

INDUSTRIAL ENGINEERING, BACHELOR OF SCIENCE IN INDUSTRIAL ENGINEERING

The **Industrial Engineering** program is accredited by the Engineering Accreditation Commission of ABET, <http://www.abet.org> (<http://www.abet.org/>), under the General Criteria and the Industrial and Similarly Named Engineering Programs Program Criteria.

Specific Admission Requirements Applying as an Incoming Freshman

In order to be considered for admission to the BSE or BSIE as an incoming freshman, a student must:

- Be placed into MATH 126 Calculus & Analytic Geometry I (GT-MA1) (5 c.h.), or higher.
- Have a high school GPA of 3.25 or higher on a 4.0 scale.

The number of students admitted to the BSE or the BSIE as incoming freshmen is limited. Priority is given to students with the highest GPA's and ACT/SAT scores. A student admitted as an incoming freshman may continue in the BSE or BSIE program as a sophomore if he or she completes the required first year engineering courses (EN 101 Introduction to Engineering (2 c.h.), EN 103 Problem Solving for Engineers (3 c.h.), and EN 107 Engineering Graphics (2 c.h.)) with a B or better in each course. If a student admitted as an incoming freshman does not meet the requirements to continue in the program as a sophomore, he or she is eligible to apply as a sophomore, as described below.

Applying After Completing Required First-Year Courses

A student (including a transfer student) who does not receive admission as a freshman must complete the required first year courses (EN 101 Introduction to Engineering (2 c.h.), EN 103 Problem Solving for Engineers (3 c.h.), EN 107 Engineering Graphics (2 c.h.), ENG 101 Rhetoric & Writing I (GT-CO1) (3 c.h.), ENG 102 Rhetoric & Writing II (GT-CO2) (3 c.h.), MATH 126 Calculus & Analytic Geometry I (GT-MA1) (5 c.h.), MATH 224 Calculus and Analytic Geometry II (5 c.h.), and PHYS 221 General Physics I (4 c.h.), PHYS 221L General Physics I Lab (1 c.h.)) with a grade of C or better in each course in order to be eligible to apply for admission to the BSE or BSIE as a sophomore. Admission is not guaranteed as priority is given to students with the highest GPA's.

The BSIE program has the following educational objectives and outcomes, which have been approved and are reviewed regularly by the BSIE Advisory Board.

BSIE Program Outcomes

The BSIE program is designed so that students graduate from the program with the following abilities and knowledge:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety,

and welfare, as well as global, cultural, social, environmental, and economic factors.

3. an ability to communicate effectively with a range of audiences.
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

BSIE Educational Objectives

During the first few years after graduation, BSIE graduates should be able to:

1. Identify root causes and solve engineering problems.
2. Function well as individual contributors and on multidisciplinary teams.
3. Obtain jobs of increasing responsibility applying industrial engineering skills and knowledge to a wide range of problems in a wide range of industries.
4. Continue their education at the graduate level.
5. Obtain additional engineering certifications.
6. Design new and improve existing production and service systems.

Outcomes Assessment Activities

The BSE and BSIE programs and the courses in each program are designed to support the Program Outcomes listed for each degree. Each program has an Advisory Board that meets annually and the input from those Boards is used to revise the programs. The Department also uses the following assessment activities:

- During the final term of study, all engineering students are required to demonstrate their ability to apply and integrate the skills and knowledge learned in the program by producing a capstone engineering design project. This project must incorporate subject material covered in two or more courses in the student's major, involve knowledge or skill not learned in a class thus demonstrating the student's ability to engage in life long learning, involve reflection on the impact of the proposed solution in a global and societal context, and be presented in written and oral reports to demonstrate the student's communication skills.
- All senior engineering studies are encouraged to take the Fundamentals of Engineering (FE) exam administered by the Colorado State Board of Registration for Professional Engineers. The Department periodically sets goals for and reviews the section-by-section performance of students on the FE. The results are used to identify areas of the curriculum that may need improvement.

Specific Program Requirements

Students are required to have earned a cumulative GPA of 2.000 or better in required EN courses.

Course	Title	Credits
Required EN Courses		
EN 101	Introduction to Engineering	2
EN 103	Problem Solving for Engineers	3
EN 107	Engineering Graphics	2
EN 211	Engineering Mechanics I	3
EN 212	Engineering Mechanics II	3
EN 215	Introduction to Industrial and Systems Engineering	3
EN 231 & 231L	Circuit Analysis I and Circuit Analysis I Lab	5
EN 321	Thermodynamics	3
EN 324 & 324L	Materials Science and Engineering and Materials Science and Engineering Lab	4
EN 343	Engineering Economy	3
EN 375	Stochastic Systems Engineering	3
EN 420	Simulation Experiments	4
EN 430	Project Planning and Control	3
EN 439	Time and Motion Studies	2
EN 440	Safety Engineering	3
EN 441 & 441L	Engineering of Manufacturing Processes and Engineering & Manufacturing Proc Lab	4
EN 443	Quality Control and Reliability	3
EN 471	Operations Research	3
EN 473 & 473L	Computer Integrated Manufacturing and Computer Integrated Mfg Lab	3
EN 475	Facility Planning and Design	3
EN 477	Operations Planning and Control	3
EN 486	Senior Seminar	2
EN 488	Industrial Engineering Design	3
Other Required Courses		
MATH 126	Calculus & Analytic Geometry I (GT-MA1)	5
MATH 207	Matrix and Vector Algebra with Applications	3
MATH 224	Calculus and Analytic Geometry II	5
MATH 337	Differential Equations I	3
PHYS 221 & 221L	General Physics I and General Physics I Lab	5
PHYS 222 & 222L	General Physics II and General Physics II Lab (GT-SC1)	5
ENG 101	Rhetoric & Writing I (GT-CO1)	3
ENG 102	Rhetoric & Writing II (GT-CO2)	3
CID 103	Speaking & Listening	3
General Education		15
Math/Science Electives		3
Technical Electives ¹		3
Total Credits		126

¹ Technical electives must be chosen from an approved list or have the approval of an Engineering adviser.

Planning Sheet

Disclaimer: The Planning Sheet is designed as a guide for student's planning their course selections. The information on this page provides only a suggested schedule. Actual course selections should be made

with the advice and consent of an academic advisor. While accurately portraying the information contained in the college catalog, this form is not considered a legal substitute for that document. Students should become familiar with the catalog in effect at the time in which they entered the institution.

Course	Title	Credits
Year 1		
Fall		
EN 101	Introduction to Engineering	2
EN 103	Problem Solving for Engineers	3
ENG 101	Rhetoric & Writing I (GT-CO1)	3
MATH 126	Calculus & Analytic Geometry I (GT-MA1)	5
General Education		3
	Credits	16
Spring		
EN 107	Engineering Graphics	2
ENG 102	Rhetoric & Writing II (GT-CO2)	3
MATH 224	Calculus and Analytic Geometry II	5
PHYS 221	General Physics I	4
PHYS 221L	General Physics I Lab	1
	Credits	15
Year 2		
Fall		
EN 211	Engineering Mechanics I	3
EN 231	Circuit Analysis I	4
EN 231L	Circuit Analysis I Lab	1
EN 215	Introduction to Industrial and Systems Engineering	3
MATH 207	Matrix and Vector Algebra with Applications	3
PHYS 222	General Physics II	4
PHYS 222L	General Physics II Lab (GT-SC1)	1
	Credits	19
Spring		
MATH 337	Differential Equations I	3
EN 212	Engineering Mechanics II	3
EN 324	Materials Science and Engineering	3
EN 324L	Materials Science and Engineering Lab	1
CID 103	Speaking & Listening	3
General Education		3
	Credits	16
Year 3		
Fall		
EN 321	Thermodynamics	3
EN 343	Engineering Economy	3
EN 375	Stochastic Systems Engineering	3
EN 439	Time and Motion Studies	2
EN 471	Operations Research	3
	Credits	14
Spring		
EN 420	Simulation Experiments	4
EN 441	Engineering of Manufacturing Processes	3
EN 441L	Engineering & Manufacturing Proc Lab	1
EN 443	Quality Control and Reliability	3
Math/Science Elective		3
EN 430	Project Planning and Control	3
	Credits	17
Year 4		
Fall		
EN 473	Computer Integrated Manufacturing	2
EN 473L	Computer Integrated Mfg Lab	1
EN 475	Facility Planning and Design	3
EN 486	Senior Seminar	2

General Education		6
	Credits	14
Spring		
EN 477	Operations Planning and Control	3
EN 440	Safety Engineering	3
EN 488	Industrial Engineering Design	3
General Education		3
Technical Elective		3
	Credits	15
	Total Credits	126