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

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSC/CPE 101</td>
<td>Fundamentals of Computer Science</td>
<td>4</td>
</tr>
<tr>
<td>CSC/CPE 123</td>
<td>Introduction to Computing</td>
<td>4</td>
</tr>
<tr>
<td>CSC/CPE 202</td>
<td>Data Structures</td>
<td>4</td>
</tr>
<tr>
<td>CSC/CPE 203</td>
<td>Project-Based Object-Oriented Programming and Design</td>
<td>4</td>
</tr>
<tr>
<td>CSC 225</td>
<td>Introduction to Computer Organization</td>
<td>4</td>
</tr>
<tr>
<td>CSC 248</td>
<td>Discrete Structures</td>
<td>4</td>
</tr>
<tr>
<td>CSC 300</td>
<td>Professional Responsibilities</td>
<td>4</td>
</tr>
<tr>
<td>or PHIL 323</td>
<td>Ethics, Science and Technology</td>
<td></td>
</tr>
</tbody>
</table>

Select from the following:

- CSC 307 Introduction to Software Engineering 4
- CSC 308 & CSC 309 Software Engineering I and Software Engineering II 4

Select from the following:

- CSC 321 Introduction to Computer Security 4
- or CSC 323 Cryptography Engineering 4
- or CSC 325 Introduction to Privacy: Policy and Technology 4
- CSC 349 Design and Analysis of Algorithms 4
- CSC/CPE 357 Systems Programming 4

Select from the following:

- CSC 364 Introduction to Networked, Distributed, and Parallel Computing 4
- 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:

- 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)
- or CSC 490 Selected Advanced Topics (2, 2, Topics: Senior Project Capstone I and Senior Project Capstone II)

SUPPORT COURSES

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>ES/WGQS 350</td>
<td>Gender, Race, Culture, Science &amp; Technology</td>
<td>4</td>
</tr>
<tr>
<td>or ES 351</td>
<td>Gender, Race, Class, Nation in Global Engineering, Technology &amp; International Development</td>
<td></td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus I (B4)</td>
<td>5</td>
</tr>
<tr>
<td>MATH 142</td>
<td>Calculus II (B4)</td>
<td>5</td>
</tr>
<tr>
<td>MATH 143</td>
<td>Calculus III (Area B Electives)</td>
<td>5</td>
</tr>
<tr>
<td>MATH 206</td>
<td>Linear Algebra I</td>
<td>4</td>
</tr>
<tr>
<td>or MATH 244</td>
<td>Linear Analysis I</td>
<td></td>
</tr>
</tbody>
</table>

Select from the following: (C2) 5

- PHIL 230 Philosophical Classics: Knowledge and Reality 4
- PHIL 231 Philosophical Classics: Ethics and Political Philosophy 4

Any GE Area C2 Course 4

STAT 312 Statistical Methods for Engineers (Upper-Division B) 4

Life Science Support Elective

Select from the following (B2): 5

- BIO 111 General Biology 4
- BIO 161 Introduction to Cell and Molecular Biology 4
- BIO 213 Life Science for Engineers 4
- BMED 213 and Bioengineering Fundamentals 4
- BOT 121 General Botany 4
- MCRO 221 Microbiology 4

Physical Science Support Elective

Select one sequence from the following (B1 & B3): 5

- CHEM 124 General Chemistry for Physical Science and Engineering I 5
- & CHEM 125 and General Chemistry for Physical Science and Engineering II 5
- & CHEM 126 and General Chemistry for Physical Science and Engineering III 5

- CHEM 124 General Chemistry for Physical Science and Engineering I 5
- & CHEM 125 and General Chemistry for Physical Science and Engineering II 5
- & CHEM 126 and General Chemistry for Physical Science and Engineering III 5
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

Additional Science Support Elective
Select from the following (Area B Electives): 5,6

- 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)

GENERAL EDUCATION (GE)
(See list of GE program requirements below.)

FREE ELECTIVES
Free Electives 7

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 substitutes 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 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) 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

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

Lower-Division C Elective - Select a course from either C1 or C2.
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.

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.