Industrial Engineering, B.S.E.

The educational objective of the Bachelor of Science in Engineering (B.S.E.) program in industrial engineering is to produce graduates who, within a few years of graduation:

- will have successful careers in engineering and beyond and will have assumed professional roles of increasing responsibility and impact;
- will have acquired new knowledge and expertise through professional development opportunities or advanced education; and
- will be engaged in workplace, professional, or civic communities.

Visit Industrial Engineering Program Educational Objectives on the Department of Mechanical and Industrial Engineering website to learn more.

Requirements

The Bachelor of Science in Engineering requires a minimum of 128 s.h. 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 must earn a grade of C-minus or higher in the core requirements MATH:1550 Engineering Mathematics I: Single Variable Calculus and MATH:1560 Engineering Mathematics II: Multivariable Calculus.

They also complete the curriculum designed for their major program, which covers four major stems: mathematics and basic sciences, engineering topics, an elective focus area, and the general education component (15 s.h. of humanities and social science courses). For information about the curriculum stems, see Bachelor of Science in Engineering in the Catalog.

Students must select elective focus area courses according to guidelines established by the Department of Mechanical and Industrial Engineering. See "Elective Focus Area" below.

Elective Focus Area

The industrial engineering program offers a variety of elective focus area options, including standard focus areas developed and maintained by the program and flexible focus areas tailored to individual student interests. For more detailed information about elective focus areas, see Bachelor of Science in Engineering in the Catalog. For a list of standard industrial engineering elective focus area options and guidelines for tailored elective focus areas, see the undergraduate Industrial Engineering Program page on the Department of Mechanical and Industrial Engineering website.

Joint B.S.E./M.S.

The College of Engineering offers a joint (fast-track) Bachelor of Science in Engineering/Master of Science for industrial engineering undergraduate students who intend to earn an M.S. in industrial engineering. B.S.E./M.S. students may take up to 12 s.h. of graduate-level course work, attend the program’s graduate seminar, and work with a faculty member on a master's thesis project while they are still undergraduates. They may count 6 s.h. of graduate course work toward both degrees. Once students complete the requirements for the bachelor's degree, they are granted the B.S.E., and they normally complete the M.S. one year later.

To be admitted to the joint degree program, students must have completed at least 80 s.h., have a cumulative g.p.a. of at least 3.25, and they must submit a letter of application to the chair of the Department of Mechanical and Industrial Engineering.

Some students in undergraduate majors other than industrial engineering may be admitted to the combined program; they must meet the same admission requirements as industrial engineering majors. In some cases, they may be required to take additional course work to meet the prerequisite requirements for upper-level courses.

Academic Plans

The following study plan includes the B.S.E. core requirements and the curriculum for the industrial engineering major. Some courses in the curriculum are prerequisites for others. Students must complete a course’s prerequisites before they may register for the course. Those who take courses in the order below satisfy the prerequisite requirements automatically.

### Course Title Hours

<table>
<thead>
<tr>
<th>First Year</th>
<th>Fall</th>
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<tbody>
<tr>
<td>CHEM:1110</td>
<td>Principles of Chemistry I</td>
</tr>
<tr>
<td>ENGR:1000</td>
<td>Engineering Success for First-Year Students</td>
</tr>
<tr>
<td>ENGR:1100</td>
<td>Introduction to Engineering Problem Solving</td>
</tr>
<tr>
<td>MATH:1550</td>
<td>Engineering Mathematics I: Single Variable Calculus</td>
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<tr>
<td>RHET:1030</td>
<td>Rhetoric</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>Hours</strong></td>
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<table>
<thead>
<tr>
<th>Spring</th>
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<tbody>
<tr>
<td>ENGR:1300</td>
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<tr>
<td>MATH:1560</td>
</tr>
<tr>
<td>MATH:2550</td>
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<tr>
<td>PHYS:1611</td>
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<tr>
<td><strong>Total</strong></td>
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<table>
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<tr>
<th>Second Year</th>
<th>Fall</th>
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<tbody>
<tr>
<td>IE:2000</td>
<td>Industrial Engineering Sophomore Seminar</td>
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<tr>
<td>ENGR:2110</td>
<td>Engineering Fundamentals I: Statics</td>
</tr>
</tbody>
</table>
ENGR:2120  Engineering Fundamentals II:  Electrical Circuits  3
ENGR:2130  Engineering Fundamentals III:  Thermodynamics  3
MATH:2560  Engineering Mathematics IV:  Differential Equations  3
PHYS:1612  Introductory Physics II  3
PSY:1001  Elementary Psychology  3

Hours  17

Spring
IE:2500  Engineering Economy  3
IE:3500  Information Systems Design  3
ENGR:2720  Materials Science  3
STAT:2020  Probability and Statistics for the  Engineering and Physical Sciences  3
Elective focus area course  3

Hours  15

Third Year
Fall
IE:3000  Professional Seminar: Industrial  Engineering  0
IE:3400  Human Factors  3
IE:3610  Stochastic Modeling  3
IE:3700  Operations Research  3
ENGR:2760  Design for Manufacturing  3
General education component course  3

Hours  15

Spring
IE:3300  Manufacturing Systems  3
IE:3450  Ergonomics  3
IE:3750  Digital Systems Simulation  3
IE:3760  Applied Linear Regression  3
Elective focus area course  3
General education component course  3

Hours  18

Fourth Year
Fall
IE:3000  Professional Seminar: Industrial  Engineering  0
IE:3350  Process Engineering  4
IE:3600  Quality Control  3
Elective focus area courses  6
General education component course  3

Hours  16

Spring
IE:4600  Industrial Engineering Design  Project  4
Elective focus area courses (including math/science elective)  12
Systems elective course  3

Hours  19

Total Hours  132-133

Career Advancement

The engineering profession is a foundation for a variety of careers in industry, medicine, law, government, and consulting. Engineering majors hold eight of the top ten spots on the list of top-paid majors for bachelor’s degree graduates, according to the National Association of Colleges and Employers (NACE). On average, 93-98 percent of graduates are employed in their field of study or pursuing advanced education within seven months of graduation.

Engineering Professional Development (EPD) develops and promotes experiential education and professional opportunities for students in the College of Engineering. Professional staff coordinate the college's co-op and internship program, engage in employer outreach, and provide opportunities for students to network with employers, including an engineering career fair each semester and other programming related to career development.

EPD also offers individual advising and class presentations on résumé and cover letter preparation, job and internship search strategies, interviewing skills, and job offer evaluation.