

4th semester

Aircraft structure-1

Subject code-RAE4C002

Module-I:

Airplane Structures And Materials

General types of construction, monocoque, semi-monocoque and geodesic constructions, typical wing and fuselage structure. metallic and non-metallic materials, use of aluminium alloy, titanium, stainless steel and composite materials. Structural nomenclature–Types of loads, load factor–Symmetric manoeuvre loads – Velocity (v-n) diagram – Function of structural components.

Module-II:

Statically Determinate and Indeterminate Structures

Analysis of plane Truss-Method of joints-3 D Truss-Plane frames._Propped Cantilever-Fixed-Fixed beams-Clapeyron's Three Moment Equation – Moment_Distribution Method, Introduction to Composite beam.

Module-III:

Energy Methods

Strain Energy due to axial, bending and Torsional loads – Castigliano's theorems- Maxwell's Reciprocal theorem, Unit load method - application to beams, trusses, frames, rings, etc.

Module-IV:

Columns

Columns with various end conditions – Euler's Column curve – Rankine's formula - Column with initial curvature - Eccentric loading – South well plot – Beam column.

Module-V:

Failure Theory

Maximum Stress theory – Maximum Strain Theory – Maximum Shear Stress Theory – Distortion Theory – Maximum Strain energy theory – Application to aircraft Structural problems.