**CVEN 4434 - ENVIRONMENTAL ENGINEERING DESIGN**

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| --- | --- | --- |
|  | **Project Principal** | **Project Principal** |
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| Office | ECES 103B | ECES 103A |
| Office Hours | By appointment  M 1:30-3, T 9-11, W&F 1:30-2:30 | By appointment  T&Th 10-11 AM, 1-3 PM |
|  | **Project Controls Specialist (TA)** |
| Name | Emily Spangler |
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| Office | TBD |
| Office Hours | TBD |

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 consulting firm experience. The projects are all real, current projects that environmental engineers would be asked to execute. In order to complete the project scope, you will need to use all the skills learned in the past four years and see how they come together. You will also need to learn 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 a technical advisor that replicates a subconsultant (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 by developing your engineering skills. This experience is more about the process than the outcome. 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 D2L site, and your @colorado.edu email daily

COURSE GRADE:

|  |  |
| --- | --- |
| Assignment | Weight (%) |
| Written Proposal | 15 |
| Proposal Presentation | 5 |
| Alternatives Report | 20 |
| Alternatives Presentation | 8 |
| AA Independent Review\* | 8 |
| Preliminary Design Report | 25 |
| PDR Presentation | 9 |
| Class Participation | 7 |
| Time Sheets | 3 |

\*competition teams will be excused from the Independent Review, but will receive all points for this item upon successful completion of competition requirements.

In order to prevent an adversarial relationship between the team and the project principal, projects will be scored by the independent instructor. In addition to statistical analysis, the project controls specialist will act as an outside evaluator to make sure the distribution of grades between the teams is fair.

At the conclusion of each project phase, you will be asked to evaluate each team member. We will use CATME software to evaluate each team member individually on five dimensions: contribution to work product, interactions with teammates, keeping team on track, expecting quality, and having knowledge/skills. Additional questions will diagnose team dynamics problems so that we can do a mid-course correction. Each individual’s grade will be modified accordingly. You will not be given a grade for the written submission until you have completed the evaluation and team dynamics surveys.

5434 Students only: The graduate students in the class will perform an independent review of another project as an individual (whether or not you are on a competition team). After reviewing the assigned project, you will also then critique your own group’s report and offer suggestions on how to improve the final PDR.

A NOTE ON PLAGIARISM

You will likely be asked to write more in this class than any other class you have taken. Do not be tempted to take short cuts. We use a plagiarism checker on all your deliverables. Students in past semesters have paid the price. Reports may be submitted before the deadline for a plagiarism check. Use the “Draft Submittals for Plagiarism Check” area of the dropbox on D2L.

**2015 SCHEDULE**

|  |  |  |  |
| --- | --- | --- | --- |
| **Wk** | **Date** | Class Period | **Assignment Due** |
| 1 | 1/13 | Course introduction, project introductions | Application for projects |
| 1/15 | Proposals, win strategies, and contracting |  |
| 2 | 1/20 | Essential Ethics, QA/QC | Timesheet |
| 1/22 | Teamwork |  |
| 3 | 1/27 | Engineering Judgment and Risk | Timesheet |
| 1/29 | Effective Presentations |  |
| 4 | 2/3 | Design Success by Avoiding Failure | Timesheet |
| 2/5 |  | **Proposal (Friday, 2/6, 3:30 p.m.)** |
| 5 | 2/10 | **Proposal Presentations** | Timesheet |
| 2/12 | **Proposal Presentations** |  |
| 6 | 2/17 | Cost and Decision Analysis | Timesheet |
| 2/19 |  |  |
| 7 | 2/24 | Sustainability Evaluation | Timesheet |
| 2/26 |  |  |
| 8 | 3/3 | Licensure as Professional Responsibility | Timesheet |
| 3/5 |  |  |
| 9 | 3/10 |  | Timesheet |
| 3/12 |  |  |
| 10 | 3/17 | **Alternatives Assessment Presentations** | Timesheet |
| 3/19 | **Alternatives Assessment Presentations** | **Alternatives Assessment Report (Friday, 3/20, 3:30 p.m.)** |
| Spring Break | | | |
| 11 | 3/31 |  | Timesheet |
| 4/2 |  |  |
| 12 | 4/7 |  | **Alternatives Assessment Critique (3:30 pm).** Timesheet |
| 4/9 |  |  |
| 13 | 4/14 |  | Timesheet |
| 4/16 |  |  |
| 14 | 4/21 |  | Timesheet |
| 4/23 | **Final Presentations** |  |
| 15 | 4/28 | **Final Presentations** | Timesheet |
| 4/30 | **Final Presentations** | **Final Report (Friday, 5/1, 3:30 p.m.)** |

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.

**DESCRIPTION OF COURSEWORK**

There are three distinct phases throughout the semester, and 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

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 prepare an evaluation of alternatives with a triple bottom line approach. Essentially, you must assess project economics, sustainability, and other non-cost factors with a weighted criteria decision matrix. This evaluation will also be accompanied by an oral presentation.

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.

Additionally, you will serve on a separate team to perform an independent review of another team’s project (unless you are on a competition team). The purpose of this exercise is to get peer feedback and gain ideas of how to do things better. It will also give you a chance to learn from what other teams are doing.

**Group Design Deliverables (Written Submissions):**

For each project phase, your team will submit a written report of the results of that phase. The written report is due by 3:30 pm on the dates shown in the schedule. As in the “real world” when a deadline comes, you either make it or you don’t...and you may need to put in “overtime” as a final push to get the report out on time. Note that professionalism requires on-time submission of all assignments and deliverables. Should anything be late, 33% per day penalty will be deducted (scaled by # of hours late).

**Group Oral Presentations:**

The proposal presentation simulates the process to “win” the project for your engineering company. Therefore, you are pitching your ideas and qualifications. Each group will have a maximum of 12-min for presentation, plus 3-min for questions and changeover. Everyone in the group should present. Both an individual presentation score and a group grade will be given.

The second presentation is a presentation of the alternatives evaluation process; a maximum of 12-min and 3-min will be allowed for questions and changeover.

At the final presentation your team will describe the process you used to select the recommended solution for the client, and describe the preliminary design. Each team will have 20-min for the presentation and 5-min for questions and changeover. Depending on your clients, an additional presentation may be required at the client site. Scheduling will be determined later.

Presentations will be recorded. After your presentation, your group will view the digital file. Each person is required to record and turn in 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.

**Class Periods and Class Participation**

There will be periodic lectures on the design process. These should be interactive discussions. In order to warm up your brain, you may be asked to write your opinion on some topic at 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).

Tuesdays will concentrate on current professional issues; Thursdays will concentrate on reviewing skills specific to the class. Times without lectures, presentations, or meetings should be used for team project work.

On-time attendance is required for all presentation days. Doors will be locked at 3:30. Attendance and asking questions of other groups will count towards your class participation grade.

**Team Meetings**

Every week each group will have a 30 minute meeting with their project principal(s). The project manager will submit an agenda 24 hours in advance of the meeting. The agenda will typically include: 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(s) 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 budget controls will be discussed. The need for change orders will be discussed.

Rules for effective meetings

* Be on time
* Have an agenda

**Timesheets**

Each person must submit a Time Sheet each Tuesday 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 Mon. through Sun. time period.

**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.

**CU BOULDER POLICIES**

If you qualify for accommodations because of a disability, please submit to your professor a letter from Disability Services in a timely manner (for exam accommodations provide your letter at least one week prior to the exam) 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](mailto:dsinfo@colorado.edu). If you have a temporary medical condition or injury, see Temporary Medical Conditions: Injuries, Surgeries, and Illnesses guidelines under Quick Links at Disability Services website and discuss your needs with your professor.  
  
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[http://www.colorado.edu/studentaffairs/judicialaffairs/code.html#student\_code](http://www.alumniconnections.com/links/link.cgi?l=5898390&h=137833&e=UCBI-20140814145349)  
  
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