



## EGR 254: Mechanics of Materials and Structures

In this course, the concepts of stress and strain caused by tensile, compression, shear and bending forces and the associated material behavior are studied. Classical and computer methods are used to analyze beams, trusses, and structures. Students also study torsion, column action and the strength of bolted and welded joints. The design of structural members made of wood, steel, and reinforced concrete is introduced. In the laboratory, students perform testing techniques used to analyze the mechanical properties of materials and evaluate structures. Prerequisite: EGR 251. Three lecture hours and three laboratory hours per week. Instructional Support Fee applies.

### Course Student Learning Outcomes

1. Define the material properties important to engineering design including strength, modulus of elasticity, Poisson's ratio, and thermal characteristic.
2. Use beam analysis tools (graphical integration and shear and moment diagrams) to determine beam strength and deflection.
3. Design basic wood, steel, and reinforced concrete structural members to withstand common loading conditions.
4. Apply the analysis and design techniques associated with power transmission shafts, bolted, riveted, and welded joints and columns.
5. Use experimental methods to determine material properties and design structures.

**Credits:** 4

**Program:** Engineering