

For Syllabus, Question Papers, Notes & many More

AE6403 AIRCRAFT STRUCTURES – I

DETAILED SYLLABUS

UNIT I STATICALLY DETERMINATE & INDETERMINATE STRUCTURES

Plane truss analysis – method of joints – method of sections – method of shear – 3-D trusses – principle of super position, clapeyron's 3 moment equation and moment distribution method for indeterminate beams.

UNIT II ENERGY METHODS

Strain Energy in axial, bending, torsion and shear loadings. Castigliano's theorems and their applications. Energy theorems – dummy load & unit load methods – energy methods applied to statically determinate and indeterminate beams, frames, rings & trusses.

UNIT III COLUMNS

Euler's column curve – inelastic buckling – effect of initial curvature – the Southwell plot – columns with eccentricity – use of energy methods – theory of beam columns – beam columns with different end conditions – stresses in beam columns.

UNIT IV FAILURE THEORIES

Ductile and brittle materials – maximum principal stress theory - maximum principal strain theory - maximum shear stress theory - distortion energy theory – octahedral shear stress theory.

UNIT V INDUCED STRESSES

Thermal stresses – impact loading – Fatigue – Creep - Stress Relaxation.

TEXT BOOKS

1. Timoshenko and Gere, "Mechanics of Materials", Tata McGraw Hill, 1993.
2. Megson T M G, "Aircraft Structures for Engineering students" Elsevier Science and Technology, 2007.
3. Peery and Azar, "Aircraft Structures"

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REFERENCES

1. Donaldson, B.K., "Analysis of Aircraft Structures - An Introduction", McGraw Hill, 1993.
2. Bruhn E F, "Analysis and Design of Flight Vehicle Structures", Tri-State Off-set Company, USA, 1985.
3. Peery, D.J. and Azar,J.J., "Aircraft Structures", 2nd Edition, McGraw – Hill, N.Y, 1999.

OBJECTIVES

- To provide the students an understanding on the linear static analysis of determinate and indeterminate aircraft structural components.
- To provide the design process using different failure theories.