

ASSESSMENT REPORT 2016-2017

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 325: Earth Materials.
Laboratory series emphasizes hand specimen description and identification.

Summary of Data:

Number of Students Meeting Criterion:	9	Number of Students Not Meeting Criterion:	2
Total Number of Students Assessed:	11	Percent of Students Meeting Criterion:	82%

Second Means of Assessment for Outcome 1:

Earn $\geq 75\%$ average of 3 laboratory assignments in GEOL 301: Environmental Geology that emphasize mineral and rock identification.

Summary of Data:

Number of Students Meeting Criterion:	5	Number of Students Not Meeting Criterion:	0
Total Number of Students Assessed:	5	Percent of Students Meeting Criterion:	100%

Interpretation of Results for Outcome 1:

A high percentage of geology students met the mineral and rock identification criterion, but the number in the GEOL 325 class could be better. The Geology faculty recognizes the importance of field application of classroom knowledge. While there is already one required all-day field trip to a mica mine for GEOL 325 students, the Geology faculty intends to add an additional 1-2 required field trips to increase the time and context students have for seeing and identifying rocks and thus, building and strengthening their identification skills (budget permitting).

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 term paper from GEOL 317: Depositional Environments describing a regional rock formation and its depositional environment.

Summary of Data

Number of Students Meeting Criterion:	3	Number of Students Not Meeting Criterion:	0
Total Number of Students Assessed:	4	Percent of Students Meeting Criterion:	75%

Second Means of Assessment for Outcome 2:

Earn $\geq 75\%$ on term paper (Adopt a Mineral) from GEOL 325: Earth Materials describing the physical, chemical, and structural properties of a mineral.

Summary of Data:

Number of Students Meeting Criterion:	8	Number of Students Not Meeting Criterion:	3
Total Number of Students Assessed:	11	Percent of Students Meeting Criterion:	73%

Third Means of Assessment for Outcome 2:

Earn $\geq 75\%$ on project report on in GEOL 301: Environmental Geology on an environmental geology issue.

Summary of Data:

Number of Students Meeting Criterion:	5	Number of Students Not Meeting Criterion:	0
Total Number of Students Assessed:	5	Percent of Students Meeting Criterion:	100%

Interpretation of Results for Outcome 2:

Environmental Geology majors do well (>70% of students assessed meets expectations) with reading, writing, and reporting on advanced topics in geology. Note, though, that this comes with faculty putting initial time into 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. The Geology faculty would like to have >80% achievement in this outcome and is discussing additional ways to introduce, practice, and reinforce reading and interpretation of geologic literature in the curriculum.

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 \geq 75% in class presentation in GEOL 325: Earth Materials on mineral term project.

Summary of Data:

Number of Students Meeting Criterion:	9	Number of Students Not Meeting Criterion:	2
Total Number of Students Assessed:	11	Percent of Students Meeting Criterion:	82%

Second Means of Assessment for Outcome 3:

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

Summary of Data

Number of Students Meeting Criterion:	6	Number of Students Not Meeting Criterion:	0
Total Number of Students Assessed:	6	Percent of Students Meeting Criterion:	100%

Interpretation of Results for Outcome 3:

Environmental Geology majors do well with communicating scientific ideas, information, and results. Again, this comes with much faculty-student engagement, from requiring classroom dialogue and computer-assisted class presentations throughout the curriculum.

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 424: Environmental Geophysics.

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%

Second Means of Assessment for Outcome 4:

Earn $\geq 75\%$ in course grade from GEOL 425: Geomorphology.

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:	67%

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; and others) 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. One of three students in GEOL 425 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.

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

First Means of Assessment for Outcome 5:

Earn $\geq 75\%$ in course grade from GEOL 435: Physical Volcanology course demonstrating proficiency in using a Brunton compass, Jacob staff, and hand-held GPS unit field data collection, as well as abilities in stereographic projections, geologic mapping of volcanic terrains, and report writing.

Summary of Data

Number of Students Meeting Criterion:	6	Number of Students Not Meeting Criterion:	0
Total Number of Students Assessed:	6	Percent of Students Meeting Criterion:	100%

Interpretation of Results for Outcome 5:

Geology seniors each earned grades of B or above in an advanced volcanology course that included six graduate students and two extended (3+ day) 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

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:	5	Number of Students Not Meeting Criterion:	0
Total Number of Students Assessed:	5	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 2016-17, 5 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.

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 2016-17 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.*
- *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.*