

ASSESSMENT REPORT 2021-2023

Environmental Geology
(Instructional Degree Program)

B.S.
(Degree Level)

Environmental Science, Environmental Geology, and Water Resources
(Concentrations)

Geographic Information Systems
(Certificates)

Program Mission:

The mission of the Environmental Geology B.S. Program is to provide students with a rigorous, high-quality education in environmental geology and natural resources management with concentrations in Environmental Science, Environmental Geology, and Water Resources.

Student Learning Outcome 1:

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

NMHU Traits Specifically Linked to Student Learning Outcome 1

- Mastery of Content Knowledge and Skills

Earn $\geq 75\%$ cumulative laboratory exercise grade from GEOL 3250: Earth Materials. Laboratory series emphasizes hand specimen description and identification.

Summary of Data: (Fall 2022)

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 1:

A high percentage of geology students met the mineral and rock identification criterion. The Environmental Geology faculty recognizes the importance of field application of classroom knowledge. They work diligently to plan and implement hands-on in-the-field laboratories throughout the curriculum. The NRM Department will continue to include the provision of field experiences in its unit Strategic Plan and campaign for more budget monies and more dispensation of time to its faculty to develop and execute field experiences.

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 reading assignment summaries in GEOL 3330: Structural Geology.

Summary of Data: (Fall 2021)

Number of Students Meeting Criterion: 6	3	Number of Students Not Meeting Criterion: 0	0
Total Number of Students Assessed: 6	3	Percent of Students Meeting Criterion: 100	100%

Second Means of Assessment for Outcome 2:

Earn $\geq 75\%$ on reading assignment (newspaper articles, journal papers, book chapters) in-class summaries in GEOL 4/5120: Geologic Resources, Laws & Environmental Policies.

Summary of Data: (Spring 2022)

Number of Students Meeting Criterion:	10	Number of Students Not Meeting Criterion:	0
Total Number of Students Assessed:	10	Percent of Students Meeting Criterion:	100%

Interpretation of Results for Outcome 2:

Geology faculty long ago (2006) identified weak scientific paper writing, class absenteeism, and inattention to deadlines as on-going problems for some of its students. We addressed the problem through a variety of measures, including developing rigorous and uniform class attendance and assignment deadline policies and requiring shorter but more frequent paper submissions. The latter provides students with repeated opportunities in developing paper theses, gathering literature resources, synthesizing geologic information, and communicating their findings in writing. Faculty also structure timetables for paper milestones (topic approval, preliminary references, outline, etc.) and requiring submission of two to three drafts of the required term papers in order to keep students on a track for success. We have “closed the loop” on this assessment and are proud that other units, like Forestry, have copied this action as cited in the NMHU Outcomes Assessment Handbook. Imitation is the highest form of flattery!

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 $\geq 75\%$ on collection of writing assignments in GEOL 4120: 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: (Spring 2023)

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 3:

Earn $\geq 75\%$ in term project presentation in GEOL 4/5140: Fundamentals of Geospatial Information, Science & Technology that relays a student's research, evaluation, and interpretation of a natural resource management issue in a geospatial science context.

Summary of Data:

Number of Students Meeting Criterion:	14	Number of Students Not Meeting Criterion:	
Total Number of Students Assessed:	14	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.

The one student who did not meet the criterion was not an Environmental Geology major. Numerous attempts to reach out and offer assistance failed. It is unclear why the student did not turn in any (0/12) assignments. The Environmental Geology faculty will work to address time management among its students – majors and non-majors – so that they are better at staying on-task and completing workflow.

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 4900: Independent Study and/or GEOL 4990: Independent Research.

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%

Second Means of Assessment for Outcome 4:

Earn $\geq 75\%$ in course grade from GEOL 4/5250: Geomorphology.

Summary of Data: (Spring 2023)

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 4:

Environmental Geology majors do extremely well in applying various tool and techniques (for example, total station data, water chemistry measurements, gravity and magnetic surveying values, 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. The NRM Department will continue to prioritize student opportunities for hands-on cutting-edge analytical instrument usage in the study of natural resources management in its unit Strategic Plan.

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 4950: Senior Geology Applications 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: (Spring 2022)

Number of Students Meeting Criterion:	2	Number of Students Not Meeting Criterion:	0
Total Number of Students Assessed:	2	Percent of Students Meeting Criterion:	100%

Interpretation of Results for Outcome 5:

Environmental Geology seniors each earned grades of B or above in the Senior Applications course that included geologic mapping exercises, material synthesis, water quality monitoring, and resource management prescriptions. The Environmental Geology Program will continue to implement numerous field experiences, from afternoon outings to extended immersive learning experiences, and integrate field data collection, natural resources mapping (bedrock, soil, and water), and data 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:	6	Number of Students Not Meeting Criterion:	
Total Number of Students Assessed:	6	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. During the 2021-23 assessment period, 6 students graduated from the program and all went on to work at environmental consulting firms or enter Master’s degree programs. The Environmental 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.