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 concentrations: Computer Science, Computer Information Systems, and Information Security. A Computer Science minor is also offered.

The Computer Science traditional concentration follows the degree guidelines formulated by the Association for Computing Machinery (ACM). This concentration is recommended for most students, particularly those who wish to attend graduate school.

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

The Information Security concentration is intended for those who wish to pursue a career in cybersecurity, either with government agencies or with industry.

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 Computer Perception Laboratory, equipped with the latest image processing and AI technology. We also have an advanced graphics workstation laboratory, a cybersecurity laboratory, a circuit laboratory, several well-equipped instructional laboratories, and multiple engineering laboratories.

We also administer our own local network, which includes multiple Linux servers and an isolated network, and maintain all of our laboratories. There is also a department study room 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
- Mobile Application Development
- Database Administration
- Network Systems
- Academic Research
- Computer Graphics
- Video Game Development
- Information Systems Management
- Graduate Study

Faculty

- Melissa Danforth (Chair) Ph.D., CS, University of California, Davis
- Huaqing Wang Ph.D., CS, Case Western Reserve University
- Wei Li Ph.D., ECE, University of Saarland
- Saeed Jafarzadeh Ph.D., EE, University of Nevada-Reno
- Vida Vakilian Ph.D., EE, University of Montreal
- Albert Cruz Ph.D., EE, University of California, Riverside
- Reza Abdoee Ph.D., ECE, McGill University
- Anthony Bianchi Ph.D., EE, University of California, Riverside
- Chengwei Lei Ph.D., CS, University of Texas, San Antonio
- Antonio Cardenas Ph.D., CS, Arizona State University
- Ehsan Rehmani Ph.D., EE, University of Hawaii
- Gordon Griesel MBA, B.S., CS, CSU Bakersfield
- Derrick McKee B.S., CS, CSU Bakersfield
At CSUB, the Bachelor of Science in Computer Science degree has three concentrations:

### Computer Science (CS) Concentration

**Lower Division Core Courses:**
- CMPS 2010 Prog I: Prog. Fundamentals (4)
- CMPS 2020 Prog II: Data Structures and Alg. (4)
- CMPS 2120 Discrete Structures (4)
- CMPS 2240 Comp. Arch I: Assembly Prog. (4)

**Upper Division Core Courses:**
- CMPS 3120 Algorithm Analysis (3)
- CMPS 3140 Theory of Computation (3)
- CMPS 3240 Computer Arch II: Organization (4)
- CMPS 3350 Software Engineering (4)
- CMPS 3420 Database Systems (4)
- CMPS 3500 Programming Languages (3)
- CMPS 3560 Artificial Intelligence (3)
- CMPS 3600 Operating Systems (4)
- CMPS 3620 Computer Networks (4)
- CMPS 3640 Distributed and Parallel Comp. (3)
- CMPS 4910 Senior Project I (2)
- CMPS 4918 Senior Project II (2)

**Upper Division Elective Courses:**
Choose two courses from the following areas (at least one course must be at the 4000-level):
- Algorithms, Complexity, Theory, Prog. Theory
- Architecture and Organization
- Software Engineering & Visual Computing
- Database Sys. & Intelligence Systems
- Operating Systems, Networking, & Security
- Special Topics & Independent Study

**Cognate Courses:**
- MATH 2510 or 2310 Calculus I (4)
- MATH 2520 or 2320 Calculus II (4)
- MATH 3200 Probability Theory (4)
- PHYS 2210 Calculus-Based Physics I (4)
- PHYS 2220 Calculus-Based Physics II (4)
- PHIL 3318 - Professional Ethics (3)
- Math/Science Elective Course (3-4)

(see catalog for complete list)

### Computer Information Systems (CIS) Concentration

**Lower Division Core Courses:**
- CMPS 2010 Prog I: Prog. Fundamentals (4)
- CMPS 2020 Prog II: Data Struct. and Alg. (4)
- CMPS 2120 Discrete Structures (4)
- CMPS 2680 Web Programming I (3)

**Upper Division Core Courses:**
- CMPS 3120 Algorithm Analysis (3)
- CMPS 3350 Software Engineering (4)
- CMPS 3390 Client, Server, ... Device Prog. (4)
- CMPS 3420 Database Systems (4)
- CMPS 3500 Programming Languages (3)
- CMPS 3560 Artificial Intelligence (3)
- CMPS 3600 Operating Systems (4)
- CMPS 3620 Computer Networks (4)
- CMPS 3640 Distributed and Parallel Comp. (3)
- CMPS 3680 Web Programming II (3)
- CMPS 4910 Senior Project I (2)
- CMPS 4918 Senior Project II (2)

**Advanced Elective Course:**
Choose one 4-unit course from:
- CMPS 4350 Advanced Software Engineering
- CMPS 4420 Advanced Database Systems
- CMPS 4450 Data Mining and Visualization
- CMPS 4490 Game Design
- CMPS 4500 Compiler Design
- CMPS 4510 Vulnerability Analysis
- CMPS 4560 Advanced Artificial Intelligence
- CMPS 4620 Network and Computer Security

**General CIS Elective Courses:**
12 units of approved elective courses or a discipline based minor.

**Cognate Courses:**
- MATH 1209 or 2200 Statistics (3-4)
- MATH 1040 Pre-calculus I and II Combined (6)
  (or both MATH 1050 and MATH 1060)
- PHIL 3318 - Professional Ethics (3)

### Information Security (IS) Concentration

**Lower Division Core Courses:**
- CMPS 2010 Prog I: Prog. Fundamentals (4)
- CMPS 2020 Prog II: Data Structures and Alg. (4)
- CMPS 2120 Discrete Structures (4)
- CMPS 2240 Comp. Arch I: Assembly Prog. (4)

**Upper Division Core Courses:**
- CMPS 3120 Algorithm Analysis (3)
- CMPS 3340 Theory of Computation (3)
- CMPS 3350 Software Engineering (4)
- CMPS 3350 Client, Server, ... Device Prog. (4)
- CMPS 3420 Database Systems (4)
- CMPS 3500 Programming Languages (3)
- CMPS 3600 Operating Systems (4)
- CMPS 3620 Computer Networks (4)
- CMPS 3640 Distributed and Parallel Comp. (3)
- CMPS 4910 Senior Project I (2)
- CMPS 4918 Senior Project II (2)

**Upper Division Elective Courses:**
Choose three courses from:
- CMPS 2650 Linux Environ. and Administration (4)
- CMPS 3650 Digital Forensics (4)
- CMPS 4450 Data Mining and Visualization (4)
- CMPS 4510 Vulnerability Analysis (4)
- CMPS 4620 Network and Computer Security (4)
- CMPS/MATH 4300 Cryptography (4)

**General Cognate Courses:**
- MATH 2510 or 2310 Calculus I (4)
- MATH 2520 or 2320 Calculus II (4)
- MATH 3200 Probability Theory (4)
- PHIL 3318 - Professional Ethics (3)

**Global Intelligence and National Security (GINS) Cognate Courses:**
One GINS Analytical Tools course (3-4)
Three GINS Focus Area courses (1)

(see catalog for complete list)

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**General Education Requirements for Computer Science Programs**

**First Year Seminar I – CSUB 1009 (1)**
**First Year Seminar II – CSUB 1019 (1)**
**A1 – COMM 1008 (3)**
**A2 – ENGL 1109 (3)**
**A3 – Critical Thinking – Recommend SCI 1409 (3)**
**A4 – Satisfied by MATH 2310 or 2510 or 1209 or 2200**
**B1/B3 – Physical Sciences (3) required for CIS and IS**
**B2/B3 – Waived for Computer Science majors**
**C1 – Arts (3)**
**C2 – Humanities (3)**

**US History for American Institutions requirement (3)**
**Government for American Institutions requirement (3)**
**Area D (1st course) (3)**
**Area D (2nd course) – 3 units waived for Computer Science Majors**
**SELF – Recommend course that double-counts for another GE requirement (0-3)**
**Junior Year Diversity Reflection (JYDR) (3)**
**UD Area A – Not required for NSME majors**
**UD Area C – Satisfied by PHIL 3318**
**UD Area D – Waived for Computer Science Majors**
**Capstone – Satisfied by CMPS 4928**
**GWAR – Pass exam or get C or better in course (0-3)**