B.S. in Computer Science

Program Your Future

Computer science is the systematic study of algorithms that represent, transform, and transmit information. The field of computer science covers the full range of software and hardware applications that deal with operations on information.

Degree Programs

The Computer Science major has three tracks: Computer Science, Computer Information Systems, and Hardware. The Hardware track is being phased out with the addition of the Computer Engineering major. A Computer Science minor with several areas of specialization is also offered.

The Computer Science track follows the degree guidelines formulated by the Association for Computing Machinery (ACM) and the Accreditation Board for Engineering and Technology (ABET). This track is recommended for most students, particularly those who wish to attend graduate school.

The Computer Information Systems track is intended for application programmers, web designers, system administrators, or those who wish to apply computer science in another discipline. This track provides ample opportunity for specialization with electives or a minor in another discipline.

The Computer Science minor is flexible enough to allow students to specialize in computational mathematics, computer security, web design, game design, system administration, and much more.

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 tutoring center dedicated to student academic support.

Career Opportunities

A degree in Computer Science 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:

- Programming
- Software Design
- Software Engineering
- Database Administration
- Network Systems
- Academic Research
- Robotics
- Computer Graphics
- Video Game Development
- Information Systems Management
- Graduate Study

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)
- Huating 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.) in Computer Science degree has three tracks:

**Computer Science Track**

This track follows the guidelines of the Association for Computing Machinery (ACM) and the Accreditation Board for Engineering and Technology (ABET).

**Introductory courses:**
- CMPS 150 Introduction to Unix (1 unit)
- CMPS 221 Programming Fundamentals
- CMPS 223 Object-Oriented Programming
- CMPS 226 Data Structures and Algorithms

**Intermediate courses:**
- CMPS 244 Assembly Language Programming
- CMPS 305 Discrete Structures
- CMPS 312 Programming Analysis and Design
- CMPS 320 Digital Circuits
- CMPS 321 Computer Architecture
- CMPS 335 Software Engineering
- CMPS 342 Database Systems
- CMPS 350 Programming Languages
- CMPS 356 Artificial Intelligence
- CMPS 360 Operating System
- CMPS 371 Computer Graphics
- CMPS 376 Computer Networks

**Advanced courses:**
- CMPS 490 Senior Project
- One course from the following:
  - Algorithms and Complexity
  - Architecture and Organization
  - Intelligent Systems
  - Programming Languages
  - Operating Systems & Computer Networks
  - Software Engineering & Databases
  - Visual Computing
  - Special Topics in Computer Science

**Mathematics/Physics courses:**
- MATH 201 Calculus I
- MATH 202 Calculus II
- MATH 203 Calculus III
- MATH 330 Linear Algebra
- MATH 340 Probability Theory
- PHYS 221 Classical Physics I
- PHYS 222 Classical Physics II

**General Education (all tracks)**

*Theme 2 – PHIL 316 is required*

◊ Item satisfies a General Education requirement

**Computer Information Systems (CIS) Track**

This track is intended for application programmers or those who wish to apply computer science to another discipline.

**Introductory courses:**
- CMPS 150 Introduction to Unix (1 unit)
- CMPS 211 Internet Prog. & Web Design
- CMPS 221 Programming Fundamentals
- CMPS 222 Object-Oriented Programming
- CMPS 223 Data Structures and Algorithms

**Intermediate courses:**
- CMPS 295 Discrete Structures
- CMPS 312 Algorithm Analysis and Design
- CMPS 335 Software Engineering
- CMPS 342 Database Systems
- CMPS 350 Programming Languages
- CMPS 356 Artificial Intelligence
- CMPS 360 Operating System
- CMPS 371 Computer Graphics
- CMPS 376 Computer Networks
- CMPS 394 Java: Client, Server, & Internet Programming

**Advanced courses:**
- CMPS 490 Senior Project
- One course from the following:
  - CMPS 356 Adv. Software Engineering
  - CMPS 422 Digital Design with VHDL or
  - CMPS 435 Adv. Software Engineering

**Mathematics/Physics courses:**
- MATH 140 Elementary Statistics
- MATH 192 or higher
- MATH 190/191 Pre-calculus I

**Electives (20 units of approved courses):**
- CMPS 215 Unix Programming Environment
- CMPS 216 Unix System Administration
- CMPS 280 X-Windows
- Any other 300 or 400 level computing course may be taken with the consent of the program advisor. Courses from other departments relevant to CIS (not exceeding 10 units) can be taken with the written consent of the program advisor. A minor in another discipline can be used to offset electives with consent of a department advisor.

**Hardware Track**

Note: This track will be phased out in the 2013/2015 catalog due to the new Computer Engineering degree.

**Introductory courses:**
- CMPS 150 Introduction to Unix (1 unit)
- CMPS 221 Programming Fundamentals
- CMPS 222 Object-Oriented Programming
- CMPS 223 Data Structures and Algorithms

**Intermediate courses:**
- CMPS 244 Assembly Language Prog.
- CMPS 295 Discrete Structures
- CMPS 320 Digital Circuits
- CMPS 321 Computer Architecture
- CMPS 360 Operating Systems
- CMPS 371 Computer Graphics
- CMPS 376 Computer Networks

**Advanced courses:**
- CMPS 322 Digital Design with VHDL or
- CMPS 420 Embedded Systems
- CMPS 432 Instrumentation, Control, & Data Acquisition or
- CMPS 457 Robotics
- CMPS 490 Senior Project

**Mathematics/Physics courses:**
- MATH 201 Calculus I
- MATH 202 Calculus II
- MATH 203 Calculus III
- MATH 204, 205, or 206
- MATH 330 Linear Algebra
- PHYS 221 Classical Physics I
- PHYS 222 Classical Physics II
- ENGR 207 Electric Circuits

**Electives (5 units):**
- CMPS 322 Digital Design with VHDL
- CMPS 335 Software Engineering
- CMPS 350 Programming Languages
- CMPS 422 Digital Signal Processing
- CMPS 450 Compiler Construction
- CMPS 457 Robotics
- CMPS 471 Advanced Computer Graphics
- CMPS 476 Advanced Computer Networks and Computer Security

Any other 300 or 400 level computing courses may be taken as an elective with the written consent of the program advisor.