Industrial Engineering, B.S.E.

**Requirements**

The Bachelor of Science in Engineering requires a minimum of 128 s.h. Students must have a g.p.a. of at least 2.00 on all college work used to satisfy degree requirements as well as on all work undertaken at the University of Iowa.

The major in industrial engineering requires a strong foundation of courses in engineering science, mathematics, design, manufacturing, social science, and humanities. Advanced work includes specialty courses in human factors and ergonomics, management, information systems, manufacturing, quality control, and operations research. Design is an integral part of the undergraduate program; all students complete a comprehensive design experience.

All engineering students complete the B.S.E. core requirements, which include RHET:1030 Rhetoric, ENGR:1100 Introduction to Engineering Problem Solving, ENGR:1300 Introduction to Engineering Computing, and courses in chemistry, engineering mathematics and fundamentals, and physics.

They also complete the curriculum designed for their major program, which covers four major stems: mathematics and basic sciences, engineering topics, a focus area, and the general education component. For information about the curriculum, see the Bachelor of Science in Engineering in the Catalog.

Students must select focus area elective courses specific to the Department of Industrial and Systems Engineering.

**Focus Areas**

The industrial engineering program offers a variety of focus area options, including big data analytics, computer and information systems, design and manufacturing, entrepreneurship, human factors and ergonomics, management, and an option to tailor a focus area to an individual student's interests. For a list of standard industrial engineering focus area options and guidelines for tailored focus areas, see undergraduate EFAs and Specialized Opportunities on the Department of Industrial and Systems Engineering website.

**Big Data Analytics**

Big data analytics is the process of examining big data in an effort to uncover hidden patterns, unknown correlations, and other useful information. Ninety-five percent of the data in the world today has been created in the last two years alone. This data comes from everywhere: sensors used to gather climate information, posts to social media sites, digital pictures and videos, purchase transaction records, and cell phone GPS signals to name a few.

**Computer and Information Systems**

Industrial engineers have a natural role to play in this field by using quantitative system analysis, manufacturing system knowledge, and human factors skills to help design and refine computer systems that are becoming ever more complex. The field offers substantial opportunities for technical skill development, travel, and interaction with a diverse range of professionals.

**Design and Manufacturing**

Many graduates find careers in manufacturing industries that include the use of computer-aided design and manufacturing, virtual and physical prototyping, 3D design, design and simulation of manufacturing processes, and manufacturing systems. They find employment in diverse industries, including the supplier manufacturing industry (e.g., John Deere, Caterpillar, Rockwell Collins, Raytheon, Boeing), health care (e.g., Johnson & Johnson, Zimmer), software, and the information industry (e.g., Pro/Engineer, CATIA, SolidWorks, AutoCAD).

**Entrepreneurship**

Entrepreneurship allows engineering students to explore venture capital, marketability of products, and technology transfer. They gain exposure to understanding sound business practice, acquire team-building skills in both small and large companies, understand the entrepreneurial approach to acquiring and managing resources, learn how to create a business plan, and obtain valuable contacts and networking opportunities with businesses and industries.

**Human Factors and Ergonomics**

The human factors and ergonomics focus area represents an increasingly important engineering specialty. The dramatic increase in netcentric computer technology makes system performance increasingly dependent on the match between system characteristics and human capabilities. Graduates find employment in diverse industries that include health care (e.g., GE, Medtronic, Guidant), original equipment manufacturer (OEM) and supplier manufacturing industry (e.g., Rockwell Collins, Boeing, Deere, Caterpillar), computer systems (e.g., Microsoft, Intel, IBM), the government (e.g., NHTSA, NTSB, NASA, the Department of Defense), and consulting (e.g., Accenture, Battelle). Human factors considers cognitive characteristics, and ergonomics considers physical characteristics. This focus area provides advanced education in psychology, systems, statistics, and biomechanics.

**Management**

Industrial engineers are often assigned managerial tasks, project management, and financial assessments as they relate to project budgets, cost calculations, and optimization criteria. This focus area prepares students for a career in business management.

**Tailored**

Students work with their advisor to tailor a program that is specific to their individual needs.