

	PHL CAR-147 (Basic) F/o Engineering and Technology ,Jamia Millia Islamia B.Sc (Aeronautics) Subject: Aircraft Structure and Associated Systems	Credits (T)-04
		Sub Code : C 1

Theory

- C1.1 Introduction to General term and vocabulary used in Aeronautical science**
Introduction to aircraft technical literature.
Introduction to ATA system
- C1.2 Introduction to aircraft, major aircraft components, aircraft systems and their functions, reference lines, station and zone identification systems**
- C1.3 Airframe Structures — General Concepts**
Airworthiness requirements for structural strength; Structural classification, primary, secondary and tertiary; Fail safe, safe life, damage tolerance concepts; Stress, strain, bending, compression, shear, torsion, tension, hoop stress, fatigue; Lightning strike protection provision. Drains and ventilation provisions, System installation provisions Aircraft bonding and continuity. Construction methods of: stressed skin fuselage, formers, stringers, longerons, bulkheads, frames, doublers, struts, ties, beams, floor structures, reinforcement, methods of skinning, anti-corrosive protection, wing, empennage and engine attachments; Describe current practice in aircraft design related to load transfer, load path continuity and reduction of stress raisers in pressurized fuselages.
- C1.4 Fasteners used on aircraft**
Fasteners, Screw threads
Screw nomenclature; Thread forms, dimensions and tolerances for standard threads used in aircraft; measuring screw threads;
Bolts, studs and screws
Bolt types: specification, identification and marking of aircraft bolts, international standards; Nuts: self-locking, anchor, standard types; Machine screws: aircraft specifications; Studs: types and uses, insertion and removal; Self tapping screws, dowels.
Aircraft rivets
Types of solid and blind rivets: specifications and identification, heat treatment.
Riveting
Riveted joints, rivet spacing and pitch; Tools used for riveting and dimpling; Inspection of riveted joints.
- C1.5 Structural Assembly**
Structural assembly techniques: riveting, bolting, bonding methods of surface protection, such as chromating, anodising, painting; Surface cleaning. Airframe symmetry: methods of alignment and symmetry checks. Complete airframe for symmetry fuselage for twist and bending, vertical stabiliser for alignment wings and horizontal stabilisers for dihedral and incidence
- C1.6 Airframe Structures — Aeroplane**
Fuselage (ATA 52/53/56) :Construction and pressurisation sealing; Wing, stabiliser, pylon and undercarriage attachments; Seat installation and cargo loading system; Doors and emergency exits: construction, mechanisms, operation and safety devices; Windows and windscreen construction and mechanisms.

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C1.7 Wings (ATA 57)

Anhedral, dihedral incidence angle interplane struts longitudinal dihedral rigging position, stagger, wash in, washout Construction; Fuel storage; Landing gear, pylon, control surface and high lift/drag attachments.

C1.8 Stabilizers

Construction; Control surface attachment.

C1.9 Flight Control Surfaces (ATA 55/57)

Construction and attachment; Balancing — mass and aerodynamic.

C1.10 Nacelles/Pylons (ATA 54)

Construction; Firewalls; Engine mounts.

Reference Books:

Dictionary of Aeronautical terms (Dale Crane)

Aircraft handbook FAA (AC 65-15 A)

Aircraft structure Ch. 01 (FAA)

Aircraft Construction Repair and Inspection-By Joe Christy

Aviation Maintenance Technician Hand book by FAA

Aircraft Maintenance and Repair- Delp/Bent/McKinley, AC 43.1B

	PHL CAR-147 (Basic) F/o Engineering and Technology ,Jamia Millia Islamia B.Sc (Aeronautics) Subject: AIRCRAFT SYSTEMS 1	Credits (T)-04
		Sub Code : C10

Theory

- C10.1 **Aircraft Weight and Balance**
(a) Centre of Gravity/Balance limits calculation: use of relevant documents;
(b) Preparation of aircraft for weighing; Aircraft weighing;
- C10.2 **Aircraft Handling and Storage**
Aircraft taxiing/towing and associated safety precautions; Aircraft jacking,
chocking, securing and associated safety precautions; Aircraft storage methods;
Refuelling /defueling procedures; De-icing/anti-icing procedures; Electrical,
hydraulic and pneumatic ground supplies. Effects of environmental conditions on aircraft
handling and operation.
- C10.3 **Pneumatic/Vacuum (ATA 36)**
System lay-out; Sources: engine/APU, compressors, reservoirs, ground supply;
Pressure control; Distribution; Indications and warnings; Interfaces with other
systems.
- C10.4 **Air Conditioning and Cabin Pressurization (ATA 21)**
Air supply- Sources of air supply including engine bleed, APU and ground cart;
Air Conditioning- Air conditioning systems; Air cycle and vapour cycle machines
Distribution systems; Flow, temperature and humidity control system.
Pressurization - Pressurization systems; Control and indication including control
and safety valves;
Cabin pressure controllers. Safety and warning devices; Protection and warning
devices.
- C10.5 **Equipment and Furnishings (ATA 25)**
Emergency equipment requirements; Seats, harnesses and belts, electronic
emergency equipment requirements
Cabin lay-out, cargo retention; Equipment lay-out; Cabin Furnishing Installation;
Cabin entertainment equipment; Galley installation; Cargo handling and retention
equipment;
Airstairs. Lifting system; Emergency flotation systems;
- C10.6 **Flight Controls (ATA 27)**
Primary controls: aileron, elevator, rudder, spoiler; Trim control; Active load
control;
High lift devices; Lift dump, speed brakes; System operation: manual, hydraulic,
pneumatic, electrical, fly-by-wire; Artificial feel, Yaw damper, Mach trim, rudder limiter, gust
locks systems; Balancing and rigging; Stall protection/warning system.
- C10.7 **Fuel Systems (ATA 28)**
System lay-out; Fuel tanks; Supply systems; Dumping, venting and draining; Crossfeed and
transfer; Indications and warnings; Refuelling and defueling; Longitudinal balance fuel
systems.
- C10.8 **Hydraulic Power (ATA 29)**
System lay-out; Hydraulic fluids; Hydraulic reservoirs and accumulators; Pressure
generation: electric, mechanical, pneumatic; Emergency pressure generation;
Filters; Pressure Control;
Power distribution; Indication and warning systems; Interface with other systems.
- C10.9 **Ice and Rain Protection (ATA 30)**

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		Sub Code : C10

Ice formation, classification and detection; Anti-icing systems: electrical, hot air and chemical; De-icing systems: electrical, hot air, pneumatic and chemical; Rain repellent; Probe and drain heating; Wiper systems

C10.10 Landing Gear (ATA 32)

Construction, shock absorbing; Extension and retraction systems: normal and emergency;

Indications and warning; Wheels, brakes, antiskid and auto-braking;

Tyres; Steering; Air-ground sensing; Skids, floats

C10.11 Abnormal Events (ATA 05)

(a) Inspections following lightning strikes and HIRF penetration.

(b) Inspections following abnormal events such as heavy landings and flight through turbulence.

Reference Books:

Airframe and Powerplant Mechanics (AC 65-15A) -Airframe Hand Book FAA

Civil Aircraft Inspection Procedure (CAP 459) Part II Aircraft

A & P technician Air Frame Text Book by Jeppesen

Aircraft Repair Manual (FAA-AC-43.13)-By Larry Reithmaier

Aviation Maintenance Technician Hand book by FAA

Hydraulic Servo Systems by M. GUILLON:

Aircraft Instruments-by E.H.J.Pallett

Aircraft Electrical System-by E.H.J.Pallett

	PHL CAR-147 (Basic) F/o Engineering and Technology ,Jamia Millia Islamia B.Sc (Aeronautics) Subject: AIRCRAFT SYSTEMS 2 Part I	Credits (T)-04
		Sub Code : C12

Theory

C12.1 Aircraft Electrical Power System (ATA 24)

Batteries Installation and Operation; DC power generation; AC power generation; Emergency power generation; Voltage regulation; Power distribution; Inverters, transformers, rectifiers; Circuit protection; External/Ground power;

C12.2 Aircraft Lights System (ATA 33)

External: navigation, anti-collision, landing, taxiing, ice; Internal: cabin, cockpit, cargo; Emergency Lights.

C12.3 Instrument System (ATA 34)


Direct reading pressure and temperature gauges; Temperature indicating systems; Fuel quantity indicating systems; Gyroscopic principles; Artificial horizons; Attitude director, direction indicator, horizontal situation indicator, turn and slip indicators, turn coordinator; Directional gyros; Ground Proximity Warning Systems; Compass systems: direct reading, remote reading; Flight Data Recording systems; Stall warning systems and angle of attack indicating systems; Vibration measurement and indication; Glass cockpit.

C12.7 Integrated Modular Avionics (ATA42)

Functions that may be typically integrated in the Integrated Modular Avionic (IMA) modules are, among others: Bleed Management, Air Pressure Control, Air Ventilation and Control, Avionics and Cockpit Ventilation Control, Temperature Control, Air Traffic Communication, Avionics Communication Router, Electrical Load Management, Circuit Breaker Monitoring, Electrical System BITE, Fuel Management, Braking Control, Steering Control, Landing Gear Extension and Retraction, Tyre Pressure Indication, Oleo Pressure Indication, Brake Temperature Monitoring, etc.; Core System; Network Components

Reference Books:

Aviation Electronics by Keith W Bose
Aircraft Instruments-by E.H.J.Pallett
Aircraft Instruments-by C.A.Williams
Avionics Systems operation & Maintenance by James W Wasson
Principles of Servo mechanism-by A Typers & R.B.Miles
Aircraft Electricity and electronics-by Bent McKinley and also by Eismen/Bent
McKinley Civil Aircraft Inspection Procedure(CAP 459) -Part II
Aircraft The Mechanism of Inertial Position and Heading Indication by Winston Merkey John Hovorka

	PHL CAR-147 (Basic) F/o Engineering and Technology ,Jamia Millia Islamia B.Sc (Aeronautics) Subject: Flight Navigation And Guidance	Credits (T)-04
		Sub Code : DSE6

Theory

DSE6.1 GENERAL

Review of flight mechanics, Dynamic of an aircraft relative to the reference coordinate located on the aircraft centre of gravity. Forces and moments acting on the aircraft Equilibrium of the forces and moments acting on the aircraft, aircraft equation of motion and aircraft static stability.

DSE6.2 NAVIGATION

Basic concepts of navigation process with guidance circumference related to Control Circumference, Determination of position and motion of an aircraft through measurements of a respective geometric configuration relative to reference.

DSE6.3 CONTROL

Basic linear system and classical control theory. Mathematical model representation of dynamic system. Understanding of open and closed loop system, feedback application, Stability analysis, dynamic analysis at frequency domain and time domain. Feedback gain design with root locus method and application of flight control systems.

DSE6.4 GUIDANCE

Primary functions in flight attitude control (auto pilot), Stability augmentation system (SAS), and Control Augmentation system (CAS) longitudinal and lateral directional modes of flight. Satellite based navigation concept such as GPS application and the basic concept of inertial navigation, Required Navigation Procedure

DSE6.5 FLIGHT MANAGEMENT

Calculation of weight and balance, familiarization with navigation of modern aircraft using flight management and guidance system, performance of aircraft, optimization of fuel consumption using flight management system.

Reference Books:

Avionics Navigation Systems, M.Kayton, W. Fried
Aircraft Radio System-by J. Powell
Electronic Communication System by George Kennedy