# MAE 3083 MECHANICS OF MATERIALS
## Fall 2008

**2008-09 Catalog Data:** Stress and strain; mechanical properties of materials; Hooke's law; axial, torsion, pure bending and transverse loading of members; transformations of stress and strain; failure criteria; strain measurements; thin-walled pressure vessels; design for strength; energy methods; design for impact; column buckling and stability (3 credits).

**Required or Elective:** Required

**Prerequisites by Topic:** MAE 2081 Applied Mechanics: Statics.

**Corequisite by Topic:** None.

**Textbook (T) and References (R):** (T) F. P. Beer, E. R. Johnston, and J. T. DeWolf, Mechanics of Materials, 4th edition 2006, McGraw-Hill Higher Education, New York.

**Course Learning Outcomes:** The student will be able to:
1. Understand the concepts of stress and strain, relationships between stress and strain in various materials, Hooke's law, mechanical properties of materials, and st(a) 0.2 (l) 0.2 2 (l) 0.29 cm250.2 0 0.24  aTf [(U) -Tf [(s)i0.2 (f) -aT -0.2 (t) 2 (ha)i abl2( of) lw

1. Introduction – concept of stress (2 lecture classes)
2. Stress and strain – axial loading (5 lecture classes)
3. Torsion (3 lecture classes)
4. Pure bending (6 lecture classes)
5. First hour-exam (covers Topics 1-4) (1 lecture class)
6. Analysis and design of beams for bending (3 lecture classes)
7. Shearing stresses in beams and thin-walled members (2 lecture classes)
8. Transformations of stress and strain (4 lecture classes)
9. Principal stresses under a given loading (2 lecture classes)
10. Second hour-exam (covers Topics 6-9) (1 lecture class)
11. Deflection of beams (6 lecture classes)
12. Columns (3 lecture classes)
13. Energy methods (4 lecture classes)
14. Final Exam (covers all the topics)

**Class Schedule:**      Three one hour lectures per week

**Contribution of Course to Meeting the Requirements of Curriculum:** This course meets the one and one-half years of engineering science topics.

**Relationship of Course to Program Outcomes:** See assessment matrix.

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