

**MAT 307 Composite Materials  
(Spring Term, 2022-2023)**

**Instructor:** Dr. Mehmet Yildiz

**Office hours:** Open door

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**Course Schedule:** Thursday, 15:40 am - 17:30 pm (FMAN G050)

Friday, 12:40 - 13:30 (FENS L045)

**Recitation** Wednesday, 12:40 am - 14:30 pm am (FASS G006)

**Course Objective**

Bring together the basic principles that will be useful for engineers who are involved with the analysis and design of composite materials: understanding the mechanics, manufacturing and testing of composite materials.

**References:** Design and Optimization of Laminated Composite Materials  
By Zafer Gürdal, Raphael T. Haftka and Prabhat Hajela  
An introduction to Composite Materials,  
by D. Hull and T. W. Clyne  
Introduction to Composite Materials Design,  
by Ever Barbero  
Mechanics of Composite Materials,  
by Robert M. Jones  
Experimental Characterization of Advanced Composite Materials  
By Donald F. Adams, Leif A. Carlson and R. Byron Pipes

**Grading Scheme (Tentative)**

MT1	30%
Project	15%
HW+Quiz+Labs	15%
Final	40%

## **Course Content and Tentative Schedule**

### **Introduction**

(Week 1)

Composites: Why? What are they?....  
Constituents: Fiber and Matrix  
Manufacturing and Processing

### **Introduction**

(Week 2)

Manufacturing and Processing  
Lab tours  
Videos (Rec.)

### **Analysis I:**

Vector and tensor algebra,  
and coordinate transformation  
Basics: stress-strain  
Mechanics of a Lamina  
Micromechanics

(Week 3)

(Week 3)

(Week 4-5)

(Week 6-7)

### **Analysis II**

Mechanics of Laminates

(Week 8)

### **Problems and review**

(Week 8)

### **Mid Term Exam**

(Week 9)

### **Analysis II**

(Week 10-11-12)

Mechanics of laminates CLT

### **Analysis III**

(Week 13)

Failure Criteria (Strength of Lamina)  
Strength of Laminate

### **Materials selection and Design**

(Week 14)