BASIC AIRCRAFT STRUCTURES & SOM

DETAILED SYLLABUS

OBJECTIVES

It aims at enabling the student to understand & analyze various types of loads and stresses acting on structures

UNIT- I SIMPLE STRESSES AND STRAINS

Simple stresses & strains viz. tensile, compressive, Shear, Crushing, Thermal stresses, & corresponding strains–Problems on Direct Stress & Linear Strain- Stress-, Hook's Law- Strain curve for Ductile material and Brittle material with all parameters- factor of Safety. Elastic Constants - Lateral Strain, Poisson's ratio, Bulk Modulus, Shear Modulus, Volumetric Strain- Relation between elastic constants- Problems on elastic constants.

UNT- II SHEAR FORCE AND BENDING MOMENT DIAGRAMS

Definition - Shear Force and Bending Moment –Types of beams, types of load acting on beams, Sagging & Hogging Bending Moment and its importance –sign convention to draw SFD and BMD- Concept of Maximum bending moment.-Drawing S.F & B.M Diagram for Cantilever, Simply Supported Beams and Cantilever beam subjected to Point Load and U.D.L. problems on cantilever and simply supported beams

UNIT- III MOMENT OF INERTIA

Centre of Gravity, Moment of Inertia & its Importance -Parallel & Perpendicular Axis Theorem C.G of Rectangle, Triangle, Circle, Semi-circle, T-Section, I-Section, L-Section, Channel-Section. Simple problems on moment of inertia

UNIT- IV TORSION

Introduction to Torsion, Angle of Twist Assumptions in theory of Torsion -Power Transmitted by a shaft, axle of solid and hollow sections subjected to Torsion – Comparison between Solid and Hollow Shafts subjected to pure torsion (No problems)

UNIT- V A BRIEF HISTORY AND MAJOR AIRCRAFT STRUCTURAL STRESS

Introduction to brief history of Aircraft Structures---The four forces acting on aircraft- There are five major stresses to which all aircraft are subjected: - Tension-Compression- Torsion-Shear-Bending.

UNIT- VI TRUSSES AND TRUSS ANALYSIS

Major Components of aircraft and their functions- Definition, types of trusses, internal forces, primary and secondary stress, truss determinacy analysis.

TEXT BOOKS

1. Ramamurtham. S., “Strength of Materials”, 14th Edition, DhanpatRai Publications, 2011
2. Khurmi R S, “Applied Mechanics and Strength of Materials”, 5 Edition, S.Chandand company
3. Aircraft Structure By FAA
4. Aircraft Structure By Lalit Gupta And OP Sharma

REFERENCES

1. Popov E.P, “Engineering Mechanics of Solids”, 2nd Edition, Prentice-Hall of India, New Delhi, 2002.
2. Nash W.A, “Theory and problems in Strength of Materials”,Schaum Outline Series, McGraw-Hill Book Co., New York, 1995.
3. Kazimi S.M.A, “Solid Mechanics”, Tata McGraw-Hill Publishing Co., New Delhi, 2003.
4. Ryder G.H, “Strength of Materials”, 3rd Edition, Macmillan India Limited, 2002.
5. Bansal R. K, “Strength of Materials”,Laxmi Publications, New Delhi, 2012.
6. Timoshenko S.P, “Elements of Strength of Materials”, Tata McGraw-Hill, Delhi,