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>Earth and Environmental Science BS</th>
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<td>Department</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.
Earth and Environmental Science BS Degree Program
Learning Outcomes

1. Demonstrate the knowledge of major rock types, geologic time, evolution, and earth history events.
2. Demonstrate the knowledge of geological availability, exploitation, use and environmental impacts of both nonrenewable and renewable natural resources.
3. Demonstrate sufficient quantitative skills, and proficiencies in computers and multi-media systems for application in the analysis and presentation of earth science concepts, and successful group work and development of teamwork skills.
4. Demonstrate the ability to recognize, formulate, employ, and interpret the scientific methodology by integrating accumulated skills and knowledge with a capstone experience for this degree comprising the successful completion of a research project as part of a regularly scheduled course, or as an independent research experience, resulting in its presentation as part of the department’s regularly scheduled Geosymposium research conference. This also includes the ability to employ critical thinking skills.

For this Assessment:
UULOs Learning Outcome: Communication

Graduates are able to write and speak effectively to both general and specialized audiences, create effective visuals that support written or spoken communication, and use electronic media common to one’s field or profession. Specific outcomes for all students include:

1. Demonstrate general academic literacy, including how to respond to the needs of audiences and to different kinds of rhetorical situations, analyze and evaluate reasons and evidence, and construct research-based arguments using Standard Written English.
2. Effectively use the common genres and conventions for writing within a particular discipline or profession.
3. Prepare and deliver effective oral presentations.
4. Collaborate effectively with others to share information, solve problems, or complete tasks.
5. Produce effective visuals using different media.
6. Apply the up-to-date technologies commonly used to research and communicate within one’s field.
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 EES major, 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 Outcome #2 is assessed through the following 2 measures:*

1. **GEOL 335 Exam 2 (Direct, Quantitative)**

EES Majors: Enrollment 24. Average grade 85%.

- 88% performed satisfactorily (21 out of a total of 24). Average 87%.
- 13% performed unsatisfactorily (3 out of a total of 24), with average exam grades C- or lower. Three students were at a C- (71% each)

Overall, students performed satisfactorily on this assessment measure. There is improvement needed on this exam among a small number of students. Of those three students who performed unsatisfactorily on this assessment, one of the students went on to significantly improve on the third exam (A-) but the other two actually performed worse (D and F respectively). Actions: Faculty will review and refine the study guide, and will try to obtain more information from those students who performed poorly to better understand why.

2. **GEOL 335: Faculty Assessment (Indirect, Qualitative)**

As reported by Dr. Judkins at the end of the course:
Overall, the EES majors are performing adequately as a cohort. This class serves as the milestone experience for EES majors. For the Fall 2016-Spring 2017 year, they did well in demonstrating their knowledge of geological availability, exploitation, use and environmental impacts of both nonrenewable and renewable natural resources.

Assessment
*Learning Outcome #3, and the UULO Communication are assessed through the following measures:*

1. **GEOL 335: Final grade on the small-group term research paper (Direct, Quant.)**

100 % performed satisfactorily (24 out of a total of 24). Average 90%.
0 % performed unsatisfactorily (0 out of a total of 24), with average grades C- or lower.

This class serves as the milestone experience for EES majors. The students performed very well on this assessment, but improvement on the first draft would be preferred. A new transparent assignment format was implemented to the term paper and while it helped, there seemed to be more that the students could have done to be successful on the first drafts. There were many student groups on the first drafts that score below a 75% and some were 50%, however, they all made the necessary improvements and managed their time to perform well on the final drafts. This accounted for the overall high grades. Actions: In order to obtain a more even performance between drafts, after the midsemester, the instructor will redistribute and review the newly implemented transparent assignment in order to improve on the quality of the first drafts.

The UULOs Learning Outcome: Communication can also be partially assessed through this measure (research paper). As noted above, the EES majors this year demonstrated an effective use of geoscience conventions for writing. The faculty will take earlier action in the semester in order to help students improve on their first drafts. Otherwise, no further action is indicated at this time.

2. GEOL 430: Geosymposium, group research poster grade (Direct, Quantitative)

EES Majors: Enrollment 16. Average grade 84%.

100 % performed satisfactorily (16 out of a total of 16). These students averaged 84%. 0 % performed unsatisfactorily (0 out of a total of 16), with average grades C- or lower.

This class serves as their capstone experience. The students develop and complete a research project and present their findings 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). Overall the students did well.

Actions: Continuing with the development of this capstone project, faculty would like to further refine the new transparent assignment structure that was initiated this semester. Specifically, two additional group interviews (beyond the one currently employed) will be scheduled for next year to help prompt further reflection and analysis in their projects. Faculty are concerned that they need to not interfere with student independence, therefore these interviews will be designed to not diminish student self-sufficiency and pressure to achieve. However, two additional group meetings might be an opportunity for students to reflectively contemplate their projects and allow faculty to make limited and broad suggestions as to their project developments. Additionally, faculty are contemplating requiring an additional short written project with the purpose of recording GIS data handling and processing steps involved because the current presentations are not sufficiently long enough to allow a deep dive into their work.
The UULOs Learning Outcome: Communication can also be partially assessed through this measure (poster creation and oral presentation of poster). As noted above, the EES majors this year demonstrated an effective use of producing a scientific poster, applying up-to-date technologies in research and communicating that information to other scientists and students, and demonstrating general academic literacy including how to respond to the needs of audiences – in this case, a highly variable audience which included representatives of numerous different mining, oil, and environmental companies; government entities; faculty; and other students. Thus, this audience varies greatly in their academic backgrounds including attendees with little to no geoscience backgrounds. Although the students performed exceptionally well, faculty plan to increase faculty-student interactions earlier in the semester (mostly to enhance critical thinking – a different UULO). However, in order to enhance their communication skills, faculty plan to ask that students provide a short, written project to go along with their final poster presentation.

3. GEOL 430: Faculty Assessment (Indirect, Qual)

This class serves as the EES major capstone experience. Faculty assessment indicated that the project continues to be successful in driving student academic and group work achievement, but that improvements could be obtained with additional group interviews and written report summaries submitted with the final poster. All EES students performed well in achieving the learning objectives of demonstrating quantitative skills, and proficiencies in computers and multi-media systems for application in the analysis and presentation of earth science concepts, and successful group work and development of teamwork skills (LO#3). Faculty felt that the students were very successful in their ability to communicate to this highly variable audience through their joint oral/poster format. However, since some students just met the definition of satisfactory performance, there is room for improvement as we would prefer seeing all students achieve above average performance on this challenging capstone experience.

This indirect, qualitative assessment measure agrees with the other two direct/quantitative measures in indicating that students are doing well for both Learning Objective #3, and the UULO: Communication.

Summary

In summary, our EES students demonstrated satisfactory performance in Learning Objectives 2 and 3, and in the UULO Learning Objective of Communication. Minor changes will be implemented next year, primarily for the purpose of achieving even better performances from the students.