ME 3464 - Engineering Mechanics II

Syllabus

Professor:

Dr. J. Rasty, Ph.D., PE, MBA

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Course Description:

Analysis of engineering components for determination of stresses, strains, and deformations using classical mechanics approach

Course Purpose/Objectives:

This course is designed to:

- 1. Develop an understanding of the fundamental principles that underlie the study of mechanics of materials (strength of materials) with the objective of applying it to the analysis and design of actual engineering structures and machine components;
- 2. Develop the ability to analyze problems in a simple and logical manner and to apply to their solution a few fundamental and well-understood principles.

Expected Learning Outcomes:	Assessment Methods:	
Upon completion of the course, students will be able to:		
• Analyze deformations, strains, and stresses in engineering components under a variety of external loading conditions such as tension, compression, torsion, pure bending, or any combination of the above	• Exams and Quizzes	
• Determine the necessary size of engineering components under a given operating condition for safe operation given the strength of subject material and the specified factor of safety	• Exams and Quizzes	
• Utilize Mohr's circle for stress and strain calculations	• Exams and Quizzes	
• Perform stress transformations and calculate principal stresses, strains, and principal planes	• Exams and Quizzes	
• Utilize failure theories for design purposes	• Exams and Quizzes	

Course Outline:

Topics addressed in the course include many of the following:

- 1. Concept of Stress
- 2. Stress and Strain Axial Loading
- 3. Torsion
- 4. Pure Bending
- 5. Analysis and Design of Beams for Bending
- 6. Shearing Stresses in Beams and Thin-Walled Members
- 7. Transformations of Stress and Strain
- 8. Design/Deflection of Beams and Shafts
- 9. Buckling of Columns
- 10. Energy Methods (time permitting)

Text:

Mechanics of Materials, 6th Ed. by R.C. Hibbeler, Pearson – Prentice Hall Publishing

Grading:

Homework	15 %	
Exams (2)	40 %	
Quizzes	20 %	
Final	25 %	Final semester grades are based on 10-pt. scale

Class Policies:

- 1. Students are expected to assist in maintaining a classroom environment that is conducive to learning. Inappropriate behavior in the classroom shall result in a request to leave the class.
- 2. All HW must be turned in at the beginning of each class. HW must be performed in pencil and on <u>engineering paper</u>, showing the "Given" (including a diagram), what is "Required" and the "Solution" in separate sections. All work performed in pen, or non-engineering paper or sloppy work will be returned without a grade and will be counted as a missed HW.
- 3. It is the aim of the faculty of Texas Tech University to foster a spirit of complete honesty and a high standard of integrity. The attempt of students to present as their own any work that they have not honestly performed is regarded as a serious offense and renders the offenders liable to serious consequences, possibly suspension.
- 4. There will be no make up opportunities for missed HW or quizzes unless in emergency and documented circumstances well beyond a student's control (hospitalization, death in family, etc.). Job interviews, family vacations, and similar circumstances do not qualify for make up work. Two lowest HW and Quiz grades will be dropped to allow for some flexibility in scheduling your non-emergency activities resulting in missed HW and quizzes.
- 5. Any student who, because of a disability, may require special arrangements in order to meet the course requirements should provide verification by contacting the Student Disability Services office at 335 West Hall or 806-742-2405.