

## MECH2040 Solid Mechanics I

<b>Course Code:</b> MECH2040	<b>Course Title:</b> Solid Mechanics I
<b>Required Course Or Elective Course:</b> Required	<b>Terms Offered (Credits):</b> Fall (3 credits)
<b>Faculty In Charge:</b> Wenjing YE and Qingping SUN	<b>Pre/Co-Requisites:</b> MECH 2020
<b>Course Structure:</b> Lecture: 2 sessions/week, 80 minutes/session	
<b>Textbook/Required Material:</b> Textbook: F. P. Beer, E. R. Johnston, J. DeWolf and D. Mazurek, <i>Mechanics of Materials</i> , 7 <sup>th</sup> ed. in SI units, McGraw-Hill Book Company, 2015	
<b>Course Description:</b> Stress and Strain, Analysis of Structure Members Subject to Axially Loading, Torsion and Bending, Columns, Energy Method	
<b>Course Topics:</b> <ol style="list-style-type: none"> <li>1. Stress and Strain and Their Relationship</li> <li>2. Axially Loaded Members - Stress, Displacement and Statically Indeterminate Problems</li> <li>3. Torsion – Torsional Diagram, Shear Strain and Stress, Displacement</li> <li>4. Transformation of Stress and Strain – Mohr Circle</li> <li>5. Pure Bending Beam</li> <li>6. Beam – Transverse Loading and Shear Stress</li> <li>7. Deflection and Statically Indeterminate Problems</li> <li>8. Columns – Stability, Buckling</li> <li>9. Energy Method</li> </ol>	
<b>Course Objectives:</b>	<ol style="list-style-type: none"> <li>1. To teach students the basics and applications of stress, strain and material properties.</li> <li>2. To teach students the determination of stresses in structures under common loading.</li> <li>3. To teach students the determination of deformation of structures under common loading.</li> <li>4. To teach students how to formulate and solve a structural engineering problem.</li> </ol>
<b>Course Outcomes:</b>	<ol style="list-style-type: none"> <li>A. Describe the basics of and relationship between stress and, strain, and distinguish normal and shear stress, extension and shear strain, and the corresponding material properties.</li> <li>B. Identify the qualitative features of the stresses, strains, material properties and area properties associated with axial loading, torsion and bending.</li> <li>C. Solve for stresses in a structural component due to axial load, torsion, and bending, acting individually or in combination.</li> <li>D. Solve for the deformation of a structural component due to axial load, torsion, and bend loads, acting individually or in combination.</li> <li>E. Solve for the principal stresses in structural components subjected to a combined state of loading.</li> <li>F. Identify, formulate and solve statically indeterminate structural components.</li> </ol>

<b>Assessment Tools:</b>	Regular homework assignments	20 %
	In class discussion	
	Mid-term and final examinations	80 %