MATH 7213</td>
<td>Algebra 3: Galois Theory</td>
</tr>
<tr>
<td>MATH 7234</td>
<td>Optimization and Complexity</td>
</tr>
<tr>
<td>MATH 7301</td>
<td>Functional Analysis</td>
</tr>
<tr>
<td>MATH 7302</td>
<td>Partial Differential Equations 2</td>
</tr>
<tr>
<td>MATH 7303</td>
<td>Complex Manifolds</td>
</tr>
<tr>
<td>MATH 7311</td>
<td>Commutative Algebra</td>
</tr>
<tr>
<td>MATH 7312</td>
<td>Lie Theory</td>
</tr>
<tr>
<td>MATH 7313</td>
<td>Representation Theory</td>
</tr>
<tr>
<td>MATH 7315</td>
<td>Algebraic Number Theory</td>
</tr>
<tr>
<td>MATH 7316</td>
<td>Lie Algebras</td>
</tr>
<tr>
<td>MATH 7321</td>
<td>Topology 3</td>
</tr>
<tr>
<td>MATH 7322</td>
<td>Geometry 3</td>
</tr>
<tr>
<td>MATH 7323</td>
<td>Differential Geometry 1</td>
</tr>
<tr>
<td>MATH 7324</td>
<td>Differential Geometry 2</td>
</tr>
<tr>
<td>MATH 7331</td>
<td>Algebraic Combinatorics</td>
</tr>
<tr>
<td>MATH 7335</td>
<td>Discrete Geometry 2</td>
</tr>
<tr>
<td>MATH 7344</td>
<td>Regression, ANOVA, and Design</td>
</tr>
<tr>
<td>MATH 7345</td>
<td>Nonparametric Methods in Statistics</td>
</tr>
<tr>
<td>MATH 7346</td>
<td>to MATH 7392</td>
</tr>
<tr>
<td>MATH 7976</td>
<td>to MATH 8986</td>
</tr>
<tr>
<td>MATH 9948</td>
<td>Modern Mathematical Research</td>
</tr>
<tr>
<td>MATH 9984</td>
<td>Research</td>
</tr>
<tr>
<td>MATH 9986</td>
<td>Research</td>
</tr>
<tr>
<td>MATH 7721</td>
<td>Readings in Topology</td>
</tr>
<tr>
<td>MATH 7722</td>
<td>Readings in Algebraic Topology</td>
</tr>
<tr>
<td>MATH 7723</td>
<td>Readings in Geometric Topology</td>
</tr>
<tr>
<td>MATH 7725</td>
<td>Readings in Singularities</td>
</tr>
<tr>
<td>MATH 7730</td>
<td>Readings in Combinatorics</td>
</tr>
</tbody>
</table>
Applied Mathematics, MS

**Dissertation**
Complete the following (repeatable) course twice:
- MATH 9990 Dissertation

**Program Credit/GPA Requirements**
32–64 total semester hours required
Minimum 3.000 GPA required

**Open Electives**
Complete 8 semester hours. These courses may be chosen from outside the Department of Mathematics with faculty approval.

**Program Requirements**
Complete all courses and requirements listed below unless otherwise indicated.

**Core Requirements**

<table>
<thead>
<tr>
<th>Methods and Modeling</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 5131</td>
<td>Introduction to Mathematical Methods and Modeling</td>
</tr>
</tbody>
</table>

**Algebra and Analysis**
Complete one of the following:

|  |
|----------------------|---|
| MATH 5101            | Analysis 1: Functions of One Variable | 4 |
| or MATH 5102         | Analysis 2: Functions of Several Variables |
| MATH 5111            | Algebra 1 |
| or MATH 5112         | Algebra 2 |

**Algebra 2 and Analysis 2**

|  |
|----------------------|---|
| MATH 5102            | Analysis 2: Functions of Several Variables | 4 |
| or MATH 7232         | Combinatorial Analysis |

Complete 4 semester hours from the following:

- MATH 5112 Algebra 2
- Elective chosen from the list below

**Electives**
Complete 16 semester hours from the following:

|  |
|----------------------|---|
| MATH 7201            | Ordinary Differential Equations |
| MATH 7202            | Partial Differential Equations 1 |
| MATH 7203            | Numerical Analysis 1 |
| MATH 7204            | Complex Analysis |
| MATH 7205            | Numerical Analysis 2 |
| MATH 7221            | Topology 2 |
| MATH 7232            | Combinatorial Analysis |
| MATH 7233            | Graph Theory |
| MATH 7234            | Optimization and Complexity |
| MATH 7235            | Discrete Geometry 1 |
| MATH 7241            | Probability 1 |
| MATH 7301            | Functional Analysis |
| MATH 7302            | Partial Differential Equations 2 |
| MATH 7314            | Algebraic Geometry 1 |

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.
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

**Probability**
Complete 4 semester hours from the following:

- MATH 7241 Probability 1 [4]
- MATH 7341 Probability 2
- OR 7230 Probabilistic Operation Research

**Statistics**

- MATH 7342 Mathematical Statistics [4]
- or MATH 7343 Applied Statistics

**Operations Research**


**Optimization and Complexity**

- MATH 7234 Optimization and Complexity [4]

Approved Electives
Complete 16 semester hours from the following:

- 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++
- CSYE 6210 Component Software Development
- EECE 7313 Pattern Recognition
- EECE 7360 Combinatorial Optimization
- EMGT 5220 Engineering Project Management
- EMGT 6225 Economic Decision Making
- EMGT 6305 Financial Decision Making
- 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 5620 Mass Customization
- 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
- IE 7615 Neural Networks in Engineering
- MATH 7232 Graph Theory
- MATH 7233 Time Series
- MATH 7347 Statistical Decision Theory
- MATH 7349 Stochastic Calculus and Introduction to No-Arbitrage Finance
- OR 7235 Inventory Theory
- OR 7240 Integer and Nonlinear Optimization
- OR 7250 Multi-Criteria Decision Making
- OR 7260 Constraint Programming
- OR 7310 Logistics, Warehousing, and Scheduling
The Northeastern Department of Physics performs advanced research in condensed matter, fundamental particles and fields, biophysics, and complexity. Students are expected to have demonstrated a graduate-level understanding of basic physics concepts upon completion of the MS degree. 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.

Programs

**Doctor of Philosophy (PhD)**
- Physics (p. 360)
- Physics—Advanced Entry (p. 362)

**Master of Science (MS)**
- Physics (p. 365)

**Graduate Certificate**
- Nanomedicine (p. 366)

---

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 may 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 in Quantum 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 those 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 proposal is approved and, normally, in the same semester.

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

Year 1
Fall Term
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 7210</td>
<td>Introduction to Research in Physics</td>
<td>0</td>
</tr>
<tr>
<td>PHYS 7301</td>
<td>Classical Mechanics/Math Methods</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 7302</td>
<td>Electromagnetic Theory</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 7315</td>
<td>Quantum Theory 1</td>
<td>4</td>
</tr>
</tbody>
</table>

Spring Term
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 5318</td>
<td>Principles of Experimental Physics</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 7210</td>
<td>Introduction to Research in Physics</td>
<td>0</td>
</tr>
<tr>
<td>PHYS 7305</td>
<td>Statistical Physics</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 7316</td>
<td>Quantum Theory 2</td>
<td>4</td>
</tr>
</tbody>
</table>

Year 2
Fall Term
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 7321</td>
<td>Computational Physics</td>
<td>4</td>
</tr>
</tbody>
</table>

Electives
If preapproved to specialize in nanomedicine or network science, consult program director.
Complete 8 semester hours from the following: 8
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 7731</td>
<td>Biological Physics 1</td>
<td></td>
</tr>
<tr>
<td>PHYS 7323</td>
<td>Elementary Particle Physics</td>
<td></td>
</tr>
</tbody>
</table>

PhD Specialization Options
A specialization is required.

Biological Physics

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 7731</td>
<td>Biological Physics 1</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 7741</td>
<td>Biological Physics 2</td>
<td>4</td>
</tr>
</tbody>
</table>

Particle Physics

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 7323</td>
<td>Elementary Particle Physics</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 7733</td>
<td>Topics: Elementary Particle Physics</td>
<td>4</td>
</tr>
</tbody>
</table>

Condensed Matter Physics

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 7324</td>
<td>Condensed Matter Physics</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 7734</td>
<td>Topics: Condensed Matter Physics</td>
<td>4</td>
</tr>
</tbody>
</table>

Nanomedicine

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NNMD 5270</td>
<td>Introduction to Nanomedicine Science</td>
<td>3</td>
</tr>
<tr>
<td>NNMD 5370</td>
<td>Nanomedicine Research Techniques</td>
<td>4</td>
</tr>
</tbody>
</table>

Network Science

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 5116</td>
<td>Complex Networks and Applications</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 7331</td>
<td>Network Science Data</td>
<td>4</td>
</tr>
</tbody>
</table>

Dissertation Courses (Third Year and Beyond)
Complete the following (repeatable) course twice:
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 9990</td>
<td>Dissertation</td>
<td></td>
</tr>
</tbody>
</table>

Complete the following (repeatable) course until graduation:
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 9996</td>
<td>Dissertation Continuation</td>
<td></td>
</tr>
</tbody>
</table>

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), Structural Biology (BIOL 7303), Optical Methods of Analysis (CHEM 5613), Molecular Modeling (CHEM 5638), Chemical Kinetics (CHEM 5639) or Principles of Magnetic Resonance (CHEM 5688).

Additional appropriate courses may also be substituted by approval of the physics graduate committee.

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. 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. Students who successfully pass both Part 1 and Part 2 of the qualifying exam on entry are exempted from the first-year course work except for Principles of Experimental Physics (PHYS 5318), which all students are required to take.

**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. The qualifying exam may include both written and oral parts. 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.

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).

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. Students who successfully pass both Part 1 and Part 2 of the qualifying exam on entry are exempted from the first-year courses except for Principles of Experimental Physics (PHYS 5318), which all students must take.

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 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.

**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**

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

**Requirements**

**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.

Complete the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 5318</td>
<td>Principles of Experimental Physics</td>
<td>4</td>
</tr>
</tbody>
</table>

**Dissertation**

- 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.

**Required Core**

**Fall Term 1**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 7301</td>
<td>Classical Mechanics/Math Methods</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 7302</td>
<td>Electromagnetic Theory</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 7315</td>
<td>Quantum Theory 1</td>
<td>4</td>
</tr>
</tbody>
</table>

May be taken either first or second year:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 7321</td>
<td>Computational Physics</td>
<td>4</td>
</tr>
</tbody>
</table>

**Spring Term 1**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 7305</td>
<td>Statistical Physics</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 7316</td>
<td>Quantum Theory 2</td>
<td>4</td>
</tr>
</tbody>
</table>

**Options**

- Course work
- Thesis
- Thesis with specialization

**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.

**Electives**

Complete 8 semester hours from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 5111</td>
<td>Astrophysics and Cosmology</td>
<td>4</td>
</tr>
</tbody>
</table>
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.

Requirements

Core Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>NNMD 5270</td>
<td>Introduction to Nanomedicine Science and Technology</td>
<td>3</td>
</tr>
<tr>
<td>NNMD 5272</td>
<td>Nanomedicine General Seminar</td>
<td>1</td>
</tr>
<tr>
<td>NNMD 5274</td>
<td>Nanomedicine Advanced Seminar</td>
<td>1</td>
</tr>
<tr>
<td>NNMD 5370</td>
<td>Nanomedicine Research Techniques</td>
<td>4</td>
</tr>
<tr>
<td>NNMD 5470</td>
<td>Nano- and Biomedical Commercialization: From Concept to Market</td>
<td>3</td>
</tr>
</tbody>
</table>

Electives

Students may apply 4 semester hours of elective credit to substitute for NNMD 5370.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 5307</td>
<td>Biological Electron Microscopy</td>
</tr>
<tr>
<td>BIOT 5700</td>
<td>Molecular Interactions of Proteins in Biopharmaceutical Formulations</td>
</tr>
<tr>
<td>CHEM 7247</td>
<td>Advances in Nanomaterials</td>
</tr>
<tr>
<td>CHME 7350</td>
<td>Transport Phenomena</td>
</tr>
<tr>
<td>ENGR 6150</td>
<td>Nanotechnology in Engineering</td>
</tr>
<tr>
<td>PHSC 6210</td>
<td>Drug Design, Evaluation, and Development</td>
</tr>
<tr>
<td>PHSC 6216</td>
<td>Human Physiology and Pathophysiology</td>
</tr>
<tr>
<td>PHSC 6226</td>
<td>Imaging in Medicine and Drug Discovery</td>
</tr>
<tr>
<td>PHSC 6290</td>
<td>Biophysical Methods in Drug Discovery</td>
</tr>
<tr>
<td>PHYS 5260</td>
<td>Introduction to Nanoscience and Nanotechnology</td>
</tr>
<tr>
<td>PHYS 7731</td>
<td>Biological Physics 1</td>
</tr>
<tr>
<td>PMST 6252</td>
<td>Pharmacokinetics and Drug Metabolism</td>
</tr>
<tr>
<td>PMST 6254</td>
<td>Advanced Drug Delivery System</td>
</tr>
<tr>
<td>POLS 7333</td>
<td>Science, Technology, and Public Policy</td>
</tr>
</tbody>
</table>

Program Credit/GPA Requirements

12 total semester hours required
Minimum 3.000 GPA required

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.

--

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)

Fotini Christophillis, Staff Assistant, f.christophillis@northeastern.edu

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.

For students who enter the program with a 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.

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 defense
At least two assigned courses as teaching assistant

Core Course Work

All graduate courses within the Department of Psychology are graded S/U. A grade of S is required in each psychology department course.

<table>
<thead>
<tr>
<th>Year 1</th>
<th>Fall</th>
<th>Hours</th>
<th>Spring</th>
<th>Hours</th>
<th>Summer Full Semester</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>6</td>
<td>Complete 6 semester hours of the following:</td>
<td>6</td>
<td>PSYC 8401</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>PSYC 5101</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>PSYC 5110</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>PSYC 5121</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>PSYC 5130</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>PSYC 5141</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>PSYC 5150</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>PSYC 5161</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>PSYC 5170</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>6</td>
<td>PSYC 5180</td>
<td></td>
<td></td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>PSYC 8401</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>12</td>
<td>PSYC 8401</td>
<td></td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year 2</th>
<th>Fall</th>
<th>Hours</th>
<th>Spring</th>
<th>Hours</th>
<th>Summer Full Semester</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>3</td>
<td>Complete one of the following:</td>
<td>3</td>
<td>PSYC 7996</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>PSYC 7990</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
<td>Complete the following:</td>
<td>3</td>
<td></td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>PSYC 7990</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
<td>PSYC 7990</td>
<td></td>
<td></td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>PSYC 7990</td>
<td></td>
<td></td>
<td>0</td>
</tr>
</tbody>
</table>
Year 3

<table>
<thead>
<tr>
<th>Fall</th>
<th>Hours</th>
<th>Spring</th>
<th>Hours</th>
<th>Summer Full Semester</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYC 9990</td>
<td>0</td>
<td>Complete one of the following:</td>
<td>PSYC 730</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>PSYC 7301</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSYC 7302</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSYC 9990</td>
<td>0</td>
<td>Complete the following:</td>
<td></td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>PSYC 7990</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Year 4

<table>
<thead>
<tr>
<th>Fall</th>
<th>Hours</th>
<th>Spring</th>
<th>Hours</th>
<th>Summer Full Semester</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYC 9996</td>
<td>0</td>
<td>PSYC 9996</td>
<td>0</td>
<td>PSYC 9996</td>
<td>0</td>
</tr>
<tr>
<td>PSYC 9996</td>
<td>0</td>
<td>PSYC 9996</td>
<td>0</td>
<td>PSYC 9996</td>
<td>0</td>
</tr>
</tbody>
</table>

Year 5

<table>
<thead>
<tr>
<th>Fall</th>
<th>Hours</th>
<th>Spring</th>
<th>Hours</th>
<th>Summer Full Semester</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYC 9996</td>
<td>0</td>
<td>PSYC 9996</td>
<td>0</td>
<td>PSYC 9996</td>
<td>0</td>
</tr>
<tr>
<td>PSYC 9996</td>
<td>0</td>
<td>PSYC 9996</td>
<td>0</td>
<td>PSYC 9996</td>
<td>0</td>
</tr>
</tbody>
</table>

Total Hours: 39

Electives

Complete 11 semester hours of electives, which can include psychology electives and proseminars (see below) not taken already to fulfill core requirements, as well as outside electives if approved by faculty advisor and graduate coordinator.

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

Program Credit/GPA Requirements

50 total semester hours required
Minimum 3.000 GPA required

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

All graduate courses within the Department of Psychology are graded S/U. A grade of S is required in each psychology department course. 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.

APPROVED COURSE WORK

Consult your faculty advisor and graduate coordinator for acceptable courses.

APPROVED ELECTIVES

Consult your faculty advisor and graduate coordinator for acceptable electives.

Dissertation Courses

Complete the following (repeatable) course twice:

<table>
<thead>
<tr>
<th>PSYC 9990</th>
<th>Dissertation</th>
</tr>
</thead>
</table>

Program Credit/GPA Requirements

20 total semester hours required
Minimum 3.000 GPA required
Programs

Doctor of Philosophy (PhD)

- Network Science (p. 209)

Master of Science (MS)

- Applied Physics and Engineering (p. 147)

Network Science, PhD

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)
Website (http://www.networkscienceinstitute.org)
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 concentration 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 Dynamical Processes in Complex Networks (PHYS 7335); one of two approved courses (Social Network Analysis or Network Data Mining); 12 semester hours of elective course work defined by their specific track; 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 3.00 or better in all course work. Students are not allowed to retake courses. A student who does not maintain the 3.00 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. The dissertation committee must be approved by the graduate program committee and constituted no later than the end of the spring semester of the first year of the program. 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
Applied Physics and Engineering, MS

Dissertation defense

Core Course Work

Networks

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 6220</td>
<td>Data Mining Techniques</td>
<td>4</td>
</tr>
<tr>
<td>or POLS 7334</td>
<td>Social Networks</td>
<td></td>
</tr>
<tr>
<td>PHYS 5116</td>
<td>Complex Networks and Applications</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 7331</td>
<td>Network Science Data</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 7335</td>
<td>Dynamical Processes in Complex Networks</td>
<td>4</td>
</tr>
</tbody>
</table>

Research

Complete the following (repeatable) course twice:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NETS 8984</td>
<td>Research</td>
<td>1-4</td>
</tr>
</tbody>
</table>

Specialization

Complete 12 semester hours of course work. Areas of specialization include:

**COMPUTER SCIENCE**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 6140</td>
<td>Machine Learning</td>
<td></td>
</tr>
<tr>
<td>CS 6220</td>
<td>Data Mining Techniques</td>
<td></td>
</tr>
<tr>
<td>CS 6240</td>
<td>Large-Scale Parallel Data Processing</td>
<td></td>
</tr>
<tr>
<td>CS 7800</td>
<td>Advanced Algorithms</td>
<td></td>
</tr>
<tr>
<td>NETS 7341</td>
<td>Network Economics</td>
<td></td>
</tr>
</tbody>
</table>

**POLITICAL SCIENCE**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>POLS 7200</td>
<td>Perspectives on Social Science Inquiry</td>
<td></td>
</tr>
<tr>
<td>POLS 7201</td>
<td>Research Design</td>
<td></td>
</tr>
<tr>
<td>POLS 7202</td>
<td>Quantitative Techniques</td>
<td></td>
</tr>
<tr>
<td>NETS 7341</td>
<td>Network Economics</td>
<td></td>
</tr>
</tbody>
</table>

**EPIDEMIOLOGY**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHTH 5202</td>
<td>Introduction to Epidemiology</td>
<td></td>
</tr>
<tr>
<td>PHTH 5224</td>
<td>Social Epidemiology</td>
<td></td>
</tr>
<tr>
<td>PHTH 5240</td>
<td>Evaluating Scientific Evidence</td>
<td></td>
</tr>
<tr>
<td>NETS 7341</td>
<td>Network Economics</td>
<td></td>
</tr>
</tbody>
</table>

**ENGINEERING**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EECE 7200</td>
<td>Linear Systems Analysis</td>
<td></td>
</tr>
<tr>
<td>EECE 7204</td>
<td>Applied Probability and Stochastic Processes</td>
<td></td>
</tr>
<tr>
<td>EECE 7233</td>
<td>Numerical Optimization Methods</td>
<td></td>
</tr>
<tr>
<td>EECE 7234</td>
<td>Fundamentals of Computer Networks</td>
<td></td>
</tr>
<tr>
<td>NETS 7341</td>
<td>Network Economics</td>
<td></td>
</tr>
</tbody>
</table>

**PHYSICS**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 7305</td>
<td>Statistical Physics</td>
<td></td>
</tr>
<tr>
<td>PHYS 5318</td>
<td>Principles of Experimental Physics</td>
<td></td>
</tr>
<tr>
<td>PHYS 7321</td>
<td>Computational Physics</td>
<td></td>
</tr>
<tr>
<td>PHYS 7731</td>
<td>Biological Physics 1</td>
<td></td>
</tr>
</tbody>
</table>

**MATH**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 7241</td>
<td>Probability 1</td>
<td></td>
</tr>
<tr>
<td>MATH 7233</td>
<td>Graph Theory</td>
<td></td>
</tr>
<tr>
<td>MATH 7375</td>
<td>Topics in Topology</td>
<td></td>
</tr>
<tr>
<td>MATH 7733</td>
<td>Readings in Graph Theory</td>
<td></td>
</tr>
<tr>
<td>NETS 7341</td>
<td>Network Economics</td>
<td></td>
</tr>
</tbody>
</table>

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. 147)
- Electromagnetics, Plasma, and Optics (p. 147)
- Analysis, Modeling, and Computation (p. 147)

**MICROSYSYEMS, MATERIALS, AND DEVICES**

**Core Courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EECE 7201</td>
<td>Solid State Devices</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 7324</td>
<td>Condensed Matter Physics</td>
<td>4</td>
</tr>
</tbody>
</table>

**Engineering Course Work**

Complete 12 semester hours from the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EECE 5606</td>
<td>Micro- and Nanofabrication</td>
<td></td>
</tr>
<tr>
<td>EECE 5680</td>
<td>Electric Drives</td>
<td></td>
</tr>
<tr>
<td>EECE 5696</td>
<td>Energy Harvesting Systems</td>
<td></td>
</tr>
<tr>
<td>EECE 7204</td>
<td>Applied Probability and Stochastic Processes</td>
<td></td>
</tr>
<tr>
<td>EECE 7240</td>
<td>Analog Integrated Circuit Design</td>
<td></td>
</tr>
<tr>
<td>EECE 7241</td>
<td>Advanced Solid State Devices</td>
<td></td>
</tr>
<tr>
<td>EECE 7242</td>
<td>Integrated Circuits for Mixed Signals and Data Communication</td>
<td></td>
</tr>
<tr>
<td>EECE 7244</td>
<td>Introduction to Microelectromechanical Systems (MEMS)</td>
<td></td>
</tr>
<tr>
<td>EECE 7245</td>
<td>Microwave Circuit Design for Wireless Communication</td>
<td></td>
</tr>
<tr>
<td>EECE 7246</td>
<td>Design and Analysis of Digital Integrated Circuits</td>
<td></td>
</tr>
<tr>
<td>EECE 7247</td>
<td>Radio Frequency Integrated Circuit Design</td>
<td></td>
</tr>
<tr>
<td>EECE 7353</td>
<td>VLSI Design</td>
<td></td>
</tr>
<tr>
<td>EECE 7354</td>
<td>VLSI Architecture</td>
<td></td>
</tr>
<tr>
<td>EECE 7269</td>
<td>Special Topics in Electronics, Semiconductor Devices, and Microfabrication</td>
<td></td>
</tr>
</tbody>
</table>
EECE 7276  Microwave Properties of Materials
EECE 7284  Optical Properties of Matter
EECE 7285  Opto-electronics and Fiber Optics
EECE 7398  Special Topics

Physics Course Work
Complete 12 semester hours from the following: 12
PHYS 5114  Physics of Advanced Materials
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
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 7274  Propagation in Artificial Structures
EECE 7275  Antennas and Radiation
EECE 7276  Microwave Properties of Materials
EECE 7284  Optical Properties of Matter
EECE 7285  Opto-electronics and Fiber Optics
EECE 7287  Optical Detection
EECE 7293  Modern Imaging
EECE 7309  Special Topics in Electromagnetics, Plasma, and Optics

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
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.

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 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
sccj@northeastern.edu

Graduate Programs Contact
Laurie Mastone, Graduate Program Administrator, sccj@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 Graduate Certificate in Global Criminology, a Master of Science degree in criminology and criminal justice, and a PhD degree in criminology and justice policy. In addition, the School of Criminology and Criminal Justice has recently joined with the School of Law to develop two new programs: the JD/MS in criminology and criminal justice program, and the JD/PhD in criminology and justice policy program.

Programs

Doctor of Philosophy (PhD)
- Criminology and Justice Policy (p. 373)
- Criminology and Justice Policy—Advanced Entry (p. 373)

Master of Science (MS)
- Criminology and Criminal Justice (p. 374)

Dual Degrees
- Law, Criminology and Criminal Justice, JD/PhD (p. 375)
- Law, Criminology and Justice Policy, JD/PhD—Advanced Entry (p. 376)
- Law and Criminal Justice, JD/MS (p. 377)
Graduate Certificate
• Global Criminology (p. 377)

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. It is expected that students entering the program with a bachelor's degree 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, 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 50 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 (50 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 and area
Annual review
PhD candidacy
Dissertation proposal
Dissertation defense

Core Requirement
A cumulative 3.000 GPA is required for the core requirement.

Criminal Justice Process
CRIM 7202 The Criminal Justice Process 3

Policy Courses
CRIM 7710 Criminology and Public Policy 1 3
CRIM 7711 Criminology and Public Policy 2 3

Advanced Analysis and Methods Courses
CRIM 7713 Advanced Research and Evaluation Methods 3
CRIM 7715 Multivariate Analysis 1 3
CRIM 7716 Multivariate Analysis 2 3

Practicum in Writing
CRIM 7706 Practicum in Writing and Publishing 2

Electives
Complete 30 semester hours in the following range: 30
CRIM 7200 to CRIM 7989

Exam and Dissertation

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 (excluding summers) until the dissertation is completed:
CRIM 9996 Dissertation Continuation

Program Credit/GPA Requirements
50 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. It is expected that 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, 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 32 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 core work (32 semester hours), 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 and area
Annual review
Dissertation proposal
Dissertation defense

**Core Requirement**
A cumulative 3.000 GPA is required for the core requirement.

**Policy Courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRIM 7710</td>
<td>Criminology and Public Policy 1</td>
<td>3</td>
</tr>
<tr>
<td>CRIM 7711</td>
<td>Criminology and Public Policy 2</td>
<td>3</td>
</tr>
</tbody>
</table>

**Advanced Analysis and Methods Courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRIM 7713</td>
<td>Advanced Research and Evaluation Methods</td>
<td>3</td>
</tr>
<tr>
<td>CRIM 7715</td>
<td>Multivariate Analysis 1</td>
<td>3</td>
</tr>
<tr>
<td>CRIM 7716</td>
<td>Multivariate Analysis 2</td>
<td>3</td>
</tr>
</tbody>
</table>

**Practicum in Writing**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRIM 7706</td>
<td>Practicum in Writing and Publishing</td>
<td>2</td>
</tr>
</tbody>
</table>

**Electives**
Complete 15 semester hours in the following range: 15

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRIM 7200 to CRIM 7989</td>
<td></td>
</tr>
</tbody>
</table>

**Exam and Dissertation**

**Exam Preparation**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRIM 8960</td>
<td>Exam Preparation—Doctoral</td>
</tr>
</tbody>
</table>

**Dissertation**

Complete the following (repeatable) course twice:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRIM 9990</td>
<td>Dissertation</td>
</tr>
</tbody>
</table>

**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:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRIM 9996</td>
<td>Dissertation Continuation</td>
</tr>
</tbody>
</table>

**Program Credit/GPA Requirements**

32 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. Broad in concept and scope, it 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.

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 30 semester hours of credit in course work.

**Program Requirements**
Complete all courses and requirements listed below unless otherwise indicated.

**Core Requirement**
A cumulative 3.000 GPA is required for the core requirement.

**Criminology and Criminal Justice**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRIM 7200</td>
<td>Criminology</td>
<td>3</td>
</tr>
</tbody>
</table>
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 and area
Annual review
PhD candidacy
Dissertation proposal
Dissertation defense

Core Requirement

A cumulative 3.000 GPA is required for the core requirement.

Criminal Justice Process

CRIM 7202 The Criminal Justice Process 3

Policy Courses

CRIM 7710 Criminology and Public Policy 1 3
CRIM 7711 Criminology and Public Policy 2 3

Advanced Analysis and Methods Courses

CRIM 7713 Advanced Research and Evaluation Methods 3
CRIM 7715 Multivariate Analysis 1 3
CRIM 7716 Multivariate Analysis 2 3

Practicum in Writing

CRIM 7706 Practicum in Writing and Publishing 2

Electives

Complete 30 hours from the following:

CRIM 7201 Global Criminology
CRIM 7208 Law and Society
CRIM 7224 Law and Psychology
CRIM 7232 Juvenile Law
CRIM 7244 Criminal Law and Procedure
CRIM 7256 Courts and Sentencing
CRIM 7266 Crimes Against Humanity
CRIM 7314 Special Topics in Law and Justice
CRIM 7330 Punishment and Social Control
CRIM 7332 International Law and Justice
CRIM 7334 Transnational Crime
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

Exam and Dissertation

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 (excluding summers) until the dissertation is completed:
CRIM 9996 Dissertation Continuation

Program Credit/GPA Requirements

50 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
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 Graduate Certificate in Global Criminology, a Master of Science in Criminology and Criminal Justice, and a Doctor of Philosophy in criminology and justice policy. In addition, the School of Criminology and Criminal Justice has recently joined with the School of Law to develop two new programs: the JD/MS in Criminology and Criminal Justice program, and the JD/PhD in Criminology and Justice Policy program.

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 and area
Annual review
PhD candidacy
Dissertation proposal
Dissertation defense

**Core Requirement**

A cumulative 3.000 GPA is required for the core requirement.

**Policy Courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRIM 7710</td>
<td>Criminology and Public Policy 1</td>
<td>3</td>
</tr>
<tr>
<td>CRIM 7711</td>
<td>Criminology and Public Policy 2</td>
<td>3</td>
</tr>
</tbody>
</table>

**Advanced Analysis and Methods Courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRIM 7713</td>
<td>Advanced Research and Evaluation Methods</td>
<td>3</td>
</tr>
<tr>
<td>CRIM 7715</td>
<td>Multivariate Analysis 1</td>
<td>3</td>
</tr>
<tr>
<td>CRIM 7716</td>
<td>Multivariate Analysis 2</td>
<td>3</td>
</tr>
</tbody>
</table>

**Practicum in Writing**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRIM 7706</td>
<td>Practicum in Writing and Publishing</td>
<td>2</td>
</tr>
</tbody>
</table>

**Electives**

Complete 15 hours from the following:  

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRIM 7201</td>
<td>Global Criminology</td>
<td></td>
</tr>
<tr>
<td>CRIM 7208</td>
<td>Law and Society</td>
<td></td>
</tr>
<tr>
<td>CRIM 7224</td>
<td>Law and Psychology</td>
<td></td>
</tr>
<tr>
<td>CRIM 7232</td>
<td>Juvenile Law</td>
<td></td>
</tr>
<tr>
<td>CRIM 7244</td>
<td>Criminal Law and Procedure</td>
<td></td>
</tr>
<tr>
<td>CRIM 7256</td>
<td>Courts and Sentencing</td>
<td></td>
</tr>
<tr>
<td>CRIM 7266</td>
<td>Crimes Against Humanity</td>
<td></td>
</tr>
<tr>
<td>CRIM 7314</td>
<td>Special Topics in Law and Justice</td>
<td></td>
</tr>
<tr>
<td>CRIM 7330</td>
<td>Punishment and Social Control</td>
<td></td>
</tr>
<tr>
<td>CRIM 7332</td>
<td>International Law and Justice</td>
<td></td>
</tr>
<tr>
<td>CRIM 7334</td>
<td>Transnational Crime</td>
<td></td>
</tr>
<tr>
<td>LAW 6103</td>
<td>Criminal Justice</td>
<td></td>
</tr>
<tr>
<td>LAW 7301</td>
<td>Advanced Criminal Procedure: Adjudication</td>
<td></td>
</tr>
<tr>
<td>LAW 7332</td>
<td>Evidence</td>
<td></td>
</tr>
<tr>
<td>LAW 7351</td>
<td>Prisoners' Rights Clinic</td>
<td></td>
</tr>
<tr>
<td>LAW 7398</td>
<td>Federal Courts and the Federal System</td>
<td></td>
</tr>
<tr>
<td>LAW 7410</td>
<td>Domestic Violence Clinic</td>
<td></td>
</tr>
<tr>
<td>LAW 7495</td>
<td>Advanced Criminal Procedure: Investigation</td>
<td></td>
</tr>
<tr>
<td>LAW 7526</td>
<td>Juvenile Courts: Delinquency, Abuse, Neglect</td>
<td></td>
</tr>
<tr>
<td>LAW 7528</td>
<td>Balancing Liberty and Security Seminar</td>
<td></td>
</tr>
<tr>
<td>LAW 7597</td>
<td>Civil Rights and Restorative Justice Clinic</td>
<td></td>
</tr>
<tr>
<td>LAW 7612</td>
<td>Wrongful Convictions and Post-Conviction Remedies</td>
<td></td>
</tr>
<tr>
<td>LAW 7619</td>
<td>Healthcare Fraud and Abuse Law</td>
<td></td>
</tr>
<tr>
<td>LAW 7647</td>
<td>Trial Practice</td>
<td></td>
</tr>
</tbody>
</table>

**Exam and Dissertation**

**Exam Preparation**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRIM 8960</td>
<td>Exam Preparation—Doctoral</td>
<td></td>
</tr>
</tbody>
</table>

**Dissertation**

Complete the following (repeatable) course twice:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRIM 9990</td>
<td>Dissertation</td>
<td></td>
</tr>
</tbody>
</table>

**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:
**Program Credit/GPA Requirements**

32 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 Criminal Justice, JD/MS**

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 Requirement**

A cumulative 3.000 GPA is required for the core requirement.

**Criminology and Criminal Justice**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRIM 7200</td>
<td>Criminology</td>
<td>3</td>
</tr>
<tr>
<td>CRIM 7202</td>
<td>The Criminal Justice Process</td>
<td>3</td>
</tr>
</tbody>
</table>

**Research and Statistics**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRIM 7404</td>
<td>Research Methods and Statistics</td>
<td>3</td>
</tr>
</tbody>
</table>

**Experiential**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRIM 7500</td>
<td>Internship 1</td>
<td>3</td>
</tr>
</tbody>
</table>

Law co-op will count as 3 semester hours of MS credit in lieu of CRIM 7500 internship.

**Electives**

Complete 18 hours from the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRIM 7201</td>
<td>Global Criminology</td>
<td>3</td>
</tr>
<tr>
<td>CRIM 7208</td>
<td>Law and Society</td>
<td></td>
</tr>
<tr>
<td>CRIM 7224</td>
<td>Law and Psychology</td>
<td></td>
</tr>
<tr>
<td>CRIM 7232</td>
<td>Juvenile Law</td>
<td></td>
</tr>
<tr>
<td>CRIM 7244</td>
<td>Criminal Law and Procedure</td>
<td></td>
</tr>
<tr>
<td>CRIM 7256</td>
<td>Courts and Sentencing</td>
<td></td>
</tr>
<tr>
<td>CRIM 7266</td>
<td>Crimes Against Humanity</td>
<td></td>
</tr>
<tr>
<td>CRIM 7314</td>
<td>Special Topics in Law and Justice</td>
<td></td>
</tr>
<tr>
<td>CRIM 7330</td>
<td>Punishment and Social Control</td>
<td></td>
</tr>
<tr>
<td>CRIM 7332</td>
<td>International Law and Justice</td>
<td></td>
</tr>
<tr>
<td>CRIM 7334</td>
<td>Transnational Crime</td>
<td></td>
</tr>
<tr>
<td>LAW 6103</td>
<td>Criminal Justice</td>
<td></td>
</tr>
<tr>
<td>LAW 7301</td>
<td>Advanced Criminal Procedure: Adjudication</td>
<td></td>
</tr>
<tr>
<td>LAW 7332</td>
<td>Evidence</td>
<td></td>
</tr>
<tr>
<td>LAW 7410</td>
<td>Domestic Violence Clinic</td>
<td></td>
</tr>
<tr>
<td>LAW 7495</td>
<td>Advanced Criminal Procedure: Investigation</td>
<td></td>
</tr>
<tr>
<td>LAW 7528</td>
<td>Balancing Liberty and Security Seminar</td>
<td></td>
</tr>
</tbody>
</table>

**Program Credit/GPA Requirements**

30 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

**Global Criminology, Graduate Certificate**

The Certificate in Global Criminology is designed to respond to recent developments in the field of international and global criminology and criminal justice that require different and specific knowledge among law enforcement personnel, nongovernmental organization (NGO) staff, as well as local and national policymakers. As borders become more permeable and crime becomes more sophisticated, crime has become increasingly global. The graduate certificate highlights how globalization and internationalization affect crime and crime control, linking the supranational, the national, and local domains.

Globalization of world economies, communications, and transportation requires criminologists, criminal justice practitioners, policymakers, and law enforcement personnel to become more globally minded. This certificate program offers students an opportunity to learn how the processes of globalization influence crime and criminal justice across the globe, with emphases on globalization and recent developments in global crime; global trends in policing and security; convergence and divergence in criminal justice and penal policy; and international criminal justice, war crimes, and the global protection of human rights.

The certificate may be completed on its own or in conjunction with other graduate degree programs including, but not limited to, criminology and criminal justice, sociology, public administration, urban and regional policy, and international affairs. Students are expected to complete the four-course certificate in one year.

**Program Requirements**

Complete all courses and requirements listed below unless otherwise indicated.

**Requirements**

**Required Course**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRIM 7201</td>
<td>Global Criminology</td>
<td>3</td>
</tr>
</tbody>
</table>

**Electives**

Complete 9 semester hours from the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRIM 7242</td>
<td>Terrorism and International Crime</td>
<td></td>
</tr>
<tr>
<td>CRIM 7258</td>
<td>Comparative Criminology</td>
<td></td>
</tr>
<tr>
<td>CRIM 7266</td>
<td>Crimes Against Humanity</td>
<td></td>
</tr>
<tr>
<td>CRIM 7268</td>
<td>Human Trafficking</td>
<td></td>
</tr>
<tr>
<td>CRIM 7332</td>
<td>International Law and Justice</td>
<td></td>
</tr>
<tr>
<td>CRIM 7334</td>
<td>Transnational Crime</td>
<td></td>
</tr>
</tbody>
</table>
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)**
- Economics (p. 378)
- Economics—Advanced Entry (p. 380)

**Master of Arts (MA)**
- Economics (p. 381)

### Economics, PhD

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 with a Master’s degree in economics, please see Economics PhD—Advanced Entry (p. 380).

**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 classes 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
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 and Field Requirements

Quantitative Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 5105</td>
<td>Math and Statistics for Economists</td>
<td>4</td>
</tr>
<tr>
<td>ECON 5140</td>
<td>Applied Econometrics</td>
<td>4</td>
</tr>
<tr>
<td>ECON 7740</td>
<td>Applied Econometrics 2</td>
<td>4</td>
</tr>
</tbody>
</table>

Theory Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 5110</td>
<td>Microeconomic Theory</td>
<td>4</td>
</tr>
<tr>
<td>ECON 5120</td>
<td>Macroeconomic Theory</td>
<td>4</td>
</tr>
<tr>
<td>ECON 7710</td>
<td>Microeconomic Theory 2</td>
<td>4</td>
</tr>
<tr>
<td>ECON 7720</td>
<td>Macroeconomic Theory 2</td>
<td>4</td>
</tr>
</tbody>
</table>

Field Courses

Labor Economics Field

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 7763</td>
<td>Labor Market Analysis</td>
<td>4</td>
</tr>
<tr>
<td>ECON 7764</td>
<td>Topics in Labor Economics</td>
<td>4</td>
</tr>
</tbody>
</table>

Industrial Organization Field

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 7771</td>
<td>Framework of Industrial Organization</td>
<td>4</td>
</tr>
<tr>
<td>ECON 7772</td>
<td>Public Policy Toward Business</td>
<td>4</td>
</tr>
</tbody>
</table>
Elective
Complete 4 semester hours from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 5200 to ECON 5299</td>
<td></td>
</tr>
<tr>
<td>ECON 7200 to ECON 7299</td>
<td></td>
</tr>
<tr>
<td>ECON 7976</td>
<td>Directed Study</td>
</tr>
<tr>
<td>ECON 8982</td>
<td>Readings</td>
</tr>
</tbody>
</table>

Field Exam and Writing the Dissertation
Registration in the following class is required in the semester prior to sitting for the field examination:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 8960</td>
<td>Exam Preparation—Doctoral</td>
</tr>
</tbody>
</table>

Registration in the following class is required in the semester that students sit for the field examination and begin dissertation planning:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 9986</td>
<td>Research</td>
</tr>
</tbody>
</table>

Registration in the following class is required in the fall and spring semesters following achievement of doctoral candidacy:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 9990</td>
<td>Dissertation</td>
</tr>
</tbody>
</table>

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:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 9996</td>
<td>Dissertation Continuation</td>
</tr>
</tbody>
</table>

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. 378).

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)
PhD annual student progress review
Dissertation committee
Dissertation proposal
Dissertation defense
Field lunch participation
Seminar series participation

Core and Field Requirements

Quantitative Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 7740</td>
<td>Applied Econometrics 2</td>
<td>4</td>
</tr>
</tbody>
</table>

Theory Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 7710</td>
<td>Microeconomic Theory 2</td>
<td>4</td>
</tr>
<tr>
<td>ECON 7720</td>
<td>Macroeconomic Theory 2</td>
<td>4</td>
</tr>
</tbody>
</table>

Field Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 7763</td>
<td>Labor Market Analysis</td>
<td>4</td>
</tr>
<tr>
<td>ECON 7764</td>
<td>Topics in Labor Economics</td>
<td>4</td>
</tr>
<tr>
<td>ECON 7771</td>
<td>Framework of Industrial Organization</td>
<td>4</td>
</tr>
<tr>
<td>ECON 7772</td>
<td>Public Policy Toward Business</td>
<td>4</td>
</tr>
</tbody>
</table>

Elective Course

Complete 4 semester hours from the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 7200 to ECON 7299</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>ECON 7976</td>
<td>Directed Study</td>
<td></td>
</tr>
<tr>
<td>ECON 8982</td>
<td>Readings</td>
<td></td>
</tr>
</tbody>
</table>

Field Exam and Writing the Dissertation

Registration in the following class is required in the semester prior to sitting for the field examination:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 8960</td>
<td>Exam Preparation—Doctoral</td>
<td></td>
</tr>
</tbody>
</table>

Registration in the following class is required in the semester that students sit for the field examination and begin dissertation planning:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 9986</td>
<td>Research</td>
<td></td>
</tr>
</tbody>
</table>

Registration in the following class is required in the fall and spring semesters following achievement of doctoral candidacy:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 9990</td>
<td>Dissertation</td>
<td></td>
</tr>
</tbody>
</table>

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:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 9996</td>
<td>Dissertation Continuation</td>
<td></td>
</tr>
</tbody>
</table>

Program Credit/GPA Requirements

- 32 total semester hours required
- Minimum 3.000 GPA required

Economics, MA

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.

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. 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.
General Requirements

Quantitative Courses
- ECON 5105 Math and Statistics for Economists 4
- ECON 5140 Applied Econometrics 4

Theory Courses
- 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.

Complete 16 semester hours in the following range: ECON 5200 to ECON 7772

Program Credit/GPA Requirements
- 32 total semester hours required
- Minimum 3.00 GPA required
- 

English
Website (http://www.northeastern.edu/cssh/english/graduate)

Elizabeth Maddock Dillon, PhD
Professor and Chair
e.dillon@northeastern.edu

Theo Davis, PhD
Associate Professor and Graduate Program Director
th.davis@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)
- English (p. 382)
- English—Advanced Entry (p. 384)

Master of Arts (MA)
- English (p. 384)

Graduate Certificate
- Digital Humanities (p. 385)

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 42 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

Course Work

Proseminar
ENGL 5103 Proseminar 3

Writing and the Teaching of Writing
ENGL 7392 Writing and the Teaching of Writing 3
## Theories and Methods

Complete 6 semester hours from the following: 6

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 7341</td>
<td>Contemporary Critical Theory</td>
</tr>
<tr>
<td>ENGL 7342</td>
<td>Topics in Criticism</td>
</tr>
<tr>
<td>ENGL 7351</td>
<td>Topics in Literary Study (selected topics only)</td>
</tr>
<tr>
<td>ENGL 7358</td>
<td>Topics in Literature and other Disciplines (selected topics only)</td>
</tr>
<tr>
<td>ENGL 7370</td>
<td>Topics in Digital Humanities</td>
</tr>
<tr>
<td>ENGL 7379</td>
<td>Ethnography</td>
</tr>
<tr>
<td>WMNS 6100</td>
<td>Theorizing Gender and Sexuality</td>
</tr>
<tr>
<td>WMNS 7976</td>
<td>Directed Study (GCWS Consortium, selected topics only)</td>
</tr>
</tbody>
</table>

## Rhetoric and Composition

Complete 3 semester hours from the following: 3

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 7111</td>
<td>Rhetorical Theory</td>
</tr>
<tr>
<td>ENGL 7112</td>
<td>Rhetorical Criticism</td>
</tr>
<tr>
<td>ENGL 7121</td>
<td>Composition Studies</td>
</tr>
<tr>
<td>ENGL 7123</td>
<td>Approaches to Teaching Writing</td>
</tr>
<tr>
<td>ENGL 7360</td>
<td>Topics in Rhetoric</td>
</tr>
<tr>
<td>ENGL 7391</td>
<td>Reading and the Teaching of Reading</td>
</tr>
<tr>
<td>ENGL 7392</td>
<td>Writing and the Teaching of Writing</td>
</tr>
<tr>
<td>ENGL 7393</td>
<td>Writing and Learning Across Curriculum</td>
</tr>
<tr>
<td>ENGL 7395</td>
<td>Topics in Writing</td>
</tr>
<tr>
<td>ENGL 7396</td>
<td>Composition Pedagogy</td>
</tr>
<tr>
<td>ENGL 7397</td>
<td>Responding to Learners</td>
</tr>
<tr>
<td>ENGL 7398</td>
<td>Writing and Reading in Content Areas</td>
</tr>
</tbody>
</table>

## Medieval and Renaissance

Complete 3 semester hours from the following: 3

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 7261</td>
<td>Medieval Literature</td>
</tr>
<tr>
<td>ENGL 7262</td>
<td>Renaissance Literature</td>
</tr>
<tr>
<td>ENGL 7271</td>
<td>Chaucer</td>
</tr>
<tr>
<td>ENGL 7272</td>
<td>Shakespeare’s Tragedies</td>
</tr>
<tr>
<td>ENGL 7273</td>
<td>Shakespeare’s Comedies</td>
</tr>
<tr>
<td>ENGL 7274</td>
<td>Topics in Shakespeare</td>
</tr>
<tr>
<td>ENGL 7281</td>
<td>Topics in Medieval Literature</td>
</tr>
<tr>
<td>ENGL 7282</td>
<td>Topics in Renaissance Literature</td>
</tr>
<tr>
<td>ENGL 7342</td>
<td>Topics in Criticism (selected topics only)</td>
</tr>
<tr>
<td>ENGL 7358</td>
<td>Topics in Literature and other Disciplines (selected topics only)</td>
</tr>
</tbody>
</table>

## Seventeenth and Eighteenth Century

Complete 3 semester hours from the following: 3

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 7213</td>
<td>Topics in Early American Literature</td>
</tr>
<tr>
<td>ENGL 7263</td>
<td>17th-Century Literature</td>
</tr>
<tr>
<td>ENGL 7264</td>
<td>Restoration and Early 18th-Century Literature</td>
</tr>
<tr>
<td>ENGL 7275</td>
<td>Milton</td>
</tr>
<tr>
<td>ENGL 7283</td>
<td>Topics in 17th-Century Literature</td>
</tr>
<tr>
<td>ENGL 7284</td>
<td>Topics in 18th-Century Literature</td>
</tr>
<tr>
<td>ENGL 7291</td>
<td>18th-Century Novel</td>
</tr>
<tr>
<td>ENGL 7351</td>
<td>Topics in Literary Study (selected topics only)</td>
</tr>
<tr>
<td>ENGL 7352</td>
<td>Topics in Genre (selected topics only)</td>
</tr>
</tbody>
</table>

## Nineteenth and Twentieth Century

Complete 3 semester hours from the following: 3

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 7211</td>
<td>Topics in American Literature (selected topics only)</td>
</tr>
<tr>
<td>ENGL 7212</td>
<td>Topics in African-American Literature (selected topics only)</td>
</tr>
<tr>
<td>ENGL 7214</td>
<td>Topics in 19th-Century American Literature</td>
</tr>
<tr>
<td>ENGL 7215</td>
<td>Topics in 20th-Century American Literature</td>
</tr>
<tr>
<td>ENGL 7221</td>
<td>Major American Novelist</td>
</tr>
<tr>
<td>ENGL 7222</td>
<td>Major American Playwright (selected versions of this course)</td>
</tr>
<tr>
<td>ENGL 7223</td>
<td>Major American Poet (selected versions of this course)</td>
</tr>
<tr>
<td>ENGL 7224</td>
<td>Major Figures in African-American Literature</td>
</tr>
<tr>
<td>ENGL 7233</td>
<td>19th-Century American Poetry</td>
</tr>
<tr>
<td>ENGL 7244</td>
<td>African-American Novel</td>
</tr>
<tr>
<td>ENGL 7251</td>
<td>Contemporary American Fiction</td>
</tr>
<tr>
<td>ENGL 7266</td>
<td>Victorian Literature</td>
</tr>
<tr>
<td>ENGL 7285</td>
<td>Topics in Romanticism</td>
</tr>
<tr>
<td>ENGL 7286</td>
<td>Topics in Victorian Literature</td>
</tr>
<tr>
<td>ENGL 7287</td>
<td>Topics in 20th-Century British Literature</td>
</tr>
<tr>
<td>ENGL 7292</td>
<td>Romantic Poetry</td>
</tr>
<tr>
<td>ENGL 7293</td>
<td>Victorian Poetry</td>
</tr>
<tr>
<td>ENGL 7294</td>
<td>Victorian Novel</td>
</tr>
<tr>
<td>ENGL 7351</td>
<td>Topics in Literary Study (selected topics only)</td>
</tr>
<tr>
<td>ENGL 7355</td>
<td>Topics in Poetry (selected topics only)</td>
</tr>
<tr>
<td>ENGL 7358</td>
<td>Topics in Literature and other Disciplines (selected topics only)</td>
</tr>
<tr>
<td>ENGL 7359</td>
<td>Topics in Comparative Literature (selected topics only)</td>
</tr>
<tr>
<td>ENGL 7361</td>
<td>Modern Poetry</td>
</tr>
<tr>
<td>ENGL 7362</td>
<td>Contemporary Poetry</td>
</tr>
</tbody>
</table>

## Open Electives

Complete 18 semester hours in the following subject area: 18

ENGL or approved non-ENGL courses (e.g., INSH 7910, WMNS 7976).

## Exam and Dissertation

### Exam Preparation

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 8960</td>
<td>Exam Preparation—Doctoral</td>
</tr>
</tbody>
</table>

### Research

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 9986</td>
<td>Research</td>
</tr>
</tbody>
</table>

### Dissertation

Complete the following (repeatable) course twice:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 9990</td>
<td>Dissertation</td>
</tr>
</tbody>
</table>

## Program Credit/GPA Requirements

- 42 total semester hours required
- Minimum 3.500 GPA required
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 21 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. The General Regulations booklet is created by the College of Social Sciences and Humanities graduate office. It reviews the minimum academic requirements established by the university and the graduate office. The PhD Guide is created by the Department of English graduate office. It reviews requirements and procedures that are specific to the doctoral program in English. 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

**Course Work**

**Proseminar**
ENGL 5103 Proseminar 3

**Writing and the Teaching of Writing**
ENGL 7392 Writing and the Teaching of Writing 3

**Open Electives**
Complete 15 semester hours of ENGL courses. 15

**Exam and Dissertation**

**Exam Preparation**
ENGL 8960 Exam Preparation—Doctoral

---

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.

**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)

**Course Work**

**Proseminar**
ENGL 5103 Proseminar 3

**Theories and Methods**

Complete 6 semester hours from the following: 6
ENGL 7341 Contemporary Critical Theory
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
ENGL 7379 Ethnography
WMNS 6100 Theorizing Gender and Sexuality
WMNS 7976 Directed Study (GCWS Consortium, selected topics only)

**Writing and Rhetoric**

Complete 6 semester hours from the following: 6
ENGL 7111 Rhetorical Theory
ENGL 7112 Rhetorical Criticism
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 7121</td>
<td>Composition Studies</td>
</tr>
<tr>
<td>ENGL 7123</td>
<td>Approaches to Teaching Writing</td>
</tr>
<tr>
<td>ENGL 7360</td>
<td>Topics in Rhetoric</td>
</tr>
<tr>
<td>ENGL 7391</td>
<td>Reading and the Teaching of Reading</td>
</tr>
<tr>
<td>ENGL 7392</td>
<td>Writing and the Teaching of Writing (Master’s students may register with permission from the instructor.)</td>
</tr>
<tr>
<td>ENGL 7393</td>
<td>Writing and Learning Across Curriculum</td>
</tr>
<tr>
<td>ENGL 7395</td>
<td>Topics in Writing</td>
</tr>
<tr>
<td>ENGL 7396</td>
<td>Composition Pedagogy</td>
</tr>
<tr>
<td>ENGL 7397</td>
<td>Responding to Learners</td>
</tr>
<tr>
<td>ENGL 7398</td>
<td>Writing and Reading in Content Areas</td>
</tr>
</tbody>
</table>

**Medieval and Renaissance**

Complete 3 semester hours from the following: 3

- ENGL 7261 Medieval Literature
- ENGL 7262 Renaissance Literature
- ENGL 7271 Chaucer
- ENGL 7272 Shakespeare’s Tragedies
- ENGL 7273 Shakespeare’s Comedies
- ENGL 7274 Topics in Shakespeare
- ENGL 7281 Topics in Medieval Literature
- ENGL 7282 Topics in Renaissance Literature
- ENGL 7342 Topics in Criticism (selected topics only)
- ENGL 7358 Topics in Literature and other Disciplines (selected topics only)

**Seventeenth and Eighteenth Centuries**

Complete 3 semester hours from the following: 3

- ENGL 7213 Topics in Early American Literature
- ENGL 7263 17th-Century Literature
- ENGL 7275 Milton
- ENGL 7283 Topics in 17th-Century Literature
- ENGL 7284 Topics in 18th-Century Literature
- ENGL 7291 18th-Century Novel
- ENGL 7351 Topics in Literary Study (selected topics only)
- ENGL 7352 Topics in Genre (selected topics only)

**Nineteenth and Twentieth Centuries**

Complete 3 semester hours from the following: 3

- ENGL 7211 Topics in American Literature (selected topics only)
- ENGL 7212 Topics in African-American Literature (selected topics only)
- ENGL 7214 Topics in 19th-Century American Literature
- ENGL 7215 Topics in 20th-Century American Literature
- ENGL 7221 Major American Novelist
- ENGL 7222 Major American Playwright (selected versions of this course)
- ENGL 7223 Major American Poet (selected versions of this course)
- ENGL 7224 Major Figures in African-American Literature

- ENGL 7233 19th-Century American Poetry
- ENGL 7244 African-American Novel
- ENGL 7251 Contemporary American Fiction
- ENGL 7266 Victorian Literature
- ENGL 7285 Topics in Romanticism
- ENGL 7286 Topics in Victorian Literature
- ENGL 7287 Topics in 20th-Century British Literature
- ENGL 7292 Romantic Poetry
- ENGL 7293 Victorian Poetry
- ENGL 7294 Victorian Novel
- ENGL 7351 Topics in Literary Study (selected topics only)
- ENGL 7355 Topics in Poetry (selected topics only)
- ENGL 7358 Topics in Literature and other Disciplines (selected topics only)
- ENGL 7359 Topics in Comparative Literature (selected topics only)
- ENGL 7361 Modern Poetry
- ENGL 7362 Contemporary Poetry

**Timed Examination Option**

**Open Electives**

Complete 6 semester hours of ENGL courses or approved non-ENGL course (e.g., INSH 7910, WMNS 7976). 6

**Exam Preparation**

Required for students who must maintain full-time status while completing the comprehensive examination.

- ENGL 6960 Exam Preparation—Master’s 0

**Thesis Option**

A minimum 3.500 GPA is required to pursue this option.

**Open Elective**

Complete 3 semester hours of ENGL courses or approved non-ENGL courses (e.g., INSH 7910, WMNS 7976). 3

**Thesis**

- ENGL 7990 Thesis (minimum 3.500 GPA required) 3

**Exam Preparation**

Required for students who must maintain full-time status while completing the MA Thesis.

- ENGL 6960 Exam Preparation—Master’s 0

**Program Credit/GPA Requirements**

30 total semester hours required

Minimum 3.000 GPA required

---

**Digital Humanities, Graduate Certificate**

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
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 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.

**Requirements**

**Topics/Readings/Methods**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 7370</td>
<td>Topics in Digital Humanities (Introduction to Digital Humanities)</td>
</tr>
<tr>
<td>or HIST 7370</td>
<td>Texts, Maps, and Networks: Readings and Methods for Digital History</td>
</tr>
</tbody>
</table>

**Lab Project Seminar**

Complete the following (repeatable) course three times: 3

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>INSH 7910</td>
<td>NULab Project Seminar</td>
</tr>
</tbody>
</table>

**Electives**

Complete 6 semester hours from the following: 6

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARTG 5100</td>
<td>Information Design Studio 1: Principles</td>
</tr>
<tr>
<td>ARTG 5120</td>
<td>Information Design Research Methods</td>
</tr>
<tr>
<td>CS 6120</td>
<td>Natural Language Processing</td>
</tr>
<tr>
<td>ENGL 7370</td>
<td>Topics in Digital Humanities</td>
</tr>
<tr>
<td>ENGL 7990</td>
<td>Thesis (for MA students in English; requires approval by the DH certificate program director)</td>
</tr>
<tr>
<td>HIST 7219</td>
<td>Topics in Cultural History</td>
</tr>
<tr>
<td>POLS 7334</td>
<td>Social Networks</td>
</tr>
<tr>
<td>PPUA 5301</td>
<td>Introduction to Computational Statistics</td>
</tr>
<tr>
<td>PPUA 5302</td>
<td>Information Design and Visual Analytics</td>
</tr>
</tbody>
</table>

**Program Credit/GPA Requirements**
Minimum 12 total semester hours required
Minimum 3.000 GPA required

1 By petition, one course outside the electives list may count as an elective with approval from the instructor and the DH certificate program director.

**History**

Website (https://www.northeastern.edu/cssh/history/graduate/programs)

Heather Streets-Salter, PhD
Associate Professor and Chair

Katherine Luongo, PhD
Associate Professor and Graduate Program Director, PhD and MA (World History)

Martin Blatt, PhD
Professor of the Practice and Graduate Program Director, MA (Public History)

249 Reserve 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)
- History (p. 387)
- History—Advanced Entry (p. 387)

Master of Arts (MA)
- History (p. 388)

Graduate Certificate
- Public History (p. 389)

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 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 deemed PhD degree candidates by the college.

Program Requirements
Milestones
- Qualifying examination
- Annual review
- Language
- PhD candidacy
- Dissertation committee
- Dissertation proposal
- Dissertation defense

Major Requirements
- Theory and Methodology

A grade of B or higher is required:

HIST 5101 Theory and Methodology 1 3
HIST 5102 Theory and Methodology 2 3

Digital History
- HIST 7370 Texts, Maps, and Networks: Readings and Methods for Digital History 3

Readings or Directed Study
- Complete 18 semester hours in either Readings or Directed Study:
- HIST 8982 Readings
- or HIST 7976 Directed Study

Research Seminar
- HIST 7314 Research Seminar in World History 3

Teaching Practicum
- HIST 8409 Practicum in Teaching 1

Electives
- Complete 6 semester hours from the following range: 6
  - HIST 7200 to HIST 7702

Exam and Dissertation
Exam Preparation
- HIST 8960 Exam Preparation—Doctoral

Dissertation
- Complete the following (repeatable) course twice:
  - HIST 9990 Dissertation

Program Credit/GPA Requirements
- 37 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 31 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

**Major Requirements**

<table>
<thead>
<tr>
<th>Theory and Methodology</th>
<th>A grade of B or higher is required:</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIST 5101</td>
<td>Theory and Methodology 1</td>
</tr>
<tr>
<td>HIST 5102</td>
<td>Theory and Methodology 2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Digital History</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>HIST 7370</td>
<td>Texts, Maps, and Networks: Readings and Methods for Digital History</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Readings or Directed Study</th>
<th>Complete 12 semester hours of either Readings or Directed Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIST 8982</td>
<td>Readings</td>
</tr>
<tr>
<td>or HIST 7976</td>
<td>Directed Study</td>
</tr>
</tbody>
</table>

**Research Seminar**
- HIST 7314 Research Seminar in World History

**Teaching Practicum**
- HIST 8409 Practicum in Teaching

**Electives**
Complete 6 semester hours from the following range:
- HIST 7200 to HIST 7702

**Exam and Dissertation**

<table>
<thead>
<tr>
<th>Exam Preparation</th>
<th>HIST 8960 Exam Preparation—Doctoral</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Dissertation</th>
<th>Complete the following (repeatable) course twice:</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIST 9990</td>
<td>Dissertation</td>
</tr>
</tbody>
</table>

**Program Credit/GPA Requirements**
- 31 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.

**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 and public history. The program requires a concentration. Please consult with a Department of History graduate program director for additional details.

**Major Requirements for Concentration in World History**

<table>
<thead>
<tr>
<th>Theory and Methodology</th>
<th>A grade of B or higher is required:</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIST 5101</td>
<td>Theory and Methodology 1</td>
</tr>
<tr>
<td>HIST 5102</td>
<td>Theory and Methodology 2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Digital History</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>HIST 7370</td>
<td>Texts, Maps, and Networks: Readings and Methods for Digital History</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Research Seminar</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>HIST 7301 to HIST 7325</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Electives</th>
<th>Complete 21 semester hours from the following:</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIST 5101 to HIST 5295</td>
<td></td>
</tr>
<tr>
<td>HIST 7201</td>
<td>European Social History 1650–1850</td>
</tr>
<tr>
<td>HIST 7205 to HIST 7218</td>
<td></td>
</tr>
<tr>
<td>HIST 7220 to HIST 7297</td>
<td></td>
</tr>
</tbody>
</table>

**Major Requirements for Concentration in Public History**

<table>
<thead>
<tr>
<th>Theory and Methodology</th>
<th>A grade of B or higher is required:</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIST 5101</td>
<td>Theory and Methodology 1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Public History</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>HIST 5237</td>
<td>Issues and Methods in Public History</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Digital History</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>HIST 7370</td>
<td>Texts, Maps, and Networks: Readings and Methods for Digital History</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fieldwork</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>HIST 8410</td>
<td>Fieldwork in History 1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Research Seminar</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>HIST 7301 to HIST 7325</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Electives</th>
<th>Complete 9 semester hours from the following:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1</td>
<td>Group 1</td>
</tr>
<tr>
<td>HIST 5238 to HIST 5248</td>
<td></td>
</tr>
</tbody>
</table>
HIST 7250  Topics in Public History

Group 2

Complete 9 semester hours from the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIST 5111</td>
<td>Money, Markets, Commodities: Global Economic History</td>
</tr>
<tr>
<td>HIST 5295 to HIST 6966</td>
<td></td>
</tr>
<tr>
<td>HIST 7201 to HIST 7297</td>
<td></td>
</tr>
</tbody>
</table>

Program Credit/GPA Requirements

33 total semester hours required
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.

Requirements

Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIST 5237</td>
<td>Issues and Methods in Public History</td>
</tr>
<tr>
<td>HIST 8410</td>
<td>Fieldwork in History 1</td>
</tr>
</tbody>
</table>

Electives

Complete two of the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIST 5238</td>
<td>Managing Nonprofit Organizations</td>
</tr>
<tr>
<td>HIST 5239</td>
<td>Media and History</td>
</tr>
<tr>
<td>HIST 5240</td>
<td>Historical Societies and Archives</td>
</tr>
<tr>
<td>HIST 5241</td>
<td>Exhibits and Museums</td>
</tr>
<tr>
<td>HIST 5243</td>
<td>Industrial Archaeology</td>
</tr>
<tr>
<td>HIST 5244</td>
<td>Historic Preservation</td>
</tr>
<tr>
<td>HIST 5245</td>
<td>Historical Analysis of Public Policy</td>
</tr>
<tr>
<td>HIST 5246</td>
<td>Oral History</td>
</tr>
<tr>
<td>HIST 5248</td>
<td>Historical Administration</td>
</tr>
<tr>
<td>HIST 7219</td>
<td>Topics in Cultural History</td>
</tr>
<tr>
<td>HIST 7240</td>
<td>Visual and Material Culture</td>
</tr>
<tr>
<td>HIST 7250</td>
<td>Topics in Public History (Sites of Violence and Public Memory)</td>
</tr>
<tr>
<td>HIST 7250</td>
<td>Topics in Public History (Public History and Slavery)</td>
</tr>
</tbody>
</table>

Program Credit/GPA Requirements

12 total semester hours required
Minimum 3.000 GPA required

Political Science

Website (http://www.northeastern.edu/cssh/polisci)

Thomas J. Vicino, PhD
Associate Professor and Chair
t.vicino@northeastern.edu

Graduate Program Directors

John Portz, PhD
PhD and MA Programs
j.portz@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

Britain Scott, Graduate Program Administrator,
br.scott@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 public policy, U.S. public policy and administration, network science, European studies, Middle East studies, and democratization and development.

Programs

Doctor of Philosophy (PhD)

• Political Science (p. 390)
• Political Science, PhD—Advanced Entry (p. 390)

Master of Arts (MA)

• Political Science (p. 391)

Master of Public Administration (MPA)

• Public Administration (p. 393)

Master of Science (MS)

• Security and Resilience Studies (p. 394)

Graduate Certificate

• Security and Resilience Studies (p. 396)
Political Science, PhD

John Portz, PhD
Program Director
j.portz@northeastern.edu

Britain Scott
Graduate Program Administrator
617.373.4404
br.scott@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 all four 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 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
Students entering with a bachelor’s degree must complete 48 semester hours. Students currently in the MA or MPA program and accepted into the PhD program before completing the MA or MPA must complete 48 semester hours.

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

Major Requirements

Inquiry and Design
POLS 7200 Perspectives on Social Science Inquiry 3
POLS 7201 Research Design 3

Quantitative Techniques
Advanced methods courses from other disciplines may be chosen in consultation with your faculty advisor.
POLS 7202 Quantitative Techniques 3
POLS 7215 Advanced Quantitative Techniques 3
or LPSC 7215 Advanced Quantitative Techniques

Seminars
POLS 7204 Seminar in Public Policy 3
POLS 7205 Seminar in American Government and Politics 3
POLS 7206 Seminar in Comparative Politics 3
POLS 7207 Seminar in International Relations 3

Electives
Courses from other disciplines may be chosen in consultation with your faculty advisor.

Complete 24 semester hours from the following: 24
POLS 7200 to POLS 7978
POLS 8982 Readings

Exam and Dissertation

Exam Preparation
POLS 8960 Exam Preparation—Doctoral

Dissertation
Complete the following (repeatable) course twice:
POLS 9990 Dissertation

Dissertation Continuation
Complete the following (repeatable) course until graduation:
POLS 9996 Dissertation Continuation

Program Credit/GPA Requirements
48 total semester hours required
Minimum 3.500 GPA required

Political Science, PhD—Advanced Entry

Program Director
John Portz, PhD, j.portz@northeastern.edu

Graduate Program Administrator
Britain Scott, br.scott@northeastern.edu
617.373.4404

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 all four 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 prior course work but must complete a minimum of 30 semester hours. Students entering with a Northeastern MA in political science must complete a minimum of 18 semester hours while also satisfying all PhD course requirements. Students entering with a Northeastern MPA degree must complete a minimum of 6 semester hours while also satisfying all PhD course requirements. Students currently in the MA or MPA program and accepted into the PhD before completing the MA or MPA must complete 48 semester hours.

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 unless otherwise indicated.

Milestones
Comprehensive examination
Annual review
Language (as determined by committee)
PhD candidacy
Dissertation proposal
Dissertation committee
Dissertation defense

Major Requirements
Consult the graduate program director regarding which major-required courses apply to your individual plan of study.

Inquiry and Design
POLS 7200 Perspectives on Social Science Inquiry 3
POLS 7201 Research Design 3
Quantitative Techniques
POLS 7202 Quantitative Techniques 3
POLS 7215 Advanced Quantitative Techniques 3
or LPSC 7215 Advanced Quantitative Techniques

Seminars
POLS 7204 Seminar in Public Policy 3
POLS 7205 Seminar in American Government and Politics 3
POLS 7206 Seminar in Comparative Politics 3
POLS 7207 Seminar in International Relations 3

Electives
Courses from other disciplines may be chosen in consultation with your faculty advisor.

Complete 3–15 semester hours in the following: 3-15
POLS 7200 to POLS 7978

Exam and Dissertation

Exam Preparation
POLS 8960 Exam Preparation—Doctoral

Dissertation
Complete the following (repeatable) course twice:
POLS 9990 Dissertation

Dissertation Continuation
Complete the following (repeatable) course until graduation:
POLS 9996 Dissertation Continuation

Program Credit/GPA Requirements
6–30 total semester hours required
Minimum 3.500 GPA required

Political Science, MA
Program Director
John Portz, PhD, j.portz@northeastern.edu

Graduate Program Administrator
Britain Scott, br.scott@northeastern.edu
617.373.4404

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 30 semester hours (typically 10 courses) of credit. Full-time students can expect to complete the degree within two academic years. Course work consists of 3 semester hours in a required statistics course, 12 semester hours within a chosen concentration, 3 semester hours outside the student’s area of concentration, and a
removing 12 elective semester hours. 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. An experiential education opportunity will be satisfied with a minimum of 3 semester hours and a maximum of 6 semester hours.

**Program Requirements**

**General Requirements**

**Quantitative Techniques**

POLS 7202  Quantitative Techniques  3

**Concentrations**

Complete one of the following concentrations:

- American Government (p. 392)
- International Relations (p. 392)
- Comparative Politics (p. 392)
- Public Policy (p.  )
- Security Studies (p.  )

**Electives**

Complete 15 semester hours in the following range:  15

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>POLS 5100</td>
<td>to POLS 7978</td>
</tr>
</tbody>
</table>

**INTERNATIONAL RELATIONS CONCENTRATION**

**Seminar**

POLS 7207  Seminar in International Relations  3

**International Relations Courses**

Complete 9 semester hours from the following:  9

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>POLS 7325</td>
<td>Contemporary Issues in Third World Development</td>
</tr>
<tr>
<td>PPUA 7243</td>
<td>International Development Administration and Planning</td>
</tr>
<tr>
<td>PPUA 7244</td>
<td>Comparative Public Policy and Administration</td>
</tr>
<tr>
<td>POLS 7331</td>
<td>Environmental Policy and Politics</td>
</tr>
<tr>
<td>POLS 7332</td>
<td>Gender and Politics</td>
</tr>
<tr>
<td>POLS 7341</td>
<td>Security and Resilience Policy</td>
</tr>
<tr>
<td>POLS 7351</td>
<td>Democratization and Governance</td>
</tr>
<tr>
<td>POLS 7357</td>
<td>International Political Economy</td>
</tr>
<tr>
<td>POLS 7359</td>
<td>International Law</td>
</tr>
<tr>
<td>POLS 7360</td>
<td>Ethnic Political Conflict</td>
</tr>
<tr>
<td>POLS 7367</td>
<td>U.S. Foreign Policy</td>
</tr>
<tr>
<td>POLS 7369</td>
<td>International Security</td>
</tr>
<tr>
<td>POLS 7376</td>
<td>Government and Politics of the Middle East</td>
</tr>
<tr>
<td>POLS 7377</td>
<td>Arab-Israeli Conflict</td>
</tr>
<tr>
<td>POLS 7379</td>
<td>Chinese Politics and Foreign Policy</td>
</tr>
<tr>
<td>POLS 7381</td>
<td>U.S.-East Asia Relations</td>
</tr>
<tr>
<td>POLS 7382</td>
<td>Politics of Developing Nations</td>
</tr>
<tr>
<td>POLS 7385</td>
<td>Transatlantic Relations</td>
</tr>
<tr>
<td>POLS 7394</td>
<td>Topical Seminar in International Relations</td>
</tr>
</tbody>
</table>

**AMERICAN GOVERNMENT CONCENTRATION**

**Seminar**

POLS 7205  Seminar in American Government and Politics  3

**American Government Courses**

Complete 9 semester hours from the following:  9

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>POLS 7250</td>
<td>American Political Institutions and Processes</td>
</tr>
<tr>
<td>POLS 7251</td>
<td>Congress and Policy</td>
</tr>
<tr>
<td>POLS 7252</td>
<td>The American Presidency</td>
</tr>
<tr>
<td>POLS 7253</td>
<td>American Constitutional History and Theory</td>
</tr>
<tr>
<td>POLS 7254</td>
<td>Campaigns and Elections</td>
</tr>
<tr>
<td>POLS 7255</td>
<td>American Political Parties and Elections</td>
</tr>
</tbody>
</table>

**COMPARATIVE POLITICS CONCENTRATION**

**Seminar**

POLS 7206  Seminar in Comparative Politics  3

**Comparative Politics Courses**

Complete 9 semester hours from the following:  9

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>POLS 7258</td>
<td>Interest Groups and Social Movements</td>
</tr>
</tbody>
</table>
Contemporary Issues in Third World Development
Comparative Public Policy and Administration
Gender and Politics
Science, Technology, and Public Policy
Democratization and Governance
Democratization: Basic Approaches
Comparative Democracies
Comparative Political Parties and Electoral Systems
Comparative Constitutionalism
Comparative Political Economy
Gender and Politics
Science, Technology, and Public Policy
Democratization and Governance
Nationalism
Politics of Revolution and Change
Terrorism, Violence, and Politics
Totalitarianism and Oppressive Government
Comparative Constitutionalism
Comparative Political Economy
International Political Economy
Ethnic Political Conflict
Nationalism
Politics of Revolution and Change
Terrorism, Violence, and Politics
Totalitarianism and Oppressive Government
Genocide in a Comparative Perspective
European and European Union Governance
Arab-Israeli Conflict
U.S.-East Asia Relations
Politics of Developing Nations
Topical Seminar in Comparative Politics
Techniques of Policy Analysis
American Political Institutions and Processes
Congress and Policy
The American Presidency
American Political Parties and Elections
Trends in American Political Thought
Institutional Leadership and the Public Manager
The Nonprofit Sector in Civil Society and Public Affairs
Administrative Law and Politics
Techniques of Program Evaluation
Business/Government Relations
Health Policy and Politics
Problems in Metropolitan Policymaking
Comparative Public Policy and Administration
Case Studies in Policy Analysis
Education Policy in the United States
Environmental Policy and Politics
Gender and Politics
Science, Technology, and Public Policy
Security and Resilience Policy
U.S. National Security Policy
Nationalism
Politics of Revolution and Change
Terrorism, Violence, and Politics
Totalitarianism and Oppressive Government
U.S. Foreign Policy
Chinese Politics and Foreign Policy
Topical Seminar in Public Policy and Administration
Seminar
Seminar in Public Policy
Public Policy Courses
Complete 9 semester hours from the following:

Program Credit/GPA Requirements
30 total semester hours required
Minimum 3.00 GPA required

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.

**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 Requirement**

A cumulative 3.000 GPA is required for the core requirement.

### Quantitative Techniques

- LPSC 7305 or POLS 7202: Research and Statistical Methods 3
- PPUA 6506: Techniques of Policy Analysis 3

### Administration and Management

- PPUA 6500: Principles of Public Administration 3
- PPUA 6503: Public Personnel Administration 3
- PPUA 6504: Organizational Theory and Management 3
- PPUA 6505: Public Budgeting and Financial Management 3
- PPUA 6507: Institutional Leadership and the Public Manager 3

**Capstone**

- PPUA 7673: Capstone in Public Policy and Urban Affairs 3

**Internship Requirement**

An approved internship or waiver is required.

### Internship Waived

Electives

Complete 15 semester hours from the Course List. (p. 394) 15

### Internship Completed for Course Credit

**Internship**

- PPUA 6862: Internship with Research 3

**Electives**

Complete 12 semester hours from the Course List. (p. 394) 12

**Program Credit/GPA Requirements**

42 total semester hours required

Minimum 3.000 GPA

---

**Course List**

- 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)

**Security and Resilience Studies, MS**

Daniel Aldrich, PhD
Graduate Program Director
d.aldrich@northeastern.edu

Britain Scott
Graduate Program Administrator
617.373.4404
br.scott@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.

To earn the Master of Science in Security and Resilience Studies degree at Northeastern, you must successfully complete 30 semester hours of credit. Full-time students can expect to complete the degree within one calendar year. This program can be completed either by students who are in residence at Northeastern University’s Boston campus or by students who live outside the Boston area. The core courses are offered in an online or hybrid format with much of the course content available online; typically once per month, students and the professor meet in extended face-to-face sessions. Low-residency students have the option of selecting elective courses that are available in a fully online...
format. Traditional students can select either traditional classroom-based courses or online courses to meet their 15 elective credits.

**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.

**General Requirements**

**Required Core Courses**
POLS 7341  Security and Resilience Policy  

**Core Elective Courses**
Complete 6 semester hours from the following:  
CRIM 7200  Criminology  
POLS 7343  Counterterrorism  
POLS 7346  Resilient Cities  
or PPUA 7346  Resilient Cities  
POLS 7369  International Security  
POLS 7441  Cyberconflict in the International System  
PPUA 5390  Special Topics in Public Policy and Urban Affairs  

**Research Methods**
Complete 3 semester hours from the following:  
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 Options**
Choose one of the following options in consultation with faculty advisor and program director.

**Capstone**
POLS 7980  Capstone Project  
or INSH 6864  Experiential Integration  
and POLS 6964  and Co-op Work Experience  

**Elective Themes**
Electives are organized to allow students to think thematically.

- Administration, Management, and Policy (p. 395)  
- Counterterrorism and Conflict Studies (p. 395)  
- Cybersecurity Policy (p. 395)  
- Resilient Cities (p. 395)  
- Criminal Justice (p. 395)  

**ADMINISTRATION, MANAGEMENT, AND POLICY**
Complete 12–15 semester hours from the following:  
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  
PPUA 6502  Economic Institutions and Analysis  
PPUA 6503  Public Personnel Administration  
PPUA 6504  Organizational Theory and Management  
PPUA 6505  Public Budgeting and Financial Management  
PPUA 6506  Techniques of Policy Analysis  
PPUA 6507  Institutional Leadership and the Public Manager  

**COUNTERTERRORISM AND CONFLICT STUDIES**
Complete 12–15 semester hours from the following:  
CRIM 7201  Global Criminology  
CRIM 7242  Terrorism and International Crime  
CRIM 7264  Immigration and Crime  
POLS 7343  Counterterrorism  
POLS 7344  Hard Power, Soft Power, and Smart Power  
POLS 7360  Ethnic Political Conflict  
POLS 7361  U.S. National Security Policy  
POLS 7363  Politics of Revolution and Change  
POLS 7364  Terrorism, Violence, and Politics  
POLS 7365  Totalitarianism and Oppressive Government  
POLS 7366  Genocide in a Comparative Perspective  
POLS 7369  International Security  
SOC 7231  Sociology of Prejudice and Violence  

**CYBERSECURITY POLICY**
Complete 12–15 semester hours from the following:  
CRIM 7246  Security Management  
CRIM 7260  Topics in Criminal Justice  
IA 5001  Cyberspace Technology and Applications  
IA 5010  Foundations of Information Assurance  
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  
POLS 7441  Cyberconflict in the International System  

**RESILIENT CITIES**
Complete 12–15 semester hours from the following:  
CRIM 7200  Criminology  
CRIM 7270  Crime and Community Context  
CRIM 7312  Special Topics in Criminology and Public Policy  
CRIM 7316  Advanced Topics in Methods
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 four courses for a total of 12 semester hours. Some courses are a hybrid format with four set face-to-face experiences per semester combined with an online component. Additional face-to-face experiences may be available for Boston-based students, although students are not required to come to campus more than four times per semester. This flexible experience offers interactive online course content and activities in tandem with structured live events that include a speaker series and interactive team project sessions.

Program Requirements
Complete all courses and requirements listed below unless otherwise indicated.

General Requirements
Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>POLS 7341</td>
<td>Security and Resilience Policy</td>
<td>3</td>
</tr>
<tr>
<td>POLS 7343</td>
<td>Counterterrorism</td>
<td>3</td>
</tr>
<tr>
<td>or POLS 7441</td>
<td>Cyberconflict in the International System</td>
<td></td>
</tr>
</tbody>
</table>

Elective
Complete 6 semester hours from the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>POLS 7346</td>
<td>Resilient Cities</td>
<td></td>
</tr>
<tr>
<td>POLS 7369</td>
<td>International Security</td>
<td></td>
</tr>
<tr>
<td>POLS 7442</td>
<td>Homeland Security and Resilience Law and Policy</td>
<td></td>
</tr>
</tbody>
</table>

If not taken as a required course, POLS 7343 or POLS 7441 may be taken as an elective.

School of Public Policy and Urban Affairs
Website (http://www.northeastern.edu/cssh/policyschool)

Matthias Ruth, PhD
Director
m.ruth@northeastern.edu

Graduate Program Directors

Alan Clayton-Matthews, PhD
PhD Program, Law and 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

Program Credit/GPA Requirements
30 total semester hours required
Minimum 3.000 GPA required

1 Occasional online offering
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)
- Law and Public Policy (p. 397)
- Law and Public Policy—Advanced Entry (p. 398)

Master of Arts (MA)
- International Affairs (p. 399)

Master of Public Administration (MPA)
- Public Administration (p. 393)

Master of Public Policy (MPP)
- Public Policy (p. 402)

Master of Science (MS)
- Urban Informatics (p. 403) (STEM Program)
- Urban and Regional Policy (p. 403)

Dual Degree
- Law and Public Policy, JD/MS (p. 406)

Graduate Certificates
- Public Policy Analysis (p. 404)
- Nonprofit Sector, Philanthropy, and Social Change (p. 405)
- Urban Analytics
- Urban Studies (p. 406)

Law and 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
310 Renaissance Park
617.373.2909

Jenn Mocarski
Graduate Program Administrator
j.mocarski@northeastern.edu
310 Renaissance Park
617.373.2891

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 bachelor's degree must complete 42 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

Major Requirements

Research and Statistical Methods
A grade of B+ or higher is required:
LPSC 7305 Research and Statistical Methods 3
or POLS 7202 Quantitative Techniques

Economics
ECON 7270 Economics of Law and Regulation 4

Policy Course
A grade of B+ or higher is required:
LPSC 7311 Strategizing Public Policy 3

Research Design
A grade of B+ or higher is required:
LPSC 7310 Research Design and Analysis 3
or PPUA 6205 Research Design and Methodology in Urban and Regional Policy

Electives

General Electives
Complete 6 semester hours from the following: 6
LPSC 6313 Economic Analysis for Law, Policy, and Planning
PPUA 6201 The 21st-Century City: Urban Opportunities and Challenges in a Global Context
PPUA 6506 Techniques of Policy Analysis
PPUA 6509 Techniques of Program Evaluation
PPUA 6525 Institutions and Public Policy

Public Policy Elective
Complete 3 semester hours of PPUA 6000-series (or higher) course or any 6000-series (or higher) course or LPSC 7976 Directed Study with program approval.

Methodology Elective
Complete 3 semester hours from the following: 3
LPSC 7215 Advanced Quantitative Techniques
CRIM 7316 Advanced Topics in Methods
PHTH 6320 Qualitative Methods in Health and Illness
Any 6000-series (or higher) course or LPSC 7976 Directed Study with program approval

Law Elective
Complete 2 semester hours of LW course work. 2

Economics Elective
Complete 3 semester hours of ECON 6000-series (or higher) course or any 6000-series (or higher) course or LPSC 7976 Directed Study with program approval. 3

Open Electives
Complete 12 semester hours of 6000-series (or higher) courses in subject area PPUA or any 6000-series (or higher) courses or LPSC 7976 Directed Study with program approval. 12

Exam and Dissertation

Exam Prep
LPSC 8960 Exam Preparation—Doctoral

Dissertation
Complete the following (repeatable) course twice:
LPSC 9990 Dissertation

Program Credit/GPA Requirements

42 total semester hours required
Minimum 3.500 GPA required

Law and 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

Jenn Mocarski (j.mocarski@northeastern.edu)
Graduate Program Administrator
j.mocarski@northeastern.edu (j.mocarski@northeastern.edu)
310 Renaissance Park
617.373.2891

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 36 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

Major Requirements

Research and Statistical Methods
A grade of B+ or higher is required:
LPSC 7305 Research and Statistical Methods 3
or POLS 7202 Quantitative Techniques

Economics
ECON 7270 Economics of Law and Regulation 4

Policy Course
A grade of B+ or higher is required:
LPSC 7311 Strategizing Public Policy 3

Research Design
A grade of B+ or higher is required:
LPSC 7310 Research Design and Analysis 3
or PPUA 6205 Research Design and Methodology in Urban and Regional Policy

Electives

Public Policy Elective
Complete 3 semester hours of PPUA 6000-series (or higher) course or any 6000-series (or higher) course or LPSC 7976 Directed Study with program approval.

Methodology Elective
Complete 3 semester hours from the following:
LPSC 7215 Advanced Quantitative Techniques
CRIM 7316 Advanced Topics in Methods
PHTH 6320 Qualitative Methods in Health and Illness

Any 6000-series (or higher) course or LPSC 7976 Directed Study with program approval

Law Elective
Complete 2 semester hours of LW course work. 2

Economics Elective
Complete 3 semester hours of ECON 6000-series (or higher) course or any 6000-series (or higher) course or LPSC 7976 Directed Study with program approval.

Open Electives
Complete 12 semester hours of 6000-series (or higher) courses in subject area PPUA or any 6000-series (or higher) courses or LPSC 7976 Directed Study with program approval.

Exam and Dissertation

Exam Prep
LPSC 8960 Exam Preparation—Doctoral

Dissertation
Complete the following (repeatable) course twice:
LPSC 9990 Dissertation

Program Credit/GPA Requirements
36 total semester hours required
Minimum 3.500 GPA required

International Affairs, MA

Amilcar Barreto, PhD
Graduate Program Director
a.barreto@northeastern.edu
201 Renaissance Park
617.373.2783

Jenn Mocarski
Graduate Program Administrator
j.mocarski@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 tracks—globalization, development, and social justice; and international public policy—as well as global and regional electives, this graduate program allows students to pursue a variety of themes.

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.

General Requirements

Political Economy
INTL 5200 Political Economy: Interdisciplinary Perspectives 3

Social Science Methods
Complete 3 semester hours from the following: 3
ECON 5110 Microeconomic Theory
ECON 5120 Macroeconomic Theory
ECON 7251 International Finance
LPSC 7305 Research and Statistical Methods
POLS 7201 Research Design
POLS 7202 Quantitative Techniques
SOCL 7210 Statistical Methods of Sociology
SOCL 7211 Research Methods
SOCL 7220  Seminar in Qualitative Analysis

**Public Policy**

Complete 3 semester hours from the following: 3

- 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

**Tracks**

Complete one of the following tracks:

- International Public Policy (p. 400)
- Globalization, Development, and Social Justice (p. 401)

**Required Electives**

**Global Issues Elective**

Complete 3 semester hours from the following: 3

- CRIM 7201  Global Criminology
- CRIM 7336  Globalization of Crime and Justice
- HIST 7237  Legal History around the World
- HIST 7239  Space and Place
- HIST 7316  Research Seminar in Global Environmental History
- PHIL 5003  Ethics, Justice, and Global Climate Change
- POLS 7362  Nationalism
- POLS 7366  Genocide in a Comparative Perspective
- PPUA 5260  Ecological Economics
- PPUA 5265  Urban and Regional Policy in Developing Countries
- PPUA 7238  Climate Change and Urbanization in Developing Countries
- PPUA 7243  International Development Administration and Planning
- SOCL 7230  Political Ecology of Global Capitalism

**Regional Elective**

Complete 3 semester hours from the following: 3

- HIST 7227  20th-Century China: Revolutionary Change in a Global Context
- HIST 7238  Colonialism in Contemporary Africa
- HIST 7252  Topics in Middle Eastern History
- POLS 7370  Europe and European Union Governance
- POLS 7376  Government and Politics of the Middle East
- POLS 7379  Chinese Politics and Foreign Policy
- POLS 7383  Government and Politics of Latin America
- POLS 7384  Government and Politics of Africa
- POLS 7385  Transatlantic Relations

**Open Electives**

Electives may also be chosen from any other track or elective category. Six of the twelve credits may be fulfilled by a thesis.
International Public Policy Electives
Complete 6 semester hours from the following: 6
CRIM 7242  Terrorism and International Crime
POLS 7207  Seminar in International Relations
POLS 7282  Contemporary Political Thought
POLS 7333  Science, Technology, and Public Policy
POLS 7351  Democratization and Governance
POLS 7356  Comparative Political Economy
POLS 7357  International Political Economy
POLS 7359  International Law
POLS 7369  International Security
PPUA 7244  Comparative Public Policy and Administration

GLOBALIZATION, DEVELOPMENT, AND SOCIAL JUSTICE TRACK
Globalization, Development, and Social Justice
SOCL 7221  Globalization, Development, and Social Justice 3

Globalization, Development, and Social Justice Electives
Complete 6 semester hours from the following: 6
HIST 7323  Seminar: Modern Colonialism
PHIL 5001  Global Justice
POLS 7325  Contemporary Issues in Third World Development
POLS 7351  Democratization and Governance
SOCL 7100  Queer Theory: Sexualities, Genders, Politics
SOCL 7222  Gender and Globalization
SOCL 7225  Gender and Social Movements
SOCL 7268  Globalization and the City

Program Credit/GPA Requirements
36 total semester hours required
Minimum 3.000 GPA required

Public Administration, MPA

Christopher Bosso
Graduate Program Director
c.bosso@northeastern.edu
617.373.4398

Louis DaRos
Graduate Program Administrator
l.daros@northeastern.edu
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.

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 Requirement
A cumulative 3.000 GPA is required for the core requirement.

Quantitative Techniques
LPSC 7305  Research and Statistical Methods 3
or POLS 7202  Quantitative Techniques

Analysis
PPUA 6506  Techniques of Policy Analysis 3
PPUA 6502  Economic Institutions and Analysis 3

Administration and Management
PPUA 6500  Principles of Public Administration 3
PPUA 6503  Public Personnel Administration 3
PPUA 6504  Organizational Theory and Management 3

PPUA 6505  Public Budgeting and Financial Management 3

PPUA 6507  Institutional Leadership and the Public Manager 3

Capstone
PPUA 7673  Capstone in Public Policy and Urban Affairs 3

Internship Requirement
An approved internship or waiver is required.

Electives
Complete 15 semester hours from the Course List. (p. 394) 15
INTERNSHIP COMPLETED FOR COURSE CREDIT

Internship
PPUA 6862 Internship with Research 3

Electives
Complete 12 semester hours from the Course List. (p. 394) 12

Course List
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
42 total semester hours required
Minimum 3.000 GPA

Program Requirements
Complete all courses and requirements listed below unless otherwise indicated.

General Requirements
Methods, Statistics, and Applications Core
LPSC 7305 or POLS 7202 Research and Statistical Methods 3 Quantitative Techniques
PPUA 6205 Research Design and Methodology in Urban and Regional Policy 3
PPUA 6509 Techniques of Program Evaluation 3

Policy Frameworks and Practice Core
LPSC 6313 Economic Analysis for Law, Policy, and Planning 3
LPSC 7311 Strategizing Public Policy 3
PPUA 6506 Techniques of Policy Analysis 3
PPUA 6525 Institutions and Public Policy 3
PPUA 7673 Capstone in Public Policy and Urban Affairs 3

Methods and Statistics Elective
Complete 3 semester hours from the following: 3
LPSC 7215 Advanced Quantitative Techniques
POLS 7216 Applied Cases in Advanced Quantitative Methodology
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.

INTERNSHIP WAIVED
Electives
Complete 12 semester hours from the Course List. (p. 402) 12

INTERNSHIP COMPLETED NOT FOR COURSE CREDIT
Internship
PPUA 6861 Internship 0

Electives
Complete 12 semester hours from the Course List. (p. 402) 12

INTERNSHIP COMPLETED FOR COURSE CREDIT
Internship
PPUA 6862 Internship with Research 3

Electives
Complete 9 semester hours from the Course List. (p. 402) 9

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.

Course List
PPUA 5000 to PPU 7999
LPSC 5000 to LPSC 7999

Christopher Bosso, PhD
Graduate Program Director
c.bosso@northeastern.edu
310 Renaissance Park
617.373.4398

Jenn Mocarski
Graduate Program Administrator
j.mocarski@northeastern.edu
310 Renaissance Park
617.373.2891

CSSH Graduate Programs General Regulations (http://www.northeastern.edu/cssh/graduate/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.

Academic Standing/Progress
Students in the program are monitored for academic progress. Those students whose grade-point average (GPA) falls below 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.
General Requirements

Data Science Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>DA 5020</td>
<td>Collecting, Storing, and Retrieving Data</td>
<td>4</td>
</tr>
<tr>
<td>PPUA 5301</td>
<td>Introduction to Computational Statistics</td>
<td>4</td>
</tr>
<tr>
<td>PPUA 5302</td>
<td>Information Design and Visual Analytics</td>
<td>4</td>
</tr>
</tbody>
</table>

Program Credit/GPA Requirements

39 total semester hours required
Minimum 3.000 GPA required

Urban Informatics, MS

Matthias Ruth, PhD
Graduate Program Director
m.ruth@northeastern.edu

Louis DaRos
Graduate Program Administrator
617.373.5913
l.daros@northeastern.edu

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.

Academic Standing/Progress

Students in the program are monitored for academic progress. Those students whose grade-point average (GPA) falls below a 3.00 are notified by and meet with the director of academic programs. They are counseled that if their GPA does not rise to a 3.00 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.

Program Credit/GPA Requirements

32 total semester hours required
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

Jenn Mocarski
Graduate Program Administrator
j.mocarski@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, 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.

Program Requirements
Complete all courses and requirements listed below unless otherwise indicated.

General Requirements

Quantitative Techniques
- LPSC 7305 or POLS 7202: Research and Statistical Methods 3
- LPSC 6313: Economic Analysis for Law, Policy, and Planning 3
- LPSC 7311: Strategizing Public Policy 3
- PPUA 6204: Urban Development and Politics 3

Policy
- PPAC 6313: Economic Analysis for Law, Policy, and Planning 3
- LPSC 7311: Strategizing Public Policy 3
- PPUA 6204: Urban Development and Politics 3

Evaluation and Research
- PPUA 6509: Techniques of Program Evaluation 3
- PPUA 6205: Research Design and Methodology in Urban and Regional Policy 3

Research Toolkits
Complete 3 semester hours from the following:
- PPUA 6206 to PPUA 6214
- PPUA 6216: Research Toolkit for Urban and Regional Policy: Grant Writing 3

Capstone
- PPUA 7673: Capstone in Public Policy and Urban Affairs 3

Internship Requirement
An approved internship or waiver is required.

**INTERNSHIP WAIVED**

Electives
Complete 15 semester hours from the Course List. 15

**INTERNSHIP COMPLETED NOT FOR COURSE CREDIT**

Internship
- PPUA 6861: Internship 0

Electives
Complete 15 semester hours from the Course List. 15

**INTERNSHIP COMPLETED FOR COURSE CREDIT**

Internship
- PPUA 6862: Internship with Research 3

Electives
Complete 12 semester hours from the Course List. 12

Course List

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
42 total semester hours required
Minimum 3.000 GPA required

Graduate Program Director
Christopher Bosso, PhD, c.bosso@northeastern.edu

Graduate Program Administrator
Jennifer Mocarski, j.mocarski@northeastern.edu

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 3.00 are notified by and meet with the director of academic programs. They are counseled that if their GPA does not rise to a 3.00 or higher, they run the risk of not graduating and are advised on strategies for improvement.

Program Requirements

General Requirements

Policy
- LPSC 6313: Economic Analysis for Law, Policy, and Planning 3
  - or PPUA 6502: Economic Institutions and Analysis
- LPSC 7311: Strategizing Public Policy 3
  - or PPUA 6506: Techniques of Policy Analysis

Methodology and Evaluation
- LPSC 7305: Research and Statistical Methods 3
  - or POLS 7202: Quantitative Techniques
- PPUA 6509: Techniques of Program Evaluation 3
  - or PPUA 6205: Research Design and Methodology in Urban and Regional Policy 3

Program Credit/GPA Requirements
12 total semester hours required
Minimum 3.000 GPA required
Nonprofit Sector, Philanthropy, and Social Change, Graduate Certificate

Louis DaRos
Graduate Program Administrator
l.daros@northeastern.edu

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.

General Requirements

Required Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PPUA 6551</td>
<td>Nonprofit Organizations and Social Change</td>
<td>3</td>
</tr>
<tr>
<td>PPUA 6552</td>
<td>The Nonprofit Sector in Civil Society and Public Affairs</td>
<td>3</td>
</tr>
</tbody>
</table>

Electives

Complete 6 semester hours from the following. Courses outside this list may be taken as electives with approval of the Graduate Program Director.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>PPUA 5275</td>
<td>Philanthropy and Civil Society</td>
</tr>
<tr>
<td>PPUA 6509</td>
<td>Techniques of Program Evaluation</td>
</tr>
<tr>
<td>PPUA 6522</td>
<td>Administrative Ethics and Public Management</td>
</tr>
</tbody>
</table>

Urban Analytics, Graduate Certificate

Matthias Ruth, PhD
Graduate Program Director
m.ruth@northeastern.edu

Louis DaRos
Graduate Program Administrator
l.daros@northeastern.edu

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.

General Requirements

Methods and Applications

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PPUA 5262</td>
<td>Big Data for Cities</td>
<td>3</td>
</tr>
<tr>
<td>PPUA 5263</td>
<td>Geographic Information Systems for Urban and Regional Policy</td>
<td>3</td>
</tr>
<tr>
<td>PPUA 5266</td>
<td>Urban Theory and Science</td>
<td>3</td>
</tr>
</tbody>
</table>

Elective

Complete 3 semester hours from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PPUA 5261</td>
<td>Dynamic Modeling for Environmental Decision Making</td>
<td>3</td>
</tr>
<tr>
<td>PPUA 6966</td>
<td>Practicum</td>
<td></td>
</tr>
<tr>
<td>PPUA 7237</td>
<td>Advanced Spatial Analysis of Urban Systems</td>
<td></td>
</tr>
</tbody>
</table>

Program Credit/GPA Requirements

12 total semester hours required
Minimum 3.000 GPA required

Law and Public Policy, JD/MS

Christopher Bosso, PhD
Graduate Program Director
c.bosso@northeastern.edu
310 Renaissance Park
617.373.4398

Jenn Mocarski
Graduate Program Administrator
j.mocarski@northeastern.edu
310 Renaissance Park
617.373.2891

CSSH Graduate Programs General Regulations (https://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.
Law and Public Policy Requirements

Analysis and Statistical Methods

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>LPSC 6313</td>
<td>Economic Analysis for Law, Policy, and Planning</td>
<td>3</td>
</tr>
<tr>
<td>LPSC 7305</td>
<td>Research and Statistical Methods</td>
<td>3</td>
</tr>
<tr>
<td>or POLS 7202</td>
<td>Quantitative Techniques</td>
<td></td>
</tr>
</tbody>
</table>

Policy Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>LPSC 7311</td>
<td>Strategizing Public Policy</td>
<td>3</td>
</tr>
<tr>
<td>PPUA 7673</td>
<td>Capstone in Public Policy and Urban Affairs</td>
<td>3</td>
</tr>
</tbody>
</table>

Evaluation and Research

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PPUA 6509</td>
<td>Techniques of Program Evaluation</td>
<td>3</td>
</tr>
<tr>
<td>PPUA 6206 to PPUA 6216</td>
<td>Research Toolkits</td>
<td>1</td>
</tr>
</tbody>
</table>

Electives

Complete 1 semester hour of the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PPUA 6509</td>
<td>Techniques of Program Evaluation</td>
<td>3</td>
</tr>
</tbody>
</table>

Course List

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>LPSC 5000 to LPSC 7999</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PPUA 5000 to PPU 7999</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CRIM 5000 to CRIM 7999</td>
<td>(by advisement)</td>
<td></td>
</tr>
<tr>
<td>ECON 5000 to ECON 7999</td>
<td>(by advisement)</td>
<td></td>
</tr>
<tr>
<td>ENGL 5000 to ENGL 7999</td>
<td>(by advisement)</td>
<td></td>
</tr>
<tr>
<td>HIST 5000 to HIST 7999</td>
<td>(by advisement)</td>
<td></td>
</tr>
<tr>
<td>POLS 5000 to POLS 7999</td>
<td>(by advisement)</td>
<td></td>
</tr>
<tr>
<td>SOCL 5000 to SOCL 7999</td>
<td>(by advisement)</td>
<td></td>
</tr>
</tbody>
</table>

Law Requirements

Complete 9 semester hours from the following subject areas:

- LW, LAW

Program Credit/GPA Requirements

37 total semester hours required
Minimum 3.000 GPA required

Sociology

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
Joan Collins, Graduate Program Administrator,
j.collins@northeastern.edu


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 MA and PhD degrees in sociology within a flexible program attractive to students interested in both academic and nonacademic careers. The MA program has two tracks—one academic and one applied (in which the student substitutes an additional research methods course for one of the required courses in social theory). Students pursuing the PhD degree earn the MA degree (academic version) 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 the Law and Public Policy program.

Programs

Doctor of Philosophy
- Sociology (p. 407)
- Sociology—Advanced Entry (p. 409)

Master of Arts (MA)
- Sociology (p. 411)

Sociology, PhD

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)
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). 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, 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/irjr); and the Women’s, Gender, and Sexuality Studies Program (http://www.dac.neu.edu/womens.studies). 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 should apply directly to that program. Students admitted without a master’s degree earn the MA in sociology en route to completing their PhD requirements. 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.)

Residency Requirement
The university’s residence requirement can be satisfied by one year of full-time graduate work, or its equivalent, beyond the Master of Arts degree. If the student’s MA degree is not in sociology, a longer period of residence is typically required. Most students should expect to spend approximately two years, or the equivalent, in full-time graduate study beyond the requirements of the master’s degree.

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:

- Statistical Methods of 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 54 semester hours. Students entering with a master’s degree complete a minimum of 24 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

Requirements
Core Courses
SOCL 7200 Foundations of Social Theory 1 3
SOCL 7201 Foundations of Social Theory 2 3
SOCL 7210 Statistical Methods of Sociology 3
SOCL 7211 Research Methods 3
SOCL 7263 Social Psychology of Stratification 3

Advanced Methods
Complete 6 semester hours from the following: 6
SOCL 7212 Feminist Methodologies
SOCL 7213 Advanced Research Methods
SOCL 7215 Advanced Quantitative Techniques
or CRIM 7715 Multivariate Analysis 1
or POLS 7215 Advanced Quantitative Techniques
SOCL 7220 Seminar in Qualitative Analysis
CRIM 7316 Advanced Topics in Methods
PHTH 6320 Qualitative Methods in Health and Illness
PPUA 6215 Geographic Information Systems for Urban and Regional Policy
PPUA 6509 Techniques of Program Evaluation

Electives
Complete 33 semester hours in the following subject area: 33
SOCL

Exam and Dissertation
Exam Preparation
SOCL 8960 Exam Preparation—Doctoral
Research
SOCL 9986 Research
Dissertation
Complete the following (repeatable) course twice:
SOCL 9990 Dissertation
Dissertation Continuation
Complete the following (repeatable) course until graduation:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOCL 9996</td>
<td>Dissertation Continuation</td>
</tr>
</tbody>
</table>

Program Credit/GPA Requirements
54 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/dukasicscenter); 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/irjr); and the Women’s, Gender and Sexuality Studies Program (http://www.dac.neu.edu/womens.studies). 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.)

**Residency Requirement**

The university's residence requirement can be satisfied by one year of full-time graduate work, or its equivalent, beyond the Master of Arts degree. If the student's MA degree is not in sociology, a longer period of residence is typically required. Most students should expect to spend approximately two years, or the equivalent, in full-time graduate study beyond the requirements of the master's degree.

**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.

- Statistical Methods of 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.

A minimum of 24 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

**Requirements**

<table>
<thead>
<tr>
<th>Core Course</th>
<th>Advanced Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOCL 7263 Social Psychology of Stratification</td>
<td>3</td>
</tr>
<tr>
<td><strong>Advanced Methods</strong></td>
<td></td>
</tr>
<tr>
<td>Complete 6 semester hours from the following:</td>
<td>6</td>
</tr>
<tr>
<td>SOCL 7212 Feminist Methodologies</td>
<td></td>
</tr>
<tr>
<td>SOCL 7213 Advanced Research Methods</td>
<td></td>
</tr>
<tr>
<td>SOCL 7215 Advanced Quantitative Techniques</td>
<td></td>
</tr>
<tr>
<td>or CRIM 7715 Multivariate Analysis 1</td>
<td></td>
</tr>
<tr>
<td>or POLS 7215 Advanced Quantitative Techniques</td>
<td></td>
</tr>
<tr>
<td>SOCL 7220 Seminar in Qualitative Analysis</td>
<td></td>
</tr>
<tr>
<td>CRIM 7316 Advanced Topics in Methods</td>
<td></td>
</tr>
<tr>
<td>PHTH 6320 Qualitative Methods in Health and Illness</td>
<td></td>
</tr>
</tbody>
</table>
Electives
Complete 15 semester hours in the following subject area: 15
SOCL

Exam and Dissertation
Exam Preparation
- SOCL 8960 Exam Preparation—Doctoral

Research
- SOCL 9986 Research

Dissertation
Complete the following (repeatable) course twice:
- SOCL 9990 Dissertation

Dissertation Continuation
Complete the following (repeatable) course until graduation:
- SOCL 9996 Dissertation Continuation

Program Credit/GPA Requirements
24 total semester hours required
Minimum 3.000 GPA required

Sociology, MA

The flexible MA degree is designed to meet the needs of applicants
who seek professional training in a focused area of social research
that can be chosen from urban sociology, the sociology of the environment,
medical sociology, and several other fields. The program encourages
students to develop expertise in research design, methodological
techniques (whether quantitative or qualitative), evaluation research,
and other research skills that are essential to data analysis and decision
making in varied organizational settings. The MA program also seeks
to equip students with substantive knowledge in fields that are relevant
to consulting organizations, social policy and planning contexts, and
nonprofit organizations. Some proportion of MA students may elect to go
on to academic PhD training, though this is not the core mission of the
MA program. Thirty semester hours of academic work, completed with
a B (3.000) average or better, are required for the degree. The program
consists of four required and six elective courses.

Students are encouraged to fashion a program of study best suited
to their interests. Those who wish to pursue careers in applied social
research or policy and administrative contexts are encouraged to
emphasize methodological training. Students who may wish to pursue
academic careers may instead favor courses in substantive and
theoretical fields. All entering students should consult with the graduate
program director, who helps the student to articulate interests and
plan courses but also suggests other faculty members whose areas of
interest and competence intersect with those of the student and with
whom the student might consult on a regular basis. A student will be
assigned an advisor; students may terminate or initiate an advisor/
advisee relationship at any time simply by consulting with and informing
the parties concerned. The graduate program administrator should also
be informed of any changes.

The MA program affords students the opportunity to forge close working
relationships with the faculty. Top applicants to the MA program are
eligible for tuition scholarships from the College of Social Sciences and
Humanities. The two-year program culminates in a master’s paper and
confers a professional degree that is of immediate use in furthering the
student’s career.

Program Requirements
Complete all courses and requirements listed below unless otherwise
indicated.

Milestones
MA paper
Annual review

Tracks
Complete one of the following tracks:

ACADEMIC TRACK
Foundations
A grade of B or higher is required in each foundations course.
- SOCL 7200 Foundations of Social Theory 1 3
- SOCL 7201 Foundations of Social Theory 2 3

Research Methods
- SOCL 7211 Research Methods 3

Statistical Methods
- SOCL 7210 Statistical Methods of Sociology 3

APPLIED TRACK
Foundations
A grade of B or higher is required
- SOCL 7200 Foundations of Social Theory 1 3

Research Methods
- SOCL 7211 Research Methods 3

Statistical Methods
- SOCL 7210 Statistical Methods of Sociology 3

Additional Methods class 3

Electives
Complete 18 semester hours from the following subject area: 18
SOCL

Program Credit/GPA Requirements
30 total semester hours required
Minimum 3.000 GPA required

Interdisciplinary

Doctor of Philosophy (PhD)
- Network Science (p. 209)

Graduate Certificate
- Data Analytics (p. 106)
- Digital Humanities (p. 385)
- Women’s, Gender, and Sexuality Studies (p. 414)

Network Science, PhD

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)
Website (http://www.networkscienceinstitute.org)
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 concentration 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 Dynamical Processes in Complex Networks (PHYS 7335); one of two approved courses (Social Network Analysis or Network Data Mining); 12 semester hours of elective course work defined by their specific track; 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. The dissertation committee must be approved by the graduate program committee and constituted no later than the end of the spring semester of the first year of the program. 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 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 Course Work

<table>
<thead>
<tr>
<th>Networks</th>
<th>Research</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 6220</td>
<td>Data Mining Techniques 4</td>
</tr>
<tr>
<td>or POLS 7334</td>
<td>Social Networks</td>
</tr>
<tr>
<td>PHYS 5116</td>
<td>Complex Networks and Applications 4</td>
</tr>
<tr>
<td>PHYS 7331</td>
<td>Network Science Data 4</td>
</tr>
<tr>
<td>PHYS 7335</td>
<td>Dynamical Processes in Complex Networks 4</td>
</tr>
<tr>
<td>NETS 8984</td>
<td>Research 1-4</td>
</tr>
</tbody>
</table>

Complete the following (repeatable) course twice:
Specialization
Complete 12 semester hours of course work. Areas of specialization include:

**COMPUTER SCIENCE**
- CS 6140 Machine Learning
- CS 6220 Data Mining Techniques
- CS 6240 Large-Scale Parallel Data Processing
- CS 7800 Advanced Algorithms
- NETS 7341 Network Economics

**POLITICAL SCIENCE**
- POLS 7200 Perspectives on Social Science Inquiry
- POLS 7201 Research Design
- POLS 7202 Quantitative Techniques
- NETS 7341 Network Economics

**EPIDEMIOLOGY**
- PHTH 5202 Introduction to Epidemiology
- PHTH 5224 Social Epidemiology
- PHTH 5240 Evaluating Scientific Evidence
- NETS 7341 Network Economics

**ENGINEERING**
- EECE 7200 Linear Systems Analysis
- EECE 7204 Applied Probability and Stochastic Processes
- EECE 7323 Numerical Optimization Methods
- EECE 7374 Fundamentals of Computer Networks
- NETS 7341 Network Economics

**PHYSICS**
- PHYS 7305 Statistical Physics
- PHYS 5318 Principles of Experimental Physics
- PHYS 7321 Computational Physics
- PHYS 7731 Biological Physics 1

**MATH**
- MATH 7241 Probability 1
- MATH 7233 Graph Theory
- MATH 7375 Topics in Topology
- MATH 7733 Readings in Graph Theory
- NETS 7341 Network Economics

Program Credit/GPA Requirements
32 total semester hours required
Minimum 3.000 GPA required

Digital Humanities, Graduate Certificate
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

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.

**Requirements**

**Topics/Readings/Methods**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 7370</td>
<td>Topics in Digital Humanities (Introduction to Digital Humanities)</td>
<td>3</td>
</tr>
<tr>
<td>or HIST 7370</td>
<td>Texts, Maps, and Networks: Readings and Methods for Digital History</td>
<td></td>
</tr>
</tbody>
</table>

**Lab Project Seminar**

Complete the following (repeatable) course three times:

3 INSH 7910 NULab Project Seminar

**Electives**

Complete 6 semester hours from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARTG 5100</td>
<td>Information Design Studio 1: Principles</td>
<td></td>
</tr>
<tr>
<td>ARTG 5120</td>
<td>Information Design Research Methods</td>
<td></td>
</tr>
<tr>
<td>CS 6120</td>
<td>Natural Language Processing</td>
<td></td>
</tr>
<tr>
<td>ENGL 7370</td>
<td>Topics in Digital Humanities</td>
<td></td>
</tr>
<tr>
<td>ENGL 7990</td>
<td>Thesis (for MA students in English; requires approval by the DH certificate program director)</td>
<td></td>
</tr>
<tr>
<td>HIST 7219</td>
<td>Topics in Cultural History</td>
<td></td>
</tr>
<tr>
<td>POLS 7334</td>
<td>Social Networks</td>
<td></td>
</tr>
<tr>
<td>PPUA 5301</td>
<td>Introduction to Computational Statistics</td>
<td></td>
</tr>
<tr>
<td>PPUA 5302</td>
<td>Information Design and Visual Analytics</td>
<td></td>
</tr>
</tbody>
</table>

**Program Credit/GPA Requirements**

Minimum 12 total semester hours required
Minimum 3.000 GPA required

---

1 By petition, one course outside the electives list may count as an elective with approval from the instructor and the DH certificate program director.

**Women’s, Gender, and Sexuality Studies, Graduate Certificate**

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@neu.edu (k.samko@neu.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.

**Requirements**

**Required Course Work**

Complete one of the following: 3

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>WMNS 6100</td>
<td>Theorizing Gender and Sexuality</td>
</tr>
<tr>
<td>WMNS 7615</td>
<td>Feminist Inquiry</td>
</tr>
<tr>
<td>WMNS 7100</td>
<td>Queer Theory: Sexualities, Genders, Politics</td>
</tr>
<tr>
<td>or SOCL 7100</td>
<td>Queer Theory: Sexualities, Genders, Politics</td>
</tr>
</tbody>
</table>

**Electives**

Complete three 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.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAEP 6380</td>
<td>Seminar in Feminist Psychology</td>
</tr>
<tr>
<td>CRIM 7210</td>
<td>Gender, Crime, and Justice</td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Title</td>
</tr>
<tr>
<td>-------------</td>
<td>--------------</td>
</tr>
<tr>
<td>HIST 7290</td>
<td>Race and Gender Frontiers: U.S. Encounters with Empire</td>
</tr>
<tr>
<td>HIST 7304</td>
<td>Research Seminar in Gender and Society in the Modern World</td>
</tr>
<tr>
<td>SOCL 7202</td>
<td>Feminist Theory</td>
</tr>
<tr>
<td>SOCL 7212</td>
<td>Feminist Methodologies</td>
</tr>
<tr>
<td>SOCL 7222</td>
<td>Gender and Globalization</td>
</tr>
<tr>
<td>SOCL 7225</td>
<td>Gender and Social Movements</td>
</tr>
<tr>
<td>SOCL 7236</td>
<td></td>
</tr>
<tr>
<td>SOCL 7237</td>
<td>Women, Men, and Social Change</td>
</tr>
<tr>
<td>SOCL 7242</td>
<td></td>
</tr>
<tr>
<td>SOCL 7248</td>
<td>Race, Gender, Class: Feminist View</td>
</tr>
<tr>
<td>SOCL 7265</td>
<td>Sociology of Gender</td>
</tr>
<tr>
<td>SOCL 7273</td>
<td>Gender and Social Policy</td>
</tr>
<tr>
<td>WMNS 7635</td>
<td>Understanding the Pornographic and the Obscene</td>
</tr>
<tr>
<td>WMNS 7642</td>
<td>Gender, Race, and the Complexities of Science and Technology</td>
</tr>
<tr>
<td>WMNS 7645</td>
<td>Motherhood and Mothering: Theory, Discourse, Practice, and Change</td>
</tr>
<tr>
<td>WMNS 7900</td>
<td>Special Topics in Women’s, Gender, and Sexuality Studies</td>
</tr>
<tr>
<td>WMNS 7976</td>
<td>Directed Study</td>
</tr>
</tbody>
</table>

The following courses are required for MPH students, in addition to one elective from the list above:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHTH 5120</td>
<td>Race, Ethnicity, and Health in the United States</td>
</tr>
<tr>
<td>or PHTH 6204</td>
<td>Society, Behavior, and Health</td>
</tr>
<tr>
<td>PHTH 6910</td>
<td>Public Health Capstone</td>
</tr>
</tbody>
</table>

**Program Credit/GPA Requirements**

12 total semester hours required
Minimum 3.000 GPA required
Mehdi Abedi  
Assistant Teaching Professor, Mechanical and Industrial Engineering; Northeastern University, PhD

Kuzhikalail M. Abraham  
Research Professor, Chemistry and Chemical Biology; Tufts University, PhD

Max Abrahms  
Assistant Professor, Political Science; University of California, Los Angeles, PhD

Ali Abur  
Professor, Electrical and Computer Engineering; Ohio State University, PhD

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

Ruth Aguilera  
Professor, International Business and Strategy; Harvard University, PhD

Amal Ahmed  
Assistant Professor, Computer and Information Science; Princeton University, PhD

Sophia Ainslie  
Lecturer, Art + Design; School of the Museum of Fine Arts/Tufts University, MFA

M. Shahid 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  
Assistant 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 P. 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 N. Aljoe  
Associate Professor, English; Tufts University, 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

Neil O. Alper  
Associate Professor, Economics; University of Pittsburgh, PhD

Akram N. Alshawabkeh  
George A. Snell Professor of Engineering, Civil and Environmental Engineering; Louisiana State University, PhD

Sari Altschuler  
Visiting Assistant Professor, English; City University of New York, PhD

George O. Alverson  
Associate Professor, Physics; University of Illinois, Urbana-Champaign, PhD

Steven Amato  
Associate Teaching Professor, College of Professional Studies; Boston College, 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

Won-Hee An  
Lecturer, Music; Boston University, DMA

James S. Anderson  
Lecturer, Music; Berklee College of Music, BM

Teiichi Ando  
Professor, Mechanical and Industrial Engineering; Colorado School of Mines, PhD

Rae Andre  
Professor, Management and Organizational Development; University of Michigan, 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

Nasim Annabi
Assistant Professor, Chemical Engineering; University of Sydney (Australia), PhD

Daniel Archabal
Senior Academic Specialist, Accounting; University of Pittsburgh, MBA

Arnold Arluke
Professor, Sociology and Anthropology; New York University, 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

Susan Asai
Associate Professor, Music; University of California, Los Angeles, PhD

Lori Ashline
Assistant Teaching Professor, College of Professional Studies; Western New England University School of Law, JD

Javed A. Aslam
Professor, Computer and Information Science; Massachusetts Institute of Technology, PhD

Yernat Assylbekov
Postdoctoral Teaching Associate, Mathematics; University of Washington, PhD

Anand Asthagiri
Associate Professor, Bioengineering; Massachusetts Institute of Technology, PhD

Nicholas Athanassiou
Associate Professor, International Business and Strategy; University of South Carolina, PhD

Polly Attwood
Associate Teaching Professor, Education; Harvard University, EdD

John Auerbach
Professor of the Practice, Institute on Urban Health Research; Boston University, MBA

Debra Augustine
Professor, Chemical Engineering; Princeton University, PhD

Earlene Avalon
Assistant Teaching Professor, College of Professional Studies; Simmons College, PhD

Cheryl Avitabile
Assistant Clinical Professor, Nursing; Massachusetts General Hospital Institute of Health Professions, DNP

Joseph L. Ayers
Professor, Marine and Environmental Sciences; University of California, Santa Cruz, PhD

Kenneth P. Baclawski
Associate Professor, Computer and Information Science; Harvard University, PhD

Sophie Bacq
Assistant Professor, Entrepreneurship and Innovation; Louvain School of Management (Belgium), PhD

Robert Baginski
Assistant Clinical Professor, Physician Assistant Program; University of Connecticut, DSc

Rekha Bai
Lecturer, Mathematics; University of Iowa, PhD

Moya Bailey
Assistant Professor, English; Emory University, PhD

Richard H. Bailey
Professor, Marine and Environmental Sciences; University of North Carolina, Chapel Hill, PhD

Wendy Bailey
Associate Professor, Accounting; University of Pittsburgh, PhD

Carolyn Bair
Assistant Teaching Professor, College of Professional Studies; Loyola University, Chicago, PhD

Ambika Bajpayee
Assistant Professor, Bioengineering; Massachusetts Institute of Technology, PhD

Allison Baker
Lecturer, Psychology; Northeastern University, PhD

Julie Baker
Associate Teaching Professor, English; Southern New Hampshire University, MFA

Apostolia Baki
Research Assistant Professor, Pharmaceutical Sciences; University of Athens (Greece), PhD

Charles Bame-Aldred
Associate Academic Specialist, Accounting; University of Massachusetts, Amherst, 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
Faculty

Albert-Laszlo Barabasi
Robert Gray Dodge Professor of Network Science and University
Distinguished Professor, Computer and Information Science and Physics;
Boston University, PhD

Amy Barber
Postdoctoral Teaching Associate, Communication Studies; University of
Wisconsin, Madison, PhD

Emanuela Barberis
Associate Professor, Physics; University of California, Santa Cruz, PhD

G. Elise Barboza
Assistant Professor, African-American Studies and Criminology and
Criminal Justice; Michigan State University, PhD

Gloria Barczak
Professor, Marketing; Syracuse University, PhD

Jay Bardhan
Assistant Professor, Mechanical and Industrial Engineering;
Massachusetts Institute of Technology, PhD

Cynthia L. Baron
Associate Academic Specialist, College of Professional Studies;
Northeastern University, MBA

Amilcar A. Barreto Jr.
Associate Professor, Political Science; State University of New York,
Buffalo, PhD

Yakov Bart
Assistant Professor, Marketing; University of California, Berkeley, PhD

Stefano Basagni
Associate Professor, Electrical and Computer Engineering; University of
Texas, Dallas, PhD

Marla Baskerville
Assistant Professor, Management and Organizational Development;
Tulane University, PhD

John Basl
Assistant Professor, Philosophy and Religion; University of Wisconsin,
Madison, PhD

Maureen Basmajian
Associate Cooperative Education Coordinator, D’Amore-McKim School of
Business; Boston College, MBA

Linnea M. Basu
Assistant 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, MS

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

Kerri Beiswenger
Associate Cooperative Education Coordinator, College of Engineering;
Northeastern University, MBA

Bianca T. Belcher
Assistant Clinical Professor, Physician Assistant Program; Northeastern
University, MS

Leo Beletsy
Assistant Professor, Health Sciences and Law; Temple University, JD

Carole Bell
Assistant Professor, Communication Studies; University of North
Carolina, Chapel Hill, PhD

Chiara Bellini
Assistant Professor, Bioengineering; University of Calgary (Canada), PhD

Sidi Bencherif
Assistant Professor, Chemical Engineering; Carnegie Mellon University,
PhD

Jonathan Benda
Lecturer, English; Syracuse University, PhD

Elizabeth Bennett
Associate Teaching Professor, Education; 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

Kostia Bergman
Associate Professor, Biology; California Institute of Technology, 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

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 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  

Ricardo Binetti  
Assistant Academic Specialist, World Languages Center; University of Massachusetts, Amherst, MA  

Allan Bird  
Brodsky Trustee Professor of Global Business, International Business and Strategy; University of Oregon, PhD  

Donna M. Bishop  
Professor, Criminology and Criminal Justice; State University of New York, Albany, PhD  

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, Bouvé College of Health Sciences; Massachusetts College of Pharmacy, MS  

Martin H. Blatt  
Professor of the Practice, History; Boston University, PhD  

Francis C. Blessington  
Professor, English; Brown University, PhD  

Cameron Blevis  
Assistant Professor, History; Stanford University, PhD  

Aaron S. Block  
Assistant Teaching Professor, English; Emerson College, MFA  

Barry Bluestone  
Russell B. and André B. Stearns Trustee Professor of Political Economy, Public Policy and Urban Affairs; University of Michigan, PhD  

Linda M. 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 M. Boeckeler  
Assistant Professor, English; Harvard University, PhD  

Charles Bognanni  
Senior Cooperative Education Coordinator, D’Amore-McKim School of Business; Northeastern University, MED  

Norman R. Boisse  
Associate Professor, Pharmaceutical Sciences; Cornell University, PhD  

Paul J. Bolster  
Professor, Finance; Virginia Polytechnic Institute, PhD  

Alice Bonner  
Associate Professor, Nursing; University of Massachusetts, Worcester, 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  

Michelle Borkin  
Assistant Professor, Computer and Information Science; Harvard University, PhD  

Natalie Bormann  
Associate 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 J. 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 L. Bourmain  
Associate Academic Specialist, World Languages Center; Western Maryland College, MS  

Stacey Bourns  
Professor, College of Social Sciences and Humanities; University of Texas, Austin, PhD  

Carla Bouwmeester  
Associate Clinical Professor, Pharmacy and Health Systems Sciences; Massachusetts College of Pharmacy, PharmD  

Jennifer Bowen  
Associate Professor, Marine and Environmental Sciences; Boston University, PhD  

James Boyer  
Assistant Academic Specialist, Accounting; Northeastern University, MBA  

Nicole M. Boyson  
Associate Professor and William Conley Faculty Fellow, Finance; Ohio State University, PhD  

Kara Braciale  
Lecturer, Art + Design; University of Illinois, Chicago, MFA  

Anthony Braga  
Distinguished Professor, School of Criminology and Criminal Justice; Rutgers University, PhD
Maxim Braverman  
Professor, Mathematics; Tel Aviv University (Israel), PhD

Heather 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 C. Britt  
Associate Professor, English; Rensselaer Polytechnic Institute, PhD

Sharon M. Britton  
Assistant Cooperative Education Coordinator, College of Engineering; Massachusetts Institute of Technology, MS

Bonnie Brock  
Associate Cooperative Education Coordinator, D’Amore-McKim School of Business; University of Vermont, MEd

Oscar T. 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

Michael E. Brown  
Professor, Sociology and Anthropology; University of Michigan, JD, PhD

Philip M. Brown  
Professor, Sociology and Anthropology and Health Sciences; Brandeis University, PhD

Ronald Brown  
Assistant Teaching Professor, College of Professional Studies; Harvard University, EdD

Timothy S. Brown  
Professor, History; University of California, Berkeley, PhD

Todd A. Brown  
Clinical Instructor, Pharmacy and Health Systems Sciences; Northeastern University, MHP

Corliss Brown-Thompson  
Assistant Teaching Professor, College of Professional Studies; University of North Carolina, Chapel Hill, PhD

Maria Brucato  
Associate Academic Specialist, World Languages Center; University of Texas, PhD

Elizabeth M. Bucar  
Associate Professor, Philosophy and Religion; University of Chicago, PhD

David E. Budil  
Associate Professor, Chemistry and Chemical Biology; University of Chicago, PhD

Mindelyn Buford II  
Assistant Professor, Sociology and Anthropology; Johns Hopkins University, 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, Languages, Literatures, and Cultures; University of Buffalo, PhD

Jeremy P. Bushnell  
Assistant Teaching Professor, English; University of Arizona, Tucson, MFA

Ahmed A. Busnaina  
William Lincoln Smith Professor of Mechanical Engineering, Mechanical and Industrial Engineering; Oklahoma State University, PhD

Michael Butera  
Clinical Instructor, Nursing; Northeastern University, 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 Campagnoni  
Assistant Cooperative Education Coordinator, College of Science; Northeastern University, MA

Octavia Camps  
Professor, Electrical and Computer Engineering; University of Washington, PhD

Clinton Canal  
Research Assistant Professor, Pharmaceutical Sciences; University of Illinois, 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

Alessandro Canossa  
Associate Professor, Game Design; Royal Danish Academy of Fine Arts (Netherlands), PhD
Mira Cantor  
Professor, Art + Design; University of Illinois, Urbana-Champaign, MFA

Michele Cao-Danh  
Associate Academic Specialist, World Languages Center; Boston University, PhD

Luca Caracoglia  
Associate Professor, Civil and Environmental Engineering; University of Trieste (Italy), PhD

Benjamin Caras  
Lecturer, Art + Design; University of Massachusetts, Amherst, MFA

Amy M. Carleton  
Visiting Lecturer, English; Northeastern University, PhD

Joelle Carlo  
Assistant Teaching Professor, Pharmaceutical Sciences; State University of New York, Buffalo, PhD

Alexa A. Carlson  
Assistant 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  
Assistant Cooperative Education Coordinator, College of Engineering; Northeastern University, MS

Jonathan Carr  
Assistant Teaching Professor, Theatre; Columbia University, MFA

Michelle Carr  
Lecturer, Communication Studies; Kingston University (United Kingdom), MA

Rebecca L. Carrier  
Associate Professor, Chemical Engineering; Massachusetts Institute of Technology, PhD

Patricia Case  
Assistant Teaching Professor, Health Sciences; Harvard University, ScD

Ana-Maria Castravet  
Associate Professor, Mathematics; Massachusetts Institute of Technology, PhD

Smajl Cenjic  
Assistant Cooperative Education Coordinator, Computer and Information Science; Cambridge College, MA

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

Srinath Chakravarthy  
Assistant Professor, Mechanical and Industrial Engineering; University of Connecticut, PhD

Christopher Chambers  
Lecturer, Sociology and Anthropology; Texas AM University, PhD

Paul M. Champion  
Professor, Physics; University of Illinois, Urbana-Champaign, PhD

Chee Chan  
Assistant Academic Specialist, Marketing; Michigan State University, PhD

Robin M. Chandler  
Associate Professor, African-American Studies; Northeastern University, PhD

Suzanne Charles  
Assistant Professor, Architecture; Harvard University, PhD

Yi-Da Chen  
Assistant Professor, Supply Chain and Information Management; University of Arizona, PhD

Esther Chewning  
Associate Cooperative Education Coordinator, D’Amore-McKim School of Business; Suffolk University, MS

Elizabeth A. Chilvers  
Associate Professor, Cooperative Education, D’Amore-McKim School of Business; Northeastern University, MEd

W. Paul Chiu  
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

Chun-An Chou  
Assistant Professor, Mechanical and Industrial Engineering; Rutgers University, PhD

Kauwik Roy Chowdhury  
Associate Professor, Electrical and Computer Engineering; University of Cincinnati, MS

Ken Chung  
Assistant Teaching Professor, Chemistry and Chemical Biology; Michigan State University, PhD

Hillary Chute  
Professor, English; Rutgers University, PhD

John W. Cipolla Jr.  
Donald W. Smith Professor of Mechanical Engineering and College of Engineering Distinguished Professor, Mechanical and Industrial Engineering; Brown 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, Pharmaceutical Sciences; University of Michigan, PhD

Sean Clark
Postdoctoral Teaching Associate, 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

Irina Cojuharenco
Assistant Teaching Professor, Management and Organizational Development; Universitat Pompeu Fabra (Spain), PhD

Dennis R. Cokely
Professor, American Sign Language and Languages, Literatures, and Cultures and World Languages Center; Georgetown University, PhD

Maxine Cokely
Associate Academic Specialist, College of Professional Studies; Bowie State University, MEd

Stephanie Colby
Assistant Teaching Professor, College of Professional Studies; Eastern University, PhD

John D. Coley
Associate Professor, Psychology; University of Michigan, PhD

C. Randall Colvin
Associate Professor, Psychology; University of Illinois, Urbana-Champaign, PhD

Sally Conant
Assistant Cooperative Education Coordinator, College of Engineering; Salve Regina University, MA

Michelle Conceison
Assistant Teaching Professor, Music; Simmons College, MBA

Michael Conley
Assistant Clinical Professor, Pharmacy and Health Systems Sciences; Northeastern University, PharmD

Richard C. Conley
Assistant Cooperative Education Coordinator, College of Social Sciences and Humanities; Boston University, JD

Kelly Conn
Assistant Teaching Professor, College of Professional Studies; Boston University, PhD

Carol Connolly
Clinical Instructor, Nursing; Northeastern University, MS

Gregory Connolly
Research Professor, Law and Health Sciences; Tufts University, PhD

James J. Connolly
Assistant Professor, Public Policy and Urban Affairs and Political Science; Columbia University, PhD

Adam Cooper
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

Debra Copeland
Associate Clinical Professor, Pharmacy and Health Systems Sciences; University of Rhode Island, PharmD

Ryan C. Cordell
Assistant Professor, English; University of Virginia, PhD

Marie B. Corkery
Associate Clinical Professor, Physical Therapy, Movement, and Rehabilitation Sciences; Northeastern University, DPT

Felipe Cortes
Assistant Professor, Finance; Washington University, St. Louis, PhD

Kristen Costa
Assistant Teaching Professor, College of Professional Studies; Northeastern University, EdD

Hugh G. Courtney
Professor, International Business and Strategy; Massachusetts Institute of Technology, PhD

Arthur J. Courey
Professor, Chemical Engineering; University of Minnesota, PhD

Erin Cram
Associate Professor, Biology; University of California, Berkeley, PhD

Frederick Crane
Senior Academic Specialist, Entrepreneurship and Innovation; Bradford University, 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
Mai’a K. D. Cross
Associate Professor, Political Science; Princeton University, PhD

Christina Crowe
Lecturer, Psychology; Boston College, PhD

Jessica Crowley
Assistant Cooperative Education Coordinator, D’Amore-McKim School of Business; Boston College, MA

Alvaro Cuervo-Cazurra
Professor and Robert Morrison Fellow, International Business and Strategy; Massachusetts Institute of Technology, PhD

Carlos A. Cuevas
Associate Professor, Criminology and Criminal Justice; Alliant International University, PhD

Thomas P. Cullinane
Professor, Mechanical and Industrial Engineering; Virginia Polytechnic Institute and State University, PhD

Kamran M. 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 D. 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

Frederick C. Davis
Professor, Biology; University of Texas, Austin, PhD

Michael Davis
Postdoctoral Teaching Associate, Communication Studies; University of Tennessee, PhD

Theo Davis
Associate Professor, English; Johns Hopkins University, PhD

Leslie Day
Assistant Clinical Professor, Physical Therapy, Movement, and Rehabilitation Sciences; Northeastern University, PhD

Anthony P. De Ritis
Professor, Music and Entrepreneurship and Innovation; University of California, Berkeley, PhD

Adenekan (Nick) Dedeke
Lecturer, Supply Chain and Information Management; Technische Universität Kaiserslautern (Germany), PhD

Plinio DeGoes
Assistant Academic Specialist, College of Professional Studies; Northwood University, MA

Mohammad Dehghaninomhammadabadi
Assistant Teaching Professor, Mechanical and Industrial Engineering; Western New England University, PhD

Richard DeJordy
Assistant Professor, Management and Organizational Development; Boston College, PhD

Candice Delams
Assistant Professor, Political Science and Philosophy; Boston University, PhD

John Dencker
Associate Professor, Management and Organizational Development; Harvard University, PhD

Jack Dennerlein
Professor, Physical Therapy, Movement, and Rehabilitation Sciences; University of California, PhD

Jacob Depue
Postdoctoral Teaching Associate, Communication Studies; University of Minnesota, PhD

Leila Deravi
Assistant Professor, Chemistry and Chemical Biology; Vanderbilt University, 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

Sebastian Deterding
Assistant Professor, Game Design; Hamburg University (Germany), PhD

H. William Detrich
Professor, Marine and Environmental Sciences; Yale University, PhD

John W. Devlin
Professor, Pharmacy and Health Systems Sciences; University of Toronto (Canada), PharmD

Janet Dewan
Assistant Clinical Professor, Nursing; Northeastern University, PhD

Jacqueline Diani
Senior Cooperative Education Coordinator, Bouvé College of Health Sciences; University of Virginia, MEd

Martin Dias
Assistant Professor, Supply Chain and Information Management; Bentley University, PhD

William T. Dickens
University Distinguished Professor, Economics and Public Policy and Urban Affairs; Massachusetts Institute of Technology, PhD
Faculty

Alessandra DiCredico
Lecturer, Physics; University of Rome (Italy), PhD

Max Diem
Professor, Chemistry and Chemical Biology; University of Toledo, PhD

Elizabeth Maddock Dillon
Professor, English; University of California, Berkeley, PhD

Charles DiMarzio
Associate Professor, Electrical and Computer Engineering; Northeastern University, PhD

Paul DiMilla
Associate Teaching Professor, Chemistry and Chemical Biology and Chemical Engineering; University of Pennsylvania, PhD

Edward Dinan
Lecturer, Accounting; Harvard University, MS

Aidong Adam Ding
Associate Professor, Mathematics; Cornell University, PhD

Kathleen B. Dioli
Assistant 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 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

Lisa Cantwell Doherty
Assistant 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

Brenda Douglas
Associate Clinical Professor, Nursing; Northeastern University, PhD

Mark Douglass
Associate Clinical Professor, Pharmacy and Health Systems Sciences; University of Michigan, PharmD

Kevin M. Drakulich
Assistant Professor, Criminology and Criminal Justice; University of Washington, PhD

Laura Dudley
Clinical Instructor, Applied Psychology; Northeastern University, MS

Molly Dugan
Assistant Teaching Professor, College of Professional Studies; Boston College, PhD

Michael S. Dukakis
Distinguished Professor, Political Science; Harvard University, JD

Daniel M. Dulaski
Associate Teaching Professor, Civil and Environmental Engineering; University of Massachusetts, Amherst, PhD

Catherine Dunand
Assistant Academic Specialist, World Languages Center; Boston University, MA

Joanne Dupuis
Assistant Clinical Professor, Nursing; Massachusetts School of Law, JD

Douglas F. Durant
Lecturer, Music; Brandeis University, PhD

Kathleen Durant
Lecturer, Computer and Information Science; Harvard University, PhD

Jennifer G. Dy
Associate Professor, Electrical and Computer Engineering; Purdue University, PhD

Lauren D’Abrosca
Assistant Cooperative Education Coordinator, Finance; Boston University, MEd

Philip Anthony D’Agati
Associate Teaching Professor, Political Science; Northeastern University, MA

Eno Ebong
Assistant Professor, Chemical Engineering; Rensselaer Polytechnic Institute, 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 E. Edwards
Associate Teaching Professor, English; Emerson College, MFA

Jessica Edwards George
Associate Clinical Professor, Applied Psychology; Northeastern University, PhD

Christopher Egan
Assistant Cooperative Education Coordinator, College of Science; Boston University, MA

Jean F. Egan
Associate Cooperative Education Coordinator, College of Social Sciences and Humanities; Northeastern University, MEd

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

Simone Elias  
Assistant Academic Specialist, World Languages Center; Harvard University, MA

Tina Eliassi-Rad  
Associate Professor, Computer and Information Science; University of Wisconsin, Madison, 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 Engen  
Professor, Chemistry and Chemical Biology and Barnett Institute; University of Nebraska, Lincoln, PhD

Christen Enos  
Lecturer, English; Emerson College, MFA

Slava S. Epstein  
Professor, Biology; Moscow State University (Russia), PhD

Randall Erb  
Assistant Professor, Mechanical and Industrial Engineering; Duke University, PhD

Deniz Erdogmus  
Associate Professor, Electrical and Computer Engineering; University of Florida, PhD

Awatef Ergai  
Assistant Teaching Professor, Mechanical and Industrial Engineering; Clemson University, 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 Ertan  
Assistant Professor, Economics and International Affairs; University of Massachusetts, Amherst, PhD

Rhea T. Eskew  
Professor, Psychology; Georgia Institute of Technology, PhD

Jonathan Esole  
Assistant Professor, Mathematics; Leiden University (Netherlands), PhD

Neenah Estrella-Luna  
Associate Teaching Professor, College of Professional Studies; Northeastern University, PhD

Sara Ewell  
Associate Teaching Professor, College of Professional Studies; University of North Carolina, Chapel Hill, PhD

Daniel R. Faber  
Professor, Sociology and Anthropology; University of California, Santa Cruz, PhD

Olubunmi Faleye  
Professor, Trahan Family Faculty Fellow, and Walsh Research Professor, 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 University, PhD

David Fannon  
Assistant Professor, Architecture and Civil and Environmental Engineering; University of California, Berkeley, MS Arch

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 S. Farrell  
Associate Professor, Criminology and Criminal Justice; Northeastern University, PhD

Christopher Featherman  
Assistant Teaching Professor, English; University of Washington, PhD

Mary Federico  
Assistant Cooperative Education Coordinator, College of Engineering; Indiana University, MS

Yunsi Fei  
Associate Professor, Electrical and Computer Engineering; Princeton University, PhD

Adrian Feiguin  
Assistant Professor, Physics; Universidad Nacional de Rosario (Argentina), PhD

Daniel Feinberg  
Assistant Clinical Instructor, Computer and Information Science and Health Sciences; Boston University, MBA

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 Neranga Fernando  
Lecturer, University of South Florida, 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  
Assistant Teaching Professor, English; 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, Law and Public Policy and Public Policy and Urban Affairs; Pennsylvania State University, PhD

John E. Fitzmaurice  
Assistant Cooperative Education Coordinator, College of Engineering; College of William and Mary, MBA

Diane F. Fitzpatrick  
Associate Clinical Professor, Physical Therapy, Movement, and Rehabilitation Sciences; Northeastern University, DPT

Julia H. Flanders  
Professor of the Practice, English and University Libraries; Brown University, PhD

Peggy L. Fletcher  
Lecturer, Finance; University of Pittsburgh, MBA

Ann Marie Flores  
Assistant Professor, Physical Therapy, Movement, and Rehabilitation Sciences; Ohio State University, PhD

Marcial Flores  
Assistant Academic Specialist, World Languages Center; Boston College, MA

Eric Folmar  
Assistant Clinical Professor, Physical Therapy, Movement, and Rehabilitation Sciences; Northeastern University, DPT

Paul Fombelle  
Associate Professor, 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  
Associate Professor, Journalism; Columbia University, MS

William M. Fowler Jr.  
Distinguished Professor, History; University of Notre Dame, PhD

James Alan Fox  
Lipman Family Professor, Criminology and Criminal Justice and Law and Public Policy; University of Pennsylvania, PhD

Laura L. Frader  
Professor, History; University of Rochester, PhD

Debra L. Franko  
Professor, Applied Psychology; McGill University (Canada), 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  
Associate Professor, Criminology and Criminal Justice; City University of New York, PhD

Yun (Raymond) Fu  
Assistant Professor, Electrical and Computer Engineering and Computer and Information Science; University of Illinois, Urbana-Champaign, 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

Terence J. Gaffney  
Professor, Mathematics; Brandeis University, PhD
Timothy Gagnon  
Associate Academic Specialist, Accounting; Sacred Heart University, MBA

Ronen Gal-Or  
Assistant Professor, Accounting; University of Arizona, PhD

Chris W. Gallagher  
Professor, English; University of New York, Albany, PhD

Susan Gallagher  
Clinical Instructor, Nursing; Massachusetts General Hospital Institute of Health Professions, MS

Auroop Ganguly  
Associate Professor, Civil and Environmental Engineering; Massachusetts Institute of Technology, PhD

Denise Garcia  
Associate Professor, Political Science and International Affairs; University of Geneva (Switzerland), PhD

Lori Gardinier  
Associate Teaching Professor, Human Services; Northeastern University, PhD

Karen Garneau  
Associate Teaching Professor, English; Northeastern University, PhD

Samuel John Gatley  
Professor, Pharmaceutical Sciences; University of Newcastle upon Tyne (United Kingdom), PhD

Nicole Georgallas  
Lecturer, Communication Studies; Emerson College, MA

Prasanth George  
Assistant Teaching Professor, Mathematics; State University of New York, Buffalo, PhD

Carleton Gholz  
Postdoctoral Teaching Associate, Communication Studies; University of Pittsburgh, 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

Richard Gilbert  
Research Professor, Chemistry and Chemical Biology; New Jersey Medical School, PhD

Thomas R. Gilbert  
Associate Professor, Chemistry and Chemical Biology; Massachusetts Institute of Technology, PhD

Laurence Ginsberg  
Assistant Academic Specialist, Accounting; Bentley University, MST

Leonard J. Glick  
Senior Academic Specialist, Management and Organizational Development; Harvard University, EdD

Veronica Godoy-Carter  
Associate Professor, Biology; Tufts University, PhD

Michael Bradford Goetz  
Assistant Teaching Professor, Architecture; University of Pennsylvania, MLA

Kevin Gold  
Lecturer, Computer and Information Science; Yale University, PhD

Natalia Gold  
Assistant Teaching Professor, International Business and Strategy; Saint Petersburg State University of Engineering (Russia), PhD

Susan Gold  
Professor of the Practice, Game Design; Visual Studies Workshop, MS

Donald Goldthwaite  
Assistant Teaching Professor, Engineering; Northeastern University, MS

Ann C. Golub-Victor  
Associate 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 R. Gonso  
Associate Teaching Professor, English; Emerson College, MFA

Michael J. Gonyeau  
Clinical Professor, Pharmacy and Health Systems Sciences; Albany College of Pharmacy, PharmD

Gregory Goodale  
Associate Professor, Communication Studies; University of Illinois, Urbana-Champaign, PhD

Pamela W. Goode  
Senior Cooperative Education Coordinator, College of Arts, Media and Design; Boston College, MA

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  
Assistant Professor, Health Sciences and Health Informatics; University of Rhode Island, PhD

Mark Gooley  
Lecturer, Finance; Northwestern University, MM

Margaret Gorman Kirchoff  
Assistant Teaching Professor, College of Professional Studies; George Washington University, EdD

Gary Goshgarian  
Professor, English; University of Wisconsin, Madison, PhD

Tarik 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

Eugene H. Gover  
Associate Professor, Mathematics; Brandeis University, PhD

Jonathan H. Grabowski  
Associate Professor, Marine and Environmental Sciences; University of North Carolina, Chapel Hill, PhD

Susan Gracia  
Assistant Teaching Professor, College of Professional Studies; Boston College, PhD

Matthew Gray  
Assistant Professor, Theatre; London Academy of Music and Dramatic Arts (United Kingdom), MFA

Laura Green  
Professor, English; University of California, Berkeley, PhD

Jack R. Greene  
Professor, Criminology and Criminal Justice; Michigan State University, PhD

Kristin Curry Greenwood  
Associate Clinical Professor, Physical Therapy, Movement, and Rehabilitation Sciences; Northeastern University, DPT

Daniel S. Gregory  
Senior Academic Specialist, Entrepreneurship and Innovation and Art + Design; Harvard University, MBA

Sara Grier  
Assistant Cooperative Education Coordinator, College of Engineering; Northeastern University, MS

Brent Griffin  
Assistant Teaching Professor, CPS International Programs; Northeastern University, PhD

Jacqueline Griffin  
Assistant Professor, Mechanical and Industrial Engineering; Georgia Institute of Technology, PhD

Joseph Griffin  
Associate Teaching Professor, Project Management; Gordon-Conwell Theological Seminary, South Hamilton, DMin

John Griffith  
Clinical Professor, Applied Psychology; Boston University, PhD

Amir Grinstein  
Associate Professor, Marketing; Hebrew University of Jerusalem (Israel), PhD

Francesca Grippa  
Associate Teaching Professor, College of Professional Studies; University of Salento (Italy), PhD

Craig Gruber  
Assistant Teaching Professor, College of Professional Studies; Clark University, PhD

April Gu  
Associate Professor, Civil and Environmental Engineering; University of Washington, PhD

Tiantian Gu  
Assistant Professor, Finance; University of Wisconsin, Madison, PhD

Jason Guo  
Associate Research Professor, Pharmaceutical Sciences; University of Connecticut, Storrs, PhD

Surendra M. Gupta  
Professor, Mechanical and Industrial Engineering; Purdue University, PhD

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

Jerome F. Hajjar  
Professor, Civil and Environmental Engineering; Cornell University, PhD

Judith A. Hall  
University Distinguished Professor, Psychology; Harvard University, PhD

Robert L. Hall  
Associate Professor, African-American Studies and History; Florida State University, PhD

James Halverson  
Assistant Professor, Physics; University of Pennsylvania, PhD

Pauline Hamel  
Associate Clinical Professor, Health Sciences; Boston University, EdD

Scott R. Hamilton  
Associate Cooperative Education Coordinator, College of Engineering; Stanford University, PhD

William S. Hancock  
Raymond and Claire Bradstreet Chair, Chemistry and Chemical Biology; University of Adelaide (Australia), PhD

Michael J. Handel  
Associate Professor, Sociology and Anthropology; Harvard University, PhD

Nancy Hanrahan  
Professor, Nursing; Boston College, PhD

Bonnie Jo Hanson  
Assistant Clinical Professor, Physician Assistant Program; University of New England, MS

Robert N. Hanson  
Matthews Distinguished University Professor, Chemistry and Chemical Biology; University of California, Berkeley, PhD
Stephen G. Harkins  
Professor, Psychology; University of Missouri, PhD

Sharon Harlan  
Professor, Health Sciences; Cornell University, PhD

Kelly Harrington  
Assistant Cooperative Education Coordinator, D’Amore-McKim School of Business; Suffolk University, MBA

Shaunna Harrington  
Associate Academic Specialist, College of Professional Studies; Boston University, MAT

Vincent Harris  
William Lincoln Smith Professor of Electrical and Computer Engineering, Electrical and Computer Engineering; Northeastern University, PhD

Vanecia Harrison-Sanders  
Associate Cooperative Education Coordinator, Bouvé College of Health Sciences and College of Science; Emmanuel College, MA

Casper Harteveld  
Assistant Professor, Game Design; Delft University of Technology (Netherlands), PhD

Christopher Hasson  
Assistant Professor, Physical Therapy, Movement, and Rehabilitation Sciences; University of Massachusetts, Amherst, PhD

Bradley Hatfield  
Assistant Teaching Professor, Music; Cambridge College, MM

Stephanie Hattoty  
Assistant Clinical Professor, Pharmacy and Health Systems Sciences; University of Rhode Island, PharmD

Heather Hauck  
Associate Cooperative Education Coordinator, D’Amore-McKim School of Business; Northeastern University, MS

Thomas Havens  
Professor, History; University of California, Berkeley, PhD

Lorna Hayward  
Associate Professor, Physical Therapy, Movement, and Rehabilitation Sciences; Boston University, EdD

Ni He  
Associate Professor, Criminology and Criminal Justice; University of Nebraska, Omaha, PhD

Julia Hechtman  
Lecturer, Art + Design; University of Illinois, Chicago, MFA

Inez Hedges  
Professor, Languages, Literatures, and Cultures; University of Wisconsin, Madison, PhD

Gretchen A. Heefner  
Assistant Professor, History; Yale University, PhD

Donald E. Heiman  
Professor, Physics; University of California, Irvine, PhD

Ferdinand L. Hellweger  
Associate Professor, Civil and Environmental Engineering; Columbia University, EngScD

Brian Helmuth  
Professor, Marine and Environmental Sciences and Public Policy and Urban Affairs; University of Washington, PhD

Carlene Hempel  
Assistant Teaching Professor, Journalism; University of North Carolina, Chapel Hill, MA

Dale Herbeck  
Professor, Communication Studies; University of Iowa, PhD

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

Julie Hertenstein  
Associate Professor, Accounting; Harvard University, DBA

Joshua Hertz  
Assistant Teaching Professor, Engineering; Massachusetts Institute of Technology, 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

Malcolm D. Hill  
Associate Professor, Marine and Environmental Sciences; University of California, Santa Cruz, PhD

Charles Hillman  
Professor, Psychology and Health Sciences; University of Maryland, College Park, PhD

Elizabeth Hirsch  
Assistant Professor, Pharmacy and Health Systems Sciences; Creighton University, PharmD

Leslie Hitch  
Associate Teaching Professor, College of Professional Studies; University of Massachusetts, Boston, EdD

Hubert Ho  
Lecturer, Music; University of California, Berkeley, PhD

Marie Odile Hobbeika  
Postdoctoral Teaching Associate, Communication Studies; University of Pittsburgh, PhD

Lynda Hodgson  
Assistant Teaching Professor, College of Professional Studies; Virginia Commonwealth University, PhD

Timothy J. Hoff  
Associate Professor, Management and Organizational Development and Public Policy and Urban Affairs; Rockefeller College, PhD
Jessica Hoffman
Associate Professor, Applied Psychology; Lehigh University, PhD

Udi Hoitash
Associate Professor and Denise and Robert DiCenso Term Fellow, Accounting; Rutgers University, PhD

Trenton Honda
Assistant Clinical Professor, Physician Assistant Program; Saint Francis University, MS

Michael J. Hoppmann
Assistant Teaching Professor, Communication Studies; University of Tübingen (Germany), PhD

Elizabeth M. Howard
Associate Professor, Nursing; Boston College, PhD

Jeffrey P. Howe
Assistant Professor, Journalism; Boston University, MFA

Hanchen Huang
Professor, Mechanical and Industrial Engineering; University of California, Los Angeles, PhD

Ian Hudson
Assistant Teaching Professor, College of Professional Studies; Nova Southeastern University, PhD

Anne Randall Hughes
Assistant Professor, Marine and Environmental Sciences; University of California, Davis, PhD

Katlyn Hughes
Assistant Cooperative Education Coordinator, Computer and Information Science; Northeastern University, Certificate of Advanced Study

Francisco Hung
Associate Professor, Chemical Engineering; North Carolina State University, PhD

Matthew O. Hunt
Professor, Sociology and Anthropology; Indiana University, PhD

Mark Huselid
Distinguished Professor of Workforce Analytics, International Business and Strategy; State University of New York, Buffalo, PhD

J. Benjamin Hutchinson
Assistant Professor, Psychology; Stanford University, PhD

Roxana Iacob
Research Assistant Professor, Barnett Institute; Konstanz University (Germany), PhD

Anthony Iarrobino
Professor, Mathematics; Massachusetts Institute of Technology, PhD

Patricia M. L. Illicitworth
Professor, Philosophy and Religion; University of California, San Diego, PhD; Boston University, JD

Vinay K. Ingle
Associate Professor, Electrical and Computer Engineering; Rensselaer Polytechnic Institute, PhD

Rei Okamoto Inouye
Associate Academic Specialist, World Languages Center; Temple University, PhD

Stephen S. Intille
Associate Professor, Computer and Information Science and Health Sciences; Massachusetts Institute of Technology, PhD

Efstratis Ioannidis
Assistant Professor, Electrical and Computer Engineering; University of Toronto (Canada), PhD

Roderick L. Ireland
Distinguished Professor, Criminology and Criminal Justice; Harvard University, LLM; Northeastern University, PhD

Derek 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 Israeloff
Associate Professor, Physics; University of Illinois, Urbana-Champaign, PhD

Alexander Ivanov
Research Associate Professor, Barnett Institute; 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, English; Stanford University, MFA

Jason Jackson
Future Faculty Fellow, Political Science; Massachusetts Institute of Technology, PhD

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
Joshua R. Jacobson
Professor, Music; University of Cincinnati, DMA

Beverly Jaeger
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

Bogume Jang
Lecturer, Mathematics; Purdue University, PhD

Leon C. Janikian
Associate Professor, Music; University of Massachusetts, Amherst, MM

Torbjorn Jarbe
Research Professor, Pharmaceutical Sciences; University of Uppsala (Sweden), 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 S. Jimenez
Associate Professor, Political Science; University of Illinois, Chicago, PhD

Holly Jimison
Professor of the Practice, Nursing and Computer and Information Science; Stanford University, PhD

Xiaoning Jin
Assistant Professor, Mechanical and Industrial Engineering; University of Michigan, PhD

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

Vanessa D. Johnson
Associate Professor, Applied Psychology; Western Michigan University, EdD

Kimberly L. Jones
Associate Teaching Professor, International Affairs; Northeastern University, PhD

Rachel Jones
Associate Professor, Nursing; New York University, PhD

T. Anthony Jones
Associate Professor, Sociology and Anthropology; Princeton University, PhD

Dierdre Jordan
Associate Cooperative Education Coordinator, Bouvé College of Health Sciences; Northeastern University, MS

Yung Joon Jung
Associate Professor, Mechanical and Industrial Engineering; Rensselaer Polytechnic Institute, PhD

Jeffrey S. Juris
Associate Professor, Sociology and Anthropology; University of California, Berkeley, PhD

David R. Kaeli
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
Associate 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

Carla Kaplan
Davis Distinguished Professor of American Literature, English and Women’s, Gender, and Sexuality Studies; Northwestern University, PhD

Swastik Kar
Associate Professor, Physics; Indian Institute of Physics (India), PhD

Alireza Karimi
Assistant Professor, Mechanical and Industrial Engineering; Virginia Polytechnic Institute and State University, PhD

Alain S. Karma
College of Arts and Sciences Distinguished Professor, Physics; University of California, Santa Barbara, PhD

Ralph Katz
Professor, Entrepreneurship and Innovation; University of Pennsylvania, PhD

William D. Kay
Associate Professor, Political Science; Indiana University, PhD

Bret Keeling
Associate Teaching Professor, English; 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
Assistant Cooperative Education Coordinator, Finance; Northeastern University, MEd

Thomas Kelley
Lecturer, Physics; University of Minnesota, PhD

Kathleen Kelly
Professor, English; University of North Carolina, Chapel Hill, PhD

M. Whitney 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, Computer and Information Science; University of Massachusetts, Amherst, BA

Richard M. Kesner
Lecturer, Supply Chain and Information Management; Stanford University, PhD

Heidi Kevoe Feldman
Associate Professor, Communication Studies; Rutgers 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

Daniel Kim
Assistant Professor, Health Sciences; University of Toronto (Canada), MD; Harvard University, 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

Tiffany Kim
Assistant Clinical Professor, Nursing; University of Pennsylvania, PhD

Yong-Bin Kim
Associate Professor, Electrical and Computer Engineering; Colorado State University, PhD

John Kimani
Assistant Teaching Professor, Electrical and Computer Engineering; University of Wisconsin, Milwaukee, PhD

David Kimbro
Assistant Professor, Marine and Environmental Sciences; University of California, Davis, 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

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

William Kirtz
Associate Professor, Journalism; Columbia University, MS

Jennifer L. Kirwin
Associate Clinical Professor, Pharmacy and Health Systems Sciences; Northeastern University, PharmD

Alan M. 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; University of Venice (Italy), PhD

Thomas H. Koenig
Professor, Sociology and Anthropology; University of California, Santa Barbara, PhD

Mieczyslaw M. Kokar
Professor, Electrical and Computer Engineering; University of Wroclaw (Poland), PhD

Ying-Yee Kong
Associate Professor, Communication Sciences and Disorders; University of California, PhD

Tania Konry
Assistant Professor, Pharmaceutical Sciences; Ben Gurion University (Israel), 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, CPS International Programs; New York University, PhD

Christopher Kottke
Postdoctoral Teaching Associate, Mathematics; Massachusetts Institute of Technology, PhD

Harilaos Koutsopoulos
Professor, Civil and Environmental Engineering; Massachusetts Institute of Technology, PhD

Linda Kowalcky
Professor of the Practice, School of 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

Dmitri Krioukov
Associate Professor, Physics; Old Dominion University, PhD

Ganesh Krishnamoorthy
Professor, Accounting; University of Southern California, PhD

Karthik Krishnan
Assistant Professor and Thomas Moore Faculty Fellow, Finance; Boston College, PhD

Louis J. Kruger
Associate Professor, Applied Psychology; Rutgers University, PsyD

Steven R. Kursh
Associate Academic Specialist, Finance; University of Pennsylvania, PhD

John E. Kwoka Jr.
Neal F. Finnegan Chair, Economics; University of Pennsylvania, PhD

Michelle Laboy
Assistant Professor, Architecture; University of Michigan, MArch

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

Arthur LaMan
Assistant Academic Specialist, College of Professional Studies; Northeastern University, MS

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

Henry W. Lane
Professor, International Business and Strategy; Harvard University, DBA

David Lang
Lecturer, Mathematics; Boston College, PhD; Northeastern University, PhD

Amy Lantinga
Associate Teaching Professor, College of Professional Studies; University of Tennessee, Knoxville, EdD

Paul LaPlante
Assistant Academic Specialist, World Languages Center; Brown University, MA

Philip Larese-Casanova
Associate Professor, Civil and Environmental Engineering; University of Iowa, PhD

Sonya L. Larrieux
Clinical Instructor, Physical Therapy, Movement, and Rehabilitation Sciences; Columbia University, MA

Barbara Larson
Assistant 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; Villanova University School of Law, JD; 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
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 H. Lee  
Associate Professor, Philosophy and Religion; Brown University, PhD

Lee-Peng Lee  
Lecturer, Mathematics; Massachusetts Institute of Technology, 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 and Stotsky Professor of Jewish and Cultural Studies, Journalism; Yale University, MA

Lori H. Lefkovitz  
Ruderman Professor, 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

Tricia Lenihan  
Assistant Cooperative Education Coordinator, College of Engineering; Boston University, MEd

Robert Lentz  
Assistant Academic Specialist, Entrepreneurship and Innovation; Babson College, MBA

Neal Lerner  
Associate 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

Jack Levin  
Irving S. and Betty Brudnick Distinguished Professor, Sociology and Anthropology; Boston University, PhD

Elinor Levine  
Assistant Cooperative Education Coordinator, D’Amore-McKim School of Business; University of Massachusetts, Amherst, MEd

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; University of New York, PhD

Chieh Li  
Associate Professor, Applied Psychology; University of Massachusetts, Amherst, EdD

Rui Li  
Assistant Clinical Professor, Health Sciences; Baylor University, PhD

Dirk Libaers  
Associate Professor, Entrepreneurship and Innovation; Georgia Institute of Technology, 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, Health Sciences and Sociology and Anthropology; Columbia University, PhD

Margo Lindauer  
Associate Teaching Professor, Health Sciences; Georgetown University Law Center, MS

John Lindhe  
Lecturer, Mathematics; Northeastern University, MA

Charles Linshaw  
Visiting Lecturer, Theatre; Columbia University, MFA

Gabor Lippner  
Assistant Professor, Mathematics; Eotvos University (Hungary), PhD

James Lipsky  
Associate Academic Specialist, World Languages Center; Boston University, MA
Heather Littlefield
Associate Teaching Professor, Linguistics; Boston University, PhD

Kelvin Liu
Associate Professor, Accounting; University of South Carolina, PhD

Yongmin Liu
Assistant Professor, Mechanical and Industrial Engineering and Electrical and Computer Engineering; University of California, Berkeley, PhD

Grigorios Livanis
Assistant Professor, International Business and Strategy; University of Florida, 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

Mary Loeffelholz
Professor, English; Yale University, PhD

Martha Loftus
Assistant Teaching Professor, College of Professional Studies; Harvard University, EdD

Diomedes E. Logothetis
Professor, Pharmaceutical Sciences; Harvard University, PhD

Jane Lohmann
Associate Teaching Professor, College of Professional Studies; Harvard University, EdD

Mark Lomanno
Visiting Assistant 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

Connie Lorette
Assistant Clinical Professor, Nursing; Boston College, PhD

Ralph H. Loring
Associate Professor, Pharmaceutical Sciences; Cornell University, PhD

Ivan Loseu
Associate Professor, Mathematics; Moscow State University (Russia), PhD

Kathleen Loterhos
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

Tania Muino Loureiro
Assistant Academic Specialist, World Languages Center; University of Barcelona (Spain), MA

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 Lu
Assistant Professor, Communication Studies and Health Sciences; University of North Carolina, Chapel Hill, PhD

Katherine A. 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

Spencer Lynn
Research Assistant Professor, Psychology; University of Arizona, PhD

Linlin Ma
Assistant Professor, Finance; Georgia State University, PhD

Patricia A. Mabrouk
Professor, Chemistry and Chemical Biology; Massachusetts Institute of Technology, PhD

Andrew Mackie
Assistant Clinical Professor, Physician Assistant Program; University of Nebraska, MS

Emanuele Macri
Associate Professor, Mathematics; SISSA (Italy), PhD

Jeanne Madden
Associate Professor, Physical Therapy, Movement, and Rehabilitation 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

Elizabeth Mahler
Assistant Teaching Professor, College of Professional Studies; George Washington University, EdD

Luigia Gina Maiellaro
Senior Academic Specialist, 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  
Behrakis Trustee Chair in Pharmaceutical Biotechnology and University Distinguished Professor, Pharmaceutical Sciences and Chemistry and Chemical Biology; University of Kansas, PhD

Michael Malamas  
Research Associate Professor, Pharmaceutical Sciences and Chemistry and Chemical Biology; University of Pennsylvania, PhD

Shiti Malhotra  
Lecturer, Linguistics; University of Maryland, PhD

Veronika Maliborska  
Assistant Teaching Professor, College of Professional Studies; Purdue University, PhD

Mikhail Malioutov  
Professor, Mathematics; Moscow State University (Russia), PhD

Andrew Mall  
Visiting Assistant Teaching 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

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 K. Manning  
Elmer V. H. and Eileen M. Brooks Trustee Professor, Criminology and Criminal Justice; Duke University, PhD

Moira C. Mannix  
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

Edwin Marengo  
Associate Professor, Electrical and Computer Engineering; Northeastern University, PhD

Donald G. Margotta  
Associate Professor, Finance; University of North Carolina, Chapel Hill, PhD

Alina Marian  
Associate Professor, Mathematics; Harvard University, PhD

Tucker Marion  
Associate Professor and Altschuler Research Fellow, 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 Haen 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 Jr.  
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

Ivan Martino  
Visiting Postdoctoral Teaching Associate, Mathematics; Stockholm University (Sweden), PhD

Mauro Martino  
Assistant Professor, Art + Design and Public Policy and Urban Affairs; Polytechnic University of Milan (Italy), PhD

Alexander Martinskovsky  
Associate Professor, Mathematics; Brandeis University, PhD

Emanuel J. Mason  
Professor, Applied Psychology; Temple University, EdD

David Massey  
Professor, Mathematics; Duke University, PhD

Jude Mathews  
Assistant Teaching Professor, Chemistry and Chemical Biology; Clemson University, PhD

Kristen Mathieu Gonzalez  
Clinical Instructor, Nursing; University of Phoenix, MS

Thomas M. Matta  
Assistant Clinical Professor, Pharmacy and Health Systems Sciences; Xavier University of Louisiana, PharmD
Samuel J. Matthews
Associate Professor, Pharmacy and Health Systems Sciences; University of Minnesota, PharmD

Gail Matthews-DeNatale
Assistant Teaching Professor, College of Professional Studies; Indiana University, Bloomington, PhD

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

William G. Mayer
Professor, Political Science; Harvard University, PhD

Mary Mayville
Assistant Clinical Professor, Nursing; Northeastern University, DNP

Dori P. Mazor
Assistant Cooperative Education Coordinator, College of Arts, Media and Design; Brandeis University, MBA

Laurie McCadden
Clinical Instructor, Nursing; University of Massachusetts, Lowell, MSN

Daniel J. McCarthy
McKim and D’Amore Distinguished Professor of Global Management and Innovation, Entrepreneurship and Innovation; Harvard University, DBA

Paulette McCarty
Assistant Academic Specialist, Management and Organizational Development; University of Tennessee, PhD

Jane McCool
Assistant Clinical Professor, Nursing; University of Rhode Island, PhD

Eileen L. McDonagh
Professor, Political Science; Harvard University, PhD

Ann McDonald
Associate Professor, Art + Design; Yale University, MFA

Matthew McDonald
Associate Professor, Music; Yale University, PhD

Melissa McCelligott
Assistant Teaching Professor, Biology; Northeastern University, PhD

Seamus McGovern
Lecturer, Supply Chain and Information Management; Northeastern University, PhD

Nicol E. McGrue
Professor, Electrical and Computer Engineering; Michigan State University, PhD

Jean McGuire
Professor of the Practice, Health Sciences; Brandeis University, PhD

Brendan McLeLlan
Postdoctoral Teaching Associate, Mathematics; University of Toronto (Canada), PhD

Cristine McMartin-Miller
Associate Teaching Professor, CPS International Programs; 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

Thomas L. Meade
Postdoctoral Teaching Associate, Communication Studies; University of Alabama, PhD

Isabel Meirelles
Associate Professor, Art + Design; Massachusetts College of Art, MFA

Emanuel S. Melachrinoudis
Associate 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 Mello
Assistant Cooperative Education Coordinator, College of Science; Boston College, MA

Richard H. Mellon Jr.
Professor, Psychology; University of Massachusetts Medical Center, 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

David Merry
Associate Cooperative Education Coordinator, Cooperative Education; University of Iowa, MA

Hameed Metghalchi
Professor, Mechanical and Industrial Engineering; Massachusetts Institute of Technology, ScD

Marc H. Meyer
Robert J. Shillman Professor of Entrepreneurship and Matthews Distinguished University Professor, Entrepreneurship and Innovation; Massachusetts Institute of Technology, PhD

Michael C. Meyer
Lecturer, Philosophy and Religion; Boston University, PhD
Ningfang Mi
Associate Professor, Electrical and Computer Engineering; University of Texas, Dallas, MS

Dean Michael
Assistant Teaching Professor, College of Professional Studies; Columbia University, PhD

Srbojib Mijailovich
Research Professor, Chemistry and Chemical Biology; Massachusetts Institute of Technology, PhD

Loiza Miles
Assistant Academic Specialist, World Languages Center; Sorbonne University (France), MA

William F. S. Miles
Professor, Political Science; Tufts University, PhD

Danielle M. Miller
Assistant Clinical Professor, Pharmacy and Health Systems Sciences; Northeastern University, PharmD

Dennis H. Miller
Professor, Music; Columbia University, DMA

Edward Miller
Assistant Teaching Professor, CPS International Programs; Boston College, PhD

Gregory Miller
Associate Professor, Pharmaceutical Sciences; Mount Sinai School of Medicine, PhD

Joanne L. Miller
Matthews Distinguished University Professor, Psychology; University of Minnesota, PhD

Matthew Miller
Professor, Health Sciences; Yale University, MD; Harvard University, ScD

Sara Minard
Assistant Academic Specialist, Entrepreneurship and Innovation; Institute d’Etudes Politiques (France), 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
Academic 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

Vallentine Moghadam
Professor, Sociology and Anthropology and International Affairs; American University, PhD

Shan Mohammed
Associate Professor, Health Sciences; Case Western Reserve University, MD

Changiz Mohiyeddini
Associate Professor, Applied Psychology; University of Trier (Germany), PhD

Beth Molnar
Associate Professor, Health Sciences; Harvard University, ScD

Katelyn Monaghan
Assistant Professor, Biology; University of Kentucky, PhD

Swapnil Moon
Assistant Teaching Professor, Mechanical and Industrial Engineering; New Jersey Institute of Technology, PhD

Enrique Moreno
Senior Lecturer, Physics; Universidad Nacional de La Plata (Argentina), PhD

Kimberly Moreno
Assistant Clinical Professor, Pharmacy and Health Systems Sciences; University of Michigan, PharmD

Robert M. Mooradian
Professor and Harding Research Professor, Finance; University of Pennsylvania, PhD

Jessica Moreno
Assistant Clinical Professor, Pharmacy and Health Systems Sciences; University of Michigan, PharmD

Joanne Morreale
Associate Professor, Media and Screen Studies; Temple University, PhD

Edward V. Moss
Assistant Teaching Professor, English; Emerson College, MFA

Jeanine K Mount
Professor of the Practice, Pharmacy and Health Systems Sciences and Health Sciences; Purdue University, PhD
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

Sanjeev Mukerjee  
Professor, Chemistry and Chemical Biology; Texas AM University, PhD

Jay Mulki  
Associate Professor, Marketing; University of South Florida, PhD

Patrick R. Mullen  
Associate Professor, English; University of Pittsburgh, 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  
Associate Professor, Chemical Engineering; Massachusetts Institute of Technology, PhD

Cecelia Musselman  
Associate Teaching Professor, English; Columbia University, PhD

Shakir Mustafa  
Senior Academic Specialist, World Languages Center; Boston University, PhD

Andrew Myers  
Assistant 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

Franklin Naarendorp  
Associate Professor, Psychology; City University of New York, PhD

Nada Naji  
Lecturer, Computer and Information Science; University of Neuchatel (Switzerland), PhD

Thomas K. Nakayama  
Professor, Communication Studies; University of Iowa, PhD

Laurie A. Nardone  
Associate Teaching Professor, English; Emory University, PhD

Uichiro Narusawa  
Associate Professor, Mechanical and Industrial Engineering; University of Michigan, PhD

Pran Nath  
Matthews Distinguished University Professor, Physics; Stanford University, PhD

Hamid Nayeb-Hashemi  
Professor, Mechanical and Industrial Engineering; Massachusetts Institute of Technology, 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

Van Nguyen  
Postdoctoral Teaching Associate, Mathematics; Texas AM University, PhD

Sandy Nickel  
Assistant Teaching Professor, College of Professional Studies; University of Iowa, PhD

Mark J. Niedre  
Associate Professor; Electrical and Computer Engineering and Bioengineering; University of Toronto (Canada), PhD

Spyridon Nikas  
Research Associate Professor, Pharmaceutical Sciences; Aristotle University (Greece), PhD

Matthew Nippins  
Assistant Clinical Professor, Physical Therapy, Movement, and Rehabilitation Sciences; Massachusetts General Hospital Institute of Health Professions, DPT

Matthew C Nisbet  
Associate Professor, Communication Studies; Cornell University, PhD

Cristina Nita-Rotaru  
Professor, Computer and Information Science; Johns Hopkins University, PhD

Daniel R. Noemi Voionmaa  
Associate Professor, History; 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, English; Emerson College, MFA

Matthew P. Noonan  
Associate Teaching Professor, English; Massachusetts College of Art, MFA

Guevara Noubir  
Professor, Computer and Information Science; Swiss Federal Institute of Technology, Lausanne (Switzerland), PhD

Welville B. Nowak  
Senior Research Scientist, Mechanical and Industrial Engineering; Massachusetts Institute of Technology, PhD

Gilbert Nyaga  
Associate Professor and Joe Dichiacchio Faculty Fellow, Supply Chain and Information Management; Michigan State University, PhD

Jessica Oakes  
Assistant Professor, Bioengineering; University of California, San Diego, PhD

Antonio Ocampo-Guzman  
Associate Professor, Theatre; York University (Canada), MFA

Lydia Odgen  
Associate Teaching Professor, Human Services; Columbia University, PhD

Curtis Odom  
Visiting Lecturer, Management and Organizational Development; Pepperdine University, EdD

Dietmar Offenhuber  
Assistant Professor, Art + Design; 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

Stephen Onu  
Assistant Academic Specialist, College of Professional Studies; University of Phoenix, DBA

Toyoko Orimoto  
Assistant Professor, Physics; University of California, Berkeley, PhD

Elika Ortega Guzman  
Assistant Professor, Languages, Literatures, and Cultures; University of Western Ontario (Canada), PhD

Oleksiy Osievskyy  
Assistant Professor, Entrepreneurship and Innovation; University of Calgary (Canada), PhD

Jacek Ossowski  
Lecturer, Computer and Information Science; New York University, PhD

Sarah Ostadabbas  
Assistant Professor, Electrical and Computer Engineering; University of Texas, Dallas, PhD

Timothy Ouilllette  
Assistant Teaching Professor, Communication Studies; Art Institute of Boston, MFA

Oyindasola Oyelaran  
Associate Teaching Professor, Chemistry and Chemical Biology; Harvard University, PhD

Dan O'Brien  
Assistant Professor, Public Policy and Urban Affairs and Criminology and Criminal Justice; Binghamton University, PhD

Sean O'Connell  
Assistant Academic Specialist, College of Professional Studies; University of Massachusetts, Boston, 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  
Senior 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 Painter  
Lecturer, Linguistics; State University of New York, Buffalo, PhD

Himlona Palikhe  
Assistant Teaching Professor, Graduate School of Engineering; Texas Tech University, PhD

Kwamina Panford  
Associate Professor, African-American Studies; Northeastern University, PhD

Coleen C. Pantalone  
Associate Professor, Finance; Iowa State University, PhD
Jeremy Papadopoulos
Assistant Teaching Professor, Mechanical and Industrial Engineering; Massachusetts Institute of Technology, PhD

Harikrishnan Parameswaran
Assistant Professor, Bioengineering; Boston University, PhD

Serena Parekh McGushin
Associate Professor, Philosophy and Religion; Boston College, PhD

Andrea Parker
Assistant Professor, Computer and Information Science and Health Sciences; Georgia Institute of Technology, PhD

Christopher M. Parsons
Assistant Teaching 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

Mark Patterson
Professor, Marine and Environmental Sciences and Civil and Environmental Engineering; Harvard University, PhD

Misha Pavel
Professor of the Practice, Computer and Information Science and Health Sciences; New York University, PhD

Nancy Pawlyshyn
Assistant Teaching Professor, College of Professional Studies; Capella University, PhD

Celia Pearce
Associate Professor, Game Design; University of the Arts London (United Kingdom), PhD

Neal Pearlmuter
Associate Professor, Psychology; Massachusetts Institute of Technology, PhD

Melissa Pearson
Assistant Teaching Professor, English; University of South Carolina, PhD

Melissa Peiken
Associate Cooperative Education Coordinator, Computer and Information Science; Emerson College, MEd

Russell Pensyl
Professor, Art + Design; Western Michigan University, MFA

Pablo Perez Ramos
Visiting Assistant Professor, Architecture; Harvard University, MLA

Natalie Perry
Assistant Teaching Professor, College of Professional Studies; University of Virginia, PhD

Stuart S. Peterfreund
Professor, English; University of Washington, PhD

Courtney Pfluger
Assistant Teaching Professor, Engineering; Northeastern University, PhD

Susan E. Picillo
Senior Lecturer, Communication Studies; Cambridge College, MEd

Sara Picklesmier
Postdoctoral Teaching Associate, Communication Studies; University of Connecticut, PhD

Pamela Pietrucci
Postdoctoral Teaching Associate, Communication Studies; University of Washington, PhD

Ameet Pinto
Assistant Professor, Civil and Environmental Engineering; Virginia Polytechnic Institute and State University, PhD

Jacqueline M. Piret
Associate Professor, Biology; Massachusetts Institute of Technology, PhD

Jennifer Pirri
Assistant Teaching Professor, Behavioral Neuroscience; University of Michigan, PhD

Marjorie Platt
Professor, Finance; University of Michigan, PhD

Robert Platt Jr.
Assistant Professor, Computer and Information Science; University of Massachusetts, Amherst, PhD

Peter Plourde
Assistant Academic Specialist, College of Professional Studies; University of Massachusetts, Lowell, MS

Elizabeth J. Podlaha-Murphy
Professor, Chemical Engineering; Columbia University, PhD

Mya Poe
Assistant Professor, English; University of Massachusetts, Amherst, PhD

Hermine Poghosyan
Assistant Professor, Nursing; University of Massachusetts Boston, PhD

Uta G. Poiger
Professor, History; 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  

Richard D. Porter  
Professor, Mathematics; Yale University, PhD  

Veronica L. Porter  
Associate Professor, Cooperative Education, College of Science; Northeastern University, MEd  

John H. Portz  
Professor, Political Science; University of Wisconsin, Madison, PhD  

David Potter  
Associate Cooperative Education Coordinator, College of Engineering; Northeastern University, MSEE  

Mary-Susan Potts-Santone  
Associate 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  

Susan Powers-Lee  
Professor, Biology; University of California, Berkeley, PhD  

Robert Prior  
Associate Teaching Professor, College of Professional Studies; Nova Southeastern University, EdD  

Mark Prokosch  
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  

William G. Quill  
Associate Professor, Applied Psychology; University of Massachusetts, Amherst, PhD  

Daniel F. Quinn  
Teaching Professor, Psychology; Northeastern University, PhD  

Samuel Rabino  
Professor, Marketing; New York University, PhD  

Gordana Rabrenovic  
Associate Professor, Sociology and Anthropology; State University of New York, Albany, 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  

Rajmohan Rajaraman  
Professor, Computer and Information Science; University of Texas, Austin, PhD  

Ravi Ramamurti  
Distinguished Chair Professor, International Business and Strategy; Harvard University, DBA  

Valeria Ramdin  
Clinical Instructor, Nursing; Northeastern University, PhD  

Janet H. Randall  
Professor, English; University of Massachusetts, Amherst, PhD  

Carey M. Rappaport  
College of Engineering Distinguished Professor, Electrical and Computer Engineering; Massachusetts Institute of Technology, ScD  

Richard A. Rasala  
Professor, Computer and Information Science; Harvard University, PhD  

Andrea Raynor  
Teaching Professor, Art + Design; School of Visual Arts, MFA  

Joseph Reagle  
Assistant Professor, Communication Studies; New York University, PhD  

Debra J. Reid  
Assistant Clinical Professor, Pharmacy and Health Systems Sciences; Northeastern University, PharmD  

Imke C. Reimers  
Assistant Professor, Economics; University of Minnesota, PhD  

Karen Reiss Medwed  
Assistant Professor, Economics; University of Toronto (Canada), PhD  

Marketa Rejtarova  
Assistant Clinical Professor, Nursing; Massachusetts General Hospital Institute of Health Professions, DNP  

Alessandra Renzi  
Assistant Professor, Art + Design; University of Toronto (Canada), PhD  

John R. Reynolds  
Professor, Pharmacy and Health Systems Sciences; Duquesne University, PharmD  

Karl Reynolds  
Associate Teaching Professor, CPS International Programs; University of Washington, PhD  

Mahtab Rezvani  
Assistant Academic Specialist, CPS International Programs; California State University, Los Angeles, MA  

Lesley Ricci  
Visiting Lecturer, Psychology; Northeastern University, PhD  

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 Ries
Associate Professor, Marine and Environmental Sciences; Johns Hopkins University, PhD

Matteo Rinaldi
Assistant Professor, Electrical and Computer Engineering; University of Pennsylvania, PhD

Christie Rizzo
Assistant Professor, Applied Psychology; University of Southern California, Los Angeles, PhD

Christina Roberts
Assistant 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
Assistant Professor, Media and Screen Studies; University of Illinois, Urbana-Champaign, PhD

William Robertson
Assistant 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

Harlow L. Robinson
Matthews Distinguished University Professor, History; University of California, Berkeley, PhD

Holbrook C. Robinson
Associate Professor, Languages, Literatures, and Cultures; Harvard University, PhD

Tracy L. Robinson Wood
Professor, Applied Psychology; Harvard University, EdD

Brian Robison
Assistant Teaching Professor, Music; Cornell University, DMA

David A. Rochefort
College of Arts and Sciences 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
Visiting Assistant Clinical Professor, Pharmacy and Health Systems Sciences; University of Connecticut, PharmD

Karyn Rosen
Associate Cooperative Education Coordinator, Computer and Information Science; Salem State College, MA

Rebeca B. Rosengaus
Associate Professor, Marine and Environmental Sciences; Boston University, PhD

James R. Ross
Associate Professor, Marine and Environmental Sciences; Johns Hopkins University, PhD

Martin E. Ross
Associate Professor, Marine and Environmental Sciences; University of Idaho, PhD

Alexandra Roth
Associate Academic Specialist, International Business and Strategy; University of Frankfurt (Germany), PhD

Amit K. Roy
Assistant Teaching Professor, Chemical Engineering; University of Calcutta (India), PhD

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

Matthais Ruth
Professor, Public Policy and Urban Affairs and Civil and Environmental Engineering; University of Illinois, Urbana-Champaign, PhD

Jane Saczynski
Associate Professor, Physical Therapy, Movement, and Rehabilitation Sciences; Pennsylvania State University, EdD

Hanai A. Sadaka
Lecturer, Mathematics; Northeastern University, PhD

J. Timothy Sage
Associate Professor, Physics; University of Illinois, Urbana-Champaign, PhD

Vinod Sahney
Professor, Mechanical and Industrial Engineering; University of Wisconsin, Madison, PhD
Masoud Salehi  
Associate Professor, Electrical and Computer Engineering; Stanford University, PhD

Carmel Salhi  
Assistant Professor, Health Sciences; Harvard University, ScD

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 L. Sandler  
Professor, Philosophy and Religion; University of Wisconsin, Madison, PhD

Billye Sankofa-Waters  
Associate Teaching Professor, College of Professional Studies; University of North Carolina, Chapel Hill, 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

Jennifer I. Sartori  
Assistant Academic Specialist, Jewish Studies; Haverford College of Pennsylvania, PhD

Mehrdad Sasani-Kolori  
Associate Professor, Civil and Environmental Engineering; University of California, Berkeley, PhD

Alicia Sasser Modestino  
Associate Professor, Public Policy and Urban Affairs and Economics; Harvard University, PhD

Cinthia Satornino  
Assistant Professor, Marketing; Florida State University, 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

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 M. Schmidt  
Assistant Professor, History; Princeton University, PhD

Paul Schreyer  
Assistant Academic Specialist, World Languages Center; Western Maryland College, MEd

Alan Schroeder  
Professor, Journalism; Harvard University, MPA

Egon Schulte  
Professor, Mathematics; University of Dortmund (Germany), PhD

Kathryn Schulte Grahame  
Associate Teaching Professor, Engineering; Columbia University, PhD

Joseph Schwartz  
Assistant Teaching Professor, Communication Studies; University of Iowa, PhD

Martin Schwarz  
Associate Professor, Mathematics; Courant Institute, 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

Magy Seif El-Nasr  
Associate Professor, Game Design; Northwestern University, PhD

Laura Senier  
Assistant Professor, Sociology and Anthropology and Health Sciences; Brown University, PhD

Sumi Seo  
Lecturer, Mathematics; University of Missouri, Columbia, PhD

Susan M. Setta  
Associate Professor, Philosophy and Religion; Pennsylvania State University, PhD

Bahram Shafai  
Professor, Electrical and Computer Engineering; George Washington University, ScD

Jayant M. Shah  
Professor, Mathematics; Massachusetts Institute of Technology, PhD
Rebecca Shansky
Assistant Professor, Psychology; Yale University, PhD

Harvey D. Shapiro
Associate Clinical Professor, Education; Hebrew Union College, PhD

Nancy H. Sharby
Associate Clinical Professor, Physical Therapy, Movement, and Rehabilitation Sciences; Northeastern University, DPT

William Sharp
Lecturer, 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

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

Olin Shivers
Professor, Computer and Information Science; Carnegie Mellon University, PhD

Mariya Shiyko
Assistant Professor, Applied Psychology; City University of New York, PhD

Aatmesh Shrivastava
Assistant Professor, Electrical and Computer Engineering; University of Virginia, Charlottesville, PhD

Brandon Sichling
Visiting Lecturer, Art + Design; Emerson College, MFA

Susan F. Sieloff
Senior Lecturer, Marketing; University of Michigan, MBA

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 J. Simon
Teaching Professor, Economics; Northern Illinois University, PhD

Simon I. Singer
Professor, Criminology and Criminal Justice; University of Pennsylvania, PhD

Hanumant Singh
Professor, Electrical and Computer Engineering and Marine and Environmental Sciences; Massachusetts Institute of Technology, PhD

Sarah S. Sinwell
Assistant Teaching Professor, Media and Screen Studies; Indiana University, 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, Pharmaceutical Sciences and Biology; Moscow State University (Russia), PhD

Mark Sivak
Associate Teaching Professor, Art + Design and Engineering; Northeastern University, PhD

Andrew Skirvin
Associate Clinical Professor, Pharmacy and Health Systems Sciences; University of Texas, Austin, PharmD

Nikolai Slavov
Assistant Professor, Bioengineering; Princeton University, PhD

Rory Smead
Assistant Professor, Philosophy and Religion; University of California, Irvine, PhD

David A. Smith
Assistant Professor, Computer and Information Science; Johns Hopkins University, PhD

Gillian Smith
Assistant Professor, Computer and Information Science and Game Design; University of California, Santa Cruz, PhD

Keith Smith
Assistant Professor, Marketing; University of Georgia, PhD

Michael Smith
Assistant Teaching Professor, Architecture; Harvard University, MArch

Ronald Bruce Smith
Assistant Professor, Music; University of California, Berkeley, PhD
Wendy A. Smith  
College of Arts and Sciences Distinguished Associate Professor, Biology; Duke University, PhD

Eugene 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

Claudia Sokol  
Assistant Academic Specialist, World Languages Center; University of Buenos Aires (Argentina), MD

Marius M. Solomon  
Professor, Supply Chain and Information Management; University of Pennsylvania, PhD

Susan J. Soroka  
Assistant Teaching Professor, English; Drew University, PhD

Bert A. Spector  
Associate Professor, International Business and Strategy; University of Missouri, PhD

Denise Spencer  
Lecturer, Supply Chain and Information Management; Boston College, PhD

Karen M. Spikes  
Lecturer, Psychology; Cornell University, PhD

Srinivas Sridhar  
College of Arts and Sciences Distinguished Professor, Physics; California Institute of Technology, PhD

Thomas Starr  
Professor, Art + Design; Yale University, MFA

Joshua Stefanik  
Assistant Professor, Physical Therapy, Movement, and Rehabilitation Sciences; Boston University School of Medicine, PhD

Mary Steffel  
Assistant Professor, Marketing; Princeton University, PhD; University of Florida, PhD

Armen Stepanyants  
Associate Professor, Physics; University of Rhode Island, PhD

Jennie Stephens  
Professor, School of Public Policy and Urban Affairs; California Institute of Technology, PhD

Dagmar Sternad  
Professor, Biology and Electrical and Computer Engineering; University of Connecticut, PhD

Sebastian Stockman  
Assistant Teaching Professor, English; 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 Connecticut, PhD

Jacob I. 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, MAT

Phyllis R. Strauss  
Matthews Distinguished University Professor, Biology; Rockefeller University, PhD

Heather Streets-Salter  
Associate Professor, History; Duke University, 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

Helen Suh  
Professor, Health Sciences; Harvard University, ScD

Annemarie C. Sullivan  
Clinical Instructor, Health Sciences; Northeastern University, MS

Denis J. Sullivan  
Professor, Political Science and International Affairs; University of Michigan, PhD

Fareena Sultan  
Professor, Marketing; Columbia 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  
Assistant Professor, Art + Design; University of California, Los Angeles, PhD

John D. Swain  
Associate Professor, Physics; University of Toronto (Canada), PhD

Richard S. Swasey Jr.  
Senior Lecturer, Finance; University of Virginia, MBA
Jacqueline F. Sweeney  
Senior Cooperative Education Coordinator, College of Arts, Media and Design; Northeastern University, MS

Nina Sylvanus  
Assistant Professor, Sociology and Anthropology; Ecole des Hautes Etudes en Sciences Sociales, Paris (France), PhD

Lynne Sylvia  
Clinical Professor, Pharmacy and Health Systems Sciences; Duquesne University, PharmD

Balazs Szelenyi  
Associate Teaching Professor, CPS International Programs; University of California, Los Angeles, PhD

Mario Sznaier  
Dennis Picard Trustee Professor, Electrical and Computer Engineering; University of Washington, 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  
Visiting Assistant Teaching Professor, Art + Design; Massachusetts College of Art and Design, MFA

Lloyd Tanlu  
Assistant Professor, Accounting; Harvard Business School, 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 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

Anna F. Thimsen  
Postdoctoral Teaching Associate, Communication Studies; University of North Carolina, PhD

Helen Thomas  
Lecturer, Management and Organizational Development; Indiana University, PhD

Ronald S. Thomas  
Senior Lecturer, International Business and Strategy; Harvard University, PhD

Mary Thompson-Jones  
Professor of the Practice, College of Professional Studies; University of Pennsylvania, EdD

Jamal Thorne  
Assistant Teaching Professor, Art + Design; Northeastern University, MFA

George Thrush  
Professor, Architecture; Harvard University, MArch

Stefanie Tignor  
Visiting Assistant Professor, Marketing; Northeastern University, PhD

Jonathan Tilly  
University Distinguished Professor, Biology; Rutgers, the State University of New Jersey, PhD

Devesh Tiwari  
Assistant Professor, Electrical and Computer Engineering; North Carolina State University, PhD

Gordana G. Todorov  
Professor, Mathematics; Brandeis University, 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 C. Tolley  
Associate Professor, Political Science; Johns Hopkins University, PhD

Iraz Topaloglu  
Assistant Professor, Political Science; Johns Hopkins University, PhD

Peter Topalov  
Associate 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

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 Academic Specialist, World Languages Center; Georgetown University, 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

Ayten Turkcan Upasani
Assistant Professor, Mechanical and Industrial Engineering; Bilkent University, Ankara (Turkey), PhD

Bonnie TuSmith
Associate Professor, English; Washington State University, PhD

Esther Tutella
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
Assistant Teaching Professor, College of Professional Studies; Harvard University, PhD

Steven R. Untersee
Lecturer, Biology; Tufts University, PhD

Moneesh Upmanyu
Associate Professor, Mechanical and Industrial Engineering; University of Michigan, PhD

Daniel Urman
Assistant Teaching Professor, College of Professional Studies; Harvard University, JD

Steven P. Vallas
Professor, Sociology and Anthropology; Rutgers University, PhD

Jenny A. Van Amburgh
Clinical Professor, Pharmacy and Health Systems Sciences; Albany College of Pharmacy, PharmD

Bobbi Van Gilder
Postdoctoral Teaching Associate, Communication Studies; University of Oklahoma, PhD

Kathi Vander Laan
Assistant Cooperative Education Coordinator, Computer and Information Science; Salem State University, MBA

Jan Vanselow
Associate Cooperative Education Coordinator, College of Engineering; Northeastern University, MS

Ashkan Vaziri
Associate Professor, Mechanical and Industrial Engineering; Northeastern University, PhD

Silvani 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

Anand Venkateswaran
Associate Professor and Chase Research Fellow, Finance; Georgia State University, PhD

Susan H. Ventura
Associate Clinical Professor, Physical Therapy, Movement, and Rehabilitation Sciences; Northeastern University, PhD

Alessandro Vespignani
Distinguished Professor and Sternberg Family Endowed Chair, 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 J. Vicino
Associate Professor, Political Science; 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, Chemistry and Chemical Biology and Computer and Information Science; Purdue University, PhD

Steven 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, CPS International Programs; Iowa State University, PhD

Paul Vouros
Professor, Chemistry and Chemical Biology; Massachusetts Institute of Technology, PhD

Sara Wadia-Fascetti
Professor, Civil and Environmental Engineering; Stanford University, PhD

Nancy Waggener
Associate Cooperative Education Coordinator, Pharmaceutical Sciences; Suffolk University, JD
<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
<th>Institution</th>
<th>Degree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thomas Wahl</td>
<td>Assistant Professor, Computer and Information Science</td>
<td>University of Texas, Austin</td>
<td>PhD</td>
</tr>
<tr>
<td>Thomas Wales</td>
<td>Research Associate Professor, Chemistry and Chemical Biology</td>
<td>Duke University</td>
<td>PhD</td>
</tr>
<tr>
<td>Jacob Walker</td>
<td>Assistant Cooperative Education Coordinator, College of Engineering</td>
<td>Northeastern University, MS</td>
<td></td>
</tr>
<tr>
<td>Louise E. Walker</td>
<td>Associate Professor, History</td>
<td>Yale University</td>
<td>PhD</td>
</tr>
<tr>
<td>Rachel Walsh</td>
<td>Assistant Cooperative Education Coordinator, College of Engineering</td>
<td>Suffolk University, MS</td>
<td></td>
</tr>
<tr>
<td>Robin Walters</td>
<td>Postdoctoral Teaching Associate, Psychology</td>
<td>University of Chicago</td>
<td>PhD</td>
</tr>
<tr>
<td>Suzanna Danuta Walters</td>
<td>Professor, Sociology and Anthropology and Women's, Gender, and</td>
<td>City University of New York</td>
<td>PhD</td>
</tr>
<tr>
<td>Richard G. Wamai</td>
<td>Associate Professor, African-American Studies</td>
<td>University of Helsinki (Finland)</td>
<td>PhD</td>
</tr>
<tr>
<td>Kai-tak Wan</td>
<td>Associate Professor, Mechanical and Industrial Engineering</td>
<td>University of Maryland, College Park</td>
<td>PhD</td>
</tr>
<tr>
<td>Lu Wang</td>
<td>Assistant Professor, Computer and Information Science</td>
<td>Cornell University</td>
<td>PhD</td>
</tr>
<tr>
<td>Ming Wang</td>
<td>College of Engineering Distinguished Professor, Civil and Environmental Engineering</td>
<td>University of New Mexico</td>
<td>PhD</td>
</tr>
<tr>
<td>Qi Wang</td>
<td>Assistant Professor, Civil and Environmental Engineering</td>
<td>Virginia Polytechnic Institute and State University</td>
<td>PhD</td>
</tr>
<tr>
<td>Meni Wanunu</td>
<td>Assistant Professor, Physics; Weizmann Institute of Science (Israel)</td>
<td></td>
<td>PhD</td>
</tr>
<tr>
<td>Robert J. Ward</td>
<td>Lecturer, Music</td>
<td>University of California, San Diego</td>
<td></td>
</tr>
<tr>
<td>Gregory H. Wassall</td>
<td>Associate Professor, Economics</td>
<td>Rutgers University</td>
<td>PhD</td>
</tr>
<tr>
<td>Barbara L. Waszczak</td>
<td>Professor, Pharmaceutical Sciences</td>
<td>University of Michigan</td>
<td>PhD</td>
</tr>
<tr>
<td>Maureen Watkins</td>
<td>Assistant Clinical Professor, Physical Therapy, Movement, and</td>
<td>Northeastern University</td>
<td>DPT</td>
</tr>
<tr>
<td>Natalya Watson</td>
<td>Assistant Teaching Professor, CPS International Programs</td>
<td>University of Colorado</td>
<td>PhD</td>
</tr>
<tr>
<td>Dov Waxman</td>
<td>Professor, Political Science and International Affairs</td>
<td>Johns Hopkins University</td>
<td>PhD</td>
</tr>
<tr>
<td>Thomas J. Webster</td>
<td>Professor, Chemical Engineering</td>
<td>Rensselaer Polytechnic Institute</td>
<td>PhD</td>
</tr>
<tr>
<td>Liza Weinstein</td>
<td>Assistant Professor, Sociology and Anthropology</td>
<td>University of Chicago</td>
<td>PhD</td>
</tr>
<tr>
<td>Michael Weintrab</td>
<td>Associate Clinical Professor, Computer and Information Science</td>
<td>Ohio State University</td>
<td>PhD</td>
</tr>
<tr>
<td>Jonathan Weitsman</td>
<td>Robert G. Stone Professor, Mathematics</td>
<td>Harvard University</td>
<td>PhD</td>
</tr>
<tr>
<td>Brandon C. Welsh</td>
<td>Professor, Criminology and Criminal Justice</td>
<td>University of Cambridge (United Kingdom)</td>
<td>PhD</td>
</tr>
<tr>
<td>Edward G. Wertheim</td>
<td>Associate Professor, Management and Organizational Development</td>
<td>Yeshiva University (Israel)</td>
<td>PhD</td>
</tr>
<tr>
<td>Richard West</td>
<td>Assistant Professor, Chemical Engineering</td>
<td>University of Cambridge (United Kingdom)</td>
<td>PhD</td>
</tr>
<tr>
<td>Alan West-Duran</td>
<td>Associate Professor, Languages, Literatures, and Cultures</td>
<td>New York University</td>
<td>PhD</td>
</tr>
<tr>
<td>Richard Whalen</td>
<td>Teaching Professor, Engineering</td>
<td>Northeastern University</td>
<td>PhD</td>
</tr>
<tr>
<td>Ronald M. Whitfield</td>
<td>Assistant Academic Specialist, Finance</td>
<td>University of Pennsylvania</td>
<td>PhD</td>
</tr>
<tr>
<td>Paul Whitford</td>
<td>Assistant Professor, Physics</td>
<td>University of California, San Diego</td>
<td>PhD</td>
</tr>
<tr>
<td>John Whitney</td>
<td>Assistant Professor, Mechanical and Industrial Engineering</td>
<td>Harvard University</td>
<td>PhD</td>
</tr>
<tr>
<td>Daniel Wichs</td>
<td>Assistant Professor, Computer and Information Science</td>
<td>New York University</td>
<td>PhD</td>
</tr>
<tr>
<td>Allan Widom</td>
<td>Professor, Physics</td>
<td>Cornell University</td>
<td>PhD</td>
</tr>
<tr>
<td>Peter H. Wiederspahn</td>
<td>Associate Professor, Architecture</td>
<td>Harvard University, MArch</td>
<td></td>
</tr>
<tr>
<td>John Wihbey</td>
<td>Assistant Professor, Journalism</td>
<td>Columbia University, MS</td>
<td></td>
</tr>
<tr>
<td>Ronald J. Willey</td>
<td>Professor, Chemical Engineering</td>
<td>University of Massachusetts, Amherst</td>
<td>PhD</td>
</tr>
<tr>
<td>Mark C. Williams</td>
<td>Professor, Physics</td>
<td>University of Minnesota</td>
<td>PhD</td>
</tr>
</tbody>
</table>
Stephen Williams  
Assistant Cooperative Education Coordinator, College of Social Sciences and Humanities; Suffolk University, JD

Christo Wilson  
Assistant Professor, Computer and Information Science; University of California, Santa Barbara, PhD

Sheila Winborne  
Visiting Lecturer, Philosophy and Religion; Harvard University, PhD

Frederick Wiseman  
Professor, Supply Chain and Information Management; Cornell University, PhD

John Wolfe  
Associate Teaching Professor, College of Professional Studies; Columbia University, EdD

Paul Wolff  
Assistant Cooperative Education Coordinator, College of Engineering; University of Pennsylvania, PhD

Darien Wood  
Professor, Physics; University of California, Berkeley, PhD

Dori Woods  
Assistant Professor, Biology; University of Notre Dame, PhD

Adam Woolley  
Assistant Clinical Professor, Pharmacy and Health Systems Sciences; Massachusetts College of Pharmacy, PharmD

Lisa C. Worsh  
Senior Cooperative Education Coordinator, College of Social Sciences and Humanities; Bridgewater State College, MEd

Nicole Wright  
Assistant Professor, Accounting; Virginia Polytechnic Institute and State University, PhD

Shu-Shih Wu  
Lecturer, Mathematics; Northeastern University, PhD

Sara A. Wylie  
Assistant Professor, Sociology and Anthropology and Health Sciences; Massachusetts Institute of Technology, PhD

Yu (Amy) Xia  
Associate Professor, Supply Chain and Information Management; Washington State University, PhD

Shiawee X. Yang  
Associate Professor, Finance; Pennsylvania State University, PhD

Mishac K. Vegian  
College of Engineering Distinguished Professor, Civil and Environmental Engineering; Massachusetts Institute of Technology, PhD

Edmund Yeh  
Associate Professor, Electrical and Computer Engineering; Massachusetts Institute of Technology, 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, Bouvé College of Health Sciences; Northeastern University, EdD

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

Sara C. Young-Hong  
Clinical Instructor, Communication Sciences and Disorders; University of Pittsburgh, MA

Shuishan Yu  
Associate Professor, Architecture; University of Washington, PhD

Jennifer Yule  
Assistant 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, Education; 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 Jade 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  
Assistant Professor, Chemistry and Chemical Biology; Washington University, St. Louis, PhD
Yue May Zhang
Associate Professor, Accounting; University of Pittsburgh, PhD

Ting Zhou
Associate Professor, Mathematics; University of Washington, PhD

Zhaohui 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

Sally Tebourne Ziane
Associate Academic Specialist, 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 M. Zimmerman
Assistant Professor, Criminology and Criminal Justice; State University of New York, Albany, PhD

Kathrin Zippel
Associate Professor, Sociology and Anthropology; University of Wisconsin, Madison, PhD

Ronald Zullo
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.

Nikolai Zvonok
Research Assistant Professor, Pharmaceutical Sciences; Russian Academy of Sciences (Russia), PhD
Governing Boards and Officers of Northeastern

Officers of the Corporation and Board of Trustees 2017–2018

Richard A. D’Amore, Chair
Edward G. Galante, Vice Chair
Katherine S. McHugh, Vice Chair
Alan S. McKim, Vice Chair

OFFICERS EMERITAE/I

Neal F. Finnegan, Chair Emeritus
Sy Sternberg, Chair Emeritus
George D. Behrakis, Vice Chair Emeritus
George W. Chamillard, Vice Chair Emeritus
Richard P. Chapman Jr., Vice Chair Emeritus
H. Patricia Hanna, Vice Chair Emerita
Frederic T. Hersey, Vice Chair Emeritus
Robert C. Marini, Vice Chair Emeritus
Richard C. Ockerbloom, Vice Chair Emeritus
Carole J. Shapazian, Vice Chair Emerita
Jean C. Tempel, Vice Chair Emerita
Alan D. Tobin, Vice Chair Emeritus

Members of the Board of Trustees

Barbara C. Alleyne
Jeffrey S. Bornstein
Nonnie S. Burnes
Peter B. Cameron
Jeffrey J. Clarke
William J. Conley
William J. Cotter
William “Mo” Cowan
Richard A. D’Amore
Susan Deitch
Deborah Dunsire
Spencer T. Fung
Edward G. Galante
Sir Lucian Grainge
David L. House
William S. Howard
Frances N. Janis
Chaitanya Kanojia
Venetia G. Kontogouris
William A. Lowell
Todd M. Manganaro
Katherine S. McHugh
Alan S. McKim
Henry J. Nasella
Anita Nassar
Kathryn M. Nicholson
James J. Pallotta
John V. Pulichino
Marcy L. Reed

Winslow Sargeant
Ronald L. Sargent
Sy Sternberg
Melina Travlos
Joseph M. Tucci
Christopher A. Viehbacher
Christophe P. Weber
Arthur W. Zafiropoulo
Michael J. Zamkow

EX-OFFICIO

Joseph E. Aoun

TRUSTEES EMERITAE/I

George D. Behrakis
Margot Botsford
Frederick Brodsky
Frederick L. Brown
Louis W. Cabot
George W. Chamillard
Richard P. Chapman Jr.
John J. Cullinane
Harry T. Daniels
Edmond J. English
James V. Fetchero
Neal F. Finnegan
W. Kevin Fitzgerald
H. Patricia Hanna
Frederic T. Hersey
Arnold S. Hiatt
J. Philip Johnston
Richard G. Lesser
Diane H. Lupean
Anthony R. Manganaro
Robert C. Marini
Roger M. Marino
Lloyd J. Mullin
Richard C. Ockerbloom
Arthur A. Pappas
Thomas L. Phillips
Dennis J. Picard
Ronald L. Rossetti
Carole J. Shapazian
Robert J. Shillman
Janet M. Smith
Stephen J. Sweeney
Jean C. Tempel
W. Nicholas Thorndike
Alan D. Tobin
James L. Waters
Catherine A. White
Ellen M. Zane

HONORARY TRUSTEES

Scott M. Black
Chad Gifford
Kuntoro Mangkusubroto
Lucille R. Zanghi

Richard A. D’Amore, Chair
Edward G. Galante, Vice Chair
Katherine S. McHugh, Vice Chair
Alan S. McKim, Vice Chair

OFFICERS EMERITAE/I
Neal F. Finnegan, Chair Emeritus
Sy Sternberg, Chair Emeritus
George D. Behrakis, Vice Chair Emeritus
George W. Chamillard, Vice Chair Emeritus
Richard P. Chapman Jr., Vice Chair Emeritus
H. Patricia Hanna, Vice Chair Emerita
Frederic T. Hersey, Vice Chair Emeritus
Robert C. Marini, Vice Chair Emeritus
Richard C. Ockerbloom, Vice Chair Emeritus
Carole J. Shapazian, Vice Chair Emerita
Jean C. Tempel, Vice Chair Emerita
Alan D. Tobin, Vice Chair Emeritus

Members of the Board of Trustees
Barbara C. Alleyne
Jeffrey S. Bornstein
Nonnie S. Burnes
Peter B. Cameron
Jeffrey J. Clarke
William J. Conley
William J. Cotter
William “Mo” Cowan
Richard A. D’Amore
Susan Deitch
Deborah Dunsire
Spencer T. Fung
Edward G. Galante
Sir Lucian Grainge
David L. House
William S. Howard
Frances N. Janis
Chaitanya Kanojia
Venetia G. Kontogouris
William A. Lowell
Todd M. Manganaro
Katherine S. McHugh
Alan S. McKim
Henry J. Nasella
Anita Nassar
Kathryn M. Nicholson
James J. Pallotta
John V. Pulichino
Marcy L. Reed
Winslow Sargeant
Ronald L. Sargent
Sy Sternberg
Melina Travlos
Joseph M. Tucci
Christopher A. Viehbacher
Christophe P. Weber
Arthur W. Zafiropoulo
Michael J. Zamkow

EX-OFFICIO
Joseph E. Aoun

TRUSTEES EMERITAE/I
George D. Behrakis
Margot Botsford
Frederick Brodsky

Frederick L. Brown
Louis W. Cabot
George W. Chamillard
Richard P. Chapman Jr.
John J. Cullinane
Harry T. Daniels
Edmond J. English
James V. Fetchero
Neal F. Finnegan
W. Kevin Fitzgerald
H. Patricia Hanna
Frederic T. Hersey
Arnold S. Hiatt
J. Philip Johnston
Richard G. Lesser
Diane H. Lupean
Anthony R. Manganaro
Robert C. Marini
Roger M. Marino
Lloyd J. Mullin
Richard C. Ockerbloom
Arthur A. Pappas
Thomas L. Phillips
Dennis J. Picard
Ronald L. Rossetti
Carole J. Shapazian
Robert J. Shillman
Janet M. Smith
Stephen J. Sweeney
Jean C. Tempel
W. Nicholas Thorndike
Alan D. Tobin
James L. Waters
Catherine A. White
Ellen M. Zane

HONORARY TRUSTEES
Scott M. Black
Chad Gifford
Kuntoro Mangkusubroto
Lucille R. Zanghi

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 Northeastern University Global 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
Hugh G. Courtney, BA, PhD, Dean of the D’Amore-McKim School of Business
Kenneth W. Henderson, BSc, PhD, Dean of the College of Science
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)

### Program | Accrediting Agency
--- | ---
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

### Program | Accrediting Agency
--- | ---
MS in Physician Assistant Studies | Accreditation Review Commission on Education for the Physician Assistant, Inc. (ARC-PA)

### Program | Accrediting Agency
--- | ---
BS in Nursing | Commission on Collegiate Nursing Education (CCNE) and Massachusetts Board of Registration in Nursing

### Program | Accrediting Agency
--- | ---
MS in Nursing | Commission on Collegiate Nursing Education (CCNE) and Massachusetts Board of Registration in Nursing

### Program | Accrediting Agency
--- | ---
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

### Program | Accrediting Agency
--- | ---
Registered Nurse/BSN | Commission on Collegiate Nursing Education (CCNE) and Massachusetts Board of Registration in Nursing

### Program | Accrediting Agency
--- | ---
Post BS Doctor of Nursing Practice US Army Program in Anesthesia Nursing (USAGPAN) | Council on Accreditation of Nurse Anesthesia Educational Programs (COA)

### Program | Accrediting Agency
--- | ---
DPT in Physical Therapy | Commission on Accreditation of Physical Therapy Education (CAPTE)

### Program | Accrediting Agency
--- | ---
MS/MBA (two-year program) | Commission on Collegiate Nursing Education (CCNE) and Massachusetts Board of Registration in Nursing; Commission on Collegiate Nursing Education (CCNE) and the Association to Advance Collegiate Schools of Business (AACSB International)
<table>
<thead>
<tr>
<th>Program</th>
<th>Accrediting Agency</th>
</tr>
</thead>
<tbody>
<tr>
<td>MS and CAGS in Applied Educational Psychology—School Psychology</td>
<td>Massachusetts Department of Education (DOE) and National Association of School Psychologists (NASP)</td>
</tr>
<tr>
<td>MS in Applied Educational Psychology—School Counseling</td>
<td>Massachusetts Department of Education (DOE)</td>
</tr>
<tr>
<td>AuD in Audiology</td>
<td>Council on Academic Accreditation in Audiology and Speech-Language Pathology (CAA) of the American Speech-Language-Hearing Association (ASHA), Massachusetts Board of Education*</td>
</tr>
<tr>
<td>MPH Master of Public Health in Urban Health</td>
<td>Council on Education for Public Health</td>
</tr>
<tr>
<td>PharmD</td>
<td>Accreditation Council for Pharmacy Education (ACPE)</td>
</tr>
<tr>
<td>PhD in Counseling and School Psychology</td>
<td>American Psychology Association (APA)</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Program</th>
<th>Accrediting Agency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Master of Architecture (Urban Architecture)</td>
<td>National Architectural Accreditation Board (NAAB)</td>
</tr>
</tbody>
</table>

### D’Amore-McKim School of Business

<table>
<thead>
<tr>
<th>Program</th>
<th>Accrediting Agency</th>
</tr>
</thead>
<tbody>
<tr>
<td>BS in Business Administration</td>
<td>AACSB International—The Association to Advance Collegiate Schools of Business</td>
</tr>
<tr>
<td>BS and MS in International Business</td>
<td>AACSB International—The Association to Advance Collegiate Schools of Business</td>
</tr>
<tr>
<td>MBA</td>
<td>AACSB International—The Association to Advance Collegiate Schools of Business</td>
</tr>
<tr>
<td>MS in Finance</td>
<td>AACSB International—The Association to Advance Collegiate Schools of Business</td>
</tr>
<tr>
<td>MS in Taxation</td>
<td>AACSB International—The Association to Advance Collegiate Schools of Business</td>
</tr>
<tr>
<td>MS in Accounting</td>
<td>AACSB International—The Association to Advance Collegiate Schools of Business</td>
</tr>
<tr>
<td>MS in Accounting/MBA</td>
<td>AACSB International—The Association to Advance Collegiate Schools of Business</td>
</tr>
<tr>
<td>MS in Finance/MBA</td>
<td>AACSB International—The Association to Advance Collegiate Schools of Business</td>
</tr>
</tbody>
</table>

### College of Computer and Information Science

<table>
<thead>
<tr>
<th>Program</th>
<th>Accrediting Agency</th>
</tr>
</thead>
<tbody>
<tr>
<td>BS in Computer Science</td>
<td>Computing Accreditation Commission of ABET (Accreditation Board for Engineering and Technology)</td>
</tr>
</tbody>
</table>

### College of Engineering

<table>
<thead>
<tr>
<th>Program</th>
<th>Accrediting Agency</th>
</tr>
</thead>
<tbody>
<tr>
<td>BS in Computer Engineering</td>
<td>Engineering Accreditation Commission of ABET</td>
</tr>
<tr>
<td>BS in Chemical Engineering</td>
<td>Engineering Accreditation Commission of ABET</td>
</tr>
<tr>
<td>BS in Civil Engineering</td>
<td>Engineering Accreditation Commission of ABET</td>
</tr>
<tr>
<td>BS in Electrical Engineering</td>
<td>Engineering Accreditation Commission of ABET</td>
</tr>
<tr>
<td>BS in Industrial Engineering</td>
<td>Engineering Accreditation Commission of ABET</td>
</tr>
<tr>
<td>BS in Mechanical Engineering</td>
<td>Engineering Accreditation Commission of ABET</td>
</tr>
</tbody>
</table>

### College of Professional Studies

<table>
<thead>
<tr>
<th>Program</th>
<th>Accrediting Agency</th>
</tr>
</thead>
<tbody>
<tr>
<td>AS and Certificate in Paramedic Technology</td>
<td>Massachusetts Department of Public Health, Office of Emergency Medical Services</td>
</tr>
<tr>
<td>BS in Finance and Accounting Management*</td>
<td>AACSB International—The Association to Advance Collegiate Schools of Business</td>
</tr>
<tr>
<td>BS in Management*</td>
<td>AACSB International—The Association to Advance Collegiate Schools of Business</td>
</tr>
<tr>
<td>BS and AS in Computer Engineering Technology</td>
<td>Accredited by the Technology Accreditation Commission of ABET, 111 Market Place Suite 1050 Baltimore, MD 21202-4012 Telephone: 410.347.7700</td>
</tr>
<tr>
<td>BS and AS in Electrical Engineering Technology</td>
<td>Accredited by the Technology Accreditation Commission of ABET, 111 Market Place Suite 1050 Baltimore, MD 21202-4012 Telephone: 410.347.7700</td>
</tr>
<tr>
<td>BS and AS in Mechanical Engineering Technology</td>
<td>Accredited by the Technology Accreditation Commission of ABET, 111 Market Place Suite 1050 Baltimore, MD 21202-4012 Telephone: 410.347.7700</td>
</tr>
</tbody>
</table>

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
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:
www.curry.neu.edu (http://www.curry.neu.edu)

Academic calendars:
www.northeastern.edu/registrar/calendars.html (http://www.northeastern.edu/registrar/calendars.html)

Other Online Resources
Course descriptions:
www.northeastern.edu/registrar/banner-catalog.html (http://www.northeastern.edu/registrar/banner-catalog.html)

Class schedules:
www.northeastern.edu/registrar/banner-schedule.html (http://www.northeastern.edu/registrar/banner-schedule.html)

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
Index

3-D Animation, Graduate Certificate .............................................. 322
Absenteeism ............................................................................. 86
Academic Calendars ..................................................................... 26
Academic Integrity ....................................................................... 86
Academic Policies and Procedures .................................................. 41
Academic Policies and Procedures .................................................. 86
Academic Policies and Procedures .................................................. 107
Academic Policies and Procedures .................................................. 214
Academic Policies and Procedures .................................................. 274
Academic Policies and Procedures .................................................. 340
Academic Probation and Dismissal ................................................. 87
Academic Probation Policy ............................................................ 216
Academic Progression .................................................................. 216
Academic Progression Standards ................................................... 279
Academic Resources .................................................................... 15
Academic Resources .................................................................... 275
Academic Standards and Degree Requirements................................. 110
Accommodations for Students with Disabilities ................................. 281
Accounting and Financial Decision Making, Graduate Certificate ... 78
Accounting and Financial Decision Making—Online Program, Graduate Certificate ... 78
Accounting, MSA ...................................................................... 65
Active-Duty Military Personnel ........................................................ 277
Administrative Procedures ............................................................. 112
Admission Requirements ............................................................... 107
Adult And Organizational Learning, Graduate Certificate .................. 323
Adult-Gerontology Nurse Practitioner, Acute Care, CAGS ............... 234
Adult-Gerontology Nurse Practitioner, Acute Care, MS ................. 237
Adult-Gerontology Nurse Practitioner, Primary Care, CAGS ........... 234
Adult-Gerontology Nurse Practitioner, Primary Care, MS ................ 237
Advanced Study in Orthopedics, Graduate Certificate ..................... 323
Agile Project Management, Graduate Certificate ............................... 323
Aging, Graduate Certificate ............................................................ 266
Analytics, MPS ........................................................................... 292
Appeals Policies and Procedures ..................................................... 31
Appendix ..................................................................................... 452
Applied Behavior Analysis, CAGS ................................................. 219
Applied Behavior Analysis, Graduate Certificate .............................. 223
Applied Behavior Analysis, MS ..................................................... 220
Applied Mathematics, MS .............................................................. 358
Applied Nutrition, MS .................................................................... 298
Applied Physics and Engineering, MS ............................................. 147
Applied Physics and Engineering, MS ............................................. 147
Applied Psychology ...................................................................... 217
Art + Design ................................................................................. 48
Arts Administration and Cultural Entrepreneurship, Graduate Certificate . 52
Attendance Requirements ............................................................... 275
Awards ........................................................................................ 340
Background Checks ...................................................................... 215
Bill Payment .................................................................................... 24
Bioengineering ............................................................................. 113
Bioengineering, MSBioE ............................................................... 122
Bioengineering, PhD ..................................................................... 113
Bioengineering, PhD—Advanced Entry .......................................... 120
Bioinformatics, MS ....................................................................... 343
Bioinformatics, MS—ALIGN Program ............................................. 344
Biology .......................................................................................... 342
Biology, PhD ................................................................................ 342
Biology, PhD—Advanced Entry ...................................................... 343
Biomedical Nanotechnology, MS ................................................... 248
Biomedical Sciences, MS ............................................................... 249
Biomedical Sciences, PhD ............................................................. 243
Biopharmaceutical Analytical Sciences, Graduate Certificate ............ 266
Biopharmaceutical Analytical Sciences, Graduate Certificate ............ 266
Biotechnology Enterprise, Graduate Certificate ............................... 349
Biotechnology, Graduate Certificate .............................................. 349
Biotechnology, MS ....................................................................... 259
Biotechnology, MS ....................................................................... 259
Bouvé College of Health Sciences .................................................. 214
Business Administration, Graduate Certificate ................................ 79
Business Administration—Online Program, Graduate Certificate ...... 79
Business Law, Graduate Certificate ................................................ 270
Campus Recreation ........................................................................ 17
Campus Resources ......................................................................... 17
Career Development ...................................................................... 17
Center for Advancing Teaching and Learning Through Research ........ 17
Certificate Programs ...................................................................... 78
Changes in Requirements ............................................................... 341
Chemical Engineering ................................................................... 124
Index

Economics, PhD ......................................................... 378
Economics, PhD—Advanced Entry .................................. 380
Education, EDD .......................................................... 282
Education, MEd ........................................................... 290
eLearning and Instructional Design, Graduate Certificate ...... 326
Electrical and Computer Engineering .................................. 142
Electrical and Computer Engineering Leadership, MSECEL ...... 167
Electrical and Computer Engineering with Concentration in Communications, Control, and Signal Processing, MSECE ... 150
Electrical and Computer Engineering with Concentration in Computer Networks and Security, MSECE .......................... 155
Electrical and Computer Engineering with Concentration in Computer Systems and Software, MSECE ............................ 152
Electrical and Computer Engineering with Concentration in Computer Vision, Machine Learning, and Algorithms, MSECE ... 157
Electrical and Computer Engineering with Concentration in Electromagnetics, Plasma, and Optics, MSECE ...................... 160
Electrical and Computer Engineering with Concentration in Microsystems, Materials, and Devices, MSECE ...................... 162
Electrical and Computer Engineering with Concentration in Power Systems, MSECE ........................................... 165
Electrical Engineering, PhD ............................................. 145
Electrical Engineering, PhD—Advanced Entry ....................... 146
Energy Systems, MSENES ............................................. 199
Energy Systems, MSENES—ALIGN Program ....................... 200
Engineering and Public Policy with Concentration in Energy & Environment, MS .......................................................... 132
Engineering and Public Policy with Concentration in Infrastructure Resilience, MS .................................................. 133
Engineering Leadership, Graduate Certificate ....................... 205
Engineering Management, MSEM .................................... 196
English ....................................................................... 382
English, MA .................................................................. 384
English, PhD .................................................................. 382
English, PhD—Advanced Entry ........................................ 384
Environmental Engineering, MSENVE ............................... 140
Exercise Science for Clinicians, Graduate Certificate ............. 230
Exercise Science with Concentration in Physical Activity and Public Health, MS ....................................................... 227
Experience Design, Graduate Certificate .............................. 53
Experience Design, MFA .................................................. 48
Experience Design, MS .................................................... 51
Experimental Biotechnology, Graduate Certificate .................. 349

Family Psychiatric Nurse Practitioner, CAGS ....................... 235
Family Psychiatric Nurse Practitioner, MS .......................... 238
Final Examinations and Related Policies on Other Exams........ 30
Finance, MSF ................................................................... 65
Finance—Evening/Part-Time Program, MSF ......................... 66
Finance—Online Program, MSF ......................................... 66
Financial Aid Assistance .................................................. 22
Financial Markets And Institutions, Graduate Certificate ........ 327
Forensic Markets And Institutions, Graduate Certificate ........ 327
Full-Time Status ............................................................. 276

Game Analytics, Graduate Certificate .................................. 56
Game Design ................................................................... 54
Game Design, Graduate Certificate ...................................... 327
Game Science and Design, MS .......................................... 55
Game Science and Design, MS .......................................... 55
General Admission and Transfer Credit ............................... 9
General Information ....................................................... 41
General Information ....................................................... 456
General Regulations ....................................................... 33
General Regulations and Requirements for Interdisciplinary Graduate Degrees ......................................................... 12
General Regulations and Requirements for Nondegree Certificate Programs ............................................................ 10
General Regulations and Requirements for the Certificate of Advanced Graduate Study ............................................... 11
General Regulations and Requirements for the Master's Degree .......................................................... 10
General Regulations and Requirements for the Research Doctorate (PhD and EdD) .................................................. 11
Geographic Information Systems, Graduate Certificate ............ 327
Geospatial Services, MPS ............................................... 295
Global Criminology, Graduate Certificate ............................. 377
Global Partnership Programs ............................................. 281
Global Student Mobility, Graduate Certificate ....................... 328
Global Studies And International Relations, Graduate Certificate 328
Global Studies and International Relations, MS ..................... 304
Gordon Institute of Engineering Leadership ......................... 204
Governing Boards and Officers of Northeastern ..................... 452
Grading ....................................................................... 215
Grading Policies ............................................................. 340
Graduate Campus ........................................................... 282
Graduate Certificate Programs .......................................... 322
Graduate School of Engineering Certificates ......................... 212
Graduate Schools Academic Policies .................................... 25
Graduate Student Classification ........................................... 42
Graduate Student Government ............................................ 18
Graduation Requirements .......................................................... 30
Health Certification ..................................................................... 214
Health Data Analytics, MS ....................................................... 98
Health Data Analytics, MS ....................................................... 98
Health Data Analytics, MS ....................................................... 98
Health Informatics ..................................................................... 95
Health Informatics Management and Exchange, Graduate Certificate .. 231
Health Informatics Management and Exchange, Graduate Certificate .. 267
Health Informatics, MS ................................................................ 98
Health Informatics, MS ............................................................. 228
Health Informatics, MS ............................................................. 98
Health Informatics, MS—ALIGN Program ................................... 99
Health Informatics, MS—ALIGN Program ................................... 99
Health Informatics Privacy and Security, Graduate Certificate ........ 231
Health Informatics Privacy and Security, Graduate Certificate ........ 267
Health Informatics Software Engineering, Graduate Certificate ....... 231
Health Informatics Software Engineering, Graduate Certificate ....... 267
Health Law, Graduate Certificate ............................................... 271
Health Management, Graduate Certificate ................................... 329
Health Sciences ........................................................................ 224
Healthcare Administration and Policy, Graduate Certificate .......... 81
Higher Education Administration, Graduate Certificate ............... 329
History .................................................................................... 386
History, MA .............................................................................. 388
History, PhD ........................................................................... 387
History, PhD—Advanced Entry ................................................. 387
Homeland Security, MA ........................................................... 287
Human Resources Law, Graduate Certificate ................................ 271
Human Resources Management, Graduate Certificate ................ 330
Human Services, MS ............................................................... 307
Human-Centered Informatics, Graduate Certificate ....................... 330
Husky Card Services ............................................................... 18
Information Assurance, PhD—Advanced Entry ......................... 102
Information Assurance, PhD—Advanced Entry ......................... 102
Information Design and Visualization, Graduate Certificate .......... 54
Information Design and Visualization, MFA ............................... 49
Information for Entering Students .............................................. 14
Information for International Students ....................................... 14
Information Security Management, Graduate Certificate ............. 330
Information Systems, MSIS ...................................................... 201
Information Technology Services .............................................. 16
Innovation Management, Graduate Certificate ........................... 82
Innovation, MS ....................................................................... 63
Institutional Calendars and Online Resources ............................... 456
Intellectual Property Law, Graduate Certificate ........................... 272
Interactive Design, Graduate Certificate .................................... 331
Interdisciplinary ..................................................................... 105
Interdisciplinary ..................................................................... 259
Interdisciplinary ..................................................................... 369
Interdisciplinary ..................................................................... 411
Interdisciplinary Arts, MFA ...................................................... 50
Interdisciplinary Engineering, PhD .......................................... 209
Interdisciplinary PhD Programs ............................................... 206
Interdisciplinary Professional Studies, Graduate Certificate ......... 331
International Affairs, MA ......................................................... 399
International Biopharmaceutical Regulatory Affairs, Graduate Certificate .... 332
International Business, Graduate Certificate ............................... 82
International Business, MSIB .................................................... 66
International Business—Online Program, Graduate Certificate ...... 82
International Management, MS ............................................... 64
Investments, Graduate Certificate ............................................ 83
JD/MBA ................................................................................. 77
John A. and Marcia E. Curry Student Center ............................... 18
Journalism, MA ..................................................................... 57
Law and Policy, DLP ............................................................... 284
Law and Public Policy, JD/MS ................................................. 406
Law and Public Policy, PhD ..................................................... 397
Law and Public Policy, PhD—Advanced Entry ........................... 398
Law and Urban Public Health, JD/MPH .................................... 264
Law, Criminology and Criminal Justice, JD/MS ......................... 377
Law, Criminology and Justice Policy, JD/PhD ............................. 375
Law, Criminology and Justice Policy, JD/PhD—Advanced Entry ...... 376
Leadership and Human Capital, Graduate Certificate .................. 83
Leadership, Graduate Certificate ............................................. 333
Leadership, MS ................................................................. 308
Leading And Managing Technical Projects, Graduate Certificate ........ 333
Leading Communication Strategy and Talent Development, Graduate Certificate .................................................. 333
Learning Analytics, Graduate Certificate ................................ 334
Learning Outcomes .................................................................. 107
Legal Studies, MS—Online ........................................................ 269
Liability Insurance ................................................................ 215
Libraries ................................................................................. 15
Living in Boston ........................................................................ 14

Marine and Environmental Sciences ........................................... 350
Marine Biology, MS—Three Seas Program ................................. 352
Marketing, Graduate Certificate ............................................... 83
Marketing—Online Program, Graduate Certificate .................... 84
Master of Architecture—One-Year Program ............................. 43
Master of Architecture—Three-Year Program ......................... 44
Master of Architecture—Three-Year Program—Advanced Degree Entrance .......................................................... 46
Master of Architecture—Two-Year Program ............................. 44
Master of Business Administration .......................................... 67
Master of Design for Sustainable Urban Environments—One-Year Program ......................................................... 47
Master of Design for Sustainable Urban Environments—Two-Year Program .......................................................... 47
Master of Science .................................................................... 63
Master’s Degree Admission Requirements ............................... 274
Master’s Degree Policies .......................................................... 41
Master’s Degree Programs ....................................................... 286
Mathematics ........................................................................ 352
Mathematics, MS .................................................................... 358
Mathematics, PhD .................................................................. 353
Mathematics, PhD—Advanced Entry ........................................ 355
MBA—Evening/Part-Time Program ......................................... 70
MBA—Full-Time Program ....................................................... 68
MBA—Online Program ............................................................ 73
Mechanical and Industrial Engineering .................................... 167
Mechanical Engineering, PhD .................................................. 174
Mechanical Engineering, PhD—Advanced Entry ...................... 176
Mechanical Engineering with Concentration in General Mechanical Engineering, MSME ............................... 183
Mechanical Engineering with Concentration in Material Science, MSME 185
Mechanical Engineering with Concentration in Mechanics and Design, MSME .................................................. 187
Mechanical Engineering with Concentration in Mechatronics, MSME 188
Mechanical Engineering with Concentration in Thermofluids, MSME ............................................................. 190
Medical Devices Regulatory Affairs, Graduate Certificate .......... 334
Medicinal Chemistry, MS ....................................................... 249
Medicinal Chemistry, PhD ...................................................... 243
Molecular Biotechnology, Graduate Certificate ......................... 350
MS/MBA—Nursing and Business Administration ..................... 74
MSA/MBA—Professional Accounting Program ....................... 74
MSCS—Master of Science in Computer Science ..................... 92
MSCS—Master of Science in Computer Science—ALIGN Program ................................................................ 93
MSF/MBA—Evening/Part-Time Program .................................. 76
MSF/MBA—Full-Time Program ................................................ 75
MSF/MBA—Online Program .................................................... 77
Multidisciplinary Programs ...................................................... 195
Music .................................................................................... 57
Music Industry Leadership, JD/MS .......................................... 61
Music Industry Leadership, MS ............................................... 58
Mutual Fund Management, Graduate Certificate ....................... 84

Nanomedicine, Graduate Certificate ......................................... 366
NEC/NU Joint Certificate Program—General Certificate of Merit in Music Performance ........................................ 58
NEC/NU Joint Certificate Program—Professional Studies Certificate in Music Performance .................................. 60
Neonatal Nurse Practitioner, CAGS ........................................ 235
Neonatal Nurse Practitioner, MS .............................................. 239
Network Science, PhD ............................................................. 209
Network Science, PhD ............................................................. 209
New Student Orientation (On-Ground and Online) ..................... 275
Nonprofit Management, Graduate Certificate ........................ 335
Nonprofit Management, MS .................................................... 309
Nonprofit Sector, Philanthropy, and Social Change, Graduate Certificate .......................................................... 405
Northeastern University Bookstore .......................................... 19
Nurse Anesthesia, CAGS ....................................................... 235
Nursing Administration, MS ................................................... 241
Nursing and Business Administration, MS/MBA ...................... 242
Nursing Anesthesia, MS ......................................................... 241
Nursing, PhD ........................................................................ 232
Nursing, PhD—Advanced Entry .............................................. 232
Nursing Practice, DNP ............................................................ 233
Nursing—Direct Entry, MS ...................................................... 240

Occupational Ergonomics and Health, Graduate Certificate ........ 256
Occupational Ergonomics and Health, MS ............................... 254
Office of the Registrar ............................................................... 16
<table>
<thead>
<tr>
<th>Course Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Online and Video Streaming Examination Policy</td>
<td>109</td>
</tr>
<tr>
<td>Operations Research, MSOR</td>
<td>192</td>
</tr>
<tr>
<td>Operations Research, MSOR</td>
<td>359</td>
</tr>
<tr>
<td>Organizational Communication, Graduate Certificate</td>
<td>335</td>
</tr>
<tr>
<td>Parking</td>
<td>19</td>
</tr>
<tr>
<td>Pediatric Nurse Practitioner, Acute and Primary Care, CAGS</td>
<td>236</td>
</tr>
<tr>
<td>Pediatric Nurse Practitioner, Acute and Primary Care, MS</td>
<td>239</td>
</tr>
<tr>
<td>Pediatric Nurse Practitioner, Acute Care, CAGS</td>
<td>236</td>
</tr>
<tr>
<td>Pediatric Nurse Practitioner, Primary Care, CAGS</td>
<td>236</td>
</tr>
<tr>
<td>Pediatric Nurse Practitioner, Primary Care, MS</td>
<td>240</td>
</tr>
<tr>
<td>Personal Health Informatics, PhD</td>
<td>96</td>
</tr>
<tr>
<td>Personal Health Informatics, PhD</td>
<td>259</td>
</tr>
<tr>
<td>Personal Information</td>
<td>281</td>
</tr>
<tr>
<td>Personal Professional Enrichment (PPE)</td>
<td>275</td>
</tr>
<tr>
<td>Petitions</td>
<td>112</td>
</tr>
<tr>
<td>Pharmaceutical Sciences, MS</td>
<td>250</td>
</tr>
<tr>
<td>Pharmaceutical Sciences, PhD</td>
<td>244</td>
</tr>
<tr>
<td>Pharmaceutical Technologies, Graduate Certificate</td>
<td>350</td>
</tr>
<tr>
<td>Pharmacology, MS</td>
<td>250</td>
</tr>
<tr>
<td>Pharmacology, PhD</td>
<td>245</td>
</tr>
<tr>
<td>Pharmacy and Public Health, PharmD/MPH</td>
<td>228</td>
</tr>
<tr>
<td>Pharmacy and Public Health, PharmD/MPH</td>
<td>228</td>
</tr>
<tr>
<td>Pharmacy, PharmD</td>
<td>245</td>
</tr>
<tr>
<td>Pharmacy, PharmD—Direct Entry</td>
<td>246</td>
</tr>
<tr>
<td>Physical Therapy, DPT</td>
<td>252</td>
</tr>
<tr>
<td>Physical Therapy, DPT—Direct Entry</td>
<td>285</td>
</tr>
<tr>
<td>Physical Therapy, DPT—Direct Entry</td>
<td>285</td>
</tr>
<tr>
<td>Physical Therapy, Movement, and Rehabilitation Sciences</td>
<td>252</td>
</tr>
<tr>
<td>Physical Therapy—Postbaccalaureate Entry</td>
<td>253</td>
</tr>
<tr>
<td>Physician Assistant</td>
<td>256</td>
</tr>
<tr>
<td>Physician Assistant Studies and Health Informatics, MS/MS</td>
<td>257</td>
</tr>
<tr>
<td>Physician Assistant Studies and Health Informatics, MS/MS</td>
<td>257</td>
</tr>
<tr>
<td>Physician Assistant Studies and Public Health, MS/MPH</td>
<td>229</td>
</tr>
<tr>
<td>Physician Assistant Studies and Public Health, MS/MPH</td>
<td>229</td>
</tr>
<tr>
<td>Physician Assistant Studies, MS</td>
<td>256</td>
</tr>
<tr>
<td>Physics</td>
<td>359</td>
</tr>
<tr>
<td>Physics, MS</td>
<td>365</td>
</tr>
<tr>
<td>Physics, PhD—Advanced Entry</td>
<td>360</td>
</tr>
<tr>
<td>Political Science</td>
<td>362</td>
</tr>
<tr>
<td>Political Science, MA</td>
<td>391</td>
</tr>
<tr>
<td>Political Science, PhD</td>
<td>390</td>
</tr>
<tr>
<td>Political Science, PhD—Advanced Entry</td>
<td>390</td>
</tr>
<tr>
<td>Population Health, PhD</td>
<td>211</td>
</tr>
<tr>
<td>Population Health, PhD</td>
<td>211</td>
</tr>
<tr>
<td>Port Security, Graduate Certificate</td>
<td>335</td>
</tr>
<tr>
<td>Practicum/Internship Policies</td>
<td>214</td>
</tr>
<tr>
<td>Process Safety Engineering, Graduate Certificate</td>
<td>129</td>
</tr>
<tr>
<td>Process Science, Graduate Certificate</td>
<td>350</td>
</tr>
<tr>
<td>Professional Sports Administration, Graduate Certificate</td>
<td>336</td>
</tr>
<tr>
<td>Program And Portfolio Management, Graduate Certificate</td>
<td>336</td>
</tr>
<tr>
<td>Program and Portfolio Project Management, MS</td>
<td>310</td>
</tr>
<tr>
<td>Project Management, Graduate Certificate</td>
<td>336</td>
</tr>
<tr>
<td>Project Management, MS</td>
<td>311</td>
</tr>
<tr>
<td>Psychology</td>
<td>366</td>
</tr>
<tr>
<td>Psychology, PhD—Advanced Entry</td>
<td>368</td>
</tr>
<tr>
<td>Public Administration, MPA</td>
<td>393</td>
</tr>
<tr>
<td>Public Administration, MPA</td>
<td>393</td>
</tr>
<tr>
<td>Public and Media Relations, Graduate Certificate</td>
<td>337</td>
</tr>
<tr>
<td>Public Health, MPH</td>
<td>226</td>
</tr>
<tr>
<td>Public History, Graduate Certificate</td>
<td>389</td>
</tr>
<tr>
<td>Public Policy Analysis, Graduate Certificate</td>
<td>404</td>
</tr>
<tr>
<td>Public Policy, MPP</td>
<td>402</td>
</tr>
<tr>
<td>Public Safety</td>
<td>19</td>
</tr>
<tr>
<td>Readmission to Program</td>
<td>276</td>
</tr>
<tr>
<td>Reentry to Program</td>
<td>276</td>
</tr>
<tr>
<td>Registration and Taking Courses</td>
<td>277</td>
</tr>
<tr>
<td>Regulations Applying only to Doctor of Philosophy (PhD) Programs</td>
<td>10</td>
</tr>
<tr>
<td>Regulations Applying to All Degree Programs</td>
<td>9</td>
</tr>
<tr>
<td>Regulatory Affairs for Drugs, Biologics, and Medical Devices with Concentration in Clinical Research Regulatory Affairs, MS</td>
<td>313</td>
</tr>
<tr>
<td>Regulatory Affairs for Drugs, Biologics, and Medical Devices with Concentration in General Regulatory Affairs, MS</td>
<td>314</td>
</tr>
<tr>
<td>Regulatory Affairs for Drugs, Biologics, and Medical Devices with Concentration in International Regulatory Affairs, MS</td>
<td>315</td>
</tr>
<tr>
<td>Regulatory Affairs for Drugs, Biologics, and Medical Devices with Concentration in Operational Regulatory Affairs, MS</td>
<td>316</td>
</tr>
<tr>
<td>Regulatory Affairs for Drugs, Biologics, and Medical Devices with Concentration in Regulatory Compliance, MS</td>
<td>317</td>
</tr>
<tr>
<td>Regulatory Affairs for Drugs, Biologics, and Medical Devices with Concentration in Strategic Regulatory Affairs, MS</td>
<td>318</td>
</tr>
<tr>
<td>Regulatory Affairs of Food and Food Industries, MS</td>
<td>319</td>
</tr>
<tr>
<td>Reinstatement after Academic Dismissal</td>
<td>279</td>
</tr>
<tr>
<td>Remote Sensing, Graduate Certificate</td>
<td>337</td>
</tr>
<tr>
<td>Respiratory Care Leadership, MS</td>
<td>319</td>
</tr>
<tr>
<td>Respiratory Specialty Practice, Graduate Certificate</td>
<td>338</td>
</tr>
</tbody>
</table>
Satisfactory Progress ..........................................................340
School of Architecture .......................................................42
School of Criminology and Criminal Justice ..........................372
School of Journalism ..........................................................56
School of Law ........................................................................269
School of Nursing ..................................................................231
School of Pharmacy .............................................................242
School of Public Policy and Urban Affairs ..............................396
School Psychology, MS/CAGS ..............................................222
School Psychology, PhD ......................................................218
Security and Resilience Studies, Graduate Certificate .............396
Security and Resilience Studies, MS ......................................394
Seeking more than One Certificate or Degree .........................280
Social Media And Online Communities, Graduate Certificate ....338
Sociology .............................................................................407
Sociology, MA .................................................................411
Sociology, PhD .................................................................407
Sociology, PhD—Advanced Entry ...........................................409
Special Student Status ..........................................................274
Speech-Language Pathology, MS ...........................................224
Sports Leadership, MSLD .....................................................321
Statements of Accreditation and State Authorization ..............454
Student Evaluation of Courses (EvaluationKit) .......................278
Student Records and Transcripts ...........................................27
Student Refunds ....................................................................21
Student Right-to-Know Act ....................................................31
Student's Academic Standing ...............................................216
Students' Bill of Academic Rights and Responsibilities ............39
Supply Chain Management, Graduate Certificate .....................84
Supply Chain Management—Online Program, Graduate Certificate ....85
Sustainable Building Systems, MSSBS ....................................141

Taxation, MST .........................................................................67
Taxation—Online Program, MST ...........................................67
Teaching, Elementary Licensure, MAT ....................................288
Teaching English To Speakers Of Other Languages, Graduate Certificate ......................................................338
Teaching, Secondary Licensure, MAT ....................................289
Technical Communication, MS ..............................................320
Technological Entrepreneurship, Graduate Certificate ...............85
Technological Entrepreneurship, MS ......................................64
Telecommunications Systems Management, MSTSM ..............202
The Doctor of Philosophy Degree (PhD) ..................................341
The Master's Degree Academic Requirements ........................342

Time Limitation ......................................................................341
Transfer Credit ......................................................................340
Transfer Credit Policies .......................................................274
Transfer of Credit ...............................................................87
Transfer of Credit ................................................................215
Tuition and Fees ....................................................................21

University Health and Counseling Services ..............................19
University Leadership ..........................................................453
University-Wide Academic Policies and Procedures ..................25
Urban Analytics, Graduate Certificate ....................................405
Urban and Regional Policy, MS .............................................403
Urban Informatics, MS ..........................................................403
Urban Studies, Graduate Certificate ......................................406

We Care .................................................................................20

Women's, Gender, and Sexuality Studies, Graduate Certificate ....414