GUJARAT TECHNOLOGICAL UNIVERSITY
AERONAUTICAL ENGINEERING
B. E. SEMESTER: VII

Subject Name: **Aircraft Design - I**
Subject Code: **170101**

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	University Exam (E)		Mid Sem Exam (Theory) (M)	Practical (Internal)
				Theory	Practical		
4	0	2	6	70	30	30	20

Sr. No	Course Content	Total Hrs.
1.	**Introduction to conceptual design of a flight vehicle design:** Aircraft purpose, Payload, cruise & Maximum Speed, Range, Endurance, take off and landing distance, design process, conceptual design.	8
2.	**Preliminary estimate of take off weight:** Fuel fraction estimate, total take off weight, spread sheet of take off weight estimate.	3
3.	**Wing loading selection:** wing loading effect on take off, landing, climb, acceleration, range, combat, flight ceiling & glide rate.	6
4.	**Fuselage design:** Volume considerations, Aerodynamic considerations, drag estimation, spread sheet for fuselage design.	4
5.	**Horizontal and Vertical Tail design:** Tail arrangement, horizontal and vertical tail sizing, tail plan form shape, airfoil section type, tail placement, spread sheet for tail design.	6
6.	**Engine selection:** Propulsion selection, No.s of engines, Engine ratings, turbojet engine sizing, propulsion system.	5
7.	**Take off and landing distance design:**	2

8.	**Structural design and material selection:** Material selection, structural loads, internal structure design, material selection.	4
9.	**Static Stability and control:** Refined weight estimate, static stability.	2
10.	**Cost estimation:** Cost estimating relationships, Unit prize.	2
11.	**Basics of helicopter design:** Main Rotor design, airfoils for rotor blades, tail rotor design, Horizontal and vertical stabilizers, control systems, airspeed systems, The turbine engine, Icing and deicing, Structural loads & components lives, Wind tunnel testing and simulation, Helicopter noise, Helicopter vibration.	12

Text Books:

1. Design of Aircraft, By Thomas C Corke
2. Aircraft Conceptual Design Analysis, By Denis Howe