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STUDENT ENGAGED ASSESSMENT OF ABET STUDENT OUTCOME 4 THROUGH SENIOR DESIGN PROJECTS IN CIVIL AND ENVIRONMENTAL ENGINEERING

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Introduction

- Department of Civil and Environmental Engineering (CEE) at the College of Engineering and Computer Science (ECS) offers two bachelor's degrees: Bachelor of Science in Civil Engineering, and Bachelor of Science in Environmental Engineering.
- CEE 475 Civil and Environmental Engineering Design is the required capstone design experience course for both degrees.
- CEE 475 assessment can be challenging.
 - No exams, only group design projects
 - Lots of teamwork
 - Lots of soft skills – presentations, business writing, communications
 - Lots of new technical knowledge
 - Lots of new standards, codes, specifications
 - Application of new mainstream software in industry
 - Different formats of technical writing
 - Different project-specific deliverables

CEE 475 Facts

- One semester only capstone project in spring semesters
- 4 credits, meets M/W/F, 5h-25m contact hours in total
- Enrollment varies from 39 – 52 in the past five years
- 8 – 12 groups, 2 – 6 members depending on the nature of projects
- Students work in groups, with each take a lead in one component and support others in other components
- Client Meetings, Project Proposal, Monthly Presentations, Final Oral Presentation, Poster Presentation, Deliverables, Project Report, Member Evaluation
- Sample topics of projects
 - Bridge replacement and new construction
 - Environmental study and sustainability
 - Multi-story and tall building design
 - Site development and stormwater management
 - Transportation and traffic improvement design
 - Water and wastewater treatment facility design

CEE ABET Assessment Cycle

SO	'24-'25	'25-'26	'26-'27	'27-'28	'28-'29	'28-'29
1		A/E	C	A/E	C	A/E
2			A/E	C	A/E	C
3	A/E	C	A/E	C	A/E	C
4		A/E	C	A/E	C	A/E
5	A/E	C	A/E	C	A/E	C
6		A/E	C	A/E	C	A/E
7			A/E	C	A/E	C



ABET Student Outcome 4

At the time of graduation students should have 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.

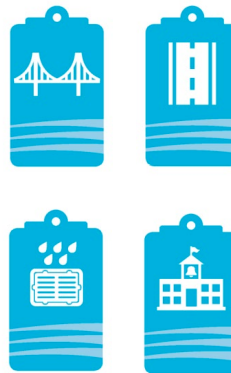


Figure Source: ASCE

SUMMARY

- Peer evaluations of statements prepared for Performance Indicators PI.4.3 and PI.4.4 were conducted in two lunch meetings.
- Results were reflected among students and further incorporated into their on-going senior design.
- Students have valued the opportunity to assess peers in a uniform rubric.
- General feedback from peer evaluators: **student engaged assessment is collaborative, constructive, and effective.**

SO4 Performance Indicators

SO
4

- PI.4.1 Environmental and Societal
- PI.4.2 Economic Context
- PI.4.3 Ethical and Professional Responsibilities
- PI.4.4 Complex Global Challenges

Student Engaged Assessment Method

CEE 475 – Peer evaluation of statements for PI.4.3 and PI.4.4

- Each group provided a statement of how their group project would address each performance indicators.
- Each group selected one member to be the peer evaluator.
- Two separate lunch meetings were conducted with five peer evaluators, with each evaluator grading other two teams' statements.
- Peer evaluators were given a grading rubric, and judged student work in four categories: Mastery, Satisfactory, Developing, and Unsatisfactory (MSDU).
- Peer evaluators recorded their rationales and shared their observations and comments to teams.
- Grades of MSDU and comments were reported back to students to be further incorporated in their final project report and final presentation.