ELECTRICAL ENGINEERING MAJOR (B.S.)

https://ceps.unh.edu/ece/electrical-engineering-bs

Description

In addition to the university's mandatory Discovery Program requirements, degree candidates must complete our core program (freshman through junior years). In the senior year, students select professional technical electives in the areas of their interest. They also carry out a student-designed project to acquire both breadth and depth of study and to integrate knowledge across course boundaries.

For a detailed semester by semester list of requirements for the four years of study, please refer to the Degree Plan tab.

Requirements

In addition to Discovery Program requirements, the department has a number of grade-point average and course requirements.

1. Any electrical engineering major whose cumulative grade-point average in ECE courses is less than 2.0 during any three semesters will not be allowed to continue as an electrical engineering major.
2. Electrical engineering majors must achieve a 2.0 grade-point average in ECE courses as a requirement for graduation.

To make an exception to any of these departmental requirements based on extenuating circumstances, students must petition the department's undergraduate committee. Mindful of these rules, students, with their adviser's assistance, should plan their programs based on the distribution of courses found in the Degree Plan tab.

Required Courses

Code	Title	Credits
CS 410C	Introduction to Scientific Programming/C	4
or CS 415	Introduction to Computer Science I	
ECE 401	Perspectives in Electrical and Computer Engineering	4
ECE 541	Electric Circuits	4
ECE 543	Introduction to Digital Systems	4
ECE 548	Electronic Design I	4
ECE 562	Computer Organization	4
ECE 602	Engineering Analysis	4
ECE 603	Electromagnetic Fields and Waves I	4
ECE 617	Junior Laboratory I	4
ECE 618	Junior Laboratory II	4
ECE 633	Signals and Systems I	3
ECE 634	Signals and Systems II	3
ECE 647	Random Processes and Signals in Engineering	3
ECE 651	Electronic Design II	4
ECON 402	Principles of Economics (Micro)	4
or EREC 411	Environmental and Resource Economics Perspectives	
MATH 425	Calculus I	4
MATH 426	Calculus II	4
MATH 527	Differential Equations with Linear Algebra	4
MATH 645	Linear Algebra for Applications	4
PHYS 407	General Physics I	4
PHYS 408	General Physics II	4
Capstone		
ECE 791	Senior Project I	2
ECE 792	Senior Project II	2
Mathematics or Science Elective		
Select one from the following:		3-4
CHEM 405	Chemical Principles for Engineers	
MATH 644	Statistics for Engineers and Scientists	
MATH 647	Complex Analysis for Applications	
PHYS 505	General Physics III	
PHYS 615	Classical Mechanics and Mathematical Physics I	
Professional Electives		
Choose four ECE 700-level courses		16
Other Courses		
Discovery requirements not already covered by required courses		24
Total Credits		**128-129**

Degree Plan

Course	Title	Credits
First Year		
Fall		
ECE 401	Perspectives in Electrical and Computer Engineering	4
MATH 425	Calculus I	4
CS 410C	Introduction to Scientific Programming/C [1]	4
ECON 402 or EREC 411	Principles of Economics (Micro) or Environmental and Resource Economics Perspectives	4
	Credits	**16**
Spring		
PHYS 407	General Physics I	4
ENGL 401	First-Year Writing	4
MATH 426	Calculus II	4
Discovery Program Category [1]		4
	Credits	**16**
Second Year		
Fall		
ECE 541	Electric Circuits	4
ECE 543	Introduction to Digital Systems	4
PHYS 408	General Physics II	4
MATH 527	Differential Equations with Linear Algebra	4
	Credits	**16**
Spring		
ECE 548	Electronic Design I	4
ECE 562	Computer Organization	4
MATH 645	Linear Algebra for Applications	4
Discovery Program Category		4
	Credits	**16**
Third Year		
Fall		
ECE 602	Engineering Analysis	4
ECE 617	Junior Laboratory I	4
ECE 633	Signals and Systems I	3
ECE 651	Electronic Design II	4
Math/Science Elective [4]		3-4
	Credits	**18-19**

Spring		
ECE 603	Electromagnetic Fields and Waves I	4
ECE 618	Junior Laboratory II	4
ECE 634	Signals and Systems II	3
ECE 647	Random Processes and Signals in Engineering	3
	Credits	**14**
Fourth Year		
Fall		
Two Professional Electives [2]		8
Two Discovery Program Category courses		8
ECE 791	Senior Project I [3]	2
	Credits	**18**
Spring		
Two Professional Electives [2]		8
Discovery Program Category		4
ECE 792	Senior Project II [3]	2
	Credits	**14**
	Total Credits	**128-129**

1. Students who wish to preserve the option of transferring to the computer engineering major without incurring a delay in graduation should consult with their academic adviser before electing these courses. It is recommended that such students take CS 415 Introduction to Computer Science I in the fall semester and CS 416 Introduction to Computer Science II in the spring semester in place of the listed courses.
2. Four professional electives must be selected from the following categories of courses:
   - At least two from: ECE 7XX not including ECE 795 Electrical and Computer Engineering Projects and ECE 796 Special Topics
   - Any of these: ECE 795 Electrical and Computer Engineering Projects, ECE 796 Special Topics
   - No more than one from: , DS 774 E-Business
   - Honors students who complete ECE 791H Senior Honors Project I and ECE 792H Senior Honors Project II satisfy one professional elective requirement as well as the requirements for ECE 791 Senior Project I and ECE 792 Senior Project II.
3. ECE 791 Senior Project I and ECE 792 Senior Project II fulfill Discovery Program Capstone Experience.
4. Math/Science Elective approved courses: MATH 644 Statistics for Engineers and Scientists, MATH 647 Complex Analysis for Applications, CHEM 405 Chemical Principles for Engineers, PHYS 505 General Physics III, PHYS 615 Classical Mechanics and Mathematical Physics I, ME #523 Introduction to Statics and Dynamics.

Students are required to take either ECON 402 Principles of Economics (Micro) or EREC 411 Environmental and Resource Economics Perspectives to fulfill the Social Science Category of the Discovery Program.

Fulfilling the EE Program curriculum automatically meets Discovery Category, "Environment, Technology and Society."

Student Learning Outcomes

- 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 life-long learning a knowledge of contemporary issues.
- An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.