# MECH 6353/ 4V95 COMPUTATIONAL MECHANICS. Fall 2012

Instructor:	Dr. Dong Qian, Associate Professor of Mechanical Engineering Office: ECSN 3.206; Tel.: 883-4890; E-mail: dong.qian@utdallas.edu.
Schedule:	MW 5:30-6:45PM
Location:	3.302 GR
Office Hours:	MW 1:30-2:30PM (For other times, please call to make appointments)
Textbook:	<i>Concepts and Applications of Finite Element Analysis</i> by Cook, Malkus, Plesha and Witt, 2002, 4th edition, Wiley.
	In-class handouts
Prerequisites:	MECH 3301 (Mechanics of Materials) for MECH 4V95, MECH 6306 (Continuum Mechanics) for MECH 6353, or equivalent.

### **Course Description**

This course will provide an introduction to the basic concepts of finite element method and the techniques used for stress analysis for mechanical systems design. Simple tutorial to the use of a commercial FEM code will be provided.

#### **Course Objectives**

- 1. Learn the basic principles and formulations of the finite element method.
- 2. Solve practical engineering problems using commercial finite element code.
- 3. Develop the ability to write a simple 2D finite element code (for graduate students only) for analysis.
- 4. Understand the implication of FEM analysis results for engineering design.

## **Course Outline (subjected to change)**

• Introduction to the concept of finite element method; review of matrix algebra and basic elasticity theory. (3)

- Bar and beam elements. Local and global stiffness equation (4)
- Energy principles, Rayleigh-Ritz Method, and interpolations. (4)
- 2D plane problems and isoparametric elements. (4)
- Finite element solution techniques (3)
- Plate and shells (2)
- 3D solid elements (2)
- Structural vibration and dynamic analysis (4)
- Computer lab sessions (3-4)

#### **Course load:**

- Seven Homework assignments (35% of total grade). Regular homework due 1 week after day assigned. Computer homework due 2 weeks after day assigned. Late submission will not be graded.
- Midterm exam (close book, 30%)

- Final project (open book, 35%, Graduate students will be assigned with different projects that requires programming).
- **Special Needs:** If you have any special needs related to your participation in this course, including identified visual impairment, hearing impairment, physical impairment, communication disorder, and/or specific learning disability that may influence your performance in this course, you should meet with the instructor to arrange for reasonable provisions to ensure an equitable opportunity to meet all the requirements of this course. At the discretion of the instructor, some accommodations may require prior approval by Disability Services.
- **Policy on academic dishonesty:** Academic dishonesty is a serious matter and will be dealt with as provided for in the student code of conduct by University of Texas.