School of Engineering
Annual Program Report of Assessment of Student Learning Outcomes

Part I: Cover Page

Title of Degree or Certificate Program	**Degree Level** *(Certificate, Associate, Bachelors, Master's, etc.)*
Civil Engineering	Bachelors

Name of Academic Department: Civil Engineering

Name of College/School/Branch: School of Engineering

Academic Year/Assessment Period: 2018-2019

Submitted By (include email address): Susan Bogus Halter, sbogus@unm.edu

Date Submitted to College/School/Branch for Review: December 2, 2019

Date Reviewed by College Assessment and Review Committee (CARC) or the equivalent:

State whether ALL of the program's student learning outcomes (SLOs) are targeted/assessed/measured within one year, two years, OR three years:

Each SLO is assessed annually

If the program's SLO's are targeted/assessed/measured within two years or three years, please state whether this assessment record focuses on SLOs from the first year, second year, or third year:

N/A

Part II: Assessment Report

What Student Learning Outcomes were assessed during this reporting period? List in the table below.

For each SLO, indicate in the table how the SLO was assessed, briefly indicate what results were obtained, what analysis of the data indicated with regard to student learning, and what recommendations have been made regarding the program curriculum.

Student Learning Outcome		**Assessment Measures incl. Measure Type (Direct or Indirect)**	**Performance Benchmark**	**Results**	**Analysis**	**Recommendations for Improvement/ Changes from Instructors**
1) an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics		Course work - Direct	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 assessed as 2 or better	The results of the assessment in CE 331 indicate that 82% (36/40) of students were assessed as "2" or better. The results of the assessment in CE 308 indicate that 83% (41/49) of students were assessed as "2" or better.	This outcome was attained	(CE 331) The students could use even more practice in developing their skillset to identify, formulate, and solve complex engineering problems. Although the outcome was met, there were still a large number of students at only the satisfactory level and several in the unsatisfactory level of demonstrated the outcome. The assessment problem was selected after-the-fact in fulfill the needs of this assessment process. In future assessments, the problem should be developed specifically to evaluate this outcome.

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		Course work - Direct	(see above)	The results of the assessment in CE 335 indicate that 93% (41/44) students were assessed as “2” or better. The results of the assessment in CE 331 indicate that 84% (37/44) students were assessed as “2” or better. The results of the assessment in CE 499 (fall 2018) indicate that 100% of students (12/12) were assessed as “2” or better. The results of the assessment in CE 499 (spr 2019) indicate that 100% of students (22/22) were assessed as “2” or better.	This outcome was attained	(CE 335) The assignments could gradually become more complex for each homework as the class topics progress so that students can periodically apply more advanced engineering tools considering public health, safety, and welfare, as well as global, cultural, social, and environmental, and economic factors. (CE 331) Because this was the last laboratory exercise, some of the students did not complete the assignment, which was otherwise unusual. This was likely a result of the stress of the end of the semester and/or their grade was unlikely to be impacted by missing this exercise. Thus, the next assessment should be carried out earlier in the semester.

3) an ability to communicate effectively with a range of audiences		Course work - Direct	(see above)	The results of the assessment in CE 382 indicate that 55% of students (26/46) were assessed as "2" or better. The results of the assessment in CE 499 (fall 2018) indicate that 100% of students (12/12) were assessed as "2" or better. The results of the assessment in CE 499 (spr 2019) indicate that 100% of students (22/22) were assessed as "2" or better.	This outcome was partially attained	(CE 382) Provide students with examples of good, professional, engineering reports and documents and require written reports of professional quality throughout their courses (CE 499) As has generally been the case, it would be beneficial to improve students' writing skills. Perhaps an additional course where students focus on basic grammar and composition would be beneficial, or better integration of writing skills in existing engineering and non-engineering courses. (CE 497L) A continuing need is to help the students improve their writing skills. Perhaps we could integrate better the use of writing skills in existing

						engineering and non-engineering courses.
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		Course work - Direct	(see above)	The results of the assessment in CE 350 (fall 2018) indicate that 100% of students (25/25) were assessed as “2” or better. The results of the assessment in CE 350 (spr 2019) indicate that 96% of students (24/25) were assessed as “2” or better. The results of the assessment in CE 335 indicate that 100% (44/44) students were assessed as “2” or better.	This outcome was attained	(CE 350) Specifically tie ethical behavior and professional responsibility to considering the impact of engineering situations in global, economic, environmental, and societal contexts and how this should be part of making informed engineering judgments. Add objective assessment(s). (CE 335) Assign grades progressively for each stage of the project and also demand deadlines periodically. In that way students will avoid accumulation of work until the end.

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		Course work - Direct	(see above)	The results of the assessment in CE 160 (fall 2018) indicate that 97% of students (28/29) were assessed as “2” or better. The results of the assessment in CE 160 (spr 2019) indicate that 96% of students (27/28) were assessed as “2” or better. The results of the assessment in CE 499 (fall 2018) indicate that 100% of students (12/12) were assessed as “2” or better. The results of the assessment in CE 499 (spr 2019) indicate that 100% of students (22/22) were assessed as “2” or better.	This outcome was attained	None at this time

6) an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions		Course work - Direct	(see above)	The results of the assessment in CE 305 indicate that 85% (44/52) of students were assessed as “2” or better. The results of the assessment in CE 360 indicate that 77% (33/43) of students were assessed as “2” or better.	This outcome was attained	(CE 360) The results from Sub Criterion 2 (ability to develop or specify tests to obtain appropriate information) and 3 (analyze experimental results to verify hypothesis/theory) are not satisfactory. As a possible solution to increase the outcome for this criterion include: 1. Additional discussion in class regarding the application of lab data to specific problems, 2. Homework problems that require more application of laboratory data, 3. Quizzes focused on use of lab data.

7) an ability to acquire and apply new knowledge as needed, using appropriate learning strategies		Course work - Direct	(see above)	The results of the assessment in CE 160 (fall 2018) indicate that 96% of students (24/25) were assessed as “2” or better. The results of the assessment in CE 160 (spr 2019) indicate that 93% of students (26/28) were assessed as “2” or better. The results of the assessment in CE 382 indicate that 85% of students (40/47) were assessed as “2” or better.	This outcome was attained	(CE 382) The assignment used for this assignment required students to search for information on the internet to use in estimating carbon emissions. Students demonstrated an ability to find information in a variety of reputable (government) website sites and databases and some less reputable locations (general websites with little/no information about the source of the data). Future courses could include more instruction about determining how reliable a source of data is.

Indicate where your assessment plan and the full set of assessment data from this year for this program can be accessed.

The assessment plan and data are currently stored on the Civil Engineering Department server.

Based on the results and analysis provided for the student learning outcome(s) listed in the table above, for EACH student learning outcome, please state if the outcome was met, partially met, or not met. Briefly explain why:

Student Learning Outcome		**Results**
1) an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics		Outcome met
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		Outcome met
3) an ability to communicate effectively with a range of audiences		Outcome partially met
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		Outcome met
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		Outcome met
6) an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions		Outcome met
7) an ability to acquire and apply new knowledge as needed, using appropriate learning strategies		Outcome met

Based on this year's assessment, what suggestions do you have for changes to the assessment process or the SLOs for your program?

- Faculty teaching courses with outcomes assessment responsibilities should review the outcome(s) and design assessment tool(s) before the course begins
- Provide regular reminders to faculty about assessment responsibilities (e.g., annual retreat in fall semester; monthly faculty meetings)

- To strengthen compliance with Outcome 1, CE 331 is incorporating more programming (e.g., MATLAB) into the course; other courses could consider the same approach
- To strengthen compliance with Outcome 3, ask Advisory Board members and other industry professional for a variety of professional writing examples that we can share with students; also inform students of writing assistance available at CAPS
- To strengthen compliance with Outcome 6, provide greater integration between lecture material and laboratory material

Describe any changes to the assessment plan or the SLOs that are in progress based on this year's or previous year's assessment.

None

List what groups (committees, faculty meetings, department leadership, etc.) within your program reviewed the assessment results either from the current year, or from previous years, during the current academic year.

Civil Engineering Undergraduate Committee: reviewed 2018-2019 results and developed recommendations for changes based on assessment results at December 2, 2019 meeting

Civil Engineering Faculty: 2018-2019 assessment results reviewed by faculty and recommendations discussed and approved December 4, 2019

Civil Engineering Department Advisory Board: 2017-2018 assessment report and 2018-2019 assessment plan were presented to the advisory board in December 2018 and April 2019, respectively; the 2018-2018 assessment report will be presented to the advisory board December 2019

Describe any curricular or course changes that are currently in progress based either on this year's assessment, or on previous year's assessment results.

No changes are in progress based on the assessment, but the department is revising the curriculum to address UNM's revisions in the General Education requirements

Describe your plans for assessment of student learning during the upcoming academic year.

Continue to collect data from courses using new SLOs and FE results.