

Academic Program
Plan for Assessment of Student Learning Outcomes
The University of New Mexico

A. College, Department and Date

1. College: *School of Engineering*
2. Department: *Department of Civil Engineering*
3. Date: *February 2, 2016*

B. Academic Program of Study*

B.S. Construction Engineering

C. Contact Person(s) for the Assessment Plan

Dr. Susan Bogus Halter, Associate Professor, email: sbogus@unm.edu

D. Broad Program Goals & Measurable Student Learning Outcomes

The B.S Construction Engineering program is accredited by the Engineering Accreditation Commission of ABET, <http://www.abet.org>. The Program Educational Objectives and Student Outcomes are listed in the UNM Catalog and on the Department of Civil Engineering website (<http://civil.unm.edu/accreditation/index.html>). The following items are consistent with the program's published objectives and outcomes.

1. Program Educational Objectives (i.e., Broad Program Learning Goals for this Degree/Certificate Program)

- Graduates will meet high professional and ethical standards of employers of construction engineers
- Graduates will pursue professional licensure and/or participate in advanced study
- Graduates will pursue leadership positions in their communities and professions

2. Student Outcomes (i.e., List of Student Learning Outcomes (SLOs) for this Degree/Certificate Program

- a) An ability to apply knowledge of mathematics, science and engineering.
- b) An ability to design and conduct experiments as well as to analyze and interpret data.

* Academic Program of Study is defined as an approved course of study leading to a certificate or degree reflected on a UNM transcript. A graduate-level program of study typically includes a capstone experience (e.g. thesis, dissertation, professional paper or project, comprehensive exam, etc.).

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- c) An ability to design a system, component or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability.
- d) An ability to function on multi-disciplinary teams.
- e) An ability to identify, formulate and solve engineering problems.
- f) An understanding of professional and ethical responsibility.
- g) An ability to communicate effectively.
- h) The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.
- i) A recognition of the need for and an ability to engage in lifelong learning.
- j) A knowledge of contemporary issues.
- k) An ability to use the techniques, skills and modern engineering tools necessary for engineering practice.

E. Assessment of Student Learning Three-Year Plan

All programs are expected to measure some outcomes annually and to measure all priority program outcomes at least once over two consecutive three-year review cycles. Describe below the plan for the next three years of assessment of program-level student learning outcomes.

1. Student Learning Outcomes

The student outcomes will be assessed on a regular basis. The following tables provide the plan for outcomes assessment:

Criteria	CE305	CE308	CE331	CE350	CE360	CE370	CE409	CE477	CE499	FE Exam
a		X	X							X
b	X				X					
c	X								X	
d								X	X	
e		X							X	X
f				X			X			X
g								X	X	
h				X		X				
i							X		X	
j						X		X		
k			X						X	

Relationship to UNM Student Learning Goals (insert the program SLOs and check all that apply):

University of New Mexico Student Learning Goals				
Program SLOs	Knowledge	Skills	Responsibility	Program SLO is conceptually different from university goals.
<i>a) An ability to apply knowledge of mathematics, science and engineering.</i>	X	X		
<i>b) An ability to design and conduct experiments as well as to analyze and interpret data.</i>	X	X		
<i>c) An ability to design a system, component or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability.</i>	X	X	X	
<i>d) An ability to function on multi-disciplinary teams.</i>		X	X	
<i>e) An ability to identify, formulate and solve engineering problems.</i>	X	X		
<i>f) An understanding of professional and ethical responsibility.</i>			X	
<i>g) An ability to communicate effectively.</i>		X		
<i>h) The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.</i>	X		X	
<i>i) A recognition of the need for and an ability to engage in lifelong learning.</i>			X	
<i>j) A knowledge of contemporary issues.</i>	X		X	
<i>k) An ability to use the techniques, skills and modern engineering tools necessary for engineering practice.</i>		X		

Adapted from Kansas State University Office of Assessment

2. How will learning outcomes be assessed?

A. What:

Student outcomes will be assessed through Course and Student Work Assessments (CSWAs). The CSWAs are produced by the course instructors at the end of the semester and have evolved over time to be increasingly focused on the degree to which specific outcomes are being met. Where comparable data are available from previous semesters, the current CSWA includes a trend over time of how well the outcome is being achieved. This is considered a direct measure of student learning.

The other assessment tool employed to evaluate the student outcomes is student performance on the Fundamentals of Engineering (FE) Examination. Measures include both the overall pass rate compared to national averages as well as scores from subject-specific questions. FE Exam results are used to assess outcomes a, e, and f. The AM (morning) results on the general exam are used to evaluate Outcomes a. and f., while the results of the PM (afternoon) Civil/Construction Exam are used to evaluate Outcome e. In particular, AM subjects, related to mathematics, chemistry, and mechanics/strength of materials, are used to assess Outcome a., while the ethics and business practices subject in the AM is used for Outcome f. PM Exam averages in the Civil/Construction Engineering subjects are used to assess Outcome e. This is considered an indirect measure of student learning.

All course-related assessments use a three-scale rubric as follows: 3 = Exemplary, 2 = Satisfactory, 1 = Unsatisfactory. Target levels for outcomes attainment have been established as 75% of students achieving an outcome of 2 or better. All FE Exam assessments evaluate the percent correct for selected questions on both the AM and PM portions of the FE Exam by the Program's students compared to the National averages. If the Program's scores are 5 percentage points or more below the National average over the assessment period, a concern is noted. A metric below the national average was selected in part because UNM students are required to take the exam prior to graduation while those at the National level may self-select to take the exam.

The results of the CSWAs are documented in a report prepared by the individual faculty members performing the assessment.

B. Who:

The goal is to evaluate evidence from all students in the program. For that reason, outcomes assessment is associated with core undergraduate courses which means that all students in the program should be included in the assessment.

3. When will learning outcomes be assessed? When and in what forum will the results of the assessment be discussed?

In order to make the outcomes assessment process sustainable, as well as to allow individual faculty some flexibility in documenting achievement of outcomes, the Department Assessment Committee developed a schedule for the collection of assessment information.

Required courses scheduled only in the Fall Semester conduct CSWAs during and at the completion of the Fall Semester. Spring-only courses produce CSWAs during and at the completion of the Spring Semester.

CSWAs for the courses taught every semester are performed at a minimum of once per year. Because of its importance in the outcomes assessment process, the assessments connected to CE 499L Design of Civil Engineering Systems, the Capstone Design Course, are performed every semester, every year, for reasons previously described.

CSWAs are collected every semester for those outcomes being evaluated; results from the FE exam are also compiled each semester. CSWA data is used to provide feedback to instructors for use in both improving the assessment process as well as in suggesting course improvements. CSWA data and FE Exam results are also provided on an annual basis to the Department Accreditation Committee in order to conduct outcomes assessments and suggest curriculum modifications.

4. What is the unit’s process to analyze/interpret assessment data and use results to improve student learning?

The program’s outcomes assessment process is on a 3-year cycle as illustrated in the following diagram. Annual reports are available on the Department website.

