

## **AEPC2004 AIRCRAFT STRUCTURES - I (3-0-0)**

### **Module-I: Airplane Structures and Materials (6 Hrs.)**

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 (6 Hrs.)**

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 (6 Hrs.)**

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 (6 Hrs.)**

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 (6 Hrs.)**

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

### **Textbook(s):**

1. Aircraft Structures for Engineering Students by TH G Megson
2. Strength of Materials by Hibler.
3. Strength of Materials by R.S.Khurmi.

### **Reference Book(s):**

1. Aircraft Structures, David J. Peery, McGraw Hill Book Company.
2. Energy Theorems and Structural Analysis, Argyris J.H. and Kelsey S. Butterworths Scientific Publications 1960.