

ASSESSMENT REPORT 2017-2018

Environmental Geology
(Instructional Degree Program)

B.S.
(Degree Level)

Program Mission:

The mission of the Environmental Geology B.S. Program is to provide students with a rigorous, high-quality education in environmental geology.

Student Learning Outcome 1:

Classify and identify geologic materials, including soils, minerals, and rocks.

NMHU Traits Specifically Linked to Student Learning Outcome 1

- Mastery of Content Knowledge and Skills

First Means of Assessment for Outcome 1:

Earn $\geq 75\%$ cumulative laboratory exercise grade from GEOL 202: Earth History. Laboratory series emphasizes hand specimen description and identification.

Summary of Data:

Number of Students Meeting Criterion:	9	Number of Students Not Meeting Criterion:	1
Total Number of Students Assessed:	10	Percent of Students Meeting Criterion:	90%

Second Means of Assessment for Outcome 1:

Earn $\geq 75\%$ cumulative laboratory exercise grade from GEOL 325: Earth Materials. Laboratory series emphasizes hand specimen description and identification.

Summary of Data:

Number of Students Meeting Criterion:	2	Number of Students Not Meeting Criterion:	1
Total Number of Students Assessed:	3	Percent of Students Meeting Criterion:	66.6%

Interpretation of Results for Outcome 1:

A high percentage of geology students met the mineral and rock identification criterion. The Geology faculty recognizes the importance of field application of classroom knowledge and will continue to campaign for more budget monies and more dispensation of time to its faculty to develop and execute field experiences. One of three students in GEOL 325 did not meet the performance indicators; Geology faculty are discussing the factors that may have led to the student's failure, including attendance, course load, and work hours to try to develop intervention measures.

NOTE: GEOL 202 Instructor William Jaremko-Wright developed 5+ new field exercises in GEOL 202. This immersion of students in the natural geologic laboratory in the Las Vegas area undoubtedly factored into the high percentage of students meeting this learning objective.

Student Learning Outcome 2:

Read and evaluate relevant professional literature.

NMHU Traits Specifically Linked to Student Learning Outcome 2

- Critical and Reflective Thinking Skills

First Means of Assessment for Outcome 2:

Earn $\geq 75\%$ on weekly journal article reading assignment summaries in GEOL 330: Structural Geology.

Summary of Data

Number of Students Meeting Criterion:	7	Number of Students Not Meeting Criterion:	0
Total Number of Students Assessed:	7	Percent of Students Meeting Criterion:	100%

Second Means of Assessment for Outcome 2:

Earn $\geq 75\%$ on weekly reading assignment (newspaper articles, journal papers, book chapters) in-class summaries in GEOL 412: Geologic Resources, Law & Environmental Policy.

Summary of Data:

Number of Students Meeting Criterion:	8	Number of Students Not Meeting Criterion:	0
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Total Number of Students Assessed:	8	Percent of Students Meeting Criterion:	100%
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Interpretation of Results for Outcome 2:

Environmental Geology majors do well (100% of students assessed meets expectations) with reading and reporting on advanced topics in geology. Geology faculty invests a considerable amount of time researching topics, identifying papers, and reading the materials in advance of the assignments. Scientific literacy has long been a hallmark of the Environmental Geology Program and continues to set the students apart from their peers.

Student Learning Outcome 3:

Effectively communicate scientific ideas, information and results, both verbally and in writing that (1) demonstrate consistent logic; (2) are well organized; (3) state and defend a thesis; and (4) demonstrate competent use of language.

NMHU Traits Specifically Linked to Student Learning Outcome 3

- Effective Communication Skills

First Means of Assessment for Outcome 3:

Earn ≥ 75% on collection of writing assignments in GEOL 412: Geologic Resources, Law & Environmental Policy that relay a student’s viewpoints and demonstrate the student’s understanding about natural resources management law and environmental policies.

Summary of Data:

Number of Students Meeting Criterion:	8	Number of Students Not Meeting Criterion:	0
Total Number of Students Assessed:	8	Percent of Students Meeting Criterion:	100%

Second Means of Assessment for Outcome 3:

Earn ≥ 75% in summary report on GEOL 495: Senior Geology Applications project.

Summary of Data

Number of Students Meeting Criterion:	3	Number of Students Not Meeting Criterion:	0
Total Number of Students Assessed:	3	Percent of Students Meeting Criterion:	100%

Interpretation of Results for Outcome 3:

Environmental Geology majors do well with communicating scientific ideas, information, and results. Geology faculty invests a considerable amount of time in structuring deadlines (submission of topic, preparing a detailed outline, submitting references and drafts, etc.) and meeting regularly with students to review work and provide editorial improvements. This year's and longitudinal data indicate that consistent and structured academic support are key to student's writing success.

Student Learning Outcome 4:

Competently use appropriate tools from geology, chemistry, physics, and mathematics to solve discipline specific problems.

NMHU Traits Specifically Linked to Student Learning Outcome 4

- Mastery of Content Knowledge and Skills
- Critical and Reflective Thinking Skills
- Effective Use of Technology

First Means of Assessment for Outcome 4:

Earn $\geq 75\%$ in course grade from GEOL 421: Environmental Groundwater Hydrology.

Summary of Data

Number of Students Meeting Criterion:	8	Number of Students Not Meeting Criterion:	0
Total Number of Students Assessed:	8	Percent of Students Meeting Criterion:	100%

Second Means of Assessment for Outcome 4:

Earn $\geq 75\%$ in course grade from GEOL 432: Environmental Geochemistry.

Summary of Data

Number of Students Meeting Criterion:	6	Number of Students Not Meeting Criterion:	0
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Total Number of Students Assessed:	6	Percent of Students Meeting Criterion:	100%
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Interpretation of Results for Outcome 4:

Environmental Geology majors do well using and applying various tool and techniques (for example, total station data; well log data; gravity and magnetic survey data; remote sensing data; calculus, linear algebra, redox reactions, and buffering equations) to complete homework and laboratory exercises. The Environmental Geology Program will continue to use multivariate datasets and instruments from geology and from outside disciplines throughout the curriculum.

Student Learning Outcome 5:

Competently use appropriate laboratory and field methods and instrumentation.

NMHU Traits Specifically Linked to Student Learning Outcome 5

- Mastery of Content Knowledge and Skills
- Critical and Reflective Thinking Skills
- Effective Use of Technology

First Means of Assessment for Outcome 5:

Earn $\geq 75\%$ in course grade from GEOL 330: Structural Geology course demonstrating proficiency in using a Brunton compass, Jacob staff, and hand-held GPS unit for field data collection, as well as abilities in stereographic projections, geologic mapping, and report writing.

Summary of Data

Number of Students Meeting Criterion:	7	Number of Students Not Meeting Criterion:	0
Total Number of Students Assessed:	7	Percent of Students Meeting Criterion:	100%

Interpretation of Results for Outcome 5:

Geology seniors each earned grades of B or above in the Structural Geology course that included two graduate students and two extended (2+ days) field experiences. The Environmental Geology Program will continue to implement numerous field experiences,

from afternoon outings to extended immersive learning experiences, and integrate field data collection, mapping, and interpretation within the curriculum.

Student Learning Outcome 6:

Attain employment in geology, environmental science, or related fields and/or obtain admission to graduate school.

NMHU Traits Specifically Linked to Student Learning Outcome 6

- Mastery of Content Knowledge and Skills
- Critical and Reflective Thinking Skills
- Effective Communication Skills
- Effective Use of Technology

First Means of Assessment for Outcome 6:

All (100%) of graduates from the Environmental Geology Program will find placement in geology-related jobs or graduate school within 3 months of graduation.

Summary of Data

Number of Students Meeting Criterion:	4	Number of Students Not Meeting Criterion:	0
Total Number of Students Assessed:	4	Percent of Students Meeting Criterion:	100%

Interpretation of Results for Outcome 6:

The Environmental Geology Program boasts 100% placement in career paths or graduate programs of its students. In 2017-18, 4 students graduated from the program and went on to work at environmental consulting firms or enter Master's degree programs. Geology faculty considers this an important measure of the success of its program. Students are well prepared for a career or advanced course work in the geosciences.

Assessment of Center Students:

(If your program is offered at one of the NNHU Centers, please contact OIER to have an analysis conducted for those students. If this does not apply to your program you can delete this section.)

N/A

Assessment of Online Students:

(If your program is offered online please contact OIER to have an analysis conducted for those students. If this does not apply to your program you can delete this section.)

N/A

Utilization of Results: (Indicate your plans for using the results in this report to improve your program. All programs are required to complete this section.)

Based upon the 2017-18 outcomes data as well as longitudinal data from the last 5+ years, student learning outcomes have been maintained at a consistently high level (100% for most student learning outcomes; >70% for all student learning outcomes) in the Environmental Geology Program. Academic areas to continue to reinforce throughout the curriculum include written communication and applied mathematics. The Geology faculty will engage in curriculum mapping in Fall 2017 to ensure introduction, reinforcement, and mastery of writing and mathematics skills throughout the Environmental Geology program of study.

Changes to Program Based on Results:

- *Develop a Senior Exit Survey to gain the students' perspective of their undergraduate experience and better assess student needs.*
- *Build guest speakers into the curriculum (water resources managers, economic geologists, hazard mitigation specialists, etc.) so that students see the application of geology to environmental issues and learn about career tracks.*

Retention Strategies

- *Add 1-2 additional required field trips in the GEOL 325 course to increase the time and context students have for seeing and identifying minerals and rocks and thus, building and strengthening their mineral and rock identification skills.*
- *Gain budgetary approval for a 3rd tenure-track geology faculty member to provide additional learning experiences, research opportunities, and individualized attention to Environmental Geology majors. At this time, the Environmental Geology Program is threatened by a reduction in teaching staff, which will seriously impact the Environmental Geology Program's ability to teach its scheduled classes and support students in meeting the program learning objectives.*
- *Coordinate field and laboratory experiences among junior-, senior-, and/or graduate-level classes to build larger student cohorts and increase academic integration.*
- *Re-evaluate the number of credit hour requirements for the Environmental Geology major as well as the 2-year and 4-year degree plans. Consider if there are classes to omit or course to consolidate in order to increase time to completion.*