The Dept of Geoscience has updated how we assess the Earth and Environmental Science BS degree Program. We have completed the following:

1. We updated the learning outcomes for the Earth and Environmental Science BS degree program. The new learning outcomes are listed below (1-4).
2. We updated the curriculum map (Tables 1, 2).
3. We created several new assessments in order to have a balance between (A) Direct and Indirect assessments, (B) Quantitative versus Qualitative assessments, and (3) to address assessment at the beginning, middle and end of our program.
Earth and Environmental Science BS Degree Program  
NEW 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 multimedia 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.

Table 1. Key descriptors for Assessments found in Table 2.

<table>
<thead>
<tr>
<th>Timeline</th>
<th>Direct or Indirect</th>
<th>Qualitative or Quantitative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessment occurs</td>
<td>Assessment is Direct or Indirect. Direct methods ask students to demonstrate their learning while indirect methods ask them to reflect on their learning. Direct methods include some objective tests, essays, presentations and classroom assignments. Indirect methods include surveys and interviews.</td>
<td>Assessment is Qualitative or Quantitative. Qualitative measures &quot;rely on descriptions rather than numbers&quot; (Palomba and Banta, 1999). Quantitative measures assess teaching and learning by collecting and analyzing numeric data using statistical techniques.</td>
</tr>
</tbody>
</table>
Table 2. New Curriculum Map showing which classes/assessments address which learning outcome. See previous list above for Learning Outcomes labeled 1-4. A key for the assessment descriptors (Direct/Indirect; Qualitative/Quantitative, Beginning/Middle/End can be found in Table 1.

<table>
<thead>
<tr>
<th>Learning Outcomes #1-4</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOL 102 (Earth and Life Through Time)</td>
<td>1. Faculty Assessment (Indirect, Qual; Beginning)</td>
<td>1. Final grade on the small-group term research paper (Direct, Quant, Middle)</td>
<td>1. Geosymposium, group research poster grade (Direct, Quant; End)</td>
<td>1. Geosymposium, group research poster grade (Direct, Quant, End)</td>
</tr>
<tr>
<td>GEOL 102 (Earth and Life Through Time)</td>
<td>2. Fossil/Earth History Quiz (Direct, Quant, Beginning)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>GEOL 335 (Earth Resources)</td>
<td></td>
<td>1. Exam 2 (Direct, Quant, Middle)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GEOL 335 (Earth Resources)</td>
<td></td>
<td>2. Faculty Assessment (Indirect, Qual, Middle)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GEOL 430 (GIS)</td>
<td></td>
<td></td>
<td>1. Geosymposium, group research poster grade (Direct, Quant, End)</td>
<td></td>
</tr>
<tr>
<td>GEOL 430 (GIS)</td>
<td></td>
<td></td>
<td>2. Faculty Assessment (Indirect, Qual, End)</td>
<td></td>
</tr>
<tr>
<td>GEOL 430 (GIS)</td>
<td></td>
<td></td>
<td>2. Faculty Assessment (Indirect, Qual., End)</td>
<td></td>
</tr>
</tbody>
</table>
Our previous assessment was too focused on quantitative and direct assessments and they were primarily based on overall course grades instead of specific learning outcomes. To address these issues, in our new plan, we have made sure that every learning objective is assessed through both quantitative and qualitative assessment as well as both direct and indirect methods. We also made sure that assessments are carried out at the beginning, middle and end of the program. Semester course grades are no longer allowed as a method of assessment.

Attached at the end of this document are the assessments for each of the 4 learning objectives. Each semester the appropriate faculty member for each assessment will fill out these forms and submit them to the Assessment coordinator. Each year the Assessment Coordinator presents the results to the faculty, and we discuss the overall results of our assessment and develop and implement changes as needed.
ASSESSMENT

Earth and Environmental Science BS Degree Program
Learning Outcomes #1

1. Demonstrate the knowledge of major rock types, geologic time, evolution, and earth history events

GEOL 102:
1. Fossil/Earth History Quiz (Direct, Quant, Beginning)
2. Faculty Assessment (Indirect, Qual, Beginning);

*****Remember Assessment is based on EES MAJORS ONLY*****

Please fill in the blanks below:

1. Fossil/Earth History Quiz

EES Majors: Enrollment ____. Average grade _____.

_____% performed satisfactorily (____ out of a total of____). These students averaged _____.

_____% performed unsatisfactorily (____ out of a total of____), with average quiz grades C- or lower.

Please state how many students had specific grades of F, D, C-, or withdrew from the class.

If you have any other useful observations based solely on these quiz results, please provide them:

2. Faculty Assessment (Indirect, Qual)

Please provide a short summary of what you learned from this assessment as far as it applies to this learning objective:
2. Demonstrate the knowledge of geological availability, exploitation, use and environmental impacts of both nonrenewable and renewable natural resources.

GEOL 335:
1. Exam 2 (Direct, Quant, Middle);
2. Faculty Assessment (Indirect, Qual, Middle)

*****Remember Assessment is based on EES MAJORS ONLY*****

Please fill in the blanks below:

1. GEOL 335 Exam 2:

EES Majors: Enrollment ____. Average grade _____.

_____% performed satisfactorily (____ out of a total of____). These students averaged _____.

_____% performed unsatisfactorily (____ out of a total of____), with average exam grades C- or lower.

Please state how many students had specific grades of F, D, C-, or withdrew from the class.

If you have any other useful observations based solely on these Exam results, please provide them:

2. Faculty Assessment (Indirect, Qual)

Please provide a short summary of what you learned from this assessment as far as it applies to this learning objective:
ASSESSMENT
Earth and Environmental Science BS Degree Program
Learning Outcomes #3

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.

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

GEOL 430:
1. Geosymposium, group research poster grade (Direct, Quant), End;
2. Faculty Assessment (Indirect, Qual, End)

*****Remember Assessment is based on EES MAJORS ONLY*****

Please fill in the blanks below:

1. GEOL 335: Final grade on the small-group term research paper
EES Majors: Enrollment ____. Average grade _____.
_____% performed satisfactorily (____ out of a total of__). These students averaged ______. 
_____% performed unsatisfactorily (____ out of a total of__), with average grades C- or lower.
Please state how many students had specific grades of F, D, C-, or withdrew from the class.
If you have any other useful observations based solely on these results, please provide them:

2. GEOL 430: Geosymposium, group research poster grade
EES Majors: Enrollment ____. Average grade _____.
_____% performed satisfactorily (____ out of a total of__). These students averaged ______. 
_____% performed unsatisfactorily (____ out of a total of__), with average poster grades C- or lower.
Please state how many students had specific grades of F, D, C-, or withdrew from the class.
If you have any other useful observations based solely on these results, please provide them:

3. GEOL 430: Faculty Assessment (Indirect, Qual)
Please provide a short summary of what you learned from this assessment as far as it applies to this learning objective:
ASSESSMENT
Earth and Environmental Science BS Degree Program
Learning Outcomes #4

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.

GEOL 430:
1. Geosymposium, group research poster grade (Direct, Quant, End);
2. Faculty Assessment (Indirect, Qual, End)

*****Remember Assessment is based on EES MAJORS ONLY*****

Please fill in the blanks below:

1. GEOL 430: Geosymposium, group research poster grade

EES Majors: Enrollment ____. Average grade _____.
_____% performed satisfactorily (____ out of a total of____). These students averaged _____.
_____% performed unsatisfactorily (____ out of a total of____), with average grades C- or lower.
Please state how many students had specific grades of F, D, C-, or withdrew from the class.
If you have any other useful observations based solely on these results, please provide them:

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

Please provide a short summary of what you learned from this assessment as far as it applies to this learning objective: