BS ENVIRONMENTAL 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 factor.
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
- 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		
CE 113	Computer Aided Drafting in Civil Engineering	2
Select one of the following two options: [1]		5
CE 204 & CE 207	Mechanics of Materials I and Mechanics of Materials II	
or CE 208	Mechanics of Materials	
CE 251	Programming Applications in Engineering	2
CE 336	Water Resources Engineering	4
CE 337	Hydraulics Laboratory	1
CE 381	Geotechnical Engineering	4
CE 434	Groundwater Hydraulics and Hydrology	4
or CE 433	Open Channel Hydraulics	
or CE 435	Engineering Hydrology	
or CE 440	Hydraulic Systems Engineering	
CE 465	Civil Engineering Professional Practice	1
ENVE 111	Introduction to the Environmental Engineering Profession	1
ENVE 264	Environmental Fluid Mechanics	4
ENVE 304	Process Thermodynamics	3
ENVE 309	Noise and Vibration Control	3
ENVE 325	Air Quality Engineering	4
ENVE 331	Fundamentals of Environmental Engineering	4
ENVE 421	Mass Transfer Operations	4
ENVE 426	Air Quality Measurements	3
ENVE 434	Water Chemistry and Water Quality Measurements	4
ENVE 438	Water and Wastewater Treatment Design	3
ENVE 450	Industrial Pollution Prevention	4
ENVE 466 & ENVE 467	Senior Project Design Laboratory I and Senior Project Design Laboratory II	4
Select from the following:		12
ENVE 411	Air Pollution Control	
ENVE 436	Introduction to Hazardous Waste Management	
ENVE 439	Sustainable Solid Waste Engineering	
ENVE 443	Bioremediation Engineering	
ENVE 455	Environmental Health and Safety	
ENVE 480	Environmental Engineering of Energy	
Technical Electives [2, 3]		10
Select from the below Technical Electives list		
SUPPORT COURSES		
CHEM 124	General Chemistry for Physical Science and Engineering I (B1 & B3) [4]	4
CHEM 125	General Chemistry for Physical Science and Engineering II	4
CHEM 126	General Chemistry for Physical Science and Engineering III	4
CHEM 312	Organic Chemistry: Fundamentals and Applications [5]	5
MATH 141	Calculus I (B4) [4]	4
MATH 142	Calculus II (B4) [4]	4
MATH 143	Calculus III (Area B Electives) [4]	4
MATH 241	Calculus IV	4
MATH 244	Linear Analysis I	4
MCRO 221	Microbiology (B2) [4]	4-5
or MCRO 224	General Microbiology I	
ME 211	Engineering Statics	3
PHYS 141	General Physics I (Area B Electives) [4]	4
PHYS 142	General Physics II	4
PHYS 143	General Physics III	4
STAT 312	Statistical Methods for Engineers (Upper-Division B) [4]	4
GENERAL EDUCATION (GE)		

(See GE program requirements below.)	44
FREE ELECTIVES	
Free Electives	0
Total units	**190-191**

1. Transfer students take CE 208 in the Fall Quarter.
2. To be selected in consultation with your academic advisor.
3. A student may petition to take a course not included in the list of electives and receive Technical Elective credit, but they must first obtain approval from a faculty advisor, before taking the course.
4. Required in Major or Support; also satisfies General Education (GE) requirement.
5. CHEM 212 substitutes, but will not be counted as upper-division units.

Technical Electives

Technical Electives may be chosen from any 300-500 level CE/ENVE courses not taken to satisfy other curriculum requirements, with the following exceptions: senior project, co-op, graduate seminar, comprehensive exam, and thesis; and ENVE 324, ENVE 323, ENVE 570, ENVE 571.

Technical Electives cannot be used to satisfy other Major or Support requirements. No double counting is allowed.

No more than 4 units in total from CE 400/ENVE 400, CE 500/ENVE 500, ENVE 405, ENVE 407, and ENVE 471 combined can be counted towards Technical Electives.

No more than 4 units of coursework other than CE/ENVE may be used to satisfy the Technical Electives degree requirement.

Air Quality and Climate	
ERSC/GEOG 414	Global and Regional Climatology
PHYS 313	Introduction to Atmospheric Physics
Appropriate Technology	
PSC/UNIV 492	Appropriate Technology for the World's People: Design
Biology/Biochemistry/Microbiology	
BIO 363	Principles of Conservation Biology
ENGR/ENVE 581	Biochemical Engineering
MCRO 342	Public Health Microbiology
Computer Applications and Computations	
LA/NR 317	The World of Spatial Data and Geographic Information Technology
STAT 313	Applied Experimental Design and Regression Models
STAT 323	Design and Analysis of Experiments I
Chemistry	
CHEM 314	Biochemistry: Fundamentals and Applications
CHEM 341	Environmental Chemistry: Water Pollution
Energy	
BRAE 448	Bioconversion
PHYS 310	Physics of Energy
Hydrology and Soils	
BRAE 532	Water Wells and Pumps
Law and Policy	
CRP/NR 404	Environmental Law
CRP/NR 408	Water Resource Law and Policy
IME 314	Engineering Economics
or IME 315	Financial Decision Making for Engineers

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/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
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		**44**

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