

Institutional Effectiveness Report

2019-20

Program: Civil & Environmental Engineering BS

College and Department: College of Engineering – Civil Engineering

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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

PEO 1. Graduates should demonstrate the ability for early career professional growth based on their grasp of fundamental concepts in civil engineering.

PEO 2. Graduates should utilize knowledge and skills to participate in civil engineering design and/or management processes.

PEO 3. Graduates should develop professionally through a commitment to life-long learning.

Student Learning Outcomes

Students should demonstrate...

1. an understanding of the interrelationships between environmental, and economic factors
2. an ability to communicate effectively with a range of audiences
3. 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
4. an ability to function effectively on a team whose goals and objectives are defined by a common mission
5. an ability to design and conduct experiments, analyze and interpret data, and use engineering judgment to draw appropriate conclusions
6. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

A departmentally developed curriculum map can be found in Appendix 1 that shows the connections

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-December) FE Exam results. The Advisory Board also reviews both Program Educational Objectives and departmental Mission/Vision statements to give input for the upcoming Fall Faculty Retreat.

In June/July, Spring FE Results are typically received and staff tabulate all Student Outcome metrics from the prior academic year. These metrics are then reviewed by the Chair in preparation for the Fall Faculty Retreat, at which point the cycle begins again.

This schedule provides for annual opportunities to identify and react to both course-level and program-level issues as they become apparent. Thus, in addition to helping reduce dependence on a large-scale mid-cycle and end-of-cycle review, the new schedule allows for faster response to program-level issues.

Results

SO 1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics

In order to capture all parts of an engineering problem (and identify any potential issues) as indicated in SO1, the outcome was broken up into three parts:

1. "Identify" – the CEE 4950 Interim 1 Technical Report grade was used as it would be expected that students have successfully identified the engineering problem
2. "Formulate" – the CEE 4950 Interim 2 Technical Report grade was used as, at this point, students would have devised a methodology for solving the engineering problem
3. "Solve" – the CEE 4950 Final Report grade should give an indication regarding the students' ability to solve the engineering problem

All metrics for this outcome are shown in the table below:

CEE 4310 Steel Design and CEE 4320 Concrete Design final course grades are moving toward BDC /TT0790e

SLO 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

In order to capture all parts of an engineering problem (and identify any potential issues) as indicated in SO1, the outcome

1. "an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments..."

2. "...which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts"

For both parts of SO 4, CEE 4920 Professionalism and Ethics was used.

All metrics for this outcome are shown in the table below:

For the Spring 2020 semester, two new assignments were planned to be given to students in order to more directly assess this outcome. Unfortunately, due to the COVID situation and transition into online course content, these assessments were not conducted but are planned for future semesters.

Given the current metrics, none met the threshold for a required action.

2019-20		2015-16		2016-17		2017-18		2018-19	
Fall	Spr	Fall	Spr	Fall	Spr	Fall	Spr	Fall	Spr
CEE 4950 Senior Design Course Components									
95.0			82.0	73.6	85.0	79.7	77.0	92.6	75.0
93.0			75.0	72.8	91.0	85.7	79.0	77.0	88.0
80.0									
94.7			87.4	88.0	88.0	91.0	77.3	92.0	81.6
Instructional Outcome Survey Question(s)									
3.69			3.77	3.80	3.60	3.77	3.54	3.88	3.40
Senior Exit Surveys									
3.46	3.52								3.36
3.58	3.5								3.46
2.67	2.49								2.50

A new assessment was added in Fall 2019 to support student application of management principles. In addition, to increase focus on these management 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. Students demonstrated strong performance in the new assessment. The metric will continue to be improved upon in future semesters.

No metrics fell below the excellent threshold for 2019-2020.

SO 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 SO 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 courses, the final lab report was chosen as the most appropriate measure, broken down into three parts.

1. "an ability to develop and conduct appropriate experimentation, ..." – The Introduction and Methodology sections were chosen to represent the "develop and conduct" portions of this student outcome.
2. "...analyze and interpret data..." – The Results and Discussion section(s) of respective lab reports were chosen to represent the "analyze and interpret" portions of this student outcome.
3. "...and use engineering judgment to draw conclusions." – The Conclusion section was used to assess this portion of the student outcome.

Modifications for Improvement:

SO 1 and SO 2

CEE 4310 Steel Design and 4320 Concrete Design final course grades had multiple reds for the 2018-19. Recent faculty hires and time for those new hires to acclimate have reversed the trend. The 2019-20 academic year showed a recovery period that CEE expects to continue.

SO 5

An embedded course assignment in CEE 4950 Senior Design is used to assess how well students can

