

BSIE in Industrial Engineering

Degree Program Description

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

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 1400 & CHEM 1401	College Chemistry I and College Chemistry I Laboratory	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	3
ISE 1000	Introduction to Industrial Engineering	1

or ENGINR 1000	Introduction to Engineering	
ENGINR 1050	Foundations of Engineering	2
ISE 2030	Fundamentals of Systems Design and Analysis	3
ISE 2210	Linear Algebra for Engineers	3
ISE 2710	Engineering Economic Decision-Making	3
ISE 3110	Probability Models for Engineers	3
ISE 3500	Introduction to Manufacturing Methods	2
ISE 3505	Computer Aided Design and Manufacturing Processes Laboratory	2
ISE 3810W	Ergonomics and Workstation Design - Writing Intensive	3
ISE 4110	Engineering Statistics	3
ISE 4210	Deterministic Models in Operations Research	3
ISE 4230	Stochastic Models in Operations Research	3
ISE 4280	Systems Simulation	3
ISE 4310	Integrated Production Systems Design	3
ISE 4350	Production and Operations Analysis	3
ISE 4410	Data Engineering and Predictive Modeling	3
ISE 4570	Industrial Automation and Control	3
ISE 4610	Quality Engineering and Analytics	3
ISE 4970W	Capstone Design I - Writing Intensive	1
ISE 4980W	Capstone Design II - Writing Intensive	3

ISE electives

Choose nine credit hours from the following:

ISE 3030	Manufacturing and Supply Systems	3
ISE 3530	Industrial Robotics	3
ISE 4001	Topics in Industrial and Systems Engineering	3
ISE 4220	Optimization Modeling and Computational Methods	3
ISE 4330	Material Flow and Logistics System Design	3
ISE 4360	Supply Chain Engineering	3
ISE 4370	Service Systems Engineering and Management	3
ISE 4380	Six Sigma Methodology	3
ISE 4565	Smart Manufacturing Systems	3
ISE 4580	Industrial Energy Efficiency and Management	3
ISE 4720	Introduction to Life Cycle Analysis	3
ISE 4810	Cognitive Ergonomics	3
ISE 4910	Industrial Engineering Internship	3
ISE 4920	Industrial Engineering COOP	3
ISE 4990	Undergraduate Research in Industrial Engineering	0-6
ISE 4995	Undergraduate Research Industrial Engineering - Honors	0-6

* ISE 1000/ENGINR 1000 and ENGINR 1050 waiver: Students with 60 or more credits have completed the ISE 1000/ENGINR 1000 and ENGINR 1050 requirements, but will need to take an additional ISE elective to cover the 3 credit hours.

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
ISE 8110	Design and Analysis of Engineering Experiments	3
ISE 8087	Industrial Engineering Graduate Seminar	0
ISE 7000 or 8000-level elective		12
Second Year (as Graduate Student)		15
ISE 8990	Research-Masters Thesis in Industrial Engineering	1-99
ISE 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 PHYSCS 2750	5
ECONOM 1014		3 ENGLSH 1000	3
Constitutional Requirement (Social Science Elective)		3 ENGINR 1050	2
ISE 1000		1	
		16	15
Second Year			
Fall	CR	Spring	CR
MATH 2300		3 MATH 4100	3
PHYSCS 2760		5 ENGINR 1200	3
MAE 1100		3 ISE 2210	3

ISE 2030	3 ISE 2710	3
ISE 3110	3 ISE 4110	3
		17
		15

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

Fourth Year			
Fall	CR	Spring	CR
ISE 4410		3 ISE 4980	3
ISE 4570		3 IMSE Elective	3
ISE 4970		1 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