Course Outline

DEN 398 Introduction to Finite Element Analysis

Course Description

The course goals will be met by students through reading of the course notes, and through hands-on applications using commercially-available FEA software which will be provided to the students.

Course Learning Objectives

The course is meant to provide the following services to the student:

- Demonstrate the nature of finite element approximation, as a tool for problems in science and engineering
- Demonstrate the underlying philosophy of FEA
- Produce familiarity in the student, with the commercially-available FEA software ANSYS
- Produce in the student a healthy appreciation for possible errors in FEA, along with an understanding of means of verification of results, and knowledge of good practices to limit error and produce useful results in a timely manner

Course Schedule

This course will be taught in six modules

Module	Topic	Description
1	Introduction	A basic not-very-technical introduction
2	Details of the Method	A complete start-to-finish example (used to demonstrate the overall steps of the method)
3	Introduction to ANSYS	An introduction to commercially-available software (specifically, ANSYS)
4	The Fundamental Assumption of FEA	More advanced topics in element generation, especially interpolation
5	Additional ANSYS Capabilities	Examples of more complex analyses in the commercial software
6	Practical Advice	Good practices and common mistakes

It is expected that the total effort required from course participants will be on the order of 20 – 24 hours, with some modules taking longer to complete than other. In particular, the more "practical" modules (numbers 3 and 5) may take longer than others, but they also are the most hands-on. Modules of the course will remain available for review for the duration of the course.

Assignment Schedule

Except for module number 5, each module of the course will be accompanied by a quiz. The module quizzes will be multiple choice, and have 8-10 questions each. At the conclusion of the course, there will be a final exam, as well. Completion of all of the quizzes, and the exam, is required for successful completion of this course.

In addition to quizzes, some modules will have exercises to be completed by the student, using the finite element software ANSYS, a copy of which will be provided as part of the course materials. This software will arrive via postal mail from ASME, on CD format. It is the responsibility of the student to install the software on a computer system which meets the minimum requirements as detailed on the software documentation.

Class Participation

It is to the benefit of the student, to ask questions and to offer opinions. The course as a whole is enhanced by enthusiastic participation. The instructor will encourage participation by arranging the class roster into groups (depending on enrollment numbers,) and pose questions for group discussion. Nevertheless, the instructor believes the students to be adults, and capable of deciding for themselves whether to participate. Thus, there is no weight given to participation, in figuring the students' scores for the course.