

Institutional Effectiveness Report 2021-2022

Program: Civil & Environmental Engineering BS

College and Department: College of Engineering – Civil Engineering

Contact: Ben Mohr

Mission: The mission of the civil engineering program is to offer the strong academic content necessary to produce well-educated graduates who become innovative and productive members of society. Graduates will possess both the problem-solving skills and the fundamentals of critical thinking and analysis that are crucial for success within the framework of the civil and environmental engineering profession.

Program Goals

- PG 1. Graduates should demonstrate the ability for early career professional growth based on their grasp of fundamental concepts in civil engineering.
- PG 2. Graduates should utilize knowledge and skills to participate in civil engineering design and/or management processes.
- PG 3. Graduates should develop professionally through a commitment to life-long learning.

Student Learning Outcomes

Students should demonstrate...

- SLO 1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
- SLO 3. an ability to communicate effectively with a range of audiences
- SLO 4.

SLO 7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Attainment of PG 1 is supported by Student Outcomes: 1,2,4,6

Attainment of PG 2 is supported by Student Outcomes: 3,4,5

Attainment of PG 3 is supported by Student Outcome: 7

Assessment Methods

1. *Course Components* are grades on a specific, recurring assignment or collection of assignments in a specific course. The assignment must be common to all faculty who teach the course.

base

The faculty chose to include multiple metrics for each SLO. Multiple metrics help the faculty to avoid unneeded reactions to statistical outliers that occur during any evaluation. As such, the occurrence of a single Unacceptable rating will not necessarily require a response.

The thresholds for a required response are:

- Multiple metrics in the red in a single academic year for a given outcome
- Single metrics in the red in consecutive academic years for a given outcome
- Multiple metrics that remain "in the yellow" (i.e., satisfactory) in multiple academic years for a given outcome. Yellow followed by red and vice versa are considered multiple "satisfactory" years as well as single years in the red.

In

In October/November, the Advisory Board reviews Student Outcome metrics to add their insight and requests for investigation to those of the faculty. They also review any planned or recently implemented program changes.

The ABET Committee meets as needed through the fall semester to address any assigned tasks.

In March/April, the CEE Chair reviews Fall (July-

component grades." Overall, it is believed that this change for more accurately reflect attainment of the associated student learning outcome.

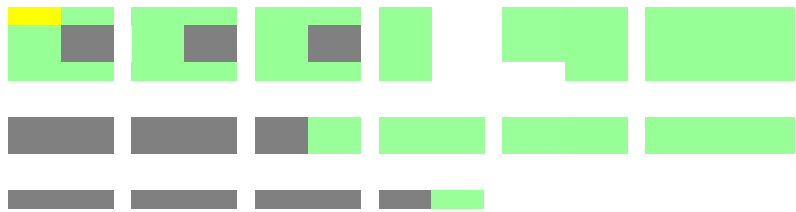
In addition, it was noted that, in some classes, students may not be acquiring the necessary prerequisites to be successful in the courses assessed. For example, for CEE 3413, it was noted that students may not be obtaining the necessary chemistry skills. This concern will be brought to the college level as this issue likely impacts not just CEE students. Similarly, for CEE 3320, college level discussions on ongoing with the Physics department to better prepare students for engineering courses. Complementary discussions with the Chemistry department should be had as well.

SLO 2. a

SLO 3. an ability to communicate effectively with a range of audiences

Communication skills continue to be assessed separately for both oral and written in CEE 4950. Written communication skills are directly measured for both the technical report and poster presentation. The oral presentation component will be separated out moving forward in both semesters as "Presentation Skills", so as to not include the "Quality of Slides," which functions as a measure of both written and oral communication skills.

SLO 3 metrics are shown in the table below.



No issues are noted with Student Outcome 3. Thus, no action is indicated at this time according to the thresholds indicated above.

SLO 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

SLO 5 was broken into three parts for assessment. Many of the assessments were similar to the previous student outcomes.

1. "an ability to function effectively on a team whose members together provide leadership..." – CEE 4950 Senior Design focused on leadership such that a previous assessment was given on leadership and has been carried over to the new student outcome.
2. "...create a collaborative and inclusive environment..." – Peer evaluations are a part of our CEE 4950 grading scheme. In other words, students are directly assessing each other regarding their group. While part of this assessment could fall under the "function effectively on a team..." part of the student outcome, it was strongly felt that a collaborative and inclusive environment is fundamental to the function of a team. As such, the prior peer evaluation has been continued, albeit with slightly different assessment wording.
3. "...establish goals, plan tasks, and meet objectives..." – Students were previously assessed on management principles, which will continue under the new student outcomes. In addition, to increase focus on these principles, in Fall 2019, students were required to further apply this portion of the student outcome by creating a project management schedule in Microsoft Project. This schedule was assessed by both mentors and faculty. The new metric will continue to be improved upon in future semesters.

SLO 5 metrics are shown in the table below.

	Fall	Spr	Fall	Spr	Fall	Spr	Fall	Spr	Fall	Spr	Fall	Spr
CEE 4920 Professionalism and Ethics Course Components												
CEE 4920 Professionalism and Ethics - Leadership Assignment											95.6	86.0
CEE 4950 Senior Design Course Components												
CEE 4950 Senior Design - Leadership paper	73.6	85.0	79.7	77.0	92.6	75.0	95.0	COVID	85.0	92.5	CI Test	96.5
CEE 4950 Senior Design - Management paper	72.8	91.0	85.7	79.0	77.0	88.0	93.0	COVID	81.6	91.3	CI Test	92.1
CEE 4950 Senior Design - Project Mgmt (MS Project)							80.0	COVID	91.2	1.8		92.0
CEE 4950 Senior Design - Peer Eval	88.0	91.0	77.3	92.0	81.6	95.0	94.7	COVID	93.3	8.0		94.3
Instructional Outcome Survey Question(s)												
CEE 4950 Senior Design	3.60	3.77	3.54	3.88	3.40	3.69	3.69	COVID	3.55	3.78	3.82	3.48
Senior Exit Surveys												
Single survey question covers leadership						3.36	3.46	3.52	3.61	3.73	3.87	3.59
Single survey question covers collaborative and inclusive environment												

No issues are noted with Student Outcome 5. Thus, no action is indicated at this time according to the thresholds indicated above.

SLO 6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions

In order to capture different parts of SLO 6, the outcome was split into three parts, with their respective direct assessment metric. Previously, assessment was conducted primarily using the final course grade or final lab component grade for those courses containing a laboratory component. In essence, all parts of the student outcome were lumped together. In order to extrapolate any potential issues, an attempt was made to focus exclusively on four lab-based courses where formal lab reports are submitted by the students. Therefore, for each of the four

Modifications for Improvement:

As part of the 6-year ABET accreditation process for the BSCE program, a reaccreditation visit occurred in Fall 2020. From this review, one weakness was initially documented:

"This criterion requires the program to regularly use appropriate, documented processes for assessing and evaluating the extent to which the student outcomes are being attained. The documents provided by the program show that student outcome (1) is assessed directly using an overall "Mentor (Technical) Grade" on the final report for CEE4950, Senior Design Project, and indirectly assessed using a question in the Senior Exit Survey. (a)S(and B(co)10a-1.217 TT4 (TjEMC P #14 TD(t)-5 (he)-3.3 (a)11 (r)-2.2 (o)-3.3 (v)-2.7 (i)-2.3 (2e)