

CE 560: ADVANCED MECHANICS OF MATERIALS

Fall 2016

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Objectives: To bridge the gap between undergraduate solid mechanics and more theoretical solid mechanics by re-examining the fundamental concepts of stress, strain, and their interaction in common engineering solids, and investigate the fundamentals of continuum mechanics.

Textbooks:

1. Advanced Mechanics of Materials and Applied Elasticity, Ugural, 5th edition.
2. Div, Grad, Curl and all that, Shey, 4th Edition.

Grading: Although this will be variable, you will guarantee a given grade by compiling “traditional” averages, i.e. A-/A: 90-100 %, B-/B+: 80-89 %, C-/C+: 70-79 %, etc. After both exams, I will try to let you know where you stand in terms of overall exam average.

Grading will be based on the following algorithm:

1. Homework: 15 %
2. Two Exams: 55 %
3. Final: 30 %

The two exams will be given approximately 1/3 and 2/3 of the way through the semester, likely on Fridays. I will give you at least one week notice.

TOPICS

1. Stress
2. Strain
3. Constitutive Theory
4. Work and Energy
5. Fundamental Principles of Elasticity
6. Applications to Torsion Problems
7. Applications to Beams
8. Theory of Plates
9. Elastic Instability
10. Vector Algebra and Tensors (when needed)

COMMENTS

1. Do not get behind in your study of the notes and the references. I require that you recopy your notes after each class, making sure you understand each step.

2. Completion of the homework is a very important way to get immersed in this subject. I grade mostly on effort: a well-presented, neat, clearly reasoned attempt will be given full credit. Use any resource available to you but make sure the work you turn in is understood and is yours. You will typically have one week to do each assignment. Please use pencil on one side of engineering paper and follow other departmental norms.
3. Make an attempt to participate in class by asking questions and answering those posed by the instructor.
4. We will be doing a small amount of computational work using MATLAB and/or MAPLE. I will give help if you need it.