Aerospace Structural Design Syllabus

Aircraft Basics and Systems

Evolution of aircraft, Aerospace industry overview, Aircraft classifications, Aircraft structure components Flight controls & Fuel system, Hydraulic system, Landing gear system, Powerplants, Electrical & Avionics system, ATA Standards, Fire Protection System & Human Factors

Basics of Aerodynamics

Basic equations of motion, Classification of Flows, Flow past bodies, Vortex motion, Lift, Drag, moments, Inviscid aerodynamics, Subsonic, transonic, and supersonic airfoil theory; Prandtl's lifting line theory, Downwash. Boundary - Layer Theory Introduction to compressible flow; normal and oblique shock waves.

Aerospace Materials

Stress-strain, Material properties (Stiffness, Strength, Toughness, Resilience etc.), types of fracture, creep, fatigue, S-N curves and fatigue life, Aerospace metallic materials, metal manufacturing (wrought products & Cast products), Metallic machining process, Aerospace Composite materials, Composite Manufacturing (Hand layup, pressure-bag, vacuum bag, Autoclave, RTM, filament winding, pultrusion), Advantages of Composite, NDT testing methodologies.

Aerospace Fasteners

Sheetmetal handing calculation (bend deduction & bend Allowance) Shear stress, single shear and double shear, types of joints (lap joints & butt joint), fastener related hand calculation, Types of fasteners used in aircraft structure design (Solid Rivets, Blind Rivets, Hi-loks, Lockbolts, Taper-lock, Blind Bolts, Shear Bolts, Tension screws & High Tension Bolt).

Aerospace Advanced Structural Design

Aircraft Design Process, product life cycle, Aircraft design cycle (conceptual, preliminary & detailed phase),Design constraints, Overview regulatory bodies FAR,EASA & ICAO, financial factors and market, Airworthiness, Loads acting on Aircraft, Aircraft wing design, Importance of swept wing, Types of empennage design, types of engine placement, rake angle in landing gear, Skin design, stringer design, frames and brackets(mechanical and electrical)

Geometric dimensioning and tolerancing

Introduction to GD&T, Tolerance (Unilateral and Bilateral), Types of measuring gauges, Features and Rules of GD&T(MMC & LMC), types of fits (Interference, clearance and transition),Hand calculation of fits, Datums Control, Form Tolerances, Orientation Tolerances, Profile Tolerances, Location Tolerances, Runout Tolerances, surface roughness.

Tool Training-Catia V5(Basic)

Sketcher, Part body (Level 1, Level 2, Level 3, Level 4), Sheetmetal and basic drafting

Catia V5(Advanced)

Assembly, Surface design, Shape design, Part body (Level 5) and Advanced drafting