BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING/ MASTER OF SCIENCE ELECTRICAL ENGINEERING (BSEE/MSEE 4+1 PROGRAM)

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

Admissions

- Bradley University Electrical Engineering undergraduates may enroll in the 4 + 1 BSEE/MSEE program while completing their bachelor's degree.
- Students will be considered for the BSEE/MSEE program during the spring of the student's junior year (preferred date: April 1) or in fall of the student's senior year, at the latest.
- Students will not be admitted to the program after the first day of spring semester of their senior year. Students are considered as graduate students once their BSEE degree is conferred.
- The student must follow the application procedures consistent with application to Graduate Education and the Electrical Engineering Graduate Program with the following exceptions. The student:
  - does not need to have completed the bachelor's degree to be admitted to the program,
  - has greater than a 3.0 GPA in the last 60 semester hours of undergraduate coursework.
  - has a minimum of 79 hours completed at time of admission to the program if admitted before completion of junior year, or 95 hours if admitted at the beginning of the senior year.
  - does not need to submit letters of recommendation, essays, transcripts, or test scores

Program of Study

Students work closely with the ECE graduate program coordinator to write a program of study best suited to their background and interests. Course sequences, design projects, and research are available in a broad range of areas such as cyber-physical systems, computer engineering, controls and robotics, Industrial Automation and Cybersecurity, Internet of Things (IoT) and networking, Machine learning and AI, RF and wireless communication, and signal processing.

Examples of areas of focus with their associated courses are listed below:

Wireless Communication, RF and Signal Processing

Code	Title	Hours
ECE 531	Communication Theory I	3.0
ECE 550	Electromagnetic Theory	3.0
ECE 551	Radio Frequency Circuits and Systems	3.0
ECE 552	Wireless Communication Systems	3.0
ECE 553	Radio Frequency Communications Laboratory	3.0
ECE 560	Digital Signal Processing	3.0

Controls, Robotics and Mechatronics

Code	Title	Hours
ECE 541	Feedback Control of Dynamic Systems	3.0
ECE 542	Advanced Data-Driven Control and Applications	3.0
ECE 543	Distributed Learning Control of Dynamic Systems	3.0
ECE 544	Autonomous Robotics	3.0
ECE 568	Mechatronics	3.0
ECE 574	Mobile Robot Navigation and Mapping	3.0

Power Electronics and Alternative Energy

Code	Title	Hours
ECE 541	Feedback Control of Dynamic Systems	3.0
ECE 542	Advanced Data-Driven Control and Applications	3.0
ECE 543	Distributed Learning Control of Dynamic Systems	3.0
ECE 545	Power Electronics Fundamentals	3.0
ECE 546	Power Laboratory	3.0

Machine Learning, Computer Vision, and Digital System Design

Code	Title	Hours
ECE 562	Digital Image Processing	3.0
ECE 563	Medical Imaging	3.0
ECE 565	Engineering Applications of Machine Learning	3.0
ECE 581	Digital Systems: Design and Synthesis	3.0
ECE 582	Digital Systems: High Level Synthesis and Codesign	3.0
ECE 583	Digital Systems: Microprocessor Architecture and Design	3.0

Internet of Thing (IoT), Networking, and Cybersecurity

Code	Title	Hours
ECE 570	Embedded Data Structures and Object Oriented Programming	3.0
ECE 571	Real-time Operating Systems	3.0
ECE 572	Embedded Microcontroller Linux	3.0
ECE 573	Embedded TCP/IP	3.0
ECE 575	Security for Industrial Automation	3.0
ECE 581	Digital Systems: Design and Synthesis	3.0
ECE 582	Digital Systems: High Level Synthesis and Codesign	3.0

In addition, Students may work on special topics in Electrical and Computer Engineering to address emerging applications, conduct a research project or work on their thesis with faculty advisor. The ECE department has excellent computer and laboratory facilities to support advanced studies in these areas.

Advanced Topics and Research

Code	Title	Hours
ECE 681	Topics in Electrical Engineering	0.0-6.0
ECE 691	Research I	0.0-6.0
ECE 699	Thesis	0.0-6.0

Degree Requirements

For students in BSEE/MSEE 4+1 program, they will apply for graduation for their bachelor's degree in the semester that they will complete all requirements for their BSEE degree. Students are considered as graduate students once their BSEE degree is conferred. Students who are admitted to the accelerated 4+1 BSEE/MSEE program will have nine graduate hours dual counted for the BSEE and MSEE Degrees. In the student's graduating year of their undergraduate program, they will take:

- 9 hours of ECE graduate level courses

In the remaining two semesters (i.e., Year 5) in the BSEE+MSEE program, students will take 21 hours of approved graduate level courses including at least 3 hours of research experience either from ECE 691 Research I or ECE 699 Thesis and pass a comprehensive exam in the graduating semester.