

	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 MATERIALS AND HARDWARE	Credits (T)-04
		Sub Code : C 5

Theory

- C5.1 **AIRCRAFT MATERIALS AND HARDWARE**
Aircraft Materials — Ferrous
(a) Characteristics, properties and identification of common alloy steels used in aircraft; Heat treatment and application of alloy steels;
(b) Testing of ferrous materials for hardness, tensile strength, fatigue strength and impact resistance.
- C5.2 **Aircraft Material — Non-Ferrous**
(a) Characteristics, properties and identification of common non-ferrous materials used in aircraft; Heat treatment and application of non-ferrous materials;
(b) Testing of non-ferrous material for hardness, tensile strength, fatigue strength and impact resistance.
- C5.3 **Aircraft Materials - Composite and Non- Metallic**
(a) Characteristics, properties and identification of common composite and nonmetallic materials, other than wood, used in aircraft; Sealant and bonding agents.
(b) The detection of defects/deterioration in composite and non-metallic material. Repair of composite and non-metallic material.
- C5.4 **Wooden structures**
Construction methods of wooden airframe structures; Characteristics, properties and types of wood and glue used in airplanes; Preservation and maintenance of wooden structure; Types of defects in wood material and wooden structures; The detection of defects in wooden structure; Repair of wooden structure.
- C5.5 **Fabric covering & Non Metals**
Characteristics, properties and types of fabrics used in aeroplane; Inspections methods for fabric; Types of defects in fabric; Repair of fabric covering. Composite and non-metallic Bonding practices; Environmental conditions
Inspection methods
- C5.6 **Fasteners, Screw threads**
Screw nomenclature; Thread forms, dimensions and tolerances for standard threads used in aircraft; measuring screw threads;
- C5.7 **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.
- C5.8 **Locking devices**
Tab and spring washers, locking plates, split pins, palnuts, wire locking, quick release fasteners, keys, circlips, and cotter pins and techniques.
- C5.9 **Aircraft rivets**
Types of solid and blind rivets: specifications and identification, heat treatment.
- C5.10 **Riveting**
Riveted joints, rivet spacing and pitch; Tools used for riveting and dimpling;
Inspection of riveted joints.

Reference Books:

Aircraft handbook FAA (AC 65-15 A)
Civil Aircraft Inspection Procedures (CAIP 459-Part I, Basic)
Airframe & Powerplant Mechanics (General Handbook EA-AC 65-9A) FAA
Aircraft Materials & Processes by Titterton Machine Drawing by AC Parkinson
Advanced Composites (EA-358) by Cindy Foreman Electricity, CAIP 562

	PHL CAR-147 (Basic) F/o Engineering and Technology ,Jamia Millia Islamia B.Sc (Aeronautics) Subject: WORKSHOP PRACTICES	Credits (T)-04
		Sub Code : C11

Theory

- C11.1 Safety & Precautions to be taken while working in the Machine shop.
Various type of aids to be used while working on machines. Basic Machining
- C11.2 **Material handling - Sheet Metal**
Marking out and calculation of bend allowance; Sheet metal working, including bending and forming; Inspection of sheet metal work.
- C11.3 Various types of gears and usage and inspection
Various Hand tools for working on bench
- C11.4 Drills and drilling procedures. Simple Turning and Taper turning.
Various types of measuring and layout tools
- C11.5 Welding Techniques: Preparation of arc welding of butt joints, lap joints and tee joints. Gas welding practice;Metric Measurement
- C11.6 Various forms of Surface Finish and Surface measurement
Various forms of Heat Treatment & Testing of Materials
Various forms of Taps & Dies
- C11.7 (a) Smithy operations, upsetting, swaging, setting down and bending
(b) Foundry operations like mould preparation for gear and step cone pulley
- C11.8 **Hoses and Pipes**
Pneumatic, Hydraulic pipes and end fitting identification, pipe bending and flaring, pipe inspection.
Types of hoses, identification, hose end fittings, house routing and inspection

Reference Books

Workshop technology By: K.P. Roy , A.K. HAJRA CHOWDHARY 2000 edition;
Shop Theory By: James Anderson

	PHL CAR-147 (Basic) F/o Engineering and Technology ,Jamia Millia Islamia B.Sc (Aeronautics) Subject: Aviation Legislation-II	Credits (T)-04
		Sub Code : DSE-5

Theory

DSE5.4 CAR-66 Certifying Staff - Maintenance

Detailed understanding of CAR-66.

DSE5.5 CAR-147 Approved Maintenance Training Organization

Detailed understanding of CAR-147.

DSE5.6 Aircraft Operations

Commercial Air Transport/Commercial Operations; Air Operators Certificates; Operators Responsibilities, in particular regarding continuing airworthiness and maintenance; Documents to be carried on board; Aircraft Placarding (Markings);

DSE5.7 Aircraft Certification

(a) General - Certification rules: such as FAA & EACS 23/25/27/29; Type Certification Supplemental Type Certification; Type Approval; CAR-21 Sub-Part F, G, H, I, M, P & Q

Aircraft Modifications and repairs approval and certification; permit to fly requirements

(b) Documents - Certificate of Airworthiness; Certificate of Registration; Noise Certificate; Weight Schedule; Radio Station Licence and Approval.

DSE5.8 Applicable National and International Requirements

Introduction to ICAO, FAR, EASA Regulations - Aircraft Maintenance and certification

(a) Maintenance Programme, Maintenance checks and inspections; Master Minimum Equipment Lists, Minimum Equipment List; Dispatch Deviation Lists; Airworthiness Directives; Service Bulletins, manufacturers service information; Modifications and repairs; Maintenance documentation: maintenance manuals, structural repair manual, illustrated parts catalogue, etc.

(b) Continuing airworthiness; Test flights; ETOPS /EDTO, maintenance and dispatch requirements; RVSM, maintenance and dispatch requirements; RNP, MNPS Operations All Weather Operations; Category 2/3 operations and minimum equipment, maintenance, training and certification requirements.

DSE5.9 Safety Management System

State Safety Programme; Basic Safety Concepts; Hazards & Safety Risks; SMS Operation; SMS Safety performance; Safety Assurance.

DSE5.10 Fuel Tank Safety

Special Federal Aviation Regulations (SFARs) from 14 CFR SFAR 88 of the FAA and of JAA TGL 47; Concept of CDCCL, Airworthiness Limitations Items (ALI).

Reference Books:

The Aircraft Act, 1934

The Aircraft Rules, 1937 VOL 1

The Aircraft Rules, 1937 VOL 3

Aeronautical Information Circular CAR - Section - 1, 2, & 8 SMS CAR - 21, M, 145, 66 & 147

Special Federal Aviation Regulations (SFARs) - 14 CFR, SFAR 88 & JAA TGL 47

Airworthiness Procedure Manual

	PHL CAR-147 (Basic) F/o Engineering and Technology ,Jamia Millia Islamia B.Sc (Aeronautics) Subject: English	Credits (T)-04
		Sub Code : AECC1

Theory

AECC 1.1 Introduction

Theory of Communication, Types and modes of Communication

AECC 1.2 Language of Communication

Verbal and Non-verbal (Spoken and Written), Personal, Social and Business Barriers and Strategies Intra-personal, Inter personal and Group communication

AECC 1.3 Speaking Skills

Monologue, Dialogue, Group Discussion, Effective Communication/ Miscommunication, Interview, Public Speech

AECC 1.4 Reading and Understanding

Close Reading, Comprehension, Summary Paraphrasing, Analysis and Interpretation, Translation (from Indian language to English and vice-versa), Literary/Knowledge Texts

AECC 1.5 Writing Skills

Documenting, Report Writing, Making notes, Letter writing

Reference Books

Fluency in English - Part II, Oxford University Press, 2006

V.R. Narayanaswami, Strengthen Your Writing, 3rd Edition, Orient Longman, 2005.

Andrea J. Rutherford, Basic Communication Skills for Technology, 1st Edition, Pearson

Business English, Pearson, 2008

Language, Literature and Creativity, Orient Blackswan, 2013

Education Asia (Singapore) Pvt. Ltd., Bangalore, 2001.

Language through Literature (forthcoming) ed. Dr. Gauri Mishra, Dr Ranjana Kaul, Dr Brati Biswas Nell

Ann Pickett, Ann A. Laster, Katherine E. Staples, Technical English (Writing, Reading and Speaking), 8th Edition, Pearson Education, USA, Addison Wesley Longman Inc., 2001