Syllabus for MECH 2322 Mechanics of Materials
Spring 2016

Overview
Mechanics of materials, a.k.a. strength of materials, is one of the fundamental classes in mechanical engineering curriculums. The overall goal of this course is to develop an understanding of the mechanical behavior of structures under different types of loading conditions. The main focus is to mathematically model and determine 1) the stresses and 2) the deformations in a deformable body under load. A significant percentage of mechanical engineers will work primarily on component and system designs, utilizing the concepts learnt in this course. The ability to determine the size and shape of parts to ensure that the stresses and/or deformations do not approach or exceed the load carrying capacity of the material is a very important aspect for a design engineer. Therefore, the ability to calculate stresses, strains and deformations in simple structural elements is essential, and will be learnt in this course.

The following load types will be learnt: axial, shear, torsion, flexure (beam) and simple combinations of these load types, column buckling and other more specialized load types.

Course Information
Instructor: Yirong Lin, Ph.D.
Email: ylin3@utep.edu
Office Hours: TRs 2 to 3 pm
Office: Engineering Annex, A-111
Prerequisites: MECH 1321 or CE 23 Statics with a C or better
Meeting Times: T, TH 4:30-5:50 pm, BUNS 313

Course Objectives
At the end of this class the typical students should be well prepared in the following areas:

1. Identify and solve basic axial, shear, torsion and beam bending stress analysis and deflection problems.
2. Solve simple combined loading stress analysis and deflection problems.
3. Have a good understanding of stress and strain components, stress transformation in 2D and 3D.
4. Solve statically indeterminate problems
5. Column buckling
6. Ability to resolve internal tractions(stresses) with properly chosen F.B.D.s

Course Policies
Grading: The grade in this class will be based on 3 midterm exams during the semester, 3 quizzes, and 1 final project. The grade will be computed as follows:

Final grade calculation:

Final Score = 0.2 Quizzes + 0.5 Midterm Exams + 0.3 Project
Tentative division for letter grade is as follows:

- 90 ≤ A ≤ 100
- 75 ≤ B < 90
- 55 ≤ C < 75
- 40 ≤ D < 55
- F < 40

**Exams:** Exams will be announced well in advance so that there is no excuse for missing an exam. There will be three midterm exams and a final. **There will be no make-up exams given!**

**Quiz:** Quizzes will be assigned on Mastering Engineering, and students are expected to solve them and submit during the specified time outside of class. **There will be no make-up quizzes given!**

**Homework:** 8-10 Optional Homework problem sets will be assigned be assigned as practice problems. These will be not be graded.

The trick to doing well in this class is to do many problems; there really is no other way to do well. Also, you need to focus on understanding the fundamental concepts in solving the homework and not just rote memorization of the particular problems approach.

1. Chapter 1: Stress
   Hibbeler 1.2, 1.3, 1.4, 1.5, 1.6
2. Chapter 2: Strain
   Hibbeler 2.1, 2.2
3. Chapter 3: Materials
   Hibbeler 3.1, 3.2, 3.4, 3.6, 3.7
4. Chapter 4: Axial
   Hibbeler 4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7
5. Chapter 5: Torsion
   Hibbeler 5.1, 5.2, 5.3, 5.4, 5.5
6. Chapter 6: Bending
   Hibbeler 6.1, 6.2, 6.3, 6.4, 6.5
7. Chapter 7: Transverse shear in bending
   Hibbeler 7.1, 7.2, 7.3
8. Chapter 8: Combined loading
   Hibbeler 8.1, 8.2

**Tentative Exam Dates (exact dates will be announced on Blackboard during the semester):**

**Quiz:** Quiz 1 (02/16/16), Quiz 2 (03/15/16), Quiz 3 (04/14/16)

**Exam:** Exam 1 (02/18/16), Exam 2 (03/17/16), Exam 3 (04/19/16)

**Project:** 05/03/16.