

**UNIVERSITY ASSESSMENT COMMITTEE**  
**Feedback to Academic Departments on Assessment Activities Reported in 2013-14 (Academic year)**

**UNDERGRADUATE PROGRAMS**

**DEPARTMENT** Chemical Engineering **DATE** 4/21/15

**PROGRAM(S) COVERED IN REVIEW** Chemical Engineering Bachelor of Science

**COMMITTEE MEMBER(S) CONDUCTING REVIEW** Shari Nelson & James Casler

**1. STUDENT LEARNING GOALS**

- |                                       |              |              |                         |
|---------------------------------------|--------------|--------------|-------------------------|
| • Were any goals referenced?          | YES <u>X</u> | NO <u>  </u> | QUALIFIED Y/N <u>  </u> |
| • If so, were goals well articulated? | YES <u>X</u> | NO <u>  </u> | QUALIFIED Y/N <u>  </u> |
| • Do goals address student learning?  | YES <u>X</u> | NO <u>  </u> | QUALIFIED Y/N <u>  </u> |

**Comments:**

*Goals and learning objectives are very explicitly described in terms of ABET student learning outcomes. Thirteen student outcomes are described. Each of these outcomes describe several related performance indicators which can be seen to be analogous to learning objectives.*

In addition to the program goals, please also consider UND's institutional and Essential Studies goals for student learning (shown in alignment within parentheses) and identify which goals are similar to program goals.

- G   1 Communication – written or oral (“able to write and speak in various settings with a sense of purpose/audience”)  
A&E 2 Thinking and reasoning – critical thinking (or “be intellectually curious”; analyze, synthesize, evaluate)  
  C   3 Thinking and reasoning – creative thinking (or “be intellectually creative”; explore, discover, engage)  
  B   4 Thinking and reasoning – quantitative reasoning (“apply empirical data...analyze graphical information”)  
  K   5 Information literacy (“be able to access and evaluate...for effective, efficient, and ethical use”)  
D,F,J 6 Diversity (“demonstrate understanding of diversity and use that understanding...”)  
  K   7 Lifelong learning (“commit themselves to lifelong learning”)  
  H   8 Service/citizenship (“share responsibility both for their communities and for the world”)

**Comments regarding program goals and alignment with institutional and Essential Studies goals:**

*The thirteen learning outcomes align completely with the above Institutional & Essential Studies goals. Above, the relevant outcomes are shown associated with the goals satisfied.*

**2. ASSESSMENT METHODS**

- |  |              |              |                         |
|--|--------------|--------------|-------------------------|
| Were any specific assessment methods referenced?   | YES <u>X</u> | NO <u>  </u> | QUALIFIED Y/N <u>  </u> |
| • If so, were specifically chosen assessment methods appropriately aligned with individual goals?        | YES <u>X</u> | NO <u>  </u> | QUALIFIED Y/N <u>  </u> |
| • Were both direct and indirect assessment methods used as components of a “multiple measures” approach? | YES <u>X</u> | NO <u>  </u> | QUALIFIED Y/N <u>  </u> |

**Comments:**

*An extensive rubric is developed for each of the learning outcomes. Each rubric defines performance which exceeds expectations, meets expectations, is developing, or is unsatisfactory. Of note, an Alumni/Industrial Advisory Board has been in place for about 30 years to provide inputs to the program assessment.*

### 3. ASSESSMENT RESULTS

Were any assessment results reported?	YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>	QUALIFIED Y/N <input type="checkbox"/>
• If so, were the results clear in terms of how they specifically affirm achievement of goals?	YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>	QUALIFIED Y/N <input type="checkbox"/>
• If so, were the results clear in terms of how they indicate need for improvement?	YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>	QUALIFIED Y/N <input type="checkbox"/>
• Were the results tied to goals for student learning?	YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>	QUALIFIED Y/N <input type="checkbox"/>

**Comments:**

*Achievement of student learning goals is assessed annually at the departmental retreat. Three annual assessment are reviewed here. In each case, quantitative results were reported for the 13 outcomes and their respective performance indicators. Areas for improvement are easily identified, providing focus areas for strategic improvement. For example, results from 2012 suggested deficient areas in ability to communicate and ability to function on multidisciplinary teams. The department could then drill down to more specific areas of concern.*

In addition to program goals, some assessment results may be applicable to institutional and Essential Studies goals. Indicate any goals for which the program presents findings, and, for indicated items, describe findings below.

- ☒ 1 Communication – written or oral (“able to write and speak in various settings with a sense of purpose/audience”)  
☒ 2 Thinking and reasoning – critical thinking (or “be intellectually curious”; analyze, synthesize, evaluate)  
☒ 3 Thinking and reasoning – creative thinking (or “be intellectually creative”; explore, discover, engage)  
☒ 4 Thinking and reasoning – quantitative reasoning (“apply empirical data...analyze graphical information”)  
☒ 5 Information literacy (“be able to access and evaluate...for effective, efficient, and ethical use”)  
☒ 6 Diversity (“demonstrate understanding of diversity and use that understanding...”)  
☒ 7 Lifelong learning (“commit themselves to lifelong learning”)  
☒ 8 Service/citizenship (“share responsibility both for their communities and for the world”)

**Comments regarding results and the application of results to program, institutional, and Essential Studies goals:**

*For the years reviewed, the department identified weaknesses relating to the following institutional and Essential Studies goals:*

2012    *Communication and Diversity*

2013    *Communication, Thinking & Reasoning (Quantitative), Diversity, and Information Literacy*

2014    *Information Literacy*

*It should be noted that the department could identify deficient areas with remarkable precision.*

### 4. CLOSING THE LOOP

Were any actions taken on the basis of assessment results reported?	YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>	QUALIFIED Y/N <input type="checkbox"/>
• If so, do curricular or other improvements/changes arising from assessment results directly address goals for student learning?	YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>	QUALIFIED Y/N <input type="checkbox"/>

**Comments:**

*In each of the three periods observed, the department implemented between 13 and 19 curriculum changes, as well as other department environmental changes, that were directly traceable to identified deficiencies, and noted specifically whether and what improvements in achievement of learning objectives resulted.*

## SUMMARY

### *Strengths*

- ☒ A specific plan for assessment is in place.
- ☒ Student learning goals are well-articulated.
- ☒ Assessment methods are clearly described.
- ☒ Assessment methods are appropriately selected.
- ☒ Assessment methods are well-implemented.
- ☒ Direct and indirect methods are implemented.
- ☒ Results are reported.
- ☒ Results are tied to closing the loop.  
(Decision-making is tied to evidence.)

### *Areas for Improvement*

- ☐ No specific plan for assessment is in place.
- ☐ Student learning goals are not well-articulated.
- ☐ Assessment methods are not clearly described.
- ☐ Assessment methods are not appropriately selected.
- ☐ Assessment methods are not well-implemented.
- ☐ A single type of assessment methods predominates.
- ☐ No results are reported.
- ☐ Results are not clearly tied to closing the loop.  
(Decision-making is not directly tied to evidence.)

## OVERALL SUMMARY AND RECOMMENDATIONS:

*This assessment program is exemplary in all respects. Further, the assessment program is itself monitored for continuous improvement. Recommend continued execution of the departmental assessment plan.*

## MATERIALS REVIEWED

- ☐ Annual assessment report
- ☒ Annual Report 2012, 2013, 2014
- ☒ Assessment plan (as posted)
- ☐ Previous assessment review
- ☐ Other (please describe)

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Section 1: ☒ Y ☐ N    Section 2: ☒ Y ☐ N    Section 3: ☒ Y ☐ N    Section 4: ☒ Y ☐ N

### Coding Key:

- Y = yes, this is done appropriately and well (bearing in mind the kind of program(s) reviewed and recognizing that assessment is a cyclical process, i.e., with additional kinds of data to be collected and analyzed in other years)
- Q = qualified yes as action or progress is apparent; however, evidence is lacking that this is completely and appropriately done
- N = no, it is unclear whether it was done at all, or it is not done in relationship to student learning

*Revised Sept 24, 2014*

**UNIVERSITY ASSESSMENT COMMITTEE**  
**Feedback to Academic Departments on Assessment Activities Reported in 2013-14 (Academic year)**

**GRADUATE PROGRAMS**

**DEPARTMENT** Chemical Engineering **DATE** 4/21/15

**PROGRAM(S) COVERED IN REVIEW** Chemical Engineering Master of Science

**COMMITTEE MEMBER(S) CONDUCTING REVIEW** Shari Nelson & James Casler

**1. STUDENT LEARNING GOALS**

- |                                       |                 |                |                           |
|---------------------------------------|-----------------|----------------|---------------------------|
| • Were any goals referenced?          | YES <u>X</u>    | NO <u>    </u> | QUALIFIED Y/N <u>    </u> |
| • If so, were goals well-articulated? | YES <u>    </u> | NO <u>    </u> | QUALIFIED Y/N <u>X</u>    |
| • Do goals address student learning?  | YES <u>X</u>    | NO <u>    </u> | QUALIFIED Y/N <u>    </u> |

**Comments:**

*The 2013 assessment plan clearly articulates two goals, with two and three student learning objectives, respectively, associated with these goals. A new assessment plan is mentioned for Fall 2014 but does not appear to have been posted yet. The learning goals are:*

- 1. Graduates will have mastered selected topics in chemical engineering and related areas to achieve their specific objectives*
- 2. Graduates will be proficient researchers, i.e., they will have the skills required to formulate, assess, and effectively communicate a hypothesis to a technically literate audience.*

*Goal 1, and accompanying learning objectives, is vaguely written. The three learning objectives related to Goal 2 add sufficient specificity and clarity to be measurable.*

**2. ASSESSMENT METHODS**

- |  |              |                |                           |
|--|--------------|----------------|---------------------------|
| Were any specific assessment methods referenced?   | YES <u>X</u> | NO <u>    </u> | QUALIFIED Y/N <u>    </u> |
| • If so, were specifically chosen assessment methods appropriately aligned with individual goals?        | YES <u>X</u> | NO <u>    </u> | QUALIFIED Y/N <u>    </u> |
| • Were both direct and indirect assessment methods used as components of a "multiple measures" approach? | YES <u>X</u> | NO <u>    </u> | QUALIFIED Y/N <u>    </u> |

**Comments:**

*Extensive matrices are provided, covering graduate seminars and the thesis and defense. Elements of the rubrics are associated with specific learning objectives for Goal 2. The alignment of measurement methods to Goal 1 is much less clear. Assessment methods are primarily direct. An exit survey is used to assess Goal 1. This appears to be appropriate, particularly for Learning Objective 1.2, but misses an opportunity to apply indirect methods to Goal 2.*

**3. ASSESSMENT RESULTS**

- |  |                 |                |                           |
|--|-----------------|----------------|---------------------------|
| Were any assessment results reported?  | YES <u>    </u> | NO <u>    </u> | QUALIFIED Y/N <u>X</u>    |
| • If so, were the results clear in terms of how they specifically affirm achievement of goals? | YES <u>    </u> | NO <u>X</u>    | QUALIFIED Y/N <u>    </u> |
| • If so, were the results clear in terms of how they indicate need for improvement?            | YES <u>    </u> | NO <u>X</u>    | QUALIFIED Y/N <u>    </u> |
| • Were the results tied to goals for student learning?   | YES <u>    </u> | NO <u>X</u>    | QUALIFIED Y/N <u>    </u> |

**Comments:**

Assessment is conducted every 5 years with the next assessment to be completed in 2015. An abbreviated report for 2014 provides data from the licensure exam. These data will be of very limited use for closing the loop because there is no indication of what corrective action should be applied where. But the results do suggest (for a very small sample) a pass rate exceeding the national average. Despite small enrollments in this program, a review period of 5 years is too long to effectively identify and correct deficiencies.

**4. CLOSING THE LOOP**

Were any actions taken on the basis of assessment results reported?

YES \_\_\_\_\_ NO X QUALIFIED Y/N \_\_\_\_\_

- If so, do curricular or other improvements/changes arising from assessment results directly address goals for student learning?

YES \_\_\_\_\_ NO \_\_\_\_\_ QUALIFIED Y/N \_\_\_\_\_

**Comments:**

No indication is made that any decisions were made as the result of the provided assessment information.

**SUMMARY****Strengths****Areas for Improvement**

X A specific plan for assessment is in place.  
 \_\_\_\_\_ Student learning goals are well-articulated.  
 \_\_\_\_\_ Assessment methods are clearly described.  
X Assessment methods are appropriately selected.  
 \_\_\_\_\_ Assessment methods are well-implemented.  
 \_\_\_\_\_ Direct and indirect methods are implemented.  
 \_\_\_\_\_ Results are reported.  
 \_\_\_\_\_ Results are tied to closing the loop.  
 (Decision-making is tied to evidence.)

\_\_\_\_\_ No specific plan for assessment is in place.  
 \_\_\_\_\_ Student learning goals are not well-articulated.  
 \_\_\_\_\_ Assessment methods are not clearly described.  
 \_\_\_\_\_ Assessment methods are not appropriately selected.  
 \_\_\_\_\_ Assessment methods are not well-implemented.  
X A single type of assessment methods predominates.  
X No results are reported.  
X Results are not clearly tied to closing the loop.  
 (Decision-making is not directly tied to evidence.)

**OVERALL SUMMARY AND RECOMMENDATIONS:**

While there is much work to be done, this assessment report represents a substantial improvement over the review of 2012. Of particular note is the well-articulated second student learning goal and the alignment of appropriate and precise measurement rubrics with the learning objectives comprising that goal. And, there are indications of future improvements in the works. However, that said, the absence of assessment data on the program is disappointing.

**MATERIALS REVIEWED**

X Annual assessment report  
 \_\_\_\_\_ Annual report  
X Assessment plan (as posted)  
X Previous assessment review  
 \_\_\_\_\_ Other (please describe)

Reviewer(s):	Name	<u>James Casler</u>	<u>Shari Nelson</u>	_____
	Department	<u>Space Studies</u>	<u>Student Success Center</u>	_____
	Phone Number	<u>7-3462</u>	<u>7-0562</u>	_____
	e-mail	<u>casler@space.edu</u>	<u>shari.nelson@und.edu</u>	_____

Section 1: Y Section 2: Q Section 3: N Section 4: N

Coding Key:

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*Revised Sept 24, 2014*