

Department of Industrial and Systems Engineering

Head: Dr. Kari Babski-Reeves

Undergraduate Coordinator: Dr. Brian Smith

Office: 260 McCain Engineering Building

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.

1. 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.
2. Graduates of the industrial engineering program lead and interact cooperatively in professional situations with individuals having diverse backgrounds, cultures, training, education, and interests.
3. Graduates of the industrial engineering program think independently, critically examine ideas, and make discerning professional judgments, whether intellectual, ethical, or aesthetic.
4. 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

General Education Requirements

English Composition

EN 1103 or EN 1104	English Composition I Expanded English Composition I	3
EN 1113 or EN 1173	English Composition II Accelerated Composition II	3

Creative Discovery

Select from General Education courses		3
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Humanities			
Select from General Education courses			6
Social/Behavioral Sciences			
PSY 1013	General Psychology		3
EC 2123	Principles of Microeconomics		3
Quantitative Reasoning			
MA 1713	Calculus I		3
MA 1723	Calculus II		3
Natural Sciences			
CH 1213 & CH 1211	Chemistry I and Investigations in Chemistry I		4
PH 2213	Physics I		3
PH 2223	Physics II		3
Additional Requirements			
MA 2733	Calculus III		3
MA 2743	Calculus IV		3
MA 3113	Introduction to Linear Algebra		3
CH 1223	Chemistry II		3
Math/Science Elective ¹			3
Major Core			
EM 2413	Engineering Mechanics I		
IE Topics ⁴			
IE 1313	Lean Works Systems		
IE 3123	Industrial Ergonomics		
IE 3323	Manufacturing Processes		
IE 3913	Engineering Economy I		
IE 4333	Production Control Systems I		
IE 4543	Logistics Engineering		
IE 4613	Engineering Statistics I		
IE 4623	Engineering Statistics II		
IE 4653	Industrial Quality Control		
IE 4733	Linear Programming		
IE 4753	Systems Engineering and Analysis		
IE 4773	Systems Simulation I		
IE 4914	Industrial Systems Design		
IE 4933	Information System in Industrial Engineering		
Engineering Management Elective (choose one)			3
IE 4513	Engineering Administration		
IE 4533	Project Management		
IE Design Elective ⁵			3
IE Design Elective ⁵			3
Other			12
GE 3513	Technical Writing		
ACC 2023	Principles of Managerial Accounting		
Engineering Science Elective ²			
Engineering Science Elective ²			
Computer Programming Elective ³			
Professional Enrichment Elective ⁶			
Approved Elective ⁷			
Total Hours			128

- 1 Math/Science Elective: MA 3053 Foundations of Mathematics, MA 3253 Differential Equations I, MA 4143 Graph Theory, MA 4313 Numerical Analysis I, MA 4533 Introduction to Probability and Random Processes, ST 4213 Nonparametric Methods, PH 2233 Physics III, CH 2313 , BIO 1134 Biology I, GG 4153 Engineering Geology, GG 4233 Applied Geophysics
- 2 Engineering Science Electives: See academic advisor for list of approved Engineering Science electives
- 3 Computer Programming Elective: CSE 1233 Computer Programming with C or CSE 1284 Introduction to Computer Programming
- 4 IE Topics: Students must earn a C or better in all industrial engineering courses (courses with an IE prefix)
- 5 IE Design Elective: Any three-hour non-required industrial engineering course
- 6 Professional Enrichment Elective: Appropriately titled, the purpose of this elective is to aid students in the enrichment of their undergraduate program in a professional manner. The intent is to help students achieve objectives such as earning a minor or a certificate, preparing for the F.E. Exam, participating in the Study Abroad Program, or additional study in technical, primarily upper-division areas of study. Students must earn a C or better in any course taken to fulfill the professional enrichment elective.
- 7 Approved Elective: Students may choose nearly any course or combination of courses totaling three credit hours or more offered at MSU for the Approved Elective. The only exception is that students may not choose remedial courses (courses which are prerequisite to required or previously completed courses), LSK courses, and physical education courses outside of varsity sports. Examples of courses that would directly benefit ISE students include: Engineering Graphics, Foreign Language, Finance, Marketing, Engineering Entrepreneurship, etc.

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**

Engineering Leadership Excellence Program-

B.S. in Industrial Engineering & B.B.A. in Business Administration

General Education

English Composition

EN 1103 or EN 1104	English Composition I Expanded English Composition I	3
EN 1113 or EN 1173	English Composition II Accelerated Composition II	3

Creative Discovery **3**

See General Education courses

Humanities 6

See General Education courses

Social/Behavioral Sciences 6

EC 2113 Principles of Macroeconomics

EC 2123 Principles of Microeconomics

Quantitative Reasoning 6

MA 1713 Calculus I

MA 1723 Calculus II

Natural Sciences 10

CH 1213 Chemistry I

CH 1211 Investigations in Chemistry I

PH 2213 Physics I

PH 2223 Physics II

Degree Requirements**Additional Requirements**CO 1003 Fundamentals of Public Speaking 3
or CO 1013 Introduction to Communication

GE 3513 Technical Writing 3

MA 2733 Calculus III 3

MA 2743 Calculus IV 3

MA 3113 Introduction to Linear Algebra 3

CH 1223 Chemistry II 3

Math/Science elective 3

PS 1113 American Government 3

Major Core (from both IE and Bus Admin)

ACC 2013 Principles of Financial Accounting 3

ACC 2023 Principles of Managerial Accounting 3

MKT 3013 Principles of Marketing 3

MKT 3323

MKT 4313

MKT 4333

FIN 3123 Financial Management 3

BL 2413 The Legal Environment of Business 3

EM 2413 Engineering Mechanics I 3

IE 1313 Lean Works Systems 3

IE 3123 Industrial Ergonomics 3

IE 3323 Manufacturing Processes 3

IE 4333 Production Control Systems I 3

IE 4513 Engineering Administration 3

IE 4533 Project Management 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 4914 Industrial Systems Design 4

IE 4933 Information System in Industrial Engineering 3

BIS/MGT/Law/BQA/Entrepreneurship Course 3

Computer Programming Elective 3

Engineering Science Elective	6
Total Hours	143