



Quick Guide to EECS Majors

The Electrical Engineering and Computer Science Department offers three majors: Computer Science (CS), Computer Engineering (CE) and Electrical Engineering (EE). Read on to learn more and see which one is right for you!

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COMPUTER SCIENCE

What do Computer Scientists do?

Computer Scientists study the theory of information and computation and apply these theories as they design and build computational systems.

Broad areas of interest within the CSE undergraduate program include:

- Computer Hardware
- Computing Infrastructure
- Data Structures and Algorithms
- Intelligent Systems
- Machine Learning
- Mobile Applications
- Networks and Distributed Systems
- Software Development
- Theory of Computation
- Web Technology and Applications

Recommended first courses:

- EECS 203 – Discrete Mathematics
- EECS 280 – Programming and Intro. Data Structures

COMPUTER ENGINEERING

What do Computer Engineers do?

Computer Engineers focus on the design and low-level use of computers. This includes hardware design (computer architecture and VLSI), building systems with processors (embedded systems and robotics) and system software (operating systems, compilers, networks, etc.). CE combines hardware and software and partially overlaps the computer science and electrical engineering programs.

Broad areas of interest within the CE undergraduate program include:

- Computer Architecture
- Computer-Aided Design
- Digital Signals and Systems
- Embedded Systems
- Robotics and Vision
- System Software
- VLSI Systems (chip design)

Recommended first courses:

- EECS 270 – Introduction to Design Logic
- EECS 280 – Programming and Intro. Data Structures

ELECTRICAL ENGINEERING

What do Electrical Engineers do?

Electrical Engineers design, develop, test and supervise the manufacture of electrical equipment, components, and systems for use in various industries. Some examples include electric lighting, electric motors, power systems, electrical communications, HDTVs, digital cameras, cell phones, MP3 players, personal computers, automotive electronics and bioelectrical devices.

Broad areas of interest within the EE undergraduate program include:

- Control Systems
- Electromagnetics and Optics
- Integrated Circuits and VLSI
- MEMS and Microsystems
- Optics and Photonics
- Power and Energy
- Signal and Image Processing
- Solid State Devices

Recommended first course:

- EECS 215 – Introduction to Electronic Circuits

A REAL WORLD EXAMPLE

Let's look at smart phones. Electrical Engineers, Computer Engineers, and Computer Scientists are all employed to design each new phone. Electrical Engineers handle the analog parts of wireless communication. Electrical and Computer Engineers design the chips in the phone, work together on the digital communication aspect, and share different parts of the board design (Computer Engineers focus on high-level design while Electrical Engineers focus on circuit and electromagnetic issues). Computer Engineers will likely do the low-level programming (embedded systems).

Computer Engineers and Computer Scientists will then work on systems-software issues like operating systems and networking. Computer Scientists design the software that users interface with, allowing them to do everything from browsing the web, to making phone calls, to being a fruit ninja.

With so much dependence on each other's functions for realizing a finished product, it's easy to see why there is so much overlap among EECS majors and the career opportunities for graduates.

