Industrial and systems engineering (ISE) 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 ISE 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 ISE 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 ISE 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 ISEs move into management, and later advance into top management positions.

Although ISE 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, ISEs remain in demand.

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

The ISE program aim is to graduate students having a broad and practical 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.

a. Graduates of the industrial engineering program 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.

b. Graduates of the industrial engineering program lead and interact cooperatively in professional situations with individuals having diverse backgrounds, cultures, training, education, and interests.

c. Graduates of the industrial engineering program think independently, critically examine ideas, and make discerning professional judgments, whether intellectual, ethical, or aesthetic.

d. Graduates of the industrial engineering program are professionally mature, responsible, and informed citizens who pursue lifelong learning.

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

The B. S. program in Industrial Engineering is accredited by the Engineering Accreditation Commission of ABET, https://www.abet.org, under the commission’s General Criteria and Program Criteria for Industrial and similarly named engineering programs.

**Engineering Leadership Excellence Program (dual degree program with ISE and Business Administration)**

The Bagley College of Engineering and College of Business jointly offer a dual degree program that facilitates the completion of the B.S. in Industrial Engineering and the B.B.A. in Business Administration in four and one-half years of coursework. This program combines an ABET accredited degree in engineering with an AACSB accredited degree in business. Graduates of the dual degree program are better positioned to advance toward management positions in the industrial engineering field. Students in the dual degree program must maintain a 2.5 GPA to remain in the program.

**Degree Requirements**

### English Composition

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 1103</td>
<td>English Composition I</td>
<td>3</td>
</tr>
<tr>
<td>or EN 1104</td>
<td>Expanded English Composition I</td>
<td></td>
</tr>
<tr>
<td>EN 1113</td>
<td>English Composition II</td>
<td>3</td>
</tr>
<tr>
<td>or EN 1173</td>
<td>Accelerated Composition II</td>
<td></td>
</tr>
</tbody>
</table>

### Mathematics

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MA 1713</td>
<td>Calculus I</td>
<td>3</td>
</tr>
</tbody>
</table>

### Math and Basic Science

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>9</td>
</tr>
</tbody>
</table>
MA 1723  Calculus II  3
MA 2733  Calculus III  3
MA 3113  Introduction to Linear Algebra  3
MA 2743  Calculus IV  3

**Natural Sciences**

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

**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/Science Elective  3

**Engineering Topics**

Engineering Mechanics I

**IE Topics**

Lean Works Systems
Industrial Ergonomics
Manufacturing Processes
Engineering Economy I
Production Control Systems I

Engineering Management Elective

Logistics Engineering
Engineering Statistics I
Engineering Statistics II
Industrial Quality Control
Linear Programming
Systems Engineering and Analysis
Systems Simulation I
Industrial Systems Design
Information System in Industrial Engineering

IE Design Elective

**Other**

Technical Writing
Principles of Managerial Accounting

Total Hours  128


2 Engineering Science Electives: See academic advisor for list of approved Engineering Science electives
### Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</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>
</table>

Students will select two of the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>IE 3123 &amp; IE 3121</td>
<td>Industrial Ergonomics and Industrial Ergonomics Laboratory</td>
<td>4</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>
</tr>
<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>
</table>

**Total Hours**: 15-16

### Degree Requirements

**English Composition/Communication**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 1103</td>
<td>English Composition I</td>
<td>3</td>
</tr>
<tr>
<td>EN 1113</td>
<td>English Composition II</td>
<td>3</td>
</tr>
<tr>
<td>CO 1003</td>
<td>Fundamentals of Public Speaking</td>
<td>3</td>
</tr>
<tr>
<td>or CO 1013</td>
<td>Introduction to Communication</td>
<td></td>
</tr>
<tr>
<td>GE 3513</td>
<td>Technical Writing</td>
<td>3</td>
</tr>
</tbody>
</table>

**Mathematics/Science**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MA 1713</td>
<td>Calculus I</td>
<td>3</td>
</tr>
<tr>
<td>MA 1723</td>
<td>Calculus II</td>
<td>3</td>
</tr>
<tr>
<td>MA 2733</td>
<td>Calculus III</td>
<td>3</td>
</tr>
<tr>
<td>MA 2743</td>
<td>Calculus IV</td>
<td>3</td>
</tr>
<tr>
<td>MA 3113</td>
<td>Introduction to Linear Algebra</td>
<td>3</td>
</tr>
<tr>
<td>CH 1213</td>
<td>Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>CH 1211</td>
<td>Investigations in Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>CH 1223</td>
<td>Chemistry II</td>
<td>3</td>
</tr>
</tbody>
</table>

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.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PH 2213</td>
<td>Physics I</td>
<td>3</td>
</tr>
<tr>
<td>PH 2223</td>
<td>Physics II</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Math/Science elective</td>
<td>3</td>
</tr>
<tr>
<td><strong>Social/Behavioral Sciences</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EC 2113</td>
<td>Principles of Macroeconomics</td>
<td>3</td>
</tr>
<tr>
<td>EC 2123</td>
<td>Principles of Microeconomics</td>
<td>3</td>
</tr>
<tr>
<td>PS 1113</td>
<td>American Government</td>
<td>3</td>
</tr>
<tr>
<td><strong>Humanities</strong></td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>See General Education courses</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Fine Arts</strong></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>See General Education courses</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Major Core (from both IE and Bus Admin)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACC 2013</td>
<td>Principles of Financial Accounting</td>
<td>3</td>
</tr>
<tr>
<td>ACC 2023</td>
<td>Principles of Managerial Accounting</td>
<td>3</td>
</tr>
<tr>
<td>MKT 3013</td>
<td>Principles of Marketing</td>
<td>3</td>
</tr>
<tr>
<td>MKT 3323</td>
<td>International Logistics</td>
<td>3</td>
</tr>
<tr>
<td>MKT 4313</td>
<td>Physical Distribution Management</td>
<td>3</td>
</tr>
<tr>
<td>MKT 4333</td>
<td>International Supply Chain Management</td>
<td>3</td>
</tr>
<tr>
<td>FIN 3123</td>
<td>Financial Management</td>
<td>3</td>
</tr>
<tr>
<td>BL 2413</td>
<td>The Legal Environment of Business</td>
<td>3</td>
</tr>
<tr>
<td>EM 2413</td>
<td>Engineering Mechanics I</td>
<td>3</td>
</tr>
<tr>
<td>IE 1313</td>
<td>Lean Works Systems</td>
<td>3</td>
</tr>
<tr>
<td>IE 3123</td>
<td>Industrial Ergonomics</td>
<td>3</td>
</tr>
<tr>
<td>IE 3323</td>
<td>Manufacturing Processes</td>
<td>3</td>
</tr>
<tr>
<td>IE 4333</td>
<td>Production Control Systems I</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 4613</td>
<td>Engineering Statistics I</td>
<td>3</td>
</tr>
<tr>
<td>IE 4623</td>
<td>Engineering Statistics II</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>
<tr>
<td>IE 4773</td>
<td>Systems Simulation I</td>
<td>3</td>
</tr>
<tr>
<td>IE 4914</td>
<td>Industrial Systems Design</td>
<td>4</td>
</tr>
<tr>
<td>IE 4933</td>
<td>Information System in Industrial Engineering</td>
<td>3</td>
</tr>
<tr>
<td>BIS/MGT/Law/BQA/Entrepreneurship Course</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Computer Programming Elective</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Engineering Science Elective</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td><strong>Total Hours</strong></td>
<td></td>
<td>143</td>
</tr>
</tbody>
</table>