COMPUTER SCIENCE MINOR

Offered at: San Luis Obispo Campus

Nearly all disciplines use the capabilities of computers. The Computer Science minor consists of a lower-division core and upper-division elective courses selected in consultation with an advisor. The core provides common knowledge and skills needed by anyone who wishes to advance further in computer science. The remaining courses enable students to specialize in areas relevant to their goals.

Code	Title	Units
Admission to the minor is limited and selection is based upon the applicant's performance in:		
CSC 1001	Fundamentals of Computer Science	3
CSC 1001L	Fundamentals of Computer Science Laboratory	1
CSC 2001	Data Structures	3
CSC 2001L	Data Structures Laboratory	1

Students who intend to minor in computer science should consult the College of Engineering's Engineering Student Services website for GPA and course grade requirements for admission to the minor. In addition, they should contact Engineering Student Services for further information *before* planning to enter the minor.

Before formally applying, students must make an appointment at the College of Engineering's Engineering Student Services. The Computer Science minor is not open to CSC, CPE or SE major students, or to students in the Cross Disciplinary Studies Minor in Computing for Interactive Arts, the Cross Disciplinary Studies Minor in Data Science, or the Cross Disciplinary Studies Minor in Bioinformatics. Questions concerning the minor should be directed to Engineering Student Services.

Program Learning Objectives

1. Analyze a computing problem and apply principles of computing to identify solutions.
2. Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements.
3. Apply software development fundamentals to produce computing-based solutions.

Minor Requirements and Curriculum

The minor must be completed prior to, or at the same time as, the requirements for the bachelor's degree. A major and a minor may not be taken in the same degree program, and a minor is not required for a degree. Requirements for the minor include:

- At least half of the units must be from upper-division courses (3000-4000 level).
- At least half of the units must be taken at Cal Poly (in residence).
- No more than one-third of the units will be taken with credit-no credit grading (CR/NC), not counting courses with mandatory CR/NC. Departments may further limit CR/NC grading if desired.
- A minimum 2.0 GPA is required in all units counted for completion of the minor.

Code	Title	Units
REQUIRED COURSES		
CSC 1001 & 1001L	Fundamentals of Computer Science and Fundamentals of Computer Science Laboratory	4
CSC 2001 & 2001L	Data Structures and Data Structures Laboratory	4
CSC 3001	Modern Application Development	4
Approved Electives		
Select from the following:		6-8
CPE 3160	Microcontrollers and Embedded Applications	
CPE 3300	Computer Architecture	
CPE 4140	Robotic Systems Integration	
CPE 4160	Autonomous Mobile Robotics	
CPE 4180	Advanced Microcontrollers and Embedded Applications	
CPE 4190	Applied Parallel Computing	
CPE 4220	Network Security	
CPE 4300	Advanced Computer Architecture	
CPE 4390	Introduction to Real-Time Operating Systems	

CPE 4420	High-Performance Embedded Systems
CPE 4455	Design of Fault-Tolerant Systems
CPE 4464	Introduction to Computer Networks
CPE 4465	Advanced Computer Networks
CPE 4650	Scalable Server Implementation and Testing
CPE 4669	Distributed Systems
CSC 3100	Software Engineering
CSC 3104	Software Engineering without Programming
CSC 3111	Computational Thinking for Educators
CSC 3113	Teaching Computing
CSC 3200	Practical Computer Security for Everyone
CSC 3201	Introduction to Computer Security
CSC 3203	Cryptography Engineering and Applications
CSC 3250	Introduction to Privacy: Policy and Technology
CSC 3300	Programming Languages
CSC 3445	Theory of Computation
CSC 3449	Algorithms and Complexity
CSC 3660	Introduction to Databases
CSC 3662	Introduction to Non-Relational Database Systems
CSC 3665	Introduction to Database Management Systems
CSC 3710	Game Design and Development
CSC 3760	Introduction to Mixed Reality
CSC 3780	Game Engineering and Critical Analysis
CSC 4036	Mobile Application Development
CSC 4037	Web Development
CSC 4100	Software Evaluation
CSC 4184	User-Centered UI/UX Design
CSC 4186	Human-Computer Interaction
CSC 4212	Malware Design and Analysis
CSC 4214	Binary Exploitation: Tools and Techniques
CSC 4230	Web and Cloud Security
CSC 4310	Compiler Construction
CSC 4448	Bioinformatics Algorithms
CSC 4553	Introduction to Operating Systems
CSC 4554	Implementation of Operating Systems
CSC/DATA 4610	Fundamentals of Machine Learning
CSC 4665	Database Management Systems Organization
CSC 4667	Deep Learning
CSC 4710	Introduction to Computer Graphics
CSC 4730	Advanced Rendering Techniques
CSC 4740	Computer Animation
CSC 4760	Real-Time 3D Computer Graphics Software
CSC 4820	Natural Language Processing
CSC 4880	Artificial Intelligence
CSC 4881	Semantic Computing
CSC 4888	Computer Vision
DATA 3301	Introduction to Data Science
PHIL 3323	Ethics, Science, and Technology
Total Units	**18**