COE 3001R Mechanics of Deformable Bodies
Summer 2023

Course: COE 3001 Mechanics of Deformable Bodies, 3 credit hours

Instructor:

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Prerequisites and co-requisites*:

COE 2001 Statics (C-or-better), MATH 2552 Differential Equations (C-or-better)*

Course Description:

Stress and strain analysis applied to beams, vessels, pipes, and combined loading; stress and strain transformations; beam deflection; column buckling.

Textbook:

Mechanics of Materials, 9th Ed, Goodno, B.J. and Gere, J.M., Cengage Learning, 2017.

Other supplemental materials:

Coursera free course support videos: Whiteman, W., Mechanics of Materials I–IV. Viewable at www.coursera.org.

Course Outcomes:

Outcome 1: Students will apply skills learned in statics and mathematics to solve mechanics of solids problems.

Outcome 2: Students will demonstrate an ability to set up and solve strength of materials problems such as beam bending and stress transformation.

Topical Outline:

1. *Definition of stress and strain*
2. *Deformation of axially loaded members*
3. *Thermal deformation*
4. *Torsion of circular bars*
5. *Shear force and bending moment diagrams*
6. *Normal stress in beams*
7. *Properties of sections*
8. *Shear stress in beams*
9. *Built-up beams*
10. *Elastic-perfectly plastic*
11. *Unsymmetric bending*
12. *Beam deflection*
13. *Curvature and beam deflection equation*
14. *Stress and strain transformation at a point*
15. *Principal stresses and maximum shear stress*
16. *Mohr's circle*
17. *Principal stresses in beams*
18. *Combined bending and axial loading*
19. *Column buckling*