## Description

In this course, the principles of Engineering Design will be applied. Students will work on multidisciplinary teams on selected and approved design projects, practice design methodology, complete project feasibility study and preliminary design, including optimization, product reliability and liability, economics, and application of engineering codes. Final report and presentation

## Instructor

Alejandro Gutiérrez, Ph.D.
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Office Location: COB-372
Office Hours: Wednesdays 11:30-13:30

## T.A.

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## Lectures

Wednesdays, 16:30-17:20. COB-102

## Textbook

All materials will be provided by the instructor

## Grading

| | |
|---|---|
| Participation & attendance | 15% |
| Weekly deliverables | 15% |
| Preliminary Design Review (PDR) | 15% |
| Critical Design Review (CDR) | 15% |
| Final Design Review (FDR) | 30% |
| Final Report | 10 % |

A+ = 95%-100%; A = 93%-94%; A- = 90%-92%; B+ = 87%-89%; B = 83%-86%; B- = 80%-82%; C+ = 77%-79%; C = 73%-76%; C- = 70%-72%; D+ = 67%-69%; D = 63%-66%; D- = 60%-62%; F = 0%-59%.

**Policies**

Attendance to class and to weekly meetings is mandatory

Participation grade consists on actively working within your team. The performance of each team member will be reviewed by their peers at each weekly meeting

Weekly deliverables must be presented on time at each weekly meeting. Late submissions will affect the grade of all team members regardless of who is individually responsible

Catcourses will be the principal means of official communication between the instructor and the students, so be sure to check your inbox often

## Learning outcomes

By the conclusion of this course, students will be able to:

- Design an engineering solution to a challenging contemporary problem, within realistic constraints and utilizing appropriate standards
- Use project management and teamwork skills to deliver a solution within time and budget constraints
- Deliver a professional presentation appropriate to a broad audience
- Demonstrate effective written technical communication skills through

  final project reports

## Academic Integrity

- Each student in this course is expected to abide by the University of California Merced's Academic Honesty Policy. Any work submitted by a student in this course for academic credit will be the student's own work.
- You are encouraged to study together and to discuss information and concepts covered in class with other students. You can give "consulting" help to or receive "consulting" help from such students. However, this permissible cooperation should never involve one student having possession of a copy of all or part of work done by someone else, in the form of an e-mail, an e-mail attachment file, other electronic file, or a hard copy. Should copying occur, both the student who copied work from another student and the student who gave material to be copied will automatically receive a zero for the assignment. Penalty for violation of this Policy can also be extended to include failure of the course and University disciplinary action.
- During examinations, you must do your own work. Talking or discussion is not permitted during the examinations, nor may you compare papers, copy from others, or collaborate in any way. Any collaborative behavior during the examinations will result in failure of the exam, and may lead to failure of the course and University disciplinary action

## Students with disabilities

The University of California Merced is committed to ensuring equal academic opportunities and inclusion for students with disabilities based on the principles of independent living, accessible universal design and diversity. The instructor is available to discuss appropriate academic accommodations that may be required for student with disabilities. Requests for academic accommodations are to be made during the first three weeks of the semester, except for unusual circumstances. Students are encouraged to register with Disability Services Center to verify their eligibility for appropriate accommodations

## Diversity and inclusion

This class is conducted in accordance to the UC Merced Principles of Community[1], which include the recognition and celebration of all identities, values, and beliefs. Discrimination on the basis of race, religion, sex, sexual orientation, gender identity, national origin, citizenship, documented status, or any other social identity will not be tolerated. All students are invited to discuss any situation they perceive as harmful or threatening with the instructor in class or during office hours

[1] https://www.ucmerced.edu/principles-of-community

# Course schedule

| Week | Topic | Deliverables |
|---|---|---|
| 01/22 - 01/26 | Introduction | List of officers, first meeting with client, meeting schedule with clients, meeting schedule with TA/faculty |
| 01/29 - 02/02 | Planning | Problem translation, report on assessment of technology |
| 02/05 - 02/09 | Concept | List of constraints and objectives, mission statement, list of concepts and functioning principles |
| 02/12 - 02/16 | System | List 2-3 possible solutions, estimated timelines, preliminary economic justification |
| 02/19 - 02/23 | Presentation | PDR Wed-Fri |
| 02/26 - 03/02 | Detail | Specifications of chosen solution, identifications of components |
| 03/05 - 03/09 | Detail | Geometry and physics calculations, preliminary drawings |
| 03/12 - 03/16 | Detail | Specifications of chosen solution, identifications of components |
| 03/19 - 03/23 | Detail | Preliminary design of ad-hoc components, identification of off the-shelf components |
| 03/26 - 03/30 | Detail | Materials selection, cost estimates |
| 04/02 - 04/06 | Detail | Detailed drawings, computational models, preliminary testing results |
| 04/09 - 04/13 | Presentation | CDR Wed-Fri |
| 04/16 - 04/20 | Testing | Testing protocol for final product design, testing results |
| 04/23 - 04/27 | Testing | Testing results, economic feasibility analysis |
| 04/30 - 05/04 | Testing | Testing results, environmental impact analysis |
| 05/07 - 05/11 | Presentation | Report due on 05/07; FDR on 05/11 |