Industrial Engineering, BSE

The major in industrial engineering requires a strong foundation of courses in engineering science, mathematics, design, manufacturing, social science, and the 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.

The Department of Industrial and Systems Engineering offers a host of options for each engineering student. From the undergraduate engineering degree, a dual Undergraduate to Graduate (U2G) degree, focus areas, and extracurricular activities, there are many options available to explore and develop professional skills. The industrial and systems engineering undergraduate program emphasizes a broad education in engineering fundamentals and the opportunity for in-depth learning in a focus area.

Programs designed to lead to professional licensure are subject to federal regulations regarding informational disclosures. Please see Professional Licensure Disclosures by Program for further information.

Focus Areas and Specialized Opportunities

As part of the mission to help students be engineers and something more, the Department of Industrial and Systems Engineering offers a variety of focus area options so that students can pursue specialized interests. Industrial engineering focus areas include 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.

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—95% of the data in the world today has been created in the last few 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, Collins Aerospace, Raytheon, Boeing), health care (e.g., Johnson & Johnson, Zimmer), software, and the information industry (e.g., Creo Parametric, 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 practices, 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, Medtronics, Guidant), original equipment manufacturer (OEM) and supplier manufacturing industry (e.g., Collins Aerospace, Boeing, John 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 engineering and business management.

Tailored

Students work with an advisor to tailor a program that is specific to their individual needs. For more information about guidelines for tailored focus areas, see Focus Areas on the Department of Industrial and Systems Engineering website.

Student Organizations

Student organizations can have an enormous impact on an undergraduate student's career. The College of Engineering is home to a number of student organizations and clubs. Popular organizations for industrial and systems engineering students include the Institute of Industrial and Systems Engineers (IISE) and the Human Factors and Ergonomics Society (HFES).

Undergraduate Resources

Undergraduate resources are available to students to pursue research, access professional services available in the college and across the university, and participate in or view sports and arts events on campus and around town.

Scholarships

A variety of engineering scholarships and funding opportunities are available to industrial and systems engineering students.

Accreditation

The undergraduate program in industrial engineering is accredited by the Engineering Accreditation Commission of ABET.

Educational Objectives

The following educational objectives of the program are defined in conjunction with the accreditation process.

Within a few years of graduation, industrial engineering graduates will:

- continue learning;
- lead and inspire others; and
- engage in the community and society.