MECENG 127/227 Composite Materials

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Office Hours: M, W at 7:00-8:30 PM on Zoom (https://berkeley.zoom.us/j/93580944176)

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Office hours: F, 1-4 PM (https://berkeley.zoom.us/j/3315399172)

Lectures: T, Th at 9:30-11 AM on Zoom (https://berkeley.zoom.us/j/93580944176)

Description: This course is concerned with the mechanical and physical properties of composite materials and their use in engineering applications.

Outline of topics:

1. Description of composite materials. Advantages and limitations. Discussion of applications.
2. Basic Solid Mechanics. Concepts of stress and strain; stress-strain relations for elastic materials. Anisotropic materials.
3. Micro-mechanics and macro-mechanics of composites.
4. 3D and 2D states of stress.
5. Mechanics of laminated fiber-reinforced plates and beams.
6. Temperature and moisture effects.
7. Strength, failure and damage. Comparison of different criteria.
8. Aspects of the design, manufacturing and testing of composite materials.

Prerequisite: ME C85/CE C30 or equivalent course on statics and mechanics of materials.

Homework: Assigned every two weeks and posted under the Assignments tab on bCourses. Due to budget restrictions related to the pandemic, we do not have a Reader for the course. Therefore homeworks will not be graded. However, you will receive full credit for *complete* homeworks that are *turned in on time*, and solutions will be posted after the due date. Incomplete homeworks will receive partial credit. Late homework will not be accepted. Homework will account for 20% of the course grade.

Exams: There will be one midterm exam on March 18, worth 40% of the course grade.

Final project: There will be a final project, worth 40% of your grade. You can either work individually or in groups. Projects can consist of literature reviews or a research project of your choice. We will discuss this further in class.

Text and reading: There is no required text. However, papers and links to books will be uploaded to bCourses as needed.