BS CIVIL ENGINEERING

Program Learning Outcomes

1. An ability to apply knowledge of mathematics, science, and engineering
2. An ability to design and conduct experiments, as well as to analyze and interpret data
3. An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
4. An ability to function on multidisciplinary teams
5. An ability to identify, formulate, and solve engineering problems
6. An understanding of professional and ethical responsibility
7. An ability to communicate effectively
8. The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
9. A recognition of the need for, and an ability to engage in life-long learning
10. A knowledge of contemporary issues
11. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

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 (http://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

CE 111 Introduction to Civil Engineering 1
CE 112 Design Principles in Civil Engineering 2
CE 113 Computer Aided Drafting in Civil Engineering 2
CE 204 Mechanics of Materials I 3
CE 207 Mechanics of Materials II 2
CE 251 Programming Applications in Engineering 2
CE 259 Civil Engineering Materials 2
CE 321 Fundamentals of Transportation 5
& CE 322 Engineering and Fundamentals of Transportation Engineering Laboratory
CE 336 Water Resources Engineering and Hydraulics Laboratory 5
& CE 337 Structural Engineering 4
CE 352 Reinforced Concrete Design 4
CE 381 & CE 382 Geotechnical Engineering and Geotechnical Engineering Laboratory
CE 465 Civil Engineering Professional Practice 1
Select from the following: 6
CE 466 & CE 467 Senior Design Project I and Senior Design Project II
CE 468 & CE 469 Community Engineering Senior Design Project I and Community Engineering Senior Design Project II
Technical Electives 2, 3

In consultation with faculty advisor, select from CE 356, CE 371 or CM 371, ENVE 325, any 400-500 level CE and ENVE courses not required in the major (maximum of 4 units from the following list):

Select a maximum of 4 units from the following:
ARCE 305 Masonry Design
ARCE 372 Steel Structures Design Laboratory
ARCE 403 Advanced Steel Structures Laboratory
BIO/NR/SS 421 Wetlands
BMED/CE/ME 404 Environmental Chemistry: Water Pollution
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 334 Construction Law
CM 432 Design-Build Project Management
CRP 420 Land Use Law
CRP 435 Transportation Theory
CRP/NR 404 Environmental Law
CRP/NR 408 Water Resource Law and Policy
ERSC/GEOL 401 Field-Geology Methods
ERSC/GEOL 402 Geologic Mapping
GEOL 415 Structural Geology
IME 314 Engineering Economics
MATE 425 Corrosion Engineering
MATE 450 Fracture and Failure Analysis
MATH 344 Linear Analysis II
SS 423 Environmental Soil and Water Chemistry
SS 442 Vadose Zone and Groundwater Processes

SUPPORT COURSES

BIO 213 Life Science for Engineers (B2) 1 2
BMED/BRAE 213 Bioengineering Fundamentals (B2) 1 2
BRAE 239 Engineering Surveying 4
CHEM 124 General Chemistry for Physical Science and Engineering I (B3/B4) 1 4

1 Required for one of the following: CE 381, CE 382, CE 465, CE 468, CE 469
2 Must be selected with CE 381, CE 382, CE 465
3 Must be selected with CE 382, CE 465
4 Must be selected with CE 382, CE 465
5 Must be completed with CE 381, CE 382, CE 465
6 Must be completed with CE 465

2 Must be selected with CE 381, CE 382, CE 465
CHEM 125  General Chemistry for Physical Science and Engineering II  4
ENGL 149  Technical Writing for Engineers (A3)  4
ENVE 331  Introduction to Environmental Engineering  4
GEOL 201  Physical Geology  3
MATE 210  Materials Engineering  3
MATE 215  Materials Laboratory I  1
MATH 141  Calculus I (B1)  4
MATH 142  Calculus II (B1)  4
MATH 143  Calculus III (Add'l Area B)  4
MATH 241  Calculus IV  4
MATH 244  Linear Analysis I  4
ME 211  Engineering Statics  3
ME 212  Engineering Dynamics  3
ME 302  Thermodynamics I  3
ME 341  Fluid Mechanics I  3
PHYS 141  General Physics IA (Add'l Area B)  4
PHYS 132  General Physics II  8
& PHYS 133  and General Physics III  8
STAT 312  Statistical Methods for Engineers (B6)  4

Approved Engineering Science Elective  
Select from the following:  
CSC 231  Programming for Engineering Students  
CSC 234  C and Unix  
EE 201  Electric Circuit Theory  
IME 314  Engineering Economics  
MATH 304  Vector Analysis  
MATH 344  Linear Analysis II

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

FREE ELECTIVES  
Free Electives  
Total units  189-191

1 Required in Support; also satisfies GE  
2 Consultation with advisor is recommended prior to selecting technical electives 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 458 / CE 558; CE 459 / CE 556.  
   4 The courses selected to satisfy this requirement may not be used to satisfy other major, support, or general education requirements (no double counting of coursework).

General Education (GE) Requirements  

• 72 units required, 32 of which are specified in Major and/or Support.  
• See the complete GE course listing (http://catalog.calpoly.edu/generalrequirementsbachelorsdegree/#generaleducationtext).  
• Minimum of 8 units required at the 300 level.

Area A  
Communication  
A1  Expository Writing  4
A2  Oral Communication  4
A3  Reasoning, Argumentation and Writing (4 units in Support)  0

Area B  
Science and Mathematics  
B1  Mathematics/Statistics (8 units in Support)  0
B2  Life Science (4 units in Support)  0
B3  Physical Science (4 units in Support)  0
B4  One lab taken with either a B2 or B3 course  0
B6  Upper-division Area B (4 units in Support)  0

Additional Area B units (8 units in Support)  0

Area C  
Arts and Humanities  
C1  Literature  4
C2  Philosophy  4
C3  Fine/Performing Arts  4
C4  Upper-division elective  4

Area D/E  
Society and the Individual  
D1  The American Experience (Title 5, Section 40404 requirement)  4
D2  Political Economy  4
D3  Comparative Social Institutions  4
D4  Self Development (CSU Area E)  4

Total units  40

1 Required in Support; also satisfies GE