Engineering Management, MSEM

The Master of Science in Engineering Management (https://mie.northeastern.edu/academics/graduate-studies/ms-engm/) offers graduate students an opportunity to develop both technical expertise and business competence that is in high demand among prospective technology-based employers. Industry leaders are seeking qualified and talented individuals who are not only able to guide research and design teams but also able to direct and supervise development and production processes. The combination of technical proficiency and business skills fostered in the engineering management program is designed to provide a competitive edge for graduates seeking a wide range of positions in technology-based product or service industries, as well as in comparable local, state, and federal agencies and programs.

The program was designed by experienced high-level managers and academic leaders as an option for engineers and scientists to broaden their skill sets to include management tools and techniques that are applicable to technology-based industries. Graduates of the engineering management program work as project managers or leaders of teams in technology-based industries. Upon completion of the program, students find that their acquired skills are applicable to a wide range of industries, primarily those focused upon the development of technical products and the management of technical projects.

Graduates may assist companies in bringing a product from an idea through its development phases to its introduction to the marketplace. They may also be involved in forming and managing teams for assessing cost-effectiveness, formulating strategies to improve production, or analyzing a company's supply chain. Most of these projects cannot be successfully completed without the skills of those possessing a background in management decision making and engineering expertise; therefore, the engineering management graduate is often a technical liaison to all levels of management. As a result, many of the assignments held by engineering management graduates have actually proven to be a gateway to upper-level management positions.

The current program of study can be taken on a part-time or full-time basis on-ground or online. There are four core courses required of all students, which have been formulated to satisfy the foundation requirements of economic decision making, decision-making mathematics, and project management. In addition to these required courses, the curriculum consists of electives that allow students to choose either a broad-based program of study or one centered on a particular concentration. Some students may elect to refresh or enhance their technical skills in engineering-based subjects such as information systems, computer systems engineering, or graduate courses from the traditional engineering disciplines. Other students may prefer to broaden their knowledge base by selecting coursework 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."

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 coursework (exclusive of any preparatory courses) with a minimum grade-point average of 3.000. Students can complete a master's degree by pursuing any of one of the three tracks: coursework 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.

Academic and Research Advisors

All nonthesis students are advised by the faculty advisor designated for their respective concentration or program. Students willing to pursue the thesis option must first find a research advisor within their first year of study. The research advisor will guide the students' thesis work, and thesis reader(s) may be assigned at the discretion of their research advisor. The research advisor must be a full-time or jointly appointed faculty. If the research advisor is outside the MIE department, before the thesis option can be approved, a faculty member with 51% or more appointments in the MIE department must be chosen as co-advisor, and a petition must be filed and approved by the co-advisor and the MIE Graduate Affairs Committee. Thesis option students are advised by the faculty advisor of their concentration before they select their research advisor(s). The research advisor and co-advisor must serve as thesis readers.

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 coursework 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 coursework needs, all MS students are strongly encouraged to complete and submit a fully signed Plan of Study to the department before enrolling in second-semester courses. This form not only helps the students manage their coursework, but it also 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.

Students pursuing study or research under the guidance of a faculty member can choose project option by taking Master's Project (EMGT 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 project course; a brief description of the goals; as well as the expected outcomes, deliverables, and grading scheme.

Options for MS Students (Coursework 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 the thesis option. Students are strongly encouraged to complete 4 semester hours of Master's Project (EMGT 7945) followed by 4 semester hours of Thesis (EMGT 7990) over two consecutive semesters.

Students who complete the thesis option must make a presentation of their thesis before approval by the department. The MS thesis presentation shall be publicly advertised at least one week in advance and all faculty members and students may attend and participate. If deemed appropriate by the research advisor, other faculty members may be invited to serve as thesis readers to provide technical opinions and judge the quality of the thesis and presentation.

Change of Program/Concentration

Students enrolled in any of the MIE department programs or concentrations may change their current program or concentration no sooner than the beginning of their second full-time semester of study. In order for the program or concentration change request to be considered by the MIE Graduate Affairs Committee, the student must not be in the first semester of their current program, must have a 3.300 GPA, and have completed at least 8 semester hours of required coursework in their sought program at Northeastern.

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 (https://catalog.northeastern.edu/graduate/engineering/graduate-certificate-programs/).

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 (https://catalog.northeastern.edu/graduate/engineering/multidisciplinary/engineering-leadership-graduate-certificate/). 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 BUSINESS

Master's Degree in Engineering Management with Graduate Certificate in Engineering Business

Students may complete a Master of Science in Engineering Management in addition to earning a Graduate Certificate in Engineering Business. Students must apply and be admitted to the Galante Engineering Business Program in order to pursue this option. The program requires the applicant to have earned or be in a program to earn a Bachelor of Science in Engineering from Northeastern University. The integrated 32-semester-hour degree and certificate will require 16 semester hours of the engineering management core courses and 16 semester hours from the outlined business-skill curriculum. The coursework, along with participation in cocurricular professional development elements, earn the Graduate Certificate in Engineering Business (https://catalog.northeastern.edu/graduate/engineering/mechanical-industrial/engineering-business-graduate-certificate/).

Program Requirements

- Concentrations and course offerings may vary by campus and/or by program modality. Please consult with your advisor or admissions coach for the course availability each term at your campus or within your program modality.
- Certain options within the program may be *required* at certain campuses or for certain program modalities. Please consult with your advisor or admissions coach for requirements at your campus or for your program modality.

Core Requirements

Complete all courses and requirements listed below unless otherwise indicated. Students may not register for more than 9 semester hours in the fall, spring, and summer terms.

Code	Title	Hours
Required Courses		
EMGT 5220	Engineering Project Management	4
EMGT 6225	Economic Decision Making	4
IE 6200	Engineering Probability and Statistics	4
OR 6205	Deterministic Operations Research	4

Options

Complete one of the following options:

COURSEWORK OPTION

Code	Title	Hours
Complete 8 semester hours from the course list below. (p. 3)		8

PROJECT OPTION

Code	Title	Hours
EMGT 7945	Master's Project	4
Complete 4 semester hours from the course list below. (p. 3)		4

THESIS OPTION [1]

Code	Title	Hours
EMGT 7945	Master's Project	4
EMGT 7990	Thesis	4

In addition to completing the thesis course, students must successfully complete the thesis submission process, including securing committee and Graduate School of Engineering signatures and submission of an electronic copy of their MS thesis to ProQuest.

ONLINE OPTION

Code	Title	Hours
Complete 8 semester hours from the course list below. (p. 3)		8
Courses offered online can be found on the online course list below. (p. 5)		

Concentration or Electives Option

A concentration is not required. Students may complete electives in lieu of a concentration.

- Digital Product Management (p. 3)
- Electives (p. 3)

Program Credit/GPA Requirements

32 total semester hours required
Minimum 3.000 GPA required

1 Thesis option is required for all students who receive financial support from the university in the form of a research, teaching, or tuition assistantship.

DIGITAL PRODUCT MANAGEMENT CONCENTRATION

Code	Title	Hours
EMGT 6700	Digital Product Design and Management	4
EMGT 6750	Advanced Product Management	4

ELECTIVES OPTION

Code	Title	Hours
Complete 8 semester hours from the course list below, not used to fulfil other requirements of the program. (p. 3)		8

ELECTIVE COURSE LIST

Code	Title	Hours
CSYE 7280	User Experience Design and Testing	
DAMG 6210	Data Management and Database Design	

EMGT 5300	Engineering/Organizational Psychology
EMGT 6305	Financial Management for Engineers
EMGT 6600	Engineering Team Performance
EMGT 6700	Digital Product Design and Management
ENSY 5000	Fundamentals of Energy System Integration
GE 5010	Customer-Driven Technical Innovation for Engineers
GE 5020	Engineering Product Design Methodology
GE 5030	Iterative Product Prototyping for Engineers
GE 5100	Product Development for Engineers
IE 5137	Computational Modeling in Industrial Engineering
IE 5374	Special Topics in Industrial Engineering
IE 5390	Structured Data Analytics for Industrial Engineering
IE 5400	Healthcare Systems Modeling and Analysis
IE 5500	Systems Engineering in Public Programs
IE 5617 and IE 5618	Lean Concepts and Applications and Recitation for IE 5617
IE 5640	Data Mining for Engineering Applications
IE 6300	Manufacturing Methods and Processes
IE 6500	Human Performance
IE 6600	Computation and Visualization for Analytics
IE 6962	Elective
IE 7200	Supply Chain Engineering
IE 7215	Simulation Analysis
IE 7270	Intelligent Manufacturing
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 7374	Special Topics in Industrial Engineering
IE 7615	Neural Networks and Deep Learning
INFO 6215	Business Analysis and Information Engineering
INFO 7245	Agile Software Development
INFO 7285	Organizational Change and IT
INFO 7385	Managerial Communications for Engineers
ME 5645	Environmental Issues in Manufacturing and Product Use
ME 6200	Mathematical Methods for Mechanical Engineers 1
OR 6500	Metaheuristics and Applications
OR 6962	Elective
OR 7230	Probabilistic Operation Research
OR 7240	Integer and Nonlinear Optimization
OR 7245	Network Analysis and Advanced Optimization
OR 7270	Convex Optimization and Applications
OR 7310	Logistics, Warehousing, and Scheduling
OR 7374	Special Topics in Operations Research
TELE 5330	Data Networking
or any EMGT, IE, or OR courses	

Electives Outside the College of Engineering

A maximum of 9 semester hours may be taken from the following toward the elective requirement:

DA 5020	Collecting, Storing, and Retrieving Data
ENTR 6212	Business Planning for New Ventures
ENTR 6218	Business Model Design and Innovation
ENTR 6219	Financing Ventures from Early Stage to Exit
ENTR 6240	Emerging and Disruptive Technologies

ENTR 6241	Entrepreneurial Marketing and Selling
ENTR 6250	Lean Design and Development
ENTR 6300	Managing a Technology-Based Business
ENTR 6340	The Technical Entrepreneur as Leader
INNO 6200	Enterprise Growth and Innovation
SCHM 6211	Logistics and Transportation Management
SCHM 6213	Global Supply Chain Strategy
SCHM 6214	Sourcing and Procurement
SCHM 6215	Supply Chain Analytics
SCHM 6221	Sustainability and Supply Chain Management
SCHM 6223	Managing Healthcare Supply Chain Operations
SCHM 6224	Demand Planning and Forecasting

Online Course List

Code	Title	Hours
EMGT 5300	Engineering/Organizational Psychology	
EMGT 6305	Financial Management for Engineers	
ENSY 5000	Fundamentals of Energy System Integration	
IE 5640	Data Mining for Engineering Applications	
IE 6300	Manufacturing Methods and Processes	
IE 7200	Supply Chain Engineering	
IE 7215	Simulation Analysis	
IE 7280	Statistical Methods in Engineering	
IE 7285	Statistical Quality Control	
IE 7290	Reliability Analysis and Risk Assessment	
IE 7315	Human Factors Engineering	
INFO 6215	Business Analysis and Information Engineering	
ME 5645	Environmental Issues in Manufacturing and Product Use	
ME 6200	Mathematical Methods for Mechanical Engineers 1	
OR 7230	Probabilistic Operation Research	
OR 7240	Integer and Nonlinear Optimization	
OR 7310	Logistics, Warehousing, and Scheduling	