

U. S. COAST GUARD ACADEMY
Civil Engineering

Civil Engineering Design (CED) - 1402
Course Syllabus

Description: This is the Senior Research and Design (Capstone) course for the Civil Engineering major, and requires students to plan, design, and manage a complex open-ended civil engineering project. Students apply a variety of knowledge from a broad range of technical, managerial, and humanities coursework to produce solutions that consider the economic, socio-political, ethical, and environmental aspects of real-world problems. Students will produce engineering calculations, construction drawings, project schedules, cost estimates and any other necessary project specific documents. In addition, students communicate the results of their project via a final report and presentation to their client.

Credit Hours: 4.0

Objectives: Students will gain basic understanding of the broad spectrum of tasks performed by design engineers and project managers. Upon successful completion of this course students will be able to:

- Plan & design an engineering solution to a real-world problem
- Communicate an engineering solution to a client
- Understand & articulate ethical issues within the engineering practice.
- Understand the broad impacts of engineering solutions in a global, economic, environmental, and societal context
- Function in a multi-disciplinary team
- Apply leadership & management concepts to the engineering profession

References:

1. Peterson, Steven, *Pearson's Pocket Guide to Construction Management*, Pearson Education, Incorporated, 2012.
2. Halpin, Daniel W. and Bolivar A. Senior, *Construction Management*, 4th Edition., Wiley, 2011.
3. Knutson, Kraig et al, *Construction Management Fundamentals*, 2nd Edition, McGraw Hill, 2009.

Other Resources:

<http://libguides.uscga.edu>

<http://ascelibrary.org/>

<http://www.asce.org/a-question-of-ethics/>

Grading:	Class Participation / Individual Contribution	10%
	Leadership Essays	10%
	Assignments	10%
	Ethics Presentation	10%
	Formal Presentation & Poster	25%
	<u>Project Notebook & Final Report</u>	<u>35%</u>
	Final Grade:	100%

Attendance: Students shall attend all lectures and field trips. Excused absences must be communicated to the instructor **prior to class meeting**.

Homework: Graded assignments are due in accordance with the published course schedule. Late work may be accepted up to 1 class meeting after the prescribed due date; assignment grades will be reduced for tardiness. Students shall communicate the reason for a late assignment to the instructor **prior to 1600 on the assignment due date.**

Collaboration: Most assignments in this course will be assigned as group efforts. Detail will be provided with each assignment. The following assignments shall be Individual Effort Assignments as indicated by an asterisk (*) on the course schedule:

- Leadership Essay assignments
- Assessment assignment

Students may only consult with the course Instructor, any other Faculty member, or cadet Writing & Reading Center Staff when Individual Effort Assignment is stated.

Project Notebook /As part of the requirements for this course, each group shall:

Final Report: prepare a project notebook that will be available for review during the final Project Presentations. The notebook should contain, at a minimum, the project problem statement, 12 sets of meeting minutes, planning assignments, cost estimates, calculations, *clean & corrected copies* of individual research papers from CPM, and the final technical report. The technical report will be produced in accordance with specifications provided by the group advisor. The notebook should be logically arranged and tabbed for simplicity. Notebook checks will occur at lessons 18 and 28. Notebook grades will be assigned based on these checks. Submission of a complete project notebook at the end of the semester is a requirement for passing the course.

Meeting Minutes: Included in project notebook. Each group will meet at least once per week with their advisor(s) for a progress meeting. Members of the project team will rotate through the position of lead engineer. The lead engineer will be responsible for preparing and distributing the meeting agenda **prior** to the meeting and the post-meeting minutes. Meeting Minutes will be submitted to the lecture instructor using the 'DropBox' feature on the Desire-2-Learn (D2L) course website.

Ethics Case Studies: Each Capstone Group will review and present an ethical scenario from ASCE's "A Question of Ethics" case study archive. The case studies can be found at the following web address:

<http://www.asce.org/a-question-of-ethics/>

Each group will be allotted 15 minutes for the presentation of their scenario and facilitation of a short in-class discussion. The objective of the case studies is to present relevant engineering ethical situations in the classroom to stimulate discussion and critical thinking. The CED class instructor will provide further guidance in class.

Leadership Essays: Students will write two leadership essays during the semester. The objective of each assignment is to reflect on how leadership concepts apply to the project and team experience. The CED class instructor will provide further guidance in class.

LCCA Mini Project: Project teams will identify and analyze design alternatives of at least one major component of the Capstone project, and use what they learn about Life Cycle Cost Analysis to select the best alternative. The CED class instructor will provide further guidance in class.