

ANNUAL PROGRAM REPORT

College	Science
Department	Earth & Environmental Sciences
Programs	Environmental Science BS Geology BS Environmental Geosciences MS
Reporting for Academic Year (i.e., the last academic year)	2021-2022
Last Five-Year Review	2020-2021
Next Five-Year Review	2025-2026
Department Chair	Mitchell Craig
Authors of Review	Mitchell Craig and Jean Moran
Date Submitted	1 October 2021

I. SELF-STUDY

A. Five-Year Review Planning Goals

The two main goals of the department's current five-year plan, for 2021-2026, are:

- 1) Review degree requirements and curriculum for all degree programs and make any needed revisions.
- 2) Hire additional faculty in both Geology and Environmental Science.

B. Progress Toward Five-Year Review Planning Goals

In the area of curriculum review and revisions, the department applied for GE recertification for several courses, and all were recertified. Work is also underway to add online modality to several existing lower-division GE courses. We plan to work the revision of degree programs and curriculum in the coming year.

The department successfully completed a tenure-track search during 2021-22 and hired a new faculty member specializing in coastal hydrology, who started Fall 2022.

C. Program Changes and Needs

Overview:

The department offers undergraduate and graduate degree programs and teaches general education courses. Its faculty and students are involved in research.

Curriculum:

The department offers two undergraduate degree programs and a graduate program; Geology (BS, BA), Environmental Science (BS), and Environmental Geosciences (MS).

Students:

During Fall 2021, there was a total 66 majors in the department's programs; this includes 38 Environmental Science BS majors, 12 Geology BS or BA majors, and 16 students in the graduate program. The number of students in the graduate program has experienced a modest increase over the past five years.

Graduates from department programs are currently in high demand in the workplace, and demand is expected to remain strong over the next decade. Employers include environmental and engineering consulting firms, municipal water agencies, California State agencies, US Department of Energy laboratories, and the US Geological Survey.

Faculty:

The Department currently has six tenure-track faculty, five of whom are full-time and one who started the FERP program in Fall 2021. One is an Assistant Professor, two are Associate Professors, and three are Professors. Two Assistant Professors left the university at the end of the 21-22 academic year. We

anticipate at least one additional faculty retirement within the next few years. A tenure-track search was completed during 2021-2022, and a new faculty member with expertise in coastal hydrology joined the department in Fall 2022.

Staff:

The department has two staff members, an Administrative Support Coordinator, who was hired in Fall 2021, and an Instructional Support Technician who has been with the department for five years. The IST will be leaving the University in November 2022 and the department will be conducting a search for a replacement.

Resources:

All current tenure-track faculty have assigned office space in Science North. In some cases, office space is combined with lab space or shared with lecturers. Some faculty use shared space in Science South for research or equipment storage. The department has sufficient space for current faculty, but will need additional office space to accommodate any additional faculty. We anticipate that any new hires would utilize existing shared space in Science South (SC S106) for research activities.

Assessment:

Assessment is discussed in Part II below.

DEI Initiatives:

The department has a relatively high percentage of students from underrepresented groups, including women, Latinx and other URM groups. The department participated in the Learning Assistant program last year and is doing so again this year. We are teaching a GE course for a cohort of GANAS students, who are primarily Latinx.

Other:

The COVID-19 pandemic has had a major effect during the past two years on department programs. The impact of the pandemic on department programs is not covered in this report.

The department teaches two required field classes, one introductory and the other advanced. Both classes were offered both during the academic year 2021-22 and during Summer 2022. Faculty who teach field classes during the summer are currently compensated with additional salary, but would like to have the option of having this count toward the regular academic year workload.

II. SUMMARY OF ASSESSMENT

Assessment results for both 2020-2021 and 2021-2022 are included here because last year's annual report (for 2020-2021) was a truncated report, and did not include assessment results.

A. Summary of Assessment Process – All Programs

Instruments: Course assignments are selected from required classes specified in the department's long-term (five year) assessment plan. PLOs are assessed on a rotating schedule; each PLO is assessed every 2-4 years.

Sampling Procedure: All enrolled students are normally included.

Data Collection: At the end of the semester in which the assignment is completed, the faculty member leading the course carries out the assessment.

Data Analysis: Student work is evaluated using a rubric to determine numeric scores, which are compiled in a spreadsheet. The instructor writes a narrative summary of the main findings and recommendations.

ASSESSMENT OF ENVIRONMENTAL SCIENCE B.S. PROGRAM

A. Program Learning Outcomes

PROGRAM STUDENT LEARNING OUTCOMES (PLOs)	
Students graduating with a B.S. in Environmental Science will be able to:	
PLO 1 ILO 1, 5, 6	Demonstrate foundational knowledge of Earth processes, natural systems, and the effects of human activity (<i>Knowledge</i>)
PLO 2 ILO 1, 2, 3, 4, 6	Develop fundamental field, laboratory, and computer skills necessary for environmental science (<i>Skills</i>)
PLO 3 ILO 1, 2, 3, 5, 6	Critically evaluate, analyze, and integrate scientific findings, data, and socioeconomic context to understand environmental issues (<i>Analysis and Synthesis</i>)
PLO 4 ILO 1, 2, 3, 4, 6	Effectively communicate in oral and written form, and develop collaborative skills (<i>Communication</i>)
PLO 5 ILO 1, 3, 5, 6	Understand the role of the environmental science in local, regional, and global sustainability, and the role of an ethical scientist (<i>Sustainability and Global Thinking</i>)

B. Summary of Assessment Process

Relevant section from the long-term assessment plan:

Year 3: 2020-2021	
1. Which PLO(s) to assess	PLO4 (<i>Communication</i>), PLO5 (<i>Global</i>)
2. Is it aligned with an ILO?	Yes
3. If yes, list ILO.	ILO5 Sustainability (280); ILO2: Communication (499)
4. Course name and number	ENSC 280 - Humans and the Environment in California ENSC 499 - Capstone Seminar in Geosciences
5. SLO's from course	ENSC 280: Apply knowledge of matter and energy, and how concepts of matter and energy relate to "sustainability," in understanding the interactions between human systems and natural systems. ENSC 499: Demonstrate the ability to gather, evaluate and articulate environmental geosciences information through advanced written and oral communication.
6. Assessment Activity	Written & Oral Presentations; Final Project & Presentation
7. Assessment Instrument	Department Rubric

Details for Courses Assessed, 2020-21

Instruments: Major assignment and rubric, see below.

ENSC/GEOL 499 (Capstone Seminar), Spring 2021

PLO Assessed: PLO4 (Communication)

Assignment: First draft of term paper

Rubric: Critical Thinking and Written Communication (Department)

ENSC 280 (Humans and the Environment), Spring 2021

PLO Assessed: PLO5 (Sustainability)

Assignment: Final oral group presentation

Rubric: Sustainability (University)

Sample Characteristics: All Environmental Science majors are required to take both ENSC 499 and ENSC 280. Work from all students in each of the classes was assessed, there were 12 students in ENSC 499 and 51 students in ENSC 280.

C. Summary of Assessment Results, Environmental Science B.S. Program

ENSC/GEOL 499: Capstone Seminar - Spring 2021 (Bhattachan)

Main findings: Out of the 12 examples of the first draft of term papers for ENSC/GEOL 499 evaluated to assess the SLO3 “Demonstrate the ability to gather, evaluate and articulate environmental geosciences information through advanced written and oral communication”, only one student failed to meet the course learning outcome. The average score for all 5 categories aggregated for all students was 10.75 with a standard deviation of 3.5. The final term paper scores were vastly improved for all students after the instructor provided feedback on their first drafts. A large majority of the students scored high (“exemplary”) for the first category, “context and purpose” and the fourth category, “explanation of issues”. This was expected because the weekly readings and discussion for the semester included the implications of climate change on public health. The students were extremely adept at procuring and evaluating the literature. The synthesis of the literature and the inclusion of current and impactful, and seminal and landmark publications were selected by all students. The readings from the National Climate Assessment report during the semester helped guide the students to such important studies. Except for a few students, most of the students did not challenge and question the current scientific literature or offer new avenues of research. This along with the language and synthesis of the original literature (“syntax and mechanics”) scored the lowest (average of 1.75). Only one student scored “exemplary” and submitted a draft with no formatting and grammatical errors and consistent in-text citations.

Recommendations: It would help students if they had prior experience and training on how to format and organize a scientific paper and to synthesize the paper without including entire sentences and paragraph from original sources. In the future semesters, more emphasis should be placed on students to propose new unexplored research questions based on their synthesis of the literature and challenge the current state of knowledge of the discipline.

CSUEB Department of Earth and Environmental Sciences Program Assessment						
Program:	Environmental Science BS					
Rubric:	Critical Thinking & Written Communication					
Course:	ENSC 499					
Semester:	Spring 2021					
Assignment:	Term paper					
Student ID	Context and Purpose	Disciplinary Conventions	Syntax and Mechanics	Explanation of Issues Thinking	Evidence	Total
1	1	1	2	2	1	7
2	0	0	1	1	1	3
3	3	3	2	3	3	14
4	3	2	2	3	2	12
5	3	3	2	3	1	12
6	3	2	1	3	2	11
7	2	3	1	2	2	10
8	3	3	2	3	2	13
9	1	1	1	2	2	7
10	3	3	2	2	1	11
11	3	3	2	3	3	14
12	3	3	3	3	3	15
Average	2.33	2.25	1.75	2.50	1.92	10.75
Standard Deviation	1.07	1.06	0.62	0.67	0.79	3.52

Course: ENSC 280 Humans and the Environment, Spring 2021 (Oikawa)

Findings and Recommendations: This group assignment was to present a research project on an environmental problem in CA. Each group presented a lightning talk based on the research towards the end of the semester. A lightning talk is a PowerPoint presentation that is brief. Presenters spent ~1 min per slide and the entire talk lasts 7 min. Students were required to use credible reference material cited on the last slide of the presentation in MLA format. They were required to present scientific data within the talk on 2-3 slides including maps or figures that quantify the environmental problem or threat. They were also required to present a solution to the environmental problem which would include possible individual or collective action.

The ILO Sustainability Rubric was used to assess this assignment. 3 students were not assessed as they did not complete the assignment and received a WU for the course. The class averaged 15 out of 20 with a standard deviation of 1.72. This assignment is worked on throughout the semester with many check-ins for learning along the way. Specifically, the students turn in 2 assignments prior to the assessed final presentation in order to make sure students are on track. The first assignment is a summary of the credible references to make sure they are using correct information and sources. Then they turn in the draft slides for credit where they receive feedback from me. Therefore when the final talks are presented there are very few students who fail the assignment or have significant gaps in knowledge.

For the Threats and Opportunities LO, most students were able to grasp the majority of the learning outcome with only minor gaps in knowledge. There were some students who struggled with identifying both economic and social opportunities relevant to the threat or environmental problem in this assignment. But most students were able to address all areas of this LO.

For the agency learning outcome, most students were able to identify either individual or collective actions to address a major sustainability threat. However many students did not provide examples of both. In future offerings of this class I will build this aspect into the assignment and clarify the need to address both types of action.

Most students did not skillfully articulate the interconnectedness between economic well-being social equity and environmental quality and provide evidence, however the rubric for this assignment did not explicitly state this as a requirement.

The application of systems-thinking to describe interactions between humans and systems affect sustainability with evidence was an explicit requirement for this assignment and the vast majority of students completed this skillfully. Analyzing social factors was another important aspect of this assignment however student performance on this learning outcome was mixed, some students performed very well with only minor gaps in knowledge. In the future this learning outcome, particularly the different stakeholder perspectives, will be emphasized.

CSUEB Department of Earth and Environmental Sciences Program Assessment						
Program:	Environmental Science BS					
Rubric:	Sustainability (University ILO Rubric)					
Course:	ENSC 280 Humans and the Environment in CA					
Semester:	Spring 2021					
Assignment:	Group Presentation Assignment on an Environmental Science Problem in California (SLO to be assessed: Apply knowledge of me					
Student ID	Threats & Opportunities	Agency	Interconnectedness	The Science	Social Factors	Total
1	4	4	3	4	4	19
2	3	3	2	3	2	13
3	3	3	2	3	3	14
4	2	2	1	2	3	10
5	3	3	2	4	4	16
6	3	3	2	4	3	15
7	3	3	2	4	2	14
8	3	3	2	4	3	15
9	3	3	2	4	3	15
10	3	3	2	4	3	15
11	3	3	2	4	3	15
12	3	3	2	4	4	16
13	3	3	2	4	3	15
14	3	3	2	4	3	15
15	3	3	2	4	3	15
16	3	3	2	4	2	14
17	4	4	3	4	3	18
18	2	2	1	3	3	11
19	2	2	1	3	4	12
20	3	3	2	4	3	15
21	3	3	2	4	3	15
22	3	3	2	4	3	15
23	3	3	2	4	3	15
24	3	3	2	4	3	15
25	3	3	2	4	3	15

26	3	3	2	4	3	15
27	3	3	2	4	2	14
28	3	3	2	4	3	15
29	3	3	2	4	3	15
30	4	4	4	4	3	19
31	3	3	2	4	3	15
32	3	3	2	4	3	15
33	3	3	2	4	3	15
34	3	3	2	4	3	15
35	3	3	2	4	3	15
36	3	3	2	4	3	15
37	3	3	2	4	2	14
38	4	4	4	4	4	20
39	3	3	2	4	3	15
40	3	3	2	4	3	15
41	3	3	2	4	3	15
42	3	3	2	4	2	14
43	3	3	2	4	3	15
44	4	4	4	4	3	19
45	3	3	2	4	3	15
46	3	3	2	4	4	16
47	3	3	2	4	3	15
48	3	3	2	4	3	15
49	3	3	2	3	3	14
50	3	3	2	3	3	14
51	3	3	2	3	3	14

Notes:

3 students were not assessed as they did not complete the assignment and received WU for the course. The class averaged 15 out of 20 with a st

2021-2022 Assessment of Environmental Science B.S. Program

PLO3 (Analysis and Synthesis) – GEOL/ENSC 432 – Hydrogeology – S22 (Moran)

B. Summary of Assessment Process

Instruments: Major assignment from ENSC 432 (Hydrogeology - water budgets) and rubric (Analysis and Synthesis).

Assignment: Develop a water budget for Mono Lake Basin. Assess the sustainability of the water budget for maintaining water levels in Mono Lake. Water budget components include Precipitation, Runoff, Evapotranspiration, Groundwater, and Change in Storage.

Sampling Procedure: The course for this year’s assessment is roughly equivalent to ENSC 350 (Environmental Hydrology) with respect to analysis & synthesis, which is the course listed on our long-term (five-year) assessment plan. All students enrolled in the class (19) were included.

Sample Characteristics: All Environmental Science majors are required to take a hydrology course; either this course (GEOL/ENSC 432) or GEOL/ENSC 350.

Data Analysis: The rubric was used to score the assignment in the areas of gather data; analyze data; and draw and present conclusions.

C. Summary of Assessment Results

Main findings: The scores indicate 90% of the students are able to gather water budget data from sources with some interpretation, and that almost half of the students can also develop a coherent analysis (water budget) using the data. 70% of students have at least intermediate competency in analyzing the data, but only 16% are able to organize the analyzed data to reveal important patterns. A similarly small percentage are able to communicate conclusions on the findings, showing a logical comprehension of the findings. Students with weak or rusty quantitative skills had to spend much of their time on the data analysis portion of the assignment, leaving little time or ‘bandwidth’ for developing logical conclusions regarding sustainability or uncertainty aspects of the water budget. Several students seemed to struggle with the return to the in-person learning format, and with the attention, time, and effort required to complete the assignment successfully.

	Low Competency	Intermediate Competency	High Competency
Gather Data	10%	43%	47%
Analyze Data	32%	52%	16%
Draw Conclusions	32%	52%	16%

2022-2023 Assessment of the Environmental Science B.S. Program

The following classes will be taught in 2022-23 and could possibly be used for assessment:

ENSC 420 - Global Change, Fall 22 (Grande).

ENSC 499 - Capstone Seminar, Spring 23 (Moran).

ENSC 350 - Environmental Hydrology, Spring 23 (Grande)

ASSESSMENT OF GEOLOGY B.S. PROGRAM

A. Program Learning Outcomes

PROGRAM STUDENT LEARNING OUTCOMES (PLOs)	
Students graduating with a B.S. in Geology will be able to:	
<i>PLO 1</i> <i>ILO 1, 4, 6</i>	Develop foundational knowledge in geologic Materials, Processes & Time (Knowledge), Processes & Time (Knowledge)
<i>PLO 2</i> <i>ILO 1, 3, 4, 5, 6</i>	Develop fundamental geological field and laboratory skills and computer competence (Skills)
<i>PLO 3</i> <i>ILO 1, 4, 5, 6</i>	Integrate and analyze geologic information through synthesis & critical thinking (Analysis)
<i>PLO 4</i> <i>ILO 1, 2, 3, 4, 5, 6</i>	Develop oral and written communication, and collaborative skills (Communication)
<i>PLO 5</i> <i>ILO 1, 2, 3, 4, 5</i>	Understand the impact of the Earth Sciences on local-to-global sustainability and their role as an ethical scientist (Global)

B. Summary of Assessment Process - 2020-2021

GEOL 361 - Igneous & Metamorphic Petrology - Spring 2021 (Seitz)

Instruments: Major assignment from GEOL 361 (Igneous & Metamorphic Petrology), Spring 2021, was used to assess PLO 4 (Communication) using the department's Oral Communication rubric.

Assignment: 15-minute, conference-style presentation on a petrologic topic of the student's choice.

Sampling Procedure: All students enrolled in the class (5) were included. Most or all are Geology majors.

Sample Characteristics: This class is the second in a sequence of three required classes (GEOL 360, 361, 371).

C. Summary of Assessment Results

Main findings: The assignment consisted of a 15-minute, conference-style presentation on a petrologic topic of their choice. In addition, students submitted research papers on the same topic. Students were required to submit an outline, bibliography, and abstract early in the semester to assess their progress and provide an opportunity for feedback. Since the course was taught via Zoom, some students had difficulty with online

presentations since it was hard to judge how well they were reaching their audience (most students opted not to turn on their cameras) or take questions. A standard oral presentation rubric was used to score the presentations. In addition, students were given the opportunity to anonymously score other students' presentations using the rubric as an opportunity for peer review.

Of the five students in the course, three did very well on the assignment. The other two students possibly had life issues that made it difficult for them to perform at a higher level. All students had well-organized presentations but differed in the use of academic language and delivery. It was clear that two students had not completed a thorough literature search and/or synthesis of the literature; their presentations lacked scientific depth. Thus, their supporting material and central message were inadequate.

CSUEB Department of Earth and Environmental Sciences Program Assessment						
Program:	Geology BSBA					
Rubric:	Oral Communication					
Course:	GEOL 361					
Quarter:	Spring 2021					
Assignment:	Research Presentation					
Student ID	Organization	Language	Delivery	Supporting Material	Central Message	Total
1	3	3	2	3	2	13
2	3	3	3	3	2	14
3	2	2	1	0	1	6
4	3	2	3	2	2	12
5	2	1	1	1	1	6

B. Summary of Assessment Process – Geology B.S. Program - 2021-2022

GEOL 360 - Mineralogy - Spring 2022 (Seitz)

Instruments: A major assignment from GEOL 360 (Mineralogy), Spring 2022, was used to assess PLO 4 (Communication) using the department's Critical Thinking and Written Communication rubric.

Assignment: Term paper on an advanced topic in mineralogy of the students' choice.

Sampling Procedure: All students enrolled in the class (10) were included. Most are Geology majors.

Sample Characteristics: This class is the first in a sequence of three required classes (GEOL 360, 361, 371).

C. Summary of Assessment Results

Main findings:

The assignment consisted of a six-page term paper on an advanced topic in mineralogy of the students' choice. Students were required to format their papers to mimic a submission to a peer-reviewed journal. Students were required to submit a preliminary outline, bibliography and abstract early in the semester to assess their progress and provide an opportunity for feedback. The term papers were scored using a rubric that was aligned to the department's rubric for critical thinking and writing. In addition, students presented their research findings in a 15-minute, conference-style oral presentation.

Of the 10 students that completed the assignment, 6 did well. From the perspective of the instructor, the performance of other students on this assignment was less than satisfactory primarily due to procrastination on the part of students. The paper required a thorough literature search, synthesis of the literature, and use of primary sources. This required students to begin early in the semester to satisfactorily complete the assignment. In addition, students differed in the use of academic and disciplinary language. The assignment required a technical writing style but some students wrote attempted to write a persuasive paper using flowery language.

CSUEB Department of Earth and Environmental Sciences Program Assessment						
Program:	Geology BSBA					
Rubric:	Critical Thinking & Written Communication					
Course:	GEOL 360					
Quarter:	Spring 2022					
Assignment:	Term Paper					
Student ID	Context and Purpose	Disciplinary Conventions	Embracing Syntax and Mechanics	Explanation of Issues	Evidence	Total
1	3	2.7	2.7	2.7	2.9	14
2	1.8	2.1	1.5	2.1	2.2	9.7
3	3	2.7	2.7	2.6	2.64	13.64
4	1.8	2.1	2.1	2.2	2	10.2
5	2.4	2.1	2.1	2.3	2.3	11.2
6	3	2.4	2.7	2.6	2.6	13.3
7	3	3	2.7	2.9	3	14.6
8	3	2.4	2.7	2.7	2.6	13.4
9	1.2	2.1	1.5	2.1	2.2	9.1
10	1.8	2.4	1.5	2.4	2.4	10.5

2022-2023 Assessment of the Geology B.S. Program

The department tentatively plans to assess the following classes:

GEOL 397 – Advanced Field Experience – Summer 22

GEOL 361 – Igneous & Metamorphic Petrology - Fall 22

Year 5: 2022-2023	
1. Which PLO(s) to assess	PLO2 (Skills), PLO3 (Analysis)
2. Is it aligned with an ILO?	Yes
3. If yes, list ILO.	ILO1 Critical Thinking (361); ILO4 Collaboration (397);
4. Course name and number	GEOL 361 - Igneous and Metamorphic Petrology GEOL 397 - Adv. Field Experience Project
5. SLO's from course	GEOL 361: Understand field relationships between igneous, metamorphic, and sedimentary rocks. Interpret igneous rock phase diagrams and petrogenesis in terms of current models. GEOL 397: Compile and construct syntheses based on field observations, data, subsequent analysis, and peer/group interaction.
6. Assessment Activity	Final Project & Oral Presentations; Final Group Mapping Project
7. Assessment Instrument	Department Rubric

ASSESSMENT OF GRADUATE PROGRAM - ENVIRONMENTAL GEOSCIENCES M.S.

A. Program Learning Outcomes (PLO)

PROGRAM STUDENT LEARNING OUTCOMES (PLOs)	
Students graduating with a M.S. in Geology will be able to:	
PLO 1 ILO 5,6	Develop advanced knowledge in geologic Materials, Processes & Time (Knowledge)
PLO 2 ILO 4,5,6	Attain proficiency in geological and environmental field, computing and laboratory applications (Synthesis)
PLO 3 ILO 1,2,6	Perform original research by integration and analysis of geologic and environmental information and data sets (Research)
PLO 4 ILO 2,3,4,6	Master effective oral and written communication, and practice collaborative skills (Communication)
PLO 5 ILO 1,2,3,4,5	Join an ethical community of scientists who recognize the importance of sustainability, the role of science in society, and the value of life-long learning (Global)

B. Summary of Assessment Process, 2020-2021

Instrument(s): Final course assignment from GEOL 602 (Graduate Seminar) was used to assess PLO2 (Synthesis) and PLO5 (Global).

Sampling Procedure: All enrolled students were included.

Sample Characteristics: This comprises 75% of the students in the program.

Data Collection: At the end of the semester in which the assignment is completed, the faculty member leading the course carries out the assessment.

Data Analysis: A rubric was used to determine numeric scores, which were compiled in a spreadsheet.

C. Summary of Assessment Results, 2020-2021

GEOL 602 - Graduate Seminar (Moran)

Numeric Scores:

PLO 2 (max score 12)	7	8	9	10	11	12
Frequency of rubric score	4	1	2	1	1	1
PLO 5 (max 8)	6	7	8			
Frequency of rubric score	2	2	6			

Recommendations for Program Improvement: Some low scores in the area of Synthesis, especially evaluating sources for relevance and making connections among sources, reflect lack of practice with these skills among first year graduate students. Students can take the graduate seminar twice (once as an elective) and more students should be advised to do so.

Other Reflections: The high scores regarding students' recognition of the importance of sustainability, role of science in society and value of life-long learning, are encouraging and reflect the high degree of relevance of our program to solving the crises we are experiencing today.

B. Summary of Assessment Process for Graduate Program, 2021-2022

Instruments: A course assignment from GEOL 641 (Earthquake Geology) was assessed for PLO 4 (Communication). PLOs are assessed on a rotating schedule; each PLO is assessed every 2-4 years.

Sampling Procedure: All enrolled students were included.

Sample Characteristics: About 75% of the students in the graduate program were enrolled in this class.

Data Collection: At the end of the semester in which the assignment was completed, the faculty member leading the course carried out the assessment.

Data Analysis: a rubric was used to determine numeric scores, which were compiled in a spreadsheet.

C. Summary of Assessment Results

GEOL 641 - Earthquake Geology - Fall 2021: Communication (Strayer)

Main Findings:

Final Précis of a Journal Article. This class focused on text readings and lectures initially and later, on individual student presentations in concert with the class reading and a summary of the presented article. These were punctuated every so often by brief (~15 mins) student presentations on some parts of some chapters as well as a longer and more in-depth oral presentation on a suitable topic of their choice. The final assignment (summarized here) was a précis on an assigned journal article.

Course average is 10/12, where 4/12 is ‘competent’ and 8/12 is ‘accomplished’. There was a wide range of students in this class, perhaps partially a result of forces applied by COVID-19 that placed some placed some students who did not have the prerequisite(s) for the class. As a result there was a wide spread of results, ranging from 3 (student rarely attended class) to 12 (perfect result) out of 12 total.

Recommendations:

The précis form is an effective tool to address reading comprehension and writing effectiveness. Anecdotal evidence and post-class student comments indicate the exercise of writing précis is a challenging but valuable exercise that will likely continue to be employed in our program.

CSUEB Geology M.S Program Assessment				
Rubric:	Communication	Class Average:	10	
Course:	GEOL 641 - EQ Geol	Std. Dev.	2.6	
Quarter:	Fall 2021	Min. Competence		
Assignment:	Final Journal Article Précis			
Student	Genre & Conventions	Syntax & Mechanics	Explanation	Total
1	1	1	1	3
2	4	4	3	11
3	4	4	4	12
4	3	3	4	10
5	4	3	4	11
6	3	4	4	11
7	3	3	2	8
8	3	2	2	9
9	4	4	4	12
10	2	3	3	8
11	3	4	3	10
Class average				10
Standard				2.6

General Recommendations for Program Improvement:

Students enter department programs with a wide range in basic writing and quantitative skills. Students need to be encouraged to take basic Math, Physics, and Chemistry classes earlier. Writing assignments with instructor feedback are valuable to the student and should be continued.

Next Steps for Closing the Loop: We will monitor assessment of PLOs to determine if curricular changes are necessary.

Other Reflections:

Some of the courses specified in the long-term (five-year) plan for assessment have been taught by lecturers. Since assessment is not part of the normal duties expected of lecturers, and some lecturers are employed by the department on a temporary, part-time basis, it may be difficult to obtain assessment results for courses taught by lecturers.

D. DISCUSSION OF PROGRAM DATA & RESOURCE REQUESTS

A. Discussion of Trends & Reflections Notable Trends

Overview:

During Fall 2021, total enrollment for all classes offered by the department was 235 FTES. Enrollment reached an all-time high of 281 FTES in Fall 2019 and has declined for each of the past two years. SFR was 30.5 in Fall 2021, with slight decreases each of the past two years (Figure 1).

Students:

Of the department's three main programs, the Environmental Science BS program has the largest number of majors. During Fall 2021, there were 38 Environmental Science majors. During the past five years, the number of Environmental Science majors oscillated between 38 and 54, with an average of 47, without a clear trend (Figure 2). During Fall 2021, the race and ethnicity of majors in the program was 37% Latinx, 26% White, 26% Asian, 8% Multirace, and 8% Black.

The number of Geology majors has ranged from 12 to 16 during the past five years (Figure 3). In Fall 2021, there were 12 Geology majors, with 10 in the BS program and 2 in the BA program.

The number of students in the graduate program has experienced a modest increase over the past five years, reaching 16 students in Fall 2021 (Figure 4).

Faculty:

Two tenure-track faculty left the department at the end of the 21-22 academic year. One new tenure-track faculty member joined the department in Fall 2022. One tenured faculty member started the FERP program in Fall 2021. We anticipate at least one additional faculty retirement within the next few years.

During Fall 2021, the total faculty headcount was 17, with 7 tenure-track faculty and 10 lecturers, for an FTE of 10.2. FTEF was 7.7 for Fall 21 and has varied between 7.5 and 8.3 over the past five years. The relative proportions of tenure-track faculty to lecturers in terms of FTEF during Fall 2021 was 54% regular tenure-track faculty and 46% lecturers (Figure 5).

Reflections on Trends and Program Statistics

Faculty:

The relative proportions of tenure-track faculty to lecturers in terms of FTEF fluctuates considerably from year to year due to the small size of the department and faculty assigned time. Averaged over the past five years, 46% of FTEF were tenure-track and 54% were lecturers. Although lecturers primarily teach general education (GE) courses, they also teach some classes for majors.

B. Request for Resources for the Upcoming Year

1. Request for Tenure-Track Hires:

In light of the departure of two tenure-track faculty last year, and as demonstrated by the Department's ongoing low proportion of tenure-track faculty to lecturers, high SFR, and large number of FTES, the Department needs two additional faculty members. Two new faculty members are needed to reduce the Department's reliance on lecturers for teaching specialized courses for majors, and to provide better oversight of online GE courses that are currently taught primarily by lecturers. We therefore request two tenure-track positions for 2023-24, one in Environmental Science, with a specialty in climate, and the other in Environmental Geoscience, with a specialty in hazards or remediation.

2. Request for Other Resources

All regular faculty currently have assigned office space in Science North. In some cases, office space is combined with lab space or shared with lecturers. Some faculty use shared research lab space in Science South. The department is currently at capacity in terms of faculty office space and will need additional office space to accommodate new faculty hires. We anticipate that new hires would utilize existing shared space in Science South (SC S106) for research activities.

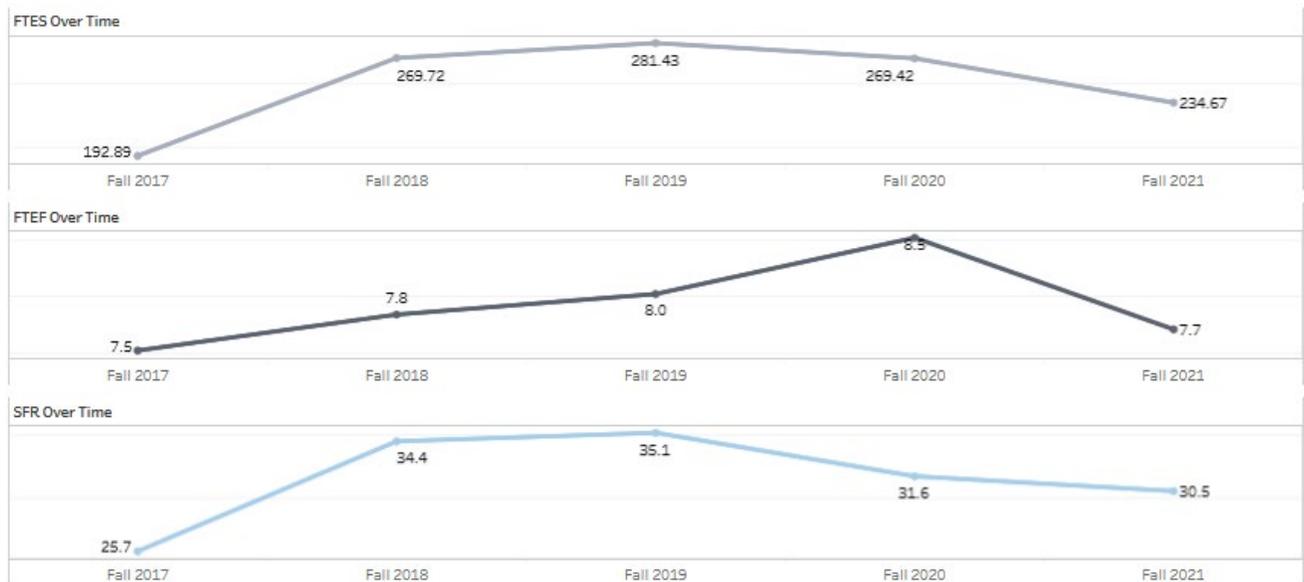


Figure 1. FTES, FTEF, and SFR, Dept. of Earth & Environmental Sciences, 2017-2021

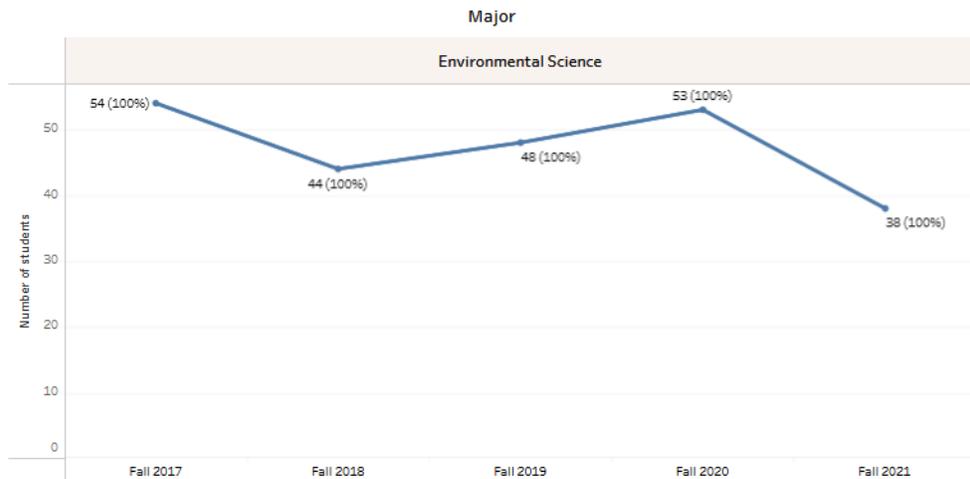


Figure 2. Number of Environmental Science BS majors, 2017-2021

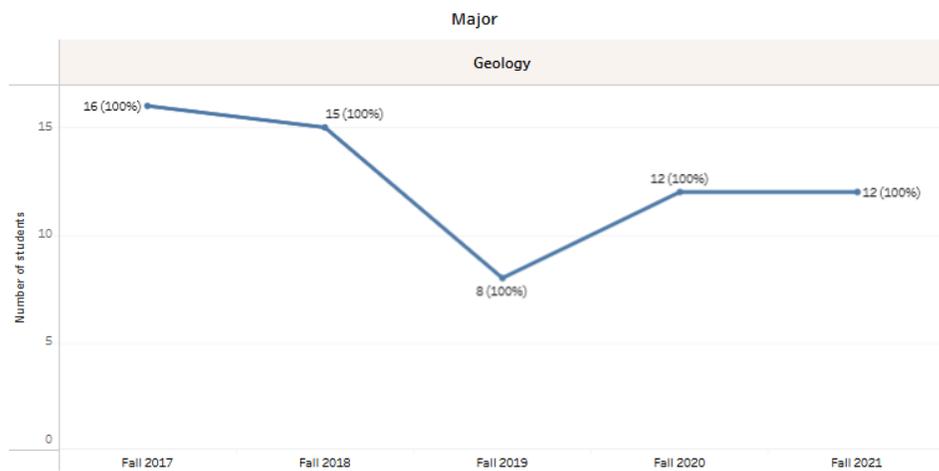


Figure 3. Number of Geology BS and BA majors, 2017-2021

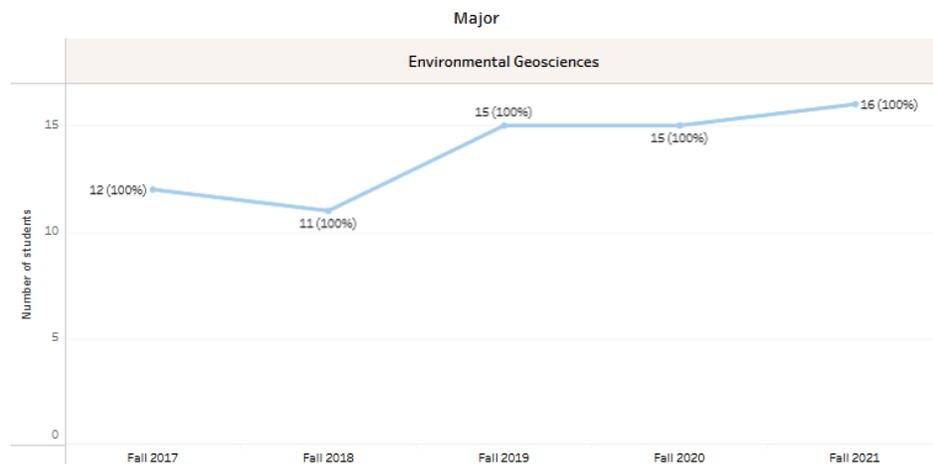


Figure 4. Number of Environmental Geosciences MS majors, 2017-2021

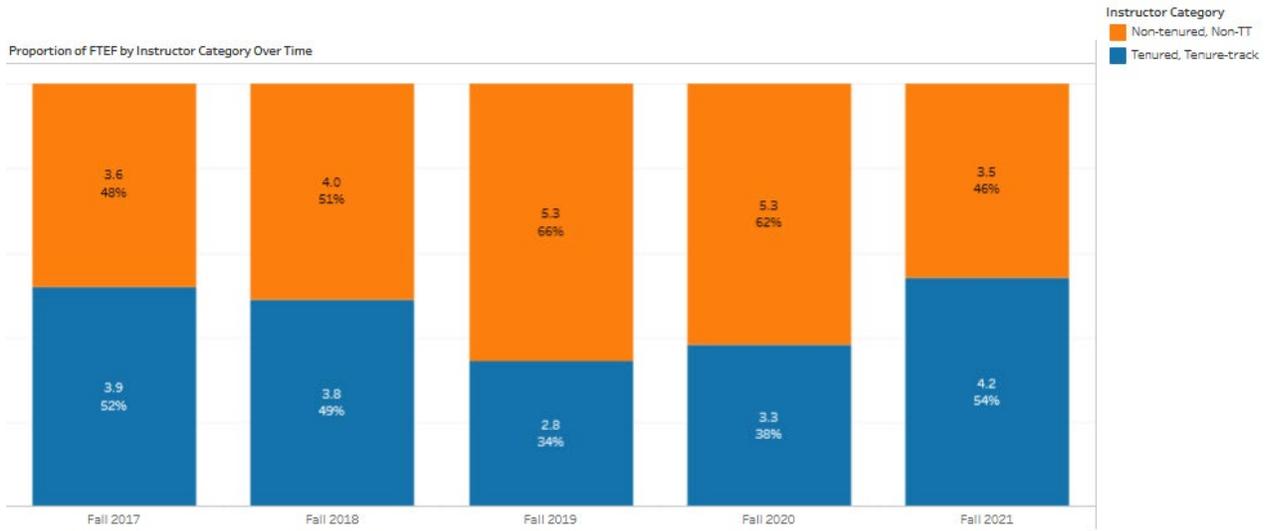


Figure 5. Proportion of FTEF by Instructor Category, Dept. of Earth & Environmental Sciences, 2017-2021