

## ENG 4793 COMPOSITE MATERIALS AND PROCESSES (Spring 2006)

MRDC Room 2405, MWF 12-1 PM

**Instructor:** Dr. Youjiang Wang, MRDC 4507, Ph 404-894-7551, youjiang.wang@ptfe.gatech.edu

**Goal:** Understand composite material and processing requirements for optimizing composite performance.

### Learning objectives:

1. Understand property enhancement mechanisms in composites.
2. Understand capabilities and limitations of existing materials and processes.
3. Understand the characteristics of fibers, fabrics and matrix materials, and their effect on composites processing and properties.
4. Understand the characteristics and limitations of different methods for manufacturing composites.
5. Develop a capability for selecting materials and processes to best suit specific applications.

### Topics and Reading Assignments:

<i>Topic</i>	<i>Reading Assignment</i>
Introduction, Applications, Properties	Ch. 1, handout
Reinforcement Mechanisms, Mechanical Properties	Handout
Reinforcements: Fibers, Particles and Whiskers	2.2, handout
Matrix Materials: Thermoset, Thermoplastic, Ceramic, Metal	2.3
Textile Preforms	2.4-2.8, Handout
Interface	Handout
Selection, Product Development, Design for Manufacturing	Chs 3, 4 & 5
Manufacturing fundamentals	6.1-6.5
Polymer Matrix Composites: Manufacturing & Properties	6.6-6.9, handout
Metal and Ceramic Matrix Composites	Handout
Cost estimation	Ch. 11
Laboratory demonstrations (processing, testing)	Dates TBA

**REQUIRED TEXTBOOK:** (Online, free via GIT Library) “COMPOSITES MANUFACTURING: Materials, Product, and Process Engineering”, by Sanjay K. Mazumdar, CRC Press, ISBN 0-8493-0585-3 1. TA418.9.C6 M34 2001

**TERM PROJECT:** A case study on composites application. Presentation to the class & a report. Details will be provided.

**EXAMS:** Quiz 1 (27%) Wednesday, February 15, 2006 (covering lectures 1/9-2/8)  
Quiz 2 (27%) Wednesday, March 15, 2006 (covering lectures up to 3/8)  
Final (36%) (OSCAR: Tuesday, 5/2/06, 8:00-10:40; check updates)  
Project (10%) Report due Friday, April 28 (Last class).

**HOMEWORK:** Problems will be assigned, due in about one week. In lieu of detailed grading, the problems will be **discussed** in class with your active participation.

## HOW TO FIND THE TEXTBOOK:

Go to GT library, databases

[http://www.library.gatech.edu/search\\_locate/databases.php](http://www.library.gatech.edu/search_locate/databases.php)

Search for “ENGnetBASE”, then click on link to “ENGnetBASE”














Logon with your GT account info

On the top-right search box, type “Mazumdar”

Click any item by this author (Mazumdar); a pdf reader will display a chapter of the book

In Arobat left pane, click “Contents” to see a list of all chapters

There is an option allowing to save a copy on your computer. There are 13 files for the different chapters plus TOC:

Name ▲	Size
 0585_PDF_C01.pdf	4,682 KB
 0585_PDF_C02.pdf	8,492 KB
 0585_PDF_C03.pdf	123 KB
 0585_PDF_C04.pdf	92 KB
 0585_PDF_C05.pdf	118 KB
 0585_PDF_C06.pdf	44,030 KB
 0585_PDF_C07.pdf	4,058 KB
 0585_PDF_C08.pdf	2,177 KB
 0585_PDF_C09.pdf	272 KB
 0585_PDF_C10.pdf	3,841 KB
 0585_PDF_C11.pdf	2,484 KB
 0585_PDF_C12.pdf	85 KB
 0585_PDF_TOC.pdf	287 KB

### A note on class attendance/examinations:

- You are expected to attend all the lectures.
- *No makeup quiz will be given.* If you miss a quiz and the absence is determined excusable by the instructor, your final exam grade will be use for the quiz missed.
  - If you miss a quiz due to illness, you must obtain a note from the attending doctor certifying that you are too ill to come to class (A note from the infirmary indicating that you have stopped by is not acceptable).

If you miss a quiz due to other emergencies (related to you and your immediate family only), you may be excused at the discretion of the instructor.

### Class notes distribution:

Primary mode: Hard copy given out in class

Secondary mode: Some files may be posted at this site:

<http://www.prism.gatech.edu/~yw6/4793/>