

# ELECTRICAL ENGINEERING - COMPUTER OPTION CONCENTRATION

Department: Electrical and Computer Engineering (<https://catalog.bradley.edu/undergraduate/engineering-technology/electrical-computer-engineering/>)

The baccalaureate program in electrical engineering is accredited by the Engineering Accreditation Commission of ABET, <https://www.abet.org> (<https://www.abet.org/>).

## Department Mission and Educational Objectives

**Department Mission:** the mission of the Electrical and Computer Engineering Department is to educate the next generation of electrical and computer engineers to meet the challenges of the future, and empower electrical engineering graduates for immediate and sustained success in their professional practice.

**Program Educational Objectives:** The ECE faculty recognize that there are a number of common elements inherent to the success in the profession, which include the following: ability to acquire, generate, and use new knowledge; ability to complete complex electrical engineering projects; critical thinking, experience, knowledge, skills, and capabilities relevant to profession. These elements required for success in the profession translate into these educational objectives of the program. It is the expectation of the ECE faculty that graduates of the EE program will attain the following goals within a few years of graduation,

1. Are applying their education to their professional work in the public or private sectors or obtaining an advanced degree in electrical engineering or related areas;
2. Are engaging in lifelong learning using their education as a foundation.
3. Are productive while demonstrating professional growth and assuming positions of increasing responsibility.

## Student Outcomes

In order to meet these program educational objectives, students graduating from Bradley's electrical engineering program will attain the following outcomes.

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

The goal of the ECE department is to provide the intellectual and physical learning environment in which students achieve these outcomes. The intellectual component of this environment is supplied by the ECE faculty members, in their roles as mentors, advisors, and engineering professionals, as well as by the curriculum they establish for the programs. The physical component consists of quality facilities equipped with state-of-art instrumentation, equipment, computers, and professional software.

Students must complete all requirements for the Electrical Engineering Major (<https://catalog.bradley.edu/undergraduate/programs/electrical-engineering-major/>).

### ECE Digital Electives

The demand for and continuing advances in computers and digital systems have created opportunities for professionals capable of not only designing computer systems but also applying these systems to a broad range of applications. Such fields as communications, automatic control, robotics, and signal processing have benefitted greatly from developments in the digital area. Additionally, the development of modern computers requires a thorough understanding of the methodologies of software and hardware design.

Five ECE digital electives are required and two must be from the core pool, listed below:

Code	Title	Hours
ECE 444	Autonomous Robotics	3.0
ECE 465	Engineering Applications of Machine Learning	3.0
ECE 470	Embedded Data Structures and Object Oriented Programming	3.0
ECE 471	Real-time Operating Systems	3.0
ECE 472	Embedded Microcontroller Linux	3.0
ECE 473	Embedded TCP/IP	3.0
ECE 481	Digital Systems: Design and Synthesis	3.0
ECE 482	Digital Systems: High Level Synthesis and Codesign	3.0
ECE 483	Digital systems: Microprocessor Architecture and Design	3.0

It is also expected that the students in the option focus their project work in the digital area. Special topic courses may be offered as ECE digital electives. See your advisor for a current list of approved ECE digital electives.