B.S. in Computer and Electrical Engineering

Computer and electrical engineering involves the design and prototyping of computing devices and systems. Computer and electrical engineering encompasses analog and digital circuit design, signals and systems, and other topics in computing where hardware plays an important role.

Degree Programs
The Computer Engineering major has two concentrations: Computer Engineering and Electrical Engineering. The department plans to elevate the Electrical Engineering concentration to a full B.S. degree program in Fall 2012.

The Computer and Electrical Engineering degrees follow the degree guidelines formulated by the Institute of Electrical and Electronics Engineers (IEEE) and the Accreditation Board for Engineering and Technology (ABET).

State-of-the-Art Facilities
Our department is located on the third floor of the spacious and modern Science III building. Here you will find our world-class Robotics Laboratory, home to a fascinating variety of high-tech robots, and the AI/Visualization Laboratory, equipped with the latest image processing and AI technology. We also have an advanced graphics workstation laboratory, a circuit laboratory, a digital signal processing laboratory, a network laboratory, and several well-equipped instructional laboratories.

The department administers its own local network, which includes multiple Linux servers and an isolated network, and maintains all of its laboratories. There is also a departmental library and a tutoring center dedicated to student academic support.

Career Opportunities
A degree in Computer or Electrical Engineering from CSUB is the first step to any number of innovative and rewarding careers. Graduates go on to work in a number of fields, including:

- Embedded Systems
- Robotics
- Semiconductors
- Digital Signal Processing
- Control Systems
- Computer Graphics
- Academic Research

Faculty
- Marc Thomas, Ph.D. Chair, University of California, Berkeley
- Melissa Danforth, Ph.D., University of California, Davis (Director of Cybersecurity & Networking Research Lab)
- Steve Garcia, B.A., University of Colorado (System Administrator)
- Wei Li, Ph.D., University of Saarland (Director of Robotics & Control Systems Lab)
- Donna Meyers, M.S., University of Idaho (Senior Lecturer)
- Linwei Niu, Ph.D., University of South Carolina (Director of Integrated Circuit Design & Embedded System Lab)
- Huaqing Wang, Ph.D., Case Western Reserve University (Director of Database Lab)
- Arif Wani, Ph.D., Cardiff University of Wales (Director of Machine Learning & Visualization Lab)
At CSUB, the Bachelor of Science (B.S.) degree in Computer Engineering has two concentrations:

### Computer Engineering

**Main Concentration**

- CMPS 150 Introduction to Unix (1 unit)
- CMPS 221 Programming Fundamentals
- CMPS 223 Data Structures and Algorithms
- CMPS 224 Assembly Language Prog.
- CMPS 295 Discrete Structures

### Electrical Engineering Concentration

- CMPS 150 Introduction to Unix (1 unit)
- CMPS 221 Programming Fundamentals
- CMPS 223 Data Structures and Algorithms
- CMPS 224 Assembly Language Prog.
- CMPS 295 Discrete Structures

### Upper Division Core courses:

- CENG 304 Linear Systems
- CENG 307 Analog Circuits
- CENG 320 Digital Circuits
- CENG 321 Computer Architecture
- CENG 322 Digital Design with VHDL
- CENG 360 Operating Systems
- CENG 420 Embedded Systems
- CENG 490 Senior Project

### Upper Division Elective courses:

- Choose one course from two different areas
  - Communications, Signal Processing, Networking
  - CENG 422 Digital Signal Processing
  - CENG 423 Digital Communications
  - Embedded Systems, Computer Control, Robotics
  - CENG 432 Instrumentation, Control & Data Acquisition
  - CENG 457 Robotics

- Computer Vision and Image Processing
  - CENG 446 Image Processing
  - CENG 447 Computer Vision

### Cognate courses:

- ◊ MATH 201 Calculus I
- MATH 202 Calculus II
- MATH 203 Calculus III
- MATH 204 Vector Calculus
- ◊ PHYS 221 Classical Physics I
- PHYS 222 Classical Physics II
- PHYS 223 Optics & Modern Physics
- ENGR 207 Electric Circuits

### General Education (all concentrations)

- Area A3 is waived for Computer/Electrical Engineering students
- Theme 2 – PHIL 316 is required

◊ Item satisfies a General Education requirement

Effective Fall 2012.

This curriculum is subject to revision.

CSUB 101 Intro to CSUB – Engineering section (2 units)
- CMPS 221 Programming Fundamentals
- CMPS 224 Assembly Language Prog.

### Upper Division Core courses:

- CENG 304 Linear Systems
- CENG 306 Complex Analysis in Engineering
- CENG 307 Analog Circuits
- CENG 320 Digital Circuits
- CENG 321 Computer Architecture
- CENG 322 Digital Design with VHDL
- CENG 330 Signals and Systems
- CENG 360 Operating Systems
- CENG 420 Embedded Systems
- CENG 490 Senior Project

### Upper Division Elective courses:

- Select two courses from the following list
  - Communications, Signal Processing, Networking
  - CENG 422 Digital Signal Processing
  - CENG 423 Digital Communications
  - Embedded Systems, Computer Control, Robotics
  - CENG 432 Instrumentation, Control & Data Acquisition
  - CENG 434 Introduction to Control Theory
  - CENG 457 Robotics

- Computer Vision and Image Processing
  - CENG 446 Image Processing
  - CENG 447 Computer Vision

### Cognate courses:

- CHEM 211 Principles of General Chemistry
- ◊ MATH 201 Calculus I
- MATH 202 Calculus II
- MATH 203 Calculus III
- MATH 204 Vector Calculus
- MATH 340 Probability Theory
- ◊ PHYS 221 Classical Physics I
- PHYS 222 Classical Physics II
- PHYS 223 Optics & Modern Physics
- ENGR 207 Electric Circuits

◊ Item satisfies a General Education requirement