

BS CIVIL ENGINEERING

Program Learning Outcomes

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.

2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.

3. An ability to communicate effectively with a range of audiences.

4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.

5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.

6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.

7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

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
- 2.0 GPA
- Graduation Writing Requirement (GWR)
- U.S. Cultural Pluralism

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>CE 111</td>
<td>Introduction to Civil Engineering</td>
<td>1</td>
</tr>
<tr>
<td>CE 112</td>
<td>Design Principles in Civil Engineering</td>
<td>2</td>
</tr>
<tr>
<td>CE 113</td>
<td>Computer Aided Drafting in Civil Engineering</td>
<td>2</td>
</tr>
<tr>
<td>CE 204</td>
<td>Mechanics of Materials I and Mechanics of Materials II</td>
<td>5</td>
</tr>
<tr>
<td>CE 222</td>
<td>Introductory Experiments in Transportation Engineering</td>
<td>1</td>
</tr>
<tr>
<td>CE 251</td>
<td>Programming Applications in Engineering</td>
<td>2</td>
</tr>
<tr>
<td>CE 259</td>
<td>Civil Engineering Materials</td>
<td>2</td>
</tr>
<tr>
<td>CE 321 &amp; CE 322</td>
<td>Fundamentals of Transportation Engineering Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>CE 336 &amp; CE 337</td>
<td>Water Resources Engineering and Hydraulics Laboratory</td>
<td>5</td>
</tr>
<tr>
<td>CE 352</td>
<td>Structural Engineering</td>
<td>4</td>
</tr>
<tr>
<td>CE 355</td>
<td>Reinforced Concrete Design</td>
<td>4</td>
</tr>
<tr>
<td>CE/CM 371</td>
<td>Construction Management and Project Planning</td>
<td>4</td>
</tr>
<tr>
<td>CE 381 &amp; CE 382</td>
<td>Geotechnical Engineering and Geotechnical Engineering Laboratory</td>
<td>5</td>
</tr>
<tr>
<td>CE 465</td>
<td>Civil Engineering Professional Practice</td>
<td>1</td>
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<tr>
<td>CE 466 &amp; CE 467</td>
<td>Senior Design Project I and Senior Design Project II</td>
<td>6</td>
</tr>
</tbody>
</table>

Technical Electives 2, 3, 4

In consultation with faculty advisor, select from CE 356, ENVE 325, CE/CM 436 and any 400-500 level CE and ENVE courses not required in Major Courses (a maximum of 4 units may be selected from the following list):

- ARCE 305 Masonry Design
- ARCE 372 Steel Structures Design Laboratory
- BIO/NR/SS 421 Wetlands
- BMED/CE/ME 404 Applied Finite Element Analysis
- BRAE 345 Aerial Photogrammetry and Remote Sensing
- BRAE 447 Advanced Surveying with GIS Applications
- BRAE 532 Water Wells and Pumps
- CHEM 341 Environmental Chemistry: Water Pollution
- CM 310 Construction Means and Methods
- CM 334 Construction Law
- CRP 420 Land Use Law
- CRP 435 Transportation Theory
- CRP/NR 404 Environmental Law
- CRP/NR 408 Water Resource Law and Policy
- ERSC 442 Applied Environmental Groundwater Hydrology
- ERSC/GEOL 416 Field-Geology Methods
- ERSC/GEOL 417 Geologic Mapping
- GEOL 415 Structural Geology
- IME 314 Engineering Economics
- or IME 315 Financial Decision Making for Engineers
- MATE 425 Corrosion Engineering
- MATE 450 Fracture and Failure Analysis
- MATH 344 Linear Analysis II
- SS 423 Environmental Soil and Water Chemistry

SUPPORT COURSES

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIO 213 &amp; BMED 213</td>
<td>Life Science for Engineers and Bioengineering Fundamentals (B2)</td>
<td>4</td>
</tr>
<tr>
<td>BRAE 239</td>
<td>Engineering Surveying</td>
<td>4</td>
</tr>
</tbody>
</table>
BS Civil Engineering

Total units: 190-192

1 Transfer students take CE 208 in the Fall Quarter.
2 Consultation with advisor is recommended prior to selecting Technical or Approved Electives; bear in mind your selections may impact pursuit of post-baccalaureate studies and/or goals.
3 Additional guidelines for Technical Electives:
   1. More than 4 units of coursework outside CE/ENVE is only permitted in special/unusual cases and requires written justification by the student, and approval by the Department Chair.
   2. No more than 4 combined units of CE 400, CE 500 and ENVE 400, ENVE 500 can count towards the degree.
   3. No more than 8 combined units of CE 470 / ENVE 470, CE 471 / ENVE 471, CE 570 / ENVE 570, CE 571 / ENVE 571 can be credited.
   4. Co-op, graduate seminar, senior project/design, and thesis courses are not permitted.
   5. Only one course can be credited for CE 459 / CE 556.
4 Degree credit will only be given to one of the following courses: IME 314 or IME 315.
5 Required in Major or Support; also satisfies General Education (GE) requirement.
6 If a course is taken to meet the Approved Engineering Science Elective requirement, it cannot be double-counted as another Major or Support requirement.

General Education (GE) Requirements

- 72 units required, 28 of which are specified in Major and/or Support.
- If any of the remaining 44 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/generalrequirements/bachelorsdegree/#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)  0
B3  One lab taken with either a B1 or B2 course  0
B4  Mathematics/Quantitative Reasoning (8 units in Support)  0

Area B Electives (4 units in Support)  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

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
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<tr>
<th></th>
<th>Ethnic Studies</th>
<th>4</th>
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<tbody>
<tr>
<td><strong>Total units</strong></td>
<td></td>
<td><strong>44</strong></td>
</tr>
</tbody>
</table>

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