

Syllabus for
ME 321—Mechanics of Materials
3 Credit Hours
Fall 2000

I. COURSE DESCRIPTION

Elastic and inelastic stress-strain behavior of engineering materials, deflection of beams, and column action. Lab experience and design are incorporated into the course.

Prerequisite: EGR 221

Course fee: \$30.

II. COURSE GOALS

The student who successfully completes this course will have a working knowledge of the theory and principles of engineering mechanics as applied to deformable solids; gain a knowledge of stress, strain, torsion, flexural loading, beam deflection, and column theory; and observe theory by means of laboratory experiments and/or demonstrations.

III. COURSE OBJECTIVES

As a result of successfully completing this course, the student will be able to do the following:

- A. describe the basic concepts and laws of mechanics of deformable solids as evidenced by the ability to identify a given description or formulation.
- B. apply the terms, concepts, and laws by solving problems similar to those in the textbook as well as unfamiliar problems using familiar laws and concepts.
- C. use mathematical methods to arrive at laws and principles of mechanics of deformable solids.
- D. apply strain gages and gage instrumentation to obtain meaningful materials data.
- E. approach the learning of a subject in a consistent and disciplined manner, as evidenced by attending class regularly, turning in homework assignments on time, and participating in class discussions, including presenting problem solutions before the class members.

IV. TEXTBOOKS

Hibbeler, R.C. Mechanics of Materials. New Jersey: MacMillan, 3rd Ed., 1997.

V. POLICIES AND PROCEDURES

- A. University Policies and Procedures
 1. Attendance in each class or laboratory is mandatory at Oral Roberts University.
 2. Double cuts will be assessed for absences immediately preceding or following holidays.
 3. Excessive absences can reduce a student's grade or deny credit for the course.
 4. Students taking a late exam because of an unauthorized absence will be charged a late exam fee.

5. Students and faculty at Oral Roberts University adhere to all laws addressing the ethical use of other's materials, whether it is in the form of print, video, multimedia, or computer software.

B. Course Policies and Procedures

1. Grading

Homework and Labs	20%
Exam 1	20%
Exam 2	20%
Exam 3	20%
Final Exam	<u>20%</u>
Total	100%

2. Homework

- a. Homework and lab reports are to be turned in at the beginning of class on the day they are due.
- b. No points will be awarded for late homework and lab reports.

3. Attendance Policy

- a. This policy allows for the missing of some classes in the case of extenuating circumstances such as illness or family tragedy.
- b. The first three absences (excused or unexcused) will result in no grade reduction. Each absence thereafter will result in a 1% reduction in the final score (100% maximum) which determines the grade. Perfect attendance will result in a 1% increase in the final score.
- c. The number of absences allowed prior to grade reduction are designed to accommodate emergencies, illnesses, and so on, and are not designed for indiscriminate use.
- d. Students are expected to be prompt for classes. Two tardies will equal one absence.

VI. COURSE CALENDAR

(Homework problems will be assigned in each class.)

<u>Week</u>		<u>Sections</u>
1	Chapter 1: Stress	1.1 - 1.2 1.3 - 1.5 1.6 - 1.7
2	Chapter 9: Stress Transformation Tensile Lab (SATEC) (Lab No. 1)	9.1 - 9.3 9.4-9.5
3	Chapter 2: Strain	2.1 - 2.2
4	Chapter 10: Strain Transformation Compression Lab (SATEC)	10.1 - 10.3 10.4 - 10.5 10.6
5	Chapter 3: Mechanical Properties of Materials	3.1 - 3.5 3.6 - 3.8
	Exam No. 1: Chapters 1, 2, 9, and 10	
6	Chapter 4: Axial Loads	4.1 - 4.2

	Hardness Lab (Lab No. 3)	4.3 - 4.5 4.6 4.7
7	Chapter 5: Torsion	5.1 - 5.3 5.4 5.5 5.6 - 5.7
8	Chapter 6: Bending Torsion Lab (Lab No. 4)	6.1 - 6.2 6.3 - 6.4 6.5 6.6 - 6.9
9	Chapter 7: Transverse Shear	7.1 - 7.4
10	Exam No. 2: Chapters 3, 4, and 5 Chapter 8: Combined Loads Strain Gage Tensile Lab (Lab No. 5)	8.1 - 8.2
11	Chapter 10: (cont'd)	10.7
	Exam No. 3: Chapters 6, 7, and 8	
12	Chapter 11: Design of Beams and Shafts Bending Lab (Strain Gage) (Lab No. 6)	11.1 - 11.3 11.4
13	Chapter 12: Deflection of Beams and Shafts	12.1 - 12.2 12.3-12.8
14	Chapter 13: Buckling of Columns Buckling Lab (Strain Gage) (Lab No. 7)	13.1-13.3
	Exam No. 4: Chapters 11 and 12	
15	REVIEW	
16	FINAL —Comprehensive	

VII. ASSESSMENT SUMMARY

Dr. Martin

Name of Instructor

ME 321

Course No.

Mechanics of Materials

Title of Course

Engineering and Physics

Name of Department

MISSION

The lifestyle at ORU is rooted in the word "Wholeness." ORU seeks to educate the whole person, with balanced emphasis placed on the development of mind, spirit, and body.

GENERAL OUTCOMES

1. Spiritual Development
2. Physical Development
3. Communication
4. Analysis
5. Problem Solving
6. Valuing in Decision-making
7. Social Interaction
8. Global Perspectives
9. Effective Citizenship
10. Aesthetic Responsiveness

MAJOR OUTCOMES

Analysis/Problem Solving:

Has the ability to analyze, design, and obtain effective solutions to real world engineering and physics problems.

Communication/Team Work:

Demonstrates ability to work on teams and communicate effectively in written and oral forms.

Fundamental Knowledge Base:

Possesses fundamental knowledge of principles of engineering, physical sciences, and mathematics.

Christian Stewardship and Ethics:

Ethically applies engineering technology to the solution of human problems using Christian principles.

COURSE OUTCOMES

Understanding the theory and principles of engineering mechanics as applied to deformable solids.

Gain a knowledge of stress, strain, torsion, flexural, loading, beam deflection, and column theory.

Confirm theory through laboratory experiments.

Gain familiarity with strain gages and strain gage techniques.

Gain hands-on experience on equipment used to determine material properties; Satec Tensile Tester and Acco Hardness Tester.

ASSESSMENT OF COURSE GOALS

STIMULI:

Exams
Quizzes
Class participation
Laboratory experiments and reports

CRITERIA:

See syllabus