

# Department of Industrial and Systems Engineering

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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 objective 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 six educational objectives of the Bachelor of Science degree program in Industrial Engineering are stated below.

1. Graduates of the Department of Industrial and Systems Engineering pursue lifelong learning.
2. Graduates of the Department of Industrial and Systems Engineering are versed in industrial engineering theory, know how to apply that theory, and are capable of functioning effectively in a broad range of organizations.
3. Graduates of the Department of Industrial and Systems Engineering display important professional skills, including those in the areas of communication, economics, physical and social sciences, mathematics and statistics.
4. Graduates of the Department of Industrial and Systems Engineering interact cooperatively in professional situations with individuals having diverse backgrounds, cultures, training, education, and interests.
5. Graduates of the Department of Industrial and Systems Engineering think independently, critically examine ideas, and make discerning professional judgements, whether intellectual, ethical, or aesthetic.
6. Graduates of the Department of Industrial and Systems Engineering are professionally mature, responsible, and informed citizens.

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.

The Industrial Engineering Program is accredited by the Engineering Accreditation Commission of ABET, <http://www.abet.org>.

## General Education Requirements

### English Composition

EN 1103	English Composition I	3
or EN 1163	Accelerated Composition I	
EN 1113	English Composition II	3
or EN 1173	Accelerated Composition II	

### Mathematics

See Major Core

### Science

See Major Core

### Humanities

See General Education courses		6
<b>Fine Arts</b>		
See General Education courses		3
<b>Social/Behavioral Sciences</b>		
PSY 1013	General Psychology	3
EC 2123	Principles of Microeconomics	3
<b>Major Core</b>		
<b>Math and Basic Science</b>		
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
<b>Math/Science Elective</b>		
Choose one of the following:		3
PH 2233	Physics III	
MA 3253	Differential Equations I	
<b>Engineering Topics</b>		
ECE 3413	Introduction to Electronic Circuits	3
EM 2413	Engineering Mechanics I	3
IE 1911	Introduction to Industrial Engineering <sup>1</sup>	1
IE 3121	Industrial Ergonomics Laboratory <sup>1</sup>	1
IE 3123	Industrial Ergonomics <sup>1</sup>	3
IE 3323	Manufacturing Processes <sup>1</sup>	3
IE 3913	Engineering Economy I <sup>1</sup>	3
IE 4333	Production Control Systems I <sup>1</sup>	3
IE 4513	Engineering Administration <sup>1</sup>	3
IE 4543	Logistics Engineering <sup>1</sup>	3
IE 4613	Engineering Statistics I <sup>1</sup>	3
IE 4623	Engineering Statistics II <sup>1</sup>	3
IE 4653	Industrial Quality Control <sup>1</sup>	3
IE 4733	Linear Programming <sup>1</sup>	3
IE 4753	Systems Engineering and Analysis <sup>1</sup>	3
IE 4773	Systems Simulation I <sup>1</sup>	3
IE 4915	Design of Industrial Systems <sup>1</sup>	5
IE 4934	Information Systems for Industrial Engineering <sup>1</sup>	4
ACC 2203	Survey of Accounting	3
EG 1142	Engineering Graphics	2
IE Design Elective <sup>2</sup>		3
Engineering Science Elective <sup>3</sup>		6
Materials Elective <sup>4</sup>		3
<b>Oral Communication Requirement</b>		
CO 1003	Fundamentals of Public Speaking	3
<b>Writing Requirement</b>		
GE 3513	Technical Writing	3
<b>Computer Literacy</b>		
Fulfilled in Engineering Topics courses		

**Total Hours** 128

- 1 A grade of C or better must be made in the course.
- 2 Any three-hour industrial engineering course not required in curriculum.
- 3 Courses that can be used for the Engineering Science Elective are EM 2433, EM 3213, EM 3313, ECE 3424, and ME 3513.
- 4 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 student pursuing the minor and two restricted elective courses.

**Required Courses**

IE 3913	Engineering Economy I	3
IE 4613	Engineering Statistics I	3
IE 4333	Production Control Systems I	3

**Students will select two of the following:**

IE 3123 & IE 3121	Industrial Ergonomics and Industrial Ergonomics Laboratory	4
IE 4113	Human Factors Engineering	3
IE 4173	Occupational Safety Engineering	3
IE 4513	Engineering Administration	3
IE 4533	Project Management	3
IE 4543	Logistics Engineering	3
IE 4553	Engineering Law and Ethics	3
IE 4573	Process Improvement Engineering	3
IE 4653	Industrial Quality Control	3
IE 4733	Linear Programming	3
IE 4753	Systems Engineering and Analysis	3

**Total Hours** 15-16