

CE 231 / MSE 211 – Mechanics of Solids

Instructor: Prof. Sanjay Govindjee, 709 Davis Hall, E-mail: sanjay@ce.berkeley.edu.
Office Hours: MF 2-3, W 1-2.

GSI: Tarek Elkhoraibi

Web: <http://www.ce.berkeley.edu/~sanjay/ce231mse211>

Required Textbook: (first third of course) [KDH] Fundamentals of Structural Mechanics by Keith D. Hjelmstad, 2nd Edition. For the later two-thirds of the course there will be no text book.

Conduct of Course: Homework will be assigned weekly and due the following the week.

There will be one midterm examination and a final exam; both take home.

Course grade is based on: Homework 30%, Midterm 30%, Final 40%.

Extremely Rough Outline:

1. Introduction
2. Mathematical Preliminaries
 - (a) Scalars, Vectors, and Tensors
 - (b) Basic Tensor Calculus
3. Kinematics
 - (a) Meaningful Ways of Describing Deformation
 - (b) Finite Measures of Strain
 - (c) Infinitesimal Measures of Strain
 - (d) Interpretation of Strain Tensors
4. Balance of Momenta
 - (a) Introduction to Stress
 - (b) Cauchy's Theorem
 - (c) Interpretation of Stress Tensors

5. Constitutive Response 1-D
 - (a) Elasticity
 - (b) Viscoelasticity
 - (c) Plasticity
 - (d) Solving 1-D problems
6. Constitutive Response 3-D
 - (a) Elasticity
 - (b) Viscoelasticity
 - (c) Plasticity
 - (d) The Structure of 3-D Problems
7. Classical Methods of Solution
 - (a) Circular and Non-Circular Torsion
 - (b) Airy Stress Function Techniques
 - (c) Michell's Solution Method
8. Selected Topics of Interest to the Class