communicate and function. Any engineered system in which sensors and actuators of several types are in the development of composite materials, metallurgical process through processing, to achieve desired properties. Practical applications 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. Mechatronics is 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 encourage students throughout the curriculum to use computer-aided design tools and high-performance computer workstations.

**Industrial Engineering**

Industrial engineers design and analyze systems that include people, equipment, and materials and their interactions and performance in the workplace. An industrial engineer collects this information and evaluates alternatives to make decisions that best advance the goals of the enterprise. Industrial engineers work in manufacturing firms, hospitals, banks, public utilities, transportation, government agencies, insurance companies, and construction firms. Among the projects they undertake are design and implementation of a computer-integrated supply chain or manufacturing system, facilities planning for a variety of industries, design of a robotics system in a manufacturing environment, long-range corporate planning, development and implementation of a quality-control system, simulation analyses to improve processes and make operational decisions, design of healthcare operations to enhance patient safety and improve efficiency, productivity, and development of computer systems for information control.

The program in industrial engineering offers students a base of traditional engineering courses, such as work design, human-machine systems, probability, statistics, and engineering economy, while emphasizing such contemporary areas as simulation modeling, engineering database systems, quality assurance, logistics and supply chain management, operations research, and facilities planning. Students integrate the knowledge acquired in these courses in a two-semester capstone design project.

**Other Programmatic Features**

More than 90 percent of the department’s undergraduate students take advantage of the cooperative education program. Cooperative education assignments increase in responsibility and technical challenge as students progress through the program. Entry-level co-op positions in mechanical engineering may be in manufacturing, quality assurance and testing, or involve 3D CAD modeling, while more advanced-level positions will allow students to gain experience in the design process, including advanced 3D modeling, design for manufacturability, prototyping, and systems engineering. Students in the industrial engineering discipline may utilize co-op to concentrate on one industry segment and build an increasingly technical skill set with each experience or explore the breadth of career opportunities over the course of several co-op rotations such as healthcare process improvement, supply chain logistics, business analytics, manufacturing operations, and more.

The department also offers significant research opportunities throughout all fields of mechanical and industrial engineering, including participating in research centers based in our department and college.

Our students have an opportunity to obtain a broad knowledge base in science, engineering, and general studies that allows them flexibility in career development and graduate education. At the same time, our graduates should be responsible and scientifically educated citizens, prepared to contribute personally as well as professionally to an educated, democratic society.
Programs

Bachelor of Science in Industrial Engineering (BSIE)
- Industrial Engineering (http://catalog.northeastern.edu/undergraduate/engineering/mechanical-industrial/bsie/)

Bachelor of Science in Mechanical Engineering (BSME)
- Mechanical Engineering (http://catalog.northeastern.edu/undergraduate/engineering/mechanical-industrial/bsme/)
- Mechanical Engineering and Design (http://catalog.northeastern.edu/undergraduate/engineering/mechanical-industrial/mechanical-engineering-design-bsme/)
- Mechanical Engineering and History (http://catalog.northeastern.edu/undergraduate/engineering/mechanical-industrial/mechanical-engineering-history-bsme/)
- Mechanical Engineering and Physics (http://catalog.northeastern.edu/undergraduate/engineering/mechanical-industrial/mechanical-engineering-physics-bsme/)

Minors
- Aerospace (http://catalog.northeastern.edu/undergraduate/engineering/mechanical-industrial/aerospace-minor/)
- Biomechanical Engineering (http://catalog.northeastern.edu/undergraduate/engineering/mechanical-industrial/biomechanical-engineering-minor/)
- Healthcare System Operation (http://catalog.northeastern.edu/undergraduate/engineering/mechanical-industrial/healthcare-system-operations-minor/)
- Industrial Engineering (http://catalog.northeastern.edu/undergraduate/engineering/mechanical-industrial/industrial-engineering-minor/)
- Mechanical Engineering (http://catalog.northeastern.edu/undergraduate/engineering/mechanical-industrial/mechanical-engineering-minor/)
- Robotics (http://catalog.northeastern.edu/undergraduate/engineering/electrical-computer/robotics-minor/)

Accelerated Programs
See Accelerated Bachelor/Graduate Degree Programs (http://catalog.northeastern.edu/undergraduate/engineering/accelerated-bachelor-graduate-degree-programs/#programstext)