



Mechanical, Materials and Aerospace Engineering EGN 3365: Structure and Properties of Materials EAS 3607: Structure and Properties of Aerospace Materials Summer 2004, 3 Credit Hours

Tuesdays & Thursdays 2:00 -3:50 PM; ENGR II Room 302; Section C001
(Classroom and time may change; Notification will be sent through e-mail)

Instructor: Dr. Samar J. Kalita (“Dr. Samar”)
ENGR I, Room 245, Tel: (407) 823-3159
E-mail: samar@mail.ucf.edu
Office Hours: Tu Th 4:00-5:00 or by appointment

TA: Himesh Bhatt, Research Pavilion 495, Tel: (407) 207-7497
Problem solving session/ TA hours: Will be discussed on the first day of class.

Text: Materials Science and Engineering - An Introduction, William D.
Callister Jr., John Wiley & Sons Inc., 6th Edition, 2002.

Prerequisites: CHS 1440 or CHS 2045 (Chemistry) and MAC 2312 or
MAC 2282 (Calculus II)

Grading:

Homework	10%
Quizzes	15%
Midterm Exam I	20%
Midterm Exam II	20%
Final Exam (Comprehensive)	30%
Design Case Study:	5%

The final grade assigned will include +/- modifiers.

General Policies:

1. There will be no make-up exam and quizzes given. In case of emergency/ illness, special arrangement will be made on one-to-one basis.
2. Homework solutions will be made available in <http://webct.ucf.edu> on the day of submission after 5:00 PM. No homework will be accepted after the solutions are posted.
3. Feedback and suggestions to improve the quality of the course are always welcome.
4. Class participation is strongly encouraged and attendance is important.
5. To enhance learning and for your convenience, all the class notes will be made available to you through <http://webct.ucf.edu> You will have to log on to the web using your PID and password. If you have any question or if you are not convenient with webCT, please contact WebCT Specialist Ms. Kim Okamoto in Room 289 (Engr-I); Telephone: 407-823-5248.

Course Objectives:

1. To understand the importance of integrated roles played by chemistry, physics and mathematics in understanding the behavior of engineering materials.
2. To explain the major difference between material classes: metals, ceramics, polymers, composites and semiconductors.
3. To understand and appreciate various material properties: structural, mechanical, electrical, optical, biological and magnetic.
4. To explain certain material manufacturing processes.
5. To appreciate the processing-structure-property relationship in materials science and engineering.
6. To be able to use the knowledge gained for materials design and selection in engineering.

Catalog Description:

Atomic structure and bonding, crystal structure and imperfections, solidification, phase transformations, phase diagram, heat treatment, mechanical and electrical properties, materials characterization techniques

Approach:

- I. Qualitative
- II. Visualization/Application
- III. Quantitative

Reference &
Texts:

1. Foundations of Materials Science and Engineering by W.F. Smith, McGraw-Hill, Third edition, 2004.
2. Engineering Materials 1: An Introduction to Their Properties Applications: Ashby, Michael F. and Jones, David R., Butterworth-Heinemann
3. Engineering Materials 2: An Introduction to Microstructures, Processing & Design: Ashby, Michael F. and Jones, David R., Butterworth-Heinemann.
4. Introduction to Materials Science for Engineers: Shackelford, James F., Prentice Hall PTR.
5. The Principles of Engineering Materials, Barrett, Nix and Tetelman, Prentice Hall, Englewood Cliffs, NJ.



University of Central Florida

EGN 3365: Structure and Properties of Materials

Summer 2004: Schedule

Instructor: Dr. Samar J. Kalita

Week #	Date	Topic	Chapter #
1	May 11 (Tu)	Introduction to Materials Science and Engineering	1
	May 13 (Th)	Atomic Structure and Interatomic Bonding	2
2	May 18 (Tu)	The Structure of Crystalline Solids	3
	May 20 (Th)	Crystal Structure and imperfections in Solids	3, 4
3	May 25 (Tu)	Diffusion	5
	May 27 (Th)	Mechanical Properties of Solids	6
4	June 01 (Tu)	Dislocations, Strengthening Mechanisms and failure	7, 8
	June 03 (Th)	MID-TERM EXAMINATION I	
5	June 08 (Tu)	Special topic: Aerospace Material	
	June 10 (Th)	Phase Diagrams	9
6	June 15 (Tu)	Phase Diagrams and Phase Transformations	9, 10
	June 17 (Th)	Phase Transformations	10
7	June 22 (Tu)	Applications and Processing of Metal alloys	11
	June 24 (Th)	Structures and Properties of Ceramics;	12
8	June 29 (Tu)	Fabrication and Processing of Glasses	13
	July 01 (Th)	Polymer Structures	14
9	July 06 (Tu)	MID-TERM EXAMINATION II	
	July 08 (Th)	Applications and Processing of Polymers	15
10	July 13 (Tu)	Composites	16
	July 15 (Th)	Corrosion and Degradation of Materials	17
11	July 20 (Tu)	Electrical Properties of Materials	18
	July 22 (Th)	Thermal and Magnetic Properties	19, 20
12	July 27 (Tu)	Optical and Biological Properties	21
	July 29 (Th)	FINAL EXAMINATION, 2:00 – 3:50 PM (Comprehensive)	
