College of Engineering

Department of Civil Engineering & Construction Engineering Management

PROGRAM OF CONSTRUCTION MANAGEMENT

ASSESSMENT RESULTS

Table 1 below summarizes the overall program assessment for the AY 2020-2021 at three levels (as presented in the continuous Quality Improvement Plan at the beginning of this section): the program educational objectives/goals (Level I), the program learning outcomes (Level II), and the course learning objectives/outcomes (Level III). Also, the feedback as well as the actions to be taken for improvement are presented.

Table 1. Overall Program Assessment Summary

Level	Assessment Tool	Feedback	Actions for improvement
Level I	- Advisory & Development Council Meetings	-Plan reading	• Restructure CEM121 – Commercial • Plans Reading Cross Curriculum (CEM121/225/375/429) • Virtual Design & Construction (VDC) • Increase commercial component of CEM 121
		Student leadership	• Student Organizational Structures • Professional / Students Associations Clubs • Local Involvement with Professional Chapters
		-Technologies integration	-Industry Mentor Program -IT Guest speakers
	- Job offers and Internship placement	- Rate of Job/Internship placement increasing	-Various mechanisms (e.g. On-campus Info Sessions, Reno Competition, Emails, LinkedIn, Facebook) were used to maintain high rate of job/internship placement

	- Academic and professional Awards - Activities in student organizations	-Few CEM students applied for Scholarships/Awards -CM Students Organizations (AGC, CMAA, ABC, …) – coordination issues - Reno competition	-Encourage more CM students to apply for Scholarships/Awards. • Create Org chart with current clubs and leaders • Structure Organizational Structures (CMA) • Professional / Students Associations Clubs • Local Involvement with Professional Chapters Improve student professional skills • Teams Selection • Comprehensive Training Program • Coaching • Incentives Knowledge Management / Transfer **Achievements:** • 3rd Place of Concrete Solutions Team at 2021 ASC Competition • 2nd Place of Heavy-Civil Team at 2022 ASC Competition
Level II	- Graduating senior surveys - CEM alumni surveys - Employer surveys	-See Tables below	-See assessment results and discussions in Tables below
Level III	- Course evaluations (using Student Works & Survey Questionnaires)	See Section 9.5d below	See assessment results and discussions in Tables below

Table 2 below summarizes the assessment results for the 5 Program Strategic Goals

Table 2. Assessment Results for the 5 Strategic Goals - AY 2020-2021

Strategic Goals	AY 2020-2021		
	Planned Activities	**Achievement**	**Actions**
G1	Continue to use and introduce new trends as well as software/technologies in CEM courses. To adopt new high-end estimating software such as DESTINI Profiler and DESTINI Estimator.	CEM faculty have been using different software/technologies in their classes. Secured 200 copies of Bluebeam licenses per academic year and used in CEM 206, CEM 429, CEM 490. All CM students are able to download it to their personal computers The ADC proposed the Industry-Mentor Program in which CEM faculty are encouraged to participate by pairing up with a construction professional to update the knowledge about new trends in the construction industry	Continue to use and introduce new trends as well as software/technologies in CEM courses. CEM Faculty are encouraged to pair-up with a construction professional to bring the emerging technologies in their classrooms IT experts from the industry will be invited to classrooms as guest-speakers who introduce the current trends in the construction industry. CEM 490: •Doing in-class exercises and hands-on trainings for construction projects •Showcase Laser Scanning and Point Cloud in the class •Showcase AR/VR in the class
G2	Continue to enhance the contents of CEM courses with new technologies such as VR, AR, 3D Laser Scanning, etc.	Jobs/Internships Placement: 75% senior students got jobs/internships Awards: Second Place in Heavy-Civil at 2022 Reno Competition Student Activities: Associated General Contractors, Construction Manager Association of America, National Association of Home Builders, Design-Build Institute of America Level II: Exit Survey shown students satisfaction with the quality of the CEM program Level III: Exit Survey shown above average ratings for 20 SLOs	Continue to enhance the contents of CEM courses with new technologies
G3	CEM faculty are encouraged to participate in the national and	CEM faculty actively engaged in the national and international events including: 1. ACCE 2021 Annual Meeting	CEM faculty are encouraged to participate in the national and international events.

	international events.	2. Construction Research Congress (CRC 2022) 3. Beach Mentorship Training, Spring 2022 3. ASC Reno Competition 2022 4. Equity Mindedness & Pedagogy, Faculty Center and Academic Technology Services, CSULB, 2021 5. CSULB Faculty Development Workshops in Jan. 2021 6. ACCE 2021 Mid-Year Conference – Virtual Version, Feb 15-19, 2021 7. ACCE – Faculty Teaching Workshop Level 1", Feb 15-19, 2021	
G4	Maintain the strong partnership with local construction companies	-A new hire for Heavy-Civil construction is in progress. -The local construction companies provided Info Sessions on campus in both Fall/Spring where CM students had opportunities to network with construction professionals and apply for jobs/internships.	Continue to maintain the strong partnership with local construction companies
G5	Continue to encourage CEM students/faculty to participate in international studies/exchange program Continue to cover global issues in CEM courses	Global issues have been covered in several courses including: CEM 121/225/365/490, CE 101. In addition, GE courses have included the subjects on global issues. Also, the elective course CEM 481 (Sustainability in the Built Environment) was offered to deliver global issues in regards to sustainability, climate changes, and environmental matters in Spring 2021 and Spring 2022	Continue to encourage CEM students/faculty to participate in international studies/exchange program Continue to cover global issues in CEM courses

Graduating Seniors Survey results

Survey Question: *What is your current status of employment?*

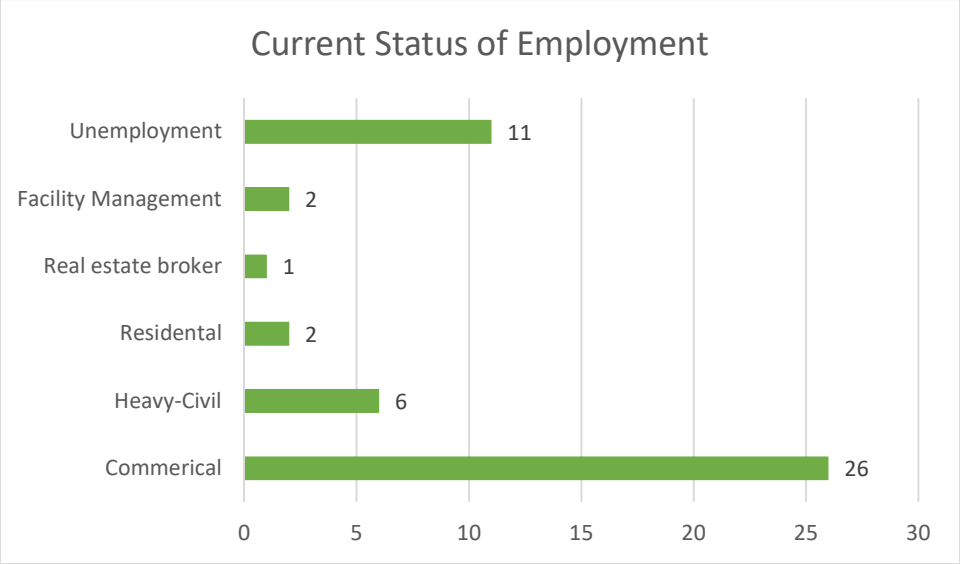

Figure 1. CEM Graduating Students Obtained Job/Internship Offers

Survey Question: *Are you a member of any professional organizations?*

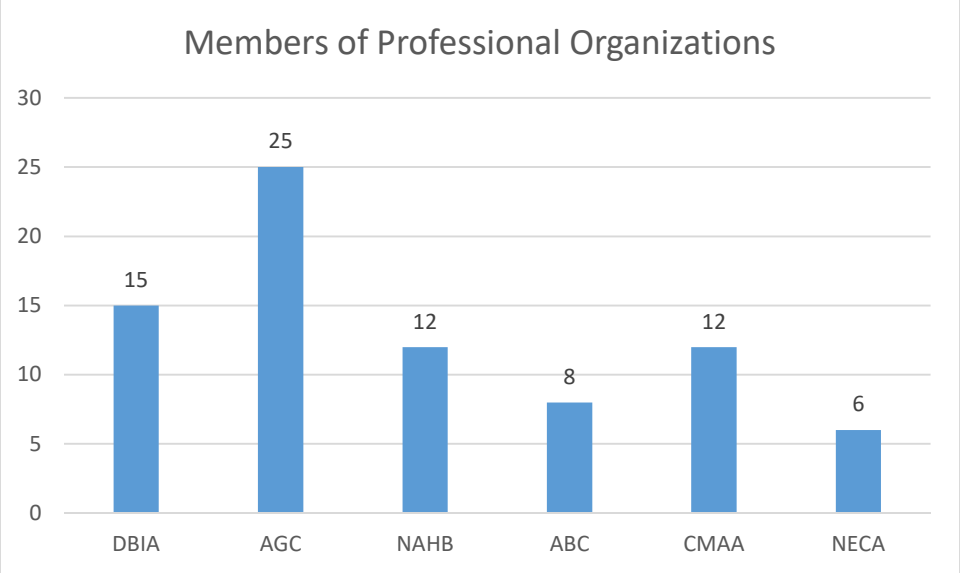

Figure 2. CEM Graduating Students with Professional Organizations

Improvement / Corrective Actions for Graduating Seniors Survey results:
Based on the data collected and summarized results, the actions taken to address senior concerns and improve students' satisfaction were mainly in the following areas:

- CEM advising and program information
  - Being flexible in schedules for advising hours per week
  - Providing annual mandatory advising services; i.e., students are required to meet with advisors every semester to go over their program planner.

- Internships and scholarships announcement:
  - CM student coordinator is assigned to contact directly with construction companies and make arrangements for their info sessions on campus
  - Using social media tools (LinkedIn and Facebook) to inform CM students on Internships/Scholarships opportunities
  - Announcements of internships/scholarships on Users Group on Beach Board
  - Posting of Scholarships on Faculty Offices
  - Posting of Scholarships on CECEM Department Office Board
  - Directing students to AGC, CMAA, DBIA, ABC websites for direct access to scholarships opportunities and information.

Program learning outcomes:

Table 3 presents the summary of primary changes to the CEM curriculum that were made in regard to the program learning outcomes. It is noted that the assessment results percentage (%) were obtained from the course assessment reports of all CEM courses conducted in Fall 2020, Spring 2020, and Fall 2021. In general, the quality of the curriculum has improved to accommodate the feedback from the assessment process as show above. Some consistency is found in the survey results and cross comparison of the data obtained from different surveys. Several areas for investigation and improvement are identified and appropriate actions will be taken accordingly to maintain the program quality.

Table 3. Program Assessment Summary (Fall 2020-Spring 2021-Fall 2021)

Program Learning Outcomes	Relevant CEM Course	Assessment Results (%)			Feedback	Importance Ranking	Actions
		F2020	S2021	F2021			
1. Create written communications appropriate to the construction discipline	CE 101	75%	85%	88%	- Senior/Alumni: acceptable performance - Continue to use grading rubrics to evaluate the student's written communication skill	Employers: 1st rank	- Have the COE-Writing & Communication Center evaluate students written communication performance.
	CEM 225	93%	96%	96%			
	CEM 429	68%	69%	68%			
	Average	**79%**	**83%**	**84%**			
2. Create oral presentations appropriate to the construction discipline	CE 101	74%	87%	91%	- All surveys show satisfactory performance	Employers: 1st rank	- Use a rubric to evaluate student oral presentation performance
	CEM 225	91%	94%	95%			
	CEM 429	66%	70%	78%			
	Average	**77%**	**84%**	**88%**			
3. Create a construction project safety plan	CEM 315	87%	86%	87%	- All surveys: above average performance	Employers: 4th rank	Continue to use a prepare safety plan for construction projects in students term project
	CEM 424	77%	87%	88%			
	CEM 490	75%	70%	87%			
	Average	**80%**	**81%**	**87%**			
4. Create construction project cost estimates	CEM 121	87%	87%	81%	Improvement was achieved. Employers ranked this SLO # 4 as the most importance	Employers: 1st rank	- Provide more sessions for blueprint readings and quantity take off
	CEM 225	91%	95%	92%			
	CEM 429	82%	83%	81%			
	Average	**87%**	**88%**	**85%**			
5. Create construction project schedules	CEM 421	83%	83%	86%	Employers ranked this SLO as the most importance	Employers: 1st rank	Use different computer software for scheduling. Invite guest speakers
	CEM 490	87%	87%	83%			
	Average	**86%**	**85%**	**83%**			
6. Analyze professional decisions based on ethical principles	CE 101	85%	94%	80%	All surveys: above average performance	Employers: 4th rank	Maintain the level of performance in regard to this learning outcome
	CEM 225	88%	89%	89%			
	CEM 429	78%	71%	72%			
	Average	**84%**	**85%**	**80%**			
7. Analyze construction documents for planning and management of construction processes	CEM 424	78%	87%	87%	Senior survey: high satisfaction Alumni/Employer: above average performance	Employers: 1st rank	Maintain the level of performance in regard to this learning outcome
	CEM 429	83%	83%	85%			
	CEM 490	86%	84%	87%			
	Average	**82%**	**85%**	**86%**			
8. Analyze methods, materials, and equipment used to construct projects	CEM 200/L	75%	80%	84%	Due to the Covid-19 pandemic our students received a lot less practical experience Maintain the level of performance in regard to this learning outcome	Employers: 3rd rank	Modernizing our laboratories in terms of equipment, testing, and academic material Maintain the level of construction equipment performance in regard to this learning outcome
	CEM 335/L	72%	75%	N/A			
	CEM 324	79%	87%	80%			
	CEM 424	78%	87%	86%			
	Average	**76%**	**82%**	**83%**			
9. Understand construction management skills as a member of a multi-disciplinary team	CE 101	72%	85%	82%	All surveys show above average performance	Employers: 1st rank	Focus on multi-disciplinary team work in CEM courses Use peer-evaluation forms
	CE 125	73%	71%	65%			
	CEM 373	86%	85%	85%			
	CEM 490	89%	89%	87%			
	Average	**80%**	**83%**	**80%**			
10. Apply electronic-based technology to manage the construction process	CEM 206	85%	83%	87%	Senior survey: high satisfaction CM students are interested in emerging technologies	Employers: 2nd rank	Introduce various electronic-based tools in CEM courses
	CEM 429	82%	83%	81%			
	CEM 421	82%	83%	86%			
	Average	**83%**	**83%**	**85%**			

Program Learning Outcomes	Relevant CEM Course	Assessment Results (%)			Feedback	Importance Ranking	Actions
		F2020	S2021	F2021			
11. Apply basic surveying techniques for construction layout and control	CEM 130/L	85%	84%	85%	Survey Results: Need to improve the level of learning performance	Employers: 5th rank	More practical problems and professional surveying works
	Average	**85%**	**84%**	**85%**			
12. Understand different methods of project delivery and the roles and responsibilities of all constituencies involved in the design and construction process	CEM 206	86%	84%	86%	CM students are familiar with different project delivery methods All surveys: above average performance	Employers: 2nd rank	Maintain the level of learning performance
	CEM 373	84%	80%	85%			
	CEM 490	72%	74%	86%			
	Average	**81%**	**79%**	**86%**			
13. Understand construction risk management	CEM 315	84%	85%	86%	More case studies should be discussed Seniors: Above average performance Alumni/Employers: Average performance	Employers: 3rd rank	Introduce risk management at different levels of CEM courses
	CEM 373	86%	84%	83%			
	CEM 421	80%	81%	90%			
	CEM 426	94%	96%	93%			
	Average	**86%**	**87%**	**88%**			
14. Understand construction accounting and cost control	CE 406	85%	88%	80%	All surveys: above average performance	Employers: 2nd rank	Introduce construction accounting at different levels of CEM courses
	CEM 429	80%	83%	82%			
	Average	**83%**	**86%**	**81%**			
15. Understand construction quality assurance and control	CEM 426	97%	97%	94%	Maintain the level of learning performance All surveys: high satisfaction	Employers: 3rd rank	Introduce this outcome in different levels of CEM courses
	CEM 490	47%	47%	47%			
	Average	**72%**	**72%**	**71%**			
16. Understand construction project control processes	CEM 421	81%	84%	81%	Alumni/Employers: average performance Overlapping exam and assignment results continues to be of a challenge.	Employers: 2nd rank	Introduce this outcomes in different levels of CEM courses
	CEM 490	46%	46%	46%			
	Average	**64%**	**65%**	**64%**			
17. Understand the legal implications of contract, common, and regulatory law to manage a construction project	CEM 426	96%	95%	93%	Breaking down lectures, assignments and exams per ACCE SLOs' provided better insight into student performance and assessment.	Employers: 3rd rank	Introduce this outcome in different levels of CEM courses
	CEM 490	83%	77%	81%			
	Average	**90%**	**86%**	**87%**			
18. Understand the basic principles of sustainable construction	CEM 121	87%	84%	85%	All surveys: average performance Maintain the level of learning performance	Employers: 2nd rank	Provide more sessions for blueprint readings and quantity take off
	CEM 365	85%	85%	85%			
	CEM 375	84%	84%	83%			
	Average	**85%**	**84%**	**84%**			
19. Understand the basic principles of structural behavior	CEM 204	82%	84%	85%	All surveys: above average performance - Explaining more practical problems in class	Employers: 5th rank	Maintain the level of learning performance
	CEM 304	78%	84%	85%			
	CEM 437	81%	82%	78%			
	Average	**80%**	**83%**	**83%**			
20. Understand the basic principles of mechanical, electrical and piping systems	CEM 365	86%	84%	84%	Stay away from PowerPoints and YouTube videos, and more so reading plans and understanding definitions.	Employers: 3rd rank	More practical problems to be discussed in class
	CEM 375	82%	83%	82%			
	Average	**84%**	**84%**	**83%**			

Actions from Recent Program Assessment Analysis

Table 4 below presents several major changes to the CM program which were made in regard to program curriculum and program learning outcomes, which are discussed below.

Table 4. Overall Program Curriculum Changes due to New Requirements

New Requirements	Changes	Effective Date
CSU Policies: New requirements for General Education	Category E: 1 additional required unit of GE course is covered by CE 101, which is double-counted as a GE course and Construction course Category F (GE Capstone): 6 additional required units of GE Upper Division Capstone are covered by CEM 490 and CE 406 for Upper Division B and D, respectively. The two courses are double counted For students who began continuous enrollment in Fall 2021 or later at CSULB, a California Community College, or other California State University must follow this pattern. Six additional required units of GE Upper Division Capstone are covered by CEM 490 and CE 406 for Upper Division B and D, respectively. The two courses are double counted. Upper Division in B: Scientific Inquiry and Quantitative Reasoning Upper Division in C: Arts or Humanities Note: 3-unit GE waiver for the Lower Division in Category C which will be incorporated in Fall 2022 Upper Division in D: Social Sciences	Fall 2021
ACCE Standards, ADC Feedback and Industry Demands	-According to feedback from transfer students, the flowchart of the BSCM Program has been recently updated to help students to accelerate their graduation -Dropped the technical elective courses of Facilities Management (CEM 432, CEM 433, and CEM 434)	AY 2021-2022
	Revise the technical elective emphases **Alternative Project Delivery Emphasis (Design-Build/IPD)** Note: It will be changed to Design-Build as of AY 2022-2023 CEM 473 - Principles of Design-Build (3 units)	AY 2021-2022

	CEM 483 - Virtual Design and Construction (3 units) CEM 485 - CEM Senior Seminar (3 units)	
	Sustainability CEM 481 - Sustainability in the Build Environment CEM 482 - Sustainability in Infrastructure Systems CEM 483 - Virtual Design and Construction	AY 2021-2022
	Heavy Civil CEM 476 - Construction and Maintenance of Infrastructure Facilities CEM 486 - Infrastructure Management CEM 483 - Virtual Design and Construction	AY 2021-2022

END