Department of Civil, Environmental and Architectural Engineering

CVEN 5836
CONSTRUCTION ENGINEERING & MANAGEMENT FUNDAMENTALS
(Fall 2016)

ROOM	ECCE 1B47
CLASS TIME:	T/R 12:30pm – 1:45pm
PROFESSOR:	Matt Morris
OFFICE:	ECOT 513
OFFICE HOURS:	T/R 2:00pm – 2:50pm *(Note: Office hours are for learning so please come prepared to use our time together efficiently)*
EMAIL:	matthew.morris@colorado.edu
TA:	Not applicable

TEXT: We will not use a textbook in this course. Reading material will be compiled from multiple sources and provided to you on D2L.

PURPOSE OF COURSE

The purpose of the course is to provide an overview of the construction industry to establish a foundation for subsequent graduate courses in construction engineering and management. The intended audience for this course is a student with limited prior construction experience or education. Students will be exposed to projects of varying funding sources, contracts, scope and complexity. Project phases will be established including planning, funding, design, construction, turnover, operation and maintenance. The course will focus on fundamental construction cost estimating, scheduling, delivery systems, contractual relationships, key contract clauses, risk allocation, building materials/systems and project controls. Special attention will be paid to emerging technologies and industry trends.

To inspire you to continue learning about engineering and construction as you complete your education and begin your professional careers.

Course learning objectives

1. Identify all phases of a construction project from cradle to grave
2. Understand the numerous roles and responsibilities of the key project players through all stages of a project
3. Analyze the advantages and disadvantages of project delivery methods and select the appropriate one for a specific construction project

4. Complete a cost estimate for a small building project
5. Compete in a construction bid scenario
6. Schedule a series of construction tasks using the critical path method
7. Establish a project cash flow projection
8. Identify and apply key construction contract clauses
9. Identify and analyze project risks
10. Identify and assess safety hazards on construction projects

GRADE PLAN

Requirement	**Points**
Participation	100
Building Construction Topics	100
Group Projects	600
Final Exam (Comprehensive)	200
TOTAL	**1000**

D-	**D**	**D+**	**C-**	**C**	**C+**	**B-**	**B**	**B+**	**A-**	**A**
60-62	63-66	67-69	70-72	73-76	77-79	80-82	83-86	87-89	90-92	93-100

This course will not be graded on a curve. I reserve the right to increase grades for exemplary participation, effort, or achievement; but I will never reduce your grade unless there is a breach of the code of ethics or if you fail to participate in class, projects, or activities.

LEARNING ACTIVITIES AND EVALUATIONS

Assignments:

a. The policy on assignment submission is based upon the principal that in the real world you should not be late. You should realize that in the professional practice of engineering and construction, late submissions are generally not accepted and often result in the loss of employment opportunities for a firm, and the subsequent loss of individual employment! **Assignments are due by the beginning of class on the due date.**

Presentation: Working in teams established at the beginning of the semester, each team will be assigned a particular role in a group project.

Final Exam: The final exam will address major concepts and terms covered in class and in reading assignments.

Quizzes & **Participation:** Pop quizzes may be given periodically at the beginning of class.

EXPECTATIONS

- Be on time!
- Be considerate - No cell phones, newspapers, YouTube, etc.
- Complete reading and review assigned handouts before attending class. Reading assignments in advance of each class lay the foundation for more interaction and discussion.
- You will be called upon in class to answer questions and to facilitate discussion.
- I will not cover all of the concepts in the readings during class time. The expectation is that some concepts students are expected to master from reading the excerpts on D2L. If you have questions on any aspect of the readings not discussed in class, please ask questions either during class or office hours.
- Exams will include some material from the readings not covered in class.

Disability Statement

If you qualify for accommodations because of a disability, please submit to your professor a letter from Disability Services in a timely manner (first week of class) so that your needs can be addressed. Disability Services determines accommodations based on documented disabilities. Contact Disability Services at 303-492-8671 or by e-mail at dsinfo@colorado.edu. If you have a temporary medical condition or injury, see Temporary Injuries guidelines under the Quick Links at the Disability Services website and discuss your needs with your professor.

Religious Holidays

If you have a religious observance which will conflict with scheduled class activities, please contact me in a timely manner (first week of class).

Classroom Behavior

Students and faculty each have responsibility for maintaining an appropriate learning environment. Those who fail to adhere to such behavioral standards may be subject to discipline. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with differences of race, color, culture, religion, creed, politics, veteran's status, sexual orientation, gender, gender identity and gender expression, age, disability, and nationalities. Class rosters are provided to the instructor with the student's legal name. I will gladly honor your request to address you by an alternate name or gender pronoun. Please advise me of this preference early in the semester so that I may make appropriate changes to my records. For more information, see the policies on classroom behavior and the student code.

Discrimination and |Harrassment

The University of Colorado Boulder (CU-Boulder) is committed to maintaining a positive learning, working, and living environment. CU-Boulder will not tolerate acts of discrimination or harassment based upon Protected Classes or related retaliation against or by any employee or student. For purposes of this CU-Boulder policy, "Protected Classes" refers to race, color, national origin, sex, pregnancy, age, disability, creed, religion, sexual orientation, gender identity, gender expression, veteran status, political affiliation or political philosophy. Individuals who believe they have been discriminated against should contact the Office of Institutional Equity and Compliance (OIEC) at 303-492-2127 or the Office of Student Conduct and Conflict Resolution (OSC) at 303-492-5550. Information about the OIEC, the above referenced policies, and the campus resources available

to assist individuals regarding discrimination or harassment can be found at the OIEC website. The full policy on discrimination and harassment contains additional information.

Honor Code

All students of the University of Colorado at Boulder are responsible for knowing and adhering to the academic integrity policy of this institution. Violations of this policy may include: cheating, plagiarism, aid of academic dishonesty, fabrication, lying, bribery, and threatening behavior. All incidents of academic misconduct shall be reported to the Honor Code Council (honor@colorado.edu; 303-735-2273). Students who are found to be in violation of the academic integrity policy will be subject to both academic sanctions from the faculty member and non-academic sanctions (including but not limited to university probation, suspension, or expulsion). Additional information regarding the Honor Code policy can be found online and at the Honor Code Office.

PLEASE MONITOR YOUR EMAIL INBOX CLOSELY DURING THE SEMESTER AS I OFTEN WILL UTILIZE EMAIL TO COMMUNICATE COURSE UPDATES AND OTHER IMPORTANT INFORMATION.

Note: This syllabus is subject to change during the semester at the instructor's discretion.

Lesson #	Date	Topic(s)	Assignment Due
1	8/23/2016	Course Introduction, Project Life Cycle	
2	8/25/2016	Building Construction Topic - Reading Drawings (Morris) Key Parties, Master Planning	Resume & Questionnaire
3	8/30/2016	Building Construction Topic - Reading Drawings & Specs (Morris) Project Delivery Systems - Definitions	
4	9/1/2016	Building Construction Topic - Soil & Underground Utilities (Student Presentation) Payment Types and Margin Opportunity	Bldg Const Topic Presentation
5	9/6/2016	Building Construction Topic - Shoring & Dewatering (Student Presentation) Project Delivery Systems - Applications	Bldg Const Topic Presentation
6	9/8/2016	Building Construction Topic - Deep/Shallow Foundations (Student Presentation) Project Delivery Systems - Contract Award Process	Bldg Const Topic Presentation
7	9/13/2016	Group Presentations - Project Delivery Systems	**Group Project #1**
8	9/15/2016	Group Presentations - Project Delivery Systems	
9	9/20/2016	Building Construction Topic - Fndtn Walls & Grade Beams (Student Presentation) Cost Estimating - Conceptual Design & Conceptual Estimates	Bldg Const Topic Presentation
10	9/22/2016	Building Construction Topic - Concrete (Student Presentation) Cost Estimating - Schematic Design & Assemblies Estimates	Bldg Const Topic Presentation
11	9/27/2016	Building Construction Topic - CIP Concrete Structures (Student Presentation) Cost Estimating - 100% Constr Docs & Detailed Estimates	Bldg Const Topic Presentation
12	9/29/2016	Building Construction Topic - Precast Concrete Structures (Student Presentation) Cost Estimating - 100% Constr Docs & Detailed Estimates	Bldg Const Topic Presentation & **Group Project #2, Deliverable #1**
13	10/4/2016	Jobsite Tour	
14	10/6/2016	Building Construction Topic - Steel Structures (Student Presentation) Cost Estimating - 100% Constr Docs & Detailed Estimates	Bldg Const Topic Presentation
15	10/11/2016	Building Construction Topic - MEP Rough (Student Presentation) Subcontractor Bids and Proposals	Bldg Const Topic Presentation
16	10/13/2016	Building Construction Topic - Load Bearing Exterior Walls (Student Presentation) Subcontractor Bids Evaluation, Pre-Bid Activities	Bldg Const Topic Presentation
17	10/18/2016	Building Construction Topic - Curtainwall (Student Presentation) Bid Day Prep Exercise	**Bldg Const Topic Presentation & Group Project #2, Deliverable #2**
18	10/20/2016	Building Construction Topic - Masonry (Student Presentation) Scheduling - Critical Path Method, Relationships	Bldg Const Topic Presentation
19	10/25/2016	Building Construction Topic - Roofing (Student Presentation) Scheduling - Critical Path Method, Relationships	Bldg Const Topic Presentation
20	10/27/2016	Project Work Day	
21	11/1/2016	Bid Day	**Group Project #2, Deliverable #3**
22	11/3/2016	Building Construction Topic - Doors & Windows (Student Presentation) Bid Day Review, Mistakes & Bid Irregularities	Bldg Const Topic Presentation
23	11/8/2016	Building Construction Topic - Interior Walls & Finishes (Student Presentation) Bid Mistakes (Cont'd), Construction Risk Management	Bldg Const Topic Presentation
24	11/10/2016	Building Construction Topic - HVAC (Student Presentation) Construction Risk Management	Bldg Const Topic Presentation
25	11/15/2016	Building Construction Topic - Plumbing (Student Presentation) Standard Contracts, Key Contract Clauses - Changes	Bldg Const Topic Presentation
26	11/17/2016	Building Construction Topic - Electrical Systems & Equip (Student Presentation) Key Contract Clauses - Differing Site Conditions	Bldg Const Topic Presentation
	11/21/16 - 11/25/16	Fall Break	
27	11/29/2016	Building Construction Topic - Fire & Life Safety (Student Presentation) Key Contract Clauses - Delays, Extensions, Progress Payments. Productivity and Project Control	Bldg Const Topic Presentation
28	12/1/2016	Building Construction Topic - Startup, Testing & Commissioning (Morris) Dispute Resolution	**Group Project #3, Deliverable #1**
29	12/6/2016	Dispute Resolution Negotiation	**Group Project #3, Deliverable #2**
	12/7/2016	FINAL EXAM - 6pm	
30	12/8/2016	Building Construction Topic - Prefabrication (Morris) Quality and Safety and Course Summary	
		**** All reading assignments are posted on D2L***	