

# Bachelor of Science in Computer Engineering

College of Engineering and Computer Science

## Why major in computer engineering at Cal State Fullerton?

The Bachelor of Science in Computer Engineering at Cal State Fullerton provides students with a strong theoretical and practical background in computer hardware and the software aspects of computer-based systems, along with the engineering analysis, design, and implementation skills necessary to work between the two. The curriculum is based on an engineering philosophy, with emphasis on hardware more than software. The topics integrated into the curriculum include digital systems, computer organization and architecture, processor interfacing techniques, VHDL design, advanced electronics, and embedded system design. The 12 units of elective courses required by the program allow students to specialize in key engineering technology and computer science areas. The program also requires two semesters of multidisciplinary senior design project. The computer engineering program is designed to develop an ability to apply design and analysis knowledge to the practice of computer engineering in an effective and professional manner.

## Why choose Cal State Fullerton?

**Distinguished faculty** - Our faculty members are highly qualified and diverse. The College of Engineering and Computer Science supports high-quality teaching, learning and research by providing a well-equipped instructional environment and investing in student internships. Our faculty members are experienced professionals, hold doctoral degrees from prestigious universities, and have active research programs in computer engineering, electrical engineering and computer science. Adjunct faculty who bring students important knowledge of current practices and trends in computer engineering supplement the full-time faculty members.

**Preparation for graduate work** - The Bachelor of Science degree in Computer Engineering is designed to be flexible enough to provide excellent preparation for graduate work. Many of our students, including those who have full-time positions in industry, continue their education and obtain advanced degrees.

**Student participation in research** - Although the college does not require undergraduate research, many of our students participate in one or more research projects before graduation. Most grant-supported research in the

college includes funds to support undergraduate students. Several of our undergraduate students have co-authored research papers with faculty members.

**Industrial partnerships** - The multidisciplinary senior design project, an innovative component of the Computer Engineering curriculum, allows students to work in project teams on professional design and development projects for clients from industry, government and the community. Partnerships with leading companies enable students and faculty to collaborate on funded projects of mutual interest with company engineers and scientists. Students gain invaluable practical experience and develop the skills necessary to work effectively in an interdisciplinary environment.

**Accreditation** - As a professional program, the Bachelor of Science degree in Computer Engineering will seek national accreditation from the Engineering Accreditation Commission (EAC) of the Accreditation Board for Engineering and Technology (ABET). ABET accreditation will be sought in the fall of 2008 after the first group of majors graduates from the program. The accreditation process includes both an internal review, as well as an external review by an evaluation team with members drawn from academic institutions, government, industry and private practice. The program has been designed to meet current accreditation requirements.

**What types of career opportunities are available?**

The proliferation of embedded systems in an increasing array of industrial products assures a ready market for graduates in the computer engineering discipline. Computer engineers are employed in a wide range of industries including VLSI chip design and manufacturing, autonomous systems, consumer electronics, expert systems, smart devices, digital signal processing (DSP) systems, computer manufacturing from PDAs to super computers, and automatic controls. A majority of products such as airplanes, automobiles, home appliances, consumer electronics, robots etc. use computers and employ computer engineers in their designs. Computer engineers are also needed in the design and implementation of computer networks for business, industrial, and governmental institutions.

**What courses are required?**

All computer engineering majors take 34 units of foundation courses in mathematics and physical sciences, 49 units (30 units unduplicated) of general education courses, 53 units of required courses in computer engineering/computer science/electrical engineering/general engineering and 12 units of technical elective courses in computer engineering/computer science/electrical engineering for a total of 129 units.

**Mathematics and Physical Science Courses (34 units)**

Mathematics 150A, 150B, 250A, 250 B and 270A; Physics 225 and 225L, 226 and 226L, 227 and 227L; Biology 101.

### **Required Courses (53 units)**

Comp Sci 131 Data Structures Concepts (3 units)  
Comp Sci 231 File System Concepts (3 units)  
Comp Sci 253U Workshop in UNIX (1 unit)  
Comp Sci 351 Operating Systems Concepts (3 units)  
EGCP 180 Digital Logic and Computer Structures (3 units)  
EGCP 280 Microcontrollers (3 units)  
EGCP 281 Designing with VHDL (2 units)  
EGCP 371 Modeling and Simulation of Signals and Systems (3 units)  
EGCP 381 Computer Design and Organization (4 units)  
EGCP 441 Advanced Electronics for Computer Engineers (4 units)  
EGCP 450 Embedded Processor Interfacing (4 units)  
EGCP 470 Multidisciplinary Projects in Computer Engineering – I (1 unit)  
EGCP 471 Multidisciplinary Projects in Computer Engineering – II (2 units)  
EGEE 203 Electric Circuits (3 units)  
EGEE 203L Electric Circuits Laboratory (1 unit)  
EGEE 303 Electronics (3 units)  
EGEE 303L Electronics Laboratory (1 unit)  
EGEE 323 Engineering Probability and Statistics (3 units)  
EGEE 490 Seminar in Electrical Engineering (1 unit)  
EGEE 406 Design Applications with Microcontrollers and FPGA (3 units)  
EGGN 314 Engineering Economy (2 units)

### **Technical Electives (12 units)**

Students choose elective courses with the approval of their adviser from the following areas: Wireless Communication, Very Large Scale Integration (VLSI) and Optics, Control Systems and Systems Engineering, Microprocessors and Microcomputer Systems, Computer Networks, Global Positioning Systems (GPS), Software Engineering, Database System Design and Intelligent Systems.

### **General Education Courses (49 units)**

Students complete courses to fill the following categories: Core Competencies, Historical and Cultural Foundations, Disciplinary Core and Cultural Diversity. A list of specific courses to meet these requirements is available from the faculty adviser.

### **Second Language Graduation Requirement**

Since the B.S. in Computer Engineering is a high-unit program, majors are exempt from the Second Language Graduation Requirement.

### **Are there special programs or internships available?**

Computer engineering majors may take advantage of the opportunities provided by the Center for Internships and Service-Learning. Internships provide students with opportunities to gain work experience, network and develop industry contacts, earn academic credit, solidify academic and career goals, earn money while learning and explore career options within the major.

In addition, the Center for Academic Support in Engineering and Computer Science (CASECS) provides services that help educationally disadvantaged students achieve a high level of academic success in engineering and computer science. For more information, please call (714) 278-3879.

### **What types of financial aid and scholarships are available?**

The Alumni Association Scholarship, the Emmett D. Burnett Scholarship and the Eugene Birnbaum Award are awarded to eligible students in the College of Engineering and Computer Science. Additional scholarships are available to students in the major from off-campus sources such as professional societies, civic foundations and corporations, and are listed online at [www.fullerton.edu/ecs/scholarships.htm](http://www.fullerton.edu/ecs/scholarships.htm).

For financial aid consideration, please call the Office of Financial Aid at (714) 278-3125, for additional details and information.

### **How can I get involved?**

Academic preparation is just one facet of our program. Students enjoy opportunities for leadership and participation in clubs and organizations, research, community service and assistantships. Students can choose from a roster of award-winning professional student organizations, including the Institute of Electrical and Electronics Engineers (IEEE), Association for Computing Machinery (ACM), National Society of Black Engineers (NSBE), Society of Hispanic Professional Engineers (SHPE), Society of Mexican-American Engineers and Scientists (MAES), Society of Women Engineers (SWE), and Tau Beta Pi Engineering Honor Society (TBP).

### **Who advises me?**

The faculty members of the computer engineering program advise students. Students may make an appointment by calling (714) 278-5987 or sending e-mail to [cpenprogram@fullerton.edu](mailto:cpenprogram@fullerton.edu). The program requires that each student meet with an adviser at least once each year to ensure that degree requirements are being met.

### **How can I learn more?**

Additional information is available on the Computer Engineering Program website at [www.fullerton.edu/ecs/cpe](http://www.fullerton.edu/ecs/cpe) or via email at [cpenprogram@fullerton.edu](mailto:cpenprogram@fullerton.edu). Our program office is located in the Engineering Building, room E-100G. Please call us at (714) 278-5987 if you need an appointment or contact us by mail at: California State University Fullerton, Computer Engineering Program (E-100G), Fullerton, CA 92834-6870. Fax: (714) 278-5804.