

AIRCRAFT STRUCTURES

DETAILED SYLLABUS

OBJECTIVES

It aims at enabling the student to understand & analyze the structural construction of the aircraft and the various loads acting on the structure

UNIT- I AIR FRAME CONSTRUCTION AND INTRODUCTION TO FIXED WING AIRCRAFT, AND LOCATION NUMBERING SYSTEM

AIR FRAME CONSTRUCTION, Structural members- FIXED WING AIRCRAFT, Identification and explanation of aircraft structural components for, typical fixed wing, single engine, propeller driven aircraft, typical fixed wing, multi engine aircraft- LOCATION AND NUMBERING SYSTEM- Purpose of the location numbering system- Station diagram for an aircraft fuselage.

UNIT- II FUSELAGE OF AIRCRAFT

FUSELAGE OF AIRCRAFT- Fuselage-Basic explanation of fuselage- TYPES OF FUSELAGE WITH DIAGRAMS- Truss type fuselage- Monocoque type fuselage- Semi-monocoque type

UNIT- III WING STRUCTURES

WING STRUCTURES- Wing structures -general explanation of three fundamental designs for wing structure, Mono spar, Multi spar, Box Beam- Wing configurations-Introduction, No of wings, position of wings, wing support, wing plan form (aspect ratio, wing sweep, chord variation, asymmetrical), tail plane and fore plane, dihedral / anhedral, leading edge / trailing edge shapes- SPARS AND RIBS, Purpose and general explanation of spars with types and construction, Purpose and general explanation of ribs with types and construction

UNIT- IV BASICS OF NACELLES/PODS

BASICS OF NACELLES/PODS- Explanation of Nacelles / pods, engine mounts, Cowlings, Skin & Fairing, Access and inspection doors- Aircraft painting and finishing, Explanations of importance and requirements of painting of aircraft, Types of paints, methods of painting, defects in painting- BASICS OF HONEY COMB SECTION WINGS, Basic diagram & Explanation, types of honeycomb structures, Areas of application.

UNIT- V MAIN CONTROL SURFACES

Explanation and purpose of main control surfaces- classification of main control surfaces- primary control surfaces (explanation of ailerons, elevator and rudder)- Secondary control surfaces (explanation of tabs etc.)

UNIT- VI LOADS ON AIRCRAFT

concept of basic loads and other Types of loads on the aircraft- Load factor, Limit load and Design load and its implications, Concept of gust loads, Load factor –velocity V-n diagram, explanation and its importance

TEXT BOOKS

Aircraft structures vol II By Dr. Lalit Gupta and O.P.Sharma

REFERENCES

1. FAA Airframe and powerplant mechanics airframe hand book: AC65:15A
2. Fundamental of aircraft structure By. Barton Millard