

Name:	MSE 2001
Title:	Principles and Applications of Engineering Materials
Section:	A
Credit:	3-0-3
Course Description:	The structure-property-processing-performance relationships of engineering materials are described. Materials selection is treated as a part of engineering design.
Text:	The Sci. & Des. of Eng. Mat'ls. 2ed. by Schaffer, et al., WCB McGraw Hill + CD-ROM
Website:	http://webct.gatech.edu/
Time / Place:	MWF @ 9:05-9:55; Love Bldg. #185
Professor:	Dr. Jud Ready (jud.ready@gtri.gatech.edu)
Office Hours:	MWF@10 or by appointment (123-C Baker Bldg; 404-385-4497)
TAs	B. Weintraub [LEAD TA] (gth863q); M. DiPrima (gth713s); H. Abernathy (gtg886e); C. Rockett (gte655u); Y. Zhang (gtg969b); Y. Liu (gtg116t).
NO CLASS:	09/05/05, 10/17/05, 10/25/05
Drop Day:	10/14/05
Tests:	09/19/05, 10/14/05, 11/16/05
Final Exam:	12/14/05 (Wednesday) @ 8:00am-10:50am (TENTATIVE)
Grade:	3 Tests = 15% each; Final = 25%; Group Paper = 15%; Group Presentation = 15%

August:

22:	Introduction & Orientation	17:	NO SCHOOL – FALL RECESS
24:	Chapter 1 -- Materials Sci. & Eng.	19:	Chapter 9 -- Mechanical Properties
26:	Chapter 2 -- Atomic Scale Structures	21:	Chapter 9 -- Mechanical Properties
29:	Chapter 2 -- Atomic Scale Structures	24:	Chapter 10 -- Electrical Properties
31:	Chapter 2 -- Atomic Scale Structures	26:	Chapter 10 -- Electrical Properties
		28:	Chapter 10 -- Electrical Properties

September:

2:	Chapter 3 -- Crystal Structures	31:	Chapter 11 -- Optical & Dielectric Properties
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5: **NO SCHOOL – LABOR DAY**

7:	Chapter 3 -- Crystal Structures	2:	Chapter 11 -- Optical & Dielectric Properties
9:	Chapter 3 -- Crystal Structures	4:	Chapter 11 -- Optical & Dielectric Properties
		7:	Chapter 12 -- Magnetic Properties

12:	Chapter 4 -- Point Defects & Diffusion	14:	Chapter 12 -- Magnetic Properties
14:	Chapter 4 -- Point Defects & Diffusion	16:	TEST #3 (Chapters 1-12)
16:	Chapter 4 -- Point Defects & Diffusion	18:	Chapter 13 -- Thermal Properties

19: **TEST #1 (Chapters 1-4)**

21:	Chapter 5 -- Linear, Planar, and Volume Defects	21:	Chapter 14 -- Composite Materials
23:	Chapter 5 -- Linear, Planar, and Volume Defects	23:	Chapter 15 -- Materials - Environment Interactions
		25:	NO SCHOOL – Thanksgiving Break

26:	Chapter 6 -- Noncryst. & Semicryst. Materials	28:	Chapter 15 -- Materials - Environment Interactions
28:	Chapter 6 -- Noncryst. & Semicryst. Materials	30:	GROUP PROJECT DUE & PRESENTATIONS
30:	Chapter 6 -- Noncryst. & Semicryst. Materials		

December:

		2:	GROUP PRESENTATIONS
3:	Chapter 7 -- Phase Equilibria & Diagrams	5:	GROUP PRESENTATIONS
5:	Chapter 7 -- Phase Equilibria & Diagrams	7:	GROUP PRESENTATIONS
7:	Chapter 7 -- Phase Equilibria & Diagrams	9:	GROUP PRESENTATIONS
10:	Chapter 8 -- Kinetics & Microstruct. Trans.		
12:	Chapter 8 -- Kinetics & Microstruct. Trans.	14:	FINAL EXAM (Chapters 1-15 + Projects)
14:	TEST #2 (Chapters 1-8) -- DROP DAY		
	GROUP ABSTRACT DUE		

Group Project

Description:

Materials engineering is an extremely broad and diverse field. The group project will allow a group of students to analyze a chosen topic in depth that is pertinent to their particular interests. The groups will report their findings to the class in a final oral presentation. Degree candidates are exempt from Group Project.

- ❑ **There will be (approximately) 20 groups of 4 or 5 students.**
- ❑ **GROUP SIZE SHALL NOT BE LESS THAN 4 NOR EXCEED 5 MEMBERS!**
- ❑ **Students will divide into groups without assistance from Professor Ready.**
- ❑ **Material from group presentations AND reports will be included on final exam.**
- ❑ **Treat your fellow group members with respect and equitably share the work-load!**

Topics may be chosen from the following three categories:

1. A material (i.e., aluminum, steel, polyvinylchloride, etc.)
 2. A material phenomenon (i.e., superconductivity, magnetism, corrosion, etc.)
 3. A material processing method (i.e., welding, chemical vapor deposition, forging, etc.)
- ❑ Topic should be covered in sufficient depth to give your fellow students a general overview of the history, present application and/or the current state of knowledge, and future prospects for the chosen topic.
 - ❑ Final report and presentation should be prepared at the level of a technically literate individual with rudimentary knowledge of the topic. (i.e., your class mates are your “audience” not Professor Ready.)

Deliverables:

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|-----------------------------|--|
| 10/14/05: | Names of group members and <u>one page</u> topic abstract with title and at least 3 references |
| 11/30/05: | Final Report & Presentation due by 9:05AM ET |
| 11/30/05, 12/2, 5, 7, 9/05: | 10 minute group presentations (Order TBD randomly) |

Final Report Description:

- ❑ Final report & Presentation must be submitted on webct as a digital PDF no later than 9:05am ET on 11/30/05.
- ❑ A hard copy report (8.5”x11”, single sided, double spaced, 11 pt. font, 1 in. margins all sides, 15 pages minimum, 20 pages maximum) is also due at the same time as above.
- ❑ The final report shall include at a minimum the following sections:
Cover Page, Individual Group Member Contributions (dated with original signatures in black ink), Abstract, Background & History, Present State of Knowledge and Applications, Future Prospects, Conclusions, References.
- ❑ All final reports shall have at least 10 references. Textbook may be used. References shall be formatted as in common technical journals. Use of on-line/web-based references is discouraged.
 - ❑ Use the “IEEE Citation-Sequence System” (<http://www.mhhe.com/mayfieldpub/tsw/doc-ie3.htm>). Use of any other referencing system will result in a 10 point penalty.
- ❑ Charts, graphs, figures and tables are to be sequentially numbered and properly referred to and formatted within the main text body. If these items are not original creations by group, they **MUST** be referenced to their original source.
- ❑ **Plagiarism will be dealt with severely and harshly by the Dean of Students (i.e., an “F” for course and expulsion from the Institute).**

Final Presentation Description:

- ❑ The final presentation shall be prepared using PowerPoint for Windows and presented with the digital projector. However, a back-up set of transparencies is highly recommended in case of equipment failure.
- ❑ Animation, sound, color, hyperlinks, etc. may be used, but should be tested first to verify projection.
- ❑ Presentation shall be at least 7 minutes in length, but must not exceed 10 minutes in length (you will be cut off).
- ❑ Presentation shall be given by no more than two individuals in proper business attire.
- ❑ Following the presentation there will be a brief question and answer period (part of the 10 minute max time allotted).
- ❑ Order of group presentation will be chosen at random.
- ❑ Attendance of all group members for all presentations is mandatory.

REPORTS OR PRESENTATIONS DEVIATING FROM ANY OF THESE REQUIREMENTS WILL BE PENALIZED