MECHATRONICS ENGINEERING, BACHELOR OF SCIENCE

Student Learning Outcomes

1. Students will have the ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
2. Students will have the 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. Students will have the ability to communicate effectively with a range of audiences.
4. Students will have the 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. Students will have the 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. Students will have the ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
7. Students will have the ability to acquire and apply new knowledge as needed, using appropriate learning strategies.
8. Program Educational Objectives. During the first few years after graduation, graduates should be able to:
9. Propose and implement solutions to large-scale engineering problems in various industrial sectors.
10. Lead and/or supervise teams to achieve project goals.
11. Obtain jobs of increasing responsibility applying industrial engineering skills and knowledge to a wide range of problems in a wide range of industries.
12. Continue their education at the graduate level.
13. Obtain additional engineering certifications.
14. Design new and improve existing mechatronic systems.

Outcomes Assessment Activities

- Program outcomes are mapped into course objectives and outcomes.
- Assessment of each program outcome is reflected in two or three courses. Each program outcome is evaluated and discussed at least every three years. Based on the results of discussions, corrective actions (if any) are prescribed.
- Every three years, the program's industrial advisory board, consisting of members of local and regional industry representatives, provides inputs on program objectives/outcomes which are then considered by the program faculty.
- 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.

Specific Program Requirements

Program Overview

Requirement	Credits
General Education	24
Core Requirements	74
Major Requirements	26
Concentration Requirements	6
Total Credits	**130**

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

Course	Title	Credits
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	Circuit Analysis I	4
EN 231L	Circuit Analysis I Lab	1
EN 260	Basic Electronics	3
EN 263	Electromechanical Devices	3
EN 321	Thermodynamics	3
EN 324	Materials Science and Engineering	3
EN 324L	Materials Science and Engineering Lab	1
EN 343	Engineering Economy	3
EN 360	Control Systems I	2
EN 360L	Control Systems I Lab	1
EN 361	Digital Electronics	3
EN 361L	Digital Electronics Lab	1
EN 362	Introduction to Mechatronics	2
EN 362L	Mechatronics Lab	1
EN 363	Virtual Machine Design	2
EN 363L	Virtual Machine Design Lab	1
EN 375	Stochastic Systems Engineering	3
EN 430	Project Planning and Control	3
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
EN 462	Industrial Robotics	2
EN 462L	Industrial Robotics Lab	1
EN 473	Computer Integrated Manufacturing	2
EN 473L	Computer Integrated Mfg Lab	1
EN 486	Senior Seminar	2
EN 487	Engineering Design (Other Required Courses)	3
Other Required Courses		
MATH 126	Calculus & Analytic Geometry I (GT-MA1)	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	General Physics I	4
PHYS 221L	General Physics I Lab (GT-SC1)	1
PHYS 222	General Physics II	4
PHYS 222L	General Physics II Lab (GT-SC1)	1
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		**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 students 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 & Analytic Geometry I (GT-MA1)	5
ENG 101	Rhetoric & Writing I (GT-CO1)	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 (GT-SC1)	1
ENG 102	Rhetoric & Writing II (GT-CO2)	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 (GT-SC1)	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 430	Project Planning and Control	3
EN 441	Engineering of Manufacturing Processes	3
EN 441L	Engineering & Manufacturing Proc Lab	1
EN 460	Control Systems II	2
EN 460L	Control Systems II Lab	1
	Credits	**17**
Year 4		
Fall		
CID 103	Speaking & Listening	3
Technical Electives		3
EN 473	Computer Integrated Manufacturing	2
EN 473L	Computer Integrated Mfg Lab	1
EN 486	Senior Seminar	2
General Education		6
	Credits	**17**
Spring		
EN 443	Quality Control and Reliability	3
EN 462	Industrial Robotics	2
EN 462L	Industrial Robotics Lab	1
EN 487	Engineering Design	3
Math/Science Electives		3
General Education		6
	Credits	**18**
	Total Credits	**130**