

EE15: The Art and Science of Engineering Product Design

3 Units

Winter 2019

Wednesday 3:30-5:45PM

Classroom Herrin T-195

Faculty:

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Course Overview:

Description

The goal of this seminar is to introduce freshmen to the design process of an engineering project. The seminar will consist of a series of lectures. The first part of each lecture will focus on the different design aspects of an engineering project, including formation of the design team, developing a project statement, generating design ideas and specifications, finalizing the design, and reporting the outcome. Students will form teams to follow these procedures in designing a term project of their choice over the quarter. The second part of each lecture will consist of outside speakers, including founders of some of the top companies in Silicon Valley, who will share their experiences about engineering design. A field trip will also be part of the course.

Learning Goals

The seminar serves three purposes: (1) it introduces students to the design process of turning an idea into a final design, (2) it presents the different functions that people play in a project, and (3) it gives students a chance to consider what role in a project would be best suited to their interests and skills.

Grading:

This is a project-based class and thus the grade will be depended heavily on the quality of the team project.

Class Participation (20%)

Assignments (20%)

Required Reading

Project-Based Assignments

Writing Assignments

Project (60%: 30% Final Presentation and 30% Final Report)

Students will work together in teams of 3 or 4. As the projects require a variety of skill sets, we encourage students from diverse background – engineering and non-engineering – to form teams.

Between week 2 and 10, each team will be working on their project with the help of outside advisor(s). In lieu of the final exam, students will have 30 minutes to present their project during the scheduled time of our final exam., Thursday March 21, 3:30-6:30pm. The final project report is due at the same time, 3:30pm March 21.

Required Textbook:

Engineering Design – A Project-Based Introduction, 4th Edition, Clive L. Dym, Patrick Little, and Elizabeth Orwin, John Wiley & Sons, Inc.

Syllabus:

Week 1 (January 9) – Introduction to Engineering Design

- Required Reading: Text, Chapter 1
- Guest Speaker: Pejman Nozad, Pear Ventures

Week 2 (January 16) – The Design Process

- Required Reading: Text, Chapter 2
- Guest Speaker: Martin Casado, Andreessen Horowitz

Week 3 (January 23) – Design Teams and Management

- Required Reading: Text, Chapters 15-16
- Assignment Due: 1-paragraph Problem Statement
- Guest Speaker: Ellen Levy, Silicon Valley Connect

Week 4 (January 30) – Problem Definition: Requirements and Objectives

- Required Reading: Text, Chapters 3-4
- Assignment Due: Writing Assignment 1, Weekly Project Meeting Notes
- Guest Speaker: Jim Fruchterman, Benetech

Week 5 (February 6) – Problem Definition: Constraints and Design Specs

- Reading Assignment: Text, Chapter 6
- Assignment Due: Revised Problem Statement, Preliminary List of Project Roles and Tasks, Objective Tree, Weekly Project Meeting Notes
- Guest Speaker: Laurie Yoler, Zoux, Bose, Church & Dwight, Broadway Angels

Week 6 (February 13) – Generating Design Ideas and Choosing a Design

- Reading Assignment: Text, Chapter 7, 8, and 14

- Assignment Due: Weekly Project Meeting Notes
- Guest Speaker: Celia Oakley, Opener

Week 7 (February 20) - Why Things Fail

- Reading Assignment: Posted Articles
- Assignment Due: Morphological Chart, Gallery Method Sketches of Design Alternatives. Weekly Project Meeting Notes
- Guest Speaker: Steve Rummage, David Wright Tremaine LLP

Week 8 (February 27) - Field Trip

Week 9 (March 6) - Communicating the Design and Prototyping

- Reading Assignment: Text, Chapters 9-11
- Assignment Due: Writing Assignment 2, Final Design Choice, Priority Checkmark Chart and Best-of-Class Chart, Weekly Project Meeting Notes
- Guest Speaker: Lee Redden, Blue River Technology

Week 10 (March 13) - Beyond the 1st Generation. Engineering Products that have Changed the World and Benefit Humanity. The Ethical Engineer.

- Reading Assignment: Posted Articles
- Assignment Due: Detailed Design: Detailed description/block diagram(s), Schedule, Cost Estimate, Prototype/model/proof of concept description (Optional), Weekly Project Meeting Notes
- Panel "On Being and Engineer": Wren Dougherty, Nathan Hall-Snyder & Sally Thorton

March 21, 3:30-6:30 PM - Final Presentations

- Each team will have 30 minutes to present their final project
- Additionally, there will be 10 minutes of Q & A for each team
- **Final Reports Due March 21 at 3:30pm**