

**AIRCRAFT DESIGN LAB**

<b>V Semester</b>								
<b>Course Code</b>	<b>Category</b>	<b>Hours / Week</b>			<b>Credits</b>	<b>Maximum Marks</b>		
<b>A5AE33</b>	<b>PCC</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>CIA</b>	<b>SEE</b>	<b>Total</b>
		-	-	3	1	30	70	100
<b>COURSE OBJECTIVES:</b>								
<p>The primary objective of this subject is to provide the students with the necessary background and engineering applications to design an aircraft. during this course student shall be able to</p> <ol style="list-style-type: none"> <li>1. Outline the process of design and development of a product.</li> <li>2. Draw / develop a configuration layout of the design.</li> <li>3. Perform calculation to complete the conceptual design</li> <li>4. Estimate the importance of interdisciplinary aspects in design of a product like aircraft.</li> <li>5. Perform trade studies.</li> <li>6. Estimate the lifecycle cost of a product.</li> </ol>								
<b>LIST OF EXPERIMENTS</b>								
<ol style="list-style-type: none"> <li>1. Objectives Requirements of the vehicle</li> <li>2. Conceptual Sketch and first estimate of weight</li> <li>3. Initial Sizing</li> <li>4. Fuselage and control surfaces</li> <li>5. Configuration layout.</li> <li>6. Load estimates</li> <li>7. Plot NACA 4 digit aerofoil</li> <li>8. Induced drag estimation</li> <li>9. Fixed engine sizing</li> <li>10. Trade off study on fixed engine sizing</li> <li>11. Fuselage design</li> <li>12. Cost analysis for anti-submarine warfare aircraft</li> </ol>								
<b>Reference Books:</b>								
<ol style="list-style-type: none"> <li>1. Raymer, Daniel P. (2006), Aircraft Design: A Conceptual Approach, 4th edition, AIAA Educational Series, USA.</li> <li>2. Bruhn. E. H (1973), Analysis and Design of Flight Vehicles Structures, New Edition, JacobsPublishing House, USA.</li> </ol>								
<b>COURSE OUTCOMES:</b>								
<p>At the end of the course the students are able to:</p> <ol style="list-style-type: none"> <li>1. Calculate the maximum takeoff weight (MTOW)and plot the variation of range and payload with MTOW</li> <li>2. Recommend an airfoil based on the category of aircraft and develop NACA 4 digit airfoil profile</li> <li>3. Calculate wing loading and power loading and thrust loading for the aircraft</li> <li>4. Perform cost analysis and calculate cost of the given aircraft</li> <li>5. Develop fuselage lofting techniques of an aircraft</li> <li>6. Predict the drag associates with each component of aircraft structure</li> </ol>								