California Polytechnic State University, San Luis Obispo

Construction Management Department

CM/CE 371, Construction Management & Project Planning, Spring Quarter, 2019

Instructor:	Stacy Kolegraff
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Office Hours:	Tuesday: 10:30 AM to 1:00 PM Wednesday: 11:00 AM to 1:30 PM
Class Days/Time:	Tuesdays and Thursdays, 8:10 AM to 10:30 AM
Classroom:	186-B203
Prerequisites:	None

Course Description

Theory and practice of planning, scheduling, estimating, and reporting for construction projects. Fundamentals of scheduling logic including critical path, deterministic, and probabilistic scheduling; including the impact of constraints. Identifying resources and estimating time requirements for design activities and project operations. Not open to Architectural Engineering or Construction Management majors. 3 lectures, 1 activity. Crosslisted as CE/CM 371.

Course Goals and Learning Objectives

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

- Differentiate between the different types of project delivery, and identify when each type of delivery method should be used
- Estimate building component quantities, including earthwork, concrete, masonry, and steel
- Develop, update and communicate a construction project schedule

Learning Objectives:

1. List the different construction sectors and identify characteristics that make the industry unique
2. Describe the different contract types used for construction projects, and determine when to apply each
3. Analyze project characteristics and provide recommendations for a project delivery method, contract type and procurement strategy
4. Distinguish between different construction delivery methods, explain each, and evaluate their effectiveness on specific projects
5. List project phase, their associated timelines, and recommended contingency factors

6. Apply time, size, and location modifiers to adjust cost data and determine estimated building costs
7. Calculate volume, area, and perimeter quantities and apply conversion factors to each
8. Identify the sequence of plan sheets in a set of construction documents
9. Comfortably navigate construction plans using section, elevation and detail call-outs, as well as plan notes
10. Locate, call out, and quantify information within construction drawings and specifications using Bluebeam
11. Calculate the amount of soil to be removed given a site plan with contours
12. Determine time required for export dependent on truck and equipment cycle time
13. Create a spreadsheet to calculate soils excavation using the four corners/grid method
14. Interpret soils reports and civil plan sets to calculate excavation, compaction, spoils, and export quantities
15. Review specifications, civil plans, and demolition plans to determine site requirements for temporary utilities and staging
16. Identify the different components required for the installation of a concrete footing, foundation and slab
17. Calculate the amount of concrete, sand, gravel, backfill and vapor barrier required in footings, slabs, and walls using the centerline and regular method
18. Calculate the amount of rebar required in a foundation and wall
19. Calculate the quantities of lumber and form ties needed for concrete formwork
20. Interpret construction plans, specifications, and details to perform quantity take-offs of concrete foundation, slab and wall construction
21. Use Bluebeam and Excel to complete and quality a concrete estimate
22. Calculate the amount of CMU, brick, mortar and grout needed for a masonry structure
23. Interpret architectural and structural plans and details to perform a quantity take-off for masonry units
24. Develop a request for quote for bid solicitation and perform bid leveling upon receipt of quotes from subcontractors
25. Identify steel types and size designations in order to calculate the amount of steel in a building
26. Interpret architectural and structural plans to perform a quantity take-off for steel components
27. Develop and format a project schedule in Microsoft Project to set up project baseline and communicate the schedule to the project team
28. Calculate forward and backwards pass and float on a network schedule to determine critical path activities

Student Learning Outcomes

The American Council for Construction Education (ACCE) is the accrediting authority for the construction management department. ACCE has identified 20 program learning outcomes (PLO) categories that must be measured for each student, and Construction Management department has included an additional 5 it feels are important for our program.

This course supports the following program learning outcomes:

PLO 1. Create written communication 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 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.

Outcomes Measurement and Assessment

Content for this course is related to the course learning objectives (CLOs) and program learning outcomes (PLOs). An overview of content, course learning objective, program learning outcomes, and assessment measures, is listed below:

Week	Content	CLOs	PLOs	Assessment Measure
1	Course Introductions Introduction to the Construction Industry Project Delivery	1-4	1, 12	Project delivery case study Project recommendation Discussion Post 1: The Construction Industry
2	Preliminary Project estimating Plan Familiarization Bluebeam	5-10	7, 10	Discussion Post 2: Planning a Project Discussion Post 3: Jobsite Selfie Bluebeam Scavenger Hunt Plan Scavenger Hunt
3	Excavation	8 - 15	1, 4, 7, 10	Calculating Area and Volume Cost modifiers exercise Excavation Exercise - Four Corners Discussion Post 4: Estimating Approach and Bluebeam
4	Excavation - Baseball clubhouse Uniformat and Masterformat Concrete Estimating	11-21	1, 4, 7 10	Baseball Clubhouse Excavation Discussion Post 5: Clubhouse Excavation Approach Foundation Estimating Flatwork and Backfill
5	Concrete Estimating	16-21	1, 4, 7 10	Concrete Formwork Concrete reinforcing Exam 1
6	Concrete Estimating Concrete Foundation Estimating	16-21,	1, 4, 7 10	Discussion Post 6: Concrete Estimating Concrete Foundation Estimating
7	Masonry Estimating	22-24	1, 4, 7 10	Masonry exercise Masonry RFQ Discussion Post 7: Evaluating Masonry Bids - Who do you choose?
8	Steel Estimating Network Scheduling and CPM Preliminary Scheduling	25-28	1, 4, 5, 7, 10	Steel Exercise Network scheduling & Crashing the Schedule
9	Crashing the Schedule Line of Balance Short Interval and Baseline Scheduling	27-28	1,5	Steel scheduling with MS Project Discussion Post 8: Documenting a daily routine Line of Balance Scheduling
10	PERT Class Wrap-Up	27-28	1,5	Daily Routine PERT Schedule Exam 2

Required Texts/Reading

Textbook

There is no required textbook for this course.

Other Readings

Material will be provided throughout the course for each unit. This material could be in the form of video, pdf file, web page, eBook, etc. All material will have the link provided in each unit as we make our way through the quarter.

Required and/or supplemental readings will be posted on the course PolyLearn page.

Other Equipment/Material Requirements

Students will be expected to complete activities and other learning modules through the PolyLearn course page. In addition, work assigned in class and as homework will require access to the following:

- A basic calculator
- Notebook computer with the following, or later, version of software installed: MS Word 2013, MS Excel 2013, and Adobe Reader 10

Technology Requirements

Bluebeam, a project workflow and collaboration software, will be used extensively throughout the course, starting in Week 2, and a free license will be provided. Additional license information is available in Technology Resources.

Microsoft Project, a scheduling software, will also be used the last few weeks of the course. This software is available for free for all students using Cal Poly's On the Hub. Visit this site for help and information: https://servicedesk.calpoly.edu/academic-and-personal-use-software. Search for Project Professional 2016.

Classroom Protocol

As a professional student, you are responsible to:

- Be punctual and present, physically and mentally, at every class session for the entire class period
- Utilize technology responsibly to limit distractions for your peers and instructor
- Be polite and respectful towards others, instructors, and students
- Limit distracting or disruptive behavior

So, although I allow the use of cell phones and laptops in class, they are there as a tool for your learning, not to distract you, others, or the instructor. If they become a distraction, I will ask you to put them away.

Additionally, I do not allow any inappropriate language in my classroom, so do not use profanity and treat others with respect. Basically, if I don't allow my 6-year old child to say it, I won't allow you to say it. This includes the words: stupid, idiot, retarded, etc. You are working towards earning a degree, you can be more articulate than that.

Assignments

The following assignments and their associated point values are subject to change by the instructor as needed.

Assignment Description	**Points**
In-Class Activities	120
Plan Review Quantity Take-Offs	120
Scheduling	60
Discussion Posts	100
Learning Checks	50
Exam 1	125
Exam 2 (Final)	125
Total Points Possible	**700**

Late/Missed Work and Make-Up Policy

Late work with valid, documented absences will not result in penalization.

Late work without a documented absence is accepted, however:

- Only with prior approval from the instructor BEFORE the assignment is due
- Only within 1 week of the original due date
- At a penalty of 10% of your grade

If you turn in work more than one week after the original due date, you will receive 0 points on the assignment, but please do the work in order to understand the material and prepare for the exam.

Grading Policy

Various forms of evaluation of student work will be implemented throughout the quarter. Grades will be based on various PolyLearn activity modules (individual and group assignments, lessons, blogs, etc.), in-class activities, weekly quizzes, one midterm and a final. Extra credit may or may not be available.

The final exam for this course will take place on the last day of the course.

Listed below is the grading scale for this course.

Letter Grade	**Percentage**	**Performance**
A	93 – 100%	Excellent Work
A-	90 – 92%	Nearly Excellent Work
B+	87 – 89%	Very Good Work

Letter Grade	Percentage	Performance
B	83 – 86%	Good Work
B-	80 – 82%	Mostly Good Work
C+	77 – 79%	Above Average Work
C	73 – 76%	Average Work
C-	70 – 72%	Mostly Average Work
D+	67 – 69%	Below Average Work
D	60 – 66%	Poor Work
F	0 – 59%	Failing Work

University Policies

Attendance

Active participation and attendance are both required and expected. Class participation includes four components: (1) attendance; (2) thorough preparation for each class meeting including (a) reading assigned materials, and (b) preparation to address questions for each class session; (3) active and full participation in small and large group activities; and, (4) timely completion of all assignments.

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.

Sensus Access

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.

Diversity and Inclusion

Cal Poly considers the diversity of its students, faculty, and staff to be a strength and critical to its educational mission. Cal Poly expects every member of the university community to contribute to an inclusive and respectful culture for all in its classrooms, work environments, and at campus events. For more information on resources related to diversity and inclusion, please visit the Office of University Diversity & Inclusivity website at diversity.calpoly.edu.

Technical Support 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.