MEEG 491 – Composite Materials
Spring 2007

Instructor

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Lecture

Monday / Wednesday / Friday: 8:30 – 9:20 am
Bell Engineering Building, Room 2273

Office Hours

Fayetteville: Monday / Wednesday / Friday: 9:30 to 10:30 am

Text

Mechanics of Composite Materials, Second Edition, A.K. Kaw, 2005.

Course Outline

- Chapter 1: Introduction to composite materials (2 weeks)
  - Definitions and classifications of different composites
  - Review of mechanics and mathematics principles

- Chapter 2: Macromechanical analysis of a lamina (2-3 weeks)
  - Anisotropic Hooke's Law with 2D and 3D extensions
  - Angle versus axial lamina

- Chapter 3: Micromechanical analysis of a lamina (2-3 weeks)
  - Physical properties of lamina
  - Rule of mixtures
  - Models for lamina strength

- Chapter 4: Macromechanical analysis of a laminate (2 weeks)
  - Code for laminate description
  - Stress-strain relations

- Chapter 5: Design (2 weeks)
  - Failure theories, failure criterion and failure modes
  - Mechanical design issues and applications

- Chapter 6 (notes from different text): Manufacturing (3 weeks)
  - Manufacturing processes for fibers / matrix / lamina / laminates
  - Process control and applications

Homework

- Homework will be assigned and collected periodically throughout the semester. No late homework assignments will be accepted without prior approval.

- To receive full credit on homework problems, solution MUST include all pertinent sketches or diagrams, setup of equations, solutions and final answers with correct units.

- Please make homework legible and professional (neat, orderly, final solutions circled or boxed). Illegible homework solutions will be marked as incorrect.

Exams (3)

- Three exams will be administered during the semester. Each exam will be given during the regular schedule course period.

- Exams may include numerical, short answer or multiple choice problems as appropriate for the course material.

Term paper

- A term paper will be required of all students in the area of composite materials.
- Examples of 'representative' project titles:
    - Fabrication of Kevlar based composite materials
    - Use of composite materials on the C130-Hercules transport aircraft
    - Impact fracture of fiber-reinforced composite panels
    - …

Grading

- Homework assignments: 25%
- 3 Midterm exams: 3 x 20% = 60%
- Term paper: 15%

Advice

- Read.
- Ask questions – make sure you press and HOLD the microphone button.
- Issues related to lecture broadcast, contact Sammy at 479-422-3691 or habusam@uark.edu