Academic Degree Programs Assessment

Submitted to the University Assessment Panel

AY 2021-2022

Part I: Assessment Plan

College of Liberal Arts and Sciences

Department of Geology and Environmental Geosciences

Geology

M.S.

2021-2022

Submitted to the University Assessment Panel by: Mark R. Frank

Mark R. Frank, Interim Chair

1. Introduction

The Northern Illinois University Department of Geology and Environmental Geosciences initiated its M.S. program in 1969, when the departments of Geology and Geography were separately created from what had previously been known as the Department of Earth Sciences. To insure that the program is modern, of high quality, and that the students are successful after graduation, the department regularly conducts formal assessments of the M.S. program students,and uses these assessments to continually improve the program. As of 2021, the Department of Geology and Environmental Geosciences comprises 9 faculty, 1 of whom are in the early stages of their career and are therefore untenured. Mark Frank, who served as Assistant Chair and Graduate Program Director for 7 years, did the vast majority of assessment work. This document is derived from an analysis of data collected over the last 7 years. Since our last report in 2013, the program has typically had approximately 20 full-time M.S. students. Approximately 90% of these students are supported on teaching or research assistantships during any given year. The M.S. program primarily focuses on research, with a secondary emphasis on workforce preparation. Faculty rely on M.S. students to execute their research plans and all students receive training in some combination of laboratory, field and computer investigative and analysis methods. The goal is to create adaptable graduates with diverse, practical skills and knowledge developed in hands-on work.

2. Student Learning Outcomes (SLOs)

Graduate students seeking a M.S. degree in the Department of Geology and Environmental Geosciences are expected demonstrate a broad variety of skills and knowledge throughout their progress through the program. For purposes of assessment, and to ensure that students have a clear understanding of what is expected of them throughout the program, the Department divides these skills and knowledge into five basic categories described below.

1. Specialized Geoscience Knowledge

Graduate students are key agents in the advancement of scientific knowledge, generally in a fairly specialized realm. This knowledge can be subdivided into four general areas of earth materials, earth features, earth processes and interpretation of the geological record. For example, graduate research may involve reconstructing the depositional environment of glacial sediments, petrographic analysis of rocks and minerals, or modeling of geological processes. Students are expected to develop and demonstrate unique geoscientific skills and knowledge of their chosen sub-discipline, and to impart this knowledge to others, including non-specialists.

2. Collection, Evaluation, and Manipulation of Data

Scientific inquiry and interpretation relies on accurate collection and evaluation of observational and experimental data. Interpretations are only as good as the data that support them, and scientists must strive to maintain excellence in collecting and handling data. Consequently, students must be able to accurately collect and synthesize field and laboratory observations or data. They must be able to assess the data quality, recognize sources of data error and bias, and demonstrate basic proficiency with computer programs used to organize, manipulate, analyze and present data.

3. Scientific Analysis

Scientific analysis is higher-order critical thinking and creative reasoning that requires students to apply their knowledge and skills in novel ways. Students who can effectively perform this critical

thinking will be able to devise original research plans, formulate testable scientific hypotheses, develop multiple working hypotheses to interpret scientific data and observations, assess the quality and accuracy of scientific reporting in the modern media, and assess the approach and results of their own research, as well as the research of others.

4. Communication

The successful advance and use of scientific knowledge and understanding requires effective communication, not only amongst scientists, but also amongst scientists, governments, educators, and the public. To ensure that graduates of the program are effective communicators,students will be able to conduct literature research, summarize the work of others, write technical summaries of research, prepare public presentations, and explain technical information to generalaudiences, including primary and secondary school students and teachers.

5. Societal Significance of Geoscience

Geoscientists have long been at the forefront of the battle for environmental preservation and forthe safe, efficient and logical exploitation of Earth's natural resources. To continue this tradition,and to assist in producing an environmentally conscientious public, students will be able to recognize, describe and explain short- and long-term environmental issues and risks faced by humans and induced by human activities. In addition, they will be able to explain the ways that geoscience contributes to society, including natural hazard assessment, water and mineral resource management, energy resource exploration and utilization, waste management, environmental protection, environmental and climate change, and education.

3. Program-by-Baccalaureate Student Learning Outcomes Matrix

NA

4. Curriculum Map

Course	Program Student Learning Outcomes						
	1.Specialized Geologic Knowledge	2. Collection, evaluation, and manipulation of data	3. Scientific Analysis	4. Communication	5. Societal Significance of Geosciences		
GEOL 501	B	B	D	D	D		
GEOL 720	P	P	P	P	P		
Note. Course supports the outcome at the B=beginning, D=developing, or P=proficient level.							

5. Assessment Methods

EXPLANATION OF ASSESSMENT METHODS TABLE

Assessment Method	**Explanation**					
	Description	Student-Level Achievement [a]	Program-Level Target [b]	When Data Will be Collected	Person Responsible	SLOs Covered
Annual Progress Report	Each M.S. student must convene a thesis committee meeting wherein they summarize the research and coursework progress they have made in the preceding year. Student can be judged to 3) does not meet expectation, 2) meets expectations, or 1) exceeds expectations.	A student will receive a score of meets (2) or better on this assessment.	90% of all students will meet or exceed the student-level target (2) for progress in the program.	Annually, near the end of each spring semester.	Student submits report to their thesis committee. Thesis Director submits to the Graduate Program Director, the committee's evaluation of student progress.	1, 2, 3
Teaching Evaluations	Annual evaluation data submitted by students in courses taught by the M.S. student. Student can be judged to 3) does not meet expectation, 2) meets expectations, or 1) exceeds expectations.	A student will receive a score of meets (2) or better on this assessment.	90% of students will demonstrate established or higher proficiency	Evaluations submitted at the end of each semester, data aggregated when returned to department at the start of each subsequent semester.	Graduate Program Director	1, 4, 5
Colloquium	Each M.S. student will prepare and deliver a professional, public presentation of their research. Student can be judged to 4) introductory, 3) basic, or 2) established or 1) advanced.	A student will receive a score of basic (3) or better proficiency on this assessment.	100% of students will show basic or higher proficiency	Delivered no later than the semester in which the dissertation defense occurs.	Graduate Program Director	1, 2, 3, 4

Assessment Method	Explanation					
	Description	Student-Level Achievement [a]	Program-Level Target [b]	When Data Will be Collected	Person Responsible	SLOs Covered
Thesis Defense	Each M.S. student will publicly present their research methodology, results, and interpretations. The student will then defend their work during questioning by the thesis committee. Student can be judged to 4) introductory, 3) basic, or 2) established or 1) advanced.	A student will receive a score of established (2) or higher proficiency on this assessment.	80% of students will demonstrate established or higher proficiency	Conducted in the final semester before graduation.	Thesis Director and thesis committee	1, 2, 3, 4, 5
Comprehensive Exam: (only for students taking the nonthesis MS option; generally less than 10% of all M.S. students choose this option)	Each M.S. student in the nonthesis program option will take a written examination prepared by an examining committee approved by the Graduate Program Director. Student can be judged to 4) introductory, 3) basic, or 2) established or 1) advanced.	A student will receive a score of established (2) or higher proficiency on this assessment.	100% of students will show established or higher proficiency	Taken after student completes the 34 credit hours of coursework required for the degree	Examination committee submits results to Graduate Program Director	1, 2, 3, 4

Assessment Method	Explanation					
	Description	Student-Level Achievement [a]	Program-Level Target [b]	When Data Will be Collected	Person Responsible	SLOs Covered
External Review of Scholarship	Publication of peer-reviewed articles; presentations at professional conferences; scholarships won; receipt of competitive research funding; honors and awards received. Student can be judged to 2) does not meet expectation, or 1) meets expectations.	A student will receive a score of meets (1) on this assessment.	50% of students that attempt will have won external research funding and presented at a regional, national or international conference	These activities occur in a non-periodic manner. Their timing depends on when students submit papers, attend conferences, or apply for external scholarships and research funding. We attempt to summarize this information at the end of each spring semester.	M.S. students and faculty members are requested to inform the Graduate Program Director when these things happen. This should normally be reported in the Annual Progress Report.	1, 2, 3, 4, 5
Employer Survey	Survey sent to student employers. Employers can respond that our students are prepared for their careers: 1) disagree, 2) slightly agree, 3) agree or 4) strongly agree	Employers will respond with a score of slightly agrees (2) or better on this assessment.	75% of employer responses will be in the agree slightly, agree, and strongly agree	Conducted at the conclusion of any internship, or 6 months after job placement	Assessment Coordinator	1, 2, 3, 4

Note. [a] Student-level target is the score or performance an individual student must demonstrate to say the student met the student learning outcome.
[b] Program-level target is the percent of all students that must demonstrate they meet the student learning outcome.

ASSESSMENT METHODS-BY-OUTCOMES MATRIX

Assessment Method	**Program Student Learning Outcome**						
	1.Specialized Geologic Knowledge	2. Collection, evaluation, and manipulation of data	3. Scientific Analysis	4. Communication	5. Societal Significance of Geosciences		
Annual Progress Report	F, I	F, I					
Teaching Evaluations	F, I			F, I	F, I		
Colloquium	F, D	F, D	F, D	F, D			
Thesis Defense	S, D	S, D	S, D	S, D	S, D		
Comprehensive Exam: (only for students taking the nonthesis MS option; generally less than 10% of all M.S. students choose this option)	S, D	S, D	S, D	S, D			
External Review of Scholarship	F, I	F, I	F, I	F, I	F, I		
Employer Survey	S, I	S, I	S, I	S, I			
Note. F=formative assessment, S=summative assessment, D=direct assessment, and I=indirect assessment. See the paragraph above for an explanation of each type of assessment.							