

ENGR 2143 Strength of Materials // CRN = 22945

Spring 2008

Department of Engineering and Physics

University of Central Oklahoma

Location	Howell Hall 100
Time	MWF 9:00 - 9:50 a.m.
Instructor	Evan Lemley, Ph.D.; Prof. of Engineering and Physics
Office	Howell Hall 221L
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Phone	(405)974-5473
Office Hours	MWR 1:30 - 2:30 p.m. or by appointment.
Final	W May 7, 2008 from 9:00 - 10:50 a.m.

Course Description

This course provides an introduction to solid mechanics: concepts of stress and strain; mechanical behavior of engineering materials; analysis of bodies under axial, torsional, and flexural loading; and stress, strain and deflections in beams.

Prerequisites

ENGR 2033 Statics

Textbook (Required)

Mechanics of Materials, 4th Edition, Ferdinand P. Beer, E. Russell Johnston, Jr., and John T. DeWolf, McGraw-Hill, 2006.

ISBN: 0-07-298090-7

Objectives

The student shall be able to

1. Calculate the stress and strain in loaded two-force members.
2. Demonstrate understanding of stress and strain diagrams for engineering materials and of the application of Hooke's and Poisson's laws to loaded members.
3. Calculate stresses in axially loaded members.
4. Calculate stresses in torsionally loaded members.
5. Calculate stresses in flexurally loaded members.
6. Calculate shear stresses in loaded members.
7. Use stress and strain transformation theory and Mohr's circle to calculate principle stresses in loaded members.
8. Analyze and design beams and shafts.
9. Calculate deflections of beams and shafts.
10. Demonstrate understanding of the application of energy methods to the analysis of beams and trusses.

Topics

1. Stress Concepts
2. Axial Loading
3. Torsion
4. Pure Bending – Flexure
5. Beam Design
6. Shear Stress in Thin-Walled Members

7. Stress and Strain Transformation
8. Beam Deflections
9. Columns
10. Energy Methods (time permitting)

Calculator

You must own a scientific calculator – see *the list of allowed calculators for exams in the Department of Engineering and Physics*. **Please bring your calculator to class for each meeting.**

Engineering Paper

Engineering Paper -- available from the UCO bookstore, Thompson's Bookstore, and Triangle A&E at Broadway Ext. and 63rd. Please use engineering paper for all homework assignments.

Internet & E-mail

Access to the Internet and ability to send and receive E-mail. If you do not have a computer at home you can use machines on the UCO campus: Look at <http://technology.ucok.edu/support/microcomplab.htm> for a full list of available general use computers on campus.

Note: E-mails directed to the entire class such as class announcements will go to your official UCO e-mail address (the address that ends in *ucok.edu*).

Portable Electronic Devices (including cell phones)

Please turn off any portable electronic devices (esp. cell phones) during class. You may not access any portable electronic device during exams except calculators that are on the approved list for Engineering and Physics courses.

Instruction Techniques

Lecture will be used predominantly although sometimes recitation periods will be employed. Lectures often involve examples and are ***encouraged to be as interactive as possible***.

Class Polices

- Prepare before you arrive in class by reading sections ahead of time.
- Come to class (some lecture info will be placed on the course website – which you should review as well as attend class).
- Take notes.
- Listen carefully.
- Keep background conversation and noise to a minimum in class and lab.
- You are responsible for paying attention to all class announcements and notes. Sometimes the course web-site may not have the latest announcements.
- Attendance is mandatory for all exams or other graded activities (e.g. project competitions or presentations).
- Cheating or academic dishonesty of any kind will not be tolerated.

Homework

Working HW problems in a timely manner is the best way to do well on exams and in the class as a whole. Homework is due at the beginning of the class period on the due-date or due-day. Each HW problem you turn in is worth ten points. Some problems will be graded on detailed solutions and others will be graded on effort. I will ***not*** tell you ahead of time which or how many problems will be graded relative to a detailed solution, but on the returned and graded HW paper a check mark next to the problem number will indicate full effort (or ten points) and a numerical score (e.g. 8/10) next to the problem number will be used on those problems under more scrutiny.

Paper Homework

Homework papers should be folded length-wise with your name written on the outside of the folded pages before turning it in. Each problem should fit all of the following criteria: clearly labeled, **one problem per**

sheet of paper, legible and organized. HW papers that do not fit these criteria will be penalized accordingly. See the following link (http://evan.lemley.org/courses/hwk_format.php) for details on the presentation of HW problems. You may also visit the following site for an electronic version of the homework format requirements:

Electronic Assignments

These may be homework, design projects, or other projects that require an electronic document to be sent to Dr. Lemley. What will need to be turned in will vary, but whatever documents you need to submit should be attached to an e-mail message to Dr. Lemley. File names should be distinct from other students – following is the general format for file names:

date_lname_assignment.ext

where

date =
current date in MMDDYY format

lname =
last name

assignment =
assignment (e.g. hw for a homework, dpr for design project, prg for a programming project)

ext =
file extension that indicates the type of file (e.g. doc for a Word document, program source, xls for a spreadsheet, ppt for a PowerPoint presentation, etc...)

Late Homework/Assignments

Homework is generally due at the **beginning of class**. HW turned in after this time will have 20% deducted per late class period. For example: if a paper is turned in one minute after class begins on the day it is due, 20% will be deducted. If it is turned in one minute before the next class meeting time after the assignment is due, 20% will also be deducted. Dr. Lemley will check e-mail just before class – any electronic assignment must be received by the due date/time, or 20% will be deducted.

Project

There will be a Design Project in this course which will constitute a significant portion of your grade. More information will be given to you at the time the project assignment is made.

Grading Policies

The following table shows the breakdown of credit for the course.

HW and Misc.	15%
Exams (x3)	10%
Project	25%
Final Exam	30%
Total	100%

Tentative Grading Scale

90-100% -- A, 80-90% -- B, 70-80% -- C, 60-70% -- D, <60% -- F

Final Exam Policy and Exam Attendance

The final exam in this course will be comprehensive and will take place as shown in the tentative schedule included in the syllabus. In the case that a student scores higher on the final exam than their lowest

regular exam, the lowest regular exam score will be replaced by the final exam score. In no event will the final exam score be discarded. Attendance for all exams is required unless an event beyond the student's control intercedes. A missed exam may be excused if the student notifies the instructor as soon as possible (before the exam occurs if possible). Official notification of the reason for the missed exam should be sent via e-mail.

STUDENT INFORMATION SHEET / SYLLABUS ATTACHMENT

See separate handout or go to:

<http://www.busn.ucok.edu/academicaffairs/FORMS/Student%20Information%20SheetSPR07.pdf>

ENGR 2143 Tentative Schedule for Spring 2008			
Week	Date	Day	Sections Covered
1	14Jan2008	Mon	Intro + 1.1 – 1.4
	16Jan2008	Wed	1.5 – 1.7
	18Jan2008	Fri	1.8 – 1.10
2	21Jan2008	Mon	NO CLASS – MLK Day
	23Jan2008	Wed	1.11 – 1.13
	25Jan2008	Fri	2.1 – 2.6
3	28Jan2008	Mon	2.7 – 2.9
	30Jan2008	Wed	2.10 – 2.11
	01Feb2008	Fri	2.12 – 2.15
4	04Feb2008	Mon	2.17 – 2.19
	06Feb2008	Wed	3.1 – 3.3
	08Feb2008	Fri	3.4 – 3.6
5	11Feb2008	Mon	Exam 1
	13Feb2008	Wed	3.7 – 3.8
	15Feb2008	Fri	3.12 – 3.13
6	18Feb2008	Mon	4.1 – 4.3
	20Feb2008	Wed	4.4 – 4.5
	22Feb2008	Fri	4.6 – 4.7
7	25Feb2008	Mon	4.12 – 4.14
	27Feb2008	Wed	5.1 – 5.3
	29Feb2008	Fri	5.4 – 5.6
8	03Mar2008	Mon	6.1 – 6.3
	05Mar2008	Wed	6.4 – 6.5
	07Mar2008	Fri	Exam 2
9	10Mar2008	Mon	6.6 – 6.7
	12Mar2008	Wed	6.9
	14Mar2008	Fri	7.1 – 7.2
10	17Mar2008	Mon	NO CLASS – SPRING BREAK
	19Mar2008	Wed	NO CLASS – SPRING BREAK
	21Mar2008	Fri	NO CLASS – SPRING BREAK
11	24Mar2008	Mon	7.2 – 7.4
	26Mar2008	Wed	7.5 – 7.6
	28Mar2008	Fri	7.9
12	31Mar2008	Mon	7.10 – 7.13
	02Apr2008	Wed	9.1 – 9.3
	04Apr2008	Fri	9.4 – 9.5 (Last Day to Drop)
13	07Apr2008	Mon	9.7 – 9.8
	09Apr2008	Wed	9.9 – 9.11
	11Apr2008	Fri	9.12 – 9.13
14	14Apr2008	Mon	Exam 3
	16Apr2008	Wed	10.1 – 10.3
	18Apr2008	Fri	10.3
15	21Apr2008	Mon	10.4 – 10.5
	23Apr2008	Wed	10.6 – 10.7
	25Apr2008	Fri	11.1 – 11.3
16	28Apr2008	Mon	11.4 – 11.5
	30Apr2008	Wed	11.7 – 11.9
	02May2008	Fri	11.10
17	07May2008	Wed	FINAL – 9:00 – 10:50 a.m. HOH 100