Spring 2016 Course Registration Information for MS Operations Research

Congratulations on your acceptance to MS Operations Research program at Northeastern University!

At this time we suggest that you register for spring 2016 courses. Before registering for courses, please make sure to watch the following webinars:

Course Search Webinar: http://www.northeastern.edu/registrar/webinar-search.html
Course Add/Drop Webinar: http://www.northeastern.edu/registrar/webinar-adddrop.html

Please refer to the following subject codes when searching for courses:

CS - Computer Science
CSYE - Computer Systems Engineering
EECE - Electrical and Computer Engineering
EMGT - Engineering Management
ENLR - Engineering Leadership
IE - Industrial Engineering
INFO - Information Systems
MATH - Mathematics
MEIE - Mechanical and Industrial Engineering
OR - Operations Research

You will be able to add or drop courses using the online course registration system during the first two weeks of the spring semester. If you have any questions or difficulties with the above instructions, we will be able to assist you upon your arrival. Please do not register for MS Thesis or MS Project at this time because these courses must be preapproved by your Academic Advisor before registration.

Spring 2016 courses are available to view at the following link:

https://w11gp.neu.edu/udcprod8/bwlkffcs.p_disp_dyn_sched

When searching for courses at the above link, please make sure to select “Spring 2016 Semester” for the term then appropriate subject code for subject followed by “Graduate” for course level.

Plan of Study

All students are required to complete a Plan of Study by meeting with their Academic Advisor during their first semester. Plan of Study can accessed at the following link:

We advise full-time students to register for at least two courses and part-time students to register for at least one course.

**MS Operations Research Curriculum**

Please choose to register for courses listed in your approved curriculum listed at the end of this message.

**Enrollment Confirmation**

Please make sure to confirm your enrollment at Northeastern University by logging into your application account and paying the enrollment deposit. You will not be able to register for spring classes until you confirm your enrollment.

**Frequently Asked Questions**

**What if I was admitted as a Provisional or Conditional Student?**

If page 2 of your Admission Letter stated that you must fulfill additional requirements such as “REQUIREMENT (S): Student must take a course in Multivariate Calculus and a course in Linear Algebra before she/he is granted Regular Student status,” you must meet with your Academic Advisor as soon as possible after the Orientation to determine your plan of study.

**What if my course is full?**

Enrollments are always shifting as students get co-ops or change their course registrations. If a seat isn’t available in your preferred class right away, you can join the waitlist. To join a waitlist, enter the class CRN (the 5 numbers in parentheses next to the course number above) directly into your registration sheet and hit submit. You will then have an option to select “waitlist” from a drop down menu. The waitlist system will automatically inform you when a seat opens up. When a seat opens up, you need to just log into your account and accept it within the 24 hour time limit.

**How do I register for the Co-op course?**

One of the requirements to become eligible to go on Co-op Experience is to take ENCP 6100 Introduction to Cooperative Education. This course is available in both fall and spring semesters. CRN for the Industrial Engineering Co-op section is 37414.

**Will I get a bill by registering for courses?**

Your first e-bill is generated when you register for your courses. You will receive an e-bill from the university with instructions on how to pay the e-bill. If you have questions about payment, please contact the Student Financial Services at: http://www.northeastern.edu/financialaid/
How do I get a MyNEU account?

After you confirm your enrollment, you will be able to utilize your MyNEU portal. If you have not yet set up your MyNEU account then please login to your electronic application and look for instructions to do so at the link: https://app.applyyourself.com/AYApplicantLogin/fl_ApplicantConnectLogin.asp?id=neu-grad

We wish you all the best and look forward to working with you.

Sincerely,

Graduate School of Engineering
Northeastern University
360 Huntington Avenue
Boston, MA 02115

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MS Operations Research Curriculum

Operations Research
www.coe.neu.edu/degrees/interdisciplinary-engineering
HANCHEN HUANG, PHD
Professor and Chair
NADER JALILI, PHD
Professor and Associate Chair for Graduate Studies and Research
EMANUEL S. MELACHRINOU DIS, PHD
Associate Professor, Associate Chair and Director of Operations Research Graduate Program

334 Snell Engineering Center
617.373.2740
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Operations research (OR) deals with the application of scientific methods to decision making. Students have an opportunity to learn how to develop and solve mathematical and computer models of systems using optimization and statistical methods. OR graduates work in a wide variety of fields, such as transportation, supply chain operations, communications and computer operations, manufacturing, finance, and healthcare. The OR program is offered jointly by the Department of Mechanical and Industrial Engineering (MIE) and the Department of Mathematics, thus achieving a unique balance of theory and application.
Master of Science Degrees

REQUIREMENTS
To be eligible for admission to any of the Master of Science (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 GPA of 3.000. Students may pursue any program either on a full- or part-time basis; however, certain restrictions may apply as described below.

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. Other students may choose to complete a thesis, project, or pursue their degree on a course-work-only (also known as nonthesis) basis. Students who complete the thesis option must make a presentation at a thesis defense before approval by the department.

SPECIAL COURSE REQUIREMENTS
All MIE MS students in thesis or project options (excluding MS students in engineering management and Gordon Engineering Leadership programs), who have entered in or after the fall 2012 semester, must complete MEIE 6800 Technical Writing and MEIE 6850 Research Seminar in Mechanical and Industrial Engineering, preferably during their 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 who entered in or after fall 2014 must take MEIE 6850 as part of their course work requirement, while 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 non-thesis students are advised by the academic advisor designated for their respective concentration or program. Thesis-option MS 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 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 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 signed Plan of Study (PS) to the department before enrolling in second-semester courses. This form helps the students in managing their course work as well as helping the department to plan for offering the requested courses. The PS form may be modified at any time as the students proceed 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 by the student’s academic advisor.

Operations research students must select all required course work, typically consisting of six or more courses, from the list below. Each student’s academic advisor must approve all courses prior to registration. Students may not use any courses taken without the approval of the academic advisor toward the 32-semester-hour minimum requirement. However, students may petition the MIE graduate affairs committee to substitute no more than one (4-semester-hour) graduate-level course from outside the approved list of electives. This may include independent study. An independent study must be approved by the research advisor (for thesis option) and academic advisor (for nonthesis option). 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.

<table>
<thead>
<tr>
<th>Degree Requirements</th>
<th>Course</th>
<th>Work Only</th>
<th>With Project</th>
<th>With Thesis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required core courses</td>
<td>16 SH</td>
<td>16 SH</td>
<td>16 SH</td>
<td></td>
</tr>
<tr>
<td>Elective courses</td>
<td>16 SH</td>
<td>12 SH</td>
<td>8 SH</td>
<td></td>
</tr>
<tr>
<td>MEIE 6800 Technical Writing</td>
<td>N/A</td>
<td>0 SH</td>
<td>0 SH</td>
<td></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>
<td></td>
</tr>
<tr>
<td>Project/Thesis</td>
<td>4 SH</td>
<td>32 SH</td>
<td>32 SH</td>
<td></td>
</tr>
<tr>
<td>Minimum semester hours required</td>
<td>32 SH</td>
<td>32 SH</td>
<td>32 SH</td>
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</tbody>
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**MSOR—Master of Science in Operations Research**
Complete all courses and requirements listed below unless otherwise indicated.

**GENERAL REQUIREMENTS**

**Required Courses**

| Course                              | 4 SH |
| IE 6200 Engineering Probability and Statistics |    |
| or MATH 7241 Probability I |    |
| OR 7245 Network Analysis and Advanced Optimization |    |
| or MATH 7234 Optimization and Complexity |    |
OR 7230  Probabilistic Operation Research  4 SH
or MATH 7341  Probability 2  4 SH

OR 6205  Deterministic Operations Research  4 SH

OPTIONS
Select one of the following options:

Course Work Option
Complete four of the following courses:
CS 5800  Algorithms  4 SH
CS 6140  Machine Learning  4 SH
CS 7805  Theory of Computation  4 SH
CSYE 6200  Concepts of Object-Oriented Design  4 SH
CSYE 6205  Concepts of Object-Oriented Design with C++
CSYE 6210  Component Software Development  4 SH
EECE 7313  Pattern Recognition  4 SH
EECE 7360  Combinatorial Optimization  4 SH
EMGT 5220  Engineering Project Management  4 SH
EMGT 5300  Engineering/Organizational Psychology  4 SH
EMGT 6225  Economic Decision Making  4 SH
EMGT 6305  Financial Management for Engineers  4 SH
IE 5400  Healthcare Systems Modeling and Analysis  4 SH
IE 5500  Systems Engineering in Public Programs  4 SH
IE 5617  Lean Concepts and Applications  4 SH
IE 5620  Mass Customization  4 SH
IE 5630  Biosensor and Human Behavior Measurement  4 SH
IE 6300  Manufacturing Methods and Processes  4 SH
IE 7200  Supply Chain Engineering  4 SH
IE 7215  Simulation Analysis  4 SH
IE 7275  Data Mining in Engineering  4 SH
IE 7280  Statistical Methods in Engineering  4 SH
IE 7285  Statistical Quality Control  4 SH
IE 7290  Reliability Analysis and Risk Assessment  4 SH
IE 7315  Human Factors Engineering  4 SH
INFO 6205  Program Structure and Algorithms  4 SH
INFO 6210  Data Management and Database Design  4 SH
MATH 7232  Combinatorial Analysis  4 SH
MATH 7233  Graph Theory  4 SH
MATH 7342  Mathematical Statistics  4 SH
MATH 7346  Time Series  4 SH
MATH 7347  Statistical Decision Theory  4 SH
MATH 7349  Stochastic Calculus and Introduction to No-Arbitrage Finance  4 SH
OR 7235  Inventory Theory  4 SH
OR 7240  Integer and Nonlinear Optimization  4 SH
OR 7245  Network Analysis and Advanced Optimization  4 SH
OR 7250  Multi-Criteria Decision Making  4 SH
OR 7260  Constraint Programming  4 SH
OR 7310  Logistics, Warehousing, and Scheduling  4 SH

Project Option

PROJECT
OR 7945  Master’s Project  4 SH
MEIE 6800  Technical Writing Seminar  0 SH
MEIE 6850  Research Seminar in Mechanical and Industrial Engineering  0 SH

ELECTIVES
Complete three of the following courses:
CS 5800  Algorithms  4 SH
CS 6140  Machine Learning  4 SH
CS 7805  Theory of Computation  4 SH
CSYE 6200  Concepts of Object-Oriented Design  4 SH
CSYE 6205  Concepts of Object-Oriented Design with C++
CSYE 6210  Component Software Development  4 SH
EECE 7313  Pattern Recognition  4 SH
EECE 7360  Combinatorial Optimization  4 SH
EMGT 5220  Engineering Project Management  4 SH
EMGT 5300  Engineering/Organizational Psychology  4 SH
EMGT 6225  Economic Decision Making  4 SH
EMGT 6305  Financial Management for Engineers  4 SH
IE 5400  Healthcare Systems Modeling and Analysis  4 SH
IE 5500  Systems Engineering in Public Programs  4 SH
IE 5617  Lean Concepts and Applications  4 SH
IE 5620  Mass Customization  4 SH
IE 5630  Biosensor and Human Behavior Measurement  4 SH
IE 6300  Manufacturing Methods and Processes  4 SH
IE 7200  Supply Chain Engineering  4 SH
IE 7215  Simulation Analysis  4 SH
IE 7275  Data Mining in Engineering  4 SH
IE 7280  Statistical Methods in Engineering  4 SH
IE 7285  Statistical Quality Control  4 SH
IE 7290  Reliability Analysis and Risk Assessment  4 SH
IE 7315  Human Factors Engineering  4 SH
INFO 6205  Program Structure and Algorithms  4 SH
INFO 6210  Data Management and Database Design  4 SH
MATH 7232  Combinatorial Analysis  4 SH
MATH 7233  Graph Theory  4 SH
MATH 7342  Mathematical Statistics  4 SH
MATH 7346  Time Series  4 SH
MATH 7347  Statistical Decision Theory  4 SH
MATH 7349  Stochastic Calculus and Introduction to No-Arbitrage Finance  4 SH
OR 7235  Inventory Theory  4 SH
OR 7240  Integer and Nonlinear Optimization  4 SH
OR 7245  Network Analysis and Advanced Optimization  4 SH
OR 7250  Multi-Criteria Decision Making  4 SH
OR 7260  Constraint Programming  4 SH
OR 7310  Logistics, Warehousing, and Scheduling  4 SH

**Thesis Option**

**THESIS**

Requires 8 semester hours:

OR 7990  Thesis  1 to 8 SH
MEIE 6800  Technical Writing Seminar  0 SH
MEIE 6850  Research Seminar in Mechanical and Industrial Engineering  0 SH

**ELECTIVES**

Complete two of the following courses:

CS 5800  Algorithms  4 SH
CS 6140  Machine Learning  4 SH
CS 7805  Theory of Computation  4 SH
CSYE 6200  Concepts of Object-Oriented Design  4 SH
CSYE 6205  Concepts of Object-Oriented Design with C++
CSYE 6210  Component Software Development  4 SH
EECE 7313  Pattern Recognition  4 SH
EECE 7360  Combinatorial Optimization  4 SH
EMGT 5220  Engineering Project Management  4 SH
EMGT 5300  Engineering/Organizational Psychology  4 SH
EMGT 6225  Economic Decision Making  4 SH
EMGT 6305  Financial Management for Engineers  4 SH
IE 5400  Healthcare Systems Modeling and Analysis  4 SH
IE 5500  Systems Engineering in Public Programs  4 SH
IE 5617  Lean Concepts and Applications  4 SH
IE 5620  Mass Customization  4 SH
IE 5630  Biosensor and Human Behavior Measurement  4 SH
IE 6300  Manufacturing Methods and Processes  4 SH
IE 7200  Supply Chain Engineering  4 SH
IE 7215  Simulation Analysis  4 SH
IE 7275  Data Mining in Engineering  4 SH
IE 7280  Statistical Methods in Engineering  4 SH
IE 7285  Statistical Quality Control  4 SH
IE 7290  Reliability Analysis and Risk Assessment  4 SH
IE 7315  Human Factors Engineering  4 SH
INFO 6205  Program Structure and Algorithms  4 SH
INFO 6210  Data Management and Database Design  4 SH
MATH 7232  Combinatorial Analysis  4 SH
MATH 7233  Graph Theory  4 SH
MATH 7342  Mathematical Statistics  4 SH
MATH 7346  Time Series  4 SH
MATH 7347  Statistical Decision Theory       4 SH  
MATH 7349  Stochastic Calculus and Introduction to No-Arbitrage Finance       4 SH  
OR 7235   Inventory Theory       4 SH  
OR 7240   Integer and Nonlinear Optimization       4 SH  
OR 7245   Network Analysis and Advanced Optimization       4 SH  
OR 7250   Multi-Criteria Decision Making       4 SH  
OR 7260   Constraint Programming       4 SH  
OR 7310   Logistics, Warehousing, and Scheduling       4 SH  

**Engineering Leadership Option**

Students completing this option receive the graduate certificate in engineering leadership in addition to the master’s degree. Students must APPLY and be admitted to the Gordon Engineering Leadership program in order to pursue this option.

**LEADERSHIP**

ENLR 5121   Engineering Leadership 1       2 SH  
ENLR 5122   Engineering Leadership 2       2 SH  

**FOUNDATIONS**

ENLR 5131   Scientific Foundations of Engineering 1       2 SH  
ENLR 5132   Scientific Foundations of Engineering 2       2 SH  

**PROJECT**

OR 7440   Operations Research Engineering Leadership Challenge Project 1       4 SH  
OR 7442   Operations Research Engineering Leadership Challenge Project 2       4 SH  

**PROGRAM CREDIT/GPA REQUIREMENTS**

32 total semester hours required  
Minimum 3.000 GPA required