COMPUTER ENGINEERING, B.S.E.

Designed to be a program that offers a rigorous curriculum with ample hands-on opportunities to incorporate experiential learning and integrative thinking in order to meet the demands of the local and national industry, the Bachelor of Science in Computer Engineering program intersects Electrical Engineering (EE) and Computer Science (CS) with both breadth and depth. It shares the same first-year common engineering curriculum with all the other engineering programs of the Frank R. Seaver College of Science and Engineering. The lower-division helps students establish a solid foundation in math, science, and introductory Engineering. The upper-division exposes them to more advanced subjects in EE and CS.

Design Experience

Design is interwoven throughout the Computer Engineering undergraduate program, culminating in a formal, year-long capstone project in the senior year. First-year and sophomore engineering courses provide an introduction to design. A junior-level lab sequence shared with the Electrical Engineering undergraduate program offers a comprehensive laboratory experience. Finally, the senior design capstone experience builds on the analytical background as well as strong programming skills developed throughout the program to solve a real-world problem.

Program Education Objectives

The Computer Engineering undergraduate program has established the following program educational objectives that are consistent with the mission of the University and the Frank R. Seaver College of Science and Engineering. The objectives describe what graduates are expected to attain within a few years of graduation. The graduates of the Computer Engineering program will:

1. Perform effectively as practicing engineers and/or successfully undertake graduate study in computer engineering, electrical engineering, computer science, or related fields;
2. Meet the challenges of the future through continuing professional growth; and
3. Exhibit concern for service and justice through leadership within their profession, as well as the community as a whole.

These program educational objectives were established in consultation with the constituents of the program. To prepare the graduates to accomplish these program educational objectives, the program provides a curriculum with both breadth and depth. Engineering science and design, mathematics, and basic sciences are significant components of the program. In addition to these traditional technical courses, and in keeping with the Jesuit tradition of educating the whole person, the curricula include core requirements in the humanities, communications, and the fine arts.

Opportunities for involvement in professional societies, student design competitions, and University co-curricular activities are plentiful and help to accomplish these objectives.

Transfer Requirements

Students interested in transferring into the Computer Engineering undergraduate program must complete CHEM 111 General Chemistry I Lab, CHEM 114 General Chemistry for Engineers, MATH 131 Calculus I, MATH 132 Calculus II, and PHYS 1100 Introduction to Mechanics (or their equivalents) with a minimum grade of C (2.0) in each course before being considered. Final approval of the transfer request resides with the Department Chairperson.

Student Outcomes

The Computer Engineering undergraduate program has established the following student outcomes. These student outcomes describe the expected knowledge and skills of graduates at the time of graduation.

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

Graduation Requirements for the Computer Engineering B.S.E.

Department criteria for graduation include

1. completion of at least 125 semester hours covering all requirements below, with
2. a grade point average of C (2.0) in the upper division major courses (excluding core), and
3. all upper division EECE/CMSI courses must be completed in residence.

The Computer Engineering undergraduate program requires the following courses to be completed:

Code	Title	Semester Hours
General Engineering		
ENGR 100	Introduction to Engineering	3
ENGR 190	Engineering Seminar	1
ENGR 1200	Computational Engineering	2
ENGR 1300	Engineering Visualization	2
Subtotal		8
Computer Science		
CMSI 3630	Data Structures and Algorithms in Engineering	4
three additional upper-division CMSI/EECE elective courses appropriate for Computer Engineering		12

Subtotal		16
Electrical Engineering		
EECE 2100	Circuits I Lab	1
EECE 2110	Circuits I	3
EECE 2210	Circuits II	4
EECE 2240	Introduction to Digital Systems	4
EECE 3100	Junior Lab I	4
EECE 3130	Electronics	4
EECE 3140	Microprocessor and Microcontroller Systems	4
EECE 3200	Junior Lab II	4
EECE 3210	Signals and Linear Systems	4
EECE 4100	Senior Lab I	4
EECE 4200	Senior Lab II	4
EECE 4280	Senior Seminar	1
Subtotal		41
Math and Science		
MATH 131	Calculus I	4
MATH 132	Calculus II	4
MATH 246	Differential Equations and Linear Algebra	4
PHYS 1100	Introduction to Mechanics	4
PHYS 2100	Introduction to Electricity and Magnetism	4
CHEM 111	General Chemistry I Lab	1
CHEM 114	General Chemistry for Engineers	3
CMSI 2820	Discrete Mathematics for Computer Science	4
EECE 2212	ENGR. Prob. & Stat.	2
Subtotal		30
University Core		
A minimum of 30 semester hours as defined in the core curriculum for students in the Frank R. Seaver College of Science and Engineering.		30
Subtotal		30
Total Semester Hours		**125**

Computer Engineering B.S.E. Curriculum

The typical course of study leading to the B.S.E. degree in Computer Engineering is as follows:

Course	Title	Semester Hours
First Year		
Fall		
ENGR 100	Introduction to Engineering	3
ENGR 190	Engineering Seminar	1
MATH 131	Calculus I	4
CHEM 111	General Chemistry I Lab	1
CHEM 114	General Chemistry for Engineers	3
University Core		3-4
ORNT 1000	First Year Forum	0
	Semester Hours	**15-16**
Spring		
ENGR 1200	Computational Engineering	2
ENGR 1300	Engineering Visualization	2
MATH 132	Calculus II	4
PHYS 1100	Introduction to Mechanics	4
University Core		3-4
	Semester Hours	**15-16**
Sophomore Year		
Fall		
EECE 2110	Circuits I	3
EECE 2100	Circuits I Lab	1
CMSI 2820	Discrete Mathematics for Computer Science	4
PHYS 2100	Introduction to Electricity and Magnetism	4
University Core		4
	Semester Hours	**16**
Spring		
EECE 2210	Circuits II	4
EECE 2240	Introduction to Digital Systems	4
MATH 246	Differential Equations and Linear Algebra	4
EECE 2212	ENGR. Prob. & Stat.	2
	Semester Hours	**14**
Junior Year		
Fall		
EECE 3100	Junior Lab I	4
EECE 3130	Electronics	4
EECE 3140	Microprocessor and Microcontroller Systems	4
University Core		4
	Semester Hours	**16**
Spring		
EECE 3200	Junior Lab II	4
EECE 3210	Signals and Linear Systems	4
CMSI 3630	Data Structures and Algorithms in Engineering	4
University Core		4
	Semester Hours	**16**
Senior Year		
Fall		
EECE 4100	Senior Lab I	4
EECE 4280	Senior Seminar	1
CMSI/EECE Elective		4
CMSI/EECE Elective		4
University Core		4
	Semester Hours	**17**
Spring		
EECE 4200	Senior Lab II	4
CMSI/EECE Elective		4
University Core		4
University Core		4
	Semester Hours	**16**
	Minimum Semester Hours	**125-127**