

ENGR/CE 496 – Senior Seminar/Design

Fall 2023

Land Acknowledgement: "We acknowledge the land that Fort Lewis College is situated upon is the ancestral land and territory of the Nuuchiu (Ute) people who were forcibly removed by the United States Government. We also acknowledge that this land is connected to the communal and ceremonial spaces of the Jicarilla Abache (Apache), Pueblos of New Mexico, Hopi Sinom (Hopi), and Diné (Navajo) Nations. It is important to acknowledge this setting because the narratives of the lands in this region have long been told from dominant perspectives, without full recognition of the original land stewards who continue to inhabit and connect with this land. Thank you for your attention and respect in acknowledging this important legacy."

Location: Sitter Family Hall (SFH) 710

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Textbook: *A Guide to Writing as an Engineer, 3rd Edition*, David Beer and David McMurrey

COURSE INFORMATION

Catalog description: Students experience the integration of technical knowledge through an open-ended, comprehensive design project which simulates an engineering project environment, including design, building or simulations, testing and verifications, project management, oral and written reports, and professional ethics.

Course Objectives: Develop competence with the elements of engineering design with a special emphasis on: the design process, technical writing, presentation skills, project management, and professionalism.

Prerequisites: Engr 315 – Engineering Design and Practice (for BSE students). CE 315 – Computer Engineering Design and Practice (for BSCE students).

Required Course: (Lect-Lab): (3-0) This is the first of a two-course design/research sequence. The process is completed in ENGR/CE 497.

COURSE OUTCOMES

ABET Criterion-3 lists 7 learning outcomes titled 1-7. This course addresses the following subset of these outcomes:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. 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.
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
5. 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.
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgement to draw conclusions.
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

TOPICS

- The engineering design process
- Problem definition
- Generating design alternatives

- Evaluating design alternatives and down-selection
- Working as a member of a design team
- Applying project management concepts
- Preliminary and critical design reviews
- Professional ethics in design and practice
- Safety standards
- Prototyping, testing and evaluation
- Documentation - oral and written reports

Design Projects: The Senior Design faculty carefully choose projects that have genuine application in the practice of engineering. Student teams for each project are selected by a panel of outside engineers and/or faculty members, using a merit-based application process similar to that found in industry.

Class Format: Fall term: Course assignments are as stated on the published Fall term schedule (below).

Spring term: Five clearly-defined critical milestones off each design team’s Gantt chart or other scheduling tool must be accomplished according to schedule. It is the responsibility of the teams to propose which milestones are critical, and when they will be completed and provided to their advisors. Each team advisor will then have the option to approve the milestones and schedule or ask for alterations.

Teams will be randomly chosen on a weekly or bi-weekly basis (at the discretion of the instructors) to publicly demonstrate the achievement of scheduled assignments/milestones in front of the ENGR496/7 student body and instructors on the class session on or immediately after the scheduled date. If a team does not have that assignment/milestone accomplished, the team members **will lose one letter grade off their final semester grades** (Fall or Spring term as appropriate). If the team believes that the delay was unavoidable, a member of the team, chosen at random by the team advisor, may publicly present their appeal to the ENGR496/7 student body and instructors during the class session that they were originally scheduled to demonstrate their assignment/milestone accomplishment. The instructors will then collaborate and vote to determine if the letter grade will be reinstated. Documentation of the unavoidable cause of delay and documentation of an advance warning of the delay to the team’s advisor is a requirement to make an appeal.

All submitted assignments will require an electronic upload (see Canvas for details)

It is the student’s responsibility to keep track of all due dates. All assignments are to be typed or prepared using applicable engineering design tools, and in final engineering format. Writing must be professional quality and follow the program standards. For guidance see: *A Guide to Writing As an Engineer* / Edition 3, by David F. Beer, David McMurrey, 3rd Edition, ISBN:0470417013, Wiley, John & Sons, 2009.

Grading: Grades are based on project work, participation and professionalism. Project work assessment includes the quality of deliverable products, the ability to effectively apply the formal design process and the ability to meet project goals and deadlines. Participation and professionalism include assessment of the level of engagement in the project and professional conduct. Graded project work are listed below with relative weights:

Project Work	Points	
Resume and cover letter	50	
Problem Definition Statement	50	
WBS/LRC/Gantt	50	
Funding Proposal	75	
PDR	200	
Draft Final Report	200	
Participation	250	(based on peer reviews and instructor observations)
Professionalism	250	(based on instructor observations, peers, and applicable project clients)

Grades will be no worse than: >90% - A-; >80% - B-; >75% - C; >60% - D-; <60% - F

Note: individual instructors may have superseding policies to those listed above.

Course Schedule: The course is officially scheduled for M 3:35-6:40 however, the nature of teamwork and the design process frequently requires longer and more flexible work times. **Additional class times may be included in the schedule and individual team meetings will be necessary outside of the scheduled course time. The official class time should be utilized for individual team meetings even if the entire class is not meeting together.**

Course Attendance: Scheduled course attendance is mandatory.

Academic Integrity: Academic integrity refers to the ethical and honorable behaviors of students engaged in learning and conducting academic work. On the other hand, unethical or illegal behavior includes, but is not limited to, cheating on exams, plagiarism, forgery of academic documents, falsification of information on academic documents, or unauthorized access to computer files containing academic information. Academic dishonesty may result in sanctions ranging from a lowered grade on a particular assignment to an "F" in the class and report submitted to the Office of Academic Affairs. Please see FLC's policy on Academic Integrity by Students posted in the Faculty Handbook, Part III. Academic Policies, Section 1. Academic Integrity by Students.

Feedback & Communication: Canvas Announcements and email will be used for course communications outside of the scheduled class time. Usually, I will respond as soon as I see your message but at least by the next lecture period. Feel free to text (this is up to each instructor) for scheduling appoints or issues that need immediate response.

Canvas: Canvas, FLC Learning Management System, will be used to post course information, access files and at times, submit documents as instructed. Learn about Canvas support through a self-guided student orientation, Passport to Canvas. For technical help with Canvas, students can contact the 24/7 support hotline at 855-971-1611 or submit a HELP ticket in Canvas.)

Diversity and Inclusive Classroom Statement: Each member of this class is responsible for contributing to and maintaining an atmosphere of respect for all other members. This means each of us is responsible for ensuring that:

- All perspectives and experiences are respected.
- Class discussions and individual comments are respectful and do not degrade, stereotype, or promote deficit thinking about any group or individual.
- Each person in the class has an opportunity to articulate their perspective and ideas without being demeaned.
- Students who demonstrate a disregard for this responsibility will be alerted that their attitudes and/or actions inhibit a respectful and safe learning environment. The instructor reserves the right to take appropriate disciplinary action.

Antidiscrimination Statement: Fort Lewis College prohibits discrimination on the basis of race, age, color, religion, national origin, sex, disability, sexual orientation, gender identity, gender expression, family or domestic status, political beliefs, veteran status, pregnancy, or genetic information. To file a complaint please contact Fort Lewis College's Equal Opportunity Coordinator David Pirrone, djpirrone@fortlewis.edu or (970) 247-7182. FLC prohibits sexual misconduct (sexual harassment, sexual assault, dating or domestic violence, stalking, or harassment based on sexual orientation or gender identity), To get support or file a complaint of sexual misconduct contact Title IX Coordinator Molly Wieser, wieser_m@fortlewis.edu, (970) 247-7241. Set up an appointment with Molly at www.calendly.com/title9.

Disability Services: If you think you have or you do have a documented disability which will need reasonable academic accommodations, please call the Director of Disability Services, 280 Noble Hall, 970-247-7459, for an appointment as soon as possible.

**ENGR/CE 496 Senior Seminar – Design/Research
Course Schedule**

Wk	Date	Seminar Topic and Time	Assignments (see Canvas for details)
1	8/28 9/1	Syllabus, schedule, procedures (Li) Project interviews	Resume and cover letter (due: 8/30)
2	9/4	Form teams, Team Charters, FE Exam (May) Student Project Area Rules & Practices (Jason Wagner) Revised Problem Statement/Definition (May)	Initial meeting with project team (9/4) Team charter (due: 9/6)
3	9/11	Resume, cover letter, interviewing (Jaityn Gomez, FLC Career Services) Work breakdown, Linear Responsibility Chart, Gantt Chart/Scheduling (May)	Revised problem definition (due: 9/11)
4	9/18	Lit review & library resources (Rosalinda Linares, FLC Library) Team meetings	WBS/LRC/Gantt (due: 9/18) Revised resume & cover letter (due: 9/18)
5	9/25	Funding proposal (Leahy) Team meetings	Report: background & lit. review (due: 9/25)
6	10/2	Team meetings	
7	10/9	Funding proposal distributed for review Team meetings	Draft 1 Funding Proposal (due: 10/9)
8	10/16	Funding Proposals Team meetings	Final/Revised Funding Proposal, 5 min Funding Proposal Presentation (10/16)
9	10/23	PDR process review (Casey) Team meetings	Funding proposals submittal due: 10/30/23
10	10/30	Team meetings	Down select (due: 10/30)
11	11/6	Resource needs and purchase requests Team meetings	Purchase requests (11/6)
12	11/13	PDR	
FALL BREAK, 11/20-11/24			
13	11/27	Testing Plans (May) Team meetings	
14	12/4	Testing Plans Team meetings	Testing Plans (12/4), Draft final report – compilation of documents (12/8)
15	12/14	Final Exam, Thurs, 9:45a – 11:45a	