

2015 Annual Assessment Report and Action Plan

Construction Engineering Management Program

Results of surveys from 83 graduating seniors, 22 alumni from the class of 2013, 15 alumni from the class of 2010, and 25 employers were reviewed by CEM faculty and the CEM Industry Advisory Committee of the CCE Industry Advisory Board. The surveys of graduating seniors were conducted by the OSU College of Engineering for June 2015 graduates. The surveys of alumni and employers were conducted by the School of CCE in June 2015. The following strengths and weaknesses were noted:

Strengths:

1. Overall customer satisfaction remains high:
 - a. Alumni 2013: 19 of 22 alumni responding to the survey were very satisfied or moderately satisfied with the educational preparation received in the OSU CEM program, with an average score of 5.8 on the 7-point scale. All 22 alumni indicated they would probably or definitely recommend to others the CEM Program at OSU, with an average score of 6.8 out of 7.0.
 - b. Alumni 2010: 14 of 15 alumni responding to the survey were very satisfied or moderately satisfied with the educational preparation received in the OSU CEM Program, with the remaining respondent being slightly satisfied. Average score was 6.4 out of 7.0. 14 of 15 alumni indicated they would probably or definitely recommend to others the CEM Program at OSU, with the remaining respondent indicating he would maybe recommend, for an average score of 6.5 out of 7.0.
 - c. Employers: 19 of 21 employers indicated they were moderately satisfied or very satisfied with OSU CEM graduates educational preparation. Average score was 6.2 on the 7-point scale. 19 respondents indicated they would definitely hire another OSU CEM graduate, while the remaining 2 would probably hire another, for an average score of 6.9 out of 7.0.
2. Achievement of CEM Program Student Learning Outcomes (SLO) remains high:
 - a. Graduates 2015: Average scores for graduating seniors for all 20 Student Outcomes exceeded the target minimum of 3.5 on the 5.0 scale, equivalent to 70%, when graduates indicated their belief that their education prepared them to meet the particular SLO. The 5-point scale is used as the standard across Schools for surveys administered by the College of Engineering. The lowest score was a 4.2 out of 5.0, with the average score being 4.6 out of 5.0.

- b. Alumni 2013: Average scores for “quality of preparation” for 18 out of 20 Student Learning Outcomes met or exceeded the target minimum of 4.9 out of 7.0.
- c. Alumni 2010: Average scores for “quality of preparation” for 15 out of 20 Student Learning Outcomes met or exceeded the target minimum of 4.9 out of 7.0.
- d. Employers: Average scores for “quality of preparation” for 15 out of 20 Student Learning Outcomes met or exceeded the target minimum of 4.9 out of 7.0.

Weaknesses:

1. The following SLO’s were rated by one or more surveyed groups as being below the target minimum score of 4.9 for “quality of preparation.” While these scores are only slightly below the target, they can be considered weaknesses. It is noted that the 20 SLO’s were instituted only in 2014 and that they are being used retroactively to assess a program that was not designed to achieve these specific outcomes.
 - SLO 3 “Create a construction project safety plan.”
 - 4.7 by Alumni 2013, 4.7 by Alumni 2010, 4.6 by Employers
 - SLO 13 “Understand construction risk management.”
 - 4.8 by Employers
 - SLO 14 “Understand construction accounting and cost control.”
 - 4.8 by Alumni 2013, 4.5 by Alumni 2010
 - SLO 15 “Understand construction quality assurance and control.”
 - 4.8 by Alumni 2010
 - SLO 16 “Understand construction project control processes.”
 - 4.6 by Alumni 2010
 - SLO 17 “Understand the legal implications of contract, common, and regulatory law to manage a construction project.”
 - 4.7 by Employers
 - SLO 18 “Understand the basic principles of sustainable construction.”
 - 4.8 by Employers
 - SLO 20 “Understand the basic principles of mechanical, electrical, and plumbing systems.”
 - 4.4 by Alumni 2010, 4.8 by Employers

Appendix A: Summary of 4 Surveys from 2015

Scale of 1 – 5 for SLO's for Graduates 2015, with target minimum score of 3.5.

Scale of 1 – 7 for Alumni and Employers, with a target minimum score of 4.9 for first five questions and for SLO "Preparation."

	Graduates 2015	Alumni 2013			Alumni 2010			Employers		
Satisfaction	-	5.8			6.4			6.2		
Attitude	-	-			-			6.2		
Work ethic	-	-			-			6.4		
Hire another CEM?	-	-			-			6.9		
Recommend CEM?	-	6.8			6.5			-		
20 Student Learning Outcomes (SLO's)	Preparation	Import ance	Prepar ation	Gap = Prep- Imp	Import ance	Prepar ation	Gap = Prep- Imp	Import ance	Prepar ation	Gap = Prep- Imp
1. Create written communications appropriate to the construction discipline.	4.5	6.4	5.5	(0.9)	6.3	5.3	(1.0)	6.4	5.7	(0.7)
2. Create oral presentations appropriate to the construction discipline.	4.6	5.5	5.8	0.3	6.1	5.1	(1.0)	5.8	5.8	0.0
3. Create a construction project safety plan.	4.4	5.6	4.7	(0.9)	5.9	4.9	(1.0)	5.4	4.6	(0.8)
4. Create construction project cost estimates.	4.7	6.2	5.5	(0.7)	6.0	6.2	0.2	6.3	5.4	(0.9)
5. Create construction project schedules.	4.6	6.1	5.4	(0.7)	6.5	5.2	(1.3)	6.2	5.2	(1.0)
6. Analyze professional decisions based on ethical principles.	4.7	6.2	5.9	(0.3)	6.0	6.2	0.2	6.7	5.7	(1.0)
7. Analyze construction documents for planning and management of construction processes.	4.7	6.6	6.0	(0.6)	6.5	5.2	(1.3)	6.5	5.8	(0.7)
8. Analyze methods, materials, and equipment used to construct projects.	4.5	6.0	5.2	(0.8)	6.0	5.3	(0.7)	6.0	5.3	(0.7)
9. Apply construction management skills as an effective member of a multi-disciplinary team.	4.7	6.3	5.8	(0.5)	6.1	5.6	(0.5)	6.6	5.9	(0.7)
10. Apply electronic-based technology to manage the construction process.	4.6	6.1	5.9	(0.2)	6.1	5.5	(0.6)	6.0	6.1	0.1
11. Apply basic surveying techniques for construction layout of control.	4.2	4.0	5.2	1.2	3.4	5.4	2.0	4.9	5.4	0.5
12. Understand different methods of project delivery and the roles and responsibilities of all constituencies involved in the design and construction process.	4.5	6.0	5.8	(0.2)	5.9	5.0	(0.9)	5.7	5.0	(0.7)
13. Understand construction risk management.	4.6	6.3	5.3	(1.0)	5.9	5.0	(0.9)	5.7	4.8	(0.9)
14. Understand construction accounting and cost control.	4.5	6.4	4.8	(1.6)	5.9	4.5	(1.4)	6.0	5.0	(1.0)
15. Understand construction quality assurance and control.	4.4	6.0	5.2	(0.8)	5.9	5.2	(0.7)	5.9	4.9	(1.0)
16. Understand construction project control processes.	4.7	5.9	5.1	(0.8)	5.5	5.1	(0.4)	5.9	5.1	(0.8)
17. Understand the legal implications of contract, common, and regulatory law to manage a construction project.	4.5	6.0	5.6	(0.4)	5.7	5.7	0.0	5.7	4.7	(1.0)
18. Understand the basic principles of sustainable construction.	4.5	5.0	5.1	0.1	4.2	4.9	0.7	4.6	4.8	0.2
19. Understand the basic principles of structural behavior.	4.7	5.8	6.4	0.6	5.5	6.1	0.6	5.3	5.3	0.0
20. Understand the basic principles of mechanical, electrical, and plumbing systems.	4.7	5.5	5.0	(0.5)	6.1	4.4	(1.7)	5.1	4.8	(0.3)

Appendix B: Follow-Up on 2014 “Assessment Report and Action Plan”:

Each item from the 2014 document is reproduced in *italics*, followed by discussion of action(s) taken in bold font.

1. *Weakness 1 – preparation for “Understanding contemporary issues, including public policy”: This is one of the ABET a)-q) outcomes adopted by the CEM Program around the turn of the century for consistency across the CCEE Department. After 2014, the CEM Program will be working toward 20 outcomes defined by ACCE that will not include this outcome. The CEM Program recommends that this outcome not be retained when the 20 new ACCE Student Outcomes are implemented. Consequently, no action is required.* **No action was taken.**
2. *Weakness 2 – “Ability to design a system, component, or process.”: This is one of the ABET a)-q) outcomes adopted by the CEM Program around the turn of the century for consistency across the CCEE Department. After 2014, the CEM Program will be working toward 20 outcomes defined by ACCE that will not include this outcome. The CEM Program recommends that this outcome not be retained when the 20 new ACCE Student Outcomes are implemented. Consequently, no action is required.* **No action was taken.**
3. *The response of only 12 alumni from the class of 2012 (from a class of approximately 70 graduates) is a cause for concern. Forming a Linked-in group for graduating CEM seniors each year is a possible method for improving response that may be attempted. If response rates are not better for future alumni surveys, other methods of outcomes assessment must be considered.* **A new survey platform, Qualtrics, has begun being used for the Alumni surveys as of 2016. The number of Alumni survey questions has been reduced from 70 to 29 upon adoption of the new ACCE Student Learning Outcomes, which allowed for elimination of previously-used questions that are now redundant. It is anticipated that the new platform and the reduction in the number of questions will increase Alumni survey participation starting in 2016.**
4. *The response to the senior exit survey of only 19 – 24 graduating seniors is a concern. Should CEM also take back the senior exit survey from EBI as it has done with alumni and employer surveys, particularly since the new 20 ACCE Student Outcomes will all be “write-in” outcomes and they will still receive the ABET a-q questions in the EBI survey anyway, making unnecessary work for the graduating seniors?* **As of 2015, the**

senior exit surveys are conducted through the College of Engineering rather than through EBI. The 20 ACCE Student Learning Outcomes have replaced the ABET outcomes for CEM graduates. 83 graduating seniors completed the exit survey in June 2015, eliminating the concern with a low response rate.

5. *Before the 2015 assessment cycle, senior exit, alumni, and employer surveys must be rewritten to assess the 20 new ACCE student outcomes. At the same time, the “planning and scheduling” question should be replaced with “knowledge of scheduling basics and ability to work with scheduling software such as P6,” in the alumni and employer surveys. If item #4 above results in CEM administering the senior exit survey too, that survey should be written to conform to the newly developed employer and alumni surveys. **The senior exit surveys are now conducted through the College of Engineering and include the 20 ACCE Student Learning Outcomes for CEM graduates. The questions in the senior exit survey and through the Qualtrics alumni and employer surveys are consistent.***
6. *Weaknesses and Concerns from the 2014 ACCE visiting team must be addressed in the first annual report. **This report was completed and submitted to ACCE.***
7. *Follow-up on Item 8 from 2013 assessment action plan – If students are not receiving an exercise in processing a submittal, find a place to introduce one and introduce it. **The submittal process is covered in four courses – CEM 341, CEM 442, CE 424, and CEM 443. The CEM faculty believes that devoting significantly more effort to the topic of submittals would lean toward training and detract from the overall goal of educating future construction managers and industry leaders. No action was taken.***
8. *All individual course learning objectives should be mapped to the new 20 ACCE Student Learning outcomes to assure that the current curriculum adequately addresses the outcomes. Tom Miller’s document for the CE Program and ABET Outcomes, available on the O drive in the ABET folder, provides a good example of how to do this. If the current curriculum does not address the new outcomes, curricular changes should be considered. **An “ACCE Student Learning Outcomes – CEM Courses” matrix has been developed by the CEM Faculty. All 20 Student Learning Outcomes are addressed in at least one of the CEM required courses.***
9. *As the new COE Strategic Plan takes shape, determination should be made as to whether there will be CCE and CEM strategic plans consistent with it. The resulting strategic plan should be checked against the ACCE Standard in Document 103, Section IX at http://www.acce-hq.org/accreditation_process/accreditation-procedures/. **At***

the time of writing this report, no CCE or CEM strategic plans had been developed, therefore no action was taken.

10. *See Appendix B, 2013 action items 4 and 14 regarding planned action to require CEM 431, Obtaining Construction Contracts, for all CEM majors. **The WIC course, CEM 443, continues to be taught twice per year in the Winter and Spring terms. A CCE Writing Instructor was hired in 2015 to assist evaluation and improvement of writing in this course, as well as others. CCE Faculty discussions regarding requiring CEM 431 for CEM majors are ongoing. Discussions of availability of faculty resources to teach this additional course are also ongoing. It appears the earliest this requirement could be implemented is 2017/2018, which requires a Category II proposal by Fall 2016.***

2013 Action Plan Items (for reference with 2014 Action Plan Item 10)

Item 4.

*Communications, written and oral, formal and informal: As usual, communications is considered extremely important by all constituencies, and preparation is not as good as all would like. CEM faculty will continue to include as many written and oral communications exercises as can be reasonably incorporated into the curriculum. CEM faculty will consider proposing teaching the writing intensive course (Construction Project Management) twice a year rather than once a year to cut the class size in half. CEM faculty will consider requiring the Obtaining Construction Contracts class and teaching it twice a year. In addition, the CCE School is adding a writing resource person to the staff to assist with writing in all CCE coursework. **CEM 443, the WIC course will be taught Winter 2015 and Spring 2015. It appears that a writing resource person will be available for both offerings. It does not appear that there are adequate faculty resources to require the Obtaining Construction Contracts class starting in the 2015/2016 academic year as planned. Consequently this action is deferred until the 2016/2017 academic year at the earliest.***

Item 14.

*Planning and Scheduling: Discussion at the June 2013 IAC meeting and the September 2013 CEM faculty meeting indicate that the low preparation score may be based on an expectation that graduates will be familiar with the details of whatever construction process that they are to schedule. On-the-job experience is really required to achieve this level of preparation. The survey question will be reworded to replace "planning and scheduling" with "knowledge of scheduling basics and ability to work with scheduling software such as P6." The CEM faculty will consider requiring the Obtaining Construction Contracts class as part of the CEM graduation requirements. (At the January 2014 CEM Faculty meeting, it was agreed that, starting with the 2015-2016 academic year, CEM 431 would be required for CEM graduates and that it would be offered Fall and Winter Quarters. A Category II Proposal is required.) **A Category II Proposal has not been prepared. There do not appear to be adequate faculty resources to implement this plan for the 2015-2016 academic year. Consequently this action is deferred until the 2016/2017 academic year at the earliest, requiring a Category II Proposal no later than Fall 2015.***

Appendix C: Other Assessment Information from 2015:

One or more groups of survey respondents found the following SLO's to have a gap between "Importance" and "Preparation" of greater than 1.0, indicating CEM graduates may be under-prepared for certain topics important to success in their fields.

SLO	Alumni 2013			Alumni 2010			Employers		
	Importance	Preparation	Gap (Prep-Imp)	Importance	Preparation	Gap (Prep-Imp)	Importance	Preparation	Gap (Prep-Imp)
5. Create construction project schedules.	6.1	5.4	(0.7)	6.5	5.2	(1.3)	6.2	5.2	(1.0)
7. Analyze construction documents for planning and management of construction processes.	6.6	6.0	(0.6)	6.5	5.2	(1.3)	6.5	5.8	(0.7)
14. Understand construction accounting and cost control.	6.4	4.8	(1.6)	5.9	4.5	(1.4)	6.0	5.0	(1.0)
20. Understand the basic principles of mechanical, electrical, and plumbing systems.	5.5	5.0	(0.5)	6.1	4.4	(1.7)	5.1	4.8	(0.3)

All weakness and concerns from the ACCE visiting team's report in October 2014 have been either "Alleviated" or were "In Progress" by the time the CEM Program's 1-year progress report was submitted to ACCE in 2015. Weaknesses included consistency of syllabi, project management computer applications, construction accounting and finance, and strategic plan. Concerns included transition of program leadership, large class sizes, and balance between CE and CEM faculty.