Department of Industrial and Systems Engineering

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Office: 260 McCain Engineering Building

Industrial and systems engineering is the application of engineering methods and the principles of scientific management to the design, improvement, and installation of integrated systems of people, materials, information, equipment, and energy. The industrial and systems engineer is concerned with the design of total systems, and is the leader in the drive for increased productivity and quality improvement.

The industrial and systems engineering profession uses a variety of specialized knowledge and skills. These include communications, economics, mathematics, physical and social sciences, together with the methods of engineering analysis and design.

The industrial and systems engineer is often involved in designing or improving major systems that encompass the total organization. Consequently, he/she is often in contact with individuals from many segments of the organization. From his/her education and these experiences, the industrial and systems engineer develops a global view of the many inter-related operations necessary to deliver a firm’s goods and services. Because of their management skills and global view of the organization, a large proportion of industrial and systems engineers move into management, and later advance into top management positions.

Although industrial and systems engineering is especially important to all segments of industry, it is also applied in other types of organizations, such as transportation, health care, public utilities, agriculture, defense, government, merchandising, distribution, logistics, and other service sectors. With increasing emphasis on quality and productivity for successful international competition, it is expected that industrial and systems engineers will be in increasing demand in the coming decades.

The objectives of the Department of Industrial and Systems Engineering are founded in Mississippi State University’s educational philosophy and in the industrial engineering profession. They were developed to satisfy the needs of the department’s constituents: students, employers, alumni, faculty, and the industrial engineering profession.

The Industrial Engineering program aim is to graduate students having a broad education, with emphasis in industrial and systems engineering fundamentals and practices, which enables them to function effectively in systems involving people, materials, information, energy, and money.

The four educational objectives of the Bachelor of Science degree in Industrial Engineering are stated below.

1. Graduates of the Department of Industrial and Systems Engineering are versed in math, science, and engineering theory, know how to apply that theory, and are capable of functioning effectively producing solutions in a broad range of organizations.
2. Graduates of the Department of Industrial and Systems Engineering lead and interact cooperatively in professional situations with individuals having diverse backgrounds, cultures, training, education, and interests.
3. Graduates of the Department of Industrial and Systems Engineering think independently, critically examine ideas, and make discerning professional judgments, whether intellectual, ethical, or aesthetic.
4. Graduates of the Department of Industrial and Systems Engineering are professionally mature, responsible, and informed citizens who pursue lifelong learning.

Because of the importance of systems design in the many facets of industrial and systems engineering, instruction of the principles and methods of design is integrated throughout the curriculum of industrial engineering, and culminates in a major design experience in the student’s senior year.


General Education Requirements

<table>
<thead>
<tr>
<th>English Composition</th>
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<tbody>
<tr>
<td>EN 1103 or EN 1104</td>
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<tr>
<td>EN 1113 or EN 1173</td>
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</table>

Mathematics
See Major Core

Science
See Major Core

Humanities
See General Education courses 6

Fine Arts
See General Education courses 3

### Social/Behavioral Sciences
- **PSY 1013**: General Psychology 3
- **EC 2123**: Principles of Microeconomics 3

### Major Core

#### Math and Basic Science
- **MA 1713**: Calculus I 3
- **MA 1723**: Calculus II 3
- **MA 2733**: Calculus III 3
- **MA 2743**: Calculus IV 3
- **MA 3113**: Introduction to Linear Algebra 3
- **CH 1213**: Chemistry I 3
- **CH 1211**: Investigations in Chemistry I 1
- **CH 1223**: Chemistry II 3
- **PH 2213**: Physics I 3
- **PH 2223**: Physics II 3

#### Math/Science Elective
Choose one of the following: 3
- **PH 2233**: Physics III
- **MA 3253**: Differential Equations I

#### Engineering Topics
- **ECE 3413**: Introduction to Electronic Circuits 3
- **EM 2413**: Engineering Mechanics I 3
- **IE 1911**: Introduction to Industrial Engineering 1
- **IE 3121**: Industrial Ergonomics Laboratory 1
- **IE 3123**: Industrial Ergonomics 3
- **IE 3323**: Manufacturing Processes 3
- **IE 3913**: Engineering Economy I 3
- **IE 4333**: Production Control Systems I 3
- **IE 4513**: Engineering Administration 3
- **IE 4543**: Logistics Engineering 3
- **IE 4613**: Engineering Statistics I 3
- **IE 4623**: Engineering Statistics II 3
- **IE 4653**: Industrial Quality Control 3
- **IE 4733**: Linear Programming 3
- **IE 4753**: Systems Engineering and Analysis 3
- **IE 4773**: Systems Simulation I 3
- **IE 4915**: Design of Industrial Systems 5
- **IE 4934**: Information Systems for Industrial Engineering 4
- **ACC 2023**: Principles of Managerial Accounting 3
- **EG 1142**: Engineering Graphics 2
- **IE Design Elective**: 3
- **Engineering Science Elective**: 3
- **Materials Elective**: 4

#### Oral Communication Requirement
- **CO 1003**: Fundamentals of Public Speaking 3

#### Writing Requirement
- **GE 3513**: Technical Writing 3

#### Computer Literacy
- Fulfilled in Engineering Topics courses

**Total Hours**: 128
A grade of C or better must be made in the course.

Any three-hour industrial engineering course not required in curriculum

Courses that can be used for the Engineering Science Elective are EM 2433, EM 3213, EM 3313, ECE 3424, and ME 3513.

Courses that can be used for the Materials Elective are CHE 3413 and ME 3403.

Industrial engineering is an academic discipline with applicability to a broad range of students from other majors. Engineering majors specifically may wish to complement their degree programs with a minor in industrial engineering to demonstrate knowledge and competence in industrial engineering areas. Completion of the minor requirements should prepare students to apply fundamental principles of industrial engineering, such as production control, operations improvement, and engineering management, to their chosen career field.

Only students with the Bagley College of Engineering are eligible for a minor in industrial engineering. Students majoring in industrial engineering are not eligible.

A minor in industrial engineering consists of three required courses for all students pursuing the minor and two restricted elective courses.

**Required Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
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</thead>
<tbody>
<tr>
<td>IE 3913</td>
<td>Engineering Economy I</td>
<td>3</td>
</tr>
<tr>
<td>IE 4613</td>
<td>Engineering Statistics I</td>
<td>3</td>
</tr>
<tr>
<td>IE 4333</td>
<td>Production Control Systems I</td>
<td>3</td>
</tr>
</tbody>
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**Students will select two of the following:**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>IE 3123</td>
<td>Industrial Ergonomics</td>
<td>4</td>
</tr>
<tr>
<td>&amp; IE 3121</td>
<td>and Industrial Ergonomics Laboratory</td>
<td></td>
</tr>
<tr>
<td>IE 4113</td>
<td>Human Factors Engineering</td>
<td>3</td>
</tr>
<tr>
<td>IE 4173</td>
<td>Occupational Safety Engineering</td>
<td>3</td>
</tr>
<tr>
<td>IE 4513</td>
<td>Engineering Administration</td>
<td>3</td>
</tr>
<tr>
<td>IE 4533</td>
<td>Project Management</td>
<td>3</td>
</tr>
<tr>
<td>IE 4543</td>
<td>Logistics Engineering</td>
<td>3</td>
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<tr>
<td>IE 4553</td>
<td>Engineering Law and Ethics</td>
<td>3</td>
</tr>
<tr>
<td>IE 4573</td>
<td>Process Improvement Engineering</td>
<td>3</td>
</tr>
<tr>
<td>IE 4653</td>
<td>Industrial Quality Control</td>
<td>3</td>
</tr>
<tr>
<td>IE 4733</td>
<td>Linear Programming</td>
<td>3</td>
</tr>
<tr>
<td>IE 4753</td>
<td>Systems Engineering and Analysis</td>
<td>3</td>
</tr>
</tbody>
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**Total Hours** 15-16