ENGR 2143 Strength of Materials
Spring 2009
Department of Engineering and Physics
University of Central Oklahoma

Location	Howell Hall 101
Time	MWF 9:00 - 9:50 a.m.
Instructor	Evan Lemley, Ph.D.; Prof. of Engineering and Physics
Office	Howell Hall 221L
Web	http://evan.lemley.org
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Phone	(405)974-5473
Office Hours	MTW 10:00 – 11:00 a.m. or by appointment.
Final	W May 6, 2008 from 11:00 a.m. - 12:50 p.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, 5th Edition, Ferdinand P. Beer, E. Russell Johnston, Jr., John T. DeWolf, and David F. Mazurek, McGraw-Hill, 2008.
ISBN: 978-0-07-352938-7

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 tosionally 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 *uco.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). Attendance in lecture sessions is **very strongly recommended and VVVVI**. This is not the only one way you learn, but come prepared for the session and you will learn as much as possible.
- 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 (see Code of Student Conduct – http://www.uco.edu/ssvp/conduct/New%20Conduct%20Documents/CSC(2007-2008).htm)

Errors

It is possible given the amount of information covered that the instructor may occasionally make a mistake in a lecture or there will be either a poorly grasped or poorly explained topic. The instructor will attempt at the earliest possible opportunity to either correct the mistake or issue a different of better explanation of a particular topic.

Homework/Team Design Project/Programming Projects

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 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 programming projects. 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_assignment_lname.ext

where

date =
current date in MMDDYY format

assignment =
assignment (e.g. *hwk* for a homework & *dpr* for design project)

lname =
last name

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

For example if your last name is Jones, you have completed an assignment called design project 1, you are submitting on 09/12/07, and you are submitting a report (a MS Word document for example) about the project , then your filename needs to be:

091207_dpr1_jones.doc

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 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

Go to: http://www.uco.edu/academicaffairs/FORMS/StudentInfoSheet.pdf

DISABILITY SUPPORT SERVICES

http://www.ucok.edu/disability_support/

ENGR 2143 Tentative Schedule for Spring 2009			
Week	***Date***	***Day***	***Sections Covered***
1	12Jan2009	Mon	Intro + 1.1 – 1.4
	14Jan2009	Wed	1.5 – 1.7
	16Jan2009	Fri	1.8 – 1.10
2	19Jan2009	Mon	**NO CLASS – MLK Day**
	21Jan2009	Wed	1.11 – 1.13
	23Jan2009	Fri	2.1 – 2.6
3	26Jan2009	Mon	2.1 – 2.6
	28Jan2009	Wed	**Ice Storm**
	30Jan2009	Fri	2.7 – 2.9
4	02Feb2009	Mon	2.10 – 2.11
	04Feb2009	Wed	2.12 – 2.15
	06Feb2009	Fri	2.17 – 2.19
5	09Feb2009	Mon	3.1 – 3.3
	11Feb2009	Wed	3.4 – 3.6
	13Feb2009	Fri	3.7 – 3.8
6	16Feb2009	Mon	***Exam 1***
	18Feb2009	Wed	3.12 – 3.13
	20Feb2009	Fri	4.1 – 4.3
7	23Feb2009	Mon	4.4 – 4.5
	25Feb2009	Wed	4.6 – 4.7
	27Feb2009	Fri	4.12 – 4.14
8	02Mar2009	Mon	5.1 – 5.3
	04Mar2009	Wed	5.4 – 5.6
	06Mar2009	Fri	6.1 – 6.3
9	09Mar2009	Mon	6.4 – 6.5
	11Mar2009	Wed	6.6 – 6.7
	13Mar2009	Fri	6.9
10	16Mar2009	Mon	**NO CLASS – SPRING BREAK**
	18Mar2009	Wed	**NO CLASS – SPRING BREAK**
	20Mar2009	Fri	**NO CLASS – SPRING BREAK**
11	23Mar2009	Mon	7.1 – 7.2
	25Mar2009	Wed	***Exam 2***
	27Mar2009	Fri	7.2 – 7.4
12	30Mar2009	Mon	7.5 – 7.6
	01Apr2009	Wed	7.9
	03Apr2009	**Fri**	**7.10 – 7.13 (Last Day to Drop)**
13	06Apr2009	Mon	9.1 – 9.3
	08Apr2009	Wed	9.4 – 9.5
	10Apr2009	Fri	9.7 – 9.8
14	13Apr2009	Mon	9.9 – 9.11
	15Apr2009	Wed	9.12 – 9.13
	17Apr2009	Fri	10.1 – 10.3
15	20Apr2009	Mon	10.3
	22Apr2009	Wed	10.4 – 10.5
	24Apr2009	Fri	***Exam 3***
16	27Apr2009	Mon	10.6 – 10.7
	29Apr2009	Wed	11.1 – 11.3
	01May2009	Fri	11.4 – 11.5
17	06May2009	Wed	***FINAL – 11:00 a.m. – 12:50 p.m. HOH 101***