

# Computer Science

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## The Field of Computer Science

Computer science is applied reasoning using both art and science: it involves communicating ideas through a combination of language and powerful technology. It is concerned with the interaction of humans and computers, as well as the application of computers to a myriad of problems.

## The Department of Computer Science

The goal of the Department of Computer Science is to offer programs to a diverse audience:

- Students interested primarily in computing
- Students interested in applying computing to some other field of study
- Students who wish to include computing as part of their general undergraduate education

The department offers a master's degree, a bachelor's degree, and a minor in computer science, as well as service courses for the general student body.

For the computer science major, the department offers courses that represent both the core of study considered essential to all aspects of computing and advanced study in particular fields of interest. The core classes introduce all majors to the spectrum of thought represented in computing. The advanced courses

allow the individual student to pursue concentrated work within such areas as artificial intelligence, databases, compilers, networking, operating systems, computer architecture, software engineering, graphics, and computer science theory. The department also offers topics courses intended to keep students informed of current advances and methodology in computing.

Computer Science faculty members come from a variety of areas including algorithms, programming languages, software engineering, computer architecture, bio-informatics, cloud computing, artificial intelligence, and networking. They share a common desire to provide a program that will give the student a broad range of experience in computer science.

Computer science majors have access to the university and College of Science and Mathematics computing facilities.

Through the Cooperative Education Program, the department encourages academically related employment for students. In addition to the experience and salary, students earn elective college credit.

## Career Opportunities

Computer use pervades our society; the industry supporting that use has been growing rapidly. Graduates from this program find job opportunities in such diverse fields as Com-

puter System Design, software development, systems analysis, database design, and web development. Because of the strong theoretical foundation of the program, graduates will be attractive to companies involved in software/web development, system programming/integration, and to those industries with information technology applications.

## High School Preparation

Students should meet California State University's admission requirements in terms of college preparatory course requirements, grade point average, and test scores.

## College Program

Students should consult the university's *General Catalog* for specific major and university requirements. Community college transfers should consult their catalogs to ensure that courses taken are CSU transferable (baccalaureate level).

## General Education/Lower Division Computer Science Requirements

Students should complete as many of the CSU Fresno General Education requirements during the freshman and sophomore years, whether they are attending CSU Fresno or a community college. Community colleges can certify up to 39 of the required General Education units. In addition, students

California State  
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<http://www.fresnostate.edu/csm/csci/>

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B.S. in Computer  
Science

Minor in Computer  
Science

M.S. in Computer  
Science

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# Computer Science

pursuing Computer Science as a major should take their lower division Computer Science courses as soon as they have met the prerequisite math competencies.

## Course Requirements

Since changes may occur, students should consult the *General Catalog* and a California State University, Fresno adviser prior to registering for courses.

### Lower Division

Freshman-Sophomore level courses  
(may be taken at a community college)

Critical Thinking and Computer Science  
(CSCI 1)

Introduction to Programming and Problem Solving (CSCI 40)

Introduction to Data Structures (CSCI 41)

Foundations of Computer Science (CSCI 60)

Mathematical Analysis I and II  
(MATH 75 and 76)

Physics (PHYS 2A and 2B or 4A /4AL and 4B/4BL)

### Upper Division

Junior-Senior level courses  
(to be taken at CSU Fresno)

Advanced Computer Graphics (CSCI 173)

Algorithms and Data Structures (CSCI 115)

Artificial Intelligence Programming (CSCI 164)

Compiler Design (CSCI 134)

Computational Foundations for Bioinformatics  
(CSCI 101)

Computer Graphics (CSCI 172)

Database Systems (CSCI 126)

Design and Analysis of Algorithms (CSCI 174)

Distributed Computer Systems (CSCI 177)

Formal Languages and Automata (CSCI 186)

Networking Systems and Protocols (CSCI 156)

Introduction to Computability (CSCI 188)

Introduction to Computer Organization (CSCI 113)

Introduction to Computer Systems (CSCI 112)

Introduction to File Processing (CSCI 124)

Introduction to Finite Automata (CSCI 119)

Introduction to Operating Systems (CSCI 144)

Introduction to Software Engineering (CSCI 150)

Parallel Processing (CSCI 176)

Principles of Artificial Intelligence (CSCI 166)

Project (directed study under supervision)  
(CSCI 198)

Simulation (CSCI 154)

Software Engineering (CSCI 152)

Structures of Programming Languages (CSCI 117)

Systems Architecture (CSCI 146)

Systems Programming (CSCI 148)

Web Programming (CSCI 130)

Workshop on Computer Languages (CSCI 105T)

The major consists of 60 units chosen primarily from the above list. The computer science curriculum is very structured. CSCI 40 (or equivalent) should be taken as soon as possible. Introduction to Computer Systems and Algorithms and Data Structures are often taken by computer science majors in their sophomore year. The minor requires 20 units of computer science courses, consisting of CSCI 1, 60, or upper-division courses. At least 6 of the 20 units must be upper division.

### Graduate Courses

Advanced Database Systems (CSCI 226)

Advanced Software Engineering (CSCI 250)

Advanced Web Application Development (CSCI 230)

Artificial Intelligence (CSCI 264)

Automata Theory (CSCI 284)

Combinatorial Algorithms (CSCI 274)

Computer Graphics (CSCI 272)

Computer Organization (CSCI 213)

Human Computer Interaction (CSCI 253)

Introduction to Research in Computer Science  
(CSCI 200)

Operating Systems (CSCI 244)

Computer Architecture (CSCI 246)

Programming Language Principles (CSCI 217)

Research Project (CSCI 298)

Seminar (CSCI 291T)

Software Development Environments (CSCI 252)

Theory of Computation (CSCI 282)

Wireless Communications and Mobile  
Computing (CSCI 256)

For additional  
information, write

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**PLEASE NOTE:** This document is for general informational purposes only. The information is subject to change; consult the appropriate department or an academic adviser. Entering freshmen must follow the revised General Education program effective fall 1999 and thereafter. The university catalog and schedule of courses are available online at [www.fresnostate.edu/ClassSchedule](http://www.fresnostate.edu/ClassSchedule) and [www.fresnostate.edu/catalog](http://www.fresnostate.edu/catalog).

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