1. Department, Course Number, and Course Title:

MECHANICAL ENGINEERING

ME 497B MECHANICAL ENGINEERING SENIOR PROJECT

2. Designation:

Required	☑	Elective	☐
Lower Division	☐	Upper Division	☑

3. Course Description: Study of engineering design processes. ME 497A includes case studies to discuss the impact of design constraints. 497B and 497C include the selection and completion of a faculty-supervised project focusing on typical problems encountered in engineering practice and resulting in a formal report and oral presentation. Must be taken in sequence starting with ME 497A

4. Prerequisites: Satisfactory completion of the graduation writing assessment requirement (GWAR), Senior standing and/or consent of the instructo

5. Text and Materials: Product Design and Development, Third Edition, Karl T. Ulrich, McGraw-Hill

6. Course Objectives: The three-quarter long Senior Project sequence is intended to provide students with a major design experience in Mechanical Engineering. In ME 497B, and C, the students are required to conduct a project of significant scope from its inception to its final completion. They need to write the specifications, evaluate parameters and constraints, and apply the engineering science and methods learned in previous classes to evaluate alternative solutions to the problem, select an optimum solution, and complete a design based on their assumptions and evaluations. The experience culminates with a presentation of results in a formal written and oral report and prototype building and testing in some cases.

Course Outcomes

- the ability to design a system, component, or process to meet desired needs.
- the ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
- the ability to select materials and manufacturing processes.
- the ability to think in a logical sequential process.
- an understanding of professional and ethical responsibility.
- the broad education necessary to understand the impact of engineering solutions in a global/societal context.
- a knowledge of computer aided design and simulation software.
- an ability to design and conduct experiments as well as to analyze and interpret data.
- an ability to communicate effectively.
- an understanding of responsibility and accountability.
- a desire to be a professional that exhibits values, dedication and a need for continual improvement.

7. Topics Covered: (in Order of Presentation)

- The Engineering Design Process
- Project Planning and Scheduling
- Static force and stress analysis
- Fatigue analysis
- Manufacturing processes
- Cost estimate
- Contemporary issues
- Report writing
- Oral presentation preparation

8. Class Schedule:

Number of Sessions per week:	2
Duration of each session:	3 hours

9. Contribution of course to meeting the professional component:

This course is required for all mechanical engineering majors.

Engineering Design 4 units

10. Relationship of course to program objectives:

This course relates to the program objectives by contributing to the following measurable outcomes at the level indicated for all engineering graduates:

Knowledge outcomes:

- an ability to apply knowledge of mathematics, science, and engineering (abet a)
- an understanding of professional and ethical responsibility (abet f)
- the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context (abet h)
- a knowledge of computer aided design and simulation software
- a knowledge of measurement and manufacturing techniques
- a knowledge of how mechanical engineering integrates into inter-disciplinary systems

Skill outcomes:

- an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability (abet c)
- an ability to communicate effectively (abet g)
- an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice (abet k)
- an ability to select materials and manufacturing processes
- an ability to visualize designs from engineering drawings
- an ability to think in a logical sequential process

Attitudes Outcome:

- an understanding of responsibility and accountability
- a desire to be a professional that exhibits values, dedication and a need for continual improvement
- a desire to be a flexible and adaptable team player (collaborative attitude)

11. Prepared by: Lih-Min Hsia 05/2005