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
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Textbook: The textbook for the course is *Fundamentals of Materials Science and Engineering: An Integrated Approach* (5th edition) by Callister and Rethwisch. Readings are indicated on the course schedule and should be reviewed prior to the class session for which they are assigned.

Office Hours: Dr. Kalika will hold office hours from 4:00 to 5:30 PM on those Tuesday and Thursday afternoons before homework sets are due (re: course schedule); other times are by appointment. Please e-mail Dr. Kalika in advance for specific meeting times.

Web Site: The instructor will maintain a course web site:

[http://www.engr.uky.edu/~kalika/MSE201Spring2018/](http://www.engr.uky.edu/~kalika/MSE201Spring2018/)

This site will contain information pertaining to all elements of the course (course schedule, announcements, homework assignments, exam information, etc.). It is the responsibility of the student to check the site regularly for assignments and other required elements of the course. Specifics for accessing the web site will be provided at the first class meeting.

In addition, the instructor will communicate with the class via broadcast e-mails sent to each student’s assigned “uky” e-mail address. Students are responsible for checking and/or forwarding these e-mails in order to stay current on class communications.

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.). The lectures presented in MSE 201 will be based on powerpoint slides that will also be posted to the course web site.

Weather Policy: Any class cancellations owing to adverse weather will be according to UK policy and official announcements. In the event of weather disruptions, the instructor reserves the right to adjust the semester course schedule, including possible changes to quiz and exam dates, if required.
Classroom Etiquette: Students are expected to maintain professional standards of decorum in the classroom. The use of cellphones (including texting) during lectures should not be necessary, and will be permitted only in exceptional circumstances (e.g. phone availability in case of family emergency). Since the lectures will be presented in powerpoint format, it is permissible for students to use tablets or laptops to follow along with the slides and annotate as appropriate. However, students are prohibited from accessing other applications (e.g. social media, email) during lectures. Student use of electronics during class is solely at the discretion of the instructor, who reserves the right to prohibit usage if the above guidelines are not observed. Please note that no devices (other than approved calculators) may be out during quizzes and exams.

Homework Sets: A total of 11 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. A significant number of the homework problems for the course will be taken directly from the textbook (Callister and Rethwisch; 5th edition). It is the responsibility of the student to have access to a copy of the required textbook for completion of the homework problems.

Homework sets are due at the start of class in 102 CB and must be submitted in hardcopy form. 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 lowest homework 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 the instructor to accept homework submitted electronically.

For each homework assignment, all pages must numbered and STAPLED with writing preferably on one side of the page, only. Student name (Last name, First name) should be printed clearly on the top right corner of the first page. Each problem solution should contain: (i) key elements of the problem statement and a diagram, if appropriate; (ii) a list of assumptions and parameters; (iii) a clear indication of the steps/calculations involved in reaching the solution. Show appropriate units, as necessary. Problems should be presented in numerical order, per the assignment. Students should submit their homework on good quality paper (i.e., not torn from a spiral notebook).

Each problem set will be graded on a basis of 100 points. Most problems will be assigned a value of five points and will be checked off for completion by the grader. Typically, only one or two problems will be graded in detail by the grader, with point values as assigned (20 to 40 points, in most cases); these problems will be clearly indicated on the assignment.

While engineering problem solving often benefits from the interchange that 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.

Exams: Three (50 minute) in-class exams are scheduled for February 9, March 7, and April 16. All exams are considered cumulative. Exams are typically closed book; details for each exam will be announced in class. Students may use a basic scientific calculator and a ruler. No other items will be allowed – no books, papers, phones, laptops, etc.

The final exam is required and is scheduled for Tuesday May 1 at 3:30 PM (102 CB).
**Quizzes:** Three in-class quizzes are scheduled during the semester. These quizzes will be ~ 20 minutes in length and will emphasize material from recent lectures and homework sets. The quizzes will be closed book, with any necessary data provided.

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 before the exam via e-mail, if at all possible. For students missing a quiz or exam due to illness, appropriate documentation of the absence will be required, as per University rules. As a policy, Dr. Kalika verifies the origin of all absence documentation. Please note that the maximum flexibility for re-scheduling a missed quiz/exam is available when the instructor is contacted promptly with regards to the absence.

Students with a documented, excused absence will have the opportunity to make up a missed quiz/exam, with the expectation that the make-up be completed within one week of the absence. The instructor reserves the right to schedule make-up quizzes and exams during the last week of the semester, as needed, to meet course requirements.

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

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
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</thead>
<tbody>
<tr>
<td>In-Class Exams</td>
<td>50%</td>
</tr>
<tr>
<td>Quizzes</td>
<td>15%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>25%</td>
</tr>
<tr>
<td>Homework</td>
<td>10%</td>
</tr>
</tbody>
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Grading will be based on each student’s composite (raw) score; scores in the range ≥ 90% will be guaranteed a grade of “A”, 80% or above at least a “B”, 70% or above at least a “C”, and 60% 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 performance trends over the course of the semester. Please note that the last day to withdraw from a class for the Spring term is March 30.

All homework, quiz and exam grades will be available to the individual student on CANVAS. Please note that only raw scores will be posted on CANVAS. If a grade is posted in error, students have up to one week after the posting to bring the error to the attention of the instructor. Grade corrections beyond one week are solely at the discretion of the instructor.

**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/](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.) be able to find and interpret materials property data, and use it in engineering solutions;
6.) understand the properties influencing materials selection, design, and processing.