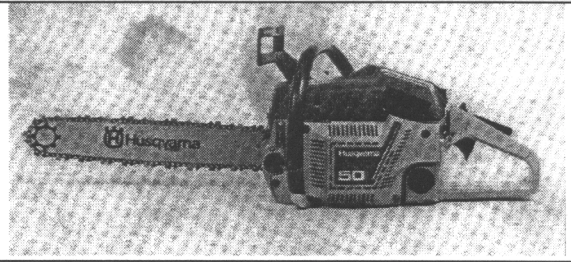


MECHANICAL ENGINEERING

ME 495 Mechanical Engineering Design
Winter Quarter 2002

COURSE SYLLABUS

File: syllabus.doc Revised: 1/7/02 by AMM



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Course Goals:

Design is an activity. You learn design by doing; hence, we have set the following major goals for the course:

1. To provide an opportunity for you to learn the course material in the context of a *real* design project. The project is made real when there is a real client who you can interact with and who is interested in the outcome of the project.
2. To provide an opportunity for you to work effectively as a design team. In this setting you will be responsible for the well being of the team, its organization, equitable distribution of tasks, the acquisition of knowledge needed for completing design tasks, and the execution of the entire project in cooperation with the client.
3. To provide an opportunity for you to develop experience in managing a design project using web-based collaborative software.

Educational Objectives:

Students who have successfully completed ME 495 should be able to:

1. Describe the sequential phases in the design process.
2. Identify the key elements of the design problem and break the problem down into tasks.
3. Plan the design project and monitor its progress.
4. Schedule and assign project tasks for timely completion of the project.
5. Access and use a variety of non-textbook resources pertinent to design. These resources may include patents, archived literature, product catalogs, computer-based resources, handbooks, codes/standards, government regulations.
6. Select design parameters on the basis of target specifications and engineering analyses.
7. Select appropriate materials on the basis of design requirements.
8. Apply appropriate simplifying assumptions and analytical models to predict the performance of the prototype.
9. Develop fabrication and assembly procedures.
10. Fabricate / assemble a prototype.
11. Develop and carry out a testing procedure that can be used to determine whether or not the prototype meets the design requirements and target specifications.
12. Evaluate the prototype in terms of performance, appearance and cost.
13. Function as part of a design team.
14. Demonstrate the ability to effectively communicate design information, both oral and written.
15. Demonstrate soft skills including cooperation and conflict resolution.
16. Describe basic tenets of professionalism and ethical conduct.

Course Requirements:

Design Project

You are required to work together in a team on an advanced design project. The minimum requirement for passing this course is a complete and fully specified product or process design including engineering performance and cost analyses.

Most teams will be working on projects where a working prototype is an expected deliverable. In this case, you are also required to schedule production of the prototype, specify the fabrication and assembly procedures, procure the necessary parts, fabricate and assemble the prototype, test the prototype, and finally, evaluate the prototype and provide recommendations for modification.

Design Journal

A design journal is a *permanently bound* (no three ring or spiral) notebook or "diary" which contains *dated entries* of *all* your notes, sketches, calculations, doodles, and any other record of thoughts and activities related to your design projects. The journal will serve as a complete record of all activities related to the design projects or other activities in the course.

At your initiative you may bring aspects of your design activities to our attention, and request our signature signifying that we have talked about that particular dated entry in your journal. The entry may take on different forms including: a list of assumptions you are using, an analysis model, sketches or diagrams of your design, records of phone conversations or meetings you have had, or draft layout or presentations or reports. These activities will be recorded and be part of the grade for the course.

Reports

You must prepare for your client a midterm Power point presentation. You are also required to prepare for your client a final written report and a poster presentation to be held in lieu of the Final exam.

Grading:

Below is the grading distribution for the major course activities.

Design Journal	15%
Is the technical analysis correct?	_____
Is the journal organized and neat?	_____
Does the journal document a significant contribution to the team effort?	_____
Individual Contribution to Design Project	35%
Individual contribution will be determined from task responsibilities provided in Appendix B of the final report, which must be supported by records in the individual design journal.	_____
Class Participation & Presentations	15%
Poster presentation	
Content, visual presentation	_____
Power point presentation	
Visual presentation, ability to answer technical questions	_____
Final Report	35%

Schedule:

1-8-02

- Introduce continuing projects for new students.
- Select projects and teams (minimum 3 persons / team).
- Select project coordinator and faculty coach for each team.
- Discuss use of **Project Schedule**, Template # 1 as planning tool. Schedule is divided into four sections:
 - Engineering tasks
 - Meetings
 - Report deadlines
 - Template deadlines
- Discuss templates for:
 - **Task Descriptions**, Template #2.
 - **Rationale and Feasibility Checklist**, Template #3.
- Assignment: Teams meet to begin work on breaking project down into engineering tasks.

1-10-02

- Faculty coaches assist teams in breaking project down into engineering tasks (2 hour session).
- Turn in team meeting times, locations, and contact information (email address, phone number) for each team member.
- Complete project schedule (Template # 1), task descriptions (Template # 2), rationale and feasibility checklist (Template # 3). Templates # 1, 2, 3 must be turned in by Friday, January 11.

1-15-02

- Approval from faculty coach and client required on Templates # 1, 2, 3.

1-17-02

- Turn in draft report section *Introduction*.

1-22-02

- Discuss templates for:
 - **Product Design**, Template #4.
 - **Fabrication and Assembly**, Templates # 5, 6.
 - **Health and Safety Plan**, Template #7.

1-24-02

- Turn in revised *Introduction*, incorporating feedback from Writing Center and faculty coach.

1-29-02

- Turn in product design (Template # 4), fabrication and assembly (Templates # 5, 6), health and safety plan (Template # 7).

1-31-02

- Turn in draft report section *Product Design and Analysis*.

2-5-02

- Power-point presentation.
- Approval from faculty coach and client required on Templates # 4, 5, 6, 7.

2-7-02

- Turn in revised *Product Design and Analysis*, incorporating feedback from Writing Center and faculty coach.
- Turn in draft report section *Fabrication and Assembly*.

2-12-02

- Discuss templates for:
 - **Testing Procedure**, Template # 8.
 - **Results and Evaluation of Prototype**, Template # 9.

2-14-02

- Turn in revised *Fabrication and Assembly*, incorporating feedback from Writing Center and faculty coach.

2-19-02

- Turn in test procedure (Template # 8).

2-21-02

- Turn in draft report section *Testing Procedure*.

2-26-02

- Approval from faculty coach and client required on Template # 8.
- Guidelines for poster presentations.

2-28-02

- Turn in revised *Testing Procedure*, incorporating feedback from Writing Center and faculty coach.

3-5-02

- Turn in results and evaluation of prototype (Template # 9).

3-7-02

- Turn in draft report section *Results and Evaluation*.
- Turn in draft of *poster*.

3-12-02

- Approval from faculty coach and client required on Template # 9.
- Ethics game
- Course evaluation

3-14-02

- Turn in draft of *entire report*.
- Turn in revised *poster*, incorporating feedback from Writing Center and faculty coach.

3-19-02

- Turn in *final report*, incorporating feedback from Writing Center and faculty coach.
- Hardcopies of final report to faculty coach and instructor.
- Peer reviews to instructor.

3-22-02

- Poster presentation.
- Prototype demonstration.
- Hardcopy of final report to client.