# University of California, San Diego ELEMENTS OF MATERIALS SCIENCE MAE 20

Winter 2010

Instructor:	Dr. Marc André Meyers					
Email:	mameyers@ucsd.edu					
Office: Office Hours:	EBU-II, I W	Room 259 4:00 - 5:00 j	p.m.			
Lectures:	MW W	10:00-10:50 9:00-9:50	)	CSB 002		
<b>Review Session</b> :	Friday	`10:00-10:50	Room:	CSB 002		
Start of Classes:	Jan. 4, 2010					
End of Classes:	March 12, 2010					
TA (Homework &	& exams):	:	Irene	Chen; EBU	@ Room 26	8 (ihchen@ucsd.edu)
Reader:			Kevir	n Ha		
Class Web page:	http://mae			maecourses.	ucsd.edu/mae	20
Text Book:	ESSENT	IALS OF MA	TERIA	LS SCIENC	CE AND EN	GINEERING
	Donald R. Askeland and Pradeep Phulé, 1st edition					

Thomson, 2004 (2008 edition is also acceptable) Course Description: This course will provide the students with the foundations of materials

science and engineering. The structure, properties, and performance of materials are connected, and we will study these linkages throughout the course. We will, for the most part, exclude mechanical properties, since they are treated in detail in a separate class (MAE 160).

### Test Schedule (subject to change):

First Progress Exam:	Jan . 22, 2010
Second Progress Exam:	February 22, 2010
Final Exam:	March 19, 2010 (Friday) 8:00 - 11:00 a.m.

## Grading:

Midterm 1	25%
Midterm 2	25%
Homework	25%
Final Exam	25%
Total	100%

#### **Materials Coverage:**

Week 1	Jan. 4	Chapter 1	Introduction to Materials Sci. & Eng.
Week 1		Chapter 2	Atomic Structure
Week 2		Chapter 3	Atomic and Ionic Arrangements
Week 2	Jan. 11	Chapter 4	Imperfections in the Atomic/Ionic Arrangements
Week 3	Jan. 20(MLK)	Chapter 5	Atom and Ion Movements in Materials; MT1
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Week 4	Jan. 25	Chapters 6,9	Mechanical Testing; Solidification
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Week 5	Feb. 2	Chapter 10	Solid Solutions and Phase Equilibrium
Week 6	Fab 8	Chapter 11	Dispersion Str. and Eutectic Phase Diagrams
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Week 7	Feb 17 (PD)	Chapter 12	Dispersion Strengthening by Phase Transform
WEEK /	100.17 (ID)	Chapter 12	& Heat Treatment
Week 8	Feb. 22	Chapters 13,15	MT2; Heat Treatment of Steels; Ceramic Matls.
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Week 9	March 1	Chapter 16	Polymers
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Week 10	March 8	Chapter 17	Composite Materials
Final:	March 19	8-11 am	

### **Grading and Homework**

Homework (3-4 questions) will be assigned on Wednesdays and collected on the following Monday, at the beginning of class (by Reader).

Solutions to homework will be on the web. Since many homework assignments have answers in back of the book, all work has to be CLEARLY shown.

The exams will be closed book. I wish you good luck and may the course be instructive, formative, challenging and fun.

Programmable (high end) calculators will be NOT be allowed during exams.

# **HOMEWORK GUIDELINES**

- 1. All homework assignments will refer to the text unless otherwise stated. Homework should be neatly written on standard **engineering**  $8 \frac{1}{2} \ge 11$  paper. Sloppy or late homework will be penalized or even rejected.
- 2. Be sure to show your work on all homework problems; the answer alone is never responsive, and points will be deducted if important steps are missing from your development. Make liberal use of carefully drawn and labeled diagrams in your homework. Since significant partial work is usually given some credit on homework, it is a sound strategy to hand in what you can do on each homework problem. One more thing: It must be <u>your own work</u>! Cases of copying will be treated as ACADEMIC DISHONESTY. You can talk with other students, but you must then do the problem yourself.
- 3. Assignments will be announced in class, typically on Thursday, and will be due the following Thursday. Homework is due at the **beginning** of class on the due date. Assignments handed in after the beginning of class will be treated as late and will not be graded. PLEASE DO NOT ATTEMPT TO COMPLETE ASSIGNMENTS DURING THE LECTURE. THESE WILL NOT BE GRADED.
- 4. Each problem should begin on a **NEW PAGE** and should include the following:
  - a) A brief statement of the problem including any necessary given information or assumptions you decide to make.
  - b) Figures
  - c) Mathematical analysis
  - d) Your final answer with a **BOX** drawn around it. <u>This is essential</u>!

Do not carry around symbols for units as you walk through a problem. When you give a final answer, then is the time and place to attach units. Use the abbreviations in the text for Mega Pascal (MPa), density (g/cm<sup>3</sup>), etc. Don't forget correct units.

- 5. Homework should be presented in a professional manner, meaning neat and legible. Work handed in with excessive scratch marks and/or arrows will not be graded.
- 6. **No homework will be accepted late** (homework is due in class on due dates before class begins). A late entrance into the class does not provide an excuse for handing homework in late.
- 7. Homework will be returned to you within a week. Re-grades on homework will be considered for a week after that homework is returned to you.
- 8. Please discuss problems concerning grading of homework with your TA before you come to me. I will only entertain discussion on homework grades after the TA has had an opportunity to discuss your problems with you and has marked out his decision.
- 9. Be sure that your name is at the top of the first page of each part. <u>PRINT</u> your name in block letters, <u>LAST NAME FIRST</u>. Staple the pages together to ensure full credit.