

BS IN CIVIL ENGINEERING

Units required for Major: 94 including GE courses

Total units required for BS: 124

Program Description

Civil Engineering involves the application of scientific principles and knowledge of mathematics and computers to the planning, analysis, design, and construction of all types of private and public works. Reduction of air and water pollution, disposal of hazardous wastes, renewal of our old cities, planning and building of new communities, providing water, power, and high-speed ground transportation systems are the responsibilities of the civil engineer. It is a continual challenge to the civil engineer to provide these services efficiently by the construction of dams, buildings, bridges, tunnels, highways, airports, waterways, and waste handling facilities in harmony with the natural environment.

Because of the broad range of demands on the civil engineer's services, the undergraduate program is devoted to fundamental principles in mathematics; basic and engineering sciences; the spectrum of Civil Engineering practice in both analysis and design; and required courses in the humanities and the social sciences, so that engineers may better relate to the world and society they serve. The upper division program permits students to select 12 units (4 courses) of electives. Students may increase the breadth or depth of their knowledge in Civil Engineering by selecting these electives in several areas: environmental and water quality engineering, geotechnical engineering, structural engineering, transportation, and water resources engineering.

Courses may be interchanged between semesters to accommodate the student's schedule, as long as prerequisites are observed. Civil engineering is a demanding major, but with devoted study it can be completed in four years. Students who are working half-time or more often find it difficult to successfully pass a full load of classes each semester. Such students should plan to take fewer units per semester and a longer time to finish their degree.

Note: Students must satisfy the requirements of the Accreditation Board for Engineering and Technology (EAC/ABET). Consult the Civil Engineering Department Chair for specific General Education requirements.

Note: Students graduating with a BS in Civil Engineering will not be subject to the University's Foreign Language Graduation Requirement. Students who change major may be subject to the University's Foreign Language Graduation Requirement.

Program Requirements

Code	Title	Units
Required Lower Division Courses (65 Units)		
<i>First Semester Freshman Year</i>		
CE 1	Civil Engineering Seminar	1
CE 4	Engineering Graphics and CAD ¹	2
CHEM 1E	General Chemistry for Engineering ¹	4
MATH 30	Calculus I ¹	4
Select two General Education courses		6
<i>Second Semester Freshman Year</i>		
CE 9	Plane and Topographic Surveying	2

CE 9L	Plane and Topographic Surveying Laboratory	1
MATH 31	Calculus II ¹	4
PHYS 11A	General Physics: Mechanics ¹	4
Select two General Education courses		6
<i>First Semester Sophomore Year</i>		
ENGR 45	Engineering Materials	3
MATH 45	Differential Equations for Science and Engineering	3
PHYS 11C	General Physics: Electricity and Magnetism ¹	4
Select two General Education courses		6
<i>Second Semester Sophomore Year</i>		
ENGL 20	College Composition II	3
ENGR 30	Analytic Mechanics: Statics	3
MATH 35	Introduction to Linear Algebra	3
or MATH 100 Applied Linear Algebra		
Select two General Education courses		6
Required Upper Division Courses (59 Units) ²		
<i>First Semester Junior Year</i>		
CE 101	Computer Applications in Civil Engineering	3
ENGR 110	Analytic Mechanics - Dynamics	3
ENGR 112	Mechanics Of Materials	3
ENGR 115	Statistics For Engineers	3
ENGR 132	Fluid Mechanics	3
<i>Second Semester Junior Year</i>		
CE 100	Engineering Geology	2
CE 130	Water Resources Engineering	3
CE 130L	Hydraulics Laboratory	1
CE 150	Principles of Environmental Engineering	2
CE 150L	Environmental Engineering Laboratory	1
CE 160	Introduction to Structural Analysis ¹	3
Select General Education course		3
<i>First Semester Senior Year</i>		
CE 140	Transportation Engineering	3
CE 140L	Transportation Engineering Laboratory	1
CE 151	Environmental Engineering Practice	2
CE 170	Soil Mechanics	3
CE 170L	Soil Mechanics Laboratory	1
Select one Civil Engineering elective ³		3
CE 190	Civil Engineering Project Skills	3
<i>Second Semester Senior Year</i>		
CE 160L	Structural Laboratory ¹	1
CE 191	Senior Project	3
Select three Civil Engineering electives ³		9
Total Units		124

Civil Engineering Electives

Code	Title	Units
Select at least two design electives from the following: ⁴		
<i>Design Electives</i>		
CE 133	Design of Urban Water and Sewer Systems	
CE 134	Open Channel Hydraulics	
CE 141	Traffic Analysis and Design	
CE 144	Geometric Design of Highways	

CE 152	Stormwater Management
CE 153	Design of Water Quality Control Processes
CE 163	Structural Steel Design
CE 164	Reinforced Concrete Design
CE 165	Masonry Design
CE 168	Prestressed Concrete Design
CE 169	Timber Design
CE 171	Soil Mechanics and Foundation Engineering
CE 175	Geotechnical Earthquake Engineering
Technical Electives	
CE 131	Hydrology
CE 132	Groundwater Engineering
CE 142	Transportation Systems
CE 156	Geoenvironmental Engineering
CE 166	Seismic Behavior of Structures
CE 182	Introduction to GIS in Civil Engineering
CE 183	Concrete Technology
ENGR 124	Thermodynamics

¹ Course also satisfies General Education (GE)/Graduation Requirement.

² Students must normally complete all lower division preparation before enrolling in upper division Engineering or Civil Engineering courses.

³ At least two Civil Engineering electives must be design courses (indicated by ⁵).

⁴ Electives are to be chosen from these courses in consultation with a faculty advisor and must include at least two design electives (indicated by ⁵).

Note: Other electives, such as a CE 196 series course or CE 199E may be chosen with the approval of a faculty advisor and Department Chair.

General Education Requirements ¹

Code	Title	Units
Area A: Basic Subjects (6 Units)		
A1 - Oral Communication		3
A2 - Written Communication		3
A3 - Critical Thinking		0
Area B: Physical Universe and Its Life Forms (3 Units)		
B1 - Physical Science ²		0
B2 - Life Forms		3
B3 - Lab (Note: Lab experience to be taken with one of the following: B1, B2 or B5) ²		0
B4 - Math Concepts ²		0
B5 - Additional Course (Any B to reach 12 units) - Take upper-division course to complete Area & upper division requirements. ²		0
Area C: Arts and Humanities (12 Units)		
C1 - Arts		3
C2 - Humanities		3
C1/C2 - Area Course C		3
C1/C2 - Area C Course - Take upper-division course to complete Area & upper division requirements.		3
Area D: The Individual and Society (6 Units)		
Area D Course		3
Area D Course		3

Area D Course - Take upper-division course to complete Area & upper division requirements. ²

Area E: Understanding Personal Development	
Area E Course ²	0
Area F: Ethnic Studies (3 Units)	
Area F Course	3
Total Units	30

¹ To help you complete your degree in a timely manner and not take more units than absolutely necessary, there are ways to use single courses to meet more than one requirement (overlap). For further information, please visit the General Education page (<https://catalog.csus.edu/colleges/academic-affairs/general-education/>).

Note: There is no way to list all possible overlaps so please consult with a professional advisor. The Academic Advising Center can be visited online (<http://www.csus.edu/acad/>), by phone (916) 278-1000, or email (advising@csus.edu).

² Required in Major; also satisfies GE.

Graduation Requirements ¹

Code	Title	Units
Graduation Requirements (required by CSU) (9 Units)		
American Institutions: U.S. History		3
American Institutions: U.S. Constitution & CA Government		3
Writing Intensive (WI)		3
Graduation Requirements (required by Sacramento State) (3 Units)		
English Composition II ²		0
Race and Ethnicity in American Society (RE)		3
Foreign Language Proficiency Requirement ³		0

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Note: There is no way to list all possible overlaps so please consult with a professional advisor. The Academic Advising Center can be visited online (<http://www.csus.edu/acad/>), by phone (916) 278-1000, or email (advising@csus.edu).

² Required in Major; also satisfies Graduation Requirement.

³ If not satisfied before entering Sacramento State, it may be satisfied in General Education Area C2 (Humanities). "C- or better required." The alternative methods for satisfying the Foreign Language Proficiency Requirement are described here: <https://www.csus.edu/college/arts-letters/world-languages-literatures/foreign-language-requirement.html>
Note: Students with a declared major of BS in Civil Engineering are exempt from the Foreign Language Graduation Requirement.

The following roadmaps are sample planning resources. Please consult your academic advisor and Academic Catalog for graduation requirements as you develop your individualized academic plan.

Civil Engineering, BS: 4-Year Roadmap

Course	Title	Units
Year 1		
First Semester		
CE 1	Civil Engineering Seminar	1
CE 4	Engineering Graphics and CAD	2

CHEM 1E	General Chemistry for Engineering	4
MATH 30	Calculus I	4
GE Area 3B - Humanities ²		3
GE Area 6 - Ethnic Studies ²		3
Units		17
Second Semester		
CE 9	Plane and Topographic Surveying	2
CE 9L	Plane and Topographic Surveying Laboratory	1
MATH 31	Calculus II	4
PHYS 11A	General Physics: Mechanics	4
GE Area 1A - English Composition ²		3
GE Area 1C - Oral Communication ²		3
Units		17
Year 2		
First Semester		
ENGR 45	Engineering Materials	3
MATH 45	Differential Equations for Science and Engineering	3
PHYS 11C	General Physics: Electricity and Magnetism	4
GE Area 5B - Biological Science ²		3
GR American Institutions (US History) ²		3
Units		16
Second Semester		
ENGR 30	Analytic Mechanics: Statics	3
MATH 35 or MATH 100	Introduction to Linear Algebra ³ or Applied Linear Algebra	3
ENGL 20	College Composition II	3
GE Area 3A - Arts ²		3
GE Area 4 - Social & Behavioral Sciences ²		3
Units		15
Year 3		
First Semester		
CE 101	Computer Applications in Civil Engineering	3
ENGR 110	Analytic Mechanics - Dynamics	3
ENGR 112	Mechanics Of Materials	3
ENGR 115	Statistics For Engineers	3
ENGR 132	Fluid Mechanics	3
Units		15
Second Semester		
CE 100	Engineering Geology	2
CE 130	Water Resources Engineering	3
CE 130L	Hydraulics Laboratory	1
CE 140	Transportation Engineering	3
CE 140L	Transportation Engineering Laboratory	1
CE 160	Introduction to Structural Analysis	3
Upper Division GE Area 3 - Arts or Humanities + Writing Intensive ²		3
Units		16
Year 4		
First Semester		
CE 150	Principles of Environmental Engineering	2
CE 150L	Environmental Engineering Laboratory	1
CE 151	Environmental Engineering Practice	2
CE 170	Soil Mechanics	3

CE 170L	Soil Mechanics Laboratory	1
CE 190	Civil Engineering Project Skills	3
Civil Engineering Elective ³		3
Units		15
Second Semester		
CE 160L	Structural Laboratory	1
CE 191	Senior Project	3
Upper Division GE Area 4 - Social & Behavioral Sciences + American Institutions (GOVT) ²		3
Civil Engineering Elective ²		3
Civil Engineering Elective ²		3
Civil Engineering Elective ²		3
Units		16
Total Units		127

Civil Engineering, BS: 2-Year Roadmap

Course	Title	Units
Year 1		
First Semester		
CE 101	Computer Applications in Civil Engineering	3
ENGR 110	Analytic Mechanics - Dynamics	3
ENGR 112	Mechanics Of Materials	3
ENGR 115	Statistics For Engineers	3
ENGR 132	Fluid Mechanics	3
GR American Institutions (US History) ²		3
Units		18
Second Semester		
CE 100	Engineering Geology	2
CE 130	Water Resources Engineering	3
CE 130L	Hydraulics Laboratory	1
CE 140	Transportation Engineering	3
CE 140L	Transportation Engineering Laboratory	1
CE 160	Introduction to Structural Analysis	3
Upper Division GE Area 3 - Arts or Humanities + Writing Intensive ²		3
Units		16
Year 2		
First Semester		
CE 150	Principles of Environmental Engineering	2
CE 150L	Environmental Engineering Laboratory	1
CE 170	Soil Mechanics	3
CE 170L	Soil Mechanics Laboratory	1
CE 190	Civil Engineering Project Skills	3
Civil Engineering Elective ³		3
Upper Division GE Area 4 - Social & Behavioral Sciences + American Institutions (GOVT) ²		3
Units		16
Second Semester		
CE 151	Environmental Engineering Practice	2
CE 160L	Structural Laboratory	1
CE 191	Senior Project	3
Civil Engineering Elective ³		3
Civil Engineering Elective ³		3
Civil Engineering Elective ³		3
Units		15
Total Units		65

- ¹. Any course not completed in the first semester should be taken in the second or a later semester.
- ². Please see General Education/Graduation Requirement **course options** (<https://catalog.csus.edu/colleges/engineering-computer-science/engineering-civil/bs-in-civil-engineering/colleges/academic-affairs/general-education/>).
- ³. Please see an academic advisor for elective options.