Inver Hills Community College

ENGR 2024: Mechanics of Materials

A. COURSE DESCRIPTION

Credits: 3

Lecture Hours/Week: 3

Lab Hours/Week: *.*

OJT Hours/Week: *.*

Prerequisites:
This course requires the following prerequisite
ENGR 2020 - Statics

Corequisites: None

MnTC Goals: None

Provides a foundation in deformable body mechanics and strength of materials. Topics include: stress, strain, and the relationships between stress and strain. Analysis of bodies subjected to axial, torsional, bending, shear, internal pressure, and combined loadings. Mohr's circle, beam deflection, stability of structures, and column buckling. Analysis of statically indeterminate structures.

B. COURSE EFFECTIVE DATES: 04/02/2010 - Present

C. OUTLINE OF MAJOR CONTENT AREAS

1. Stress and Strain in Axially Loaded Members. (20%)
2. Torsion in circular shafts (10%)
3. Stress and Strain due to Pure Bending (10%)
4. Analysis and Design of Beams for Bending inc. Shear and Moment Diagrams (10%)
5. Shearing Stress in Beams and Thin-walled members (10%)
6. Transformation of Stress and Strain, Mohr's Circle (15%)
7. Deflections of Beams (15%)
8. Column Buckling (10%)

D. LEARNING OUTCOMES (General)

1. Interpret stress-strain diagrams.
2. Calculate stress and strain due to tensile and compressive forces. Include statically indeterminate members.
3. Calculate stress, strain, and angle of twist in members with circular cross sections due to torsion. Include statically indeterminate members.
4. Calculate internal forces in a beam, including generating shear and bending moment diagrams.
5. Analyze stress in beams due to shear forces and bending moments.
6. Perform stress transformations. Use Mohr's Circle.
7. Calculate the state of strain for plane stress. Determine principle stress and strain. Use Mohr's circle.
8. Calculate beam deflections under simple loading conditions. Include statically indeterminate members.
9. Determine the conditions under which column buckling could occur.

E. Minnesota Transfer Curriculum Goal Area(s) and Competencies

None

F. LEARNER OUTCOMES ASSESSMENT

As noted on course syllabus

G. SPECIAL INFORMATION

None noted