The University of Texas at Tyler  
Department of Mechanical Engineering  
MENG 5333 Composite Materials

Credits: 3 hours lecture

Instructor: Dr. Sara E. McCaslin


Additional Material: Provided through Blackboard

Course Information

Catalog Description: Explores fundamental relationships between both the mechanical and hygrothermal behavior and the composition of multiphase media with an emphasis on fiber reinforced polymers. Topics will include the use of analytical tools to calculate strength, behavior, and failure of multidirectional lamina.

Prerequisites: MENG 3306 or equivalent, consent of instructor

Required, Elective, Selected: Elective

Course Goals

Instructional Outcomes: By the end of this course students will be able to:

1. Demonstrate an understanding of the benefits and limitations of the use of FRP (fiber reinforced plastics) in engineering applications
2. Understand the underlying concepts of composite materials
3. Use analytical tools to calculate material properties for a single ply, unidirectional fiber-reinforced composite
4. Use analytical tools to determine the elastic strength and behavior of unidirectional lamina
5. Use analytical tools to evaluate the elastic behavior and failure of multidirectional lamina
6. Synthesize knowledge of elastic behavior and failure of multidirectional lamina in order to develop an appropriate ply layup for an engineering design

Relationship to Student Outcomes: This course supports the following Mechanical Engineering Program Student Outcomes, which state that our students will:

1. Apply fundamental knowledge of specialized mechanical engineering concepts and modern engineering tools in solving engineering problems. [1 - 6]
4. Demonstrate an ability to effectively communicate results from engineering problems or other intellectual products. [1], [6]

**Topics Covered**
- Applications of FRPs
- Strength and material properties of FRPs
- Strength and behavior of a single ply
- Strength and behavior of multiple plies
- Failure analysis
- Design principles

Prepared By: Sara E. McCaslin  
Date: 2/20/2012