SCHOOL OF ENGINEERING AND COMPUTING

BACHELOR OF SCIENCE IN ELECTRICAL AND COMPUTER ENGINEERING

Making Hardware and Software Speak the Same Language

There's an intricate exchange between hardware and software. In the Electrical and Computer Engineering program at National University, you'll be in the communications center between the two, guiding the way to make them collaborate. The program's curriculum focuses on the theories, principles, and practices of traditional electrical engineering and mathematics and applies them to the design of computers and computer-based devices—the devices that now seem to run the world.

You'll study the design and development of both digital hardware systems and the software that enables that hardware—and how both users and other hardware interact with those systems. Because clean computer engineering is at the heart of how hardware and software work together, a central focus will be on embedded systems that rely on both, such as cell phones, digital audio players, digital video recorders, alarm systems, x-ray machines, and laser surgical tools.

Your analytical thinking and design skills will be encouraged and developed in the pursuit of the finest integration of the devices making a profound difference in everyday life.

Program highlights:

- Entire program can be completed online
- Apply mathematics, science, and engineering to design a component, a system, or a process to meet desired needs
- Use the techniques, skills, and modern engineering tools necessary for engineering practice
- Work effectively on a team and be able to communicate orally and in writing to identify, formulate, and reach common engineering goals
- Identify engineering solutions in a global and economic environment

Online and On-campus Programs
Monthly Starts and Accelerated Classes
WSCUC Accredited
MAJOR IN ELECTRICAL AND COMPUTER ENGINEERING

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The Electrical and Computer Engineering program involves the study of hardware, software, communications, and the interactions between them. Its curriculum focuses on the theories, principles, and practices of traditional electrical engineering and mathematics and applies them to the design of computers and computer-based devices. Electrical and Computer Engineering students study the design of digital hardware systems including communications systems, computers, and devices that contain computers. They study software development, focusing on software for digital devices and their interfaces with users and other devices. The program emphasizes a balanced approach between hardware and software, both built on an engineering and mathematics foundation. Currently, a dominant area within Electrical and Computer engineering is embedded systems, the development of devices that have software and hardware embedded within. For example, devices such as cell phones, digital audio players, digital video recorders, alarm systems, X-ray machines, and laser surgical tools all require integration of hardware and embedded software and all are the result of computer engineering. The undergraduate program is structured to establish analytical thinking and design skills in areas such as computer architecture, digital logic design, circuits analysis, computer communication networks, digital computer control, integrated circuit engineering, project management, VLSI design, digital signal processing, and embedded systems.

Program Learning Outcomes

Upon successful completion of this program, students will be able to:

- Apply knowledge of mathematics, science, and engineering to solve problems.
- Analyze and interpret data.
- Design a component, a system, or a process to meet desired needs within realistic constraints.
- Function on a team and be able to communicate orally and in writing to accomplish a common goal.
- Identify, formulate, and solve engineering problems.
- Use professional ethics in making engineering decisions.
- Identify the impact of engineering solutions in a global, and economic environment.
- Use the techniques, skills, and modern engineering tools necessary for engineering practice.

Degree Requirements

To receive a Bachelor of Science in Electrical and Computer Engineering, students must complete at least 180 quarter units to include a minimum of 70.5 units of the University General Education requirements; 76.5 quarter units must be completed at the upper-division level, and 45, including the senior project courses (CEE 498, CEE 499A and CEE 499B), must be taken in residence at National University. In the absence of transfer credit, students may need to take additional general electives to satisfy the total units for the degree. Students should refer to the section on undergraduate admission procedures for specific information on admission and evaluation. All students receiving an undergraduate degree in Nevada are required by state law to complete a course in Nevada Constitution.

Prerequisites for the Major

(8 courses; 33 quarter units)

MTH 215* College Algebra & Trigonometry
Prerequisite: Accuplacer test placement evaluation or MTH 12A and MTH 12B

PHS 104* Introductory Physics
Prerequisite: 2 years of high school algebra, and MTH 204, or MTH 215, or MTH 216A, and MTH 216B

PHS 130A Physics Lab for Engineering (1.5 quarter units)

CSC 208* Calculus for Comp. Science I
Prerequisite: MTH 215

CSC 209 Calculus for Comp. Science II
Prerequisite: CSC 208

CSC 220 Applied Probability & Stats.
Prerequisite: MTH 215

CSC 242* Intro to Programming Concepts
Prerequisite: MTH 215

CSC 252* Programming in C++
Prerequisite: CSC 242

* May be used to meet a General Education requirement.

Requirements for the Major

(24 Courses; 93 quarter units)

CSC 300 Object Oriented Design
Prerequisite: CSC 252

CSC 310 Linear Algebra and Matrix Comp
Prerequisite: CSC 300

CEE 300 Engineering Numerical Methods
Prerequisite: CSC 209 and CSC 310

PHS 231 Calculus-based Physics 1
Prerequisite: PHS 104 and MTH 220 or MTH 221 or MTH 221 or MTH 221 or MTH 229

PHS 232 Calculus-based Physics 2
Prerequisite: PHS 104, PHS 231 and MTH 220 or MTH 221 or MTH 221 or MTH 229

CSC 331 Discrete Structures and Logic
Prerequisite: CSC 252 and CSC 310

CEE 310 Circuit Analysis
Prerequisite: CSC 300

CEE 310L Circuit Analysis Lab (1.5 quarter units)
Corequisite: CSC 310L

CSC 340 Digital Logic Design
Prerequisite: CSC 208 or EGR 220, Corequisite: CSC 340L

CSC 340L Digital Logic Design Lab (1.5 quarter units)
Corequisite: CSC 340

CSC 342 Computer Architecture
Prerequisite: CSC 340 and CSC 340L

CSC 350 Computer Ethics

CSC 436 Comp. Communication Networks
Prerequisite: CSC 335 or CSC 340 and CSC 340L

CEE 340 Embedded Systems
Prerequisite: CSC 208 and CSC 252 or CSC 262

CEE 340L Embedded Systems Lab (1.5 quarter units)
Corequisite: CSC 340

CEE 324 Linear Systems and Signals
Prerequisite: CSC 208 and MTH 220 and CEE 310

CEE 324L Linear Systems and Signals Lab (1.5 quarter units)
Corequisite: CSC 324

CEE 420 Microelectronics
Prerequisite: CEE 310
Corequisite: CEE 420L

CEE 420L Microelectronics Lab (1.5 quarter units)
Corequisite: CEE 420

CEE 430 Digital Signal Processing
Prerequisite: CEE 420

CEE 440 VLSI Design
Prerequisite: CEE 430

CEE 498 Capstone Design Project I
Prerequisite: Complete all core courses except CEE 499 OR Permission of the program lead.

CEE 499A Capstone Design Project II
Prerequisite: CEE 498

CEE 499B Capstone Design Project III
Prerequisite: CEE 499A

For complete program information, see the National University Catalog 82, effective 10/2018.