

BS IN GEOLOGY (HYDROGEOLOGY)

In Workflow

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Approval Path

1. Tue, 15 Oct 2019 23:04:09 GMT
Brian Hausback (hausback): Approved for GEOL Committee Chair
2. Tue, 15 Oct 2019 23:08:12 GMT
Kevin Cornwell (cornwell): Approved for GEOL Chair
3. Mon, 21 Oct 2019 22:22:50 GMT
Thomas Krabacher (tsk): Approved for NSM College Committee Chair
4. Wed, 23 Oct 2019 18:00:45 GMT
Shannon Datwyler (datwyler): Approved for NSM Dean

New Program Proposal

Date Submitted: Tue, 15 Oct 2019 22:11:20 GMT

Viewing: BS in Geology (Hydrogeology)

Last edit: Tue, 15 Oct 2019 22:11:17 GMT

Changes proposed by: Amelia Vankeuren (218611017)

Academic Group: (College)

Natural Sciences & Mathematics

Academic Organization: (Department)

Geology

Catalog Year Effective:

2020-2021 Catalog

NOTE: This degree major program will be subject to program review evaluation within six years after implementation.

Individual(s) primarily responsible for drafting the proposed degree major program:

Name (First Last)	Email	Phone 999-999-9999
Amelia Vankeuren	vankeuren@csus.edu	916-278-7385

Type of Program Proposal:

Concentration

Is this a pilot program?

No

Is this a Fast Track program?

No

Title of the Program:

BS in Geology (Hydrogeology)

Designation: (degree terminology)

Bachelor of Science

Abstract of the proposal:

The B.S. Geology with a concentration in Hydrogeology provides students with a solid foundation in the principles of Geology (core classes), and builds upon that with classes that focus on the the water cycle and related processes. Water resources and hydrogeology account for a significant portion of employment in the geological sciences, and this degree will prepare students to succeed in these jobs, both in state agencies and in private industry such as environmental consulting.

Briefly describe the program proposal (new or change) and provide a justification:

The B.S. Geology with a concentration in Hydrogeology provides students with a solid foundation in the principles of Geology (core classes), and builds upon that with classes that focus on the physics and chemistry of water and how it interacts with the landscape in the context of water resources.

Water resources and hydrogeology account for a significant portion of employment in the geological sciences, and this degree will prepare students to succeed in these jobs. Many of our alumni go on to work at state agencies –e.g., Department of Water Resources, State Water Resources Control Board, or Department of Toxic Substances – or at environmental consulting firms that specializes in groundwater. This concentration will aid students in getting employment in the hydrogeology sector by ensuring they have the necessary courses to prepare them for this field, as well as highlighting their specialization on their degree and thus making them more competitive applicants.

Because the emphasis has shifted from geological mapping of rock formations to water-related processes, two classes that were required for the B.S. Geology have been moved from the required list to the elective list: GEOL 102 Igneous and Metamorphic Petrology and GEOL 188 Advanced Geologic Mapping. Instead, this concentration requires General Chemistry II and Hydrogeology, and specifies that 6 of the elective units come from 2 of 3 classes: Surficial Processes, Geochemistry, and Environmental Field Methods.

The concentration also includes several new or modified classes that are being changed for the B.S. Geology. There are Form A course proposals in the workflow for the following classes in this concentration:

GEOL 11 Digital Methods in Geoscience
GEOL 100 Earth Materials – Rocks and Minerals
GEOL 189 Geology Colloquium

Objectives of the degree program:

The B.S. in Geology (Hydrogeology) has the following program learning goals:

- I. Students are prepared for professional and/or graduate study involving the geosciences
- II. Students develop a deep understanding of Earth systems: how Earth systems work and how they interact
- III. Students develop their ability to solve hydrogeologic problems through the use of the scientific method
- IV. Students develop their technical communication skills: seeking and processing technical information; and communicating technical information and conclusions in both oral and written form
- V. Students develop the quantitative reasoning skills necessary to solve geologic problems

These goals lead to the following program learning outcomes:

- a. Students will master a set of fundamental geologic concepts essential to understanding and solving geologic problems
- b. Students will be proficient in solving hydrogeologic problems
- c. Students will be proficient in using quantitative skills to solve geologic problems
- d. Students will be proficient in introductory skills of understanding and producing geologic maps
- e. Students will be proficient writers, skilled in the genres of scientific and technical writing
- f. Students will be proficient oral communicators, skilled in presenting scientific topics

University Learning Goals

Undergraduate Learning Goals:

Competence in the disciplines
Knowledge of human cultures and the physical and natural world
Intellectual and practical skills

Will this program be required as part of a teaching credential program, a single subject, or multiple subject waiver program (e.g., Liberal Studies, Biology) or other school personnel preparation program (e.g., School of Nursing)?

No

Please attach a Comprehensive Program Assessment Plan (required)

Geology Assessment Plan 2019 Hydrogeology concentration.pdf

Please attach a Curriculum Map Matrix (required)

BS Geology Hydrogeology curriculum map.pdf

Please attach a five-year budget projection (required)

5 year budget projection.pdf

Please attach the Smart Planner roadmap:

GEOL_BS_Roadmap_with hydro note.pdf

Catalog Description:**Units required for Major: 71****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: (If new courses are being created as part of a new program, it will be useful to propose courses first.)

Program Requirements

Code	Title	Units
Required Lower Division Courses (31 Units)		
CHEM 1A	General Chemistry I	5
CHEM 1B	General Chemistry II	5
GEOL 10 or GEOL 5	Physical Geology Geology Of Mexico	3
GEOL 10L or GEOL 5	Physical Geology Lab Geology Of Mexico	1
GEOL 11	Course GEOL 11 Not Found(3 hr lab)	1
GEOL 12	Historical Geology	3
GEOL 12L	Historical Geology Lab	1
MATH 30	Calculus I ¹	4
PHYS 5A or PHYS 11A	General Physics: Mechanics, Heat, Sound General Physics: Mechanics	4
PHYS 5B or PHYS 11B	General Physics: Light, Electricity and Magnetism, Modern Physics General Physics: Heat, Light, Sound, Modern Physics	4
Required Upper Division Courses (40 Units)		
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 127	Hydrogeology	3
GEOL 189	Course GEOL 189 Not Found(1 unit class must be taken twice for a total of 2 units)	2
Select 15 units of electives. At least 6 of those units must come from the following three classes:		15
GEOL 120	Surficial Processes	
GEOL 123	Geochemistry	
GEOL 126	Environmental Field Methods	
Remaining electives may come from the following classes:		
GEOL 101	Course GEOL 101 Not Found	
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 190A	Geology and Tectonic Development of California Seminar
GEOL 193C	Engineering Geology
GEOL 198A	Senior Research Preparation
GEOL 198B	Senior Research Project

Total Units	71
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¹ Course also satisfies General Education (GE)/Graduation Requirement.

General Education Requirements ¹

Code	Title	Units
Area A: Basic Subjects (9 Units)		
A1 - Oral Communication		3
A2 - Written Communication		3
A3 - Critical Thinking		3
Area B: Physical Universe and Its Life Forms (6 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.		3
Area C: Arts and Humanities (12 Units)		
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
Area D: The Individual and Society (12 Units)		
Area D Course		3
Area D Course		3
Area D Course		3
Area D Course - Take upper-division course to complete Area & upper division requirements.		3
Area E: Understanding Personal Development (3 Units)		
Area E Course		3
Total Units		42

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 (<http://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) (12 Units)		
English Composition II		3
Race and Ethnicity in American Society (RE)		3
Foreign Language Proficiency Requirement ²		6

- 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 (<http://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 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/wll/flgr/>

Attach the results of a formal survey in the geographical area to be served indicating demand for individuals who have earned the proposed degree and evidence of serious student interest in majoring in the proposed program:

Hydrogeology survey results.pdf

For graduate programs, the number of declared undergraduate major and the degree production over the preceding years of the corresponding baccalaureate program:

N/A

Professional uses of the proposed degree major program:

N/A

The expected number of majors in:

1st Year Enrollment:

10

3rd Year Enrollment:

20

5th Year Enrollment:

30

1st Year Graduates:

0

3rd Year Graduates:

20

5th Year Graduates:

30

Please attach any additional files not requested above:

OK to add CHEM 1B as required class from Chemistry Department chair.pdf

Key: 477