EVEN/CVEN 4434- ENVIRONMENTAL ENGINEERING DESIGN
Spring 2023
T/TH 3:30 – 5:10

	Project Principal	**Project Principal**
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Office Hours	By Appointment	By Appointment
	Project Principal	**Project Control Specialists (TA)**
Name	Nicholas Clements	Shelby Buckley
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Office Hours	By Appointment	By Appointment

GOALS

The primary goal of this course is to complete your transition from an engineering student to a practicing engineer. This course provides an authentic engineering experience. The projects are all real, current projects that environmental engineers would be asked to execute. To complete the project scope, you will need to use all the skills learned in your time at CU. You will also need to acquire new information and skills not learned in any class, but that are required for successful completion of the project.

You will have a client that you are executing the project for, a project principal (professor) that would be your boss, project controls specialist (TA) that watches timesheets and budgets, and possibly a technical advisor that replicates a sub consultant (additional faculty member, or design professional). We all work together to deliver the project the client is asking us to deliver.

You will gain experience with tackling open-ended design problems and further develop your engineering skills. This experience is more about the process than the outcome, but the outcome is important. With this generic process, you will be able to solve virtually any problem posed to you during your career.

Prerequisite: CVEN 3414 & Senior standing OR instructor consent

Support: Check Canvas site & your @colorado.edu email daily

DESCRIPTION OF COURSEWORK
There are three distinct phases throughout the semester, and both written submissions and oral presentations are required with each:

1. Proposal and Scope - in response to the request for proposals (RFP)
2. Alternatives Assessment and Recommendation
3. Preliminary Design Report (including revised Alternatives Assessment where appropriate)

Given the general project description and RFP, your team will prepare a proposal, develop a scope that describes how your team will execute the project, and make an oral presentation to illustrate your qualifications and design approach.

Next, assume that your company was awarded the contract and you will prepare an evaluation of alternatives based on a triple bottom line approach. Essentially, you must assess project economics, sustainability, and other non-cost factors with a weighted criteria decision matrix. An oral presentation will also accompany this evaluation.

Finally, your group will develop the selected alternative into a more detailed preliminary design and complete a detailed cost estimate, which will be presented in both an oral and written form. Note that the competition projects have additional specific requirements and deadlines.

COURSE AND STUDENT LEARNING OUTCOMES
When you complete this class, you should be able to:

1) Work as a team to solve a large, authentic engineering problem using all your engineering skills (ABET SO5)
2) Design a complete system after having evaluated alternatives on a standardized triple bottom line basis (ABET SO2)
3) Communicate your design in written reports, drawings, and oral presentation (ABET SO3)

The mapping of the course outcomes to the ABET Criterion 3 student outcomes is shown below:

Course Outcome Mapping to ABET

Course Learning Outcomes	1	2	3
ABET Criterion 3 Student outcomes			
1. Solve Problems			
2. Design		X	
3. Communication			X
4. Ethics & Professionalism			
5. Teamwork	X		
6. Experimentation			
7. Acquire New Knowledge			

SO2: An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
SO3: An ability to communicate effectively with a range of audiences.
SO5: An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.

COURSE GRADE

Assignment	Weight (%)
Written Proposal	10
Proposal Presentation	5
Alternatives Assessment (AA) Report	30
AA Presentation	10
Preliminary Design Report (PDR)	15
PDR Presentation	10
Team Contract and Completion of Team Evals (3x)	4
Completion of Time Sheets (15 total)	3
Reflective Essays (3x Presentation, 1x Leadership)	3
Design Expo	10

At the conclusion of each project phase, you will evaluate each team member individually on their contribution to work product, interactions with teammates, keeping the team on track, and expecting quality. Additional questions will diagnose team dynamics problems so that we can do a mid-course correction, if necessary. A student's individual grade may be modified as a result. You will not be given a grade for the written submission until you have completed the evaluation and team dynamics assessment forms which are posted on Canvas.

Team Meetings
Every week each group will have 4 x 30-60 minute meetings – one with their project principal, client, TA, and team. The project manager will submit an agenda 24 hours in advance of the meeting. The agenda will typically include a brief update of progress, specific challenges and successes, and the path forward. The remaining time will be used to answer specific questions that you have, and for the project principal to ask you questions or make suggestions to help your group. Every other week the team will meet with the project controls specialist (TA). Timecards and hours will be discussed. The need for change orders to project scope will be discussed.

Rules for effective meetings
- Be on time
- Have an agenda
- Assign clear, specific and manageable tasks to guide each team member for upcoming week

Presentations
For each presentation everyone in the group must present (for competitions with a presentation, it may be good tactics to only have your best 2-4 presenters present). Both an individual presentation score and a group grade will be given. Depending on your clients, an additional presentation may be required at the client site. Presentations will be recorded and will be made available on Canvas for your review.

COURSE SCHEDULE

Wk	Date	Class Period	Assignment Due Dates
1	1/17	Course & project introductions (Bolhari)	Teaming Questionnaire
	1/19	Proposals, win strategies, and contracting (Becker) + Teamwork (Clements)	
2	1/24	Essential Ethics, QA/QC (Bolhari)	
	1/26	Design: Decision Making, Triple-bottom-line assessment (Econ, Environment, Social) (Bolhari)	
3	1/31	Resume Workshop (Bolhari)	Timesheet
	2/2	Effective Presentations (Clements) + Licensure as Professional Responsibility (Becker)	
4	2/7	*No Class*	Timesheet
	2/9	*No Class*	
5	2/14	**Proposal Presentations**	Timesheet
	2/16	EVEN Career Fair 12-4pm	Proposal & Team Evaluation #1 (Sunday 2/12, 11:59 p.m.)
6	2/21	**Proposal Presentations**	Timesheet
	2/23		Reflective Essay #1: Proposal (2/24)
7	2/28		Timesheet
	3/2		
8	3/7		Timesheet
	3/9		
9	3/14		Timesheet
	3/16		
10	3/21		Timesheet
	3/23		
11	3/28	*Spring Break*	
	3/30	*No Classes this week*	
12	4/4	**Alternatives Assessment Presentations**	Timesheet
	4/6	**Alternatives Assessment Presentations**	Alternatives Assessment Report & Team Evaluation #2 (Sunday 4/2, 11:59 p.m.)
13	4/11		Timesheet
	4/13		Reflective Essay #2: AA (4/14)
14	4/18		Timesheet
	4/20		
	4/25		Timesheet
15	4/27	**PDR Presentations**	PDR Report & Team Evaluation #3 Both Due (Sunday, 4/23, 11:59 pm)* Reflective Essay #3: Leadership (4/28)
16	5/2	**PDR Presentations**	Timesheet
	5/4	**Design Expo Day (TBD)**	

*We will <u>not</u> meet during the final's timeslot for this class.
Notes:
1. Days with no lecture will be used for team meetings with the instructor(s) and TA.
2. Structured projects (competitions) may have different timing requirements, be aware of those dates specific to each project.

Class Periods and Class Participation
There will be periodic lectures on the design process. These should be interactive discussions. You are going to be hired less for your ability to do calculations and more for your ability to come up with creative solutions- but you must express your ideas to do this. For those of you are naturally very quiet students, use the lectures to find your voice.

To warm up your brain, you may be asked to write your opinion on some topic in the first few minutes of class. These will be collected and count towards your class participation grade (you will be graded on your participation, not your opinion or writing).
Just like the work world, if you are going to miss a meeting you must notify your project principal as soon as possible. On-time attendance is required for all class days. Attendance and   asking questions of other groups will count towards your class participation grade.

Timesheets
Each person must submit a Timesheet each Monday to the project controls specialist (TA). There are two purposes of these timesheets: (1) to simulate a real consulting firm where you must account for the number of hours you spend on various projects for the purpose of billing the clients; and (2) to help track individual effort toward the team project. The Time Sheet should cover the previous week Monday through Sunday period. Lying on your time sheet is the fastest way to get fired in the "real world," in this class it will be treated as an Honor Code violation (the same as cheating on a test).

Reflective Essays
One week after the Proposal and Alternatives Assessment presentations each person is required to submit (to Canvas) a list of three positive and three negative aspects of the team presentation, and three positive and negative aspects of your individual presentation. Discuss ways that you wish to improve the next presentation. Each person is also required to complete a reflective essay on leadership later in the semester. Additional details will be provided mid-semester.

Engineering Projects Expo
Everything CU Boulder engineering students learn culminates in capstone design projects, presented at the annual Engineering Projects Expo. All teams are required to present a poster at the collegewide Engineering Project Expo. This event typically takes place the Thursday before finals week (Tentatively plan for the afternoon of Thursday, 5/4) https://www.colorado.edu/engineering/expo

Handling Negative Team Dynamics
At times, some team members may not do their fair share of work or may be disruptive to the team. This can also happen in the professional world. In this class, notify your project principal as soon as there is a conflict, and we will work together to resolve the issue. Only the project principal has the authority to terminate a student from a team.

Tasks & Course Expectations

Weekly Tasks	Deliverable	Suggestions for Success
Meeting with Client	Meet for 30 minutes – 1 hour	Be professional & on time Be prepared **BEFORE** the meeting with updates and questions Look at the assignment requirements (Rubric for proposal, AA, PDR, etc) before starting Take notes to share with TA
Meeting with Project Principal	Meet for 30 minutes – 1 hour	Be professional & on time Be prepared **BEFORE** the meeting with updates and questions Take notes to share with TA
Meeting with TA	Discuss deliverables and timeline Share notes from meetings	Be on time Remind you teammates of the meeting the day of
Timesheets	Link to timesheet submission will be posted on Canvas	Set a weekly reminder to complete this before Monday of each week Remind your teammates to complete their timesheets
Lecture & Assignments	Attend lecture when applicable	Updates on details, deadlines, etc. are stated in class – don't miss it Do assignments ahead of time

*All meetings are expected to be held weekly unless specified otherwise
*If your team has different due dates, it is your responsibility to know those

General Tips for Success!
- Work off each other strengths and work style when selecting team positions
- Read the rubric, project description, and project examples before starting
- Make a shared calendar with meeting days & times
- Do not waste anyone's time, come on time, and be prepared to meet
- When there is no lecture, use that time to meet with your team to work together
- Set expectations of each team member at the beginning and discuss schedule conflicts

CU BOULDER POLICIES

Classroom Behavior

Both students and faculty are responsible for maintaining an appropriate learning environment in all instructional settings, whether in person, remote or online. 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 race, color, national origin, sex, pregnancy, age, disability, creed, religion, sexual orientation, gender identity, gender expression, veteran status, political affiliation or political philosophy. For more information, see the classroom behavior policy, the Student Code of Conduct, and the Office of Institutional Equity and Compliance.

Requirements for COVID-19

As a matter of public health and safety, all members of the CU Boulder community and all visitors to campus must follow university, department and building requirements and all public health orders in place to reduce the risk of spreading infectious disease. CU Boulder currently requires COVID-19 vaccination and boosters for all faculty, staff and students. Students, faculty and staff must upload proof of vaccination and boosters or file for an exemption based on medical, ethical or moral grounds through the MyCUHealth portal.

The CU Boulder campus is currently mask-optional. However, if public health conditions change and masks are again required in classrooms, students who fail to adhere to masking requirements will be asked to leave class, and students who do not leave class when asked or who refuse to comply with these requirements will be referred to Student Conduct and Conflict Resolution. For more information, see the policy on classroom behavior and the Student Code of Conduct. If you require accommodation because a disability prevents you from fulfilling these safety measures, please follow the steps in the "Accommodation for Disabilities" statement on this syllabus.

If you feel ill and think you might have COVID-19, if you have tested positive for COVID-19, or if you are unvaccinated or partially vaccinated and have been in close contact with someone who has COVID-19, you should stay home and follow the further guidance of the Public Health Office (contacttracing@colorado.edu). If you are fully vaccinated and have been in close contact with someone who has COVID-19, you do not need to stay home; rather, you should self-monitor for symptoms and follow the further guidance of the Public Health Office (contacttracing@colorado.edu). {Faculty: insert your procedure here for students to alert you about absence due to illness or quarantine. Because of FERPA student privacy laws, do not require students to state the nature of their illness when alerting you. Do not require "doctor's notes" for classes missed due to illness; campus health services no longer provide "doctor's notes" or appointment verifications.}

Accommodation for Disabilities

If you qualify for accommodations because of a disability, please submit your accommodation letter from Disability Services to your faculty member in a timely manner so that your needs can be addressed. Disability Services determines accommodations based on documented disabilities in the academic environment. Information on requesting accommodations is located on the Disability Services website. Contact Disability Services at 303-492-8671 or dsinfo@colorado.edu for further

assistance. If you have a temporary medical condition, see [Temporary Medical Conditions](#) on the Disability Services website.

Preferred Student Names and Pronouns

CU Boulder recognizes that students' legal information doesn't always align with how they identify. Students may update their preferred names and pronouns via the student portal; those preferred names and pronouns are listed on instructors' class rosters. In the absence of such updates, the name that appears on the class roster is the student's legal name.

Honor Code

All students enrolled in a University of Colorado Boulder course are responsible for knowing and adhering to the [Honor Code](#). Violations of the Honor Code may include, but are not limited to: plagiarism, cheating, fabrication, lying, bribery, threat, unauthorized access to academic materials, clicker fraud, submitting the same or similar work in more than one course without permission from all course instructors involved, and aiding academic dishonesty. All incidents of academic misconduct will be reported to Student Conduct & Conflict Resolution (honor@colorado.edu); 303-492-5550). Students found responsible for violating the [Honor Code](#) will be assigned resolution outcomes from the Student Conduct & Conflict Resolution as well as be subject to academic sanctions from the faculty member. Additional information regarding the Honor Code academic integrity policy can be found on the [Honor Code website](#).

Sexual Misconduct, Discrimination, Harassment and/or Related Retaliation

CU Boulder is committed to fostering an inclusive and welcoming learning, working, and living environment. University policy prohibits sexual misconduct (harassment, exploitation, and assault), intimate partner violence (dating or domestic violence), stalking, protected-class discrimination and harassment, and related retaliation by or against members of our community on- and off-campus. These behaviors harm individuals and our community. The Office of Institutional Equity and Compliance (OIEC) addresses these concerns, and individuals who believe they have been subjected to misconduct can contact OIEC at 303-492-2127 or email cureport@colorado.edu. Information about university policies, [reporting options](#), and support resources can be found on the [OIEC website](#).
Please know that faculty and graduate instructors have a responsibility to inform OIEC when they are made aware of any issues related to these policies regardless of when or where they occurred to ensure that individuals impacted receive information about their rights, support resources, and resolution options. To learn more about reporting and support options for a variety of concerns, visit [Don't Ignore It](#).

Religious Holidays

Campus policy regarding religious observances requires that faculty make every effort to deal reasonably and fairly with all students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. In this class, please provide two weeks' notice of a scheduling conflict.
See the [campus policy regarding religious observances](#) for full details.