

## ME 220: Materials Laboratory

<i>Course description:</i>	Mechanical behavior of materials and application to engineering structures.
<i>Number of credits:</i>	1 (0-3)
<i>Course Coordinator:</i>	J.L. Ding
<i>Prerequisites by course:</i>	CE 215 or concurrent enrollment
<i>Prerequisites by topic:</i>	<ol style="list-style-type: none"><li>1. Concepts of stress, strain, and their relationships.</li><li>2. Axial, bending, torsion, shear loads, and their combinations.</li></ol>
<i>Postrequisites:</i>	MSE/ME 413; ME 414 (recommended)
<i>Textbooks/other required materials:</i>	<ol style="list-style-type: none"><li>1. Ding, J.L., Sheldon, G.L. <i>Mechanics of Materials Laboratory Notes</i>, WSU Cougar Copies.</li></ol>
<i>Course objectives:</i>	<ol style="list-style-type: none"><li>1. To provide the students with hands-on experience in various material testing and experimental stress analysis methods, and engineering data analysis and report writing.</li><li>2. To familiarize the students with various types of mechanical behavior in response to different loading conditions.</li></ol>
<i>Topics covered:</i>	<ol style="list-style-type: none"><li>1. Tension test</li><li>2. Impact test</li><li>3. Fatigue test</li><li>4. Stress wave experiment</li><li>5. Torsion test</li><li>6. Strain gages</li><li>7. Combined stress analysis</li><li>8. Photoelasticity</li></ol>
<i>Expected student outcomes:</i>	<ol style="list-style-type: none"><li>1. Gain hands-on experience in conducting tension, torsion, impact, and fatigue tests.</li><li>2. Gain hands-on experience in using strain gages for one and two dimensional stress analysis.</li><li>3. Be able to extract mechanical properties of materials from tension, torsion, impact, and fatigue test data.</li><li>4. Appreciate the difference between the ductile and brittle behavior of materials and the environmental effects including temperature on such behavior.</li><li>5. Be able to apply Hooke's law in one and two dimensional stress analysis.</li><li>6. Be able to logically arrange, present, and summarize findings in a written report.</li></ol>
<i>Class schedule:</i>	One 50-minute lecture session every two weeks, for one semester.
<i>Laboratory schedule:</i>	One 2-hour and 50 minute laboratory session every two weeks, for one semester.
<i>Contribution to meeting the professional component:</i>	Engineering Topics
<i>Relationship of course to program objectives:</i>	Meets: <ol style="list-style-type: none"><li>1. School of MME ME educational objectives: 1, 2, 3</li><li>2. School of MME ME program outcomes: (a), (b), (g), (k)</li><li>3. ABET EC2000, Criterion 3 program outcomes: (a), (b), (g), (k)</li></ol>

*Prepared by:* J.L. Ding

*Date:* December 10, 2015

### **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.