

MSE 320: Materials Structure-Properties Laboratory

<i>Course description:</i>	Principles and techniques of optical metallography and other laboratory methods used in modern materials science and engineering.
<i>Number of credits:</i>	3 (1-6)
<i>Course Coordinator:</i>	Yuehe Lin and Collin Merriman
<i>Prerequisites by course:</i>	MSE 201 or concurrent enrollment
<i>Prerequisites by topic:</i>	<ol style="list-style-type: none">1. Crystal structures.2. Polycrystalline nature of engineering alloys.3. Phase diagrams.4. Links between structure, processing, and properties
<i>Postrequisites:</i>	MSE 323: Materials Characterization Laboratory (recommended)
<i>Textbooks/other required materials:</i>	Callister. <i>Materials Science & Engineering an Introduction</i> . Wiley
<i>Course objectives:</i>	<ol style="list-style-type: none">1. Develop techniques that will allow students to operate in a modern metallographic laboratory and analyze structures of a wide range of materials.2. Explore structure - processing - properties relationships in a wide variety of materials.3. Produce professional quality lab reports.
<i>Topics covered:</i>	<ol style="list-style-type: none">1. Optical microscopy and stereology.2. Heat treating.3. Phase identification.4. Sample preparation for optical microscopy.5. Basic mechanical testing.
<i>Expected student outcomes:</i>	<ol style="list-style-type: none">1. Ability to prepare standard metallographic samples on a wide range of materials.2. Ability to interpret microstructures in engineering materials (metals, ceramics, and polymers, and polymer matrix composites) using an optical microscope.3. Ability to perform quantitative metallography, including grain size and volume fraction calculations.4. Perform hardness and microhardness testing.5. Relate phase diagram to resulting microstructures.6. Interpret TTT curves.7. Ability to incorporate diffusivity data into structure – properties relationships.8. Prepare semiconductor and circuit board samples for structural analysis.
<i>Class schedule:</i>	1 hour lecture per week, for one semester
<i>Laboratory schedule:</i>	Two 3-hour laboratory sessions per week, for one semester.
<i>Contribution to meeting the professional component:</i>	Engineering Topics Other (development of technical writing skills)

Relationship of course to program objectives:

Meets:

1. School of MME MSE educational objectives: 1, 2, 3
2. ABET, Criterion 3 program outcomes: 2, 3, 4, 5, 6
3. School of MME MSE program outcomes: 2, 3, 4, 5, 6, 9, 11

Prepared by: Andrea Butcherite and Dr. Yuehe Lin

Date: May 30, 2018

POLICIES

A. Reasonable Accommodation (the nature of the particular course determines which one applies):

- **Pullman Campus.** Reasonable accommodations are available for students with a documented disability. If you have a disability and need accommodations to fully participate in this class, please either visit or call the Access Center (Washington Building 217; 509-335-3417) to schedule an appointment with an Access Advisor. All accommodations MUST be approved through the Access Center.
- **WSU Online Course.** Reasonable accommodations are available in online classes for students with a documented disability. All accommodations must be approved through your WSU Disability Services office. If you have a disability and need accommodations, we recommend you begin the process as soon as possible. For more information contact a Disability Specialist on your home campus: Pullman or WSU Online (<http://accesscenter.wsu.edu>), Spokane (<http://spokane.wsu.edu/students/current/studentaffairs/disability/>), Tri-Cities (<http://www.tricity.wsu.edu/disability>), Vancouver (<http://studentaffairs.vancouver.wsu.edu/student-resource-center/disability-services>).

B. Academic Integrity

WSU expects all students to behave in a manner consistent with its high standards of scholarship and conduct. Students are expected to uphold these standards both on and off campus and acknowledge the university's authority to take disciplinary action. The Standards of Conduct for Students can be found at <http://conduct.wsu.edu>.

C. WSU Safety

WSU is committed to maintaining a safe environment for its faculty, staff, and students. Safety is the responsibility of every member of the campus community and individuals should know the appropriate actions to take when an emergency arises. In support of our commitment to the safety of the campus community the University has developed a Campus Safety Plan, <http://safetyplan.wsu.edu>. It is highly recommended that you visit this web site as well as the University emergency management web site at <http://oem.wsu.edu/> to become familiar with the information provided.