

Mechanical and Aerospace Engineering  
MAE 6040  
Continuum Mechanics and Elasticity

Syllabus

**Course Description**

Fundamentals needed to model our engineering and natural system as continuous body will be covered, including the concepts of stress, strain, constitutive relations, field equations, and boundary conditions. This course provides a uniform treatment and holistic view for the mathematical fundamentals for fluid mechanics and solid mechanics.

**Prerequisites: MAE 3040/CEE 3010**

**Textbook:** *An Introduction to Continuum Mechanics with Applications*, by J. N. Reddy, Cambridge University Press, 2008 (ISBN #978-0-521-87044-3).

**Course Objectives**

Epistemologically, our objective is to learn how to formulate problems in mechanics and how to reduce vague questions and ideas into precise mathematical statements, as well as to cultivate a habit of questioning, analyzing, designing, and inventing in engineering and science.

**Topics Covered**

1. Introduction to continuum mechanics (Chapter 1);
2. Vectors and tensors (Chapter 2);
3. Kinematics of continua (Chapter 3);
4. Concept of stress (Chapter 4);
5. Conservation of mass, momenta, and energy (Chapter 5);
6. Constitutive equations (Chapter 6);
7. Linear elasticity (Chapter 7);
8. Fluid mechanics and heat transfer (Chapter 8)
9. Linear Viscoelasticity (Chapter 9)

**Class Schedule**

Three 50 minute lectures, M-W-F