

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, Construction, and Environmental Engineering*
3. Date: *September 5, 2018*

B. Academic Program of Study*

B.S. Civil Engineering

C. Contact Person(s) for the Assessment Plan

Dr. Susan Bogus Halter, AGC Endowed Chair Professor, email: sbogus@unm.edu

D. Broad Program Goals & Measurable Student Learning Outcomes

The B.S Civil Engineering program is accredited by the Engineering Accreditation Commission of ABET, <http://www.abet.org>. Program Educational Objectives are required as part of program accreditation and are used here to describe the broad program goals. The Program Educational Objectives are periodically reviewed and approved by the department faculty (most recently at the September 2018 faculty meeting) and the department advisory board (most recently at the November 2017 meeting). Assessment of Student Outcomes is also required for program accreditation, and the required outcomes have recently been updated by ABET. The Student Outcomes listed here are the new ABET outcomes that were approved by the department faculty at the September 2018 faculty meeting, and they will be assessed starting in the 2018-2019 academic year. Both the Program Education Objectives and Student Outcomes are listed in the UNM Catalog and on the Department of Civil, Construction, and Environmental 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 civil engineers
- Graduates will pursue professional licensure and/or participate in advanced study
- Graduates will pursue leadership positions in their communities and professions

* 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.).

Adapted from Kansas State University Office of Assessment

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

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
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

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 in a variety of courses and the Fundamentals of Engineering (FE) Exam. The following table indicates which courses (or FE Exam) will be used to assess each student outcome:

| Outcome | CE160 | CE305 | CE308 | CE331 | CE335 | CE350 | CE360 | CE382 | CE499 | FE Exam |
|---------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------|
| 1 | | | X | X | | | | | | X |
| 2 | | | | | X | | | | | X |
| 3 | | | | | | | | X | X | |
| 4 | | | | | X | X | | | | X |
| 5 | X | | | | | | | | | X |
| 6 | | X | | | | | X | | | |
| 7 | X | | | | | | | | X | |

Adapted from Kansas State University Office of Assessment

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

| University of New Mexico Student Learning Goals ¹ | | | | |
|--|-----------|--------|----------------|--|
| Program SLOs | Knowledge | Skills | Responsibility | Program SLO is conceptually different from university goals. |
| 1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics. | X | X | | |
| 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 | X | X | | |
| 3. an ability to communicate effectively with a range of audiences. | | X | | |
| 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. | X | | X | |
| 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. | | X | X | |
| 6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions. | X | X | | |
| 7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies. | X | | | |

¹ KNOWLEDGE of human cultures and the natural world, gained through study in the sciences and mathematics, social sciences, humanities, histories, languages and the arts.

SKILLS, both intellectual and applied, demonstrated in written and oral communication, inquiry and analysis, critical and creative thinking, quantitative literacy, information literacy, performance, teamwork and problem solving.

RESPONSIBILITY, both personal and social, that will be manifested in civic knowledge and engagement, multicultural knowledge and competence, ethical reasoning and action, and foundations and skills for lifelong learning.

Adapted from Kansas State University Office of Assessment

2. How will learning outcomes be assessed?

A. What:

Student outcomes will be assessed by the instructor in specific courses and through the results on the FE Exam. Within each course, the instructor will identify one or more pieces of student work to use for the assessment process. Examples of student work that may be assessed include homework assignments, in-class activities, lab reports, quiz questions, or exam questions. An assessment report is produced by the course instructor at the end of the semester based on a template developed by the Department Undergraduate Committee. 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 1 and 4. The overall pass rate is used to assess outcome 1, while the specific questions related to ethics are used to assess outcome 4. This is considered an indirect measure of student learning.

All course-related assessments use a rubric with a three-point scale 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 difference between our students' performance and the overall performance of all people taking the test. If our students' 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.

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. Assessments are the responsibility of the course instructor.

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

Instructors are to assess student outcomes each time one of the courses listed above is offered, which typically means once per academic year. Assessments for courses taught every semester are performed at a minimum of once per year, but preferably each time the course is offered. 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.

Assessment reports are prepared by course instructors and forwarded to the Director of Undergraduate Programs after the end of each semester. Instructors are asked to make an initial evaluation of the assessment results, which are then reviewed by the Department Undergraduate Committee on an annual basis.

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

Once per year (typically in the fall semester), the assessment reports from individual courses and the FE Exam results are compiled into an annual assessment report. The annual assessment report is initially reviewed by the Department Undergraduate Committee which makes recommendations to improve student learning based on the report data. The data and recommendations from the Undergraduate Committee are then presented to the Department Faculty for approval and implementation. The data and recommendations are also presented to the Department Advisory Board for their review.