

ME 473 - SENIOR DESIGN PROJECTS
LECTURE and LAB SCHEDULE
Spring 2020

Introduction:

This two-semester course constitutes the culmination of four years of engineering education where students will bring together their knowledge towards the completion of a 'design project'. Some of the skills acquired by students fall in the traditional areas of Mechanical Engineering: Solid mechanics, Machine design, Dynamics, Materials, FE- CAD, Thermodynamics, Heat transfer, Fluid dynamics, etc. However, there also some skills, not necessarily technical in nature, that are required to have a successful career. These include: team-oriented mentality, problem solving, project planning and control, management and writing skills, etc.

It is assumed that a graduating engineer will have mastered all the skills within the traditional disciplines. The purpose of the Senior Design Project is to pull them all together and apply them towards the design and implementation of a 'product', and to afford the students an opportunity to experience team-based design under conditions that closely resemble those that will be encountered in industry. Students must develop and sharpen skills in team organization, time management, self-discipline, presentations, and technical writing, in order to be successful in this course.

An important goal of this course is to expose students to a 'hands-on' experience in which they have to specify, design, and produce a full-system beginning from relatively ill-posed needs as stated by a 'customer'. This objective has to be accomplished while working as a team, and under time pressure.

Additional important goal of this course is to create an industrial and engineering working environment similar to the culture of an engineering company where students are hired to design and manufacture a product from its concept to the final product. The final grade is your final pay from the company. Your contract is your project specifications. You have only 9 months to finish the final product. You will not get paid unless you finish the project and deliver the product stated in the contract. You will not get paid if you only finish half or $\frac{3}{4}$ of the project. Your grade is based on how good or average you finish the project. There is no incomplete in this course.

Some of the 'non-technical' areas that the course is intended to cover include:

- " Team organization and motivation
- " Interpersonal skills applied within the design team and with the 'customer'
- " Technical writing (specifications, proposals, reports, online documents, etc.)
- " Engineering drawings for manufacturing
- " Presentation skills
- " Professionalism and ethics
- " Scheduling and budgeting
- " Personal time management
- " Project planning, work breakdown structure, and design record-keeping
- " Preparing a project scope
- " Identifying customer needs and needs assessment
- " Product synthesis based on customer needs
- " Concept generation and selection
- " Preparing an engineering specification
- " Preparing a design criteria document
- " Identifying system architecture
- " Problem formulation and application of engineering disciplines to design components
- " Ability to pursue design under conditions of shifting requirements
- " Interface identification and tracking
- " Consistency of purpose and project management skills

This course, although not necessarily demanding at an intellectual level, is extremely demanding in terms of hours needed to complete tasks, self-motivation, team dynamics, and time management skills. Students are graded based on a combination of personal and team performance goals. Those who pass this course successfully should be well prepared to embark on a successful career in engineering.

New Requirement for the course: Every team by the end of each term should make a website for their project that may include: Problem statement, Project scope, Background, Motivation, Concepts, Final design, Manufacturing, Results Members and Sponsor, Links, Photo galleries, any Videos(final report, analysis, etc pdf format)

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Prepared by Richard LaGrotta

In order to provide students in the Senior Design Projects with material not ordinarily found in previous courses or textbooks, a number of lectures of a diverse nature are provided, such lectures are made by invited speakers from industry whenever possible, and the rest are provided by the instructor. Students are required to write a short, accurate and complete summary of each lecture in their logbook. The schedule is given below.

DATE	DAY	TIME	LAB/LECTURE	SUBJECT
28-Jan	Tuesday	2 to 5	Lab	ORIENTATION INTRODUCTION TO PROJECTS
30-Jan	Thursday	3 to 5	Lecture	DESIGN PROCESS, LITERATURE SEARCH
4-Feb	Tuesday	2 to 5	Lab	PROJECT SELECTION
6-Feb	Thursday	3 to 5	Lecture	REQUIREMENTS GENERATION, BRAINSTORMING
11-Feb	Tuesday	2 to 5	Lab	HOW TO START A PROJECT
13-Feb	Thursday	3 to 5	Lecture	DESIGN REVIEWS, DESIGN ASSUMPTIONS
18-Feb	Tuesday	2 to 5	Lab	Work on Requirements
20-Feb	Thursday	3 to 5	Lecture	SCHEDULING AND GANTT CHARTS, PROJECT MANAGEMENT
25-Feb	Tuesday	2 to 5	Lab	PROJECT REQUIREMENTS DUE
27-Feb	Thursday	3 to 5	Lecture	ENGINEERING ETHICS
3-Mar	Tuesday	2 to 5	Lab	DESIGN WORK
5-Mar	Thursday	3 to 5	Lecture	SAFETY AND PRODUCT LIABILITY
10-Mar	Tuesday	2 to 5	Lab	DESIGN WORK
12-Mar	Thursday	3 to 5	Lecture	SELECTING A BASELINE, MATERIAL SELECTION
17-Mar	Tuesday	2 to 5	Lab	CONCEPTUAL DESIGN DUE
19-Mar	Thursday	3 to 5	Lecture	PROJECT AND TIME MANAGEMENT
24-Mar	Tuesday	2 to 5	Lab	FORMAL PEER REVIEW DUE (PRESENTATION)
26-Mar	Thursday	3 to 5	Lecture	DOCUMENTATION OF DESIGN
31-Mar	Tuesday	2 to 5	Lab	REVIEW OF CAD DESIGNS
2-Apr	Thursday	3 to 5	Lecture	ECONOMICS AND BUDGETS
7-Apr	Tuesday	2 to 5	Lab	NO CLASS
9-Apr	Thursday	3 to 5	Lecture	NO CLASS
14-Apr	Tuesday	2 to 5	Lab	NO CLASS
16-Apr	Thursday	3 to 5	Lecture	NO CLASS
21-Apr	Tuesday	2 to 5	Lab	DESIGN WORK
23-Apr	Thursday	1 to 5	Lecture	REPORT WRITING
28-Apr	Tuesday	0 to 5	Lab	FIRST DRAFT OF FINAL REPORT DUE
30-Apr	Thursday	1 to 5	Lecture	EFFECTIVE ORAL PRESENTATION
5-May	Tuesday	2 to 5	Lab	DRY RUN OF FINAL PRESENTATION
7-May	Thursday	3 to 5	Lecture	RAPID PROTOTYPING

12-May	Tuesday	4 to 5	Lab	FINAL PRESENTATION
14-May	Thursday	5 to 5	Lecture	NO CLASS

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SPRING 2018**

PREREQ: ME 472
PRE/COREQ: ME 37100, 43300, 43600, and 46200

Instructor: Richard LaGrotta

ROOM: Shepard -207 LECTURE
LAB- Shepard 207
LAB- Shepard 378

TUESDAYS, 2:00 - 4:50 PM
TUESDAYS, 5:00 – 7:50 PM
THURSDAYS, 3:00 - 4:50 PM

TEXT: Lecture notes: Richard LaGrotta
The Mechanical Design Process, Ullman, David G. McGraw-Hill, New York, 1992.

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Grading: Relative weight of course components

Literature survey	5%	Team
Summaries	5%	Individual
Log Books	5%	Individual
Professional Conduct:		
Attendance,	15%	Individual
Team work	5%	Individual
Initiatives, peer reviews,	5%	Team
Modeling/design	15%	Team
Final Presentation	15%	Team/Individual
Final Report	35%	Team
Website:	5%	Team bonus

Approximately 60% of the grade will depend on team performance, leaving 40% for individual effort.

Each Lab Session:
Regular meeting with each team 15 min each

There will be a regular progress report meeting with each team that will include; design review, update, discussion, and question every week for at least 30 minutes. The schedule for each team will be announced.