

BS COMPUTER SCIENCE

Program Learning Outcomes

Graduates of the program will have an ability to:

1. Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.
2. Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.
3. Communicate effectively in a variety of professional contexts.
4. Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.
5. Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.
6. Apply computer science theory and software development fundamentals to produce computing-based solutions.

Degree Requirements and Curriculum

In addition to the program requirements listed on this page, students must also satisfy requirements outlined in more detail in the Minimum Requirements for Graduation (<https://catalog.calpoly.edu/generalrequirementsbachelorsdegree/#generaleducationtext>) section of this catalog, including:

- 60 units of upper-division courses
- Graduation Writing Requirement (GWR)
- 2.0 GPA
- U.S. Cultural Pluralism (USCP)

Note: No Major or Support courses may be selected as credit/no credit.

MAJOR COURSES

CSC/CPE 101	Fundamentals of Computer Science	4
CSC/CPE 123	Introduction to Computing ¹	4
CSC/CPE 202	Data Structures	4
CSC/CPE 203	Project-Based Object-Oriented Programming and Design	4
CSC 225	Introduction to Computer Organization	4
CSC 248	Discrete Structures	4
CSC 300	Professional Responsibilities	4
or PHIL 323	Ethics, Science and Technology	
Select from the following:		4
CSC 307	Introduction to Software Engineering	
or		
CSC 308 & CSC 309	Software Engineering I and Software Engineering II ²	
Select from the following:		4
CSC 321	Introduction to Computer Security ³	
or CSC 323	Cryptography Engineering	
or CSC 325	Introduction to Privacy: Policy and Technology	
CSC 349	Design and Analysis of Algorithms	4
CSC/CPE 357	Systems Programming	4
Select from the following:		4

CSC 364	Introduction to Networked, Distributed, and Parallel Computing	
or		
CPE 464 & CPE 469	Introduction to Computer Networks and Distributed Systems ⁴	
CSC 365	Introduction to Database Systems	4
CSC 430	Programming Languages	4
CSC 445	Theory of Computation I	4
CSC/CPE 453	Introduction to Operating Systems	4
Select from the following:		4
CSC 491 & CSC 492	Senior Project I and Senior Project II (2, 2)	
or		
CSC 497 & CSC 498	Research Senior Project I and Research Senior Project II (2, 2)	

SUPPORT COURSES

ES/WGQS 350	Gender, Race, Culture, Science & Technology	4
or ES 351	Gender, Race, Class, Nation in Global Engineering, Technology & International Development	
MATH 141	Calculus I (B4) ⁵	4
MATH 142	Calculus II (B4) ⁵	4
MATH 143	Calculus III (Area B Electives) ⁵	4
MATH 206	Linear Algebra I	4
or MATH 244	Linear Analysis I	
Select from the following: (C2) ⁵		4
PHIL 230	Philosophical Classics: Knowledge and Reality	
PHIL 231	Philosophical Classics: Ethics and Political Philosophy	
Any GE Area C2 Course		
STAT 312	Statistical Methods for Engineers (Upper-Division B) ⁵	4
Life Science Support Elective		
Select from the following (B2): ⁵		4
BIO 111	General Biology	
BIO 161	Introduction to Cell and Molecular Biology	
BIO 213 & BMED 213	Life Science for Engineers and Bioengineering Fundamentals	
BOT 121	General Botany	
MCRO 221	Microbiology	
Physical Science Support Elective		
Select one sequence from the following (B1 & B3): ⁵		12
CHEM 124 & CHEM 125 & CHEM 126	General Chemistry for Physical Science and Engineering I and General Chemistry for Physical Science and Engineering II and General Chemistry for Physical Science and Engineering III	
PHYS 141 & PHYS 142 & PHYS 143	General Physics I and General Physics II and General Physics III	
Additional Science Support Elective		
Select from the following (Area B Electives): ^{5,6}		4

BIO 111	General Biology	
BIO 161	Introduction to Cell and Molecular Biology	
BOT 121	General Botany	
CHEM 124	General Chemistry for Physical Science and Engineering I	
MCRO 221	Microbiology	
PHYS 141	General Physics I	
Concentration or General Curriculum in Computer Science		
(See list of Concentrations and General Curriculum in Computer Science below)		24
GENERAL EDUCATION (GE)		
(See list of GE program requirements below.)		40
FREE ELECTIVES		
Free Electives ⁷		0
Total units		180

¹ Although new students are strongly encouraged to take CSC/CPE 123, an additional 4 units of CPE/CSC Technical Electives within your selected concentration or, if not selected, the General Curriculum may substitute for CSC/CPE 123.

² CSC 309 counts as a Technical Elective. Students in the Artificial Intelligence and Machine Learning concentration or the Privacy and Security concentration are advised to take CSC 307 instead of CSC 308 and CSC 309.

³ Students in the Privacy and Security Concentration must take CSC 321.

⁴ CPE 469 counts as a Technical Elective for the General Curriculum, and the following concentrations: Graphics, Privacy and Security, and Data Engineering.

⁵ Required in Major or Support; also satisfies General Education (GE) requirement.

⁶ No double-counting is allowed between Additional Science Support Elective and Life Science Support Elective or Physical Science Support Elective.

⁷ If a General Education (GE) course is used to satisfy a Major or Support requirement, additional units of Free Electives may be needed to complete the total units required for the degree.

General Curriculum in Computer Science or Concentrations (select one)

- General Curriculum in Computer Science
- Artificial Intelligence and Machine Learning
- Data Engineering
- Game Development
- Graphics
- Privacy and Security

General Education (GE) Requirements

- 72 units required, 32 of which are specified in Major and/or Support.
- If any of the remaining 40 units is used to satisfy a Major or Support requirement, additional units of Free Electives may be needed to complete the total units required for the degree.
- See the complete GE course listing (<https://catalog.calpoly.edu/generalrequirementsbachelorsdegree/#generaleducationtext>).

- A grade of C- or better is required in one course in each of the following GE Areas: A1 (Oral Communication), A2 (Written Communication), A3 (Critical Thinking), and B4 (Mathematics/Quantitative Reasoning).

Area A	English Language Communication and Critical Thinking	
A1	Oral Communication	4
A2	Written Communication	4
A3	Critical Thinking	4
Area B	Scientific Inquiry and Quantitative Reasoning	
B1	Physical Science (4 units in Support) ¹	0
B2	Life Science (4 units in Support) ¹	0
B3	One lab taken with either a B1 or B2 course	
B4	Mathematics/Quantitative Reasoning (8 units in Support) ¹	0
Upper-Division B (4 units in Support) ¹		0
Area B Electives (8 units in Support) ¹		0
Area C	Arts and Humanities	
Lower-division courses in Area C must come from three different subject prefixes.		
C1	Arts: Arts, Cinema, Dance, Music, Theater	4
C2	Humanities: Literature, Philosophy, Languages other than English (4 units in Support) ¹	0
Lower-Division C Elective - Select a course from either C1 or C2.		4
Upper-Division C		4
Area D	Social Sciences	
D1	American Institutions (Title 5, Section 40404 Requirement)	4
Area D Elective - Select either a lower-division D2 or upper-division D course.		4
Area E	Lifelong Learning and Self-Development	
Lower-Division E		4
Area F	Ethnic Studies	
F	Ethnic Studies	4
Total units		40

¹ Required in Major or Support; also satisfies General Education (GE) requirement.