

BSIE in Industrial Engineering

Degree Program Description

The Bachelor of Science in Industrial Engineering has a core engineering curriculum during the first two years. The objective of this curriculum is to give the student a rigorous foundation in mathematics, natural sciences, basic engineering sciences, applied probability, and computer science, as well as a complementary and meaningful exposure to the humanities and social sciences.

Building on the core courses, students gain knowledge of optimization methodologies, human factors, data analytics and systems modeling. They also learn to model and evaluate integrated systems of people, technology and information in the areas of production and service system design, supply chain design and management, control systems, quality systems, sustainability, data engineering, product and process design.

Students also have the opportunity to obtain Lean Six Sigma Green Belt certification and/or an interdisciplinary Global Supply Chain Management certificate while completing the program requirements.

Major Program Requirements

Students earning a Bachelor of Science in Industrial Engineering are required to complete all University general education (<http://catalog.missouri.edu/academicdegreerequirements/generaleducationrequirements/>), University undergraduate requirements (<http://catalog.missouri.edu/academicdegreerequirements/universityrequirements/>), degree, and major requirements, including selected foundational courses, which may fulfill some University general education requirements. Students are also required to complete one 3-hour cultural awareness course which is selected from an approved cultural awareness course list, created and maintained by the College of Engineering or which meets the Arts and Science (A&S) diversity intensive (DI) requirement. Currently ECONOM 1014, which is required for the BSIE, meets this requirement. The curriculum is designed so that over half of the course work for the degree is completed in ENGR/ISE or professionally related courses.

Major Core Requirements

MATH 1500	Analytic Geometry and Calculus I	5
MATH 1700	Calculus II	5
MATH 2300	Calculus III	3
MATH 4100	Differential Equations	3
CHEM 1320	College Chemistry I	4
PHYSICS 2750	University Physics I	5
PHYSICS 2760	University Physics II	5
INFOTC 4401	Python 1: Learn to Program in Python	3
MAE 1100	Introduction to Computer Aided Design	3
ENGINR 1200	Statics and Elementary Strength of Materials	3
ENGINR 2200	Intermediate Strength of Materials	3
ECONOM 1014 or ECONOM 1014H	Principles of Microeconomics Principles of Microeconomics-Honors	3
IMSE 1000 or ENGINR 1000	Introduction to Industrial Engineering Introduction to Engineering	1

ENGINR 1050	Foundations of Engineering	2
IMSE 2030	Fundamentals of Systems Design and Analysis	3
IMSE 2210	Linear Algebra for Engineers	3
IMSE 2710	Engineering Economic Decision-Making	3
IMSE 3110	Probability Models for Engineers	3
IMSE 3500	Introduction to Manufacturing Methods	2
IMSE 3505	Computer Aided Design and Manufacturing Processes Laboratory	2
IMSE 3810W	Ergonomics and Workstation Design - Writing Intensive	3
IMSE 4110	Engineering Statistics	3
IMSE 4210	Linear Optimization	3
IMSE 4230	Operations Research Models	3
IMSE 4280	Systems Simulation	3
IMSE 4310	Integrated Production Systems Design	3
IMSE 4350	Production and Operations Analysis	3
IMSE 4410	Data Engineering and Predictive Modeling	3
IMSE 4610	Quality Engineering and Analytics	3
IMSE 4970W	Capstone Design I - Writing Intensive	1
IMSE 4980W	Capstone Design II - Writing Intensive	3
IMSE electives		9
Choose nine credit hours from the following:		
IMSE 3030	Manufacturing and Supply Systems	3
IMSE 4001	Topics in Industrial and Manufacturing Systems Engineering	3
IMSE 4085	Problems in Industrial Engineering	1-3
IMSE 4220	Optimization Modeling and Computational Methods	3
IMSE 4330	Material Flow and Logistics System Design	3
IMSE 4360	Supply Chain Engineering	3
IMSE 4370	Service Systems Engineering and Management	3
IMSE 4380	Six Sigma Methodology	3
IMSE 4420	Web-Based Information Systems	3
IMSE 4560	Introduction to Rapid Prototyping	3
IMSE 4570	Integrated Industrial Automation and Control	3
IMSE 4580	Industrial Energy Efficiency and Management	3
IMSE 4720	Introduction to Life Cycle Analysis	3
IMSE 4750	Entrepreneurial Innovation Management: Enterprise Conception	3
IMSE 4810	Cognitive Ergonomics	3
IMSE 4910	Industrial Engineering Internship	3
IMSE 4920	Industrial Engineering COOP	3
IMSE 4990	Undergraduate Research in Industrial Engineering	1-3
IMSE 4995	Undergraduate Research Industrial Engineering - Honors	1-3
Engineering elective		3
Choose three credit hours from the following:		
ENGINR 2100	Circuit Theory for Engineers	3
ENGINR 2300	Engineering Thermodynamics	3

Accelerated BSIE to MS in Industrial Engineering

The accelerated option will allow students to earn a bachelors and masters degree within five years. Eligible students who have completed at least 90 credit hours with a cumulative GPA of 3.0 or higher. The academic requirements of the accelerated MS program will require a total of 30 graduate credit hours, to graduate. Accepted undergraduate students can take up to 15 hours of graduate level courses that will count toward both the undergraduate and the graduate degrees. Once the student has completed 126 credit hours (includes up to 15 credit hours of dual enrollment), the corresponding bachelor's degree will be conferred and they will become graduate students in our MS program to complete the remaining 15 hours of graduate credit. A minimum of 12 credit hours must be from courses at the 8000 level or above and of those classes 9 credit hours must be ISE courses. The student's graduate course GPA must be 3.0 or greater.

Total credits required for graduation must be at least 144 total credit hours:

- Total undergraduate credit hours: 126
- Total dual enrollment credit hours: 15
- Total graduate credit hours: 30

First Year (as Provisional Graduate Student)		15
IMSE 8110	Design and Analysis of Engineering Experiments	3
IMSE 8087	Industrial Engineering Graduate Seminar	0
IMSE 7000 or 8000-level elective		12
Second Year (as Graduate Student)		15
IMSE 8990	Research-Masters Thesis in Industrial Engineering	6
or IMSE 8085	Problems in Industrial and Manufacturing Systems Engineering	
IMSE 8000-level or higher elective		6
8000-level elective		3

Thesis/Non-Thesis Option

All candidates for the MS degree are required to complete an independent research effort, submit a thesis or project report and defend it in a final oral examination.

Semester Plan

Below is a sample plan of study, semester by semester. A student's actual plan may vary based on course choices where options are available.

First Year			
Fall	CR	Spring	CR
MATH 1500		5 MATH 1700	5
CHEM 1320		4 PHYSICS 2750	5
ECONOM 1014		3 ENGLISH 1000	3
Constitutional Requirement (Social Science Elective)		3 ENGINEER 1050	2
IMSE 1000 or ENGINEER 1000		1	
		16	15
Second Year			
Fall	CR	Spring	CR
MATH 2300		3 MATH 4100	3

PHYSICS 2760		5 ENGINEER 1200	3
MAE 1100		3 IMSE 2210	3
IMSE 2030		3 IMSE 2710	3
IMSE 3110		3 IMSE 4110	3
		17	15

Third Year			
Fall	CR	Spring	CR
INFOTC 4401		3 ENGINEER 2200	3
IMSE 3810		3 IMSE 3500	2
IMSE 4210		3 IMSE 3505	2
IMSE 4230		3 IMSE 4310	3
IMSE 4280		3 IMSE 4350	3
		IMSE 4610	3
		15	16

Fourth Year			
Fall	CR	Spring	CR
IMSE 4410		3 IMSE 4980	3
IMSE 4970		1 IMSE Elective	3
ENGR Elective		3 IMSE Elective	3
IMSE Elective		3 Humanities/Social Science Elective	3
Humanities/Social Science Elective		3 Humanities/Social Science Elective	3
Humanities/Social Science Elective		3	
		16	15

Total Credits: 125