

# **MMAT 2002- Introduction to Structure, Properties, and Processing of Materials II**

*Spring, 2009*      *Every Tuesday, Thursday; 11:00-12:15 pm; UTEB 175*

Instructor:      Prof. Bryan D. Huey  
IMS Plaza Room 158 (Gant Science Bldg.) Phone:486 3284  
Email:                [bhuey@ims.uconn.edu](mailto:bhuey@ims.uconn.edu)  
Office Hours:      12:30-1:30 Wednesdays

TA:

Course Web Page:      <http://www.ims.uconn.edu/~bhuey>

Required Textbook:      Materials Science and Engineering: An Introduction  
By W. D. Callister Jr., 7th edition, 2007 (required)

Goals:      To provide a basic understanding of the structure and processing of powder, glass, semiconductor, composite, and polymer materials. To relate mechanical, electronic, optical, magnetic, and thermal properties of these materials to defects, dopants, microstructure, and monetary and environmental cost-benefit analyses.

Students will have an opportunity to gain the following specific skills and abilities through lectures, class participation, and assignments:

- a. an ability to apply knowledge of mathematics, science, and engineering
- b. an ability to design and conduct experiments, as well as to analyze and interpret data
- e. an ability to identify, formulate, and solve engineering problems
- f. an ability of professional ethical responsibility
- h. the broad education necessary to understand the impact of engineering solutions in a global and societal context
- j. a knowledge of contemporary issues
- k. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

Labs:      None.

Grading:      The final course grade will depend on student performance in 3 areas: homework (5x8% each=40%), midterm exam (25%), and a final exam (35%).

# Syllabus: MMAT2002, Introduction to Materials II

Bryan D. Huey

Tuesday, Thursday; 11:00-12:15 pm; UTEB 175

Date	Lecture	Topic	Reading	Remarks
1/20	1	Intro, Structures		
1/22	2	Ceramic Structures, planes	12.1-5	
1/27	3	Defects in Ceramics	12.1-5	
1/29	4	Mechanical Properties of Ceramics	8.4, 12.8-11	
2/3	5	Ceramics Phase Diagrams	12.6-7	HW1 due
2/5	6	Glass and glass processing	13.1-3, 13.8-9	
2/10	7	Clay and powder processing, refractories	13.4-7, 13.10-11	
2/12	8	Other ceramic processing		HW2 due
2/17	9	Polymers I	Ch 14	
2/19	10	Polymers II	Ch 15	
2/24	11	Composite Materials I	16.1-7	
2/26	12	Composite Materials II	16.8-15	HW3 due
3/3	13	Composites III, Exam Review		
3/5		<b>Midterm Exam I</b>		MIDTERM
3/10		<b>No Class: Spring Break</b>		
3/12		<b>No Class: Spring Break</b>		
3/17		<b>No Class</b>		
3/19		<b>No Class</b>		
3/24	14	Electronic Properties: metals	18.1-9	
3/26	15	Semiconductors	18.10-14	
3/28		<b>Emergency Snow Day</b>		
3/31	16	Doped Semiconductors	18.15	
4/2	17	Diodes and Transistors	18.16-23	
4/7	18	Dielectrics and ionic conductors	18.24-25	
4/9	19	Magnetic Properties I	20.1-20.6	HW 4 due
4/14	20	Magnetic Properties II, Superconductivity	20.7-12	
4/16	21	Thermal Properties	19.1-19.5	
4/21	22	Optical Properties I	21.1-7	
4/23	23	Optical Properties II	21.8-14	
4/28	24	Final Optical Properties	21	
4/30	25	Exam Review, Surveys		HW 5due
???	<i>extra</i>	<b>Exam Review</b>		
5/8		<b>Final Exam, 10:30-12:30</b>	<b>Comprehensive</b>	FINAL