

# BS IN GEOLOGY (HYDROGEOLOGY)

Units required for Major: 72  
Total units required for BS: 120

## Program Description

The BS in Geology with a concentration in Hydrogeology is designed to prepare students for professional employment or further studies in hydrogeology and water resources. The program emphasizes the fundamentals of geology, including mineralogy/petrology, stratigraphy, structural geology, and field geology, then builds on this foundation with coursework focusing on the water cycle and related Earth processes.

## Program Requirements

Code	Title	Units
<b>Required Lower Division Core Courses (26 Units)</b>		
CHEM 1A	General Chemistry I	5
GEOL 10 & 10L	Physical Geology Physical Geology Lab	4
or GEOL 5	Geology Of Mexico	
GEOL 11	Digital Methods in Geoscience	1
GEOL 12	Historical Geology	3
GEOL 12L	Historical Geology Lab	1
MATH 30	Calculus I <sup>1</sup>	4
PHYS 5A	General Physics: Mechanics, Heat, Sound	4
or PHYS 11A	General Physics: Mechanics	
PHYS 5B	General Physics: Light, Electricity and Magnetism, Modern Physics	4
or PHYS 11B	General Physics: Heat, Light, Sound, Modern Physics	
<b>Required Upper Division Core Courses (22 Units)</b>		
GEOL 100	Earth Materials - Rocks and Minerals	4
GEOL 103	Sedimentology/Stratigraphy	4
GEOL 110A	Structural Geology and Tectonics	4
GEOL 110B	Structural Geology Field	1
GEOL 111A	Field Geology	2
GEOL 111B	Field Techniques	2
GEOL 121	Geology of California	3
GEOL 189	Geology Colloquium	2
<b>Concentration (24 Units)</b>		
Select from the following concentrations:		24
General Geology		
Hydrogeology		
<b>Total Units</b>		<b>72</b>

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

## Concentration in Hydrogeology (24 units)

Code	Title	Units
<b>Required Courses (9 Units)</b>		
CHEM 1B	General Chemistry II	5
GEOL 127	Hydrogeology	4

### Elective Courses (15 Units)

Select at least 6 units from the following three classes:		15
GEOL 120	Surficial Processes	
GEOL 123	Geochemistry	
GEOL 126	Environmental Field Methods	
Remaining elective units may come from the following classes:		
GEOL 101	Optical Mineralogy	
GEOL 102	Igneous and Metamorphic Petrology	
GEOL 105	Paleontology	
GEOL 112	Geophysics For Geologists	
GEOL 114	Volcanology	
GEOL 125	Metallic Ore Deposits	
GEOL 132	Marine Geology	
GEOL 150	Computer Mapping in Geology	
GEOL 171	Petroleum Geology	
GEOL 188	Advanced Geologic Mapping	
GEOL 193C	Engineering Geology	
GEOL 198A	Senior Research Preparation	
GEOL 198B	Senior Research Project	
<b>Total Units</b>		<b>24</b>

## General Education Requirements <sup>1</sup>

Code	Title	Units
<b>Area A: Basic Subjects (9 Units)</b>		
A1	Oral Communication	3
A2	Written Communication	3
A3	Critical Thinking	3
<b>Area B: Physical Universe and Its Life Forms (6 Units)</b>		
B1	Physical Science <sup>2</sup>	0
B2	Life Forms	3
B3	Lab (Note: Lab experience to be taken with one of the following: B1, B2 or B5) <sup>2</sup>	0
B4	Math Concepts <sup>2</sup>	0
B5	Additional Course (Any B to reach 12 units) - Take upper-division course to complete Area & upper division requirements.	3
<b>Area C: Arts and Humanities (12 Units)</b>		
C1	Arts	3
C2	Humanities	3
C1/C2	Area C Course	3
C1/C2	Area C Course - Take upper-division course to complete Area & upper division requirements.	3
<b>Area D: The Individual and Society (9 Units)</b>		
Area D	Course	3
Area D	Course	3
Area D	Course - Take upper-division course to complete Area & upper division requirements.	3
<b>Area E: Understanding Personal Development (3 Units)</b>		
Area E	Course	3
<b>Area F: Ethnic Studies (3 Units)</b>		
Area F	Course	3
<b>Total Units</b>		<b>42</b>

<sup>1</sup> 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](mailto:advising@csus.edu)).

<sup>2</sup> Required in Major; also satisfies GE.

## Graduation Requirements <sup>1</sup>

Code	Title	Units
<b>Graduation Requirements (required by CSU) (9 Units)</b>		
American Institutions: U.S. History		3
American Institutions: U.S. Constitution & CA Government		3
Writing Intensive (WI)		3
<b>Graduation Requirements (required by Sacramento State) (12 Units)</b>		
English Composition II		3
Race and Ethnicity in American Society (RE)		3
Foreign Language Proficiency Requirement <sup>2</sup>		6

<sup>1</sup> 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](mailto:advising@csus.edu)).

<sup>2</sup> 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>

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.

## Geology (Hydrogeology), BS: 4-Year Roadmap

Course	Title	Units
<b>Year 1</b>		
<b>First Semester</b>		
MATH 30	Calculus I	4
GE Area 1C - Oral Communication <sup>2</sup>		3
GE Area 3A - Arts <sup>2</sup>		3
GR American Institutions (GOVT) <sup>2</sup>		3
Elective of Choice		3
<b>Units</b>		<b>16</b>
<b>Second Semester</b>		
CHEM 1A	General Chemistry I	5
GEOL 5	Geology Of Mexico <sup>3</sup>	1 - 4
or GEOL 10	or Physical Geology	
or GEOL 10L	or Physical Geology Lab	
GE Area 1A - English Composition <sup>2</sup>		3

GE Area 5B - Biological Science <sup>2</sup>		3
<b>Units</b>		<b>12-15</b>
<b>Year 2</b>		
<b>First Semester</b>		
CHEM 1B	General Chemistry II	5
GEOL 12	Historical Geology	3
GEOL 12L	Historical Geology Lab	1
GE Area 1B - Critical Thinking <sup>2</sup>		3
Foreign Language Semester 1 <sup>2</sup>		4
<b>Units</b>		<b>16</b>
<b>Second Semester</b>		
ENGL 20	College Composition II	3
GE Area 3B - Humanities <sup>2</sup>		3
GE Area 6 - Ethnic Studies <sup>2</sup>		3
GR American Institutions (US History) <sup>2</sup>		3
Foreign Language Semester 2 <sup>2</sup>		4
<b>Units</b>		<b>16</b>
<b>Year 3</b>		
<b>First Semester</b>		
GEOL 11	Digital Methods in Geoscience	1
GEOL 100	Earth Materials - Rocks and Minerals	4
GEOL 127	Hydrogeology	4
PHYS 5A	General Physics: Mechanics, Heat, Sound	4
GEOL Hydrogeology Elective <sup>3</sup>		3
<b>Units</b>		<b>16</b>
<b>Second Semester</b>		
GEOL 103	Sedimentology/Stratigraphy	4
GEOL 111A	Field Geology	2
GEOL 111B	Field Techniques	2
GEOL 189	Geology Colloquium	1
PHYS 5B	General Physics: Light, Electricity and Magnetism, Modern Physics	4
GE Area 4 - Social & Behavioral Sciences <sup>2</sup>		3
<b>Units</b>		<b>16</b>
<b>Year 4</b>		
<b>First Semester</b>		
GEOL 110A	Structural Geology and Tectonics	4
GEOL 110B	Structural Geology Field	1
GEOL 189	Geology Colloquium	1
GEOL Hydrogeology Elective <sup>3</sup>		3
Upper Division GE Area 4 - Social & Behavioral Sciences <sup>2</sup>		3
Upper Division GE Area 5 or 2 - Science or Mathematical Concepts/Quantitative Reasoning <sup>2</sup>		3
<b>Units</b>		<b>15</b>
<b>Second Semester</b>		
GEOL 121	Geology of California	3
GEOL Hydrogeology Elective <sup>3</sup>		3
GEOL Hydrogeology Elective <sup>3</sup>		3
GEOL Hydrogeology Elective <sup>3</sup>		3
Upper Division GE Area 3 - Arts or Humanities + Writing Intensive <sup>2</sup>		3
<b>Units</b>		<b>15</b>
<b>Total Units</b>		<b>122-125</b>

## Geology (Hydrogeology), BS: 2-Year Roadmap

Course	Title	Units
<b>Year 1</b>		
<b>First Semester</b>		
GEOL 100	Earth Materials - Rocks and Minerals	4
GEOL 127	Hydrogeology	4
GEOL Hydrogeology Elective <sup>3</sup>		3
Foreign Language Semester 1 <sup>2</sup>		4
<b>Units</b>		<b>15</b>
<b>Second Semester</b>		
GEOL 103	Sedimentology/Stratigraphy	4
GEOL 111A	Field Geology	2
GEOL 111B	Field Techniques	2
GEOL 189	Geology Colloquium	1
GR American Institutions (US History) <sup>2</sup>		3
Foreign Language Semester 2 <sup>2</sup>		4
<b>Units</b>		<b>16</b>
<b>Year 2</b>		
<b>First Semester</b>		
GEOL 110A	Structural Geology and Tectonics	4
GEOL 110B	Structural Geology Field	1
GEOL 189	Geology Colloquium	1
GEOL Hydrogeology Elective <sup>3</sup>		3
Upper Division GE Area 4 - Social & Behavioral Sciences + American Institutions (GOVT) <sup>2</sup>		3
Upper Division GE Area 5 or 2 - Science or Mathematical Concepts/Quantitative Reasoning <sup>2</sup>		3
<b>Units</b>		<b>15</b>
<b>Second Semester</b>		
GEOL 121	Geology of California	3
GEOL Hydrogeology Elective <sup>3</sup>		3
GEOL Hydrogeology Elective <sup>3</sup>		3
GEOL Hydrogeology Elective <sup>3</sup>		3
Upper Division GE Area 3 - Arts or Humanities + Writing Intensive <sup>2</sup>		3
<b>Units</b>		<b>15</b>
<b>Total Units</b>		<b>61</b>

<sup>1</sup>. Any course not completed in the first semester should be taken in the second or a later semester.

<sup>2</sup>. Please see General Education/Graduation Requirement **course options** ([https://www.csus.edu/academic-affairs/curriculum-%20workflow/\\_internal/\\_documents/program-road-maps/als\\_2yr/art\\_transfer-%20roadmap-2024-25.pdf](https://www.csus.edu/academic-affairs/curriculum-%20workflow/_internal/_documents/program-road-maps/als_2yr/art_transfer-%20roadmap-2024-25.pdf)).

<sup>3</sup>. Please see an academic advisor for elective options.