Electrical Engineering, Bachelor of Science

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

Program Educational Objectives

The Program Educational Objectives (PEOs) for the electrical engineering program are a statement of what its graduates are doing or are capable of doing three to five years after graduation. Electrical engineering is concerned with the production, transmission, and utilization of electrical energy and the transmission and processing of information. Employment opportunities for electrical engineers cover a wide spectrum of activities including design, development, research, sales, and management. These activities are carried on in industrial organizations, public and private utilities, the communications and computer industry, governmental and educational institutions, and consulting engineering firms. Careers may encompass electronic materials, nanotechnology, optical systems, communications, biomedical applications, signal processing, microelectronics design, energy systems, and electromagnetics. The objective of this program is to offer students an education to become productive electrical engineers and be active, contributing citizens of the nation and the world.

The Program Educational Objectives for the electrical engineering program are that graduates 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 electrical 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.

Student Outcomes

Student Outcomes are those abilities that a graduate of the Electrical 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 Electrical Engineering program will have:

- An ability to apply knowledge of mathematics, science, and engineering.
- An ability to design and conduct experiments, as well as to analyze and interpret data.
- 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.
- An ability to function on multidisciplinary teams.
- An ability to identify, formulate, and solve engineering problems.
- An understanding of professional and ethical responsibility.
- An ability to communicate effectively.
- The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.
- A recognition of the need for, and an ability to, engage in lifelong learning.
- A knowledge of contemporary issues.
- An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Students graduating with a Bachelor of Science in Electrical Engineering degree must successfully complete 124 credit hours as follows:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>Required electrical engineering courses</td>
<td>41</td>
<td></td>
</tr>
<tr>
<td>Required math and science courses</td>
<td>32</td>
<td></td>
</tr>
<tr>
<td>Technical electives 1</td>
<td>27</td>
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</table>

1 Of the 27 credit hours of technical electives, at least 12 credit hours must be taken as electrical engineering (ECEN) courses, which are referred to as “EE Technical Electives.” The remaining 15 credit hours of technical electives which are referred to as “EE or Other Technical Electives” may be taken from any 300 or 400 level course offering (with some exceptions) in the department of Electrical and Computer Engineering or in any other engineering department within the College of Engineering, or in the departments of Biological Sciences, Chemistry, Computer Science and Engineering, Mathematics, Statistics, or Physics and Astronomy at UNL or UNO.

Requirements

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>First Year</td>
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<tr>
<td>First Semester</td>
<td></td>
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<tr>
<td>ECEN 1030</td>
<td>COMPUTER AND ELECTRONICS ENGINEERING FUNDAMENTALS</td>
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<tr>
<td>MATH 1950</td>
<td>CALCULUS I</td>
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<tr>
<td>CIST 1400</td>
<td>INTRODUCTION TO COMPUTER SCIENCE I</td>
<td>3</td>
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<tr>
<td>ACE Elective 1</td>
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<tr>
<td>Credits</td>
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<tr>
<td>Second Semester</td>
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<tr>
<td>ECEN 1060</td>
<td>MICROPROCESSOR APPLICATIONS</td>
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<td>ECEN 1940</td>
<td>SPECIAL TOPIC IN COMPUTER ELECTRONICS ENGINEERING I</td>
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<td>ECEN 2250</td>
<td>COMPUTER AND ELECTRONICS ENGINEERING SEMINAR</td>
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<td>MATH 1960</td>
<td>CALCULUS II</td>
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<tr>
<td>PHYS 2110</td>
<td>GENERAL PHYSICS I - CALCULUS LEVEL</td>
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<tr>
<td>CMST 1110</td>
<td>PUBLIC SPEAKING FUNDS 2</td>
<td>3</td>
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<tr>
<td>Credits</td>
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<td>First Semester</td>
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<tr>
<td>ECEN 2130</td>
<td>ELECTRICAL CIRCUITS I</td>
<td>3</td>
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<tr>
<td>ECEN 2184</td>
<td>ELECTRICAL CKT I LAB</td>
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<tr>
<td>MATH 2050</td>
<td>APPLIED LINEAR ALGEBRA</td>
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MATH 2350  DIFFERENTIAL EQUATIONS  3
PHYS 2120  GENERAL PHYSICS-CALCULUS LEVEL  4
PHYS 1164  GENERAL PHYSICS LABORATORY II  1

Credits  15

Second Semester
ECEN 2140  ELECTRICAL CIRCUITS II  3
ECEN 2220  ELECTRONIC CIRCUITS I  4
ECEN 3130  SWITCHING CIRCUITS THEORY  4
MATH 1970  CALCULUS III  4

Credits  15

Third Year
First Semester
ECEN 3040  SIGNALS AND SYSTEMS I  3
ECEN 3060  ELECTROMAGNETIC FIELD THEORY  3
ECEN 3070  ELECTRICAL ENGINEERING LABORATORY I  2
STAT 3800  APPLIED ENGINEERING PROBABILITY AND STATISTICS  3
Electrical Engineering Option Elective  3

Credits  15

Second Semester
ECEN 3940  SPECIAL TOPICS IN COMPUTER AND ELECTRONICS ENGINEERING III  1
ENGL 3980  TECHNICAL WRITING ACROSS THE DISCIPLINES  3
Electrical Engineering Option Elective  3
Engineering Elective  3
Science Elective  4
ACE Elective  1

Credits  18

Fourth Year
First Semester
ECEN 4940  CAPSTONE I  2
Electrical Engineering Option Elective  3
Engineering Elective  3
ACE Electives  1

Credits  15

Second Semester
ECEN 4950  CAPSTONE II  3
Engineering Electives  3
ACE Elective  1

Credits  15

Total Credits  125

1  Choose one course from not yet satisfied ACE outcomes 5,6,7,8 or 9.
2  ENGR 1000 may be substituted for CMST 1110
3  The department maintains or approved list of technical electives (within and outside of ECE) on the department website.
4  Can substitute ENGR 3000 for ENGL 3980.

Total Credit Hours Required for Graduation - 124 Hours