California Polytechnic State University, San Luis Obispo

Construction Management Department

CM450-01, 02 Integrated Project, Design and Program Management
Fall 2019

Instructor:	Gregory F Starzyk, J.D., Associate Professor
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Office Hours:[1]	Tuesday & Thursday 10:10 – noon Friday 12:10 – 1:00 pm
Class Days/Times:	Monday, Tuesday & Wednesday 1:10 am - 3:00 pm Thursday 12:10 pm to 4:00 pm
Classroom:	186-B303
Prerequisite(s):	STAT 251 or STAT 312, CM 313 and CM 334

Course Description

Evaluation of roles and relationships of owner, designer, and construction professionals over project life cycles. Modeling, conceptual estimating, lean scheduling, contract selection, integrated delivery, design management, program management, and influential leadership strategies and techniques. Not open to students with credit in CM 415. 3 laboratories, 2 activities.

Course Goals and Learning Outcomes

Course Goals:

The purpose of this course is to explore the roles and relationships of owners, designers, and construction professionals during the design phases of built projects. This purpose is engaged by student teams that are tasked to learn and apply technical skills pursuant to integrated project management, design management, and program management. There will be a heavy emphasis on conceptual design for offsite construction, lean culture, and influential leadership in professional practice.

As a result of this course, you should be able to:

- Demonstrate competency with conceptual estimating, modeling, scheduling and related technical skills required for integrated project, design and program management, evidenced by attainment of learning outcomes 1 through 6;
- Demonstrate a basic understanding of program management, evidenced by attainment of learning outcomes 7 through 9;
- Demonstrate a basic understanding of design and construction integration through offsite fabrication, evidenced by attainment of learning outcomes 10 and 11;

[1] No office hours on holidays; during finals week; or during the ASC Region 3 competition, October 15, 16 and 17.

- Demonstrate influential leadership skills and an understanding of lean culture, evidenced by attainment of learning outcomes 12 through 14.

Course Learning Outcomes (CLOs):

1. Create conceptual estimates using D4Cost, RSMeans, and Destini Profiler.
2. Create a project budget from an architectural program.
3. Compare and contrast D4Cost and RSMeans conceptual estimates with a project budget.
4. Create a schematic design model using Destini Profiler.
5. Develop summary schedules with Uniformat Level II conceptual construction and conceptual project activities.
6. Create an owner's cost model of direct costs for Uniformat Level II construction activities and project soft costs.
7. Describe the tools, techniques and concepts being used by modern serial builders.
8. Apply the Project Definition Rating Index (PDRI) to an architectural program.
9. Compare and contrast modern project delivery strategies and select an appropriate delivery strategy for a case study
10. Describe the historical context of offsite fabrication methods development.
11. Explain how modern offsite fabrication methods integrate design and construction practices.
12. Identify the fundamental principles of lean culture
13. Apply influential leadership skills in a multidisciplinary context.
14. Develop and deliver a persuasive presentation.

Student and Program Learning Outcomes

The American Council for Construction Education (ACCE) is the accrediting body for Cal Poly's construction management program. The ACCE requires achievement of 20 student learning outcomes (SLOs). The construction management program has identified 20 program learning outcomes (PLOs) that equal or exceed the ACCE SLOs and 5 additional idiosyncratic PLOs.

This course supports the following PLOs:

PLO 1: Create written communications appropriate to the construction discipline.
PLO 2: Create oral presentations appropriate to the construction discipline.
PLO 4: Create construction project cost estimates.
PLO 5: Create construction project schedules.
PLO 7: Analyze construction documents for planning and management of construction processes.
PLO 8: Analyze methods, materials, and equipment used to construct projects.
PLO 9: Apply construction management skills as an effective member of a multi-disciplinary team.
PLO 10: Apply electronic-based technology to manage the construction process.
PLO 12: Understand different methods of project delivery and the roles and responsibilities of all constituencies involved in the design and construction process.
PLO 13: Understand construction risk management.
PLO 14: Understand construction accounting and cost control.
PLO 16: Understand construction project control processes.
PLO 18: Understand the basic principles of sustainable construction.
PLO 19: Understand the basic principles of structural behavior.
PLO 20: Understand the basic principles of mechanical, electrical and plumbing systems.
PLO 23: Understand the key leadership characteristics that are successful in building and strengthening construction management teams.

PLO 24: Understand the importance of recognizing culture differences and role culture plays on influencing project success for a construction team.
PLO 25: Understand the benefits of respecting the unique and diverse backgrounds individuals bring to a construction team.

Topical Outline, Outcomes, and Method of Assessment

This course has embedded assessment instruments for the PLO(s) listed below:

PLO 9: Apply construction management skills as an effective member of a multi-disciplinary team.
PLO 12: Understand different methods of project delivery and the roles and responsibilities of all constituencies involved in the design and construction process.

An overview of content, course learning outcomes, program learning outcomes, instructional activities, and assessment measures, is listed in the table below.

Section	**Topical Outline**	**CLOs**	**PLOs**
Technical Skills: Preparation	Conceptual Estimates Architectural Program Budgets Schematic Design Models	1, 3 2, 3 4	4, 10 4 8, 10, 18, 19, 20
Technical Skills: Mid-Term Project	Report, Simulations, General Requirements, Cost and Duration, Summary Schedules, Owner's Cost Model, Functional Space Table and Presentation	1-6, 15	1, 2, 4, 5, 8, 10, 13, 14, 16, 18, 19, 20
Program Management	Serial Builders PDRI Project Delivery Strategies	7 8 9, 14	12 7 12, 13, 16
Integration	Offsite Fab Historical Context Integrated Design & Construction Final Presentation	10 11 10-11	12 12, 13, 18 2, 12, 13, 18
Leadership	Lean Culture Influential Leadership	12 13	23, 24, 25 9, 23, 24, 25

Section	Topical Outline	Instructional Activities	Method of Assessment
Tech. Skills: Preparation	Conceptual Estimates RSMeans D4 Cost Budget Reconciliation General Requirements	Demonstration and team activities	Team scoring rubrics
	Program Budget	Demonstration and team activity	Team scoring rubric
	Design Models	Demonstration and desk critiques	Individual scoring rubric
Tech. Skills: Mid-Term Project	Mid-Term Project Report Simulations General Requirements Cost and Duration Summary Schedules Owner's Cost Model Functional Space Table Presentation	Demonstrations, examples and desk critiques	Team scoring rubrics
Program Management	Serial Builders	Reading assignment, short lectures and team activity	Individual multiple-choice exam
	PDRI	Reading assignment, short lecture and team activity	Individual multiple-choice exams and team rating scale
	Delivery Strategies	Reading assignment, short lectures and team activity	Individual multiple-choice exams and team presentation scoring rubrics

Section	Topical Outline	Instructional Activities	Method of Assessment
Integration	Historical Context Industrialized buildings & architecture Integrated Design & Construction Environ., organization & technology Prefab principles Prefab fundamentals Prefab elements: comp. & panels Prefab elements: Modules & ISBU Final Presentation	Reading assignment, short lectures and team activities Reading assignment, short lectures and team activities Desk critiques	Individual multiple-choice exams Individual multiple-choice exams and team scoring rubrics Team presentation scoring rubric
Leadership	Lean Culture Influential Leadership	Videos Reading assignment, short lectures, and multidisciplinary role-playing within construction-related scenarios.	Group dialogue Individual multiple-choice exams and individual responses assessed to scoring rubric.

ASSIGNMENTS

Students will be organized into teams of up to four students each. Each team will be provided with 24 x 7 access to the Construction Innovations Center, room B303. Classes will meet in rooms B303, computer lab B102 or in other spaces depending upon the particular mode of instruction that is being delivered on any given day.

Required Texts/Reading

Thomsen, C. and Sanders, S. (2011). *Program Management 2.0*. McLean, Va.: Construction Manager's Association of America Foundation.

Smith, Ryan E. (2010). *Prefab Architecture: A Guide to Modular Design and Construction*. Hoboken, N.J.: John Wiley & Sons, Inc. ISBN 9780470950555.
(Purchase online at https://www.vitalsource.com/referral?term=9780470950555)

Carnegie, D. (1981). *How to Win Friends and Influence People.* New York: Simon & Schuster.

Recommended Reading

Access the course's PolyLearn portal at https://myportal.calpoly.edu. There you will find, among other things, important announcements, this syllabus, and the course schedule. Stay current with PolyLearn by regularly logging onto the site.

Other Equipment/Material Requirements

None are required

Classroom Protocol

As a student, you are responsible to:

- Actively participate;
- Engage other students in topical discussion;
- Turn off your cell phones and other electronic devices;
- Exhibit a professional demeanor, behave courteously, respect others; and
- Never sleep, twitter, engage in any social networking, or otherwise digress during class.

If you need help, avail yourself of my help. My office hours are available for walk-ins or you may make a special appointment if my office hours conflict with your academic schedule.

Assignments and Exams

The following assignments and their associated Grade Weights are subject to change.

Description	Team Grade Weight %	Individual Grade Weight %	Total Grade Weight %
TECHNICAL SKILLS: Preparation	10	10	20
TECHNICAL SKILLS: Mid-Term Project	20	0	20
PROGRAM MANAGEMENT	13	7	20
INTEGRATION and CONNECTIONS	21	9	30
LEADERSHIP	2	8	10
Total	**66**	**34**	**100**

Late/Missed Work and Make-Up Policy

The importance of participating at all times that class is in session and timely submittal of documents cannot be overemphasized. The class is highly oriented toward teamwork and there is no substitute for actively participating. Makeup assignments are not possible for presentations and other activities that rely on team participation.

Grading Policy

Your final letter grade expresses my assessment of your attainment of Course Learning Outcomes. I will make this assessment through both an objective evaluation of Grade Weights; and a subjective evaluation of evaluation by your peers, attendance, participation, academic integrity and other factors. This result may be higher or lower than would be indicated by Grade Weights alone.

Listed below is the grading scale for this course.

Letter Grade	Percentage	Performance	Definition
A	93 – 100%	Excellent Work	Superior Attainment of Course Learning Outcomes
A-	90 – 92%	Mostly Excellent Work	
B+	87 – 89%	Very Good Work	Good Attainment of Course Learning Outcomes
B	83 – 86%	Good Work	
B-	80 – 82%	Mostly Good Work	
C+	77 – 79%	Very Acceptable Work	Acceptable Attainment of Course Learning Outcomes
C	73 – 76%	Acceptable Work	
C-	70 – 72%	Mostly Acceptable Work	
D+	67 – 69%	Mostly Poor Work	Poor Attainment of Course Learning Outcomes
D	63 – 66%	Poor Work	
D-	60 – 62%	Very Poor Work	
F	0 – 59%	Failing Work	Non-Attainment of Course Learning Outcomes

University Policies

Participation and Attendance

Attend all class sessions, arrive on time, do not leave early, and if you have to be absent or late, have a justifiable reason. Inform me of your absence as soon as possible through the PolyLearn "Makeup Assignment" link. **Do not use email to inform me of your absence.** Email, especially email using services such as Google and Yahoo, is neither private nor secure. The "Makeup Assignment" link is private and secure. Correspondence through the makeup assignment link is not shared with your classmates, other students, other professors, or administrators. It is private and confidential.

Students are responsible for knowing the University policy regarding class attendance. See this link on Class Attendance Policy provided on the university website.

Add/Drop Policy

Students are responsible for knowing the University policies, procedures, and schedule for dropping or adding classes. See this link on Add/Drop Policy provided on the university website.

Academic Integrity

Students are responsible for knowing the Academic Honesty Policy.

Students with Disabilities

If you have a disability for which you are or may be requesting an accommodation, you are encouraged to contact both your instructor and the Disability Resource Center, Building 124, Room 119, at (805) 756-1395, as early as possible in the term, as accommodations may take several weeks to arrange. If you are a student with a disability, please consider discussing your needs and possible accommodations with me as soon as possible and visit the DRC Website for additional information.

SensusAccess

SensusAccess is a self-service, alternate media solution made available by Kennedy Library to automatically convert files into a range of alternate media including audio books (MP3 and DAISY), e-books (EPUB, EPUB3 and Mobi) and digital Braille. The service can also be used to convert inaccessible files such as image-only PDF files, JPG pictures and Microsoft PowerPoint presentations into more accessible and less tricky formats. This service is available at no charge for all Cal Poly students, faculty, staff and alumni. For additional information, visit SensusAccess at the Kennedy Library.

Technical Support and Contact Information

Support is available for troubleshooting and access issues for PolyLearn. Please visit the PolyLearn Student Support Web Site for further information.

Campus Resources to Support Student Learning

Cal Poly offers programs and resources that are available to assist students during your academic studies, such as the Cal Poly Student Academic Services Web Site.

Course Schedule
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	Monday (12:10 - 3:00)	Tuesday (12:10 - 3:00)	Wednesday (12:10 - 3:00)	Thursday (12:10 - 4:00)
Week 1	16-Sep	17-Sep	18-Sep	19-Sep Syllabus and Course Overview
Week 2	23-Sep RSMeans	Computer Lab 24-Sep D4 Cost	25-Sep Building Area Definitions Office Building Program Budget	Computer Lab 26-Sep DProfiler Day 1 - EX 3-a, 4-a, 5-a, and 6-a
Week 3	30-Sep Office Building Budget Reconciliation	Computer Lab 1-Oct DProfiler Day 2 - Office Building Massing and Rooms	Computer Lab 2-Oct DProfiler Day 3 - Office Building Cladding and Site	Computer Lab 3-Oct DProfiler Day 4 - Office Building Cost Collections
Week 4	(LPA, Los Angeles) 7-Oct Office Building General Requirements	Computer Lab 8-Oct DProfiler Day 5 - Office Building **Submittal**	9-Oct Card House Activity. Program Management Introduction.	Computer Lab 10-Oct Mid-Term Project Introduction. Low/Typical/High Prices.
Week 5	14-Oct RA1 Quiz - Program Management Introduction; and Serial Builder Videos	Computer Lab (ASC Region 3) 15-Oct Cost & Schedule Integration	Computer Lab (ASC Region 3) 16-Oct Mid-Term Project Preparation	Computer Lab (ASC Region 3) 17-Oct Mid-Term Project Preparation
Week 6	21-Oct RA2 Quiz - Program Management Serial Builders; Rotation, Repetition and Refinement	22-Oct RA3 Quiz - Program Management Program and Project Definition PDRI Activity	23-Oct Mid-Term Project Preparation	24-Oct Mid-Term Presentations
Week 7	28-Oct RA4 Quiz - Program Management Delivery Methodologies D-B-B, D-B, Bridging	29-Oct RA5 Quiz - Program Management Delivery Methodologies CMa, CMAR, IPD	30-Oct Program Management Delivery Methodology Scenario Analysis	31-Oct Delivery Methodology Scenario Presentations
Week 8	4-Nov RA6 Quiz - Prefab Architecture History of Industrialized Buildings and Architecture Case Studies	5-Nov RA7 Quiz - Prefab Architecture Environment, Organization and Technology Case Study Presentations	6-Nov RA8 Quiz - Prefab Architecture Principles Introduce Final Project Value Proposition Activity	7-Nov RA9 Quiz - Prefab Architecture Fundamentals Environment, Organization and Technology Activity
Week 9	11-Nov **Veterans Day Holiday** **No Classes**	12-Nov RA10 Quiz - Prefab Architecture Elements Part 1 Principles and Fundamentals Activity	13-Nov RA11 Quiz - Prefab Architecture Elements: Part 2 Elements: Components & Panels Actiity	14-Nov Elements: Modules & ISBU Containers Activity
Week 10	18-Nov Elements Selection for Final Presentation	19-Nov Final Presentation Preparation	20-Nov Final Presentation Preparation	21-Nov Final Presentations
	25-Nov	26-Nov **Thanksgiving Holiday** **No Classes**	27-Nov	28-Nov
Week 11	2-Dec RA12 Quiz Influential Leadership and Lean Culture	3-Dec Influential Leadership Scenario Preparation	4-Dec Influential Leadership Scenarios	5-Dec Lean Culture Scenarios