

MSE 209 - SPRING 2001
INTRODUCTION TO THE SCIENCE OF ENGINEERING OF MATERIALS
<http://toolkit.virginia.edu/MSE209>

Course Objectives: To introduce the basic principles underlying the behavior of materials. This course will provide the scientific foundation for an understanding of the relations among material properties, structure and performance for the classes of engineering solids (metals, polymers, ceramics, semiconductors and composites). Concepts will be developed and applied which allow for correlation between performance and aspects of structure, from the atomic through the macroscopic level, including ideas relating to atomic and larger size defects.

Textbook: **Materials Science and Engineering: An Introduction**
W. D. Callister, Jr. (John Wiley 1999, 5th Edition)

Grading: The final grade will be determined from homework, tests, and a final exam. Homework will account for 20% of the course grade, three 1 hour tests will account for 50%, and the final exam 30%.

Homework: 11 problem sets will be assigned and will be due at the beginning of class one week after assignment. Late homework will be accepted after this time only with an approved excuse. Homework solutions should be neat and stapled. Homework does not require the pledge and reasonable cooperation among students is permitted, providing it aids in the learning process. Copying is not permitted.

Prerequisites: Chemistry 111 or 141, principles of differentiation and integration, principles of algebra, geometry and trigonometry.

Class Sessions:

<u>Section</u>	<u>Instructor</u>	<u>Classroom</u>	<u>Final Exam</u>
#1, MWF 11-11:50	Taylor (MSE 317)	OLS 009	Tue May 8 0900-1200
#2, T R 11:00-12:15	Jesser (MSE 119)	OLS 009	Fri May 4 0900-1200
#3, MWF 9-9:50	Cahen (THN A123)	CHE 005	Fri May 11 1400-1700
#4, T R 9:30-10:45	Baragiola (THN B101)	THN E303	Sat May 5 1400-1700
#5, T R 11:00-12:15	Fitz-Gerald (MSE 223)	THN E303	Fri May 4 0900-1200
#6, T R 9:30-10:45	Zhigilei (MSE 227)	OLS 005	Sat May 5 1400-1700

Problem Sessions

Group	Wed.	3:30-5:30	MEC 205 (Mays, Schamp)
Individual	Tue.	3:00-4:00	MSE 229 (Wang)
	Tue.	5:30-6:30	MSE 231 (Moore)
	Wed.	10:00-11:00am	MSE A125 (Mays)
	Wed.	2:15-3:15	MSE 229 (Schamp)

Graduate Teaching Assistant: Brian Mays, Aisha Moore, Tom Schamp, and Jason Wang will be available for regularly scheduled office hours as outlined above. All instructors will have scheduled office hours, and individual hours as per prior arrangement with the student.

MSE 209 TENTATIVE COURSE OUTLINE - SPRING 2001

<u>Weeks</u>	<u>Chapter and Topic</u>
1/2	1. Introduction
1/2	2. Atomic Structure and Interatomic Bonding
1	3. The Structure of Crystalline Solids
1/2	4. Imperfections in Solids
1/2	5. Diffusion
	TEST # 1 - Chapters 1-5
1	6. Mechanical Properties of Metals
1	7. Dislocations and Strengthening Mechanisms
1/2	8. Failure
1 1/2	9. Phase Diagrams
	TEST # 2 - Chapters 6- 9
1/2	10. Phase Transformations in Metals: Development of Microstructure and Alteration of Mechanical Properties
1/2	11. Thermal Processing of Metal Alloys
	12. Metal Alloys
1/2	13. Structure and Properties of Ceramics
	14. Applications and Processing of Ceramics
1	15. Polymer Structures
	TEST # 3 - Chapters 10-15
1	16. Characteristics, Applications, and Processing of Polymers
2	19. Electrical Properties
	17. Composites