



<b>Program and Degree: BSc in Aerospace Engineering</b>	
<b>Course Description</b>	
<b>Course Title</b>	<b>Aircraft structural analysis</b>
<b>Prerequisites</b>	Strength of materials, Algorithm and computer programming
<b>The course aims</b>	The course is aimed at introducing the bases of structural analysis to the undergraduate students of aerospace engineering. The students who successfully complete this course will be able to calculate the internal forces and displacements of the different components of an aerospace structure.
<b>Contents</b>	<ol style="list-style-type: none"> <li>1. Introduction to structural components of aircraft/spacecraft.</li> <li>2. Stability and determinacy: Equilibrium equations, definition of the instability and determination of the degree of indeterminacy.</li> <li>3. Structural analysis methods for calculation the internal forces of the statically determinate structures (beams, trusses, and frames).</li> <li>4. Deflection of the statically determinate beams: Differential equation for deflection of an elastic beam, Integration methods, Moment-Area method.</li> <li>5. Energy methods: Strain energy, Impact loads, Deflections by energy methods, Virtual work method for deflections.</li> <li>6. Structural analysis methods for statically indeterminate structures: Analysis of indeterminate system based on superposition, Displacement and Force method, the three-moment equation for beams with two adjoining spans.</li> <li>7. Structural analysis methods for symmetric structures.</li> <li>8. Structural Stability: Buckling Bases, Euler Formula, Boundary conditions effects and generalized Euler Formula, Eccentricity effects and Secant formula, Effects of side loads.</li> </ol>
<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>