**Computer engineering**, also called **computer systems engineering**, is a discipline that integrates several fields of [electrical engineering](http://en.wikipedia.org/wiki/Electrical_engineering" \o "Electrical engineering) and [computer science](http://en.wikipedia.org/wiki/Computer_science" \o "Computer science) required to develop computer systems.[[1]](http://en.wikipedia.org/wiki/Computer_engineering#cite_note-0) Computer engineers usually have training in [electronic engineering](http://en.wikipedia.org/wiki/Electronic_engineering" \o "Electronic engineering), [software design](http://en.wikipedia.org/wiki/Software_design), and hardware-software integration instead of only software engineering or electronic engineering. Computer engineers are involved in many hardware and software aspects of computing, from the design of individual [microprocessors](http://en.wikipedia.org/wiki/Microprocessor" \o "Microprocessor), [personal computers](http://en.wikipedia.org/wiki/Personal_computer" \o "Personal computer), and[supercomputers](http://en.wikipedia.org/wiki/Supercomputer), to [circuit design](http://en.wikipedia.org/wiki/Circuit_design" \o "Circuit design). This field of engineering not only focuses on how computer systems themselves work, but also how they integrate into the larger picture.[[2]](http://en.wikipedia.org/wiki/Computer_engineering#cite_note-1)

Usual tasks involving computer engineers include writing software and [firmware](http://en.wikipedia.org/wiki/Firmware) for [embedded](http://en.wikipedia.org/wiki/Embedded_system" \o "Embedded system)[microcontrollers](http://en.wikipedia.org/wiki/Microcontroller), designing [VLSI](http://en.wikipedia.org/wiki/Very-large-scale_integration) chips, designing analog sensors, designing mixed signal [circuit boards](http://en.wikipedia.org/wiki/Circuit_board" \o "Circuit board), and designing [operating systems](http://en.wikipedia.org/wiki/Operating_system" \o "Operating system). Computer engineers are also suited for [robotics](http://en.wikipedia.org/wiki/Robotics" \o "Robotics)research, which relies heavily on using digital systems to control and monitor electrical systems like [motors](http://en.wikipedia.org/wiki/Electric_motor" \o "Electric motor), [communications](http://en.wikipedia.org/wiki/Computer-mediated_communication" \o "Computer-mediated communication), and [sensors](http://en.wikipedia.org/wiki/Sensor" \o "Sensor).

The first accredited computer engineering degree program in the [United States](http://en.wikipedia.org/wiki/United_States) was established at [Case Western Reserve University](http://en.wikipedia.org/wiki/Case_Western_Reserve_University) in 1971. As of October 2004, there were 170 [ABET](http://en.wikipedia.org/wiki/Accreditation_Board_for_Engineering_and_Technology)-accredited computer engineering programs in the US.[[3]](http://en.wikipedia.org/wiki/Computer_engineering#cite_note-2) Due to increasing job requirements for engineers, who can concurrently design hardware, [software](http://en.wikipedia.org/wiki/Computer_software), firmware, and manage all forms of computer systems used in industry, some tertiary institutions around the world offer a [bachelor's degree](http://en.wikipedia.org/wiki/Bachelor%27s_degree" \o "Bachelor's degree) generally called computer engineering. Both computer engineering and[electronic engineering](http://en.wikipedia.org/wiki/Electronic_engineering) programs include analog and digital circuit design in their curricular. As with most [engineering](http://en.wikipedia.org/wiki/Engineering" \o "Engineering) disciplines, having a sound knowledge of [mathematics](http://en.wikipedia.org/wiki/Mathematics" \o "Mathematics) and sciences is necessary for computer engineers.

In many institutions, computer engineering students are allowed to choose areas of in-depth study in their junior and senior year, because the full breadth of knowledge used in the design and application of computers is beyond the scope of an undergraduate degree. Other institutions may require engineering students to complete one year of General Engineering before declaring computer engineering as their primary focus.[[4]](http://en.wikipedia.org/wiki/Computer_engineering#cite_note-3) [[5]](http://en.wikipedia.org/wiki/Computer_engineering#cite_note-4) [[6]](http://en.wikipedia.org/wiki/Computer_engineering#cite_note-5)