

Syllabus

COMPOSITE MATERIALS

MME 3314

Course Description:

This course is an introduction to composite materials with an emphasis on fiber reinforcement. The properties, design and manufacturing of composite products will be studied. Concepts of adhesion, interfacial shear, critical fiber length, anisotropic plane-stress elasticity, multiaxial strength of anisotropic materials and performance problems will all be covered.

Prerequisites: BE2434 and BE2303, with a grade of "C" or better.

Professor:

Darren M. Cone
Office: Prospect Hall – Room 120
E-mail: dmcone@utep.edu
Phone: 747-5785

Office Hours:

Monday and Wednesday 1:30 - 3:00 pm. Please email an appointment request if unable to meet during regular office hours.

Meeting Times and Places:

Monday and Wednesday, 12:00 - 1:20 pm, Room 210 in the Undergraduate Learning Center (UGLC). Some of the classroom sessions will be dedicated to laboratory demonstrations, experiments, design activities or making and testing composite specimens. These informal 'lab' activities will occur in other, more technically-suitable areas on campus, and announcements with details will be made in advance.

Deliverables and Grading:

40% Exams (x2) (20% each)
30% Special Topic Report and Presentation
10% Homework
20% Final Exam (Friday Dec. 14, 2018 1:00 - 3:45pm)

Course Outline: *Not necessarily in order of lecture sequence shown here.*

1. Introduction: families of composites, some properties and applications
2. Physical Characteristics: volume fraction, density, heat capacity, etc.
3. Elastic micromechanics of continuous-fiber composites
4. Reinforcing fibers: manufacture and properties
5. Strength prediction and failure modes

6. Polymer-matrix composites: properties and limitations (PMC)
7. Manufacturing of polymer-matrix composites
8. Discontinuous reinforcement: critical length and properties
9. Metal-matrix Composites (MMC)
10. Ceramic-matrix Composites (CMC)
11. Laminates: mechanics, design and performance

Textbook and Other Readings:

Composite Materials: Science and Engineering, Third Edition, by Krishna K. Chawla, Springer (2013). ISBN: 978-0-387-74364-6

You will need to use the internet and books available in the UTEP library for some assignments, while I will provide some literature as part of the course material.

University OneDrive for Business:

All course materials (syllabus, lecture materials, presentations, supporting documentation, etc.) will be made available via a dedicated share folder on OneDrive for Business. All registered students have access to Microsoft Office 365, of which OneDrive for Business is a core component. **It is the responsibility of each student in this course to ensure access to their OneDrive for Business account, utilizing the UTEP IT Help Desk if necessary.** For more information, see:

https://www.utep.edu/irp/technologysupport/ServiceCatalog/ACCT_OneDrive.html

Group Work, Cheating, Plagiarism and Quality:

I encourage you to work together in groups to solve homework problems. Discussing problems in groups is an effective way to learn difficult concepts. Put all names of collaborators on the assignment when you have worked in a group, however everyone must turn in their own assignment. *Copying another person's work is cheating and will be treated as such.*

You must work alone when completing exams.

Your work must be professional. If you would be embarrassed to hand your homework to your supervisor, please do not hand it to me. Work that is deemed unprofessional or unreadable will be returned ungraded.

All student submissions for assignments shall be emailed to me no later than the start of class time on the due date.

Please Note: *No programmable calculators will be allowed for exams!*

Cheating/Plagiarism:

Cheating is unethical and not acceptable. Plagiarism is using information or original wording in a paper or reference without giving credit to the source of that information or wording: it is also not acceptable. You may not submit work for this

class that you did for another class. If you are found to be cheating or plagiarizing, you will be subject to disciplinary action, per UTEP catalog policy. Refer to <http://www.utep.edu/dos/acadintg.htm> for further information.

Disabilities:

I will make any reasonable accommodation for students with limitations due to disabilities, including learning disabilities. Please see me personally before or after class in the first two weeks or make an appointment to discuss any special needs you might have. If you have a disability and need classroom accommodations, please contact The Center for Accommodations and Support Services (CASS) at 747-5148, or by email to cass@utep.edu, or visit their office located in UTEP Union East, Room 106. For additional information, please visit the CASS website at www.sa.utep.edu/cass.