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SYLLABUS FOR CAT-B2

TYPE OF TRAINING	LOCATION	ALLOTTED TIME (MINIMUM)
		Cat. B2
Knowledge Training	In-House	1440
Practical Training	In-House	640
	Sub-contracted	320
Total Allotted Hours		**2400**

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KNOWLEDGE TRAINING HOURS (CATEGORY B2)			
Semester	**Module No.**	**Module Name**	**Hours**
1	M. 03	Electrical Fundamentals	90
	M. 08	Basic Aerodynamics	70
	M. 9A	Human Factors	60
	M. 10	Aviation Legislation (Part – I)	110
	M. 13	Aircraft Aerodynamics, Structures and Systems (Part – I)	91
2	M. 04	Electronic Fundamental (Part – I)	75
	M. 7A	Maintenance Practices (Part – I)	90
	M. 10	Aviation Legislation (Part – II)	110
	M. 13	Aircraft Aerodynamics, Structures and Systems(Part – II)	95
3	M. 04	Electronic Fundamental (Part – II)	72
	M. 05	Digital Techniques/Electronic Instrument Systems (Part – I)	70
	M. 06	Materials and Hardware (Part – I)	60
	M. 7A	Maintenance Practices (Part – II)	90
	M. 13	Aircraft Aerodynamics, Structures and Systems (Part – III)	84
4	M. 05	Digital Techniques/Electronic Instrument Systems (Part – II)	70
	M. 06	Materials and Hardware (Part – II)	80
	M. 13	Aircraft Aerodynamics, Structures and Systems (Part – IV)	63
	M. 14	Propulsion	60
		TOTAL HOURS	1440

PRACTICAL TRAINING HOURS (IN HOUSE)		
Semester	**Title**	**Hours**
1	Electrical Shop Practical	74
	Documentation Practical	50
2	Hangar Practical (Part – I)	84
3	Fitting Shop	132
	Hangar Practical (Part – II)	116
4	Hangar Practical (Part – III)	100
	Avionics Shop Practical	84
PRACTICAL TRAINING HOURS (SUB-CONTRACTED)		320
	TOTAL TRAINING HOURS	2400

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MODULE 3. ELECTRICAL FUNDAMENTALS

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MODULE 3. ELECTRICAL FUNDAMENTALS

TOTAL ALLOTTED HOURS ALLOTTED: 90

S. No.	Main Topic	Sub-Topic	Hours Allotted	LEVEL
3.1	**Electron Theory**	Structure and distribution of electrical charges within: atoms, molecules, ions, compounds; Molecular structure of conductors, semiconductors and insulators.	2	1
3.2	**Static Electricity and Conduction**	Static electricity and distribution of electrostatic charges; Electrostatic laws of attraction and repulsion; Units of charge, Coulomb's Law; Conduction of electricity in solids, liquids, gases and a vacuum	2	2
3.3	**Electrical Terminology**	The following terms, their units and factors affecting them: potential difference, electromotive force, voltage, current, resistance, conductance, charge, conventional current flow, electron flow.	2	2
3.4	**Generation of Electricity**	Production of electricity by the following methods: light, heat, friction, pressure, chemical action, magnetism and motion.	2	1
3.5	**DC Sources of Electricity**	Construction and basic chemical action of: primary cells, secondary cells, lead acid cells, nickel cadmium cells, other alkaline cells; Cells connected in series and parallel; Internal resistance and its effect on a battery; Construction, materials and operation	8	2

		of thermocouples; Operation of photo-cells.		
3.6	**DC Circuits**	Ohms Law, Kirchhoff's Voltage and Current Laws; Calculations using the above laws to find resistance, voltage and current; Significance of the internal resistance of a supply.	4	2
3.7	**Resistance/Resistor**	(m) Resistance and affecting factors; Specific resistance; Resistor color code, values and tolerances, preferred values, wattage ratings; Resistors in series and parallel; Calculation of total resistance using series, parallel and series parallel combinations; Operation and use of potentiometers and rheostats; Operation of Wheatstone Bridge;	6	2
		(b) Positive and negative temperature coefficient conductance; Fixed resistors, stability, tolerance and limitations, methods of construction; Variable resistors, thermostats, voltage dependent resistors; Construction of potentiometers and rheostats; Construction of Wheatstone Bridge.		1
3.8	**Power**	Power, work and energy (kinetic and potential); Dissipation of power by a resistor; Power formula; Calculations involving power, work and energy	2	2
3.9	**Capacitance/Capacitor**	Operation and function of a capacitor; Factors affecting capacitance area of	5	2

		plates, distance between plates, number of plates, dielectric and dielectric constant, working voltage, voltage rating; Capacitor types, construction and function; Capacitor color coding; Calculations of capacitance and voltage in series and parallel circuits; Exponential charge and discharge of a capacitor, time constants; Testing of capacitors.		
3.10	**Magnetism**	(n) Theory of magnetism; Properties of a magnet; Action of a magnet suspended in the Earth's magnetic field; Magnetization and demagnetization; Magnetic shielding; Various types of magnetic material; Electromagnets construction and principles of operation; Hand clasp rules to determine: magnetic field around current carrying conductor;	4	2
		(b) Magneto motive force, field strength, magnetic flux density, permeability, hysteresis loop, retentively, coercive force reluctance, saturation point, eddy currents; Precautions for care and storage of magnets.	4	2

3.11	**Inductance/Inductor**	Faraday's Law; Action of inducing a voltage in a conductor moving in a magnetic field; Induction principles; Effects of the following on the magnitude of an induced voltage: magnetic field strength, rate of change of flux, number of conductor turns; Mutual induction; The effect the rate of change of primary current and mutual inductance has on induced voltage; Factors affecting mutual inductance: number of turns in coil, physical size of coil, permeability of coil, position of coils with respect to each other; Lenz's Law and polarity determining rules; Back emf, self induction; Saturation point; Principle uses of inductors.	8	2
3.12	**DC Motor/Generator Theory**	Basic motor and generator theory; Construction and purpose of components in DC generator; Operation of, and factors affecting output and direction of current flow in DC generators; Operation of, and factors affecting output power, torque, speed and direction of rotation of DC motors; Series wound, shunt wound and compound motors; Starter Generator construction.	10	2

3.13	**AC Theory**	Sinusoidal waveform: phase, period, frequency, cycle; Instantaneous, average, root mean square, peak, peak to peak current values and calculations of these values, in relation to voltage, current and power; Triangular/Square waves; Single/3 phase principles.	3	2
3.14	**Resistive I, Capacitive I and Inductive (L) Circuits**	Phase relationship of voltage and current in L, C and R circuits, parallel, series and series parallel; Power dissipation in L, C and R circuits; Impedance, phase angle, power factor and current calculations; True power, apparent power and reactive power calculations.	6	2
3.15	**Transformers**	Transformer construction principles and operation; Transformer losses and methods for overcoming them; Transformer action under load and no-load conditions; Power transfer, efficiency, polarity markings; Calculation of line and phase voltages and currents; Calculation of power in a three phase system; Primary and Secondary current, voltage, turns ratio, power, efficiency; Auto transformers.	8	2
3.16	**Filters**	Operation, application and uses of the following filters: low pass, high pass, band pass, band stop.	2	1
3.17	**AC Generators**	Rotation of loop in a magnetic field and waveform produced; Operation and construction of	6	2

		revolving armature and revolving field type AC generators; Single phase, two phase and three phase alternators; Three phase star and delta connections advantages and uses; Permanent Magnet Generators.		
3.18	**AC Motors**	Construction, principles of operation and characteristics of: AC synchronous and induction motors both single and polyphase; Methods of speed control and direction of rotation; Methods of producing a rotating field: capacitor, inductor, shaded or split pole.	6	2
		Total Allotted Hours	**90**	

MODULE 4 :ELECTRONIC FUNDAMENTALS

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MODULE 4. ELECTRONIC FUNDAMENTALS (PART – I)

TOTAL ALLOTTED HOURS: 75

S. No.	Main topic	Sub topic	Hours Allotted	Level
4.1.1	***Diodes***	(o) Diode symbols; Diode characteristics and properties; Diodes in series and parallel; Main characteristics and use of silicon-controlled rectifiers (thyristors), lightemitting diode, photo conductive diode, varistor, rectifier diodes; Functional testing of diodes.	10	2
		(b) Materials, electron configuration, electrical properties; P and N type materials: effects of impurities on conduction, majority and minority characters; PN junction in a semiconductor, development of a potential across a PN junction in unbiased, forward biased and reverse biased conditions; Operation and function of diodes in the following circuits: clippers, clampers, full and half wave rectifiers, bridge rectifiers, voltage doublers and triplers; Detailed operation and characteristics of the following devices: silicon-controlled rectifier (thyristor), light emitting diode, Shottky diode, photo conductive diode, varactor diode, varistor, rectifier diodes, Zener diode.	30	2
4.1.2	***Transistors***	(p) Transistor symbols; Component description and orientation; Transistor characteristics and properties.	05	2
		(b)Construction and operation of PNP and NPN transistors;	30	2

		Base, collector and emitter configurations; Testing of transistors. Basic appreciation of other transistor types and their uses. Application of transistors: classes of amplifier (A, B, C); Simple circuits including: bias, decoupling, feedback and 124tabilization; Multistage circuit principles: cascades, push-pull, oscillators, multivibrators, flip-flop circuits.		
		Total Allotted Hours	75	

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MODULE 4. ELECTRONIC FUNDAMENTALS (PART – II)

TOTAL ALLOTTED HOURS: 72

S. No.	Main topic	Sub topic	Hours Allotted	Level
4.1.3	***Integrated Circuits***	(b) Description and operation of logic circuits and linear circuits; Introduction to operation and function of an operational amplifier used as: integrator, differentiator, voltage follower, comparator; Operation and amplifier stages connecting methods: resistive capacitive, inductive (transformer), inductive resistive (IR), direct; Advantages and disadvantages of positive and negative feedback.	37	2
4.2	**Printed Circuit Boards**	Description and use of printed circuit boards.	10	2
4.3	**Servomechanisms**	(b) Understanding of the following terms: Open and closed loop, follow up, servomechanism, analogue, transducer, null, damping, feedback, deadband; Construction operation and use of the following synchro system components: resolvers, differential, control and torque, E and I transformers, inductance transmitters, capacitance transmitters, synchronous transmitters; Servomechanism defects, reversal of synchro leads, hunting.	25	2
		Total Hours	72	

MODULE 5. DIGITALTECHNIQUES/ELECTRONIC INSTRUMENT SYSTEM

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MODULE 5. DIGITAL TECHNIQUES ELECTRONIC INSTRUMENTSYSTEMS (PART – I)

TOTAL ALLOTTED HOURS: 70

S. No.	Main topic	Sub topic	Hours Allotted	Level
5.1	**Electronic Instrument Systems**	Typical systems arrangements and cockpit layout of electronic instrument systems.	12	3
5.2	**Numbering Systems**	Numbering systems: binary, octal and hexadecimal; Demonstration of conversions between the decimal and binary, octal and hexadecimal systems and vice versa.	10	2
5.3	**Data Conversion**	Analogue Data, Digital Data; Operation and application of analogue to digital, and digital to analogue converters, inputs and outputs, limitations of various types.	10	2
5.4	**Data Buses**	Operation of data buses in aircraft systems, including knowledge of ARINC and other specifications.	8	2
5.5	**Logic Circuits**	(q) Identification of common logic gate symbols, tables and equivalent circuits; Applications used for aircraft systems, schematic diagrams	10	2
		(b)Interpretation of logic diagrams.	10	2
5.6	**Basic Computer Structure**	(b) Computer related terminology; Operation, layout and interface of the major components in a micro computer including their associated bus systems; Information contained in single and multi-address instruction words; Memory associated terms; Operation of typical memory devices; Operation, advantages and disadvantages of the various data storage systems.	10	2
		Total Allotted Hours	70	

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MODULE 5. DIGITAL TECHNIQUES ELECTRONIC INSTRUMENTSYSTEMS (PART – II)

TOTAL ALLOTTED HOURS: 70

S. No.	Main topic	Sub topic	Hours Allotted	Level
5.7	**Microprocessors**	Functions performed and overall operation of a microprocessor; Basic operation of each of the following microprocessor elements: control and processing unit, clock, register, arithmetic logic unit.	10	2
5.8	**Integrated Circuits**	Operation and use of encoders and decoders Function of encoder types Uses of medium, large and very large-scale integration	10	2
5.9	**Multiplexing**	Operation, application and identification in logic diagrams of multiplexers and demultiplexers.	10	2
5.10	**Fibre Optics**	Advantages and disadvantages of fibre optic data transmission over electrical wire propagation; Fibre optic data bus; Fibre optic related terms; Terminations; Couplers, control terminals, remote terminals; Application of fibre optics in aircraft systems.	10	2
5.11	**Electronic Displays**	Principles of operation of common types of displays used in modern aircraft, including Cathode Ray Tubes, Light Emitting Diodes and Liquid Crystal Display.	6	2
5.12	**Electrostatic Sensitive Devices**	Special handling of components sensitive to electrostatic discharges; Awareness of risks and possible damage, component and personnel anti-static	4	2

		protection devices.		
5.13	**Software Management Control**	Awareness of restrictions, airworthiness requirements and possible catastrophic effects of unapproved changes to software programmes.	5	2
5.14	**Electromagnetic Environment**	Influence of the following phenomena on maintenance practices for electronic system: EMC-Electromagnetic Compatibility EMI-Electromagnetic Interference HIRF-High Intensity Radiated Field Lightning/lightning protection	5	2
5.15	**Typical Electronic/Digital Aircraft Systems**	General arrangement of typical electronic/digital aircraft systems and associated BITE (Built-In Test Equipment) testing such as: (r) ACARS-ARINC Communication and Addressing and Reporting System EICAS-Engine Indication and Crew Alerting System FBW-Fly by Wire FMS-Flight Management System IRS-Inertial reference system	5	2
		(b) ECAM-Electronic Centralised Aircraft Monitoring EFIS-Electronic Flight Instrument System GPS-Global Positioning System TCAS-Traffic Collision Avoidance system Integrated modular Avionics, Cabin System	5	2
		Total Allotted Hours	70	

MODULE 6. MATERIALS AND HARDWARE

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MODULE 6. MATERIALS AND HARDWARE (PART – I)

TOTAL ALLOTTED HOURS: 60

S. No.	Main topic	Sub topic	Hours Allotted	Level
6.1	**Aircraft Materials — Ferrous**	(s) Characteristics, properties and identification of common alloy steels used in aircraft; Heat treatment and application of alloy steels;	06	1
		(b) Testing of ferrous materials for hardness, tensile strength, fatigue strength and impact resistance.		1
6.2	**Aircraft Materials — Non-Ferrous**	(t) Characteristics, properties and identification of common non-ferrous materials used in aircraft; Heat treatment and application of non-ferrous materials;	06	1
		(b) Testing of non-ferrous material for hardness, tensile strength, fatigue strength and impact resistance.		1
6.3.1	**Composite and non-metallic other than wood and fabric**	(u) Characteristics, properties and identification of common composite and non-metallic materials, other than wood, used in aircraft; Sealant and bonding agents.	10	2
6.4	**Corrosion**	(a) Chemical fundamentals; Formation by, galvanic action process, microbiological, stress;	16	1
		(v) Types of corrosion and their identification; Causes of corrosion; Material types, susceptibility to corrosion.		2
6.6	**Pipes and Unions**	(a) Identification of, and types of rigid and flexible pipes and their connectors used in aircraft;	10	2
		(b) Standard unions for aircraft hydraulic, fuel, oil, pneumatic and air system pipes.		1

6.11	**Electrical Cables and Connectors**	Cable types, construction and characteristics; High tension and co-axial cables; Crimping; Connector types, pins, plugs, sockets, insulators, current and voltage rating, coupling, identification codes.	12	2
		Total Hours	60	

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MODULE 6. MATERIALS AND HARDWARE (PART – II)

TOTAL ALLOTTED HOURS: 80

S. No.	Main topic	Sub topic	Hours Allotted	Level
6.5	**Fasteners**			
	6.5.1 **Screw threads**	Screw nomenclature; Thread forms, dimensions and tolerances for standard threads used in aircraft; Measuring screw threads;	10	2
	6.5.2 **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.	10	2
	6.5.3 **Locking devices**	Tab and spring washers, locking plates, split pins, palnuts, wire locking, quick release fasteners, keys, circlips, cotter pins.	08	2
	6.5.4 **Aircraft rivets**	Types of solid and blind rivets: specifications and identification, heat treatment.	15	1
6.7	**Springs**	Types of springs, materials, characteristics and applications.	05	1
6.8	**Bearings**	Purpose of bearings, loads, material, construction; Types of bearings and their application.	10	2
6.9	**Transmissions**	Gear types and their application; Gear ratios, reduction and multiplication gear systems, driven and driving gears, idler gears, mesh patterns; Belts and pulleys, chains and sprockets.	15	2
6.10	**Control Cables**	Types of cables; End fittings, turnbuckles and compensation devices; Pulleys and cable system components; Bowden cables; Aircraft flexible control systems.	07	1
		Total Allotted Hours	80	

MODULE 7A. MAINTENANCE PRACTICES

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MODULE 7A: MAINTENANCE PRACTICES (PART – I)

TOTAL ALLOTTED HOURS: 90

S. No.	Main topic	Sub topic	Hours Allotted	Level
7.1	**Safety Precautions-Aircraft and Workshop**	Aspects of safe working practices including precautions to take when working with electricity, gases especially oxygen, oils and chemicals. Also, instruction in the remedial action to be taken in the event of a fire or another accident with one or more of these hazards including knowledge on extinguishing agents.	10	3
7.2	**Workshop Practices**	Care of tools, control of tools, use of workshop materials; Dimensions, allowances and tolerances, standards of workmanship; Calibration of tools and equipment, calibration standards.	10	3
7.3	**Tools**	Common hand tool types; Common power tool types; Operation and use of precision measuring tools; Lubrication equipment and methods. Operation, function and use of electrical general test equipment;	40	3
7.4	**Avionic General Test Equipment**	Operation, function and use of avionic general test equipment.	20	3
7.20	**Maintenance Procedures**	Maintenance planning; Modification procedures; Stores procedures; Certification/release procedures; Interface with aircraft operation; Maintenance Inspection/Quality Control/Quality Assurance; Additional maintenance procedures. Control of life limited components	10	2
		Total Hours	90	

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MODULE 7A: MAINTENANCE PRACTICES (PART – II)

TOTAL ALLOTTED HOURS: 90

S. No.	Main topic	Sub topic	Hours Allotted	Level
7.5	**Engineering Drawings, Diagrams and Standards**	Drawing types and diagrams, their symbols, dimensions, tolerances and projections; Identifying title block information Microfilm, microfiche and 136tabilizatio presentations; Specification 100 of the Air Transport Association (ATA) of America; Aeronautical and other applicable standards including ISO, AN, MS, NAS and MIL; Wiring diagrams and schematic diagrams.	20	2
7.6	**Fits and Clearances**	Drill sizes for bolt holes, classes of fits; Common system of fits and clearances; Schedule of fits and clearances for aircraft and engines; Limits for bow, twist and wear; Standard methods for checking shafts, bearings and other parts.	05	1
7.7	**Electrical Wiring Interconnection System (EWIS)**	Continuity, insulation and bonding techniques and testing; Use of crimp tools: hand and hydraulic operated; Testing of crimp joints; Connector pin removal and insertion; Co-axial cables: testing and installation precautions; Identification of wire types, their inspection criteria and damage tolerance. Wiring protection techniques: Cable looming and loom support, cable clamps, protective sleeving techniques including heat shrink wrapping, shielding.	20	3

		EWIS installations, inspection, repair, maintenance and cleanliness standards.		
7.15	**Welding, Brazing, Soldering and Bonding**	(a) Soldering methods; inspection of soldered joints.	08	2
7.16	**Aircraft Weight and Balance**	(a) Centre of Gravity/Balance limits calculation: use of relevant documents;	07	2
7.17	**Aircraft Handling and Storage**	Aircraft taxiing/towing and associated safety precautions; Aircraft jacking, chocking, securing and associated safety precautions; Aircraft storage methods; Refuelling/137tabiliza procedures; De-icing/anti-icing procedures; Electrical, hydraulic and pneumatic ground supplies. Effects of environmental conditions on aircraft handling and operation.	10	2
7.18	**Disassembly, Inspection, Repair and Assembly Techniques**	(w) Types of defects and visual inspection techniques. Corrosion removal, assessment and reprotection.	12	3
		I Non-destructive inspection techniques including, penetrant, radiographic, eddy current, ultrasonic and boroscope methods.		1
		(d) Disassembly and re-assembly techniques.		2
		(e) Trouble shooting techniques		2
7.19	**Abnormal Events**	(a) Inspections following lightning strikes and HIRF penetration.	08	2
		Total Hours	90	

MODULE 8. BASIC AERODYNAMICS

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MODULE 8. BASIC AERODYNAMICS

TOTAL ALLOTTED HOURS : 70

S. No.	Main Topic	Sub-Topic	Hours Allotted	LEVEL
8.1	**Physics of the Atmosphere**	International Standard Atmosphere (ISA), application to aerodynamics	5	2
8.2	**Aerodynamics**	Airflow around a body; Boundary layer, laminar and turbulent flow, free stream flow, relative airflow, up wash and downwash, vortices, stagnation; The terms: camber, chord, mean aerodynamic chord, profile (parasite) drag, induced drag, Centre of pressure, angle of attack, wash in and wash out, fineness ratio, wing shape and aspect ratio; Thrust, Weight, Aerodynamic Resultant; Generation of Lift and Drag: Angle of Attack, Lift coefficient, Drag coefficient, polar curve, stall; Aerofoil contamination including ice, snow, frost.	30	2
8.3	**Theory of Flight**	Relationship between lift, weight, thrust and drag; Glide ratio; Steady state flights, performance; Theory of the turn; Influence of load factor: stall, flight envelope and structural limitations; Lift augmentation.	25	2
8.4	**Flight Stability and Dynamics**	Longitudinal, lateral and directional stability (active and passive).	10	2
		Total Allotted Hours	**70**	

MODULE 9A.
HUMAN FACTOR

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MODULE 9A. HUMAN FACTOR

TOTAL ALLOTTED HOURS: 60

S. No.	Main Topic	Sub-Topic	Hours Allotted	LEVEL
9.1	**General**	The need to take human factors into account; Incidents attributable to human factors/human error; 'Murphy's' law.	5	2
9.2	**Human Performance and Limitations**	Vision; Hearing; Information processing; Attention and perception; Memory; Claustrophobia and physical access.	15	2
9.3	**Social Psychology**	Responsibility: individual and group; Motivation and de-motivation; Peer pressure; 'Culture' issues; Team working; Management, supervision and leadership.	5	1
9.4	**Factors Affecting Performance**	Fitness/health; Stress: domestic and work related; Time pressure and deadlines; Workload: overload and under load; Sleep and fatigue, shift work; Alcohol, medication, drug abuse.	5	2
9.5	**Physical Environment**	Noise and fumes; Illumination; Climate and temperature; Motion and vibration; Working environment.	5	1

9.6	**Tasks**	Physical work; Repetitive tasks; Visual inspection; Complex systems.	5	1
9.7	**Communication**	Within and between teams; Work logging and recording; Keeping up to date, currency; Dissemination of information.	5	2
9.8	**Human Error**	Error models and theories; Types of error in maintenance tasks; Implications of errors (i.e. accidents); Avoiding and managing errors.	10	2
9.9	**Hazards in the Workplace**	Recognizing and avoiding hazards; Dealing with emergencies.	5	2
		Total Allotted Hours	**60**	

MODULE 10.
AVIATION LEGISLATION

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MODULE 10. AVIATION LEGISLATION (Part – I)

TOTAL ALLOTTED HOURS: 110

S. No.	Main Topic	Sub-Topic	Hours Allotted	LEVEL
10.1	**Regulatory Framework**	Role of the International Civil Aviation Organisation; The Aircraft Act and Rules made there under Role of the DGCA; Relationship between CAR-21, CAR-M, CAR-145, CAR-66, CAR-147 The Aircraft Rules (Applicable to Aircraft Maintenance and release) Aeronautical Information and Circulars (Applicable to Aircraft Maintenance and release) CAR Sections 1 and 2	25	1
10.3	**CAR-145 Approved Maintenance Organisations**	Detailed understanding of CAR-145 and CAR-M Subpart F.	40	2
10.6	**CAR-M**	Detailed understanding of CAR-M provisions related to continuing airworthiness. Detailed understanding of CAR-M.	40	2
10.8	**Safety Management System**	State safety program, Basic safety Concepts Hazards and safety Risks, SMS Operations SMS Safety Performance Safety Assurance	5	2
		Total Allotted Hours	110	

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MODULE 10. AVIATION LEGISLATION (Part – II)

TOTAL ALLOTTED HOURS: 110

S. No.	Main Topic	Sub-Topic	Hours Allotted	LEVEL
10.2	**CAR-66 Certifying Staff-Maintenance**	Detailed understanding of CAR-66.	30	2
10.4	**Aircraft operations**	Commercial Air Transport/Commercial Operations Air Operators Certificates; Operator's responsibilities, in particular regarding continuing airworthiness and maintenance; Documents to be carried on board; Aircraft placarding (markings).	25	1
10.5	**Aircraft Certification**	(x) General Certification Rules: such as FAA & EACS 23/25/27/29; Type Certification; Supplemental Type Certification; CAR-21 Design/Production Organisation Approvals. Aircraft Modifications and Repairs Approval and certification Permit to fly requirements	25	1
		(y) Documents Certificate of Airworthiness; Certificate of Registration; Noise Certificate; Weight Schedule; Radio Station License and Approval.		2
10.7	**Applicable**	(z) Maintenance Programs, Maintenance	20	2

	National and International Requirements	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.		
		(aa) 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 requirements.	5	1
10.9	**Fuel Tank Safety**	Special Federal Aviation Regulations (SFARs) from 14 CFR SFAR 88 of the FAA and JAA TGL 47 Airworthiness Limitations Items (ALI)	5	2
		Total Allotted Hours	110	

MODULE 13 (PART – I)
AIRCRAFT AERODYNAMICS, STRUCTURES AND SYSTEMS

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Module 13 AIRCRAFT AERODYNAMICS, STRUCTURES AND SYSTEMS (Part – I)

TOTAL ALLOTTED HOURS: 91

S. No.	Main topic	Sub topic	Hours Allotted	Level
13.1	**Theory of Flight**	(bb) Aeroplane Aerodynamics and Flight Controls Operation and effect of: — roll control: ailerons and spoilers, — pitch control: elevators, stabilators, variable incidence 148tabilizati and canards, — yaw control, rudder limiters; Control using elevons, ruddervators; High lift devices: slots, slats, flaps; Drag inducing devices: spoilers, lift dumpers, speed brakes; Operation and effect of trim tabs, servo tabs, control surface bias;	08	1
		(cc) High Speed Flight Speed of sound, subsonic flight, transonic flight, supersonic flight; Mach number, and critical Mach number;	03	1
		(dd) IRotary Wing Aerodynamics Terminology; Operation and effect of cyclic, collective and anti-torque controls.	05	1
13.2	**Structures — General Concepts**	(a) Fundamentals of structural systems;	02	1
		(b) Zonal and station identification systems; Electrical bonding; Lightning strike protection provision.	03	2
13.3	**Auto-flight (ATA 22)**	Fundamentals of automatic flight control including working principles and current terminology; Command signal processing; Modes of operation: roll, pitch and yaw	38	3

		channels; Yaw dampers; Stability Augmentation System in helicopters; Automatic trim control; Autopilot navigation aids interface; Auto-throttle systems; Automatic Landing Systems: principles and categories, modes of operation, approach, glideslope, land, go-around, system monitors and failure conditions.		
13.6	**Equipment and Furnishings (ATA 25)**	Electronic emergency equipment requirements; Cabin entertainment equipment.	07	3
13.7	**Flight Controls (ATA 27)**	(ee) Primary controls: aileron, elevator, rudder, spoiler; Trim control; Active load control; High lift devices; Lift dump, speed brakes; System operation: manual, hydraulic, pneumatic; Artificial feel, Yaw damper, Mach trim, rudder limiter, gust locks. Stall protection systems;	10	2
		(c) System operation: electrical, fly-by-wire.	05	3
13.12	**Fire Protection (ATA 26)**	(ff) Fire and smoke detection and warning systems; Fire extinguishing systems; and System tests;	08	3
		(gg) Portable fire extinguisher	02	1
		Total Allotted Hours	91	

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MODULE 13 (PART – II) AIRCRAFT AERODYNAMICS, STRUCTURES AND SYSTEMS

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SYLLABUS PLAN

MODULE 13 AIRCRAFT AERODYNAMICS, STRUCTURES AND SYSTEMS (PART – II)

TOTAL ALLOTTED HOURS: 95

S. No.	Main topic	Sub topic	Hours Allotted	Level
13.4	**Communication/ Navigation (ATA 23/34)**	Fundamentals of radio wave propagation, antennas, transmission lines, communication, receiver and transmitter; Working principles of following systems: — Very High Frequency (VHF) communication, — High Frequency (HF) communication, — Audio, — Emergency Locator Transmitters, — Cockpit Voice Recorder, — Very High Frequency omnidirectional range (VOR), — Automatic Direction Finding (ADF), — Instrument Landing System (ILS), — Microwave Landing System (MLS), — Flight Director systems, —Distance Measuring Equipment (DME), — Very Low Frequency and hyperbolic navigation (VLF/Omega), — Doppler navigation, — Area navigation, RNAV systems, — Flight Management Systems, — Global Positioning System (GPS), —Global Navigation Satellite Systems (GNSS), — Inertial Navigation System, — Air Traffic Control transponder, secondary surveillance radar, — Traffic Alert and Collision Avoidance System (TCAS), — Weather avoidance radar,	35	3

		— Radio altimeter, — ARINC communication and reporting.		
13.8	**Instruments (ATA 31)**	Classification; Atmosphere; Terminology; Pressure measuring devices and systems; **Pitot static systems**; • Altimeters; • Vertical speed indicators; • Airspeed indicators; • Machmeters; • Altitude reporting/alerting systems; **Air data computers**; Instrument pneumatic systems; Direct reading pressure and temperature gauges; Temperature indicating systems; Fuel quantity indicating systems; Gyroscopic principles; Artificial horizons; Slip indicators; Directional gyros; Ground Proximity Warning Systems; Compass systems; Flight Data Recording systems; Electronic Flight Instrument Systems; Instrument warning systems including master warning systems and centralized warning panels; Stall warning systems and angle of attack indicating systems; Vibration measurement and indication; Glass cockpit	35	3
13.20	**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	25	3

		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; and Network Components.		
		Total Allotted Hours	95	

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MODULE 13 (PART – III)
AIRCRAFT AERODYNAMICS, STRUCTURES AND SYSTEMS

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Module 13 AIRCRAFT AERODYNAMICS, STRUCTURES AND SYSTEMS (Part – III)

TOTAL ALLOTTED HOURS: 84

S. No.	Main topic	Sub topic	Hours Allotted	Level
13.11	**Air Conditioning and Cabin Pressurisation (ATA21)**	1) Air supply, Sources of air supply including engine bleed, APU and ground cart;	05	2
		2) Air Conditioning Air conditioning systems; Air cycle and vapour cycle machines; Distribution systems; Flow, temperature and humidity control system.	07	 2 3 1 3
		3) Pressurisation: Pressurisation systems; Control and indication including control and safety valves; Cabin pressure controllers.	10	3
		4) Safety and warning devices Protection and warning devices.	02	3
13.13	**Fuel Systems (ATA 28)**	System lay-out; Fuel tanks; Supply systems; Dumping, venting and draining; Cross-feed and transfer; Indications and warnings; Refuelling and de-fuelling; Longitudinal balance fuel systems.	13	1 1 1 1 2 3 2 3
13.14	**Hydraulic Power (ATA 29)**	• System lay-out; • Hydraulic fluids; • Hydraulic reservoirs and accumulators; • Pressure generation: electrical, mechanical, pneumatic; • Emergency pressure generation; • Filters; • Pressure control;	15	1 1 1 3 3 1 3

		• Power distribution; • Indication and warning systems; • Interface with other systems.		1 3 3
13.15	**Ice and Rain Protection (ATA 30)**	• Ice formation, classification and detection; • Anti-icing systems: electrical, hot air and chemical; • De-icing systems: electrical, hot air, pneumatic, chemical; • Rain repellent; • Probe and drain heating; • Wiper Systems.	12	2 2 3 1 3 1
13.16	**Landing Gear (ATA 32)**	• Construction, shock absorbing; • Extension and retraction systems: normal and emergency; • Indications and warnings; • Wheels, brakes, antiskid and autobraking; • Tyres; • Steering; • Air-ground sensing	08	1 3 3 3 1 3 3
13.17	**Oxygen (ATA 35)**	System lay-out: cockpit, cabin; Sources, storage, charging and distribution; Supply regulation; Indications and warnings.	05	3
13.18	**Pneumatic/ Vacuum (ATA 36)**	• System lay-out; • Sources: engine/APU, compressors, reservoirs, ground supply; • Pressure control; • Distribution; • Indications and warnings; • Interfaces with other systems.	06	2 2 3 1 3 3
13.19	**Water/Waste (ATA 38)**	Water system lay-out, supply, distribution, servicing and draining; Toilet system lay-out, flushing and servicing.	01	2
		Total Allotted Hours	84	

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MODULE 13 (PART – IV)
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MODULE 13 AIRCRAFT AERODYNAMICS, STRUCTURES AND SYSTEMS (PART – IV)

TOTAL ALLOTTED HOURS: 63

S. No.	Main topic	Sub topic	Hours Allotted	Level
13.5	**Electrical Power (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.	15	3
13.9	**Lights (ATA 33)**	External: navigation, landing, taxiing, ice; Internal: cabin, cockpit, cargo; Emergency.	03	3
13.10	**On Board Maintenance Systems (ATA 45)**	Central maintenance computers; Data loading system; Electronic library system; Printing; Structure monitoring (damage tolerance monitoring).	10	3
13.21	**Cabin Systems (ATA44)**	The units and components which furnish a means of entertaining the passengers and providing communication within the aircraft (Cabin Intercommunication Data System) and between the aircraft cabin and ground stations (Cabin Network Service). Includes voice, data, music and video transmissions. The Cabin Intercommunication Data System provides an interface between cockpit/cabin crew and cabin systems. These systems support data exchange of the different related LRU's and they are typically	17	3

		operated via Flight Attendant Panels. The Cabin Network Service typically consists on a server, typically interfacing with, among others, the following systems: — Data/Radio Communication, In-Flight Entertainment System The Cabin Network Service may host functions such as: — Access to pre-departure/departure reports, — E-mail/intranet/Internet access, — Passenger database; —Cabin Core System; —In-flight Entertainment System; —External Communication System; —Cabin Mass Memory System; —Cabin Monitoring System; —Miscellaneous Cabin System.		
13.22	**Information Systems (ATA46)**	The units and components which furnish a means of storing, updating and retrieving digital information traditionally provided on paper, microfilm or microfiche. Includes units that are dedicated to the information storage and retrieval function such as the electronic library mass storage and controller. Does not include units or components installed for other uses and shared with other systems, such as flight deck printer or general use display. Typical examples include Air Traffic and Information Management Systems and Network Server Systems. Aircraft General Information System; Flight Deck Information System; Maintenance Information System; Passenger Cabin Information System; Miscellaneous Information System.	18	3
		Total Allotted Hours	63	

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MODULE 14
PROPULSION

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SYLLABUS PLAN

MODULE 14. PROPULSION

TOTAL ALLOTTED HOURS: 60

S. No.	Main topic	Sub topic	Hours Allotted	Level
14.1	**Turbine Engines**	(hh) Constructional arrangement and operation of turbojet, turbofan, turbo shaft and turbo propeller engines;	10	1
		(b) Electronic Engine control and fuel metering systems (FADEC).	05	2
14.2	**Engine Indicating Systems**	Exhaust gas temperature/Interstage turbine temperature systems; Engine speed; Engine Thrust Indication: Engine Pressure Ratio, engine turbine discharge pressure or jet pipe pressure systems; Oil pressure and temperature; Fuel pressure, temperature and flow; Manifold pressure; Engine torque; Propeller speed.	30	2
14.3	**Starting and Ignition Systems**	Operation of engine start systems and components; Ignition systems and components; Maintenance safety requirements	15	2
		Total Allotted Hours	60	

PRACTICAL TASK (IN-HOUSE)

MODULE. 7a. PRACTICALS		**TOTAL HRS: 132 HRS**
	FITTING SHOP	
SN	**Task Title**	**Hours**
1	Fabricate external threads on a shaft using UNF thread die	2
2	Check the diameter of different drill bits used in the fitting shop using vernier micrometer.	2
3	Draw parallel lines and layout using Surface gauge, V-Block and Surface plate	2
4	Check the true edges of a job using Fitter square and Surface plate	2
5	Carryout pounding operation and stretching of stock using different types of hammers	2
6	Carryout cutting operation on mild steel and Al alloy of metals using hacksaw	2
7	Carryout drilling operation on a mild steel plate using a twist drill bit	2
8	Fabricate internal threads on a pre drilled hole using Tap set	2
9	measure the pitch, diameter of the thread, thread per inch (TPI) and accuracy of thread	2
10	Matching of two metals blocks of mild steel as per drawing no – 7.1.1	20
11	Fabrication of steel plate as per drawing no- 7.1.2	20
12	Make a matching block of 'T' as per dwg. No- 7.1.3 given of mild steel plate	10
13	Fabricate matching square block and drill a threaded hole as per dwg no-7.1.4 given on MS plate	10
14	Fabricate a hexagonal block and fit it into a hexagonal slot as per given drawing no- 7.1.5	20
15	Carryout rigid pipe flaring	4
16	Make a elbow by bending a pipe	2
17	Fabrication of base plate with clamp as per drawing – 7.1.6	20
18	Removal of a broken screw/bolt from a threaded hole/tap hole	2
19	Demonstrate the use of lubrication equipment according AMM	2
20	Use a torque meter with and without extension.	4
	TOTAL ALLOTTED HOURS	**132**

MODULE 3, 7a. & 13 PRACTICAL		**TOTAL HRS: 74 HRS**
ELECTRICAL SHOP PRACTICALS		
SN	**Task Title**	**Man Hours**
1	Check the continuity of a given wire	3
2	Check the insulation resistance of given wire	3
3	Perform crimping on a different electrical cables using crimping tool and crimp joint (mechanically and electrically	3
4	Bench charge battery	4
5	Perform lacing and tying of electrical wire bundles	3
6	Removal / Installation & Functional testing of landing light	5
7	Perform bonding and insulation test	3
8	Perform typical avionic testing using test equipment	4
9	Use test meters to measure Volts, Amps and Resistance	4
10	Check Aircraft Electrical Circuit for continuity in conjunction with an Electrical wiring diagram	3
11	Removal / Installation and functional testing of anti collision beacon	5
12.	Capacity test and charging of lead acid battery	16
13.	Initial activation and charging of lead acid battery	16
14.	Inspection of lead acid battery before charging	2
	Total Allotted Hours	**74**

MODULE 3, 7a. & 13 PRACTICAL		**TOTAL HRS: 84 HRS**
AVIONICS SHOP PRACTICALS		
SN	**Task Title**	**Man Hours**
1.	Soldering of electrical component to PCB	8
2.	Inspection of soldered joints	8
3.	Calibration of hydraulic pressure gauge	8
4.	Calibration of Pneumatic pressure gauge	8
5.	Pitot static leak test	16
6.	DC voltage measurement by using oscilloscope	4
7.	Measurement of voltage between two points on a waveform	4
8.	Measurement of time period of a waveform using oscilloscope	4
9.	Measurement of frequency of waveform using frequency meter or oscilloscope	4
10.	Pulse width measurement of waveform	4
11.	Pulse rise time and fall time measurement	4
12.	Measurement of Phase difference of two waveforms	4
13.	Frequency response measurement	4
14.	Time difference measurement	4
	Total Allotted Hours	**84**

MODULE. 13		**TOTAL HRS: 84 HRS**
	HANGAR PRACTICALS (Part – I)	
SN.	**Name of Task**	**Man Hours**
1.	Renew of silica gel crystals in flight compartment	4
2.	Removal and installation of loud speaker	8
3.	Safety precaution during working on avionics system	16
4.	Inspection of avionics system	16
5.	Inspection of static discharge wicks	8
6.	Bonding test & insulation test	8
7.	Inspection of external power port and connecting TRU	8
8.	Inspection using mirror and light source	8
9.	Checking earth path impedance standard practices	8
	Total Allotted Hours	**84**

MODULE. 13		**TOTAL HRS: 116 HRS**
HANGAR PRACTICALS (Part – II)		
SN.	**Name of Task**	**Man Hours**
1.	Removal and installation of weather radar antenna	16
2.	Removal and installation of glideslope antenna	8
3.	Removal and installation of VHF antenna	8
4.	Routine inspection of magnetic compass	4
5.	Removal and installation of magnetic compass	8
6.	Inspection and test before installation of magnetic compass	8
7.	Pivot friction test of standby compass	4
8.	Damping test of magnetic compass	4
9.	Compass swinging	8
10.	Functional check of gyroscopic instruments	8
11.	Visual inspection and maintenance of engine instruments	8
12.	Inspection of pitot pressure head and electrical check	8
13.	Inspection of pitot static instruments like altimeter, airspeed indicator, VSI and machmeter	8
14.	Inspection of EGT thermocouple, harness and leads	8
15.	Removal and installation of ADF antenna	8
	Total Allotted Hours	**116**

MODULE. 13		**TOTAL HRS: 100 HRS**
	HANGAR PRACTICALS (Part – III)	
SN.	**Name of Task**	**Man Hours**
1	Functional check of external lights	8
2	Functional check of flight compartment lights	4
3	Functional check of passenger's compartment lights	4
4	Removal installation of beacon light	8
5	Removal installation of Landing/taxi lights	8
6	Removal installation of flight compartment/passenger's compartment light	8
7	Removal and installation of starter generator	16
8	Brush wear check of starter generator	8
9	Removal and installation of AC generator	16
10	Removal and installation of inverter	16
11	Removal and installation of aircraft emergency battery	4
	TOTAL ALLOTTED HOURS	**100**

MODULE. 13 & 14		**TOTAL ALLOTTED HOURS = 50 HRS.**
	DOCUMENTATION PRACTICAL	
SN.	**Name of Task**	**Hours**
1	Prepare a Non-Routine task card for replacement of Brake assembly on aircraft. Also prepare removal tag for the brake assembly and note down the AMM and IPC ref. no. and refer IPC for part number and required Hardware	2
2	An aircraft has come after Hard Landing in overweight condition as reported by pilot, take out the special inspection schedule referring AMM and prepare documents for occurrence reporting.	2
3	You have carried out lay over inspection over an aircraft. Prepare documents required to relapse the aircraft for service.	2
4	You have removed a component from the aircraft due to a confirmed fault in it, do the documentation to root the component to quarantine store.	2
5	Take out the specimen copy of certificate of airworthiness and certificate of registration, confirm the validity of these documents and list the information available in these documents.	2
6	An aircraft approved for ETOPS suffered a snag listed in min. equipment list.	2
7	During damage mapping of the aircraft, it was observed that a dent on outer skin in non-pressurized area of tail section is beyond allowable limits. Refer structure repair manual and raise a non routine task sheet for the work.	2
8	Take out a specimen copy of aircraft technical log book (Techlog) and report the required information. Calculate the no. of hrs remaining for the next A check.	2
9	Take out a specimen copy of engine log book and record all the work done on engine including component replacement and snag rectification.	2
10	Prepare documents to carry out duplicate inspection (Double check) on primary flight controls or engine controls.	2
11	Engine driven hydraulic pump needs to be replaced as not developing required pressure, prepare documents for the jobs and label(tag) for the removed components.	2
12	Pilot rejected take off due to fire warning on engine no. 1, refer trouble shooting manual(TSM) to raise the non routine task sheet and also prepare the documents for occurrence reporting.	2
13	No. 1 engine generator was disconnected in flight due to overheat warning, do the necessary documentation to release the aircraft under MEL.	2

14	During Airworthiness review certification (ARC), an item of inspection requires checking all the emergency equipment on board the aircraft. Prepare an off-job sheet (non routine task card) for the above referring AMM and LOPA)	2
15	A last minute(pre-departure) snag of low bleed pressure resulted in a delay of 20 minutes to the scheduled flight, prepare the documents for defect and delay reporting.	2
16	Prepare Tech Log to reflect status of Pilot Defect Report, deferred maintenance and fuel and oil uplift before issuing CRS.	2
17	Prepare a document to show layout of On Board Emergency and Safety Equipment	2
18	Demonstrate correct reading and interpretation of electrical wiring diagram	2
19	Prepare Cockpit and Emergency Checklist for takeoff, cruise and landing phases.	2
20	Empty weight of the aircraft increased by XXXX Kgs. After a structural repair. Prepare a revised weight and balance document for the Aircraft.	2
21	An engine ground runs to be carried out at idle power for leak check. Prepare a “Before-Start” checklist with safety precautions and raise an OFF JOB sheet with AMM Task reference number.	2
22	A serviceable component is to be transferred from one aircraft to another aircraft. Document the process.	2
23	Engine Performance monitoring report shows a sudden drop in EGT margin. Raise an OFF JOB Sheet for the work to be carried out as per TSM and AMM giving reference number of the tasks.	2
24	From the engine logbook note down the serial number and part number from the engine driven hydraulic pump installed on the engine and cross check physically on the aircraft.	2
25	Report a tire-burst incident (during landing) and raise a non routine task sheet as per AMM.	2
	Total Allotted Hours	**50**