

UNIVERSITY OF HAWAII AT MANOA
 Department of Civil & Environmental Engineering
CEE 489 – Senior Design Project & Professional Ethics
Fall 2024

Instructors:

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Office Hours: By appointment by email

Meeting Times: Fri: 2:00-4:30PM, Saturdays 8:00AM-4:00PM

Meeting Places:

Online (Zoom): TBD

In Person: HOT Room (TBD)

Prerequisites: CEE 220, CEE 250, CEE 305 and senior standing

Text:

1. Engineering Your Future: The Professional Practice of Engineering, 3rd Ed., S.G. Walesh, 2012, ASCE Press/Wiley.
2. Other online resources.

Accreditation: The content of this course is related to the CEE program outcomes which are listed on the Dept web page at: <http://www.cee.hawaii.edu/program-assessment/>. The relationship to the outcomes is based on the following scale:

“blank” = no emphasis; 1 = some emphasis; 2 = moderate emphasis; 3 significant emphasis

Student Outcome (SO)	1	2	3	4	5	6	7
Senior Design Project (2 cr)	3	3	2		3	3	3
Professional Ethics (1 cr)							3

Week

- 1-3 Introduction, select teams and projects, prepare proposal.
Teams develop a proposal containing statement of qualifications and a detailed workplan, timeline, and engineering services budget.
- 4-15 Teams conduct data collection/analysis and preliminary design.
During this phase, students will collect data, conduct site visits, determine/evaluate feasible alternatives, check restrictions/regulations, complete design calculations, consult with industry and faculty mentors, create preliminary CAD drawings, determine construction budget, and submit billing statements.
- 8 Teams present proposal in interview by industry panel (written and oral).
 Submittal will include project description, company background and relevant experience, description of project/site challenges and proposed approach and project tasks, timeline with deliverables, detailed manpower-based budget for engineering services, completed Form 120, and company promotional literature.

- 9-14 Ethics
- 15 Teams present 30% design submittal including Basis of Design to industry panel (written and oral).
Submittal will include written description of project, details of the basis of design findings in all areas of the project (zoning, flooding, drainage, water/wastewater, geotech, structural, traffic), alternatives evaluated and recommendations, and preliminary construction budget. *Will include preliminary CAD design drawings showing site layout, and preliminary grading/drainage, utility connections, traffic patterns, building locations with elevation views from all sides, structural and geotech designs.*
- 16 Ethics Final

Senior Design Project (2 credits)

General:

This is a senior-level required course. The purpose is to provide a capstone experience that requires seniors to *integrate principles, theories, and methods learned throughout the major*. Students creatively analyze, synthesize, and evaluate learned knowledge in a project having a *professional focus and communicate the results of the project effectively at a professional entry level*. Through a series of lectures as well as team-based project work and required submittals, students will be introduced to the requirements and realities of the practice of professional engineering to facilitate their transition from academia into industry. Two (2) credits of this course has an Oral Communication (O) Focus designation. Students will learn how to and then practice preparing professional engineering written submittals. Students will learn how to and then practice making polished and professional technical presentations (O). Lecture topics, many given by practicing professionals, will include: types of engineering work, cost of doing business, information collection methods, effective teamwork, leadership skills, value engineering, proposal development, technical writing and presentation skills. Submittals are evaluated by a team of practicing professional engineers who also serve as mentors for design work.

Teams: Students will be assigned to **teams of 5 persons** who will work together on various submittals and presentations. Instructions for effective group work and presentations will be provided.

Submittals: Written:
a) **Team proposal / workplan / budget**
b) **30% Design Report**

Presentations (PowerPoint slides submitted):
a) Team proposal – 10 min [Oct 14]
b) 30% design report – 15 min [Dec 9]

Team Submission: Team leaders are responsible and will submit one copy per team. Submission should be in the team leader's Dropbox on Laulima.

Individual Submission: Students will leave an electronic copy in their personal Dropbox in Laulima.

Grading: Grades will be based on an individual grade (50%) and a team grade (50%) as follows:

Individual:	Written Assignments	15%
	Oral Presentations	15%
	Team Member Assessments	20%
Team:	Billing statements and Reports	25%
	Oral presentations	25%

Speaking: This course has an Oral Communication (O) Focus designation. The course will achieve the O Focus Hallmarks including: O1) Each student will participate in three oral communication assignments. In addition, 40% of the final grade will be a function of the student's oral communication activities. O2) Each student will receive explicit training, in the context of the class, in oral communication concerns relevant to professional engineering presentations including competitive proposals and project progress reports. O3) Each student will receive specific feedback, critiquing, and grading of the oral communication assignments or activities from the instructor and professional engineering mentor panel. Saturday class sessions are devoted to oral presentation practice/instruction.

Upon completion of this course, students will be able to: (1) describe the consulting engineering design process including proposal preparation, project scoping, and budget formulation and explain how real-world constraints affect the process of engineering design; (2) analyze a realistic Request for Proposal for building and site improvements to determine requirements and constraints. Develop a solution to a well-defined project management problem; (3) design a building and site improvement for an actual site to meet stated needs using realistic constraints including zoning, water, wastewater, traffic and other ordinances, economic, environmental, political, ethical, health and safety, constructability, and sustainability; (4) assess design component compliance with actual standards of practice, user needs and realistic constraints; (5) apply the rules of grammar and composition in verbal and written communications, properly cite sources, and use appropriate graphical standards in preparing engineering drawings. Organize and deliver effective verbal, written, virtual, and graphical communications to a professional audience of practicing professional engineers who also serve as mentors for design work; and (6) explain the factors affecting the ability of teams to function effectively. Function effectively as a member of an intra-disciplinary team. Apply leadership principals to direct the efforts of a small group.

Ethics (1 credit)

General:

This course also provides a thorough grounding in the ethics of professional engineering practice. It provides an understanding of engineering as a profession, and the ethical and legal responsibilities implied. It presents an ethical decision making framework for tackling ethical dilemmas, discusses responsible ethical deliberation, and through a variety of written assignments and group discussion/role-playing activities, provides practice in ethical deliberation and decision making. Licensure and professional organizations codes of ethics are covered with a focus on civil engineering practice. One (1) credit this course has a Contemporary Ethical Issues (E) Focus designation.

Goals of Course:

Specific Outcomes

1. Explain key concepts related to the ethics of professional engineering practice, engineering as a profession, and the ethical and legal responsibilities of engineers.
2. Explain engineering licensure requirements, application procedures, and examination dates.
3. Solve realistic engineering ethical dilemmas using an ethical decision-making framework.
4. Practice responsible deliberation on difficult ethical dilemmas.
5. Understands impact of civil engineering systems in a global, economic, environmental and societal context.

List of Topics

Covered:

1. Engineering as a profession
2. An ethical decision making framework
3. Ethical deliberation
4. Engineering licensure
5. Laws governing licensure
6. Codes of ethics
7. Company policies on ethical business practices
8. ASCE guidelines, examples, role playing
9. Engineering ethics case studies

Homework and Final:

There will be reading/writing assignments analyzing problems and case studies. Assignments, Final and due dates will be posted to Laulima and are due at 4:30pm Hawaii Standard Time. Notifications of these will to your UH email through Laulima. It is your duty to check your email for these and for all class announcements, no reminders of these due dates will be sent out. Late HW is penalized 10% per day late. Final exam will be a take-home.

To turn in Homeworks and the Final, you will have a Dropbox on Laulima to turn these in. These Laulima Dropboxes are private between the instructor and student, only.

HW and Final must be typed and sent in PDF format to be accepted (photos in JPG or other formats are OK as long as I can read it). HW and Final grading will be as follows, you will receive your score and the HW and Exam answers, but no detailed graded HW or Exams will be returned. Don't turn in more than one HW or Exam.

Grading: Homework 65 %; Final Exam (take-home): 35 %

E:

This course has a Contemporary Ethical Issues (E) Focus designation. Contemporary ethical issues are fully integrated into the main course material and will constitute at least 30% of the content. At least 8 hours of class time will be spent discussing ethical issues. Through the use of lectures, discussions and assignments, students will develop basic competency in recognizing and analyzing ethical issues; responsibly deliberating on ethical issues; and making ethically determined judgments.

Fall 2023: Approximate Course Schedule (tentative)

Week		
1 8/25	Course intro, select teams, review RFP/select projects, memos, consulting practice, teamwork and teambuilding exercises, team photos	
2 9/1	SOQs, RFPs, proposals, workplans, Form 120, costs of doing business, budget prep, introduction to projects	
2 9/2	Saturday: Site visit	
3 9/8	Checklists, zoning, LUO, flood maps/regulations, ADA, online resources, technical presentation/interview tips, writing workshop, progress reports/invoices	
3 9/9	Saturday: Site visit	
4 9/15	Permitting Requirements	Site planning, grading, Erosion Control Plans – M. Fujioka
5 9/22	Stormwater BMPs – J. Stone	Construction Engineering and Cost Estimating – M. Wagner
6 9/29	Storm Drainage Design/Water/Wastewater; Expectations for 30% Design Calculations	Submittals, permitting, NPDES – R. Abe
6 9/30	Saturday: Groups meet to practice oral presentations	
7 10/6	Transportation Engineering - W. Yoshioka	30% Prep, what to present, Example submittals, alternatives to present
7 10/7	Saturday: Groups meet to practice oral presentations	
8 10/13	Structural Systems - G.Miyasato	Geotechnical Eng. – K. Sandefur
8 10/14	***** Saturday: Proposal Interview Presentations *****	
9 10/20	Ethics	
10 10/27	Ethics	
11 11/3	Ethics	
12 11/10	Veteran's Day	
13 11/17	Ethics	
13 11/18	Saturday: Groups meet to practice oral presentations	
14 11/24	Thanksgiving Holiday	
14 12/1	Ethics	
14 12/2	Saturday: Groups meet to practice oral presentations	
15 12/8	Study Day	
15 12/9	***** Saturday: 30% Design Presentations *****	
16 TBD	Ethics Final Exam	