MtSE 681 – Composite Materials
Spring 2017 – Tuesday 6-9PM – FMH 306

Instructor: Dr. George E. Georgiou
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Office Hours: Tuesday 4-6PM or by appointment (e-mail is best contact method)

General Description:
Introduction to fundamental principles of design and technology of composite materials. Materials based on polymer, ceramic, and metal matrices are discussed. Properties of the constitutive materials, their structure, methods of structural arrangements, as well as properties and characterization of the final products are described. The different perspectives, examples, and problems in composite applications are outlined.

Grading: 40% midterm, 40% final, 20% project (with presentation)

A = Class Average + 1 StandardDeviation
B = Class Average, B+ = Class Average + ½ SD,
C= Class Average - 1 SD, C+ = Class Average -½ SD

Textbook: "Composite Material: Science and Engineering" by K.K.Chawla, 3rd edition, Springer (2012), ISBN 0387743642

Supplemenary material – "Principles of Composite Materials Mechanics" by R.F. Gibson, 4th edition, CRC Press (2016)
"Strength of Materials" by S.Timoshenko parts 1 and 2
(Original published in 1950s, 3rd edition available in inexpensive paperback)

Topics:

Week 1 – 1/17	Introduction – Why composite materials? Fibers (Properties and processing of Carbon, SiC, Glass, Polymer Fibers)
Week2 – 1/24	Fibers continued, Matrix Materials
Week 3 – 1/31	Interfaces (Bond Strength)
Week 4 – 2/7	Polymer Matrix Composites
Week 5 – 2/14	Metal Matrix Composites
Week 6 – 2/21	Ceramic Matrix Composites
Week 7 – 2/28	Carbon Fiber Composites Recycling Composites
Week 8 – 3/7	**Midterm Exam, Project Proposal Due**
March 12-19	SPRING RECESS – NO CLASSES (University Open)
Week 9 – 3/21	Bending and stress distribution of bi-metallic strip with thermal expansion mismatch (from Timoshenko -- Strength of Materials -- Handout)
Week 10 – 3/28	Micromechanics of Composites
Week 11 – 4/4	Macromechanics of Composites
	Example: Bending and stress of steel reinforced concrete (from Timoshenko – Strength of Material Handout)

Week 12 – 4/11	Strength, Fracture, Fatigue and Creep
Week 13 – 4/18	Design with Composite Materials
Week 14 – 4/25 (Last Class)	**Presentations and Reports Due**
May 2	No class, Tuesday follows Friday schedule
May 3-4	Reading Days 1&2
May 5-11	FINAL EXAM (Probably scheduled for Tuesday 5/9)

Spring 2017 Calendar

January 17	Tuesday	First Day of Classes
January 23	Monday	Last day to Add / Drop Class
		Last day to Withdraw with 100% Refund
March 12-19	Sun-Sun	SPRING RECESS – NO CLASSES (University Open)
March 27	Monday	Last day for Withdrawal
April 14	Friday	NO CLASSES (Good Friday – University Closed)
May 2	Tuesday	Last Day of Class, Friday Classes Meet
May 3-4	Wed. – Thurs.	Reading Days
May 5-11	Fri. – Thurs.	FINAL EXAM Period
May 16	Tuesday	Final Grades Due.