MECHANICAL ENGINEERING PROGRAM

ABET COURSE SYLLABUS

ME 470: Experimental Mechanics of Materials (3 credit): Elective Course

Course Description (2008-2010 Catalog):

Failure theories for isotropic and composite materials, stress concentration, fracture mechanics, combined loading, photoelasticity, composites fabrication, mold making, mechanical testing, and microstructural analysis.

Prerequisite Course: ME 302, ME 302L

Prerequisite by Topic:

- Mechanics of Materials and Mechanics of Materials Lab


Other Reference Material: ASTM Manuals and test procedures

Course Coordinator: Brendan O’Toole, Associate Professor

Course learning outcomes:

(a) Learn standard test procedures for determining mechanical properties of metallic materials and fiber reinforced polymer composite materials
(b) Learn how to fabricate and prepare specimens for testing
(c) Write thorough laboratory reports including specimen prep, procedures, statistical analysis of data, comparison with theoretical predictions, and conclusions
(d) Design a unique set of experiments as a group, perform the experiments, and evaluate the results.

Relationship of Course to Mechanical Engineering Program Educational Outcomes:

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<th>Goal 1: Provide mechanical engineering graduates with technical capabilities.</th>
<th>Goal 2: Prepare the mechanical engineering graduates to have effective workplace skills.</th>
<th>Goal 3: Instilling a sense of responsibility as a professional member of society.</th>
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Topics Covered:

1. Laboratory Report Writing
2. Instrumentation for Material Characterization
3. Autoclave and wet lay-up fabrication techniques for composites
4. Microstructural Analysis
5. Tensile response
6. Flexural Response
7. Compression response
8. Special Topics

Laboratory Projects: There are scheduled group lab exercises and original experimental design lab activities for each group.

Class/Laboratory Schedule: 170 minutes lecture one session per week

Assessment of Student Progress toward Course Objectives

Lab reports, Written Group Project Report, Final Exam

Class/Laboratory Schedule: F 10:00 – 12:50 PM (Spring Semester)

Contribution of Course for meeting Professional Component:

(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