WHY CHOOSE

UNIVERSITY OF CALIFORNIA SANTA BARBARA

COMPUTER ENGINEERING

THE CONVERGENCE OF EDUCATION AND ENGINEERING
**Starting salaries for the class of 2011**

**Computer Engineering National Average**: $64,499  
**UC Santa Barbara Average**: $66,125

Computer engineers are expected to have employment growth of 4% over the next decade according to the United States Bureau of Labor Statistics. As computer and semiconductor manufacturers contract out more of their engineering needs to both domestic and foreign design firms, much of the growth in employment of hardware engineers is expected to take place in the computer systems design and related services industry. According to our recent surveys, UCSB Computer Engineering students have starting salaries just above the national average.

* According to the 2011 National Association of Colleges and Employers Survey

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**WE ARE QUALIFIED**

Computer Engineering undergraduates at UCSB receive the finest engineering education in an academic setting that boasts:

- Campus ranking of 9th in the list of U.S. public universities by U.S. News and World Report
- State-of-the-art teaching and research laboratories
- True four-year program
- Excellent student to faculty ratio (10 to 1)
- Senior Capstone course that combines all of your design education and experience together in a final project
- Undergraduate research opportunities with a group of world-renowned, friendly faculty focused on productive research
- Accredited by the Engineering Accreditation Commission of ABET, http://www.abet.org
Ever wonder how an iPod really works? A combination of specialized audio decompression circuits, delicate touch sensors, nonvolatile flash memory, tiny embedded processors, and layer upon layer of complex software carefully choreographed. A system so useful that everyone covets it, yet simple enough for a child to operate. An impressive feat indeed, and the type of problem that computer engineers enjoy solving! Building these systems requires expertise that crosses the traditional boundaries of computer science and electrical engineering.

The Computer Engineering program at UCSB prepares students for these types of courses. Offered jointly by the departments of Electrical and Computer Engineering (ECE) and Computer Science (CS), the Computer Engineering major trains you to understand the workings of high-speed processors, study and build wireless networks, design circuits using the latest tools, and write software systems that are robust against catastrophic failures. Before you graduate, you will put these concepts together in a senior capstone project that will impress both your peers and your potential employers!
Max Hinson: Entered as a Freshman

Why did you choose to study engineering at UCSB?
In high school, I realized that my strengths and interests were rooted in math and science. I also really enjoyed problem solving and creating things that had real-life applications. Having very little programming and circuits experience upon entering UCSB, I chose computer engineering primarily because it sounded interesting. I am lucky that it has turned out to be even better than I had hoped.

What do you like most about your major and the courses that you've taken so far?
I have been very happy with computer engineering as a major. Every day, computers are becoming a bigger and bigger part of our lives. I am fascinated to learn about where technology has been, where it is now, and where it will go in the future. I have really enjoyed the way that the computer science and electrical engineering courses present a multidimensional approach to learning. The lectures are great for learning the theory behind why things work, while the labs are perfect for allowing us to apply what we have learned.

What kinds of things have you participated in to enrich your education while at UCSB?
During the summer before my first year, I participated in the Summer Institute of Mathematics and Science (SIMS) program to get an introduction to research and college-level work. I also joined the Engineering Student Council. The next summer, I researched motion planning algorithms in Professor Francesco Bullo's lab with the EUREKA program. During my second year, I became the treasurer for the Engineering Student Council and joined Tau Beta Pi, an engineering honor society. During this past summer, I have worked as a software engineering intern at Karl Storz Imaging in Goleta.

How do you balance your academic and the rest of your life at UCSB?
For all engineering majors, the workload is heavy and the material is difficult. It is very easy to become overwhelmed with the stress. In order to stay balanced, I always set aside a little time for extracurricular activities first and then leave all the rest for homework and studying. This helps to keep me from burning out.

What are your plans for the future?
This year, I will begin taking courses for the Technology Management Program. I also plan to take advantage of the five-year B.S./M.S. program for computer engineering. After college, I plan to work in the technology industry and my ultimate goal is to eventually start a technology company.
what’s going on...

With 21 full-time faculty and over 150 undergraduates, it is impossible to quickly summarize everything that is going on in the program. Here is a glimpse:

The Computer Engineering Capstone Project provides students the opportunity to put their education into practice. Students design and engineer innovative hardware and software systems using techniques from robotics, distributed systems, circuit design, networking, and real-time systems to tackle problems and create a final “tangible” project. Final projects are presented at a full-day, industry-sponsored event where student groups present their projects and awards are made for best projects.

The best projects from 2011 were:

**Kwik-E-Kart**, a smart shopping cart that “knows” what items are currently residing within it. It is an attachment that fits into most shopping carts. Its RFID readers are connected to the processor, which update the total cost displayed on the LCD screen on the handlebar. An external computer (Android-OS phone) connects to the board via Bluetooth to keep an itemized list of contents in the cart, which serves as the receipt. The cashier uses the Bluetooth connection upon checkout, and an ARM processor is the heart of the system. ([https://sites.google.com/site/azteka0/](https://sites.google.com/site/azteka0/))

**WhichAisle**, a mobile app for grocery shopping. This project allows grocery store customers to find items quickly by allowing the creation of shopping lists and mapping of items on a given store layout. This project was sponsored by SuperValu.

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**Education Highlights**

**BS/MS Programs**
Outstanding students can earn a bachelor’s and master’s degree in five years.

**Engineering honors program**
Exceptional students are invited to the Honors Program. Privileges include: priority registration, residential scholars housing floors, research opportunities, and honors courses. The College also has a chapter of Tau Beta Pi, which is the national engineering honors society.

**Research/Internships**
UCSB offers a variety of outstanding research opportunities for undergraduates where students can receive either course credit or a salary. Internship positions are available through Career Services and research positions are available through individual departmental faculty.

**Professional Societies**
Active student chapters of professional societies include: Association for Computing Machinery, Engineers Without Borders, Institute of Electrical and Electronic Engineers, and the Society of Women Engineers.

**Special Programs**
The College supports a diverse range of programs for student support, including mentoring, tutoring, study skills workshops, and career planning. We also partner with the MESA program on campus, which offers services to first-generation college students.

**Scholarships**
Numerous scholarships are available to enrolled undergraduate students in the college, totaling about $65,000 annually. [engineering.ucsb.edu/scholarships](http://engineering.ucsb.edu/scholarships)

**Entrepreneurial Courses**
The Technology Management Program provides classes in management, entrepreneurship, and marketing. The program offers a Technology Entrepreneurship certificate with UC Extension. [www.tmp.ucsb.edu](http://www.tmp.ucsb.edu)
what you do...

Inventive Solutions

Computer engineering students study the design of digital hardware and software systems, including: communications facilities, computers of all types and sizes, and devices that contain computers. System design is focused on devices and their interfaces with users and other devices. An important area within computer engineering is the development of embedded systems. The average car sold today, for example, has more than 15 interconnected microprocessors that control everything from the car’s anti-lock brakes to its entertainment system. 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 software, and are all brought to us by inventive and hard-working computer engineers.

Oh, the places you can go...

Education Abroad Program

The College encourages its students to participate in the U.C. Education Abroad Program to enhance their educational experience. Participants stay registered at UCSB while abroad and make usual progress towards their degrees. Nearly all participants say their EAP experiences were life-changing, career-enhancing, and the highlight of their education.

http://eap.ucop.edu

"EAP gave me an experience that really complimented my time at UCSB. Not only could I engage in a new culture, but also a new way of learning and new ways of thinking. On top of that, I am still able to graduate in 4 years. I stood on top of a mountain in the Highlands of Scotland and raced the forming storm clouds to finish programming a BASH script on exposed circuitry before the rain started. In that moment, I was more than a student, I was an epic engineer. EAP let my studies reach ‘epic’ status."

Joshua Chamberlain
Computer Engineering Senior,
EAP student at University of Edinburgh, Scotland

What you will study in Computer Engineering

• Freshmen are introduced to their major in “Ten Puzzling Problems in the Practice of Computer Engineering” course in their first year at UCSB.
• Students receive a solid foundation in mathematics, physics, electrical theory, computer hardware and software; balancing fundamental principles in science and engineering with the practical skills necessary to apply them. A broad selection of design sequences and technical electives encourage students to pursue special interests that promote the integration of computer hardware and software through computer science and electrical engineering courses.
• Senior elective sequences include courses in the following areas: computer systems, multimedia computing, computer networks, computer operation systems and computer languages, real-time computing, and very large-scale integrated circuit design.
• Computer Engineering majors culminate their studies with a capstone senior project, showcasing their breadth of knowledge and creativity.

why choose Computer Engineering
why I transferred...

What made you choose UCSB as your college destination?
UCSB has a great engineering program, great professors, and a history of including undergraduate students in research. Who would want to leave Santa Barbara after living here? This place is perfect for everything, including college.

What community college did you attend and what did you do last summer?
I attended Santa Barbara City College (SBCC) and I took even more classes during the summer! If you’re staying in town, you should take summer classes. I also worked for a local start-up company. It’s a great opportunity to get some field experience so you’re more prepared for your first career job.

What activities did you participate in to enhance your education prior to coming to UCSB?
At UCSB, I worked as a Lab Assistant and a Tutor. Teaching is by far the best way to actually understand a subject. As a lab assistant, I had a lot of hands-on experience in topics I learned in class. It really allowed me to see things I like to study in action. The tutoring made me better prepared for tests and projects. It’s amazing how tutoring strengthened my knowledge when I was explaining concepts and theories to someone else.

What would you tell a student preparing to transfer to a major research institution in an engineering field?
I wish I would have taken some UCSB courses by cross-enrolling during my last year at SBCC. Being introduced to the university prior to transferring can make the transition easier. Just taking one university class while at the community college could help you be accustomed to how things work.

What are your plans for the future?
I want to help a Santa Barbara start-up go big! There’s so much potential in this town just waiting for the big break. I want to be part of it!
Admissions

The College of Engineering seeks to enroll well-prepared students who exceed UC’s minimum academic requirements. We look for students who will bring passion, creativity and dedication to their college experience.

Given the strength of our programs and national reputation, it is not surprising that UCSB’s College of Engineering receives far more applications from qualified students than can be admitted. Each applicant must apply to a specific major, and those with the strongest qualifications are admitted. The exact level of performance required to gain admission varies from year to year and from major to major depending on the size and quality of the applicant pool and the number of available spaces. The College accepts applications for the fall term only and preference is given to freshmen and upper-division transfer students (who have completed at least 90 transferable quarter units).

High School Preparation

When admitting freshmen, the College considers: GPA in college preparatory courses and standardized test scores (with an emphasis on mathematics grades and scores); completion of coursework beyond the university’s A-G requirements; advanced placement; and honors courses, especially in science and mathematics. For more information about applying to UCSB as a freshman see:

www.admissions.ucsb.edu/

Opportunities to get an early start on your freshman year:

UCSB offers many opportunities for incoming students, from the Freshman Summer Start Program where students can get an early start on classes, to summer bridge programs which offer hands-on work with scientific research projects. For a complete list of summer opportunities, see:

gineering.ucsb.edu/fresh-opps

Transfer Preparation

When admitting transfer students, the College of Engineering considers the amount of preparatory coursework completed, grades earned in those courses, and cumulative transferable GPA. Consequently, transfer students should focus on completing all engineering preparatory courses offered at their college with the best grades possible and then finish their General Education requirements after matriculation to UCSB. IGETC is not recommended for this major.

For general University of California Transfer Admissions information see:
www.universityofcalifornia.edu/admissions

California Community College students should refer to www.assist.org for course articulations and information on the California Community College Transfer Admissions Guarantee.

Opportunities for transfer students:

- Shorten your time to degree by attending UCSB the summer before you start as a transfer student
- Participate in the Summer Transitions Program for new transfers
- Engage in scientific research through a summer enrichment program

For a complete list of transfer student opportunities, see:

gineering.ucsb.edu/trans-opp

College of Engineering Transfer Admission Advising

admissions@engineering.ucsb.edu
(805) 893-6139