

## COURSE OUTLINE

Revision: Mike Steffancin, February 2008

DEPARTMENT:	Academic Programs
CURRICULUM:	Engineering
COURSE TITLE:	Mechanics of Materials
COURSE NUMBER:	ENGR& 225
TYPE OF COURSE:	Academic Transfer
COURSE LENGTH:	1 quarter
CREDIT HOURS:	5
LECTURE HOURS:	55
LAB HOURS:	0
CLASS SIZE:	25
PREREQUISITES:	ENGR& 214 and MATH& 152

## COURSE DESCRIPTION:

Basic relationships between axial, torsion, bending and shear loads acting on solid elements such as rods, shafts, columns, and beams and their allowable stress, strains and deformations. Mohr's circle of stress.

## STUDENT LEARNING OUTCOMES ADDRESSED:

1. Critical Thinking and Problem-Solving – Analyze and apply principles of engineering mechanics.
2. Computation – Utilize calculus to solve engineering problems.
3. Technology – Use current data/information in engineering mechanics.
4. Information Literacy – Access and use information from variety of resources/data.
5. Personal Responsibility – Take pride and value in own work.

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#### GENERAL COURSE OBJECTIVES:

At the end of the course the student will be able to:

1. Acquire knowledge in relations between externally applied loads and their internal effect on bodies.
2. State the definitions of normal stress, strain, Poisson's ratio, modulus of elasticity, proportional limit, elastic limit, yield point, homogeneous, and linearly elastic material.
3. Construct force-deformation and stress-strain diagram from a given set of data points as obtained from a laboratory experiment.
4. Determine shearing stresses, angular deflection and strains on circular torsion members.
5. Write shear and bending-moment equations, and draw shear and bending-moment diagrams for beams loaded with concentrated and/or uniformly distributed loads.
6. Explain how the flexure stress is distributed over a cross-sectional area of a beam. Calculate the maximum tensile flexure stress and state where they occur.
7. Calculate the maximum horizontal or vertical shear stress in a given beam and state where it occurs.
8. Determine the principal stressed and maximum shear stress in a given beam and where they occur.
9. Determine the lateral deflections of long slender beams by the method of integration, and superposition.
10. Analyze the effect of combined loads on machine members.

#### TOPICAL OUTLINE:

#### APPROX. HOURS

I. Simple Stress	6
II. Simple Strain	4
III. Mechanical Properties of Materials	5
IV. Axial Load	5
V. Torsion	5
VI. Bending	5
VII. Transverse Shear	3
VIII. Design of Beams and Shafts	5
IX. Deflection of Beams and Shafts	5

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TOPICAL OUTLINE: (cont.)	APPROX. HOURS
X. Combined Loading	2
XI. Stress Transformation and Mohr's circle	5
XII. Columns	5
Total hours	55

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ENGR& 225

Course Prefix and Number: ENGR& 225

Course Title: Mechanics of Materials

SLO #	Included in Course Objective Number	SSCC Student Learning Outcomes
SLO 1.1	1-10	Communication - Read and listen actively
SLO 1.2		Communication - Speak and write effectively
SLO 2.1	1-10	Computation - Use mathematical operations
SLO 2.2	1-10	Computation - Apply quantitative skills
SLO 2.3	1-10	Computation - Identify, interpret, and utilize higher level mathematical and cognitive skills
SLO 3.1		Human Relations - Use social interactive skills to work in groups effectively
SLO 3.2		Human Relations - Recognize the diversity of cultural influences and values
SLO 4.1	1-10	Critical Thinking and Problem Solving -
SLO 5.1		Technology - Select and use appropriate technological tools
SLO 6.1		Personal Responsibility - Be motivated and able to continue learning and adapt to change
SLO 6.2		Personal Responsibility - Value one's own skills, abilities, ideas and art
SLO 6.3		Personal Responsibility - Take pride in one's work
SLO 6.4		Personal Responsibility - Manage personal health and safety
SLO 6.5		Personal Responsibility - Be aware of civic and environmental issues
SLO 7.1	1-10	Information Literacy - Access and evaluate information
SLO 7.2	1-10	Information Literacy - Use information to achieve personal, academic, and career goals, as well as to participate in a democratic society

PREPARED BY: Mike Steffancin  
DATE: May 2008