ENGINEERING, BACHELOR OF SCIENCE IN ENGINEERING: MECHATRONICS SPECIALIZATION

Undergraduate 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 AND ANALYTIC GEOMETRY I (5.00 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 (2.00 c.h.), EN 103 PROBLEM SOLVING FOR ENGINEERS (3.00 c.h.), and EN 107 ENGINEERING GRAPHICS (2.00 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 the 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 (2.00 c.h.), EN 103 PROBLEM SOLVING FOR ENGINEERS (3.00 c.h.), EN 107 ENGINEERING GRAPHICS (2.00 c.h.), ENG 101 RHETORIC & WRITING I (3.0 c.h.), ENG 102 RHETORIC & WRITING II (3.0 c.h.), MATH 126 CALCULUS AND ANALYTIC GEOMETRY I (5.00 c.h.), MATH 224 CALCULUS AND ANALYTIC GEOMETRY II (5.00 c.h.), and PHYS 221 GENERAL PHYSICS I (4.00 c.h.), PHYS 221L GENERAL PHYSICS I LAB (1.00 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 BSE program has the following educational objectives and outcomes, which have been approved and are reviewed regularly by the BSE Advisory Board.

BSE Program Outcomes

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

1. An ability to apply knowledge of mathematics, science, and engineering;
2. An ability to design and conduct experiments, as well as to analyze and interpret data;
3. An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability;
4. An ability to function on multi-disciplinary teams;
5. An ability to identify, formulate, and solve engineering problems;
6. An understanding of professional and ethical responsibility;
7. An ability to communicate effectively;
8. The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context;
9. A recognition of the need for, and an ability to engage in life-long learning;
10. A knowledge of contemporary issues; and
11. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

BSE Educational Objectives

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

- Conduct low-level designs and modifications of mechatronic systems;
- Trouble shoot and support existing mechatronic systems;
- Work directly with suppliers and customers of mechatronic systems;
- Manage small and support large engineering projects;
- Assume ownership and accountability for engineering projects;
- Function well on teams of engineers with different skill levels;
- Implement basic quality control principles;
- Write sound technical documents such as requests for proposals, grant applications, project specifications and technical reports;
- Continue their education at the graduate level; and
- Obtain additional engineering certifications.

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.

General Education

The general education requirement for graduation includes a total of 35 semester credits in two categories: Skills Component and Knowledge

Component. Please see the General Education Requirement section under Academic Policies for more information.

Specific Requirements for the BSE Degree

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 231 & 231L	CIRCUIT ANALYSIS I and CIRCUIT ANALYSIS I LAB	5
EN 260	BASIC ELECTRONICS	3
EN 263	ELECTROMECHANICAL DEVICES	3
EN 321	THERMODYNAMICS	3
EN 324 & 324L	MATERIALS SCIENCE AND ENGINEERING and MATERIALS SCIENCE AND ENGINEERING LAB	4
EN 343	ENGINEERING ECONOMY	3
EN 360 & 360L	CONTROL SYSTEMS I and CONTROL SYSTEMS I LAB	3
EN 361 & 361L	DIGITAL ELECTRONICS and DIGITAL ELECTRONICS LAB	4
EN 362 & 362L	INTRODUCTION TO MECHATRONICS and MECHATRONICS LAB	3
EN 363 & 363L	VIRTUAL MACHINE DESIGN and VIRTUAL MACHINE DESIGN LAB	3
EN 375	STOCHASTIC SYSTEMS ENGINEERING	3
EN 430	PROJECT PLANNING AND CONTROL	3
EN 441 & 441L	ENGINEERING OF MANUFACTURING PROCESSES and ENGINEERING & MANUFACTURING PROC LAB	4
EN 443	QUALITY CONTROL AND RELIABILITY	3
EN 460 & 460L	CONTROL SYSTEMS II and CONTROL SYSTEMS II LAB	3
EN 462 & 462L	INDUSTRIAL ROBOTICS and INDUSTRIAL ROBOTICS LAB	3
EN 473 & 473L	COMPUTER INTEGRATED MANUFACTURING and COMPUTER INTEGRATED MFG LAB	3
EN 486	SENIOR SEMINAR	2
EN 487	ENGINEERING DESIGN	3
Other Required Courses		
MATH 126	CALCULUS AND ANALYTIC GEOMETRY I	5
MATH 224	CALCULUS AND ANALYTIC GEOMETRY II	5
MATH 207	MATRIX AND VECTOR ALGEBRA WITH APPLICATIONS	3
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	5
ENG 101	RHETORIC & WRITING I	3
ENG 102	RHETORIC & WRITING II	3
COMR 103	SPEAKING AND LISTENING	3
General Education		15
Math/Science Electives		3
Technical Electives [1]		3
Total Credits		130

[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
MATH 126	Calculus and Analytic Geometry I	5
ENG 101	Rhetoric & Writing I	3
General Education		3
	Credits	16
Spring		
EN 107	Engineering Graphics	2
MATH 224	Calculus and Analytic Geometry II	5
PHYS 221	General Physics I	4
PHYS 221L	General Physics I Lab	1
ENG 102	Rhetoric & Writing II	3
	Credits	15
Year 2		
Fall		
EN 211	Engineering Mechanics I	3
EN 231	Circuit Analysis I	4
EN 231L	Circuit Analysis I Lab	1
MATH 207	Matrix and Vector Algebra with Applications	3
PHYS 222	General Physics II	4
PHYS 222L	General Physics II Lab	1
	Credits	16
Spring		
EN 212	Engineering Mechanics II	3
EN 260	Basic Electronics	3
EN 263	Electromechanical Devices	3
EN 324	Materials Science and Engineering	3
EN 324L	Materials Science and Engineering Lab	1
MATH 337	Differential Equations I	3
	Credits	16
Year 3		
Fall		
EN 321	Thermodynamics	3
EN 343	Engineering Economy	3
EN 360	Control Systems I	2
EN 360L	Control Systems I Lab	1
EN 362	Introduction to Mechatronics	2
EN 362L	Mechatronics Lab	1

EN 375	Stochastic Systems Engineering	3
	Credits	15
Spring		
EN 361	Digital Electronics	3
EN 361L	Digital Electronics Lab	1
EN 363	Virtual Machine Design	2
EN 363L	Virtual Machine Design Lab	1
EN 441	Engineering of Manufacturing Processes	3
EN 441L	Engineering & Manufacturing Proc Lab	1
EN 443	Quality Control and Reliability	3
EN 460	Control Systems II	2
EN 460L	Control Systems II Lab	1
	Credits	17
Year 4		
Fall		
COMR 103	Speaking and Listening	3
EN 473	Computer Integrated Manufacturing	2
EN 473L	Computer Integrated Mfg Lab	1
EN 486	Senior Seminar	2
General Education		6
Technical Elective		3
	Credits	17
Spring		
EN 430	Project Planning and Control	3
EN 462	Industrial Robotics	2
EN 462L	Industrial Robotics Lab	1
EN 487	Engineering Design	3
General Education		6
Math/Science Elective		3
	Credits	18
	Total Credits	130