

# ANNUAL PROGRAM REPORT

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| College<br>Department | Science |
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# **ASSESSMENT OF ENVIRONMENTAL SCIENCE B.S. PROGRAM**

## **A. Program Learning Outcomes**

## **B. Summary of Assessment Process**

Relevant section from the long-term assessment plan:

### **Details for Courses Assessed, 2020**



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

## **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.



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 BSBA05013 4837 091 56568 cm. 5q3g 5q3g 5q3g 5q373 489.T0.4905013 489.3901092 507.04630 0.502 0 RGO



**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

| <b>Student ID</b> | <b>Context and Purpose</b> | <b>Disciplinary Conventions</b> | <b>Embracing Syntax and Mechanics</b> | <b>Explanation of Issues</b> | <b>Evidence</b> | <b>Total</b> |
|-------------------|----------------------------|---------------------------------|---------------------------------------|------------------------------|-----------------|--------------|
| 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

**ASSESSMENT OF GRADUATE PROGRAM - ENVIRONMENTAL GEOSCIENCES M.S.**

**A. Program Learning Outcomes (PLO)**

**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:** A

### **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

## **B. Request f**

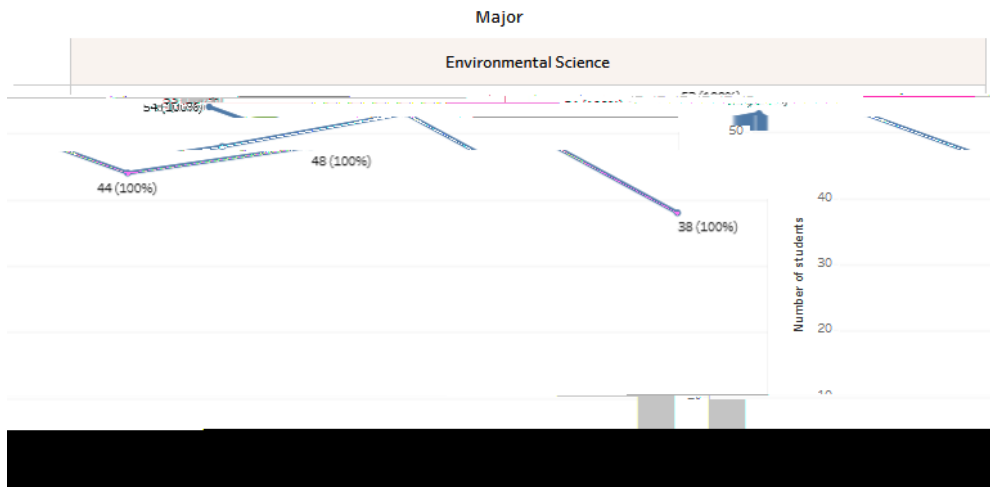


Figure 2. Number of Environmental Science BS majors, 2017-2021

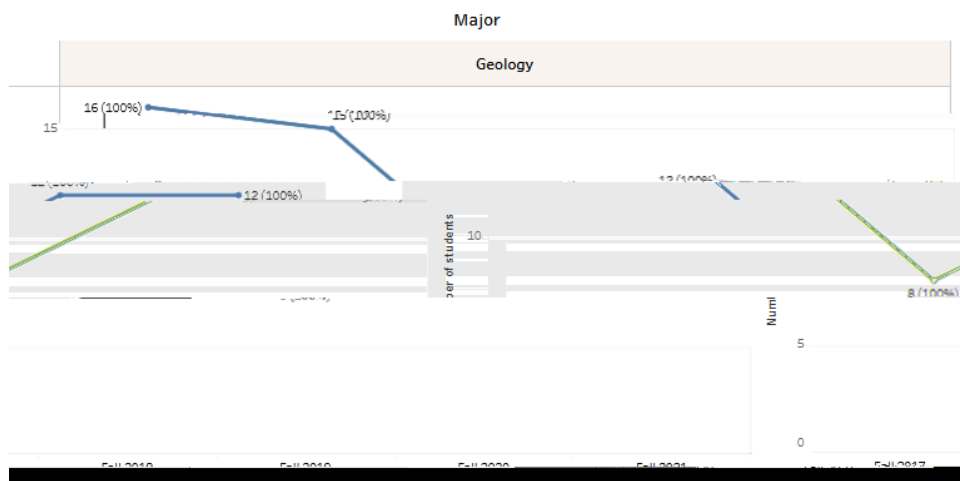


Figure 3. Number of Geology BS and BA majors, 2017-2021

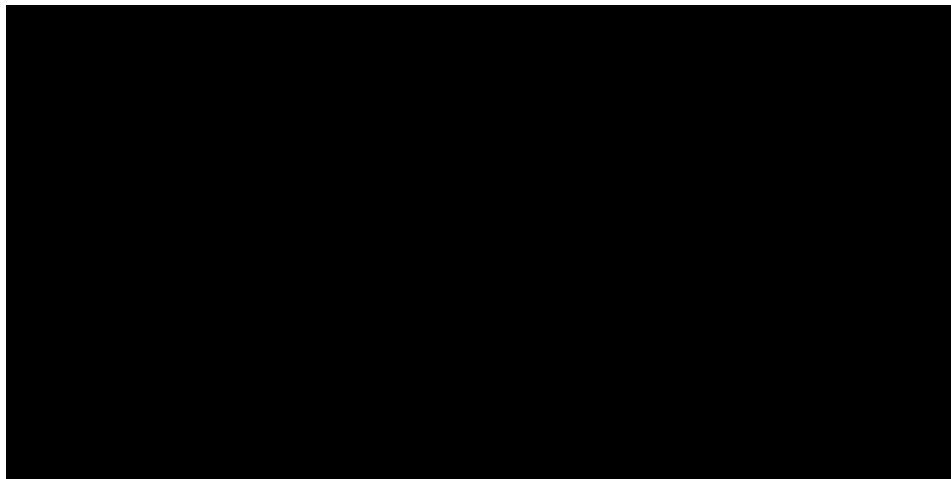


Figure 4. Number of Environmental Geosciences MS majors, 2017-2021

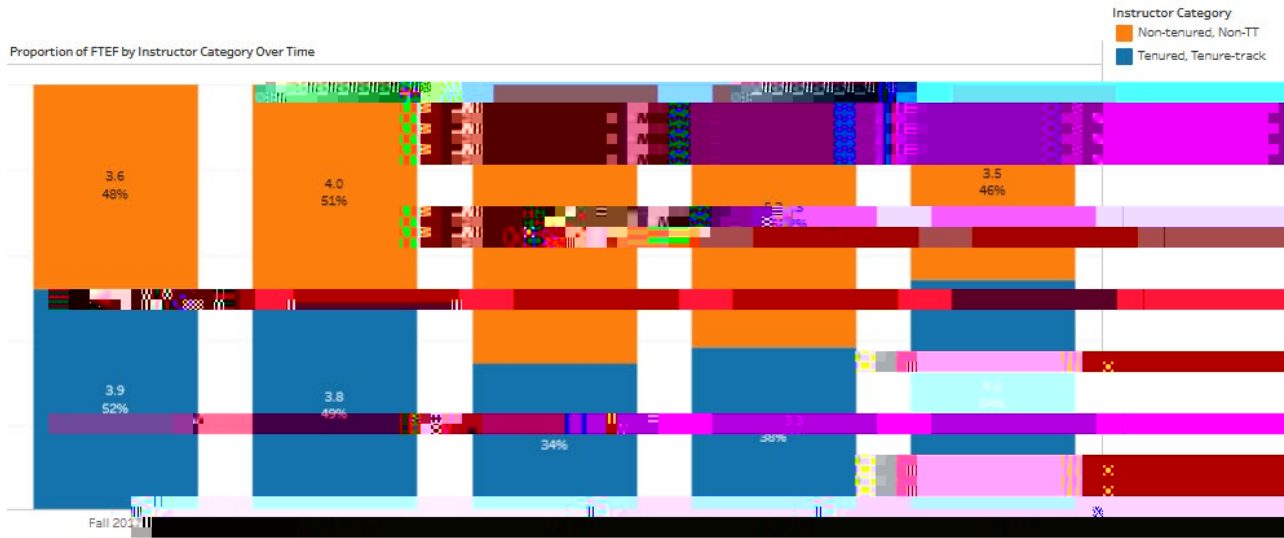


Figure 5. Proportion of FTEF by Instructor Category, Dept. of Earth & Environmental Sciences, 2017-2021