ME 4444 SENIOR DESIGN PROJECT

2007 Catalog Data: ME 4444. Senior Design Project. Lec. 2. Lab. 4. Credit 4. Prerequisites: ME 3910; ME 4751; and either: ME 4020 as a prerequisite with ME 4720 as a corequisite, or ME 4720 as a prerequisite with ME 4020 as a corequisite. Capstone group design project in mechanical engineering and FE exam review.

Prerequisites, by Topic:

1. Introduction to design methodology
2. Basic measurement theory and techniques
3. Mechanical systems analysis methods
4. Energy systems analysis methods
5. Optimization

Textbook and Resources: Fundamentals of Engineering Design, Hyman
Engineering Experimentation, Wheeler and Ganji
Class notes

Course Objectives: This course provides the student with a capstone experience in the use of mechanical engineering design for the solution of engineering problems. Students work in a team format on selected mechanical engineering projects emphasizing both mechanical systems and thermal science design aspects. Important parts of these semester-long design projects are a formal project proposal, design analysis report, engineering drawings, project construction, and project testing. Formal written and oral presentations of results are made at the completion of the project. Time scheduling and project costs are also important considerations. In the first half of the term, students undergo an FE (Fundamentals of Engineering) exam review both to provide a review of basic engineering concepts for the projects and to help students prepare for the FE Exam itself.

Course Topics:

T1. Introduction and overview (3%)
T2. FE Exam Review (15%)
T2. Engineering design (20%)
T3. Computer-based data acquisition systems (10%)
T4. Programmable logic controllers (7%)
T5. Student projects (45%)

Class/Lab Schedule: Two 55-minute class sessions, two 55-min and one 110-minute labs per week; total equivalent 56 class sessions/semester

Course Outcomes: Upon completion of this class, the student will be able to:

C1. Engage in the various elements of the engineering design process [c,f,g,h,I,k]
C2. Complete a group-based, hands-on, capstone design project [a,b,c,d,e,f,g,h,j,k,l]
C3. Employ basic computer-based data acquisition and PLCs[a,k]

And have gained experience with and/or exposure to:

C4. FE Exam-type material and questions [a]
C5. Working in a team environment on an engineering design project [c,d,g,i]
C6. The impact of engineering design on ethical and societal concerns [f,h,i]
C7. Preparation and delivery of a written and oral reports [b,d,g]
C8. Communication with a variety of "nonacademic" contacts [c,d,g]

Professional Component: This course is required of all Mechanical Engineering students as the major (culminating) design experience in their course of study in Mechanical Engineering. It involves the integration of foundational course material within an applied design context and in a team environment.

Contribution of Course to Meeting the Professional Component:

Math and Basic Science:
General Education:

Engineering: 4 credit hours. This course contains significant design.
Other:

Relation to Program Objectives: This course goes beyond the presentation of basic "analytical" skills, to incorporate experience in critical thinking (integration of analytical skills, quantitative and qualitative evaluation of alternatives) and communication (written/oral presentations, location and acquisition of information through direct contact with external sources/individuals). As a consequence, students who successfully complete this class should be more comfortable, confident and productive when engaged in career activities that involve: self-education, teamwork, and interaction with engineering and non-engineering communities and individuals. The FE exam review serves to prepare the students for the actual FE Exam and encourages them to take this first step down the path to professional registration.

Course Coordinator: Undergraduate Program Committee

Prepared by: Darrell Hoy **Date:** 1-15-08