

Southern Polytechnic State University
ENGR 3131 - Strength of Materials
Course Syllabus –Fall 2012

Course Description

Simple states of stress and strain; Hook's law; torsional stresses; axial deformation; internal forces in beams; bending and shearing diagrams and stresses; beam design; stress transformation; beam deflection.

Instructor:

Wasim Barham, Ph.D.

Assistant Professor

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Office Hours: Monday : 11:00am – 12:00 pm

Wednesday: 10:00 am – 12:00 pm

Thursday: 3:00 pm – 5:00 pm

Other times (By appointment – Walk in- Email me or Call me!!!)

Class Time and Location:

Lecture: Monday and Wednesday: 1:00pm - 2:15pm

Textbook (Required):

Mechanics of Materials, 8th Edition, Hibbeler, 2010

ISBN-10: 0136022308

ISBN-13: 978-0136022305ISBN

Prerequisite:

ENGR 2214, MATH 2254 (Students must register for a lab ENGR 3132 with ENGR 3131)

Learning Outcomes:

The student, upon completion of this course, will be able to:

- 1- Calculate stress, strain, and deformation for basic geometries subjected to axial, torsional, bending, and transverse loading.
- 2- Utilize the stress-strain diagrams for determining the mechanical properties of various materials.
- 3- Analyze simple indeterminate members subjected to axial loading by using equilibrium and compatibility equations
- 4- Draw shear and bending moment diagrams and write beam equilibrium equations.
- 5- Design and analysis of determinate beams under bending
- 6- Calculate stresses resulting from combined loads
- 7- Use the stress transformation equations and Mohr's circle to calculate the principal stresses and the max in-plane shear stress for plane stress.

Course Outcome Measures and Assessment:

Measures and assessment of the outcomes will be made by:

- 1- Periodic homework assignments and quizzes .
- 2- Three one hour exams during the semester.
- 3- One 2-hour final exam.
- 4- Course and instructor evaluation at the end of the semester to provide student feedback on the quality of the course and effectiveness of the instructor.

Grading:

1. First exam (mid September)	15.0 %
2. Second exam (mid October)	15.0 %
3. Third exam (mid November)	15.0 %
4. Homework and quizzes	20.0 %
5. Attendance	5.0 %
6. Final exam (during finals week)	30.0 %

The Grading Scale is as follows:

90.0 % and up = A

77.0-89.0% = B

64.0-76.0% = C

52.0-63.0% = D

0.0 - 51.0% = F

- Late homework will NOT be accepted for credit. Work turned in late may be evaluated to provide you with feedback, but will not be graded / given credit except in cases of documented emergency.

Homework Preparation Guideline:

- Homework must be submitted on engineering calculation sheets and must be bounded or stapled

Class and lab Attendance Policy:

“ ... *The instructor may reduce the course grade of any student who fails to meet the attendance requirements as set forth in the instructor’s attendance policy. Students should understand they are responsible for all course material covered and that they are responsible for the academic consequences of their absences.*” (SPSU Student’s handbook)

Class attendance policy

# of Absence	0 - 3	More than 3
Point Deduction	0	1.5 points per absence

Disruptive Behavior and Academic Dishonesty

A faculty member reserves the right to remove any student from his or her course if the student’s behavior is of a disruptive nature or where there is evidence of academic dishonesty. In instances of disruptive behavior and/or academic dishonesty, the faculty member will discuss the circumstances with the student(s) before taking final action. In the event the student cannot be reached, he/she will be given the grade of "Incomplete" until such time as he/she can be reached. The student shall have the right of appeal of the faculty member’s decision first to the faculty member’s department head and then to the appropriate college or school dean and, if necessary, to the Vice President for Academic Affairs. Removal of a student from a course under this provision will result in the faculty member’s issuing a grade of "F". A grade of "F" issued under these circumstances shall not be superseded by a voluntary withdrawal and will be included in the student’s cumulative grade point average calculated for graduation purposes. (SPSU Student’s Handbook)

<u>WEEK</u>	<u>DATE</u>	<u>TOPIC</u>	<u>CHAPTER</u>
1	8/13	Introduction	1.1 and 1.2
2	8/20	Normal Stress, Shear Stresses, Stresses on Inclined Planes Allowable Stresses, Bearing Stress	1.3-1.5 1.6
3	8/27	Design of Axial & Shear Members Normal & Shear Strain	1.7 2.1-2.2
4	9/03	Mechanical Properties of Materials	3.1-3.7
5	9/10	Mechanical Properties of Materials Axial Deformation due to Loads Thermal Stress & Strain	3.1-3.7 4.1-4.5 4.6
6	9/17	Axial Deformation due to Loads Thermal Stress & Strain	4.1-4.5 4.6
First Exam			
7	9/24	Torsional Stress & Strain Shear and Moments using Equations	5.1-5.5 6.1
8	10/01	Shear and Moments using Relationships	6.2
9	10/8	Flexural Stresses	6.4
10	10/15	Composite Beams	6.6-6.7
Second Exam			
11	10/22	Beam Design Problems Beam Shear Stresses	11.1,2 7.1-7.4
12	10/29	Beam Shear Stresses	7.1-7.4
13	11/05	Combined Stresses	8
Third Exam			
14	11/12	Plane Stress Transformations Principal Stresses & Maximum Shear Stresses	9.1-9.2 9.3
15	11/19	Mohr's Circle	9.4
16	11/26	Mohr's Circle Column Buckling	13.1-13.4 13.1-13.4
	12/03	Final Exam	