ME349
Engineering Design Projects

Instructor:

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Course Objectives:

Students must learn and understand the overall design process including techniques, methods and procedures that add structure and organization to the design process.

Students must have the opportunity to apply this process to a real mechanical engineering design problem. This will involve the conceptualization and design of a project involving brainstorming, problem solving, design development and detailed analytical support.

Students will learn a structured process for design and to apply this design process to a project having commercial applications. In the course of doing this we will learn new things (about engineering, about working together in teams, about ourselves), and hopefully, have fun.

Background:

This class will be different than your other engineering courses since it is designed to simulate real-world design projects. These are team-based projects dedicated to solving a structured design problem.

Because of the team structure, the project solution is not completely within your individual control. It is an atmosphere where the outcome is based upon the results of others and, by and large, you will either succeed or fail as a team.

This course can be a source of frustration to some. You will quickly find that there is no single correct answer or approach and no specific “plan” for success. It is an atmosphere where your instructor or “the back of the book” can’t tell you the ‘right’ answer.

In the end, we hope that we can be proud of our efforts when we’re finished.
Attendance:

On-time* attendance is expected at all classes unless some prior arrangements have been made. This can affect your grade... * and your bank account (r.e. “Late Fees”)

Grading:

Grading will be based largely on the quality and execution of the design project as demonstrated through ongoing reviews and the final project. In some (but not all) cases, all members of a design team will receive identical grades. Other factors that may influence grades include a peer assessment by your fellow team members, your design notebook, and observed level of effort. The following is an approximate breakdown of how I will determine grades.

- Final design deliverables & Senior Symposium: 550 pts.
- Preliminary design presentation: 150 pts.
- Notebook evaluation: 100 pts.
- My input (from task reports, design update meetings, etc.): 200 pts.
- Peer evaluation: Priceless

Total: ~ 1000 pts.

Text: Ullman, David G. *The Mechanical Design Process*

I recommended this text, but it is not required for the course. I will be providing materials on the course web page, some of which are taken from this text. I do think it is a good reference.

Other good references include Machinery’s Handbook (available in pdf format via Books 24/7), Material Selection in Mechanical Design (Michael Ashby), and Mechanism and Mechanical Devices Sourcebook (Nicholas Chironis)

Design Notebook:

Each student will be required to keep a design notebook, to be used to record the progress of your project throughout the semester. The National #43-648 Composition Notebook is a good choice.

Project Binder:

Your project team may wish to maintain a project binder for the project. This can be used for collecting the various “loose” materials such as Gantt charts, brochures, and other product information that will accumulate during the design process. I recommend the large 3-ring variety. This is optional and not a graded item. If you keep a binder, we can find storage in the classroom for it.
Deliverables:

Project teams will be responsible for deliverables such as a project proposal, a copy of the team’s current product design specification, a preliminary design presentation, periodic project review documentation, a final presentation, and participation in the Mechanical Engineering Department’s Design and Research Symposium. The team is also responsible for submitting weekly task reports and maintaining an up-to-date project timeline in the form of a Gantt Chart. The team will also be completing some level of design prototype (or prototypes) during the design process. The characteristics of the prototype(s) used will be determined on a per-case basis, but the final version(s) must be at a “proof of concept” level.

Each student will be responsible to develop, maintain and submit his or her own Design Notebook for review at the completion of the project.

Final details on all course deliverables are available via the course web page.

The Role of the Instructor

I look at the role of the instructor in a design course as being similar to that of an engineering manager. I will be available to provide advice and to point you in the right direction. I will also provide periodic project assessment. However, I will not be providing you with solutions; I cannot and will not complete your design for you.

I will try to teach you a process by which you may approach the task of solving a design problem. I will also discuss related aspects of product development such as prototyping, product liability, etc.

Some Final Comments and Advice:

Your best strategy is to ‘front load’ your efforts. That is, do the work early. Often in open-ended courses (and projects) such as this, it is easy to procrastinate. Do not fall prey that! I understand that most of you have other commitments (other course, interviewing, etc.). The existence of simultaneous multiple projects and priorities are very common in industry as well.

So start early, plan and organize the project, trust your teammates and finally communicate.