BS IN COMPUTER ENGINEERING

Units required for Major: 97
Total units required for the BS: 124

Program Description

The Bachelor of Science degree in Computer Engineering is a four-year program that emphasizes engineering design of computer hardware and systems at all levels. Engineering design begins with logic design taught to entering students during their first semester. The thread of design continues through the study of architecture, CMOS and VLSI technology, ASIC design, operating systems, computer hardware design, and networking hardware. To complete their degree, students take a two-semester senior design and project course.

Program Requirements

Code	Title	Units
FIRST SEMESTER FRESHMAN YEAR		
CSC 15	Programming Concepts and Methodology I	3
MATH 30	Calculus I [1]	4
ENVS 10	Introduction to Environmental Science [1]	3
ENGR 1	Introduction to Engineering [1]	1
ENGL 5	Accelerated Academic Literacies [2]	3
SECOND SEMESTER FRESHMAN YEAR		
CSC 20	Programming Concepts and Methodology II	3
MATH 31	Calculus II [1]	4
PHYS 11A	General Physics: Mechanics [1]	4
CSC 35	Introduction to Computer Architecture	3
Select a General Education Course		3
FIRST SEMESTER SOPHOMORE YEAR		
CPE/EEE 64	Introduction to Logic Design [1]	4
MATH 45	Differential Equations for Science and Engineering	3
PHYS 11C	General Physics: Electricity and Magnetism	4
CSC 60	Introduction to Systems Programming in UNIX	3
Select a General Education Course		3
SECOND SEMESTER SOPHOMORE YEAR		
CSC 28	Discrete Structures for Computer Science	3
ENGR 17	Introductory Circuit Analysis	3
ENGL 20	College Composition II	3
CSC 130	Data Structures and Algorithm Analysis	3
Select a General Education Course		3
FIRST SEMESTER JUNIOR YEAR		
CPE 166	Advanced Logic Design	4
CPE 185	Computer Interfacing	4
ENGR 140	Engineering Economics [1]	2
EEE 117	Network Analysis	3
EEE 117L	Networks Analysis Laboratory	1
Select a General Education Course		3
SECOND SEMESTER JUNIOR YEAR		
CPE/CSC 142	Advanced Computer Organization	3
EEE 108	Electronics I	3
EEE 108L	Electronics I Laboratory	1
EEE 180	Signals & Systems	3
CPE 187	Embedded Systems Design	3
Select a General Education Course		3
FIRST SEMESTER SENIOR YEAR		
CPE 151	CMOS and Digital VLSI Design	3
CSC 139	Operating System Principles	3
ENGR 120	Probability and Random Signals	3
CPE 190	Senior Design Project I [1]	2
Select a General Education Course		3
SECOND SEMESTER SENIOR YEAR		
CPE/CSC 138	Computer Networking Fundamentals	3
CPE 191	Senior Design Project II [1]	2
Select a General Education Course		3
Tech Elective I		3
Tech Elective II		3
Technical Elective I Choices		
Select one of the following:		
CPE 144	Dsp Architecture Design	
CPE 153	Vlsi Design	
CPE 186	Computer Hardware System Design	
CSC 131	Computer Software Engineering	
CSC 133	Object-Oriented Computer Graphics Programming	
CSC 134	Database Management Systems	
CSC 151	Compiler Construction	
CSC 152	Cryptography	
CSC 153	Computer Forensics Principles and Practices	
CSC 154	Computer System Attacks and Countermeasures	
CSC 155	3D Graphics and Shader Programming	
EEE 120	Electronic Instrumentation	
EEE 122	Applied Digital Signal Processing	
EEE 181	Introduction to Digital Signal Processing	
EEE 187	Robotics	
Technical Elective II Choices		
(select one of the following)		
CSC 154	Computer System Attacks and Countermeasures	
CPE/CSC 159	Operating System Pragmatics	
Required Lower Division Courses (23 UNITS, Included Above)		
Required Mathematics Courses - Included Above (11 UNITS: Math 30, Math 31 and Math 45)		
Additional Required Courses - Included Above (13 UNITS: ENVS 10, ENGR 140, PHYS 11A, PHYS 11C)		
Required Upper Division Courses (44 UNITS - Included Above)		
Tech Electives I and II (6 UNITS: Included Above)		
Total Units		**124**

[1] Course also satisfies General Education (GE)/Graduation Requirement.

Note:

- Students are expected to satisfy the general education requirements of the Accreditation Board for Engineering and Technology (ABET) as well as the University's General Education requirements. Students should consult the Program Coordinator for specific General Education requirements.

- A second-year foreign language course (2A or equivalent) may also satisfy 3 units of GE when the course is being taken to comply with the Sacramento State foreign language requirement. Students should consult with an advisor for exact GE eligibility of these courses.

[2] ENGL 10 and ENGL 11 may be taken in lieu of ENGL 5 (only 3 units will be counted towards degree)

General Education Requirements [1]

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		
B1 - Physical Science [2]		0
B2 - Life Forms [2]		0
B3 - Lab (Note: Lab experience to be taken with one of the following: B1, B2 or B5) [2]		0
B4 - Math Concepts [2]		0
B5 - Additional Course (Any B to reach 12 units) - Take upper-division course to complete Area & upper division requirements. [2]		0
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. [2]		0
Area E: Understanding Personal Development		
Area E Course [2]		0
Area F: Ethnic Studies (3 Units)		
Area F Course		3
Total Units		**30**

[1] 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).

[2] Required in Major; also satisfies GE.

Graduation Requirements [1]

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 [2]		0

[1] 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).

[2] If not satisfied before entering Sacramento State, it may be satisfied in General Education Area C2 (Humanities). "C- or better required." The alternative methods for satisfying the Foreign Language Proficiency Requirement are described here: https://www.csus.edu/college/arts-letters/world-languages-literatures/foreign-language-requirement.html
Note: Students with a declared major of BS in Computer Engineering 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 Engineering, BS: 4-Year Roadmap

Course	Title	Units
Year 1		
First Semester		
CSC 15	Programming Concepts and Methodology I	3
ENGR 1	Introduction to Engineering	1
ENVS 10	Introduction to Environmental Science	3
MATH 30	Calculus I	4
GE Area 1A - English Composition [2]		3
	Units	**14**
Second Semester		
CSC 20	Programming Concepts and Methodology II	3
CSC 35	Introduction to Computer Architecture	3
MATH 31	Calculus II	4
PHYS 11A	General Physics: Mechanics	4
GE Area 1C - Oral Communication [2]		3
	Units	**17**
Year 2		
First Semester		
CPE 64	Introduction to Logic Design	4
CSC 60	Introduction to Systems Programming in UNIX	3
MATH 45	Differential Equations for Science and Engineering	3
PHYS 11C	General Physics: Electricity and Magnetism	4
GE Area 4 - Social & Behavioral Sciences [2]		3
	Units	**17**
Second Semester		
CSC 28	Discrete Structures for Computer Science	3

CSC 130	Data Structures and Algorithm Analysis	3
ENGR 17	Introductory Circuit Analysis	3
ENGL 20	College Composition II	3
GE Area 3A - Arts [2]		3
	Units	**15**
Year 3		
First Semester		
CPE 166	Advanced Logic Design	4
CPE 185	Computer Interfacing	4
EEE 117	Network Analysis	3
EEE 117L	Networks Analysis Laboratory	1
ENGR 140	Engineering Economics	2
GR American Institutions (US History) [2]		3
	Units	**17**
Second Semester		
CPE 142	Advanced Computer Organization	3
CPE 187	Embedded Systems Design	3
EEE 108	Electronics I	3
EEE 108L	Electronics I Laboratory	1
EEE 180	Signals & Systems	3
GE Area 3B - Humanities [2]		3
	Units	**16**
Year 4		
First Semester		
CPE 151	CMOS and Digital VLSI Design	3
CPE 190	Senior Design Project I	2
CSC 139	Operating System Principles	3
ENGR 120	Probability and Random Signals	3
GE Area 6 - Ethnic Studies [2]		3
GR American Institutions (GOVT) [2]		3
	Units	**17**
Second Semester		
CPE 138	Computer Networking Fundamentals	3
CPE 191	Senior Design Project II	2
CPE Technical Elective Group I [3]		3
CPE Technical Elective Group II [3]		3
Upper Division GE Area 3 - Arts or Humanities + Writing Intensive [2]		3
	Units	**14**
	Total Units	**127**

Computer Engineering, BS: 2-Year Roadmap

Course	Title	Units
Year 1		
First Semester		
CPE 166	Advanced Logic Design	4
CPE 185	Computer Interfacing	4
CSC 130	Data Structures and Algorithm Analysis	3
EEE 117	Network Analysis	3
EEE 117L	Networks Analysis Laboratory	1
ENGR 140	Engineering Economics	2
	Units	**17**
Second Semester		
CPE 142	Advanced Computer Organization	3
CPE 187	Embedded Systems Design	3
EEE 108	Electronics I	3
EEE 108L	Electronics I Laboratory	1
EEE 180	Signals & Systems	3
GR American Institutions (GOVT) [2]		3
	Units	**16**
Year 2		
First Semester		
CPE 151	CMOS and Digital VLSI Design	3
CPE 190	Senior Design Project I	2
CSC 139	Operating System Principles	3
ENGR 120	Probability and Random Signals	3
GR American Institutions (US History) [2]		3
	Units	**14**
Second Semester		
CPE 138	Computer Networking Fundamentals	3
CPE 191	Senior Design Project II	2
CPE Technical Elective Group I [3]		3
CPE Technical Elective Group II [2]		3
Upper Division GE Area 3 - Arts or Humanities + Writing Intensive [2]		3
	Units	**14**
	Total Units	**61**

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.