BS IN COMPUTER SCIENCE

Units required for Major: 78
Total units required for BS: 120

Program Description

The Bachelor of Science degree in Computer Science is accredited by the Computing Accreditation Commission (CAC) of ABET, Inc. (http://www.abet.org/), providing majors with a sound educational base in Computer Science.

Pre-Major Requirements

Students requesting to become Computer Science majors must first complete the lower-division (pre-major) courses listed in this section. If a student requests to become a Computer Science major but has not yet completed these courses, they should change their major to pre-Computer Science. Changing to the pre-Computer Science major requires either completion of or enrollment in MATH 30 and a Sacramento State and overall GPA of at least 2.5. Changing to the Computer Science major requires a GPA of at least 2.7 in the courses listed in this section.

To change to the Computer Science or pre-Computer Science major, students are required to complete and submit a Change of Major form to the Computer Science Department Office along with transcript copies.

Registration in Computer Science courses numbered 133 and above is restricted to Computer Science and Computer Engineering majors. Other students need to obtain approval from the CSC Department Chair.

Code	Title	Units
CSC 15	Programming Concepts and Methodology I	3
CSC 20	Programming Concepts and Methodology II	3
CSC 28	Discrete Structures for Computer Science	3
CSC 35	Introduction to Computer Architecture	3
MATH 30	Calculus I	4
MATH 31	Calculus II	4
PHYS 11A	General Physics: Mechanics	4

Minimum Grade Requirement

Grade of "C-" or better required in all courses applied to the Computer Science major.

Program Requirements

Code	Title	Units
Required Lower Division Courses (15 Units)		
CSC 15	Programming Concepts and Methodology I	3
CSC 20	Programming Concepts and Methodology II	3
CSC 28	Discrete Structures for Computer Science	3
CSC 35	Introduction to Computer Architecture	3
CSC 60	Introduction to Systems Programming in UNIX	3
Required Mathematics and Science Courses (21-24 Units)		
MATH 30	Calculus I [1]	4
MATH 31	Calculus II	4
PHYS 11A	General Physics: Mechanics [1]	4
Select one of the following:		3 - 4
STAT 50	Introduction to Probability and Statistics	
ENGR 115	Statistics For Engineers	
Select one of the following:		3
MATH 35	Introduction to Linear Algebra [2]	
MATH 100	Applied Linear Algebra [2]	
MATH 101	Combinatorics	
MATH 102	Number Theory	
MATH 150	Introduction to Numerical Analysis	
PHIL 160	Deductive Logic II	
STAT 103	Intermediate Statistics	
STAT 115A	Introduction to Probability Theory	
STAT 155	Introduction to Techniques of Operations Research	
Select one of the following:		3 - 5
BIO 1	Biodiversity, Evolution and Ecology [1]	
BIO 10	Basic Biological Concepts [1]	
CHEM 1A	General Chemistry I	
CHEM 1E	General Chemistry for Engineering	
PHYS 11B	General Physics: Heat, Light, Sound, Modern Physics	
PHYS 11C	General Physics: Electricity and Magnetism	
Required Upper Division Courses (33 Units)		
CSC 130	Data Structures and Algorithm Analysis	3
CSC 131	Computer Software Engineering	3
CSC 133	Object-Oriented Computer Graphics Programming	3
CSC 134	Database Management Systems	3
CSC 135	Computability and Formal Languages	3
CSC 137	Computer Organization	3
CSC/CPE 138	Computer Networking Fundamentals	3
CSC 139	Operating System Principles	3
CSC 190	Senior Project - Part I	2
CSC 191	Senior Project - Part II	2
PHIL 103	Business and Computer Ethics [1]	3
Select two units from the following:		2
CSC 192	Career Planning	
CSC 193A	Web Programming	
CSC 194	Computer Science Seminar	
CSC 195	Fieldwork in Computer Science	
CSC 195A	Professional Practice	
CSC 198	Co-Curricular Activities in Computer Science	
CSC 199	Special Problems	
ENGR 197	Seminar in Peer-Assisted Learning	
Electives (9 Units)		
Select 9 units of CSC courses 140 or above **excluding** the following: [3]		9
CSC 192	Career Planning	
CSC 193A	Web Programming	
CSC 194	Computer Science Seminar	
CSC 195	Fieldwork in Computer Science	
CSC 195A	Professional Practice	
CSC 198	Co-Curricular Activities in Computer Science	
CSC 199	Special Problems	

ENGR 197	Seminar in Peer-Assisted Learning	
Total Units		**78-81**

1 Course also satisfies General Education (GE)/Graduation Requirement.
2 Computer science students choosing between MATH 35 and MATH 100 should normally choose MATH 100 because it is more applied. MATH 35 at Sacramento State is designed for math majors.
3 In addition to the required lower-division and upper-division Computer Science courses, Computer Science majors must take additional elective courses, totaling at least nine (9) units, from undergraduate Computer Science courses numbered CSC 140 or above (excluding the listed courses).

Course choices should be made with advisor consultation. With advance written approval from their advisor, the course instructor, and the Department Chair, students with a GPA of 3.0 or greater may take graduate courses as electives. In any case students must meet any course prerequisite stated in the catalog prior to taking any elective course.

General Education Requirements [4]

Code	Title	Units
Area A: Basic Subjects (9 Units)		
A1 - Oral Communication		3
A2 - Written Communication		3
A3 - Critical Thinking		3
Area B: Physical Universe and Its Life Forms (3-6 Units)		
B1 - Physical Science [5]		0
B2 - Life Forms [6]		0 - 3
B3 - Lab (Note: Lab experience to be taken with one of the following: B1, B2 or B5 [5]		0
B4 - Math Concepts [5]		0
B5 - Additional Course (Any B to reach 12 units) - Take upper-division course to complete Area & upper division requirements.		3
Area C: Arts and Humanities (12 Units)		
C1 - Arts		3
C2 - Humanities		3
C1/C2 - Area Course C		3
C1/C2 - Area C Course - Take upper-division course to complete Area & upper division requirements.		3
Area D: The Individual and Society (6 Units)		
Area D Course		3
Area D Course		3
Area D Course - Take upper-division course to complete Area & upper division requirements. [5]		0
Area E: Understanding Personal Development (3 Units)		
Area E Course		3
Area F: Ethnic Studies (3 Units)		
Area F Course		3
Total Units		**36-39**

Graduation Requirements [4]

Code	Title	Units
Graduation Requirements (required by CSU) (9 Units)		
American Institutions: U.S. History		3
American Institutions: U.S. Constitution & CA Government		3
Writing Intensive (WI)		3
Graduation Requirements (required by Sacramento State) (6 Units)		
English Composition II		3
Race and Ethnicity in American Society (RE)		3
Foreign Language Proficiency Requirement [7]		0

4 To help you complete your degree in a timely manner and not take more units than absolutely necessary, there are ways to use single courses to meet more than one requirement (overlap). For further information, please visit the General Education page (https://catalog.csus.edu/colleges/academic-affairs/general-education/).
Note: There is no way to list all possible overlaps so please consult with a professional advisor. The Academic Advising Center can be visited online (http://www.csus.edu/acad/), by phone (916) 278-1000, or email (advising@csus.edu).
5 A required course in the major satisfies this GE area.
6 Choosing BIO 1 or BIO 10 as the Computer Science science elective satisfies GE Area B2.
7 Students with a declared major of BS in Computer Science are exempt from the Foreign Language Graduation Requirement.

The following roadmaps are sample planning resources. Please consult your academic advisor and Academic Catalog for graduation requirements as you develop your individualized academic plan.

Computer Science, BS: 4-Year Roadmap

Course	Title	Units
Year 1		
First Semester		
CSC 15	Programming Concepts and Methodology I	3
MATH 30	Calculus I	4
GE Area 1B - Critical Thinking [2]		3
GE Area 6 - Ethnic Studies [2]		3
Elective of Choice		3
	Units	**16**
Second Semester		
CSC 20	Programming Concepts and Methodology II	3
MATH 31	Calculus II	4
GE Area 1A - English Composition [2]		3
GE Area 1C - Oral Communication [2]		3
GE Area 5B - Biological Science [2]		3
	Units	**16**
Year 2		
First Semester		
CSC 28	Discrete Structures for Computer Science	3
CSC 35	Introduction to Computer Architecture	3
ENGL 20	College Composition II	3
PHYS 11A	General Physics: Mechanics	4
GE Area 3A - Arts [2]		3
	Units	**16**

Second Semester		
CSC 130	Data Structures and Algorithm Analysis	3
CSC 131	Computer Software Engineering	3
STAT 50 or ENGR 115	Introduction to Probability and Statistics [3] or Statistics For Engineers	3 - 4
MATH 35 or MATH 100 or MATH 101 or MATH 102 or MATH 150 or PHIL 160 or STAT 103 or STAT 115A or STAT 155	Introduction to Linear Algebra [3] or Applied Linear Algebra or Combinatorics or Number Theory or Introduction to Numerical Analysis or Deductive Logic II or Intermediate Statistics or Introduction to Probability Theory or Introduction to Techniques of Operations Research	3
GE Area 4 - Social & Behavioral Sciences [2]		3
	Units	**15-16**
Year 3		
First Semester		
CSC 60	Introduction to Systems Programming in UNIX	3
CSC 133	Object-Oriented Computer Graphics Programming	3
CSC 134	Database Management Systems	3
CSC 192 or CSC 193A or CSC 194 or CSC 195 or CSC 195A or CSC 198 or CSC 199 or ENGR 197	Career Planning [3] or Web Programming or Computer Science Seminar or Fieldwork in Computer Science or Professional Practice or Co-Curricular Activities in Computer Science or Special Problems or Seminar in Peer-Assisted Learning	1 - 12
GR American Institutions (US History) [2]		3
	Units	**13-24**
Second Semester		
CSC 135	Computability and Formal Languages	3
CSC 137	Computer Organization	3
PHIL 103	Business and Computer Ethics	3
CSC 193A or CSC 192 or CSC 194 or CSC 195 or CSC 195A or CSC 198 or CSC 199 or ENGR 197	Web Programming [3] or Career Planning or Computer Science Seminar or Fieldwork in Computer Science or Professional Practice or Co-Curricular Activities in Computer Science or Special Problems or Seminar in Peer-Assisted Learning	1 - 12
BIO 10 or BIO 1 or CHEM 1A or CHEM 1E or PHYS 11B or PHYS 11C	Basic Biological Concepts [3] or Biodiversity, Evolution and Ecology or General Chemistry I or General Chemistry for Engineering or General Physics: Heat, Light, Sound, Modern Physics or General Physics: Electricity and Magnetism	3 - 5
GE Area 3B - Humanities [2]		3
	Units	**16-29**
Year 4		
First Semester		
CSC 138	Computer Networking Fundamentals	3
CSC 139	Operating System Principles	3
CSC 190	Senior Project - Part I	2
CSC Elective [3]		3
GR American Institutions (GOVT) [2]		3
Elective of Choice		3
	Units	**17**
Second Semester		
CSC 191	Senior Project - Part II	2
CSC Elective [3]		3
CSC Elective [3]		3
Upper Division GE Area 3 - Arts or Humanities + Writing Intensive [2]		3
Upper Division GE Area 5 or 2 - Science or Mathematical Concepts/Quantitative Reasoning [2]		3
	Units	**14**
	Total Units	**123-148**

Computer Science, BS: 2-Year Roadmap

Course	Title	Units
Year 1		
First Semester		
CSC 130	Data Structures and Algorithm Analysis	3
CSC 131	Computer Software Engineering	3
CSC 133	Object-Oriented Computer Graphics Programming	3
CSC 134	Database Management Systems	3
CSC 192 or CSC 193A or CSC 194 or CSC 195 or CSC 195A or CSC 198 or CSC 199 or ENGR 197	Career Planning [3] or Web Programming or Computer Science Seminar or Fieldwork in Computer Science or Professional Practice or Co-Curricular Activities in Computer Science or Special Problems or Seminar in Peer-Assisted Learning	1 - 12
	Units	**13-24**
Second Semester		
CSC 135	Computability and Formal Languages	3
CSC 137	Computer Organization	3
PHIL 103	Business and Computer Ethics	3

CSC 193A or CSC 192 or CSC 194 or CSC 195 or CSC 195A or CSC 198 or CSC 199 or ENGR 197	Web Programming [3] or Career Planning or Computer Science Seminar or Fieldwork in Computer Science or Professional Practice or Co-Curricular Activities in Computer Science or Special Problems or Seminar in Peer-Assisted Learning	1 - 12
GR American Institutions (US History) [2]		3
	Units	**13-24**
Year 2		
First Semester		
CSC 138	Computer Networking Fundamentals	3
CSC 139	Operating System Principles	3
CSC 190	Senior Project - Part I	2
MATH 35 or MATH 100 or MATH 101 or MATH 102 or MATH 150 or PHIL 160 or STAT 103 or STAT 115A or STAT 155	Introduction to Linear Algebra [3] or Applied Linear Algebra or Combinatorics or Number Theory or Introduction to Numerical Analysis or Deductive Logic II or Intermediate Statistics or Introduction to Probability Theory or Introduction to Techniques of Operations Research	3
CSC Elective [2]		3
GR American Institutions (GOVT) [2]		3
	Units	**17**
Second Semester		
CSC 191	Senior Project - Part II	2
BIO 10 or BIO 1 or CHEM 1A or CHEM 1E or PHYS 11B or PHYS 11C	Basic Biological Concepts [3] or Biodiversity, Evolution and Ecology or General Chemistry I or General Chemistry for Engineering or General Physics: Heat, Light, Sound, Modern Physics or General Physics: Electricity and Magnetism	3 - 5
CSC Elective [3]		3
CSC Elective [3]		3
Upper Division GE Area 3 - Arts or Humanities + Writing Intensive [2]		3
Upper Division GE Area 5 or 2 - Science or Mathematical Concepts/Quantitative Reasoning [2]		3
	Units	**17-19**
	Total Units	**60-84**

1. Any course not completed in the first semester should be taken in the second or a later semester.
2. Please see General Education/Graduation Requirement **course options (https://catalog.csus.edu/colleges/engineering-computer-science/engineering-civil/bs-in-civil-engineering/colleges/academic-affairs/general-education/)**.
3. Please see an academic advisor for elective options.