Assessment of Student Learning

2019 Faculty Development Week

New Mexico Tech

Aly El-Osery, Acting Dean of Graduate Studies

Peter Mozley, Associate Vice President for Academic Affairs

Kevin Wedeward, Dean of Engineering

Outline

Why do assessment?

Bigger picture and definitions

Learning/student outcomes

Continuous improvement process

Curriculum maps

NMT’s process

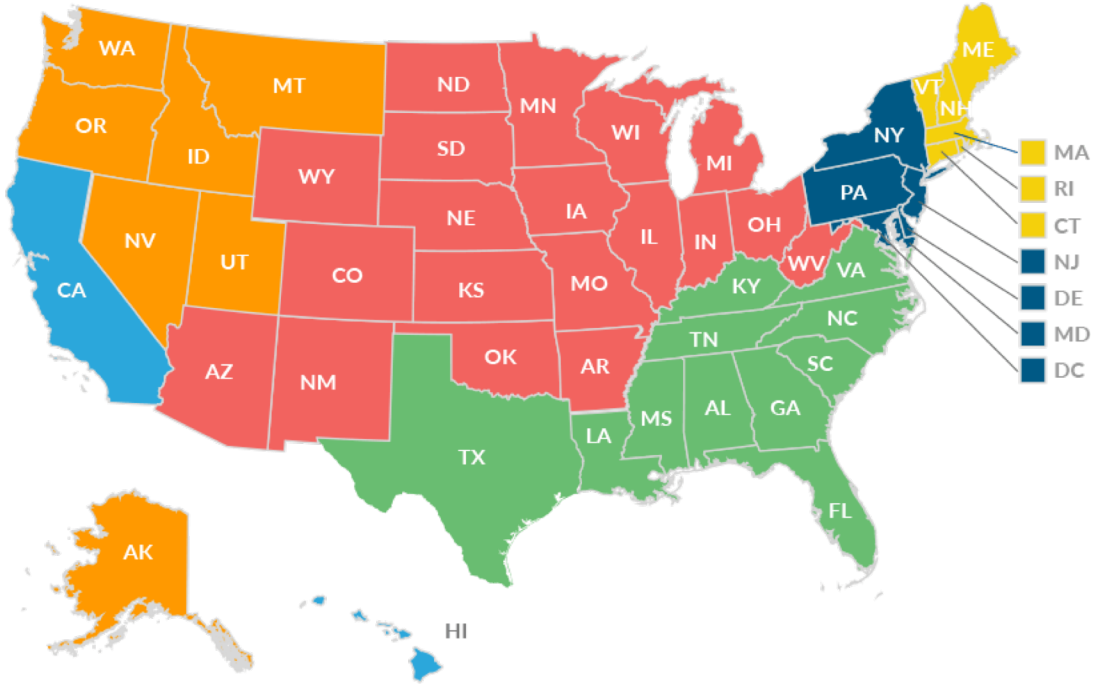
Why do assessment?

Core component of education

Support accreditation of institution

Higher Learning Commission (HLC)

- formerly (until 2014) North Central Association
- accredits **institutions** in 19 states of North Central region



HLC criterion

Criterion 4. Teaching and Learning: Evaluation and Improvement

4.B. The institution demonstrates a commitment to educational achievement and improvement through ongoing assessment of student learning.

Support accreditation of programs

ABET

- accredits **programs** in applied and natural science, computing, engineering, and engineering technology
- 9 undergraduate programs at NMT are accredited by ABET

chemical engineering
computer science
environmental engineering
mechanical engineering
petroleum engineering
civil engineering
electrical engineering
materials engineering
mineral engineering

ABET criterion

Criterion 4. Continuous Improvement

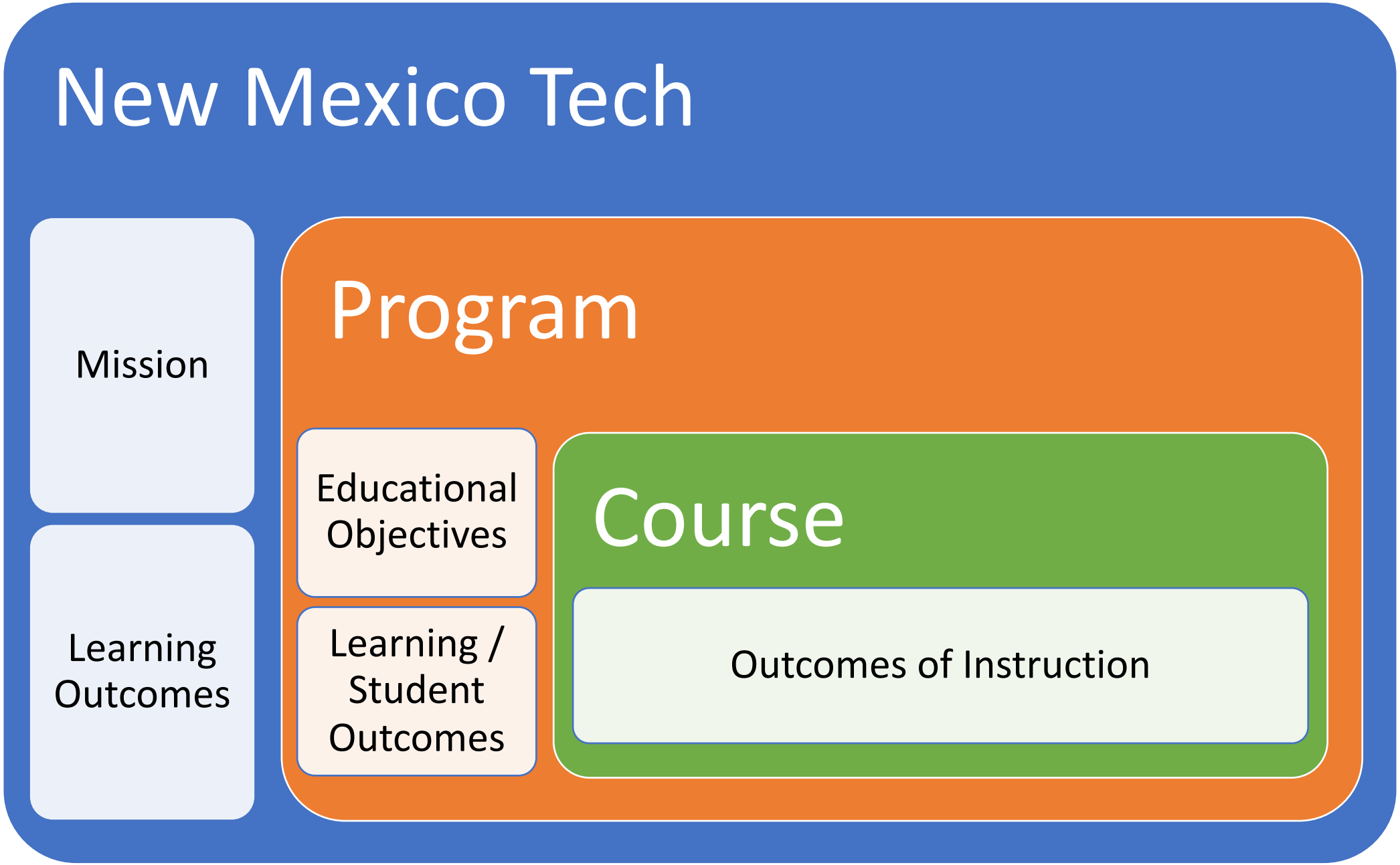
The program must regularly use appropriate, documented processes for assessing and evaluating the extent to which the student outcomes are being attained.

The results of these evaluations must be systematically utilized as input for the continuous improvement of the program.

Required by NM HED for general education

Content Area	Essential Skills
Communication	Communication Critical Thinking Information and Digital Literacy
Mathematics	Communication Critical Thinking Quantitative Reasoning
Science	Critical Thinking Personal and Social Responsibility Quantitative Reasoning
Social and Behavioral Science	Communication Critical Thinking Personal and Social Responsibility
Humanities	Critical Thinking Information and Digital Literacy Personal and Social Responsibility
Creative and Fine Arts	Communication Critical Thinking Personal and Social Responsibility

Bigger Picture and Definitions


New Mexico Tech
Mission
Learning Outcomes
Program
Educational Objectives
Learning / Student Outcomes
Course
Outcomes of Instruction

Definitions

Program Educational Objectives: Broad statements that describe what graduates are expected to attain within a few years of graduation.

Learning/Student Outcomes: Statements that describe what students are expected to know and be able to do by the time of graduation.

Course Outcomes: Statements that describe what students are expected to know and be able to do by the end of the course.

Focus on learning/student outcomes

Each academic program should have

1. process to periodically review and revise outcomes

2. process to regularly assess and evaluate achievement of outcomes, and utilize results to continuously improve along with follow up on prior actions

3. curriculum map (especially for undergraduate programs) to identify courses where outcomes are addressed and/or assessed

Learning/Student Outcomes

Learning/student outcomes

Required for all academic programs

Describe the knowledge, skills, etc. that your program expects students to demonstrate by the time of graduation

- typically begin with an action verb
- graduates of the program: know, provide, comprehend, apply, analyze, evaluate, design, identify, explain, communicate, have the ability to, …

Learning/student outcomes (cont.)

Attainment needs to be assessed/measured, so keep them focused and simple (limit compound sentences and multiple emphases)

Recognize that everything cannot be included and assessed on a regular, sustainable basis, so limit to those deemed most important

- recommend 3-6 in number

ABET specifies learning/student outcomes

BS program in computer science adopted new outcomes 1-6 this year

BS programs in engineering will adopt new outcomes 1-7 next year, so plan to update websites, catalog, assessment processes and data collection

Discuss learning/student outcomes

Graduates will be able to apply knowledge of mathematics, science, and engineering.

Discuss learning/student outcomes (cont.)

Graduates will be able to communicate biological concepts and interpretations to different audiences orally and in writing.

Discuss learning/student outcomes (cont.)

Graduates will be able to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.

Discuss learning/student outcomes (cont.)

Graduates will have a recognition of the need for, and an ability to engage in, life-long learning.

Discuss learning/student outcomes (cont.)

Graduates will have an understanding of the research process.

Continuous Improvement Process

Adopt and document a process

Definitions

Assessment is defined as one or more processes that identify, collect, and prepare the data necessary for evaluation.

Evaluation is defined as one or more processes for interpreting the data acquired though the assessment processes in order to determine how well the student outcomes are being attained.

The results of these evaluations must be systematically utilized as input for the continuous improvement of the program.

How to assess learning/student outcomes

Assessment should happen on a regular and documented schedule (recommend every outcome be assessed on a 1 to 3 year cycle)

May focus on limited number of outcomes each year

Keep effectiveness, efficiency and sustainability in mind

Use targeted problems or assignments for measurable results

- grades from an exam or course are typically not appropriate assessment tools
- don’t over-rely on student self-assessment (e.g., surveys) as opposed to assessment methods based on actual student performance

Measures of student learning

Direct measures are those that measure student learning by assessing actual samples of student work.

- Examples include: problems on exams/quizzes/homework, papers, projects, presentations, portfolios, and performances.

- Capture what students can actually do, so considered best for measuring levels of achievement of student learning.

Measures of student learning (cont.)

Indirect measures provide a less concrete view of student learning and imply student learning through self-reported data and reports.

- Examples include surveys, interviews, course evaluations, and reports on retention, graduation, and placement.

- May be used in conjunction with direct measures to substantiate student learning.

Targets/thresholds for performance

Adopt targets/thresholds for measures of student learning, i.e., quantify expectations

- 70% of students will score 70% or above
- average of students scores will be 70%

Continuous improvement should occur regardless of the level of performance

Curriculum Map

Curriculum maps

- Required for all undergraduate programs
- Table(s) that specify when and where in curriculum learning/student outcomes are addressed and/or assessed
- Useful to identify outcomes that are not being sufficiently addressed and/or courses that may be overloaded
- Range from basic (checkbox) with separate assessment schedule to all inclusive Introduced-Reinforced/Practiced-Mastery-Assessment (IRMA)
    - see NMT's annual assessment report for examples from undergraduate programs

Level of ability format (IRMA)

Required Course	Learning Outcome 1	Learning Outcome 2	Learning Outcome 3	Learning Outcome 4
ANY 101	I			I, A
ANY 200	R, A		I	R
ANY 210	R	I, A	R, A	
ANY 320		R		M, A
ANY 331		M, A	R	
ANY 450	M, A		M, A	

Basic

Required Course	Learning Outcome 1	Learning Outcome 2	Learning Outcome 3	Learning Outcome 4
ANY 101	X			X
ANY 200	X		X	X
ANY 210	X	X	X	
ANY 320		X		X
ANY 331		X	X	
ANY 450	X		X	

Assessment

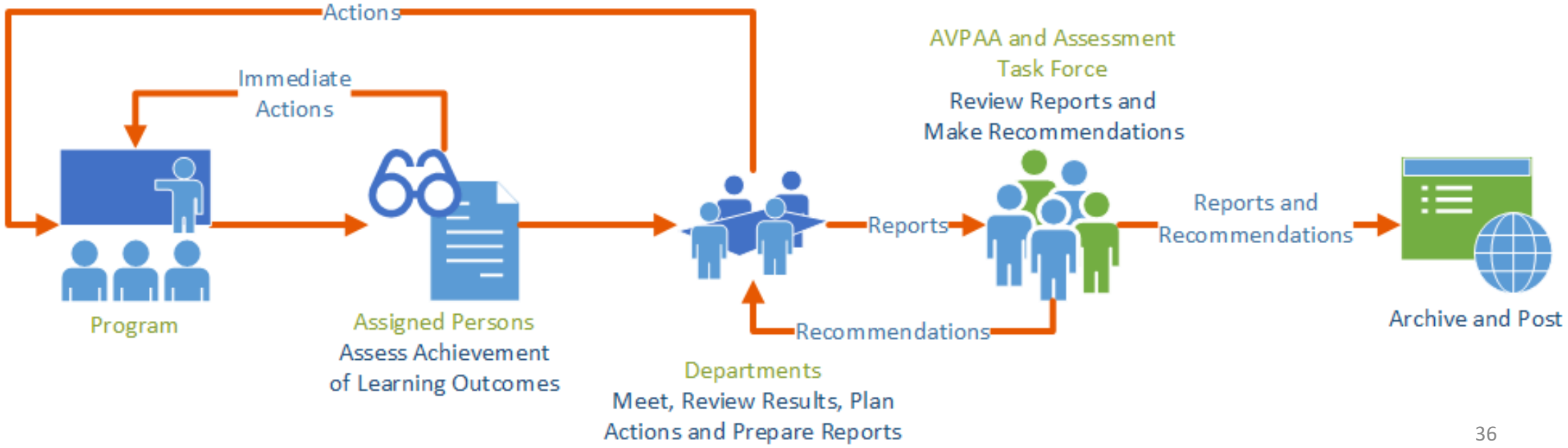
Required Course	Learning Outcome 1	Learning Outcome 2	Learning Outcome 3	Learning Outcome 4
ANY 101				Odd Year
ANY 200	Even Year			
ANY 210		Even Year	Odd Year	
ANY 320				Even Year
ANY 331		Odd Year		
ANY 450	Odd Year		Even Year	

NMT’s Processes

Campus-wide leadership and process

Associate Vice President for Academic Affairs

Assessment Taskforce with membership from across campus



Schedule

October 1: Assessment reports for prior academic year due to the Office of Academic Affairs

December 1: Assessment reports returned to departments with comments. Revisions may be requested.

March 1: Final (in some cases, revised) reports included with the Department Activity Reports (DARs)

ASSESSMENT COVER SHEET AND CHECKLIST FOR 2017-2018 REPORTING PERIOD

1. Academic Program, Office, or General Ed. Area: _____.

2. Report completed by (include title): _____.

3. Date(s) assessment results discussed with faculty/staff? _____.

Checklist

- ❑ Learning outcomes clearly stated? (*What students should know or be able to do.)*
- ❑ Curricular map included and discussed? (Mandatory for undergraduate programs.)
- ❑ Assessment methods noted for all outcomes? (*How you will assess student performance on the outcomes.)*
- ❑ Results included and discussed?
- ❑ Actions indicated for continuous improvement? *(Actions to address areas where improvement is needed.)*
- ❑ 2016-2017 review comments discussed with faculty/staff and addressed?
- ❑ Follow-up from previous report provided (e.g., were planned actions implemented)?

Please contact Peter Mozley if you have any questions when completing your report. Peter.mozley@nmt.edu, 575-835-5311.

Department/Program Assessment Rubric

* Required

1. **Email address** *

2. **Department/program** *

3. **Program Level** *
Mark only one oval.
- ◯ Undergraduate
- ◯ Graduate

4. **Source of learning outcomes** *
Mark only one oval.
- ◯ ABET outcomes
- ◯ Internal to the NMT department/program
- ◯ Other:

5. **Are learning outcomes clear and possible to assess?** *
Learning outcomes are what students should know and be able to do upon completing the program. Complexly worded outcomes should be avoided, as should outcomes that are extremely difficult or impossible to assess.
Mark only one oval.

	1	2	3	4	5	
All are unclear	◯	◯	◯	◯	◯	All are clear

6. **Do learning outcomes focus on knowledge and skills?** *
Outcomes should focus on things students know or be able to do.
Mark only one oval.

	1	2	3	4	5	
Most do	◯	◯	◯	◯	◯	Most do not

7. **Are outcomes mapped to the curriculum?** *
Ideally departments should map outcomes to courses where they are assessed (i.e., curricular mapping). This is now mandatory for all undergraduate programs.
Mark only one oval.
- ◯ Yes
- ◯ No

8. **Comments**

9. **Are the assessment methods capable of assessing student performance on outcomes?** *
Each learning outcome should have clearly identified methods used to gauge performance. For example, an outcome for oral presentation skills could be assessed using faculty scoring of student presentations.
Mark only one oval.

	1	2	3	4	5	
Methods do a poor job of assessing associated outcomes	◯	◯	◯	◯	◯	Methods do a good job of assessing outcomes

10. **Comments**

11. **Are assessment results stated clearly and interpreted?** *
Data should be clearly reported and interpreted.
Mark only one oval.

	1	2	3	4	5	
Results and interpretation are unclear	◯	◯	◯	◯	◯	Results and interpreation are very clear

12. **Comments**

13. **Were appropriate actions taken, or proposed?** *
Based on the evaluation/interpretation of the assessment data some actions should be taken for continuous improvement of the program.
Mark only one oval.

- ◯ Yes
- ◯ No

14. **Comments**

15. **Is there follow up from previous report?** *
The report should describe what was done in response to the previous year's assessment.
Mark only one oval.

	1	2	3	4	5	
Needs more follow up	◯	◯	◯	◯	◯	Well done

16. **Comments**

17. **Are dates of department meetings in which assessment was discussed included in the report?** *
Departments should include this information in their reports in order to document broad faculty participation in the process.
Mark only one oval.

- ◯ Yes
- ◯ No

18. **Reviewer's general comments and suggestions**

19. **Name and Title of Reviewer** *

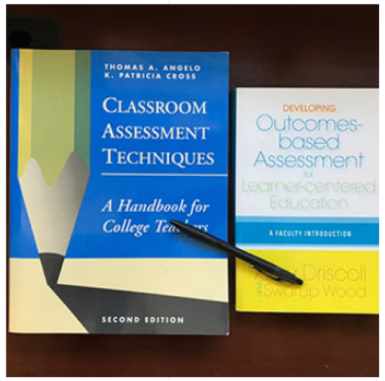
☐ Send me a copy of my responses.

Assessment webpage

https://nmt.edu/academicaffairs/assessment/

ACADEMIC AFFAIRS OFFICE

Assessment of Student Learning



Assessment Primer

Reports, Forms, Templates, and Other Resources

Assessment News and Events

Introduction

Assessment of student learning is critical to New Mexico Tech for a variety of reasons. Fundamentally, the purpose of assessment is to ensure that students gain the knowledge and skills necessary for them to function as professionals and members of

The End -
Questions or Comments?

ABET student outcomes for engineering

Graduates of the program will have

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. an ability to communicate effectively with a range of audiences

ABET student outcomes for engineering (cont.)

4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.