

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**B.E. SEMESTER : VIII**  
**AERONAUTICAL ENGINEERING**

Subject Name: **AIRCRAFT DESIGN II**

Sr. No.	Course Contents	Total Hrs
1.	<b>OVERVIEW OF THE DESIGN PROCESS:</b> Introduction, Phases of aircraft design, Integrated product development & design, Aircraft configuration.	<b>04</b>
2.	<b>INITIAL SIZING:</b> Rubber engine sizing and Fixed engine sizing, Geometry sizing, Control surface sizing.	<b>03</b>
3.	<b>CONFIGURATION LAYOUT &amp; LOFT:</b> End products of configuration layout, Conic lofting, Conic fuselage development, Flat-wrap fuselage lofting, Circle-To-Square adapter, Fuselage loft verification, Wing/tail layout and loft, Aircraft Layout Procedure, Wetted Area Determination, Volume Determination.	<b>10</b>
4.	<b>SPECIAL CONSIDERATIONS IN CONFIGURATION LAYOUT:</b> Aerodynamic considerations, Structural considerations, Radar detectability, Infrared detectability, Visual detectability, Aural signature, Vulnerability Considerations, Crashworthiness considerations, Producibility considerations, Maintainability considerations.	<b>10</b>
5.	<b>CREW STATION, PASSENGERS AND PAYLOAD:</b> Crew station, Passenger compartment, Cargo provisions, Weapons carriage, Gun installation.	<b>05</b>
6.	<b>PROPULSION AND FUEL SYSTEM INTEGRATION:</b> Propulsion selection, Jet engine integration, Propeller engine integration, Fuel system.	<b>04</b>
7.	<b>LANDING GEAR &amp; SUBSYSTEMS:</b> Shock absorbers, Castoring wheel geometry, Gear retraction geometry, Sea planes, Sub systems (Hydraulics, Electrical systems, Pneumatic System, Auxiliary/Emergency power, Avionics).	<b>05</b>
8.	<b>STRUCTURE AND LOADS:</b> Load Categories, Air Loads(Maneuver Loads, Gust Loads, Air loads on lifting surfaces, Air loads due to Control deflection) Inertial Loads, Power plant loads, Landing gear Loads, Structure Fundamentals, Material selection, Material Properties, .	<b>08</b>
9.	<b>INTRODUCTION TO ADVANCED CONCEPTS IN AIRCRAFT DESIGN:</b> Performance estimation, parametric analysis & optimization.	<b>02</b>
10.	<b>DESIGN OF UNIQUE AIRCRAFT CONCEPT:</b> Jet VTOL, Prop VTOL and different Helicopter's configurations.	<b>05</b>

**Books:**

- (1) Aircraft design – A conceptual approach by D.P. Raymer
- (2) Aircraft conceptual design analysis- by Denis Howe
- (3) E. Torenbeck, “Synthesis of subsonic airplane design”, Delft Univ. Press 1977
- (4) Aircraft Performance and Design- by John D. Anderson, Jr.