

Purdue University
School of Materials Engineering

MSE 600 *Materials Engineering Fundamentals*

Fall 2019

Lecture: Tuesday and Thursday at 4:30 pm - 5:45 PM (Wang 2579)

Lecturer: Prof. Rod W. Trice, ARMS 2227, rtrice@purdue.edu

Lectures will be recorded in the classroom studio for students taking the course off campus through Purdue Engineering Professional Education (EPE). The recorded lectures will also be available to on-campus students.

Trice Office Hours: TBD

Required Textbook

Materials Science and Engineering: An Introduction, William D. Callister, Jr., **8th edition** is the required textbook. The 9th and 10th editions are acceptable, but Homework comes from 8th ed (but is not graded). Additional readings will be provided when necessary.

Reading the textbook is strongly recommended. This text is very clearly written and will supplement lectures. The attached schedule indicates the required readings.

Website

Homework problems and solutions, and links to other resources will be available on Blackboard. Your grades will also be posted there as well.

Examination Dates

Exam 1:	Thursday, about 6 weeks into the semester
Exam 2:	Thursday, about 12 weeks into the semester
Final Exam:	TBD/finals week

Course Overview for MSE 600:

Understand the fundamental basis for materials phenomena in terms of the hierarchy of structures (e.g., atomic, molecular, crystal, grain) and their relations to properties responses and processing. Develop a foundation for advanced studies in materials engineering and related fields.

Fundamental relationships between the internal structure, properties and processing in all classes of engineering materials. Comprehensive coverage spanning physical, chemical, thermal, mechanical, electrical, magnetic, and optical responses.

The course is intended for materials researchers from all backgrounds, as well as engineers working in product design, development and manufacturing who seek a deeper understanding of the full spectrum of engineering materials.

Class Topics

1. Introduction, bonding and crystal structure
2. Non-crystalline and molecular structure
3. Mechanical properties (elastic)
4. Mechanical properties (plastic and time-dependent)
5. Fracture of Materials
6. Diffusion
7. Phase equilibrium and phase diagrams
8. Kinetics and phase transformations
9. Metal Alloys and Processing
10. Processing of Glasses and Ceramics
11. Processing of Polymers
12. Composites
13. Corrosion
14. Electrical properties
15. Thermal properties
16. Magnetic properties
17. Optical properties

Lectures will emphasize the most important points but you are also responsible for the details in the reading that time may not permit covering in lecture. Feel free to ask short questions in lecture. Consult the schedule for required readings.

Lectures will be given from an iPad which allows Prof. Trice to annotate slides during lecture. Thus, I will make available the pdf of the lectures so that students can either print them off or annotate them using their preferred method (iPad, Surface Pro, etc.) The provided slides are only “sketches” of the lectures, and you will need to add your own notes to them during class – thus, hopefully, we will avoid “death by Power Point”. *A bound copy of the notes will be available at CopyMat Services in the village, near Basil Thai, for about \$30.*

Homework and Homework Solutions are available on Blackboard. While there are homework problems to do every week, there is *no homework assigned*. Homework is from the 8th edition of textbook.

Participation in recitation will not be scored, per se, but will be used in deciding borderline cases in final grading.

Examinations

All examinations are closed-book but you may use up to 1 sheet of HANDWRITTEN notes (8.5” x 11”, two sides). Besides this crib sheet, the only other things allowed for the exams are writing implements, eraser, straight edge (ruler), and a calculator. *You cannot use your phone as a calculator.*

If space allows, we will sit in alternate seating during exams grouped by recitation. More details before the first exam.

In case of emergency, e-mail Prof. Trice at rtrice@purdue.edu

Make-up exams or quizzes will be given only for the following verifiable reasons: serious illness, family emergencies, direct conflict with another scheduled exam (must inform instructor no later than two weeks prior), or official university absence. Do not schedule travel without knowing the final exam schedule.

Grading appeals will be considered up to one week after an exam is returned to you. Make no additional marks on the paper. Return the entire exam along with a brief, logical explanation of the basis for your appeal written on a separate sheet of paper.

Grading

Exam I (30% ea)	30%
Exam II (30%)	30%
Final Exam	40%

Cheating

Academic Dishonesty

Purdue University Regulations, Part 5, Section III-B-2-a describes the formal policies governing academic dishonesty. A guide providing specific examples, tips, and consequences is available from the Office of the Dean of Students at <http://www.purdue.edu/ODOS/osrr/integrity.htm>.

Campus Emergency Policy

In the event of a major campus emergency, course requirements, deadlines and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances. Any such changes will be posted to the course website. If you are unable to use Blackboard from home please let us know early in the semester so we can make other arrangements for your special needs.

THE BEST WAY TO DO WELL IN MY CLASS IS TO ATTEND ALL LECTURES.