



<b>Program and Degree: BSc in Aerospace Engineering</b>	
<b>Course Description</b>	
<b>Course Title</b>	<b>Strength of Materials</b>
<b>Prerequisites</b>	Statics
<b>The course aims</b>	<p>Students' acquaintance with the fundamentals of strength of metallic and non-metallic materials and their internal behavior and their deformation due to external forces.</p> <ol style="list-style-type: none"> <li>1- Ability of mathematical modeling of internal behavior and their deformation due to external forces</li> <li>2- Calculation of the stresses and strains created in the materials used in the aerospace industry under the influence of forces</li> </ol>
<b>Contents</b>	<p>1) Analysis of Stress and Strain: Stresses in the Members of a Structure, Normal stress and Shear stress, Normal Strain and Shearing Strain, Poisson's Ratio, Stress-Strain Curve, Elastic Constants, Ductile and Brittle behavior of materials, Hooke's Law, Bulk Modulus.</p> <p>2) Axial Loading: Deformations under Axial Loading, Saint-Venant's Principle, Stress Concentrations.</p> <p>3) Torsion: Material Behavior under Pure Torsion (Twisting Moment), Shear Stress Distribution in Solid and Hollow Round Members, Angle of Twist, Statically Indeterminate Shafts, Design of Power Transmission Shafts, Stress Concentrations in Circular Shafts, Torsion of Noncircular Members, Narrow Rectangular Beam Sections, Thin-Walled Hollow Shafts.</p> <p>4) Pure Bending: Symmetric Members in Bending, Elastic Stresses, Transversely loaded beams and shafts, Maximum Bending Stress, Stress Concentrations, Eccentric Axial Loading, and Unsymmetrical Bending Analysis.</p> <p>5) Shearing Stresses: Transverse loading and Shearing Stresses in Beams, Shear flow, Thin-Walled Members, Unsymmetrical Loading of Thin-Walled Members, Shear Center, Combined Stresses.</p> <p>6) Transformations of Stress and Strain: Transformation of Plane Stress, Mohr's Circle, Principal Stresses, Principal Planes and Maximum Shear Stress, Transformation of Plane Strain, Principal Strains and Maximum Shear Strain.</p>
<b>Duration</b>	<b>1 Semester (16 weeks)</b>
<b>Course Hours</b>	<b>3 hours/week</b>
<b>Course Type</b>	<b>Required</b>