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

Subject Name: **Flight Mechanics**
Subject Code: **150101**

Teaching Scheme				Evaluation Scheme		
Theory	**Tutorial**	**Practical**	**Total**	**University Exam (Theory) (E)**	**Mid Sem Exam (Theory) (M)**	**Internal Assessment (I)**
3	1	0	4	70	30	50

Sr. No.	Course Content
1.	**Standard Atmosphere:** Definition of altitude, The hydrostatic equation, Relation between geopotential and geometric altitudes, Definition of standard atmosphere, Pressure, Density & temperature altitudes.
2.	**Airfoils and Wings:** Introduction, Airfoil nomenclature, Lift, Drag & Moment coefficients, Infinite & Finite wings, Lift coefficient from pressure coefficient, Compressibility correction, Critical & drag-divergence Mach number, Critical pressure coefficient, Wave drag, Induced drag, Swept back wing.
3.	**Airplane Performance:** Introduction, Equation of motion, Thrust required for level unaccelerated flight, Thrust available and maximum velocity, Power required for level unaccelerated flight, Power available and maximum velocity for jet engine and reciprocating engine-propeller combination, Altitude effect on power required and available, Rate of climb, Gliding flight, Absolute and service ceilings, Time to climb, Range & endurance for propeller driven airplane and jet engine driven airplane, Take off & landing performance, Turning flight and V-N diagram, Accelerated rate of climb.
4.	**Principles of Stability and Control:** Introduction, Definitions of Stability & Control, Moments on Airplane, Absolute angle of attack, Criteria for longitudinal static stability, Total pitching moment about C.G., Equation of longitudinal static stability, Neutral point, Static margin, The concept of static longitudinal stability, Calculation of elevator angle to trim, Stick free & Stick fixed static stability, Elevator hinge moment, Stick free longitudinal static stability.
5.	**High lift Systems:** Increasing area, Increasing lift coefficient, Multi-element airfoil, Leading edge trailing edge devices, Effect of sweepback, Deep stall, Effect of reynolds number, Power augmented lift.

Reference Books:

1. Introduction to flight: John D. Anderson Jr., Tata McGraw – Hill Book Company.
2. Fundamentals of Flight: Richard S. Shevell, Pearson Education Limited
3. Flight without Formulae: A. C. Kermode
4. Aerodynamics for Engineering Students: Houghton & Carrathur
5. Aerodynamics: L. J. Clancy Bertin.
6. Aerodynamics for Engineers: & Smith