

## **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:**

Shalayna Smith  
Office: M-201H Metallurgy Suite, Engineering-Science Complex  
E-mail: [shalaynal@utep.edu](mailto:shalaynal@utep.edu)

### **Office Hours:**

Tues & Thurs 8:00 am to 10:20 a.m. These may change so please feel free to talk with me in my office, in the class or email me with any questions or to schedule an appointment.

### **Meeting Times and Places:**

Tuesday and Thursday, 10:30 am to 11:50 am, Room 210, Liberal Arts Building.  
There may be a few meetings in other places--for laboratory demonstrations, experiments, design activities or making and testing composite specimens. I will announce these when and if these meetings occur.

### **Deliverables and Grading:**

30% Homework & Quizzes  
20% Tests (two)  
40% Topic Report(s)  
10% Final Project or Test – Thursday Dec. 10, 2015 10:00am-12:45pm

### **Course Outline:**

*Note: we will not necessarily go through these topics in the order 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 extensively for some assignments and books available in the library.

### **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 quizzes and 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.

Late work is generally not accepted. Work can be turned in at the beginning of class.

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 documented disability and require specific accommodations, you will need to contact the Disabled Student Services Office in the East Union Bldg., Room 106 within the first two weeks of classes. The Disabled Student Services Office can also be reached in the following ways:

Web: <http://www.utep.edu/dsso>  
Phone: (915) 747-5148 voice or TTY  
E-Mail: [dss@utep.edu](mailto:dss@utep.edu)