

SUNY Orange SYLLABUS

DEPARTMENT OF SCIENCE AND ENGINEERING

53290 – Introduction to Solid Mechanics

3 cr. (Spring)

Analysis of stress and strain due to axial, torsional, thermal and flexural loads; elastic deformation and buckling applied to beams, shafts and columns. The course will address statically determinate and indeterminate problems. The concepts of principal stresses, principal strains and Mohr's Circle will be presented as well as shear and moment diagrams.

Prerequisite: Mechanics I (53201), Calculus III (38207)

TEXT AND MATERIALS:

This course will cover the topics presented in the text: F. Beer Johnson & De Wolf Mechanics of Materials, Fifth Edition (New York: McGraw-Hill, 2002) [ISBN 0-07248673-2]. The student will also need a programmable calculator (suggested: HP 48G+, or an HP 49) and access to Excel.

RELATIONSHIP TO PROGRAMS:

Introduction to Solid Mechanics is a professional course specifically designed as an engineering elective for the A.S. Engineering Science major. It is not recommended as an elective for any other students.

COURSE OBJECTIVES:

The student who successfully completes this course can:

- analyze stresses and strains in various loading conditions.
- apply mathematical analysis to deformation and buckling conditions to beams.
- analyze the factors in stressing shafts and columns.
- design beams for various loading conditions.
- apply energy methods to the problems of solid mechanics.
- model and solve the problems of Solid Mechanics using a spreadsheet (Excel).

GRADING SYSTEM:

The grading for this course will be determined as follows

Exam # 1 --	20 %
Exam # 2 --	20 %
Exam # 3 --	20 %
Final Exam --	20 %
Computer Projects --	20 %

ALL CLASS ASSIGNMENTS (HOMEWORK SETS & LAB REPORTS) WILL BE DUE AS ANNOUNCED BY THE INSTRUCTOR IN CLASS. NO LATE ASSIGNMENTS WILL BE ACCEPTED.

INSTRUCTOR OFFICE HOURS: -- TBA

ATTENDANCE AND WITHDRAWAL:

Perfect attendance is simply assumed in this course. Without such attendance and dedication to the homework one will not be successful in the engineering course. The student's grade will reflect any lack of attendance, simply because of the difficulty of the material. It is the student's responsibility to speak with the instructor and withdraw from the course if things are not going well. The instructor will **not** initiate the withdrawal. An early consult with the instructor can save a great deal of later confusion.

SUPPORT SERVICES:

Tutoring services are available in the Library. There is also tutoring available in the Mathematics Study Lounge in Ha 311. Working together in the Physical Science Study Lounge (Harriman 315) has proven a valuable resource for students, assisting each other in reviewing the material, and working together solving homework problems. This strategy, used correctly, can be of great assistance to you. Take advantage of it.

There are services available for students with disabilities. Any such conditions should be communicated privately to the instructor on the first day of class so that any necessary special arrangements or accommodations can be made.

NOTE REGARDING CLASS SYLLABUS

The following weekly lecture schedule should be viewed as tentative to the extent that some adjustments may seem advisable as the course progresses.

A detailed syllabus with HW assignments is distributed during the first class meeting.

SYLLABUS

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WEEK	TOPIC
1.	Concepts of Stress
2.	Stress and Strain
3.	Determinant and Indeterminate Problems
4.	Thermal Stress, Poissons Ratio, Composites
5.	Torsion
6.	Pure Bending
7.	Composites and Concrete Beams
8.	Analysis and Design of Beams, V and M Diagrams
9.	Unsymmetric Bending
10.	Shear Stresses in Beams
11.	Deflection of Beams
12.	Column Stability and Buckling
13.	Transformations of Stress and Strain
14.	Principal Stresses and Mohr's Circle
15.	Energy Methods