

**Course Name: ENR-222 Mechanics of Solids**

Date Updated: 4/2022

Credit Hours/week: 3 hrs./wk. – 3 cr.

BEGINNING: SPRING 2022

Catalog Description: Principles of strength of material are derived for uniaxial stresses and strains, direct shear, torsion, bending, combined stresses, and column buckling. Also covered are axial force, shea moment and torque in structural members and in statically indeterminate systems. Elementary failure theory in structures and mechanical components is discussed.

Prerequisite: ENR 223- Engineering Mechanics I (Statics)

Text: Mechanics of Materials, 7th Edition, Beer, Johnston, DeWolf, and Mazurek

Supplementary Material: Check Blackboard

Syllabus:

Period	Topics
1	Statics review. Introduction to Mechanics
2	Axial Loading stress and strain
3	Indeterminate Axial problems. Temperature changes
4	Poisson's ratio
5	Exam 1/Torsion
6	Bending
7	Beams
8	Designing Beams
9	Thin Wall Members
10	Exam 2/Mohr's Circle
11	Principal Stresses and Failure Theories
12	Shaft Design Analysis/PROJECT
12	Deflection of Beams
14	Deflection of Beams / Columns
15	Special Topics and Final Exam Review
16	Final Exam

Students are expected to adhere to the policies of the County College of Morris. These can be accessed at: (insert link here)

## **Statement of Expected Course LEARNING OUTCOMES**

- Mathematically determine the stress and strain for materials having applied normal loads, shear, torsion, bending, or a combination of loads.
- Design mechanical components such as fasteners, weldments, shafts, beams, and columns to mathematically satisfy stress, strain, and stability criteria
- Calculate the stress and strain of a member or an assembly due to change in temperature
- Correctly use the theory of stress concentration, fatigue endurance limit, and factor of safety to protect the welfare of the public
- Use Mohr's Circle to determine principal stresses and maximum shear stress