Annual Academic Assessment Report Cover Sheet

Assessment reports are due the 1st Wednesday after the Fall Term
Email to: assessment@unlv.edu

Program Information:

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<th>Program Assessed</th>
<th>Geology M.S.</th>
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<td>Department</td>
<td>Geoscience</td>
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<td>College</td>
<td>Sciences</td>
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<td>Date Submitted</td>
<td>December 7, 2017</td>
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Contact Person for This Report

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Please attach a narrative (not to exceed 4 pages, excluding appendices) addressing the following:

- What are the student learning outcomes? Please provide a numbered list.
- Which learning outcomes were assessed?
- How were they assessed? (Programs must use at least one direct assessment of student learning.)
- Undergraduate programs should assess at least one University Undergraduate Learning Outcome (UULO) each year, which may or may not overlap with a program learning outcome.
- Graduate programs should assess at least one outcome related to one of the following graduate level requirements each year:
  - student engagement in research, scholarship, creative expression and/or appropriate high-level professional practice.
  - activities requiring originality, critical analysis and expertise.
  - the development of extensive knowledge in the field under study.
- What was learned from the assessment results?
- How did the program respond to what was learned?

Please limit the narrative portion of your report to no more than four pages. You may attach appendices with data, tables, charts, or other materials as needed. Please explain the relevant conclusions from any appendices in your narrative. Please contact the Office of Academic Assessment if you have questions or need assistance.
M.S. Program in Geoscience
Learning Outcomes

1. Demonstrate an understanding of scientific ethics and appreciation for scientific inquiry / scientific method
2. Demonstrate the ability to
   (1) Search existing scientific literature for work relevant to a specific problem;
   (2) Define and frame a research problem, including hypothesis;
   (3) Design and carry a substantial independent research project through to completion by executing problem-specific skills at an advanced level.
3. Demonstrate the ability to successfully present the results of a scientific inquiry in both oral and written formats.

• Graduate programs should assess at least one outcome related to one of the following graduate level requirements each year:
  o student engagement in research, scholarship, creative expression and/or appropriate high-level professional practice.
  o activities requiring originality, critical analysis and expertise.
  o the development of extensive knowledge in the field under study.

New Assessment Matrices and Measurements Developed

During the Fall 2016-Spring 2017 (and summer 2017) academic year, the geoscience faculty held several meetings including a faculty retreat, in which assessment was discussed. We re-wrote/edited the Learning Objectives for the Geology Ph.D., and we re-did all the assessment matrices for this program. Major changes include the development of at least one direct, quantitative measurement and at least one indirect, qualitative measurement for each of our learning objectives. These new assessments have been implemented in this assessment report.

Assessment

Learning Assessment #2 and #3 and the graduate level requirement of student engagement in research, scholarship, creative expression and/or appropriate high level professional practice are assessed through the following measures:

GEOL 795 Poster Creation and Presentation at Geosymposium (Direct, Quant.)

Nine M.S. students presented their research in an oral format using a poster they created as part of an assignment in GEOL 795. These presentations were delivered to all attendees at the annual UNLV Geosymposium (attendees include numerous representatives from local, regional and national companies, UNLV faculty and students, and sometimes students from other regional universities). All 9 students performed satisfactory on this assessment and earned A’s.
GEOL 795 Faculty Assessments (Indirect, Qualitative)

The faculty assessment of the performance described above indicated that the students did an excellent job of searching existing literature to determine and define their specific research problem (partial learning objective #2), and successfully presented this work in an oral format at a meeting of other scientists (learning objective #3).

Presentation at Geosymposium (not part of GEOL 795) (Indirect, Qualitative)

A separate faculty assessment on 2 M.S. students also occurred at the annual Geosymposium meeting, where these M.S. students presented an oral talk of their individual research (thus different from the poster presentations described above). One of the 2 students performed satisfactorily (excellent; and poor). The unsatisfactory performance was below expectations for scientific content, approach and analysis. The data and processing presented were openly questioned by those knowledgeable of GIS data and methods. This information was relayed to the student for improvement.

Geosymposium, a student organized and run research conference, was well received by all participating groups: undergraduate students, graduate students, faculty, and geologist from the professional community. Written and verbal comments from professional attendees during, and since the conference were all positive to extremely positive. Statements such as, "UNR should do this." and "The students do excellent work." are representative comments. Overall, the students benefit from both presenting their research projects to a broad audience and participating in science discussions in a professional style setting. The students' enthusiasm to attend and present is astounding. In general, this event increases student research activity and eagerness to perform research. In addition, the students that participate in organizing and running the conference learn and practice many organizational, budgeting and logistical skills.

Presentation at Geological Society of America Meeting in Denver (Indirect, Qual)

Another faculty assessment of 2 M.S. students was performed when they presented their M.S. thesis results at the Geological Society of America meeting in Denver. Both students did an excellent job, and several faculty commented on their presentation of their research which included successfully demonstrating searching the existing scientific literature, defining the research problem using a hypothesis, and completing the independent research project through to completion as well as successfully presenting the results in both an oral and written format (e.g. poster).

Faculty Assessment of Thesis Proposal defense (Indirect/Direct, Qual.)

Faculty assessment of a M.S. thesis proposal defense recorded the following observations: The proposal defense was an exemplary demonstration of preparation, background knowledge, thesis project and methods familiarity, and the ability to quickly
answer a range of questions. The student was well prepared by their faculty advisor and obviously had worked hard on preparing the presentation of the research project as well as generally gaining the field of knowledge necessary to be a successful student. I was particularly impressed with the ability to answer on their feet any and all questions not only concerning the project by their general field and methods. The student passed the exam satisfactorily.

A second M.S. thesis proposal defense occurred during the Spring 2017 semester. This student passed his proposal defense and did an excellent job in searching the scientific literature for relevant work and brought several interesting papers to the faculty’s attention. He did a good job at framing a research problem and a hypothesis, although on the latter he required and received some guidance.

Faculty Assessment of Thesis Defense (Indirect/Direct, Qual).
One M.S. student successfully defended their thesis. No additional descriptive data were provided.

A second M.S. student successfully defended their thesis. Faculty assessment provided the following observations: The student was able to correctly cite published research, and give proper credit to previous work. The student performed significantly above average on this topic. He was able to successfully define and frame a research question, and wrote an NSF EAPSI fellowship proposal, which focuses to understand the high Ni anomaly in some Niihau lavas from Hawaii, and its implication to the mantle plume hypothesis. He was awarded the fellowship, which supported his analytical work in China, and his NSF EAPSI proposal later evolved into his master thesis. A manuscript based on his thesis result is in the process of development and will be submitted to a peer reviewed journal. In successfully completing his thesis defense, he was able to demonstrate that he designed and carried a substantial independent research project through to completion by executing problem-specific skills at an advanced level.

Student Progress through the M.S. Degree Program

This is the second year in a row where we report that several M.S. students are not progressing satisfactorily in their program: they are late in filing paperwork and more importantly late in taking their proposal exams (3 students of 8 earned an unsatisfactory evaluation due to these problems, which could lead to loss of their funding). Although this is not a traditional method of assessment, it is an important indicator that our students are not progressing in a timely manner which affects not only their success but our entire program since funding is so limited and continuing students on additional funding past year 2 prevents us from admitting new students. Our faculty have significant concerns about these issues, which we began to address this past year by holding several faculty meetings to discuss changes in our program that would better help students progress in a satisfactory manner leading to increased student success.
We learned that giving increased unsatisfactory ratings to students did increase their compliance at meeting these deadlines. Several faculty meetings had partial time devoted to them to discuss these issues and although some suggested changes were presented, none have yet been adopted other than giving students an unsatisfactory evaluation at the end of each semester where they do not complete the appropriate milestones on time.

Summary

Overall, we are pleased with the successes of our M.S. students. As a whole, they are satisfactorily demonstrating their abilities to search existing scientific literature, develop hypotheses and frame their research problem, and design and carry out a substantial independent research project through to completion. These students are also effectively presenting their results in both oral and written formats.

Geoscience remains one of the top ranked programs at UNLV, with a national ranking in the top 100 university Geology programs. The Hydrogeology Program was also ranked by the largest groundwater association in the world as in the top 100 programs in North America.