



What is Computer Engineering?

Computer Engineering is one of the most "in-demand" degrees in engineering, combining computer science with engineering. Computer engineering topics include logic design, microprocessors, computer architecture, and networking. The computer science disciplines of programming languages, operating systems, data structure, and data communications are included in computer engineering as well as the topics of circuits, electronics, and signal processing from electrical engineering. Computer engineering is one of the newest engineering degrees, but it has grown rapidly. Enrollments are large and industry worldwide seeks new college graduates with this degree.



High level software tools

At Sacramento State, the BS degree in computer engineering is a jointly sponsored program offered by the Computer Science Department and the Electrical & Electronic Engineering Department. This is an excellent means to assure the highest quality curriculum. Some universities place the degree inside one of the two departments or within its own department. Since the fields of computer science, computer engineering and electrical engineering overlap, Sacramento State feels this shared program approach is superior.

What do Computer Engineers do?

Computer engineering is a combination of hardware and software. The typical computer engineer uses software tools to design, simulate, and test hardware devices and projects. Designing the successor microprocessor devices in the Pentium family is such an example; the actual design is done with a programming language similar to the language "C." Other computer engineers design "printed circuit boards" for small to large computer systems. These boards contain large-in-function but small-in-size digital logic devices, memories, CPUs and so forth. Some computer engineers write operating system "drivers" for computer peripheral devices and integrated circuit devices. Other computer engineers work with devices inside wireless devices such as cell phones or pagers, or they work on consumer products

such as workstations, personal digital assistants, etc.

Where do Computer Engineers work?

Computer engineers are found in all sizes of companies; however, most take positions with well-known companies such as Hewlett Packard, Intel, Agilent, Motorola, Sun, Microsoft, Cisco, 3COM, Altera, Xilinx, Cadence, Synopsys, etc. The adventuresome work for start-up companies or start their own companies. Some prefer a quieter lifestyle and work for small companies in the Foothills east of Sacramento.

What's the best high school preparation for Computer Engineering?



Microcomputer design laboratory

Students are advised to take as much mathematics as possible, through AP calculus if feasible (be sure you take the AP exam). Students should also take high school chemistry and physics.

AP exam credit in either will count towards graduation. Although not offered everywhere, students are expected to have completed a programming course in Basic, Visual Basic, "C," or JAVA. All students are expected to know and use: WIN 98 or WIN NT; a word processor; a spreadsheet and data base; the WEB for information; and electronic mail for communication.

Students coming to Sacramento State who are not at these levels will find that Sacramento State offers basic courses to catch up.

How long will it take to complete the degree?

A full time student at the entering level of AP credits can graduate in four years if they live close to campus, study very hard, and does not have to work to support themselves. Most students take closer to five years.

Features of the Computer Engineering Program.

Like the other engineering degrees on the Sacramento State campus, this degree is very hands-on oriented. Lab courses with interesting projects follow lecture courses closely.

The Computer Engineering lab equipment is excellent and constantly being refreshed by donations and assistance from industry. Some of the equipment has been custom designed by CpE faculty.

With entry level programming experience, first semester students can take a programming course in JAVA (CSc 15) and a logic design course in computer engineering (CpE 64). The logic design course introduces students to a commercial grade design tool called Verilog. Students in one semester's time can learn how basic logic circuits work and then do some real engineering designs and implement them in hardware in the lab. Using the customized lab equipment, students in this first course can design and build a very simple computer system. These two courses are an excellent pair of classes to discover if one has the interest and ability to be a computer engineer.

The Computer Engineering curriculum:

First year:

- Math: Calculus I and II
- Science: Chemistry
- CpE: Logic Design
- CSc: JAVA, Data Structures, and Assembly Lang.
- Plus: general education

Second year:

- Math: Differential Eq. Statistics & Probability
- Science: Physics (mechanics and electricity)
- CSc: System programming, Discrete Structures
- Engr: Circuits
- Plus: general education

Third year:

- Engr: Electronics
- CpE: Microprocessor, Advanced Logic Design Architecture, CMOS Devices, Hardware Systems, Embedded Processor Design
- CSc: Adv. Data Structures, Operating Systems
- Plus: general education

Fourth year:

- CpE: Data Communications, Adv. Operating Sys. Senior Project I and II, Technical Electives
- Math: Linear Algebra or Numerical Analysis
- Plus: general education

FAQs - frequently asked questions

- Q.** Is CpE difficult? Are there lots of jobs? Do the positions pay well? Is it fun? Is it challenging? Is it exciting? Can I do a Co-op in industry for one or more semesters? Is it accredited? How does the Sacramento State CpE program compare to other programs in CA?
- A.** All "YES" and industry supports our contention that our program is one of the very top ones in the whole state-including all CSU, UC and private universities!

For more information:

Computer Engineering Program

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Information is available on current job listings and salary ranges for graduates, on the College Career Services website at: www.ecs.csus.edu/career

Admissions and Records

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