Academic Quality Improvement Plan B.S. Degree: Construction Management California Baptist University



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### Academic Quality Improvement Plan

#### **B.S. Degree: Construction Management**

#### California Baptist University

The academic Quality Improvement Plan (QIP) for the Construction Management (CM) program is comprised of three integrated elements: (a) Strategic Plan, (b) Assessment Implementation Plan, and (c) Determination of Achievement. The plan is designed to comply with California Baptist University (CBU) requirements and the American Council for Construction Education Document 103 Standards and Criteria for Accreditation of Postsecondary Construction Education Degree Program, specifically Section 9 Academic Quality Planning Process and Outcome Assessment (See Appendix I). The QIP is posted on the CM program's webpage at https://calbaptist.edu/academics/programs/bachelor-of-science-constructionmanagement/public-information. The annual performance results are published in the same webpage.

#### 1. CM Mission

The CM program prepares men and women for management and supervisory professions in the world of construction, offers enriched technical training with people skills in Christian context and biblical worldview.

#### 2. CM Program Strategic Plan Overview

The CM Program Strategic Plan is aligned with the Mission of the California Baptist University (CBU). The CBU Mission Core 4 are

- Academically Prepared: able to use critical thinking skills to demonstrate literacy: listening, speaking, writing, reading, viewing, and visual representing and demonstrate competence in mathematical, scientific, and technological skills;
- **Biblically Rooted**: able to demonstrate spiritual literacy, including Biblical Christian faith and practice, Baptist perspectives, and the Christian's role in fulfilling the Great Commission;
- **Globally Minded**: able to respect diverse religious, cultural, philosophical, and aesthetic experiences and perspectives;
- Equipped to Serve: able to transfer academic studies to a profession and the workplace and implement a personal and social ethic that results in informed participation in multiple levels of community.

The CM Program strategic plan is also aligned to CBU's Priorities and the College of Engineering's Goals which is shown in the next section of this document. The four Program goals for the CM

program that comprise the Strategic Plan are the foundation of the CM Program's annual Plan of Work (PoW), a management document designed to assure that the resources are in place and effectively deployed for the successful operation of the CM Program. The Program Goals provide direction for operational actions to maintain adequate resources and a contemporary curriculum aligned with industry needs. The goals that comprise the Strategic Plan are reviewed annually by faculty as part of the Plan of Work process and shared with the Industry Advisory Board (IAB) for feedback.

At the beginning of each academic year, activities for attaining the Program Goals are identified and assigned to faculty. The implementation status of the PoW is subsequentially reviewed CM faculty meetings. As such, the Strategic Plan as operationalized through the PoW, is constantly reviewed to assess the internal and external factors that influence the operation of the Program. Further, the Strategic Plan, PoW and Annual PoW Report are shared with the IAB and other constituents to maintain a broad understanding of the directions and needs of the construction industry.

An assessment of the Strategic Plan is developed by the CM program director in conjunction with the CM faculty annually at the beginning of the academic year. The assessment includes the Plan of Work (PoW) for the coming year as well as a summary Goal Report on Work completed during the previous academic year. Results for the assessment are disseminated to the CM faculty and the IAB for further action aimed at program improvement.

#### 3. CM Program Strategic Plan and Goals [2020-2025]

The CM Program has four goals along with two visions to achieve its mission.

- Vision #1: to become an academic incubator nurturing the next-generation believers to become essential assets to the community and serve the world.
  - Goal #1: Program Stability
     The program will maintain and improve program enrollment in collaboration with the College of Engineering (CoE) leadership and the CBU Career Center.
  - Goal #2: Industry Community Engagement
     The program will create and maintain partnerships with the peer institutions, local industry, and community to benefit student learning and career development.
- Vision #2: to provide a unique learning environment where students enjoy their time with the faculty and find their learning fun and fruitful.
  - Goal #3: Scholarly Activities
     The program will provide an atmosphere where faculty can be committed to quality education, research, and professional development and offer students with guidance to become life-long learners in construction management fields.
  - Goal #4: Continuous quality education

The program will maintain quality education in construction management and help students understand Christian's role in fulfilling the Great Commission in the built environment.

The CM program's goals are aligned with the CBU's Priorities and CoE's Goals as shown in the following table.

CM Goals [2020-2025]	Goal Alignment
1. Program stability	[CBU Priorities]
The program will maintain and improve program	
enrollment in collaboration with the CoE	[CoE Goals]
leadership and the CBU Career Center.	#6. To be the school of choice for Christian
	engineering prospective students worldwide
	beginning with California.
2. Industry and community engagement	[CBU Priorities]
The program will create and maintain	#5.Community and Global Engagement: Engage
partnerships with the peer institutions, local	the local community and the nations.
industry, and community to benefit student	[CoE Goals]
learning and career development.	#8. To be the school of choice for hiring from
	individuals, businesses and organizations
	who share our values and need competent,
	personable and value-centered engineering
	graduates.
3. Scholarly activities	[CBU Priorities]
The program will provide an atmosphere where	##2. Research & Scholarship: Enhance
faculty can be committed to quality education,	scholarship, research and
research, and professional development and	creative/professional achievements.
offer students with guidance to become life-long	[CoE Goals]
learners in construction management fields.	#7. To be the school of choice for new Christian
	faculty and staff in the field of engineering
	who are called to the Christian academic
	environment either as employees or while on
	sabbatical.
4. Continuous quality education	[CBU Priorities]
The program will maintain quality education in	#1. Educational Effectiveness: Enhance the
construction management and help students	quality of undergraduate, graduate, doctoral
understand Christian's role in fulfilling the Great	and professional education.
Commission in the built environment.	[CoE Goals]
	#4. To be a school that provides an excellent
	dynamic curriculum taught by highly
	competent and caring faculty.
	#5. Io be a school that plays a decisive role in
	strategically motivating young people to
	pursue engineering and science as a
	vocation.

The CM Strategic Plan includes strategies to achieve the four CM Program Goals and Plan of Work (PoW) for each objective as shown in Appendix II. The fourth column in the Plan of Work (PoW) and Goal report in the Appendix II shows detailed objectives for each year. Also the detailed objectives includes target amount or how achievement of each objective is assessed.

#### 4. CM Program Learning Objectives and Learning Outcomes

The CM Program's educational objectives are in line with the university's mission statement. The CM Program through the BSCM degree contributes to this mission and its core values by offering the curriculum that prepares men and women for management and supervisory professions in the world of construction. Focusing on field operations, estimating, and project management processes as they relate to the built environment, the program curriculum combines solid technical training with people skills in a Christian context and biblical worldview. More specifically, the CM Program Education Objectives read as follows.

Our alumni will show evidence of integrating a Christian worldview into their life and vocation by following the example of Christ in being an articulate, ethical and empowered servant leader. This implies being aware of and meeting the needs of humanity by doing most if not all of the following:

- serving community and faith based organizations,
- serving professional societies,
- and serving employers by being a steward of time, competencies and resources.

Our alumni will show competence to apply fundamental engineering concepts in a professional setting by active participation in professional engineering activities. These activities will involve some of the following: creating, researching, innovating, designing, building, testing, inspecting, evaluating, estimating, planning, allocating, forecasting, selling, educating, communicating and collaborating.

**Our alumni will continue to develop professionally through involvement in post-graduate learning activities.** These activities would include participating in training or continued education, receiving a post graduate degree, attending and or delivering presentations, papers or posters at professional conferences, taking and passing the EIT and PE exam, and/or attending or delivering presentations at professional society meetings or in academic and educational settings.

Our alumni will show evidence of success in at least one of a variety of post graduate experiences. These experiences include but are not limited to employment in industry, public service, education, missions/NGO's, and/or participation in graduate school, and success could be demonstrated through achievements such as promotion, completion of an advanced degree, and awards.

Under the umbrella of Program Educational Objectives, the CM Program sets the Program Learning Outcomes by synchronizing them with those of ACCE's. With the Christian worldview and ethical minds as a foundation for their education, our students can demonstrate an ability to articulate a Christian worldview on personal, professional, technical, and societal issues and exhibit an understanding of the basic concepts in leadership. As far as the technical aspects of learning outcomes, our students should achieve the following 17 Student Learning Outcomes (SLOs) upon successful completion of their education at CBU:

- 1) Create *written communications* appropriate to the construction discipline.
- 2) Create *oral presentations* appropriate to the construction discipline.
- 3) Create a construction project *safety* plan.
- 4) Create construction project *cost estimates.*
- 5) Create construction project *schedules*.
- 6) Analyze professional decisions based on *ethical principles*.
- 7) Analyze *methods, materials, and equipment* used to construct projects.
- 8) Apply *electronic-based technology* to manage the construction process.
- 9) Apply basic *surveying* techniques for construction layout and control.
- **10)** Understand different methods of project delivery and the roles of and responsibilities of all constituencies involved in the design and construction process.
- 11) Understand construction accounting and cost control.
- 12) Understand construction *quality* assurance and control.
- 13) Understand construction *project control* processes.
- 14) Understand the *legal implications* of contract, common, and regulatory law to manage a construction project.
- 15) Understand basic principles of *sustainable construction*.
- 16) Understand the basic principles of *structural behavior*.
- 17) Understand the basic principles of *HVAC, electrical and plumbing* systems.

Course learning objectives support each SLOs and are indicated accordingly in the syllabus. Further, syllabi are presented in a consistent format as shown in the Appendix III.

#### 5. CM Program Goals and SLOs Assessment Plan

5.1. CM Program Goals Assessment

CM programs' Goals and objectives, and Plan of Work (PoW) are discussed and developed by CM faculty in the beginning of each academic year (typically in August). Then, CM faculty along with support by IAB and construction partners implement PoW for the year. Data of achievement of the PoW is collected by all CM faculty and analyzed by the CM director at the end of the academic year. Result of assessment is discussed among CM faculty and CM IAB is asked for their feedback. Depending on the assessment result, CM faculty take actions for correction or improvement. The Figure 2 shows the cycle of CM goals/objectives implementation and assessment.



Figure 2. CM Objectives and Learning Outcomes Implementation Plan

The CM program Plan of Work and Report as shown in the Appendix II shows not only annual objectives, but also how each objective is measured. In addition, CM program goal achievement is reported to ACCE as requested by the ACCE (Section 8.5.1 and 9.4.1 of ACCE Document 103, Standards and Criteria for the Accreditation of Construction Education Programs) as shown in the Appendix IV.

Data for assessment of the CM objectives are collected by CM faculty along with CoE Office of Strategic Initiatives throughout an academic year. Then, the data is assessed and analyzed by the CM director near the end of each academic year. The assessment and analysis of each CM objective achievement includes:

- Determination of achievement: each CM objective is determined for achievement compared to the set target(s) directly.
- Analysis of the results in five years: results of CM objective achievement are kept track of in five years frame for change or updating CM goals and objectives in the future.
- Actions taken and impacts: results of the CM objectives assessment and analysis are reviewed and discussed among CM faculty for determination of corrective/improvement actions, if needed.

Figure 3 shows schedule for the assessment process every year: both for CM goals & objectives assessment and SLOs assessment.

Assessment Items	Derformed by	Month											
Assessment items	Performed by	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June	July
CM Goals & Objectives													
Review assessment results from the	CM faculty												
previous academeic year	civitacuity												
Adjust/change Plan of Work	CM faucity												
Incorporate/improve CM courses as	CM faculty												
needed	civitacuity												
Discuss with IAB	CM faculty, & IAB												
Collect data for assessment	CM Director												
Analyze the achievement	CM Director												
Student Learning Outcomes (SLOs)													
Direct Measure in CM Courses													
Review assessment results from the	Review assessment results from the												
previous academeic year	CIVI faculty												
Incorporate/improve CM courses as	IS CALLER IN												
needed	Civitacuity												
Discussion with IAB	CM faculty, & IAB												
Collect data for assessment	CM faculty												
Analyze the assessment results	CM Director												
Indirect Measure													
Employer Survey: administration &	CM Director & CoE Director												
data collection	of Strategic Initiatives												
Alumni Survey: administration & CM Director & CoE Director													
data collection	llection of Strategic Initiatives												
Senior Exit Survey: administration &	CM Director												
data collection													
Analyze the collected data	CM Director												

Figure 3. Schedule for CM Goals & SLOs Assessment

#### 5.2. CM Program Student Learning Outcomes Assessment

The 17 SLOs are assessed both directly and indirectly as follows:

1) Direct Assessment

Each of the 17 SLOs are assessed in annually or in every semester (if a CM course is offered in every semester) in at least one CM or Engineering courses (EGR). The Appendix V shows the map for SLO assessment in CM or EGR courses.

Typically this assessment is performed in a format of homework assignment, quiz, exam, or class project. CM faculty members contribute to the assessment process in his or her courses: selection of assessment tool (or format), administration of assessment, and collection of assessment data through an academic year. At the end of each semester, the CM director collects direct assessment data. Then, at the end of each academic year, the collected direct assessment is analyzed by the CM director. Then, the analyzed result is discussed among CM faculty, and shared with IAB for feedback. Figure 2 shows the continuous improvement cycle for SLOs.

The performance criteria for each SLO in direct assessment is that average score for CM students will be greater than or equal to 70% for the appropriate category.

2) Indirect Assessment

CM SLOs are measured indirectly in all the following methods every year.

Employer Survey

CM employers who have hired CBU CM graduates in recent 3 years are asked to evaluate their performance regarding the 17 SLOs. Typically, CM employers who come to the College of Engineering career fair in Fall semester are asked for the evaluation.

The performance criteria for each SLO in employers' responses is that average score of employers' positive response will be greater than or equal to 70%, which indicates that students were well prepared in that skill or knowledge area.

• Senior Exit Survey

Graduating CM seniors are asked to evaluate their perception regarding the 17 SLOs in their last semester.

The performance criteria for each SLO in senior exit survey is that average score of CM seniors response will be greater than or equal to 3.5 on a 5- point scale.

• Alumni Survey

CM alumni who graduated 3 years ago are asked to evaluate their learning experience at CBU and preparedness for their career in terms of the 17 SLOs.

The performance criteria for each SLO in alumni survey is that average score of CM seniors response will be greater than or equal to 3.5 on a 5- point scale.

CM SLOs' indirect assessment is concluded by the overall performance criteria, all the three indirect SLO assessments should satisfy their own performance criterion. The Appendix VI shows the forms of indirect SLO assessment tools (questionnaire surveys) and the Appendix VII shows the form of annual CM SLO assessment report.

The annual CM SLO assessment report form includes CM faculty's actions or responses depending on the assessment result. This report is shared with IAB for their feedback. Also, the CM SLO assessment report is reported to ACCE as requested.

Appendix I: ACCE Document Standard 103 Section 9 Requirements

ACCF

# SECTION NINE: ACADEMIC QUALITY PLANNING PROCESS AND OUTCOME

AMERICAN COUNCIL FOR

CONSTRUCTION EDUCATION

# ASSESSMENT

# STANDARD 9: Conduct a systematic process of gathering, interpreting, and evaluating information that requires taking actions as part of an academic quality planning process and outcome assessment.

To meet this standard, the Degree Program shall present proof of the development, existence, and use of:

- A Strategic Plan for the Educational Unit;
- An Assessment Implementation Plan that includes the four segments of:
  - Assessment of the ACCE SLOs using the appropriate mix of direct and indirect measurements,
  - Assessment of the Degree Program Objectives,
  - Data gathering,
  - Data interpretation; and
- A Determination of Achievement of SLOs and Degree Program Objectives that describes actions taken to maintain or improve performance of SLOs and Degree Program Objectives.

#### 9. REQUIREMENTS

While ACCE recognizes the obligation of Degree Programs to use assessment terminology congruent with their Institutions, it is necessary for ACCE Visiting Teams to have a consistent understanding of terminology used in the assessment process. With that purpose in mind, the ACCE will use the definitions in Introduction Section as the preferred terminology in its assessment documentation.

If the Degree Program cannot use this terminology because of institutional constraints, they shall provide a glossary of compatible terminology at the beginning of Section 9 in the Self-Evaluation Study.

#### 9.1. CONTINUOUS IMPROVEMENT

The Quality Improvement Plan (QIP) serves as the basis for the continuous improvement of the Degree Program. It shall have three major components:

- Strategic Plan for the Educational Unit,
- Degree Program Assessment Implementation Plan, and
- Determination of Achievement of SLOs and Degree Program Objectives.

These documents shall be included in the Self-Evaluation Study and made available for Visiting Teams to review.



#### 9.2. EDUCATIONAL UNIT STRATEGIC PLAN

- 9.2.1. The Educational Unit shall have a comprehensive Strategic Plan that describes the systematic and sustained effort to enable the Degree Program to fulfill its mission.
- 9.2.2. The Strategic Plan shall review the internal status of the Degree Program resources as well as the external factors that influence the operation of the Degree Program.
- 9.2.3. The Strategic Plan shall be updated periodically and represent the collective input from all Degree Program constituencies.

#### 9.3. DEGREE PROGRAM ASSESSMENT IMPLEMENTATION PLAN

The Degree Program shall produce an assessment implementation plan that is based on such tools as the results of surveys of graduates, employers of the graduates, and Industry Advisory Committee members; exit interviews; comprehensive exams; capstone projects; or other systematically structured information.

The mission, goals, and objectives shall reflect both short-range and long-range considerations and shall be clear as to the educational and institutional results expected.

At a minimum, the Degree Program Assessment Implementation Plan shall include the following:

9.3.1. Mission Statement of the Degree Program.

The Mission Statement expresses the underlying purposes and values of the Degree Program.

9.3.2. Degree Program Objectives.

The Degree Program Objectives shall be clearly defined and stated in a manner that permits an assessment of achievement.

9.3.3. Assessment Tools

These tools shall measure achievement of Degree Program Objectives and SLOs. All data from these tools shall be collected annually or collected across multiple years leading up to a complete assessment cycle; however, there must be a plan indicating what data is collected in each year. ACCE SLOs (Section 3.4) (Section 3.2 for Master's Degree) shall be regularly evaluated and reviewed with the appropriate participation of faculty, Industry Advisory Committee, and other pertinent parties.

9.3.4. Performance Criteria.

There must be at least one performance criteria for each assessment tool to achieve the Degree Program Objectives and SLOs.

9.3.5. Methodology.

The Degree Program shall comprehensively describe the methods used for data collection, the frequency of data collection, the assessment process, the evaluation process, and how it takes the results of assessment evaluation into consideration for Program improvement and development. A complete assessment cycle shall be performed at least once every three years. A complete assessment cycle is defined as data collection, data analysis, selection of appropriate actions (if needed), and review of the effect of such action (if applicable) in the assessment of SLOs and Program Objectives.



#### 9.4. DETERMINATION OF ACHIEVEMENT OF STUDENT LEARNING OUTCOMES AND DEGREE PROGRAM OBJECTIVES

To determine student achievement of SLOs listed in Section 3.4 (or Section 3.2 for Master's Degree), the Degree Program shall:

- 9.4.1. Provide a summary report containing the following information for each SLO (e.g., direct and indirect) and Degree Program Objective:
  - Methods of assessment,
  - Current evaluation of the results,
  - Last reported evaluation of the results,
  - Resulting corrective actions,
  - Follow-up of the impact of actions taken on student performance including the dates of each follow-up, and
  - Description of any revisions made to Degree Program assessment tools (if applicable).
- 9.4.2. Evaluate each SLO by a minimum of two assessment methods, at least one of which must be direct. Provide a table identifying the specific assessment methods used for each SLO and the location the assessment is made (e.g., the course or activity) so each assessment can be easily located.
  - If student teams or group projects are used for assessment, there must also be a process in this team/group environment to assess individual student learning.
  - If an SLO direct assessment measure is an examination in a course with mixed enrollment, all non-construction majors shall be excluded from the assessment data collection.
- 9.4.3. Produce evidence in the form of assessment tools, associated grading rubrics, and one example of graded student work to:
  - Demonstrate applicability of assessment content to the specified SLO.
  - Demonstrate adequacy of the assessment tool in evaluating individual student's ability to meet each SLO at or above the required minimum level of Bloom's Taxonomy (e.g., Understand, Apply, etc.). Programs using third-party certifications shall provide comprehensive results for each SLO where such assessment is applied.
  - The determination of achievement shall be documented in a systemic manner.

To determine the achievement of Degree Program Objectives, the Degree Program shall:

- 9.4.4. Evaluate each Degree Program Objective with at least one direct measure.
- 9.4.5. Provide evidence to demonstrate the applicability of the assessment to the specified Degree Program Objective.

## Gordon and Jill Bourns College of Engineering Construction Management (CM) Program

# CM Program Mission, Strategic Plan and Goals

Mission: The CM program prepares men and women for management and supervisory professions in the world of construction, offers enriched technical training with people Strategic Plan: CM Program Plan of Work (2024-2025)

CM Goals [2024-2029]	Goal Alignment	Objectives	Plan of Work for 2024-2025	Report on Plan of Work 2024-2025
<b>1. Program stability</b> The program will maintain and improve program enrollment in collaboration with the CoE leadership and the CBU Career Center.	[CBU Priorities] [CoE Goals] #6. To be the school of choice for Christian engineering prospective students worldwide beginning with California.	<ul> <li>Collaborate with the CM programs at regional community colleges for recruiting.</li> <li>Recruit through current CM students' high schools.</li> <li>Provide and improve placement services for employment and career opportunities for students.</li> </ul>	<ul> <li>Recruit two new transfers from regional community colleges.</li> <li>Update CM brochure and share it with community colleges by electronically and hard copy.</li> <li>Develop CM student ambassador program and recruit two through CM student ambassadors.</li> <li>Continue to have job placement of 70% or higher of graduating seniors through the CoE placement services.</li> </ul>	
<b>2. Industry and community engagement</b> The program will create and maintain partnerships with the peer institutions, local industry, and community to benefit student learning and career development.	<ul> <li>[CBU Priorities]</li> <li>#5.Community and Global Engagement: Engage the local community and the nations.</li> <li>[CoE Goals]</li> <li>#8. To be the school of choice for hiring from individuals, businesses and organizations who share our values and need competent, personable and value-centered engineering graduates.</li> </ul>	<ul> <li>Increase K-12 outreach efforts through the partnership with regional schools.</li> <li>Continue to participate in professional development through partnership with industries.</li> <li>Develop connection with diverse industry professionals/organizations.</li> <li>Communicate with CM alumni and get them engaged through CM social media.</li> </ul>	<ul> <li>Hold or participate in one activity pertaining to K-12 regional schools.</li> <li>Participate in at least a training/professional development event through partnership with industries per each faculty member.</li> <li>Develop a <i>Linkedin</i> page/group for the CM program and invite alumni.</li> </ul>	
<b>3. Scholarly activities</b> The program will provide an atmosphere where faculty can be committed to quality education, research, and professional development and offer students with guidance to become life-long learners in construction management fields.	<ul> <li>[CBU Priorities]</li> <li>#2. Research &amp; Scholarship: Enhance scholarship, research and creative/professional achievements.</li> <li>[CoE Goals]</li> <li>#7. To be the school of choice for new Christian faculty and staff in the field of engineering who are called to the Christian academic environment either as employees or while on sabbatical.</li> </ul>	<ul> <li>Maintain faculty participation in research publication in its respective field of study.</li> <li>Conduct applied research and professional development opportunities.</li> <li>Maintain the level of faculty participation in professional societies</li> <li>Maintain the number of scholarly activities by faculty and undergraduate students.</li> </ul>	<ul> <li>Disseminate result of applied research minimum one per faculty member.</li> <li>Attend/ involve with minimum one professional events/activities per faculty member.</li> <li>Advise minimum one scholarly activity per faculty member.</li> </ul>	
<b>4. Continuous quality education</b> The program will maintain quality education in construction management and help students understand Christian's role in fulfilling the Great Commission in the built environment.	<ul> <li>[CBU Priorities]</li> <li>#1. Educational Effectiveness: Enhance the quality of undergraduate, graduate, doctoral and professional education.</li> <li>[CoE Goals]</li> <li>#4. To be a school that provides an excellent dynamic curriculum taught by highly competent and caring faculty.</li> <li>#5. To be a school that plays a decisive role in strategically motivating young people to pursue engineering and science as a vocation.</li> </ul>	<ul> <li>Increase student participation in extra-curricular activities, e.g. student academic competitions or community service projects in program related fields.</li> <li>Increase the opportunities for student engagement with professional society events.</li> <li>Continuously improve the CM learning experiences for students and link program content closely to industry.</li> <li>Maintain an effective industry advisory board focused on continuous program improvement.</li> <li>Continue to improve/update CM curriculum to reflect industry trends and needs</li> </ul>	<ul> <li>Attend AGC local events.</li> <li>Participate in ASC student competition: ASC Reno competitions.</li> <li>Arrange two project site visits or two guest lectures.</li> <li>Conduct employer and senior exit surveys and incorporate the feedback into CM course contents.</li> <li>Add or adjust CM topics to reflect new construction paradigms, technologies and methods into existing courses.</li> <li>Get CM curriculum reviewed by CM faculty and Industry Advisory Board members.</li> </ul>	

le skills in Christian context and biblical worldv	iew.
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Appendix III: Example of CM course syllabus format

# **Syllabus**

# **CON105A** – Introduction to Construction Management (3 units)

Instructor:	Dr. Jay Lee
Office location:	TEGR – 352
Telephone:	951-552-8189
Email:	jaylee@calbaptist.edu
Office hours:	9:00 - 11:00 AM on MWF; 1:00 - 2:00 PM on TR

#### **Course Instructor and Curriculum Partners:**

Instructor:	California Baptist University	Instructor of Record		
Dr. Jay Lee	www.calbaptist.edu			
Academic Consultant: Dr. Bob McCullouch	Associate Professor of Practice, Beaver Fellow Emeritus at Purdue University, West Lafayette			
Industry Partner 1: Mr. Kevin Terry	Tovey Shultz https://toveyshultz.com/			
<b>Industry Partner 2:</b> Mr. John Rogers	Inland Empire Survey and Engineering https://iesurveyandeng.com/			

#### **Course Description**

This course will explore fundamental concepts related to the theory and practice of construction management. The course includes an overview of the construction industry, job market, common project management tools, basic materials and methods of construction, risk management challenges, sustainable operations, and leadership skills required to direct a construction company and project activities.

#### **Required Textbook**

John E. Schaufelberger and Len Holm (2017), *Management of Construction Projects: A Constructor's Perspective*; 2<sup>nd</sup> edition, ISBN: 978-1-138-69391-3

#### **Student Learning Outcomes**

	Course Objective	ACCE Student Learning Outcome	
1	Students will demonstrate understanding of the construction industry, opportunities in construction, and strategies for competing in the construction job market.		
2	Students will show competence in applying the theories and practices to plan, organize, and control construction projects.	10	
3	Students will analyze the basic materials and methods of construction and understand developments in project delivery.	10	
4	Students will examine the managerial and leadership skills required of construction professionals in a contemporary environment.		
6	Students will show competence in quality management of construction projects.	12	
7	Students will demonstrate understanding of the principles of sustainable construction.	15	

#### **ACCE Student Learning Outcomes**

- 10. Understand different methods of project delivery and the roles and responsibilities of all constituencies involved in the design and construction process.
- 12. Understand construction quality assurance and control.
- 15. Understand basic principles of sustainable construction.

#### **ASSESSMENT POLICIES**

#### **Class preparation**

It is the general policy that the student will contribute a minimum of two hours of preparation time for each one hour of class time.

#### **Course Evaluation Plan**

An assessment instrument (checklist, rubric, etc.) will accompany each major graded assignment.

See course website (weekly Blackboard postings) for specific assignment criteria and the accompanying grading instruments.

All assignments should be typed and should be original to this class (not used for another class assignment). All of the assignments and the corresponding instructions will be posted in Blackboard. In addition, all assignments are to be submitted electronically in Blackboard – hard copy or emailed submissions will not be accepted. Should you have any questions or concerns accessing or locating any of the assignments, folders, instructions, and due dates please notify the instructor immediately. Assignment due dates are specified in the weekly course schedule at the end of the syllabus. Upon gaining full access to the course in Blackboard, on the start date, be sure to navigate the course entirely in Blackboard to ensure you have proper access to all of the links, assignments, and instructions you will need to complete all of the assignments.

#### **Course Point Distribution: Graded assignments will be weighted as follows:**

Graded Assignments		
Homework Assignments	20%	
Quizzes	20%	
Term Paper	20%	
Mid-term Exam	20%	
Final Exam	20%	
Total Points:	100%	

Note that the scores posted on Blackboard are unweighted scores. Students are advised to refer to the above Course Point Distribution when computing the weighted scores for the final grade.

#### **Final Grades**

The following scale will be used when calculating final grades for graduate students:

А	93%-100%	A-	90%-92%	B+	87%-89%
В	83%-86%	B-	80%-82%	C+	77%-79%
С	73%-76%	C-	70%-72%		

#### **Checking Grades**

Be sure to check your grades often via the Blackboard.

#### EXPECTATIONS

#### Attendance

Students are encouraged to read the university catalog which covers the attendance policy. Failure to follow this attendance policy may result in academic withdrawal and/or a failing grade. **CM class attendance is regarded mandatory due to the applied nature of course content and group learning formats, more than five absences per semester will prevent a student from passing the course regardless of his or her grade standing.** Students who elect to arrive late or leave early will be counted as absent. Should you not want to be marked absent for the class session, personally inform the professor prior to the class that you will leave early or, personally notify the professor after class if you were late. In an event of testing, a student electing to arrive late, will not be given extra time to complete the test. As a professional, you are expected to collaborate with your fellow students during in-class activities or out-of-class group projects, and to respect one another during all interactions, presentations, and class discussions.

**Late Assignments -** Late work is not acceptable; the course moves too quickly through new and challenging material. If a student is going to be absent, he or she should manage their course load accordingly and have the assignment(s) submitted on or before the respective due date. If a student is sick preceding class or has a personal emergency, he or she should contact the instructor immediately to discuss the nature of the situation. There is a formulaic deduction of points for late work, which is:

- Rule 1: Work turned in after the due date will be docked by 5% per day (or partial day) for up to one week. Therefore, the best possible score on late work ranges from 95% down to 65% (if turned in just before the one week deadline).
- Rule 2: No work will be accepted after one week of the original due date.
- The above rules apply even if absence is excused. The only exception to these rules is a major event resulting in a significant impact to the student's ability to keep up with coursework (e.g. hospitalization).

**Make-up Work -** Make-ups for missed exams and quizzes will be allowed in the event of an illness or emergency, but the instructor must be notified and approve it before the exam. In the case of an emergency, notify the instructor within 24 hours after the exam. There will be no make-ups for unexcused absences or absences where notification was received after 24 hours of the exam time.

**Academic Honesty -** Any incident of academic dishonesty (cheating, plagiarism, copying, and other forms) must be reported to the Dean of Students. A detailed discussion of academic dishonesty appears in the CBU *Student Handbook.* 

**Students with Disabilities -** Students who have qualified disabilities and wish to arrange the appropriate accommodations, in addition to the general academic support services coordinated by the Academic Resources Center, must identify themselves to the Director of Disability Services. Disabled students who wish to arrange appropriate accommodations must complete and submit a Request for Accommodations form and provide recent (not older than 3 years) diagnostic test results.

**Materials Required**: Each student needs to have his or her required texts and resources as specified in the course syllabus. Materials or computer for note taking is required.

#### **Recording Class Sessions**

Recording of class sessions without the prior express written permission of the instructor is prohibited. Any permission granted shall include the requirements that a recording may only be used for content study purposes only and sharing a recording with anyone outside of the course and/or posting on social media are strictly prohibited. This course policy is in alignment with Student Handbook and the Standard of Student Conduct. Refer to Student Handbook policies 15.6, 15.7, and 15.8 for more information.

Class	Date	Learning	Assignment
Week 1	Sep 5/7	Overview of class; Introduction to Construction Management	Read Schaufelberger and Holm Chapter 1
Week 2	Sep 12/14	Project delivery, law and contracts	Read Schaufelberger and Holm Chapter 2 Quiz 1
Week 3	Sep 19/21	Cost estimating for construction projects and cost control (Instructor Out on 9/19)	Read Schaufelberger and Holm Chapters 3 & 12
Week 4	Sep 26/28	Planning and scheduling construction projects and time control	Read Schaufelberger and Holm Chapters 4, 5 & 12 Quiz 2
Week 5	Oct 3/5	Procuring for construction projects and material management	Read Schaufelberger and Holm Chapter 7
Week 6	Oct 10/12	MID-TERM Review; Subcontracting; Project start-up and risk management	Read Schaufelberger and Holm Chapters 6 & 8 Quiz 3 MID-TERM EXAM (10/12)
Week 7	Oct 17/19	Project monitoring, documentation, and closeout (Instructor Out on 10/17)	Read Schaufelberger and Holm Chapter 9/17
Week 8	Oct 24/26	Communication and management within construction	Read Schaufelberger and Holm Chapter 10
Week 9	Oct 31 Nov 2	Quality and safety management	Read Schaufelberger and Holm Chapters 13 & 14 Quiz 4
Week 10	Nov 7/9	Financial management, pay applications, and progress billing	Read Schaufelberger and Holm Chapter 11
Week 11	Nov 14/16	Project change orders, claims, and dispute resolution	Read Schaufelberger and Holm Chapters 15& 16 Quiz 5
Week 12	Nov 21/23	Thanksgiving Holiday	
Week 13	Nov 28/30	Sustainability in construction project	Handout
Week 14	Dec 5	FINAL Review	Term Paper Due (12/5)
Week 15		FINAL EXAM (TBA)	

The course schedule is subject to change based on the progress of the class. Instructor will post all course schedule changes on Blackboard after in-class announcement.

I am in receipt of the syllabus for CON105 Introduction to Construction Management for Fall 2023. I have read and I understand the contents of the syllabus.

SIGNED: \_\_\_\_\_

NAME (printed):

DATE: \_\_\_\_\_

#### Annual Summary Report of Achievement of Student Learning Outcomes and Degree Program Objectives

As prescribed in Section 8.5.1 and 9.4.1 of ACCE Document 103, Standards and Criteria for the Accreditation of Construction Education Programs

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1 cai	Academic Tear	Degree Lever	Bachelor s	i rogi ani ivanie		Degree i rogram (vanie	Institution (value		Name of institution	J	PARTNERSHIP FOR EXCELLENCE
	Student Learning Outcome	Method of Assess	ment	Current Evaluation of Results and Re		sulting Corrective Actions	Last Reporte	d Evaluation of Re	sults and Follow-up on the impact of corrective actions taken		Description of any revisions made to Degree Program assessment tools
SLO #	SLO Description			Current Evaluation Dates of evaluation		Corrective Actions	Last Evaluation Dates of Last Evaluation		Follow-up of the impact of corrective actions taken	Date(s) of Follov up	ч
#0	Sample of feedback for Student Learning Outcomes	CONST XXX - Principles of Effectiv Construction Communications	Direct	Describe the results of the evaluation - example - "Meeting the targeted objective."	May-24	Review the technical writing course for content and rigor.	Not meeting target	5/1/2022	Meeting with industry in AY2022 to discuss student's writing skills did not yield positive impact on writing skills.	8/1/2023	Made adjustments to the curriculum to incorporate the feedback received from our industry meeting that was held in AY2022.
		Senior survey	Assessment Type	Meeting target		None	Meeting target		None	N/A	None needed at this time.
#1	Create written communication appropriate to the construction discipline		Direct Assessment Type								
#2	Create oral presentations appropriate to the construction		Direct								
	discipline		Assessment Type Direct								
#3	Create a construction project safety plan.		Assessment Type								
#4	Create construction project cost estimates.		Assessment Type								
#5	Create construction project schedules.		Direct								
#0	Andrea and a state of		Assessment Type Direct								
#0	Analyze professional decisions based on ethical principles.		Assessment Type								
#7	Analyze methods, materials, and equipment used to construct projects.		Assessment Type					1			
#8	Apply electronic-based technology to manage the		Direct								
	construction process. Apply basic surveying techniques for construction layout and		Assessment Type Direct								
#9	control.		Assessment Type								
#10	Understand different methods of project delivery and the roles and responsibilities of all constituencies involved in the design		Direct								
	and construction process.		Assessment Type								
#11	Understand construction accounting and cost control.		Direct Assessment Type								
#12	Understand construction quality assurance and control		Direct								
	onderstand construction quarky assurance and control.		Assessment Type Direct								
#13	Understand construction project control processes.		Assessment Type								
#14	Understand the legal implications of contract, common, and regulatory law to manage a construction project		Direct Assessment Type								
#15	Understand the basic principles of sustainable construction		Direct								
			Assessment Type Direct								
#16	Understand the basic principles of structural behavior.		Assessment Type								
#17	Understand the basic principles of HVAC, electrical and plumbing systems		Direct Assessment Type								
#18	Additional Program Specific SLO if needed		Direct								
			Assessment Type Direct								
#19	Additional Program Specific SLO if needed		Assessment Type								
#20	Additional Program Specific SLO if needed		Direct Assessment Type								
			Paracazinene Type				1				
	Degree Program Objectives	Assessment To	ool	Current Evaluation of R	esults and Re	sulting Corrective Actions	Last Reporte	d Evaluation of Re	esults and Follow-up of the impact of corrective actions taken		Description of any revisions made to Degree Program assessment tools
DPO #	DPO Description	Method of Assessment	Direct	Current Evaluation	Dates of evaluation	Corrective Actions	Last Evaluation	Dates of Last Evaluation	Follow-up of the impact of corrective actions taken	Date(s) of Follov up	
#0			Direct								
#2			Direct								
#3			Direct								
#5			Direct								
#6			Direct								
#8			Direct								
#9			Direct								
#11			Direct					l			
#12			Direct								
#13	+		Direct								
#15			Direct								
#16			Direct								
#18			Direct								
#19			Direct								

ACCE Form A-17

REV. 2024.07.19

#### ACCE Curriculum Map - Construction Management

	SLO1	SLO2	SLO3	SLO4	SLO5	SLO6	SLO7	SLO8	SLO9	SLO10	SLO11	SLO12	SLO13	SLO14	SLO15	SLO16	SLO17
CON105			1			D				]		IPD			IPD		
CON205				I/P													
CON215	l I							Р									
CON310							IPD									Р	
CON315	Р							Р		Р							
CON325											IPD						
CON330			P/D														
CON340																D	
CON350						Р				D				IPD			
CON430				D													
CON460					P/D			D					IPD				
CON470																	IPD
EGR241																I/P	
EGR251									IPD								
EGR306		I/P															
EGR401	D	D															
EGR402																	
EGR405	Р	Р															
EGR451							Р					Р			Р		
SLO1	Create wri	itten comn	nunications	appropria	ite to the c	onstructior	n discipline										
SLO2	Create ord	ıl presenta	tions appr	opriate to t	he constru	ction discip	oline										
SLO3	Create a co	onstructior	n project <b>sa</b>	<b>fety</b> plan													
SLO4	Create cor	nstruction	project <b>cos</b> t	t estimates													
SLO5	Create cor	nstruction	oroject <b>sch</b> e	edules													
SLO6	Analyze pr	ofessional	decisions b	oased on <b>et</b>	hical princ	iples											
SLO7	Analyze <b>m</b>	ethods, m	aterials, an	d equipme	nt used to	construct p	orojects										
SLO8	Apply <i>elec</i>	tronic-bas	ed technolo	<b>ogy</b> to mar	hage the co	nstruction	process										
SLO9	Apply basi	c <b>surveyin</b>	<b>g</b> techniqu	es for cons	truction lay	out and co	ntrol										
SLO10	Understan	d different	methods of	of project d	<b>lelivery</b> an	d the roles	of and resp	onsibilitie	s of all cons	tituencies	involved in	the design	and const	ruction pro	cess		
SLO11	Understan	d <b>construc</b>	tion accou	nting and	cost contro	l											
SLO12	Understan	id construc	tion <b>qualit</b>	<b>y</b> assuranc	e and cont	rol											
SLO13	Understan	id construc	tion <b>projec</b>	<b>t control</b> p	rocesses												
SLO14	Understan	d the <i>lega</i>	l implicatio	ns of cont	ract, comn	non, and re	gulatory la	w to mana	ge a constr	uction proj	ect						
SLO15	Understan	id basic pri	nciples of <b>s</b>	ustainable	constructi	on											
SLO16	Understan	d the basic	c principles	of structur	al behavio	r											
SLO17	Understan	d the basic	principles	of HVAC, e	lectrical a	nd plumbin	g systems.										

I Introduced P Practiced I/P Introduced/Practiced D Demonstrated P/D Practiced/Demonstrated

IPD Introduced/Practiced/Demonstrated

#### **Exit Survey - Construction Management Program**

#### Name:

- 1. What is the status of your job/grad school status? Please select one of the following.
  - Accepted a job offer
  - Under decision-making process for job offer(s)
  - Under interviewing process
  - Still searching for a job position
  - ☐ Will go to a graduate school (no job searching is planned)

If you are still searching, where are you searching (location)?

- In Southern California
- 🗌 In Central California
- 🗌 In Northern California
- $\Box$  In another state rather than California in the U.S.
- $\Box$  In a foreign country rather than U.S.
- $\Box$  No preference

If you have a permanent position, what company, where, and what is your job title/description?

- Name of company:
- Job title:
- Location of your company/project:

If you have a permanent position, what would be your salary? Please select one of the following,

- Less than \$50,000
- ☐ Between \$50,000 and \$60,000
- ☐ Between \$60,000 and \$70,000
- ☐ Between \$70,000 and \$80,000
- ☐ Between \$90,000 and \$100,000
- ☐ More than \$100,000

If you have a permanent position, which sector in the construction industry will you work? Please select one of the following,

- Commercial construction
- □ Residential construction
- Heavy/Civil construction
- ☐ Industrial construction
- Specialty construction (Mechanical/Electrical/Plumbing)
- Others (please specify your section:

If you have a permanent position, where will you work? Please select one of the following,

In Southern California

)

In Central California
In Northern California
In another state rather than California in the U.S.
In a foreign country rather than U.S.

If you are pursuing M.S degree, what school, and which program (CE, CM, or MBA)?

2. Please provide your email address that you most frequently use other than calbaptist.edu.

#### Construction Management Program Outcomes

Please mark each student learning outcome based on the following scale:

- 1. Strongly Disagree
- 2. Disagree
- 3. Somewhat Disagree
- 4. Agree
- 5. Strongly Agree

As a result of the courses taken and internship experience,	1	2	3	4	5
I can create <i>written communications</i> appropriate to the construction discipline.					
I can create <i>oral presentations</i> appropriate to the construction discipline.					
I can create a construction project <i>safety plan</i> .					
I can create construction project cost estimates.					
I can create construction project schedules.					
I can analyze professional decisions based on <i>ethical principles</i> .					
I can analyze <i>methods, materials, and equipment</i> used to construct projects.					
I can apply <i>electronic-based technology</i> to manage the construction process.					
I can apply basic <i>surveying techniques</i> for construction layout and control.					
I understand different <i>methods of project delivery</i> and the roles and responsibilities of all constituencies involved in the design and construction process.					
I understand construction <i>accounting</i> and cost control.					
I understand construction <i>quality</i> assurance and control.					
I understand construction <i>project control</i> processes.					
I understand the <i>legal implications of contract</i> , common, and regulatory law to manage a construction project.					
I understand the basic principles of <i>sustainable construction</i> .					
I understand the basic principles of <i>structural behavior</i> .					
I understand the basic principles of <i>mechanical, electrical and plumbing systems</i> .					

Do you have anything to say about the CM program? Feel free to continue to the next page ©



## **Employer Survey B.S. in Construction Management**

Employer:

Employer Representative & Title:

Number of program graduates hired within the past three years:

**Confidentiality statement**: All information from interviews will be reported in aggregate and not linked to any individual or company. This information is intended to help with our continuous improvement efforts.

**Explanation of interview questions**: Our program curriculum and facilities are informed by several desired learning outcomes. Our interest is in understanding your perceptions as to how well prepared program graduates are positioned for success in the workplace with regard to these learning outcomes. For each outcome, please rate the overall performance of graduates as "meets expectations" or "below expectations," and provide any insight into of the performance of our graduates within the context of your work environment. *Please remember that you are not rating a specific employee, but rather graduates collectively from the* **Construction Management program** during the past 3-years.

	Construction Management Learning Outcomes	Employer Rating	Employer Comments
1.	Create <b>written communications</b> appropriate to the construction discipline.		
2.	Create <i>oral presentations</i> appropriate to the construction discipline.		
3.	Create a construction project <i>safety</i> plan.		
4.	Create construction project <i>cost estimates</i> .		
5.	Create construction project <i>schedules</i> .		
6.	Analyze professional decisions based on ethical principles.		



Construction Management Learning Outcomes	Employer Rating	Employer Comments
7. Analyze <i>methods, materials, and</i> <i>equipment</i> used to construct projects.		
8. Apply <i>electronic-based technology</i> to manage the construction process.		
9. Apply basic <i>surveying techniques</i> for construction layout and control.		
10. Understand different <i>methods of project delivery</i> and the roles and responsibilities of all constituencies involved in the design and construction process.		
11. Understand <i>construction accounting</i> and cost control.		
12. Understand <i>construction quality</i> assurance and control.		
13. Understand construction <i>project control</i> processes.		
14. Understand the <i>legal implications of</i> <i>contract</i> , common, and regulatory law to manage a construction project.		
15. Understand the basic principles of <i>sustainable construction</i> .		
16. Understand the basic principles of <i>structural behavior</i> .		
17. Understand the basic principles of <i>mechanical, electrical and plumbing systems.</i>		

Additional Comments or Suggestions: please provide any other comments or suggestion to the Construction Management program at CBU below.



# Alumni Survey B.S. in Construction Management

- Job title:
- Year of your graduation from CBU CM program:
- Number of years you have worked in the construction industry after graduation from CBU:
- Construction sector you work for:

#### Please specify for Others:

**Confidentiality statement**: All information from this survey will be reported in aggregate and not linked to any individual. This information is intended to help with continuous improvement efforts in the CM program at CBU.

**Explanation of survey questions**: the main purpose of this survey is to understand your perceptions as to how well the CM program prepared you as a construction professional in the workplace regarding the CM learning outcomes below. For each outcome, please rate your perception: if you agree or disagree with "<u>I was well</u> <u>prepared through the learning experience in the CM program at CBU to be able to…</u>". Also please provide any insight/comments.

	I was well prepared through the learning experience in the CM program at CBU to be able to	Alumni Rating	Alumni Comments
1.	Create <b>written communications</b> appropriate to the construction discipline.		
2.	Create <i>oral presentations</i> appropriate to the construction discipline.		
3.	Create a construction project <i>safety</i> plan.		
4.	Create construction project <i>cost estimates</i> .		
5.	Create construction project <i>schedules</i> .		
6.	Analyze professional decisions based on <i>ethical principles</i> .		



I was well prepared through the		
nearning experience in the CM	Alumni Kating	Alumni Comments
program at CBO to be able to		
<i>equipment</i> used to construct projects.		
- <b> </b>		
8. Apply <i>electronic-based technology</i> to		
manage the construction process.		
9. Apply basic <i>surveying techniques</i> for		
construction layout and control.		
10. Understand different <i>methods of</i>		
project delivery and the roles and		
responsibilities of all constituencies		
process		
11. Understand <i>construction accounting</i> and		
cost control.		
12. Understand construction quality		
assurance and control.		
12 Understand construction project control		
processes.		
P		
14. Understand the <i>legal implications of</i>		
to manage a construction project.		
15. Understand the basic principles of		
sustainable construction.		
16. Understand the basic principles of		
structural behavior.		
17. Understand the basic principles of		
mechanical, electrical and plumbing		
systems.		



Additional Comments or Suggestions: please provide any other comments or suggestion to the Construction Management program at CBU below.

#### CM SLO Assessment Annual Report: 2024-2025

		Dire	ect Assessmen								
		I	n CM Courses		Employe	r Survey <sup>2</sup>	Senior Ex	it Survey <sup>3</sup>	CBU Alun	n Survey <sup>3</sup>	-
	ACCE/CM Student Learning Outcomes	CM Course	Number of data	Score	# of Responses	Score	# of Responses	Score	# of Responses	Score	
SL01	Create <i>written communications</i> appropriate to the construction discipline	EGR401									No action at th
SLO2	Create oral presentations appropriate to the construction discipline	EGR401									No action at th
SLO3	Create a construction project safety plan	CON330									No action at th
SLO4	Create construction project cost estimates	CON430									No action at th
SLO5	Create construction project schedules	CON460									No action at th
SLO6	Analyze professional decisions based on <b>ethical</b> principles	CON105									No action at thi
SLO7	Analyze <i>methods, materials, and equipment</i> used to construct projects	CON310									No action at th
SLO8	Apply <i>electronic-based technology</i> to manage the construction process	CON460									No action at th
SLO9	Apply basic <i>surveying</i> techniques for construction layout and control	EGR251									No action at th
SLO10	Understand different <i>methods of project delivery</i> and the roles of and responsibilities of all constituencies involved in the design and construction process	CON350									No action at th
SL011	Understand construction accounting and cost control	CON325									No action at th
SL012	Understand construction <i>quality</i> assurance and control	CON105									No action at th
SL013	Understand construction <i>project control</i> processes	CON460									No action at th
SLO14	Understand the <i>legal implications</i> of contract, common, and regulatory law to manage a construction project	CON350									No action at th
SLO15	Understand basic principles of <i>sustainable construction</i>	CON105									No action at th
SL016	Understand the basic principles of structural behavior	CON340									No action at th
SL017	Understand the basic principles of <i>HVAC, electrical and plumbing</i> systems.	CON470									No action at th

Note

1 Benchmark: >70%

2 Benchmark for Action for Survey Data < 70%

3 Benchmark for Action for Survey Data < 3.5 on 5-pt. scale

#### **Reponse/Actions**

is time. Objective and self-report measures all positive.

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