Mechanical and Industrial Engineering

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The Department of Mechanical and Industrial Engineering offers two accredited programs leading to a Bachelor of Science in industrial engineering and a Bachelor of Science in mechanical engineering. Five-year Bachelor of Science/Master of Science PlusOne programs in the above two disciplines are also available. In addition, the department offers the following minors: (a) minor in industrial engineering, (b) minor in mechanical engineering, and (c) minor in biomechanical engineering.

Our mission is to educate persons for professional and technical excellence; to perform research to advance the science and practice of engineering; to engage in service activities that instill in ourselves and our students habits and attitudes that promote ethical behavior, professional responsibility, and careers that advance the well-being of society.

The program educational objectives for the mechanical engineering and industrial engineering programs are as follows. Graduates from our undergraduate programs will demonstrate technical excellence in their chosen fields, anticipate and respond to societal changes and develop careers with depth and flexibility, while retaining a professional and intellectual thrust throughout. Specifically, (1) graduates will contribute to the advancement of the mechanical or industrial engineering field, while satisfying the expectations of their employers and displaying leadership in the larger community; and (2) graduates will engage in activities that promote professional development and personal growth.

Mechanical Engineering

Mechanical engineering involves the design, development, and manufacture of machinery and devices to transmit power or to convert energy from thermal to mechanical form in order to power the modern world and its machines. Its current practice has been heavily influenced by recent advances in computer hardware and software.

Mechanical engineers use computers to formulate preliminary and final designs of systems or devices, to perform calculations that predict the behavior of the design, and to collect and analyze performance data from system testing or operation.

Traditionally, mechanical engineers have designed and tested devices, such as heating and air-conditioning systems, machine tools, internal-combustion engines, and steam power plants. Today they also play primary roles in the development of new technologies in a variety of fields—energy conversion, solar energy utilization, environmental control, prosthetics, transportation, manufacturing, and new-materials development.

The curriculum in mechanical engineering focuses on four areas: applied mechanics, thermofluids engineering, materials science, and controls. Applied mechanics is the study of the motion and deformation of structural elements acted on by forces in devices that range from rotating industrial dynamos to dentists’ drills. Thermofluids engineering deals with the motion of fluids and the transfer of energy, as in the cooling of electronic components or the design of gas turbine engines. Materials science is concerned with the relationship between the structure and properties of materials and with the control of structure, through processing, to achieve desired properties. Practical applications are in the development of composite materials, metallurgical process industries, and advanced functional materials. Controls are critical to any engineered system in which sensors and actuators of several types communicate and function.

Courses in each area form the foundation for advanced analytical and creative design courses that culminate in a two-semester capstone design project. Faculty encourages students throughout the curriculum to use computer-aided design tools and high-performance computer workstations.

More than 90 percent of department undergraduate students take advantage of the cooperative education program. Cooperative education assignments increase in responsibility and technical challenge as students progress through the program. Initial positions may involve computer-intensive CAD/CAM assignments or programming tasks, while more advanced jobs will place students in charge of design, quality-control systems, and performance testing of equipment.

BSME—Bachelor of Science in Mechanical Engineering

Complete all courses listed below unless otherwise indicated. Also complete any corequisite labs, recitations, clinicals, or tools courses where specified.

NU Core Requirements
See page Error! Bookmark not defined. for requirement list.

Major GPA Requirement
2.000 minimum GPA required in ME, IE, and MEIE courses

Mathematics/Science Requirement
Complete 36 semester hours in mathematics and science as indicated below:

Required Mathematics/Science
BIOL 1115 General Biology 1 for Engineers 4 SH
Required Engineering
at the Northeastern University, covering EMGT, ENGR, IE, ME, or MEIE.

Complete one technical elective in one of the following subjects:
- Mechanical and Industrial Engineering Technical Elective (MEIE)
- ME
- EECE

Complete 68 semester hours in engineering as indicated below:

**Supplemental Credit**
Partial credit from the following courses counts toward the engineering requirement:
- GE 1110 Engineering Design 4 SH
- GE 1111 Engineering Problem Solving and Computation 4 SH

**ENGINEERING**
Complete 68 semester hours in engineering as indicated below:

**Required Engineering**
- EECE 2210 Electrical Engineering 4 SH
- EECE 2211 Lab for EECE 2210 1 SH
- ME 2340 Introduction to Material Science 4 SH
- ME 2341 Lab for ME 2340 1 SH
- ME 2350 Engineering Mechanics and Design 4 SH
- ME 2355 Mechanics of Materials 4 SH
- ME 2356 Lab for ME 2355 1 SH
- ME 2380 Thermodynamics 4 SH
- ME 3455 Dynamics and Vibrations 4 SH
- ME 3456 Lab for ME 3455 1 SH
- ME 3475 Fluid Mechanics 4 SH
- ME 3480 International Applications of Fluid Mechanics 4 SH
- ME 4505 Measurement and Analysis with Thermal Science Application 4 SH
- ME 4506 Lab for ME 4505 1 SH
- ME 4508 Mechanical Engineering Computation and Design 4 SH
- ME 4550 Mechanical Engineering Design 4 SH
- ME 4555 System Analysis and Control 4 SH
- ME 4570 Thermal Systems Analysis and Design 4 SH
- MEIE 4701 Capstone Design 1 1 SH
- MEIE 4702 Capstone Design 2 5 SH

**Mechanical and Industrial Engineering Technical Elective**
Complete one technical elective in one of the following subject areas: EMGT, ENGR, IE, ME, or MEIE.

**Supplemental Credit**
Partial credit from the following courses counts toward the engineering requirement:
- GE 1110 Engineering Design 4 SH
- GE 1111 Engineering Problem Solving and Computation 4 SH

**PROFESSIONAL DEVELOPMENT**
**Required Professional Development**
- GE 1000 Introduction to the Study of Engineering 1 SH
- MEIE 2000 Introduction to Engineering Co-op Education 1 SH
- MEIE 3000 Professional Issues in Engineering 1 SH

**Additional Required Courses**
Partial credit for the following courses counts toward requirements above:
- GE 1110 Engineering Design 4 SH
- GE 1111 Engineering Problem Solving and Computation 4 SH

**ADDITIONAL NU CORE COURSES**

**Writing**
A grade of C or higher is required in each course:
- ENGW 1111 First-Year Writing 4 SH
- ENGW 3302 Advanced Writing in the Technical Professions or ENGW 3315 Interdisciplinary Advanced Writing in the Disciplines 4 SH

**Arts/Humanities Level 1**
Complete one course from the NU Core arts/humanities level 1 domain, as described on page Error! Bookmark not defined..

**Social Science Level 1**
Complete one course from the NU Core social science level 1 domain, as described on page Error! Bookmark not defined..

**REQUIRED GENERAL ELECTIVES**
Complete four academic, nonremedial, nonrepetitive courses, each equivalent to 4 semester hours.

**COURSE WORK THAT DOES NOT COUNT TOWARD THE ENGINEERING DEGREE**
Students in engineering are allowed to count a maximum of two pass/fail courses toward their degree program. Only general electives outside the College of Engineering may be taken on a pass/fail grading basis. A maximum of one pass/fail course is allowed per semester.

**GENERAL ELECTIVES**
Additional courses taken beyond college and major course requirements to satisfy graduation credit requirements.
COOPERATIVE EDUCATION

RESIDENCY REQUIREMENT
Students must earn a minimum of 64 Northeastern University semester hours in order to receive a bachelor’s degree.

UNIVERSITY-WIDE REQUIREMENTS
141 total semester hours required
Minimum 2.000 GPA required