

## MECHANICAL ENGINEERING PROGRAM

### ABET COURSE SYLLABUS

#### ME 302: Materials Mechanics (3 credit): Required Course

#### Course Description (2008-2010 Catalog):

Study of the response of isotropic elastic solids to load, stress and strain of a point, elasticity, thin walled pressure vessels, torsion, bending, deflection of beams, column failure, and connections.

**Prerequisite Course:** CEE 241, MATH 182, PHYS 180, PHYS 180L

#### Prerequisite by Topic:

- Statics
- Calculus II
- Physics for Scientists and Engineers I
- Physics for Scientists and Engineers Lab I

**Textbook:** “Mechanics of Materials”, Beer, Johnston, DeWolf, and Mazurek, 5<sup>th</sup> Edition, McGraw Hill.

**Other Reference Material:** N/A

**Course Coordinator:** Brendan O’Toole, Associate Professor

#### Course learning outcomes:

- Learn the vocabulary necessary to understand the text and related material.
- Improve free-body drawing skills to interpret applied loads and solve for reactions.
- Learn basic material properties and response to applied loads.
- Learn how to solve mechanics problems.
- Improve engineering design skills.

#### Relationship of Course to Mechanical Engineering Program Educational Outcomes:

Goal 1: Provide mechanical engineering graduates with technical capabilities.					Goal 2: Prepare the mechanical engineering graduates to have effective workplace skills.				Goal 3: Instilling a sense of responsibility as a professional member of society.			
1.a	1.b	1.c	1.d	1.e	2.a	2.b	2.c	2.d	3.a	3.b	3.c	3.d
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(L)ow					(M)edium (H)igh							

#### Topics Covered:

1. Axial Loads: Normal Stress & Components of Stress
2. Safety Factors
3. Stress-Strain Curves
4. Statically indeterminate problems
5. Poisson's Ratio
6. Torsion and power
7. Bending Stresses
8. Load, Shear, and Bending Moment Diagrams in Beams
9. Transverse Shear in Beams
10. Thin walled pressure vessels
11. Combined Loading: Mohr's Circle, Principle Stresses, Failure theories
12. Beam Deflection
13. Column Stability, Buckling

**Laboratory Projects:** There is a separate 1 credit lab course that students take at the same time.

**Class/Laboratory Schedule:** 75 minutes lecture two sessions per week

**Assessment of Student Progress toward Course Objectives**

Three written exams, home-work assignments, one group project, and final exam

**Class/Laboratory Schedule:** TR 11:30 AM - 12:45 PM (Fall and Spring Semester)

**Contribution of Course for meeting Professional Component:**

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|--|-----------|
| (a) Mathematics and basic sciences:      | 0 credit  |
| (b) Engineering Topics (Design/Science): | 3 credit  |
| (c) General Education:                   | 0 credit  |
| (d) Others:                              | 0 credits |

**Prepared By:**

Brendan O'Toole

**Date:**

October 12, 2009