

2012 Annual Assessment Report and Action Plan

Construction Engineering Management Program

Results of surveys from 41 graduating seniors, 57 alumni, and 16 employers were reviewed by CEM faculty. The surveys of graduating seniors were conducted by EBI for June 2011 graduates. The surveys of alumni and employers were conducted by the CCE School in April 2012. The following Strengths and Weaknesses were noted:

Strengths:

1. Overall customer satisfaction remains high:
 - a. Average scores for 41 respondents to the senior exit survey for "The Bottom Line – Overall Satisfaction – Extent that the undergraduate engineering program experience fulfilled expectations" was 5.2 on the 7.0 scale, exceeding the target minimum score of 4.9.
 - b. Forty-nine of fifty-seven respondents from the graduating classes of 2005 to 2010 to the alumni survey were very satisfied (25) or moderately satisfied (24) with the educational preparation received in the OSU CEM program. Average score was 6.0 on the 7-point scale.
 - c. All respondents to the employer survey reported that they were very satisfied (10) or moderately satisfied (6) with the "average recent OSU CEM graduate's educational preparation." Average score was 6.6 on the 7-point scale.
2. Achievement of CEM Program Desired Learning Outcomes (PDLO's) remains high:
 - a. Average scores for graduating seniors for sixteen of seventeen PDLO's exceeded the target minimum of 4.9 on the 7.0 scale. (Ability to design and conduct experiments including analysis and interpreting data" was the one PDLO that did not meet the minimum, with a score of 4.82.)
 - b. Average scores for 57 alumni (2005 – 2010 grads) for sixteen of seventeen PDLO's exceeded the target minimum of 4.9 on the 7.0 scale. (Understanding contemporary issues, including public policy" was the one PDLO that did not meet the minimum, with a score of 4.3.)
 - c. Average scores from 16 employers for all 17 PDLO's exceeded the target minimum of 4.9 on the 7.0 scale.

Weaknesses:

1. Graduating seniors, on average, rated the degree that their engineering education enhanced their ability to design and conduct experiments including analysis and interpreting data at 4.82 on the 7-point scale. This is slightly below the target minimum score of 4.9

2. Alumni, on average, rated their preparation to understand contemporary issues, including public policy, at 4.3 on the 7-point scale. This is below the target minimum score of 4.9.

Other Assessment Information:

In addition, review of the assessment results and comparison of “importance” vs “preparation” for items on the alumni and employer surveys identified the following discussion items:

1. Although all 3 surveys rated preparation to “communicate effectively” well above the target minimums, the alumni and employers rated the PDLO as their highest (6.7/7.0) and 2nd highest (6.7/7.0) importance item respectively, resulting in the largest, or near-largest, deficits between level of preparation and level of importance for PDLO’s. The importance of communication is a familiar theme, to which much attention has been devoted over the years. The discussion concluded with no practical ideas for improvement of preparation at this time. PDLO preparation scores exceed minimums, and compliance with ACCE standards exceeds minimums.
2. Although all 3 surveys rated preparation to be “able to incorporate effective negotiation or consensus-gaining in group decision making” above the target minimums, again the high importance rating on alumni and employer surveys produced some of the highest deficits between level of preparation and level of importance for PDLO’s. Ideas generated include considering:
 - a. Adding a negotiation component to the construction project management class (CEM 443)
 - b. Adding a 1-credit seminar class with negotiation as part or all of the content
3. Although all 3 surveys rated preparation to be “able to assess risk and make sound decisions among alternatives when data is incomplete and imperfect” above the target minimums, again, the high importance rating on alumni and employer surveys produced some of the highest deficits between level of preparation and level of importance for PDLO’s. Ideas generated include considering:
 - a. Adding a risk assessment component to the construction project management class.
 - b. Adding a risk assessment component to the construction planning and scheduling class.
 - c. Adding a risk assessment component to the second construction estimating class.
4. The alumni indicated a shortage in estimating preparation versus importance (6.1 vs 5.0), as did the employers (6.2 vs 5.3). Within the past year significant changes have been made in the two estimating courses, so this is one to watch for trends. The changes have been to have the first estimating class be primarily a building construction cost estimating course, with the majority of the students having first completed the building construction materials and methods course, and the second estimating class to be primarily a heavy civil, work package oriented cost estimating course with the majority of the students having first completed the heavy civil construction methods and equipment course. Preparation score does exceed target minimum.
5. The alumni indicated a shortage in planning and scheduling preparation versus importance (6.2 vs 5.1), as did the employers (6.4 vs 5.9). The planning and scheduling course (CEM 343) is currently being taught in a fashion similar to the past 5 years. No ideas for change and improvement resulted from the discussion. Preparation score does exceed target minimum.
6. The alumni indicated a substantial shortage in submittal processing preparation versus importance (5.7 vs 4.4), but the employers did not note a significant shortfall (6.1 vs 5.9). A submittal processing exercise could be added to the construction project management class. About 10 years ago, an attempt was made to introduce PROLOG into the class, but it was decided that the amount of time and effort required did not justify the value added.

7. The alumni indicated a substantial shortage in understanding of "field operations and issues" preparation versus importance (6.0 vs 4.5), but the employers noted a lesser shortfall (6.0 vs 5.5). It was noted that there is now an abundance of videos of construction operations available on the web. There was discussion of whether adding a class on field operations and superintendence should be added to complement the project management course. The discussion was inconclusive.
8. The alumni indicated a substantial shortage in "relevant, practical work experience" preparation versus importance (6.5 vs 5.2), with the employers in agreement to a lesser extent (6.2 vs 5.5). It has been more difficult for students to obtain summer internships during the "Great Recession," which may contribute to the survey results. Considerable energy is still being expended by faculty and staff in connecting employers with students. The loss of employer support for CEM participation in CECOP may also be a factor, although since this has just happened in the past year, it would not be reflected in the alumni and employer surveys. In the past, the CEM Program has declined to undertake a required internship program because of the cost of administration, challenges produced by economic downturns, and because the informal matchmaking for summer internships has been working so well. It is believed that making sure that the informal process works well is still the best course of action.
9. The employers indicated a substantial shortage in understanding of construction safety issues preparation versus importance (6.3 vs 5.3), as did the alumni (6.4 vs 5.5). CEM faculty need to be sure that all courses include topics on good safety practices when the opportunity arises. The question was raised whether the CEM Program should attempt to include 10-hr or 30-hr OSHA safety training in a required course. Adding a required 1-credit course could be considered. CEM faculty will talk with the instructor of the H 385 required safety course about this topic.
10. The four skills offered in the alumni survey that received the lowest ratings for importance were ability to "develop 4-D and 5-D models" (3.5), hydraulic design (3.7), "ability to perform clash detection using NAVISWORKS" (3.8), and "ability to construct 3-D models using REVIT, or similar software." (4.1)
11. In rating importance, the employers agreed with the alumni on low importance for hydraulic design (4.2), and agreed somewhat on ability to develop 4-D and 5-D models (4.7). Other low ratings of importance from the employers were for asphalt design and construction practice (4.0), ability to design and conduct experiments; analyze and interpret data (4.5), and ability to understand impact of engineering solutions in a global/societal context (4.6).

Summary and Action Plan:

1. Overall ratings of customer satisfaction indicate that there are no serious, significant issues that need to be addressed.
2. Although the graduating seniors rating for "Ability to design and conduct experiments including analysis and interpreting data" fell below the target minimum score (4.82 vs 4.9), this PDLO was rated 14 of 17 in importance by the alumni and 17 of 17 in importance by the employers. The employers rated the preparation substantially higher than the importance 5.4 vs 4.5). No action is required.
3. Although the alumni rating for PDLO "Understanding contemporary issues, including public policy" fell below the target minimum score (4.3 vs 4.9), this PDLO was rated 16 of 17 in importance by the alumni, and 15 of 17 in importance by the employers. The employers and graduating seniors gave passing scores (5.0 and 5.4) for preparation. No action is required.
4. Because of the high importance placed on effective communication, faculty should be continually looking for practical opportunities to include in their courses exercises that improve communication skills.

5. CEM faculty will consider adding a negotiation component to the Construction Project Management class, and look for opportunities to include negotiation exercises in all coursework that they teach.
6. CEM faculty will work with Dr. Sillars to determine an appropriate risk assessment addition to CEM 343, Construction Planning and Scheduling, or CEM 342, Estimating II.
7. CEM faculty will check future assessments to determine if 2011-2012 changes in the two estimating courses are changing scores for construction estimating preparation.
8. CEM faculty to determine where the introduction of a submittal processing exercise would be most practical and beneficial.
9. Alumni low scores for preparation for "field operations and issues" will be discussed with the CEM Industry Advisory Committee.
10. CCE School Head will be reminded of the importance placed on "relevant, practical work experience" by alumni and employers.
11. CEM faculty will explore addition of OSHA 10-hr or 30-hr training into existing coursework, or through the addition of a 1-credit required course.
12. The relatively low scores for importance assigned to REVIT models, NAVISWORKS clash-detection, and 4-D and 5-D models by the alumni survey should not discourage CEM faculty and the CCE School from moving forward in these areas, where higher value is generally perceived by employers.
13. If the need arises to make space for new content in the CEM curriculum by dropping required coursework, employer and alumni surveys suggest that deleting the required hydraulics course (CEM 311) would be a good place to start.

Discussion of Summary and Action Plan at May 18, 2012 Industry Advisory Committee Meeting:

Item 9: The committee noted that field trips or virtual field trips would be a way to provide more exposure to field operations and issues. Because of the logistics of field trips for groups of more than 50, and because of improvements in technology, virtual field trips may be more practical. Summer internships are a way to improve this preparation, but taking on the administrative burden of mandatory internships is not recommended.

Item 11: The committee thought that OSHA 10-hr or 30-hr training would be most effective for students after they have obtained employment and when training could be supported by their employer. They did not see adding this training to the curriculum as a high priority. They did suggest connecting the instructor of the H 385 safety course with AGC safety managers for possible guest presentations in the H 385 class. They suggest incorporation of a job hazard analysis exercise into coursework. Some felt that job hazard analysis could most effectively be taught in an 8-hour session.

New Item: Add the topic of GIS to the alumni and employer surveys.