

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

Textbook: “Experimental Characterization of Advanced Composite Materials”, D. Adams, L. Carlsson, R. Pipes, 3rd Edition, CRC Press, 2003.

Other Reference Material: ASTM Manuals and test procedures

Course Coordinator: Brendan O’Toole, Associate Professor

Course learning outcomes:

- Learn standard test procedures for determining mechanical properties of metallic materials and fiber reinforced polymer composite materials
- Learn how to fabricate and prepare specimens for testing
- Write thorough laboratory reports including specimen prep, procedures, statistical analysis of data, comparison with theoretical predictions, and conclusions
- 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:

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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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:

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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