Industrial Engineering, B.S.E.

The educational objectives of the Bachelor of Science in Engineering (B.S.E.) program in industrial engineering are 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 and Systems Engineering Program Educational Objectives on the Department of Industrial and Systems 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 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. For information about the curriculum stems, see the Bachelor of Science in Engineering in the Catalog.

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

Elective Focus Area

The industrial engineering program offers a variety of elective focus area (EFA) 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 the 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 EFAs and Specialized Opportunities page on the Department of Industrial and Systems Engineering website.

Combined Programs

B.S.E./M.S.

The College of Engineering offers a combined Bachelor of Science in Engineering/Master of Science program for industrial engineering undergraduate students who intend to earn a 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 combined 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 Industrial and Systems 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

Sample Plan of Study

Sample plans represent one way to complete a program of study. Actual course selection and sequence will vary and should be discussed with an academic advisor. For additional sample plans, see MyUI.

Industrial Engineering, B.S.E.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH:1550</td>
<td>Engineering Mathematics I: Single Variable Calculus a</td>
<td>4</td>
</tr>
<tr>
<td>ENGR:1100</td>
<td>Introduction to Engineering Problem Solving</td>
<td>3</td>
</tr>
<tr>
<td>CHEM:1110</td>
<td>Principles of Chemistry I b</td>
<td>4</td>
</tr>
<tr>
<td>RHET:1030</td>
<td>Rhetoric</td>
<td>4</td>
</tr>
<tr>
<td>ENGR:1000</td>
<td>Engineering Success for First-Year Students</td>
<td>1</td>
</tr>
<tr>
<td>CSI:1600</td>
<td>Success at Iowa</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Hours</td>
<td>16</td>
</tr>
<tr>
<td>Spring</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH:1560</td>
<td>Engineering Mathematics II: Multivariable Calculus</td>
<td>4</td>
</tr>
<tr>
<td>ENGR:1300</td>
<td>Introduction to Engineering Computing</td>
<td>3</td>
</tr>
<tr>
<td>PHYS:1611</td>
<td>Introductory Physics I</td>
<td>4</td>
</tr>
<tr>
<td>MATH:2550</td>
<td>Engineering Mathematics III: Matrix Algebra</td>
<td>2</td>
</tr>
<tr>
<td>GE:</td>
<td>Engineering Be Creative c</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Hours</td>
<td>16</td>
</tr>
</tbody>
</table>
### Second Year

#### Fall
- **MATH:2560** Engineering Mathematics IV: Differential Equations 3
- **PHYS:1612** Introductory Physics II 3
- **ENGR:2110** Engineering Fundamentals I: Statics 2
- **ENGR:2120** Engineering Fundamentals II: Electrical Circuits 3
- **ENGR:2130** Engineering Fundamentals III: Thermodynamics 3
- **PSY:1001** Elementary Psychology 3
- **IE:2000** Industrial Engineering Sophomore Seminar 0
- **Hours** 17

#### Spring
- **IE:2500** Engineering Economy 3
- **STAT:2020** Probability and Statistics for the Engineering and Physical Sciences 3
- **ENGR:2720** Materials Science 3
- **IE:3500** Information Systems Design 3
- **Elective Focus Area: #1** 3
- **Hours** 15

### Third Year

#### Fall
- **IE:3610** Stochastic Modeling 3
- **ENGR:2760** Design for Manufacturing 3
- **IE:3400** Human Factors 3
- **IE:3700** Operations Research 3
- **GE: Approved Course Subjects d** 3
- **Hours** 18

#### Spring
- **IE:3300** Manufacturing Systems 3
- **IE:3450** Ergonomics 3
- **IE:3760** Applied Linear Regression 3
- **IE:3750** Digital Systems Simulation 3
- **Elective Focus Area: #2** 3
- **GE: Approved Course Subjects d** 3
- **IE:3000** Professional Seminar: Industrial Engineering 0
- **Hours** 15

### Fourth Year

#### Fall
- **IE:3350** Process Engineering 4
- **IE:3600** Quality Control 3
- **Elective Focus Area: #3** 3
- **Elective Focus Area: #4** 3
- **GE: Approved Course Subjects d** 3
- **Hours** 16

#### Spring
- **IE:4600** Industrial Engineering Design Project 4
- **System Elective** 3
- **Math/Science Elective Focus Area #5** 3
- **Elective Focus Area: #6** 3
- **Elective Focus Area: #7** 3
- **Hours** 18

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**IE:3000** Professional Seminar: Industrial Engineering 0
- **Hours** 16
- **Total Hours** 129

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**Career Advancement**

Industrial and systems engineers have many opportunities for employment and service in industrial, government, research, and public service organizations. Employment opportunities are among the most varied in the engineering field. Industrial and systems engineers hold positions as advisors to management or may participate directly in management decisions. Representative job titles include industrial engineer, manufacturing engineer, systems analyst, quality specialist, operations research analyst, internal consultant, human factors specialist, supervisor, and manager. Industrial and systems engineers are employed by manufacturing and energy firms, wind turbine manufacturers, government agencies, and service organizations such as airlines, banks, hospitals, health care groups, and consulting companies.

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.

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**Notes:**

a. Enrollment in math courses requires completion of a placement exam.
b. Enrollment in chemistry courses requires completion of a placement exam.
c. Courses with prerequisites; students should complete a prerequisite waiver form.
d. A full list of approved course subjects can be found on the College of Engineering General Education Component website.