

Course	ME 25200 – Strength of Materials
Cross-listed Course	CE 25200 – Strength of Materials
Type of Course	Required for ME program
Catalog Description	Plane stress, plane strain, and stress-strain laws. Applications of stress and deformation analysis to members subjected to centric, torsional, flexural, and combined loading. Introduction to theories of failure, buckling, and energy methods.
Credits	3
Contact Hours	3
Prerequisite Courses	ME 25000 with a minimum grade of C-
Corequisite Courses	None
Prerequisites by Topics	Classification of forces Equilibrium of a rigid body Internal forces Centroids and moments of inertia
Textbook	<i>Mechanics of Materials</i> , William F. Riley, Leroy D. Sturges, and Dan H. Morris, John Wiley & Sons, current edition.
Course Objectives	To provide basic knowledge in mechanics of materials so that the students can solve real engineering problems and design engineering systems.
Course Outcomes	Students who successfully complete this course will have demonstrated an ability to:

1. Understand the concepts of stress and strain at a point as well as the stress-strain relationships for homogenous, isotropic materials. **(1)**
2. Calculate the stresses and strains in axially-loaded members, circular torsion members, and members subject to flexural loadings. **(1)**
3. Calculate the stresses and strains associated with thin-wall spherical and cylindrical pressure vessels. **(1)**
4. Determine the stresses and strains in members subjected to combined loading and apply the theories of failure for static loading. **(1)**
5. Determine and illustrate principal stresses, maximum shearing stress, and the stresses acting on a structural member. **(1)**
6. Determine the deflections and rotations produced by the three fundamental types of loads: axial, torsional, and flexural. **(1)**
7. Analyze slender, long columns subjected to axial loads. **(1)**
8. Design simple bars, beams, and circular shafts for allowable stresses and loads. **(2,3)**

Lecture Topics

1. Analysis of stress: concepts and definitions
2. Analysis of strain: concepts and definitions
3. Material properties and stress-strain relationships
4. Axial Loading applications and pressure vessels
5. Torsional loading of shafts
6. Flexural loading: stresses in beams
7. Combined loadings: axial, pressure, flexural, and torsional
8. Flexural loading: beam deflections
9. Buckling
10. Energy methods
11. Theories of failure (yielding)

Computer Usage

Low

Laboratory Experience

None

Design Experience

Low

Coordinator

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Date

12 October 2022