COMPUTER ENGINEERING, BACHELOR OF SCIENCE

The 123 credit hour program in computer engineering leads to the Bachelor of Science degree in Computer Engineering. Thirty-one (31) hours of mathematics and physics and 9 hours of computer science complement the required 44 hours of work in the computer engineering area. Six (6) hours in written and oral communications, 15 hours in the humanities and social sciences, and 18 hours of engineering electives provide the opportunity for the student to acquire a general educational background and gain the cultural attributes associated with a university education.

The individual holding this degree will have advanced knowledge in his or her field of engineering interest and in addition will have a university educational background involving mathematics, the physical sciences, and the humanities and social sciences. Completion of this curriculum will enable the graduate to enter employment in positions involving computer hardware design and applications, computer software design and development, microcomputer based applications, and computer networking. The program also leads to the preparation for graduate work in computer engineering, computer science or electrical engineering.

Accreditation

The Electrical and Computer Engineering (ECE) department's Computer Engineering Program (CENG) is accredited by the Engineering Accreditation Commission of ABET (http://www.abet.org/)

Program Educational Objectives

The department's Program Educational Objectives are a statement of what graduates are doing, or are capable of doing, three to five years after graduation. The students in the Computer Engineering program receive a strong foundation in engineering science and design that not only enables them to pursue productive careers in the computer engineering field but that can be used as the foundation for careers in other areas, such as business, management, and medicine. Typical industries in which Computer Engineering graduates are employed include microprocessor/embedded system design, digital design, hardware/software integration, and computer architecture and parallel processing.

The Computer Engineering program prepares graduates for their professional careers with the objective that within five years after graduation they will be:

- Employed in business, academia, or government.
- Successful engineers who have established productive careers in their field and have contributed to improve and provide innovative and effective solutions in computer engineering or related fields.
- Demonstrating technical and decision-making processes and the human interactions necessary to produce viable, responsible, and sustainable technological solutions.
- Engaging in lifelong learning, which may include postgraduate education, to successfully adapt to technological, industry specific, and cultural changes and to foster adept functioning in society.
- Performing engineering practice in a context that reflects awareness of the ethics of their profession and of the impacts of their work on the profession and society at large.

These Program Educational Objectives were developed with input from the program's educational objectives constituency, consisting of employers (including the Industry Advisory Board), graduates of the program, and faculty of the department.

Student Outcomes

Learning Outcomes are those abilities that a graduate of the Computer Engineering program will have attained so that he/she can meet the educational objectives established for the program.

At the time of graduation, students in the ECE Computer Engineering program will have:

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.

Professional Admission Requirements

Pre-professionally admitted College of Engineering students majoring in computer engineering will be granted profession admission into the computer engineering program if the students have:

- maintained a cumulative GPA of at least 2.4 and is in good standing in the College of Engineering, and
- completed ECEN 213 Electrical Circuits I or ECEN 215 Electronics and Circuits I and ECEN 313 Switching Circuit Theory or ECEN 370 Digital Logic Design with a grade of C or better.

A transfer student will be admitted if he/she has:

- completed courses equivalent to ECEN 213 or ECEN 215 and ECEN 313 or ECEN 370 at other institutions with acceptable transfer grades of C or better, and
- earned a GPA of 2.4 or better during their first 12 credit hours in computer engineering course work at UNL/UNO.

Transfer students will be able to appeal to the College's Academic Appeals Committee for admission for an additional semester if they fail to meet the GPA requirement.

See the College of Engineering section of the catalog for details on admission to the college.

Requirements

Course	Title	Credits
First Year		
First Semester		
ECEN 103	ELECTRICAL AND COMPUTER ENGINEERING FUNDAMENTALS	4
CIST 1400	INTRODUCTION TO COMPUTER SCIENCE I	3
MATH 1950	CALCULUS I	5
ENGL 1160	ENGLISH COMPOSITION II	3
	Credits	**15**

Second Semester		
ECEN 106	MICROPROCESSOR APPLICATIONS	3
ECEN 123	INTRODUCTION TO ELECTRICAL AND COMPUTER ENGINEERING	1
ECEN 225	ELECTRICAL AND COMPUTER ENGINEERING SEMINAR	1
CSCI 1620	INTRODUCTION TO COMPUTER SCIENCE II	3
MATH 1960	CALCULUS II	4
PHYS 2110	GENERAL PHYSICS I - CALCULUS LEVEL	4
	Credits	**16**
Second Year		
First Semester		
ECEN 215	ELECTRONICS AND CIRCUITS I	3
ECEN 218	ELECTRICAL CIRCUITS LABORATORY I	1
MATH 2350	DIFFERENTIAL EQUATIONS	3
PHYS 1164	GENERAL PHYSICS LABORATORY II	1
PHYS 2120	GENERAL PHYSICS-CALCULUS LEVEL	4
CMST 1110	PUBLIC SPEAKING FUNDS [2]	3
	Credits	**15**
Second Semester		
ECEN 217	ELECTRICAL CIRCUITS III	1
ECEN 222	ELECTRONIC CIRCUITS I	4
ECEN 313	SWITCHING CIRCUITS THEORY	4
MATH 1970	CALCULUS III	4
ACE Elective [1]		3
	Credits	**16**
Third Year		
First Semester		
ECEN 310	DIGITAL DESIGN AND INTERFACING	4
ECEN 332	ASSEMBLY LANGUAGE PROGRAMMING	1
CSCI 3320	DATA STRUCTURES	3
MATH 2050	APPLIED LINEAR ALGEBRA	3
Engineering Elective [3]		3
	Credits	**14**
Second Semester		
ECEN 305	PROBABILITY THEORY AND STATISTICS FOR ELECTRICAL AND COMPUTER ENGINEERS	3
ECEN 325	COMMUNICATIONS SYSTEMS	4
ECEN 433	MICROPROCESSOR SYSTEM DESIGN	4
Engineering Elective [3]		3
ACE Elective [1]		3
	Credits	**17**
Fourth Year		
First Semester		
ECEN 435	EMBEDDED MICROCONTROLLER DESIGN	4
ECEN 496	COMPUTER ENGINEERING CAPSTONE I	2
ENGR 469	TECHNOLOGY, SCIENCE AND CIVILIZATION (ACE 8)	3
Engineering Elective [3]		3
ACE Elective [1]		3
	Credits	**15**
Second Semester		
ECEN 499	COMPUTER ENGINEERING CAPSTONE II	3
Engineering Elective [3]		9
ACE Elective [1]		3
	Credits	**15**
	Total Credits	**123**

1. ACE elective: Choose one course from each ACE Student Learning Outcome (SLO) 5,6,7 and 9 elective course. ENGR 469 satisfies ACE SLO 8.
2. Students may substitute ENGR 100 for CMST 1110
3. Engineering electives may be selected from ECE junior and senior or approved sophomore level courses. Three hours of engineering electives may be selected from an approved list of non-ECE courses.

Engineering Electives

The computer engineering program requires 18 hours of engineering electives. These consist of at least 15 hours of any ECEN course at the junior or senior level. Students can substitute three (3) of these hours with a course from the following list.

Computer Science (CSCI) Courses:

4150/8156	Graph Theory and Applications
4220/8226	Programming Languages
4300/8306	Deterministic Operations Research Models
4310/8316	Probabilistic Operations Research Models
4440/8446	Introduction to Parallel Computing
4450/8456	Introduction to Artificial Intelligence
4470/8476	Pattern Recognition
4500/8506	Operating Systems
4510/8516	Advanced Operating Systems
4620/8626	Computer Graphics
4660/8666	Automata, Computability and Formal Languages
4760/8766	Topics in Modeling
4830/8836	Introduction to Software Engineering
4850/8856	Database Management Systems

Math (MATH) Courses:

4150/8156	Graph Theory and Applications
4300/8306	Deterministic Operations Research Models
4310/8316	Probabilistic Operations Research Models
4660/8666	Automata, Computability and Formal Languages
4760/8766	Topics in Modeling