

University of Kentucky
Department of Chemical and Materials Engineering
Spring 2009
MSE 201

MWF: 1:00-1:50PM
110 Whitehall Classroom Bldg. (CB)

Prof. D.S. Kalika
kalika@engr.uky.edu

MSE 201 **MATERIALS SCIENCE** (3)
Microscopic and macroscopic structure as related to the properties of materials with engineering applications. Prereq or concur: MA 114 and freshman chemistry.

Instructor: D.S. Kalika
 171 Anderson Hall (Tower)
 257-5507
 kalika@engr.uky.edu

Office Hours: Dr. Kalika will hold office hours on Thursdays from 3:00 to 4:30PM; other times by appointment. The best way to contact Dr. Kalika is via e-mail at kalika@engr.uky.edu. Dr. Kalika will make every effort to respond to e-mail inquiries promptly (*i.e.*, within 24 hours in most cases).

Textbook: The textbook for the course is The Science and Design of Engineering Materials, 2nd edition, by J. Schaffer, A. Saxena, S. Antolovich, T. Sanders and S. Warner. Readings are indicated on the course schedule and should be completed *prior* to the class session for which they are assigned. *Warning:* The answers in the back of the book are not always accurate (Appendix E).

Web Site: The instructor will maintain a course web site:
 http://www.engr.uky.edu/~kalika/mse201_Spring2009/

This site will contain information pertaining to all elements of the course (course schedule, announcements, homework assignments, exam information, etc.).

Attendance: Regular attendance at lectures is *strongly* encouraged, as students will be held responsible for all material presented in class (in addition to the text readings, any handouts, etc.). Dr. Kalika reserves the right to conduct unannounced “concept quizzes” (~ 10-15 minutes in length) in order to encourage student attendance and timely review of the course material; these quizzes are in addition to the scheduled quizzes and exams described below. Concept quizzes will be factored into the homework grade: each quiz will be the equivalent of one homework assignment.

Homework Sets: A total of 12 homework sets will be assigned during the semester; homework assignments will be posted on the class web site at least one week prior to the due date. Homework sets are due at the start of class on Fridays. Late homework will receive no credit (homework is considered late if it is submitted more than 10 minutes after the start of the class period). The point value for each individual homework problem will be indicated on the assignment. The lowest homework set grade for each student will be dropped when determining the final grade. Please note that given the size of the class, it is not practical for Dr. Kalika to accept homework submitted electronically.

In submitting homework assignments, all pages should be numbered, and the assignment should be stapled. Each problem solution should contain: (i) a diagram (if appropriate), (ii) a list of assumptions and parameters, (iii) a clear explanation of the steps/calculations involved in reaching the solution. Also, be sure to indicate appropriate units, as necessary. Students are encouraged (but not required) to submit homework on green engineering paper. Engineering paper is available at the UK Bookstore.

While engineering problem solving often benefits from the interchange which accompanies a group effort, the *maximum* learning benefit for the student typically results from a careful balance between serious individual effort and occasional group consultation. As such, students are permitted to work in small groups to discuss methods and approaches to solving the homework problems. However, students should focus on developing the skills necessary to define and solve problems *independently*, as these skills will be required on the quizzes and exams administered in class. Problem solutions submitted for credit must be the student's own work. Verbatim copying of homework solutions is not permitted. The teaching assistant has been instructed to identify homework that displays evidence of copying; all such solutions will receive zero credit regardless of the source of the solution.

Exams: Three (50 minute) in-class exams are scheduled for February 16, March 9, and April 20. All exams are considered cumulative. Exams are typically closed book; the policy for each exam will be announced in class. The final exam is scheduled for Monday, May 4th at 8:00 AM. (110 CB).

Quizzes: Four in-class quizzes are scheduled during the semester. These quizzes will be ~ 20 minutes in length, and will emphasize material from recent homework sets. The quizzes will be closed book, with any necessary data provided. The lowest quiz score will be dropped in determining each student's final grade; in the case of a missed quiz, that quiz will automatically be considered as the dropped grade.

An unexcused absence from a quiz/exam will result in a grade of 0 for that quiz/exam. If an excused absence is anticipated (*e.g.* illness, family emergency) please contact Dr. Kalika (257-5507 or kalika@engr.uky.edu) before the exam, if at all possible. University policies regarding excused absences are detailed in the "*Students Rights and Responsibilities*" (<http://www.uky.edu/StudentAffairs/Code/>).

Grading: The final grade will be determined based on the following formula:

In-Class Exams (3)	45%
Quizzes (3 out of 4)	20%
Final Exam	25%
Homework & Concept Quizzes	10%

Grading will be based on each student's composite (raw) score; scores in the range $\geq 85\%$ will be guaranteed a grade of "A", 75% or above at least a "B", 65% or above at least a "C", and 55% or above at least a "D". The instructor will provide approximate letter grade equivalents after each exam, in order to assist students in determining their status in the course. For students with grades near the endpoints in the above distribution, consideration may be given to attendance and class participation, as well as to performance trends over the course of the semester. Please note that the last day to withdraw from a class for the Spring term is April 3rd.

Cheating: The engineering profession is one where individuals are held to the highest ethical and professional standards. Consistent with this philosophy, cheating in MSE 201 will not be tolerated. The definition of cheating at the University is presented in the “*Student Rights and Responsibilities*”:

6.3.2 CHEATING: Cheating is defined by its general usage. It includes, but is not limited to, the wrongfully giving, taking, or presenting any information or material by a student with the intent of aiding himself/herself or another on any academic work which is considered in any way in the determination of the final grade. Any question of definition shall be referred to the University Appeals Board.

Complete policies and procedures regarding cheating and other academic misconduct can be reviewed at: (<http://www.uky.edu/StudentAffairs/Code/>)

STUDENT OUTCOMES FOR MSE 201:

At the conclusion of MSE 201, the student should...

- 1.) understand how different arrangements of atoms and different types of bonding lead to distinctly different materials and materials behavior.
- 2.) understand how the constitution and arrangement of atoms affect the physical properties of a material.
- 3.) be familiar with fundamental engineering properties and their relation to material structure and morphology.
- 4.) understand and be able to explain/interpret phase diagrams.
- 5.) have a broad appreciation for the various processing methods used to engineer materials into useful forms.