

**J. Sargeant Reynolds Community College  
Course Content Summary**

**Course Prefix and Number:** EGR 246

**Credits:** 3

**Course Title:** Mechanics of Materials

**Course Description:** Teaches concepts of stress, strain, deformation, internal equilibrium, and basic properties of engineering materials. Analyses axial loads, torsion, bending, shear, and combined loading. Studies stress transformation and principle stresses, column analysis, and energy principles. Prerequisite: EGR 140. Lecture 3 hours per week.

**General Course Purpose:** Engineering Mechanics course for AS Engineering majors.

**Course Prerequisites and Co-requisites:**

Prerequisite: EGR 140

**Student Learning Outcomes:**

Upon completing the course, the student will be able to

- a. Solve a truss by method of joint or method of sections;
- b. Solve a frame;
- c. Draw shear and moment diagram;
- d. Identify and calculate the types of stresses and strains;
- e. Differentiate between stress and strain;
- f. Solve problems using the torsion formula;
- g. Solve problems using the flexure formula;
- h. Solve problems using the shearing stress for beams formula;
- i. Solve problems of combined stress; and
- j. Solve problems using the stress transformation equations.

**Major Topics to Be Included:**

- a. Equilibrium of force systems (review)
- b. Analysis of structures
- c. Stress
- d. Strain
- e. Torsion
- f. Axial Force — shear and bending moment
- g. Pure bending of beams
- h. Shearing stresses in beams
- i. Compound stresses
- j. Analysis of plane stress and strain
- k. Combined stresses
- l. Deflection of beams
- m. Columns

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