

2020 Annual Assessment Report and Action Plan Construction Engineering Management Program

Follow-up from 2019 Annual Assessment Report and Action Plan:

1. Faculty will re-focus on improving individual course delivery with a focus on content related to measureable SLO's and enhancing the learning experience for students. **Follow-up: All SLO's were measured to be above the "70% passing" threshold.**
2. Explore the possibility of a project-based sequence of courses, in which a single project is used across multiple courses. **Follow-up: This initiative is still being pursued and may be implemented within a few years.**
3. Re-assess the entire CEM curriculum in terms of sequencing and flow of courses as well as inclusion, exclusion, or modification of courses, in light of the elimination of the Pro-School system. Focus areas for curriculum improvement will include innovation, project-based learning, leadership, and critical analysis and thinking. **Follow-up: The College of Engineering has initiated a new "first-year experience," known as Engineering +, for all first-year students, including those in CEM. Feedback from this initiative will inform subsequent adjustments to the CEM curriculum.**

Survey Data Results

Results of surveys from 3 alumni from the class of 2018, 3 alumni from the class of 2015, and 112 employers were reviewed by CEM faculty and the CCE Industry Advisory Board during Fall 2020. The surveys of graduating seniors were conducted by the OSU College of Engineering for Winter, Spring, and Summer 2020 graduates. The surveys of alumni and employers were conducted by the School of CCE in July and August of 2020 using the Qualtrics platform. The low alumni response numbers, due to not having accurate alumni contact information, are a cause for concern in evaluating data. CEM graduating seniors were not surveyed. The issues should be corrected for next year.

1. Overall customer satisfaction:

Survey Item	Alumni 2018	Alumni 2015
# reporting CEM Program “moderately” or “extremely” fulfilled their expectations / satisfied with educational preparation	2 of 3	3 of 3
# who would “probably” or “definitely” recommend CEM to others	2 of 3	3 of 3

Employer Survey:

- 92 of 112 employers indicated they were “moderately” satisfied or “very” satisfied with OSU CEM graduates educational preparation. Average score was 5.9 out of 7.0.
- 96 of 111 respondents rated the professionalism, in terms of attitude and work ethic, of OSU CEM graduates to be “moderately” or “extremely” professional, with an average score of 6.2 out of 7.0.
- 104 of 112 respondents indicated they would “probably” or “definitely” hire another OSU CEM graduate, with an average score of 6.6 out of 7.0.

2. Achievement of CEM Program Student Learning Outcomes (SLO’s):

- a. Graduating seniors 2020: Surveys of graduating seniors were not conducted.
- b. Alumni 2018: Average scores for “quality of preparation” for 9 out of 20 Student Learning Outcomes met or exceeded the target minimum of 4.9 out of 7.0, with all 20 scoring 2.7 or greater.

- c. Alumni 2015: Average scores for “quality of preparation” for 8 out of 20 Student Learning Outcomes met or exceeded the target minimum of 4.9 out of 7.0, with all 20 scoring 4.3 or greater.
- d. Employers: Only 6 out of 20 SLO’s achieved the target score of 4.9 or greater for “quality of preparation,” though all of the remaining 14 SLO’s scored no lower than 4.3.

3. High Priority SLO’s:

The following SLO’s were determined to be high priority for potential improvements based on high scores for “Importance” and scores below 4.9 for “Quality of Preparation” from the surveyed groups.

- SLO 4 “Create construction project cost estimates.”
 - Importance 5.9 (4th out of 20 SLO’s); Preparation 4.4
- SLO 13 “Understand construction risk management.”
 - Importance 5.8 (6th out of 20 SLO’s); Preparation 4.4
- SLO 14 “Understand construction accounting and cost control.”
 - Importance 5.8 (6th out of 20 SLO’s); Preparation 4.4

4. CEM Program Educational Objectives

Starting in 2021, the five CEM Program Educational Objectives will be included on the graduating senior exit survey and evaluated just as the SLO’s are. The Objectives are summarized below with key phrases from the complete statement.

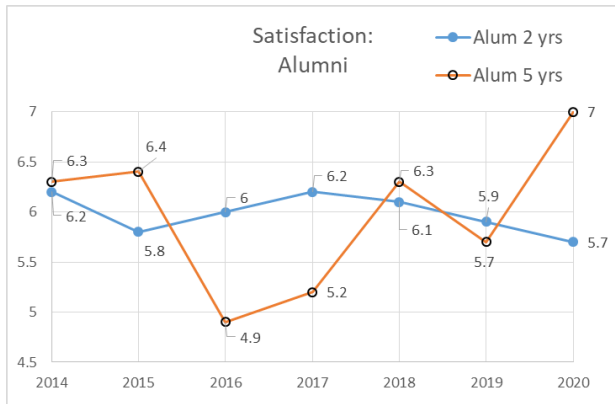
1. *compelling education*
2. *analyze, synthesize, and evaluate*
3. *modern professional practice*
4. *immediate employment*
5. *contemporary societal issues*

Direct Assessment of SLO’s by Faculty

None of the 20 SLO’s directly assessed by individual faculty members during the past year was identified as deficient (*i.e.*, less than 70% of students passing the assessment).

Trends

Historical data from survey questions regarding Satisfaction, Professionalism, Hiring of other CEM graduates, and Recommending the CEM major were analyzed to determine if any trends are present. Slight downward or flat trends from Alumni and Employers can be identified, though the number of years assessed and the year-to-year variations may be too small to draw meaningful conclusions. No Action Items were identified based on this data.



Summary and Action Plan: (After Discussion with CEM Faculty on September 21, 2020 and with IAB on May 26, 2021)

The CEM faculty analyzes survey data and trends, SLO direct assessment results, and input from faculty, staff, students, industry, and administration to identify an Action Plan for improvement for the upcoming year.

1. Replace the Hydraulics course with the third course of the Engineering + first-year sequence. It was necessary to remove four credits from the CEM curriculum to accommodate Engineering +, which is required of all College of Engineering students. The justification for removing Hydraulics is that it is not covered by an ACCE Student Learning Outcome nor is it an area of common practice for CEM graduates.
2. Explore options for a new course, Introduction to Concrete Construction, to be offered as an elective to CEM students. The Concrete Construction course directly addresses multiple SLO's (*e.g.*, SLO 7 Analyze construction documents, SLO 8 Analyze methods), complements other courses in the curriculum (*e.g.*, Estimating II, Heavy Civil Construction), and covers a significant component of practice for CEM graduates.
3. Continue to consider a project-based sequence of courses. IAB was supportive and encouraged weaving writing and ethics throughout this sequence.
4. Solicit industry and other faculty input into individual course curriculum, with input from a working group of recent CEM graduates and other stakeholders.

Appendix A: Summary of 4 Surveys from 2020

Scale of 1 – 7 with a target minimum score of 4.9 for first four questions and for SLO “Preparation.”

	Graduates 2020	Alumni 2018		Alumni 2015		Employers	
Satisfaction	-	5.7		7.0		5.9	
Professionalism (attitude & work ethic)	-	-		-		6.2	
Hire another CEM?	-	-		-		6.6	
Recommend CEM?	-	5.3		7.0		-	
Number of respondents		3		3		112	
20 Student Learning Outcomes (SLO's)	Preparation	Importance	Preparation	Importance	Preparation	Importance	Preparation
1. Create written communications appropriate to the construction discipline.		6.3	4.7	5.7	4.7	5.9	5.1
2. Create oral presentations appropriate to the construction discipline.		4.7	4.0	5.3	4.7	5.2	4.8
3. Create a construction project safety plan.		6.3	3.3	4.7	4.7	5.1	4.4
4. Create construction project cost estimates.		6.0	5.0	5.7	4.7	5.9	4.4
5. Create construction project schedules.		6.0	4.3	6.0	4.3	5.6	4.5
6. Analyze professional decisions based on ethical principles.		5.0	5.0	5.7	5.7	6.1	5.5
7. Analyze construction documents for planning and management of construction processes.		6.3	4.7	5.7	5.0	6.2	4.9
8. Analyze methods, materials, and equipment used to construct projects.		6.0	4.3	4.3	4.7	5.6	4.7
9. Apply construction management skills as an effective member of a multi-disciplinary team.		6.7	4.3	5.5	5.5	6.1	5.1
10. Apply electronic-based technology to manage the construction process.		5.7	4.0	5.7	5.7	5.8	5.6
11. Apply basic surveying techniques for construction layout of control.		3.3	2.7	3.0	4.7	3.7	4.4
12. Understand different methods of project delivery and the roles and responsibilities of all constituencies involved in the design and construction process.		4.7	5.3	5.0	5.0	5.1	4.7
13. Understand construction risk management.		5.0	5.0	6.3	5.0	5.8	4.4
14. Understand construction accounting and cost control.		5.3	5.3	6.0	4.3	5.8	4.4
15. Understand construction quality assurance and control.		5.3	5.0	5.7	4.3	5.5	4.6
16. Understand construction project control processes.		5.0	4.7	5.7	4.7	5.3	4.6
17. Understand the legal implications of contract, common, and regulatory law to manage a construction project.		5.7	5.3	6.3	5.0	5.3	4.3
18. Understand the basic principles of sustainable construction.		4.7	4.7	3.7	4.7	4.3	4.8
19. Understand the basic principles of structural behavior.		5.3	5.7	4.0	5.3	4.6	4.9
20. Understand the basic principles of mechanical, electrical, and plumbing systems.		4.3	5.0	5.7	4.0	4.9	4.3

Appendix B: Highest to Lowest “Importance” Weighted Average of 4 Surveys from 2020

Scale of 1 – 7

20 Student Learning Outcomes (SLO's)	Weighted Avg. Importance	Weighted Avg. Preparation
7. Analyze construction documents for planning and management of construction processes.	6.2	4.9
9. Apply construction management skills as an effective member of a multi-disciplinary team.	6.1	5.1
6. Analyze professional decisions based on ethical principles.	6.0	5.5
1. Create written communications appropriate to the construction discipline.	5.9	5.1
4. Create construction project cost estimates.	5.9	4.4
13. Understand construction risk management.	5.8	4.4
10. Apply electronic-based technology to manage the construction process.	5.8	5.6
14. Understand construction accounting and cost control.	5.8	4.4
5. Create construction project schedules.	5.6	4.5
8. Analyze methods, materials, and equipment used to construct projects.	5.6	4.7
15. Understand construction quality assurance and control.	5.5	4.6
17. Understand the legal implications of contract, common, and regulatory law to manage a construction project.	5.3	4.4
16. Understand construction project control processes.	5.3	4.6
2. Create oral presentations appropriate to the construction discipline.	5.2	4.8
3. Create a construction project safety plan.	5.1	4.4
12. Understand different methods of project delivery and the roles and responsibilities of all constituencies involved in the design and construction process.	5.0	4.7
20. Understand the basic principles of mechanical, electrical, and plumbing systems.	4.9	4.3
19. Understand the basic principles of structural behavior.	4.6	4.9
18. Understand the basic principles of sustainable construction.	4.3	4.7
11. Apply basic surveying techniques for construction layout of control.	3.7	4.4