A, B1, B2 & B3 SYLLABUSES

Cross-References

European Aviation Safety Agency

PART-66

AeroGATES

PART-66 ALL CATEGORIES

SYLLABUSES AND AEROGATES CROSS- REFERENCES

AeroGATES

TABLE OF CONTENTS

A CATEGORIES

A1 CATEGORY

Module 1

MATHEMATICS

PART-66 Syllabuses	Cross-reference	Level
MODULE 1. MATHEMATICS – A CATEGORY		
1.1. ARITHMETIC		
Arithmetical terms and signs, Methods of multiplication and division, Fractions and decimals, Factors and multiples, Weights, measures and conversion factors, Ratio and proportion, Averages and percentages, Areas and volumes, squares, cubes, Square and cube roots.	**AG-01-01-A**	**1**
1.2. ALGEBRA		
(a)	**AG-01-02a-A**	**1**
Evaluating simple algebraic expressions, addition, subtraction, multiplication and division, use of brackets, simple algebraic fractions.		
(b)	-	-

Linear equations and their solutions, Indices and powers, negative and fractional indices, Binary and other applicable numbering systems, Simultaneous equations, Second degree equations with one unknown, Logarithms.		
1.3. GEOMETRY		
(a)	**-**	**-**
Simple geometrical constructions.		
(b)	**AG-01-03b-A-B1-B2-B3**	**2**
Graphical representation; nature and uses of graphs, Graphs of equations/functions.		
(c)	-	-
Simple trigonometry; trigonometrical relationships, use of tables and rectangular and polar coordinates.		
	-	**-**

Module 2

PHYSICS

PART-66 Syllabuses	Cross-reference	Level
MODULE 2. PHYSICS – A CATEGORY		
2.1. MATTER		
Nature of matter: the chemical elements, structure of atoms, molecules; Chemical compounds. States: solid, liquid and gaseous; Changes between states.	**AG-02-01-A-B1-B2-B3**	**1**
2.2. MECHANICS		
2.2.1. Statics	**AG-02-02-01-A-B2-B3**	**1**
Forces, moments and couples, representation as vectors; Centre of gravity. Elements of theory of stress, strain and elasticity: tension, compression, shear and torsion; Nature and properties of solid, fluid and gas; Pressure and buoyancy in liquids (barometers).		
2.2.2. Kinetics	**AG-02-02-02-A-B2-B3**	**1**
Linear movement: uniform motion in a straight line, motion under constant acceleration (motion under gravity) ; Rotational movement: uniform circular motion (centrifugal/centripetal forces);		

Periodic motion: pendular movement; Simple theory of vibration, harmonics and resonance; Velocity ratio mechanical advantage and efficiency.		
2.2.3. Dynamics	**AG-02-02-02-A-B2-B3**	**1**
(a) Mass	**AG-02-02-03a-A-B2-B3**	**1**
Mass, force, inertia, work, power, energy (potential, kinetic and total energy), heat, efficiency.		
(b) Momentum, conservation of momentum	**AG-02-02-03b-A-B3**	**1**
Momentum, conservation of momentum; Impulse; Gyroscopic principles. Friction: nature and effects, coefficient of friction (rolling resistance).		
2.2.4. Fluid dynamics		
(a)	**AG-02-02-04a-A-B1-B2-B3**	**2**
Specific gravity and density		
(b)	**AG-02-02-04b-A-B2-B3**	**1**
Viscosity, fluid resistance, effects of streamlining; Effects of compressibility on fluids ; Static, dynamic and total pressure: Bernoulli's Theorem, Venturi		
2.3. THERMODYNAMICS		
(a)	**AG-02-03a-A-B1-B2-B3**	**2**

Temperature: thermometers and temperature scales: Celsius, Fahrenheit and Kelvin. Heat definition.		
(b)	-	-
Heat capacity, specific heat; Heat transfer: convection, radiation and conduction; Volumetric expansion; First and second law of thermodynamics; Isothermal, adiabatic expansion and compression, engine cycles, constant volume and constant pressure, refrigerators and heat pumps; Gases: ideal gases laws; specific heat at constant volume and constant pressure, work done by expanding gas; Latent heat of fusion and evaporation, thermal energy, heat of combustion.		
2.4. OPTICS (LIGHT)		
Nature of light; speed of light; Laws of reflection and refraction: reflection at plane surfaces, Reflection by spherical mirrors, refraction, lenses, fibre optics.	**-**	**-**
2.5. WAVE MOTION AND SOUND		
Wave motion: mechanical waves, sinusoidal wave motion, Interference phenomena, standing waves; Sound: speed of sound, production of sound, intensity, Pitch and quality, Doppler effect.	**-**	**-**
	-	**-**

Module 3

ELECTRICAL FUNDAMENTALS

PART-66 Syllabuses	Cross-reference	Level
MODULE 3. ELECTRICAL FUNDAMENTALS – A CATEGORY		
3.1. ELECTRON THEORY		
Structure and distribution of electrical charges within: atoms, molecules, ions, compounds; Molecular structure of conductors, semiconductors and insulators.	**AG-03-01-A-B1-B2-B3**	**1**
3.2. STATIC ELECTRICITY AND CONDUCTION		
Static electricity and distribution of electrostatic charges; Electro static laws of attraction and repulsion; Units of charge, Coulomb's Law; Conduction of electricity in solids, liquids, gases and vacuum.	**AG-03-02-A-B3**	**1**
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.	**AG-03-03-A-B3**	**1**
3.4. GENERATION OF ELECTRICITY		
Production of electricity by the following methods: light, heat, friction, pressure, chemical action, magnetism and motion.	**AG-03-04-A-B1-B2-B3**	**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 of thermocouples; Operation of photo-cells.	**AG-03-05-A**	**1**
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.	**-**	**-**
3.7. RESISTANCE/RESISTOR		
(a)	-	-
Resistance and affecting factors Specific resistance; Resistor colour 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.		
(b)	-	-
Positive and negative temperature coefficient conductance		

Fixed resistors, stability, tolerance and limitations, methods of construction; Variable resistors, thermistors, voltage dependent resistors; construction of potentiometers and rheostats; Construction of Wheatstone Bridge.		
3.8. POWER		
Power, work and energy (kinetic and potential); Dissipation of power by a resistor; Power formula; Calculations involving power, work and energy.	-	-
3.9. CAPACITANCE/CAPACITOR		
Operation and function of a capacitor; Factors affecting capacitance area of plates, distance between plates, number of plates, dielectric and dielectric constant, working voltage, voltage rating; Capacitor types, Construction and function; Capacitor colour 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		
(a)	**-**	**-**
Theory of magnetism Properties of a magnet; Action of a magnet suspended in the Earth's magnetic field;		

Magnetisation and demagnetisation; Magnetic shielding; Various types of magnetic material; Electromagnets construction and principles of operation; Hand clasp rules to determine: magnetic field around current carrying conductor.		
(b)	-	-
Magnetomotive force, field strength, magnetic flux density, permeability, hysteresis loop, retentivity, coercive force reluctance, saturation point, eddy currents; Precautions for care and storage of magnets.		
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, 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;	-	-
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; Principle uses of inductors.		
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.	-	-
3.13. AC THEORY		
Sinusoidal waveform: phase, period, frequency, cycle; Instantaneous, average, root mean square, peak, peak to peak current values and calculations of the values, in relation voltage, current and power; Triangular/Square waves; Single/3 phase principles.	**AG-03-13-A-B3**	**1**
3.14. RESISTIVE (R), CAPACITIVE (C) AND INDUCTIVE (L) CIRCUITS		
Phase relation ship of voltage and current in L, C and R circuits, parallel, series and series parallel; Impedance, phase angle, power factor and current calculations;	-	**-**
True power, apparent power and reactive power calculations.		
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; Primary and Secondary current, voltage, turns ratio, power, efficiency; Auto transformers.		
3.16. FILTERS		
Operation, application and uses of the following filters: Low pass, high pass, band pass, band stop.	-	-
3.17. AC GENERATORS		
Rotation of loop in a magnetic field and waveform produced; Operation and construction of 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.		

Module 5

DIGITAL TECHNIQUES / ELECTRONIC INSTRUMENT SYSTEMS

PART-66 Syllabuses	Cross-reference	Level
MODULE 5. DIGITAL TECHNIQUES – A CATEGORY		
5.1. ELECTRONIC INSTRUMENT SYSTEMS		
Typical systems arrangements and cockpit layout of electronic instrument systems.	**AG-05-01-A-B3**	**1**
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.	**-**	**-**
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.	**-**	**-**
5.4. DATA BUSES		
Operation of data buses in aircraft systems including knowledge of ARINC and other specifications; Aircraft network/Ethernet.	**-**	**-**
5.5. LOGIC CIRCUITS		
(a)	**-**	**-**
Identification of common logic gate symbols, tables and equivalent circuits;		

Applications used for aircraft systems, schematic diagrams.		
(b)	**-**	**-**
Interpretation of logic diagrams.		
5.6. BASIC COMPUTER STRUCTURE		
(a)	**AG-05-06a-A**	**1**
Computer terminology (including bit, byte, software, hard ware, CPU, IC, and various memory devices such as RAM, ROM, PROM); Computer technology (as applied in aircraft systems).		
(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.		
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.	**-**	**-**
5.8. INTEGRATED CIRCUITS		
Operation and use of encoders and decoders;	**-**	**-**

Function of encoder types; Uses of medium, large and very large scale integration.		
5.9. MULTIPLEXING		
Operation, application and identification in logic diagrams of multiplexers and demultiplexers.	**-**	**-**
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.	**-**	**-**
5.11. ELECTRONIC DISPLAYS		
Principles of operation of common types of displays used in modern aircraft, including : cathode ray tubes, light emitting diodes, liquid crystal display.	**-**	**-**
5.12. ELECTRONIC SENSITIVE DEVICES		
Special handling of components sensitive to electrostatic discharges; Awareness of risks and possible damage, component and personnel anti-static protection devices.	**AG-05-12-A-B3**	**1**
5.13. SOFTWARE MANAGEMENT CONTROL		
Awareness of restrictions, airworthiness requirements and possible catastrophic effects of unapproved changes to software programmes.	**-**	**-**
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.		
5.15. TYPICAL ELECTRONIC/DIGITAL AIRCRAFT SYSTEM		
General arrangement of typical electronic / digital aircraft systems and associated BITE (Built In Test Equipment) testing such as: ▪ ACARS – ARINC Communication and Addressing and Reporting System; ▪ ECAM – Electronic Centralised Aircraft Monitoring; ▪ EFIS – Electronic Flight Instrument System; ▪ EICAS – Engine Indication and Crew Alerting System; ▪ FBW – Fly-By-Wire: ▪ FMS – Flight Management System; ▪ GPS – Global Positioning System; ▪ IRS – Inertial Reference System; ▪ TCAS – Traffic Alert Collision Avoidance System; ▪ IMA – Integrated Modular Avionics; ▪ Cabin systems; ▪ Information systems.	-	-

Module 6

MATERIALS AND HARDWARE

PART-66 Syllabuses	Cross-reference	Level
MODULE 6. MATERIALS AND HARDWARE – A CATEGORY		
6.1. AIRCRAFT MATERIALS - FERROUS		
(a)	**AG-06-01a-A-B2**	**1**
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.		
6.2. AIRCRAFT MATERIALS – NON-FERROUS		
(a)	**AG-06-02a-A-B2**	**1**
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.		
6.3. AIRCRAFT MATERIALS – COMPOSITE AND NON-METALLIC		
6.3.1. Composite and non-metallic other than wood and fabric		

(a)	**AG-06-03-01a-A**	**1**
Characteristics, properties and identification of common composite and non-metallic materials, other than wood, used in aircraft; Sealant and bonding agents.		
(b)	**AG-06-03-01b-A**	**1**
The detection of defects/deterioration in composite and non-metallic material. Repair of composite and non-metallic material.		
6.3.2. Wooden structures		
Construction methods of wooden airframe structures; Characteristics, properties and types of wood and glue used in aeroplanes; 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.	**AG-06-03-02-A**	**1**
6.3.3. Fabric covering		
Characteristics, properties and types of fabrics used in aeroplanes; Inspections methods for fabric; Types of defects in fabric; repair of fabric covering.	**AG-06-03-03-A**	**1**
6.4. CORROSION		
(a)	**AG-06-04a-A-B1-B2-B3**	**1**
Chemical fundamentals;		

Formation by, galvanic action process, microbiological, stress.		
(b)	**AG-06-04b-A-B2-B3**	**2**
Types of corrosion and their identification; Causes of corrosion; Material types, susceptibility to corrosion.		
6.5. FASTENERS		
6.5.1. Screw threads	**AG-06-05-01-A-B1-B2-B3**	**2**
Screw nomenclature; Thread forms, dimension and tolerances for standard thread used in aircraft; Measuring screw threads		
6.5.2. Bolts, studs and screws	**AG-06-05-02-A-B1-B2-B3**	**2**
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.		
6.5.3. Locking devices	**AG-06-05-03-A-B1-B2-B3**	**2**
Tab and spring washers, locking plates, split pins, pal-nuts, wire locking, quick release fasteners, keys, circlips, cotter pins.		
6.5.4. Aircraft rivets	**AG-06-05-04-A-B2**	**1**
Types of solid and blind rivets: specifications and identification;		

Heat treatment.		
6.6. PIPES AND UNIONS		
(a)	**AG-06-06a-A-B1-B2-B3**	**2**
Identification of, and types of rigid and flexible pipes and their connectors used in aircraft.		
(b)	**AG-06-06b-A-B1-B3**	**2**
Standard unions for aircraft hydraulic, fuel, oil, pneumatic and air system pipes.		
6.7. SPRINGS		
Types of springs, materials, characteristics and applications.	**-**	**-**
6.8. BEARINGS		
Purpose of bearings, loads, material, construction; Types of bearings and their application.	**AG-06-08-A-B3**	**1**
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.	**AG-06-09-A-B3**	**1**
6.10. CONTROL CABLES		
Types of cables; End fittings, turnbuckles and compensation devices; Pulleys and cable system components;	**AG-06-10-A-B2**	**1**
Bowden cables; Aircraft flexible control systems.		

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.	**AG-06-11-A**	**1**

Module 7A

MAINTENANCE PRACTICES

PART-66 Syllabuses	Cross-reference	Level
MODULE 7A. MAINTENANCE PRACTICES – A CATEGORY		
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.	**AG-07A-01-A-B1-B2**	**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.	**AG-07A-02-A-B1-B2**	**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.	**AG-07A-03-A-B1-B2**	**3**
7.4. AVIONIC TEST EQUIPMENT		

Operation, function and use of avionic general test equipment.	-	-
7.5. ENGINEERING DRAWINGS, DIAGRAMS AND STANDARDS		
Drawing types and diagrams, their symbols, dimensions, tolerances and projections; Identifying title block information; Microfilm, microfiche and computerised 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.	**AG-07A-05-A**	**1**
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.	**AG-07A-06-A-B2**	**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;	**AG-07A-07-A**	**1**
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; EWIS installations, inspection, repair, maintenance and cleanliness standards.		
7.8. RIVETING		
Riveted joints, rivet spacing and pitch; Tools used for riveting and dimpling; Inspection of riveted joints.	**AG-07A-08-A**	**1**
7.9. PIPES AND HOSES		
Bending and belling / flaring aircraft pipes; Inspection and testing of aircraft pipes and hoses; Installation and clamping of pipes.	**AG-07A-09-A**	**1**
7.10. SPRINGS		
Inspection and testing of springs.	**AG-07A-10-A**	**1**
7.11. BEARINGS		
Testing, cleaning and inspection of bearings; Lubrication requirements of bearings; Defects in bearings and their causes.	**AG-07A-11-A**	**1**
7.12. TRANSMISSIONS		
Inspection of gears, backlash; Inspection of belts and pulleys, chains and sprockets;	**AG-07A-12-A**	**1**
Inspection of screw jacks, lever devices, push-pull rod systems.		

7.13. CONTROL CABLES		
Swaging of end fittings; Inspection and testing of control cables; Bowden cables; aircraft flexible control systems.	**AG-07A-13-A**	**1**
7.14. MATERIAL HANDLING		
7.14.1. Sheet metal	**-**	**-**
Marking out and calculation of bend allowance; Sheet metal working, including bending and forming; Inspection of sheet metal work.		
7.14.2. Composite and non-metallic	**-**	**-**
Bonding practices; Environmental conditions Inspection methods		
7.15. WELDING, BRAZING, SOLDERING AND BONDING		
(a)	**-**	**-**
Soldering methods; inspection of soldered joints.		
(b)	**-**	**-**
Welding and brazing methods; Inspection of welded and brazed joints;		
Bonding methods and inspection of bonded joints.		

7.16. AIRCRAFT WEIGHT AND BALANCE		
(a)	**-**	**-**
Centre of gravity/Balance limits calculation: use of relevant documents.		
(b)	**-**	**-**
Preparation of aircraft for weighing; Aircraft weighing.		
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 / de-fuelling procedures; De-icing / anti-icing procedures; Electrical, hydraulic and pneumatic ground supplies; Effects of environmental conditions on aircraft handling and operation.	**AG-07A-17-A-B1-B2**	**2**
7.18. DISASSEMBLY, INSPECTION, REPAIR, AND ASSEMBLY TECHNIQUES		
(a)		
Types of defects and visual inspection techniques. Corrosion removal, assessment and re-protection.	**AG-07A-18a-A**	**2**
(b)	**-**	**-**
General repair methods, Structural Repair Manual;		

Ageing, fatigue and corrosion control programmes.		
(c)	**-**	**-**
Non destructive inspection techniques including, penetrant, radiographic, eddy current, ultrasonic and boroscope methods.		
(d)		
Disassembly and re-assembly techniques.	**AG-07A-18d-A-B1-B2**	**2**
(e)		
Trouble shooting techniques.	**-**	**-**
7.19. ABNORMAL EVENTS		
(a)	**AG-07A-19a-A-B1-B2**	**2**
Inspections following lightning strikes and HIRF penetration.		
(b)	**AG-07A-19b-A-B1**	**2**
Inspections following abnormal events such as heavy landings and flight through turbulence.		
7.20. MAINTENANCE PROCEDURES		
Maintenance planning; Modification procedures; Stores procedures; Certification / release procedures;	**AG-07A-20-A**	**1**
Interface with aircraft operation; Maintenance Inspection / Quality Control / Quality Assurance ;		

Additional maintenance procedures. Control of life limited components.		

Module 8

BASIC AERODYNAMICS

PART-66 Syllabuses	Cross-reference	Level
MODULE 8. BASIC AERODYNAMICS – A & B3 CATEGORIES		
8.1. PHYSICS OF THE ATMOSPHERE		
International Standard Atmosphere (ISA), application to aerodynamics.	**AG-08-01-B1-B2**	**2**
8.2. AERODYNAMICS		
Airflow around a body; Boundary layer, laminar and turbulent flow, free stream flow, relative airflow, upwash 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.	**AG-08-02-B1-B2**	**2**
8.3. THEORY OF FLIGHT		
Relation ship between lift, weight, thrust and drag; Glide ratio; Steady stable flights, performance; Theory of the turn;	**AG-08-03-B1-B2**	**2**
Influence of load factor: stall, flight envelope and structural limitations;		

Lift augmentation.		
8.4. FLIGHT STABILITY AND DYNAMICS		
Longitudinal, lateral and directional stability (active and passive).	**AG-08-04-B1-B2**	**2**

Module 9A

HUMAN FACTORS

PART-66 Syllabuses	Cross-reference	Level
MODULE 9A. HUMAN FACTORS – A CATEGORY		
9.1. GENERAL		
The need to take human factors into account; Incidents attributable to human factors / human error; 'Murphy's' law.	**AG-09A-01-A**	**1**
9.2. HUMAN PERFORMANCE AND LIMITATIONS		
Vision; Hearing; Information processing; Attention and perception; Memory; Claustrophobia and physical access.	**AG-09A-02-A**	**1**
9.3. SOCIAL PSYCHOLOGY		
Responsibility: individual and group; Motivation and de-motivation; Peer pressure;	**AG-09A-03-A-B1-B2**	**1**

'Culture' issues; Team working; Management, Supervision and leadership.		
9.4. FACTORS AFFECTING PERFORMANCE		
Fitness / health; Stress: domestic and work related; Time pressure and deadlines; Workload: over load and underload; Sleep and fatigue, shiftwork; Alcohol, medication, drug abuse.	**AG-09A-04-A-B1-B2**	**2**
9.5. PHYSICAL ENVIRONMENT		
Noise and fumes; Illumination; Climate and temperature; Motion and vibration; Working environment.	**AG-09A-05-A-B1-B2**	**1**
9.6. TASKS		
Physical work; Repetitive tasks; Visual inspection; Complex systems.	**AG-09A-06-A-B1-B2**	**1**
9.7. COMMUNICATION		

Within and between teams; Work logging and recording; Keeping up to date, currency; Dissemination of information.	**AG-09A-07-A-B1-B2**	**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.	**AG-09A-08-A**	**1**
9.9. HAZARDS IN THE WORKPLACE		
Recognising and avoiding hazards; Dealing with emergencies.	**AG-09A-09-A**	**1**

Module 10

AVIATION LEGISLATION

PART-66 Syllabuses	Cross-reference	Level
MODULE 10. AVIATION LEGISLATION – A CATEGORY		
10.1. REGULATORY FRAMEWORK		
Role of International Civil Aviation Organisation; Role of the European Commission; Role of EASA; Role of the Member States and the National Aviation Authorities Regulation (EC) N° 1321/2014 and its implementing rules Regulations (EC) N° 216/2008 and (EC) N° 2042/2003. Relationships between the various Annexes (Parts) such as Part-21, Part-M, Part-145, Part-66, Part-147 and EO-OPS.	**AD-10-01-A-B1-B2-B3**	**1**
10.2. CERTIFYING STAFF - MAINTENANCE		
Detailed understanding of Part-66.	**AD-10-02-A-B1-B2-B3**	**2**
10.3. APPROVED MAINTENANCE ORGANIZATIONS		
Detailed understanding of Part-145 and Part-M Subpart F.	**AD-10-03-A-B1-B2-B3**	**2**
10.4. AIR OPERATIONS		
General understanding of EU-OPS;	**AD-10-04-A-B1-B2-B3**	**1**

Air Operators Certificates; Operators Responsibilities, in particular regarding continuing airworthiness and maintenance; Aircraft Maintenance Programme; MEL/CDL; Documents to be carried on board; Aircraft placarding (markings).		
10.5. CERTIFICATION OF AIRCRAFT, PARTS AND APPLIANCES		
(a) General	-	-
General understanding of Part-21 and EASA certification specifications CS-23, 25, 27, 29.		
(b) Documents	-	-
Certificate of Airworthiness; restricted certificates of airworthiness and permit to fly; Certificate of registration; Noise certificate; Weight schedule; Radio station licence and approval.		
10.6. CONTINUING AIRWORTHINESS		
Detailed understanding of Part-21 provisions related to continuing airworthiness; Detailed understanding of Part-M.	**AD-10-06-A-B1-B2-B3**	**2**
10.7. APPLICABLE NATIONAL AND INTERNATIONAL REQUIREMENTS FOR (IF NOT SUPERSEDED BY EU REQUIREMENTS).		
(a)		

Maintenance programmes, maintenance checks and inspections; Airworthiness directives; Service bulletins, manufacturers service information; Modifications and repairs; Maintenance documentation: maintenance manuals, structural repair manual, illustrated parts catalogue, etc. Master Minimum Equipment Lists, Minimum equipment lists, Dispatch Deviation lists.	**AD-10-07a-A**	**1**
(b)	**-**	**-**
Continuing airworthiness; Minimum equipment requirements – Test flights.		

Module 11A

TURBINE AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS

PART-66 Syllabuses	Cross-reference	Level
MODULE 11A. TURBINE AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS – A1 CATEGORY		
11A.1. THEORY OF FLIGHT		
11A.1.1. Aeroplane Aerodynamics and Flight controls	**AG-11A-01-01-A1**	**1**
Operation and effect of: ▪ roll control: ailerons and spoilers; ▪ pitch control: elevators, stabilators, variable incidence stabilisers and canards; ▪ yaw control, rudder limiters; Control using elevons, ruddervators; High lift devices, slots, slats, flaps, flaperons; Drag inducing devices, spoilers, lift dumpers, speed brakes; Effects of wing fences, saw tooth leading edges; Boundary layer control using, vortex generators, stall wedges or leading edge devices; Operation and effect of trim tabs, balance and antibalance (leading) tabs, servo tabs, spring tabs, mass balance, control surface bias, aerodynamic balance panels.		
11A.1.2. High Speed flight	**AG-11A-01-02-A1**	**1**
Speed of sound, subsonic flight, transonic flight, supersonic flight,		

Mach number, critical Mach number, compressibility buffet, shock wave, aerodynamic heating, area rule; Factors affecting airflow in engine intakes of high speed aircraft; Effects of sweepback on critical Mach number.		
11A.2. AIRFRAME STRUCTURES – GENERAL CONCEPTS		
(a)	**AG-11A-02a-A1-B11**	**2**
Airworthiness requirements for structural strength; Structural classification, primary, secondary and tertiary; Fail safe, safe life, damage tolerance concepts; Zonal and station identification systems; Stress, strain, bending, compression, shear, torsion, tension, hoop stress, fatigue; Drains and ventilation provisions; System installation provisions; Lightning strike protection provision; Aircraft bonding.		
(b)	**AG-11A-02a-A1**	**1**
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; Structure assembly techniques: riveting, bolting, bonding Methods of surface protection, such as chromating, anodising, painting ; Surface cleaning; Airframe symmetry: methods of alignment and symmetry checks.		
11A.3. AIRFRAME STRUCTURES – AEROPLANES		

11A.3.1. Fuselage (ATA 52/53/56)	**AG-11A-03-01-A1**	**1**
Construction and pressurisation sealing; Wing, stabiliser, pylon and under carriage attachments; Seat installation and cargo loading system; Doors and emergency exits : construction, mechanisms, operation and safety devices ; Windows and windscreen construction and mechanisms.		
11A.3.2. Wings (ATA 57)	**AG-11A-03-02-A1**	**1**
Construction; Fuel storage; Landing gear, pylon, control surface and high lift/drag attachments.		
11A.3.3. Stabilizers (ATA 55)	**AG-11A-03-03-A1**	**1**
Construction; Control surface attachment.		
11A.3.4. Flight Control Surfaces (ATA 55/57)	**AG-11A-03-04-A1**	**1**
Construction and attachment; Balancing – mass and aerodynamic.		
11A.3.5. Nacelles/Pylons (ATA 54)	**AG-11A-03-05-A1**	**1**
Construction; Firewalls;		
Engine mounts.		

11A.4. AIR CONDITIONING AND CABIN PRESSURIZATION (ATA 21)		
11A.4.1. Air supply	**AG-11A-04-01-A1**	**1**
Sources of air supply including engine bleed, APU and ground cart.		
11A.4.2. Air conditioning	**AG-11A-04-02-A1**	**1**
Air conditioning systems; Air cycle and vapour cycle machines; Distribution systems; Flow, temperature and humidity control system.		
11A.4.3. Pressurization	**AG-11A-04-03-A1**	**1**
Pressurisation systems; Control and indication including control and safety valves; Cabin pressure controllers.		
11A.4.4. Safety and warning devices	**AG-11A-04-04-A1**	**1**
Protection and warning devices.		
11A.5. INSTRUMENT/AVIONIC SYSTEMS		
11A.5.1. Instrument Systems (ATA 31)	**AG-11A-05-01-A1**	**1**
Pitot static: altimeter, air speed indicator, vertical speed indicator; Gyroscopic: artificial horizon, attitude director, direction indicator, horizontal situation indicator, turn and slip indicator, turn coordinator;		
Compasses: direct reading, remote reading;		

Angle of attack indication, stall warning systems; Glass cockpit; Other aircraft system indication.		
11A.5.2. Avionic Systems	**AG-11A-05-01-A1-B11**	**1**
Fundamentals of system lay-outs and operation of: ▪ Auto Flight (ATA 22); ▪ Communications (ATA 23); ▪ Navigation Systems (ATA 34).		
11A.6. ELECTRICAL POWER		
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	**AG-11A-06-A1**	**1**
11A.7. EQUIPMENT AND FURNISHINGS (ATA 25)		
(a)	**AG-11A-07a-A1-B11**	**2**
Emergency equipment requirements; Seats, harnesses and belts.		

(b)	**AG-11A-07a-A1-B11**	**1**
Cabin lay-out; Equipment lay-out; Cabin Furnishing Installation; Cabin entertainment equipment; Galley installation; Cargo handling and retention equipment; Airstairs.		
11A.8. FIRE PROTECTION (ATA 26)		
(a)	**AG-11A-08a-A1**	**1**
Fire and smoke detection and warning systems; Fire extinguishing systems; System tests.		
(b)	**AG-11A-08b-A1-B11**	**1**
Portable fire extinguisher.		
11A.9. FLIGHT CONTROLS (ATA 27)		
Primary controls: aileron, elevator, rudder, spoiler; Trim control; Active load control;	**AG-11A-09-A1**	**1**
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.		
11A.10. FUEL SYSTEMS (ATA 28)		
System lay-out; Fuel tanks; Supply systems; Dumping, venting and draining; Cross-feed and transfer; Indications and warnings; Refuelling and defuelling; Longitudinal balance fuel systems.	**AG-11A-10-A1**	**1**
11A.11. HYDRAULIC POWER (ATA 29)		
System lay-out; Hydraulic fluids; Hydraulic reservoirs and accumulators; Pressure generation: electric, mechanical, pneumatic; Emergency pressure generation; Filters;	**AG-11A-11-A1**	**1**
Pressure Control; Power distribution; Indication and warning systems;		

Interface with other systems.		
11A.12. 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 and chemical ; Rain repellent; Probe and drain heating; Wiper systems.	**AG-11A-12-A1**	**1**
11A.13. 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.	**AG-11A-13-A1**	**2**
11A.14. LIGHTS (ATA 33)		
External: navigation, anti-collision, landing, taxiing, ice; Internal: cabin, cockpit, cargo;	**AG-11A-14-A1**	**2**
Emergency.		
11A.15. OXYGEN (ATA 35)		

System lay-out: ▪ cockpit, ▪ cabin; Sources, storage, charging and distribution; Supply regulation; Indications and warnings.	**AG-11A-15-A1**	**1**
11A.16. PNEUMATIC/VACUUM (ATA 36)		
System lay-out; Sources: ▪ engine / APU, ▪ compressors, ▪ reservoirs, ▪ ground supply; Pressure and vacuum pumps; Pressure control; Distribution; Indications and warnings; Interfaces with other systems.	**AG-11A-16-A1**	**1**
11A.17. WATER/WASTE (ATA 38)		
Water system lay-out, supply, distribution, servicing and draining; Toilet system lay-out, flushing and servicing; Corrosion aspects.	**AG-11A-17-A1**	**2**
11A.18. ON BOARD MAINTENANCE SYSTEMS (ATA 45)		

Central maintenance computers; Data loading system; Electronic library system; Printing; Structure monitoring (damage tolerance monitoring).	**AG-11A-18-A1**	**1**
11A.19. INTEGRATED MODULAR AVIONICS (ATA 42)		
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,	**1**	**1**
▪ Braking control, ▪ Steering control, ▪ Landing gear extension and retraction, ▪ Tyre pressure indication, ▪ Oleo pressure indication,		

▪ Brake temperature monitoring, etc. Core system; Network components.		
11A.20. CABIN SYSTEMS (ATA 44)		
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 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;	**AG-11A-20-A1**	**1**
▪ External Communication System; ▪ Cabin Mass Memory System; ▪ Cabin Monitoring System; ▪ Miscellaneous Cabin System.		
11A.21. INFORMATION SYSTEMS (ATA 46)		

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.	**AG-11A-21-A1**	**1**

Module 15

GAS TURBINE ENGINE

PART-66 Syllabuses	Cross-reference	Level
MODULE 15. GAS TURBINE ENGINE – A1 & A3 CATEGORIES		
15.1. FUNDAMENTALS		
Potential energy, kinetic energy, Newton's laws of motion, Brayton cycle; The relationship between force, work, power, energy, velocity, acceleration; Constructional arrangement and operation of turbojet, turbofan, turboshaft, turboprop.	**AG-15-01-A1-A3**	**1**
15.2. ENGINE PERFORMANCE		
Gross thrust, net thrust, choked nozzle thrust, thrust distribution, resultant thrust, thrust horsepower, equivalent shaft horsepower, specific fuel consumption; Engine efficiencies; By-pass ratio and engine pressure ratio; Pressure, temperature and velocity of the gas flow Engine ratings, static thrust, influence of speed, altitude and hot climate, flat rating, limitations.	-	-
15.3. INLET		
Compressor inlet ducts; Effects of various inlet configurations; Ice protection.	**AG-15-03- A1-A3 -B1**	**2**
15.4. COMPRESSORS		

Axial and centrifugal types; Constructional features and operating principles and applications; Fan balancing; Operation; Causes and effects of compressors tall and surge; Methods of air flow control: bleed valves, variable inlet guide vanes, variable stator vanes, rotating stator blades; Compressor ratio.	**AG-15-04- A1-A3**	**1**
15.5. COMBUSTION SECTION		
Constructional features and principles of operation.	**AG-15-05- A1-A3**	**1**
15.6. TURBINE SECTION		
Operation and characteristics of different turbine blade types; Blade to disk attachment; Nozzle guide vanes; Causes and effects of turbine blade stress and creep.	**AG-15-06- A1-A3-B1**	**2**
15.7. EXHAUST		
Constructional features and principles of operation; Convergent, divergent and variable area nozzles; Engine noise reduction; Thrust reversers.	**AG-15-07- A1-A3**	**1**
15.8. BEARINGS AND SEALS		
Constructional features and principles of operation.	-	-

15.9. LUBRICANTS AND FUELS		
Properties and specifications; Fuel additives; Safety precautions.	**AG-15-09- A1-A3**	**1**
15.10. LUBRICATION SYSTEMS		
System operation / lay-out and components.	**AG-15-10- A1-A3**	**1**
15.11. FUEL SYSTEMS		
Operation of engine control and fuel metering systems including electronic engine control (FADEC); Systems lay-out and components.	**AG-15-11- A1-A3**	**1**
15.12. AIR SYSTEMS		
Operation of engine air distribution and anti-ice control systems, including internal cooling, sealing and external air services.	**AG-15-12- A1-A3**	**1**
15.13. STARTING AND IGNITION SYSTEMS		
Operation of engine start systems and components; Ignition systems and components; Maintenance safety requirements.	**AG-15-13- A1-A3**	**1**
15.14. ENGINE INDICATION SYSTEMS		
Exhaust gas temperature/ Interstage turbine temperature; Engine thrust Indication: ▪ engine pressure ratio, ▪ engine turbine discharge pressure or jet pipe pressure systems;	**AG-15-14- A1-A3**	**1**

Oil pressure and temperature; Fuel pressure and flow; Engine speed; Vibration measurement and indication; Torque; Power.		
15.15. POWER AUGMENTATION SYSTEMS		
Operation and applications; Water injection, water methanol; Afterburner systems.	-	**-**
15.16. TURBO-PROP ENGINES		
Gas coupled / free turbine and gear coupled turbines; Reduction gears; Integrated engine and propeller controls; Overspeed safety devices.	**AG-15-16- A1-A3**	**1**
15.17. TURBO-SHAFT ENGINES		
Arrangements drive systems, reduction gearing, couplings, control systems.	**AG-15-17- A1-A3**	**1**
15.18. AUXILIARY POWER UNITS (APUs)		
Purpose, operation, protective systems.	**AG-15-18- A1-A3**	**1**
15.19. POWERPLANT INSTALLATION		
Configuration of firewalls, cowlings, acoustic panels, engine mounts, anti-vibration mounts, hoses, pipes,	**AG-15-19- A1-A3**	**1**

feeders, connectors, wiring looms, control cables and rods, lifting points and drains.		
15.20. FIRE PROTECTION SYSTEMS		
Operation of detection and extinguishing systems.	**AG-15-20- A1-A3**	**1**
15.21. ENGINE MONITORING AND GROUND INSTALLATION		
Procedures for starting and ground run-up; Interpretation of engine power output and parameters; Trend (including oil analysis, vibration and boroscope) monitoring; Inspection of engine and components to criteria, tolerances and data specified by engine manufacturer; Compressor washing / cleaning; Foreign object damage.	**AG-15-21- A1-A3**	**1**
15.22. ENGINE STORAGE AND PRESERVATION		
Preservation and depreservation for accessories/systems	-	-

Module 17

PROPELLER

PART-66 Syllabuses	Cross-reference	Level
MODULE 17A. PROPELLER – A1 CATEGORY		
17A.1. FUNDAMENTALS		
Blade element theory; High/low blade angle, reverse angle, angle of attack, rotational speed; Propeller slip; Aerodynamic, centrifugal, and thrust forces; Torque; Relative airflow on blade angle of attack; vibration and resonance.	**AG-17A-01-A**	**1**
17A.2. PROPELLER CONSTRUCTION		
Construction methods and materials used in composite and metal propellers; Blade station, blade face, blade shank, blade back and hub assembly; Fixed pitch, controllable pitch, constant speeding propeller; Propeller/spinner installation.	**AG-17A-02-A**	**1**
17A.3. PROPELLER PITCH CONTROL		
Speed control and pitch change methods; Feathering and reverse pitch;	**AG-17A-03-A**	**1**

Overspeed protection.		
17A.4. PROPELLER SYNCHRONIZING		
Synchronising and synchrophasing equipment.	**-**	**-**
17A.5. PROPELLER ICE PROTECTION		
Fluid and electrical de-icing equipment.	**AG-17A-05-A**	**1**
17A.6. PROPELLER MAINTENANCE		
Static and dynamic balancing; Blade tracking; Assessment of blade damage, erosion, corrosion, impact damage, delamination; Propeller treatment/repair schemes; Propeller engine running.	**AG-17A-06-A**	**1**
17A.7. PROPELLER STORAGE ANDPRESERVATION		
Propeller preservation and depreservation	**AG-17A-07-A**	**1**

A2 CATEGORY

Module 1

MATHEMATICS

PART-66 Syllabuses	Cross-reference	Level
MODULE 1. MATHEMATICS – A CATEGORY		
1.1. ARITHMETIC		
Arithmetical terms and signs, Methods of multiplication and division, Fractions and decimals, Factors and multiples, Weights, measures and conversion factors, Ratio and proportion, Averages and percentages, Areas and volumes, squares, cubes, Square and cube roots.	**AG-01-01-A**	**1**
1.2. ALGEBRA		
(a)	**AG-01-02a-A**	**1**
Evaluating simple algebraic expressions, addition, subtraction, multiplication and division, use of brackets, simple algebraic fractions.		
(b)	-	-

Linear equations and their solutions, Indices and powers, negative and fractional indices, Binary and other applicable numbering systems, Simultaneous equations, Second degree equations with one unknown, Logarithms.		
1.3. GEOMETRY		
(a)	**-**	**-**
Simple geometrical constructions.		
(b)	**AG-01-03b-A-B1-B2-B3**	**2**
Graphical representation; nature and uses of graphs, Graphs of equations/functions.		
(c)	-	-
Simple trigonometry; trigonometrical relationships, use of tables and rectangular and polar coordinates.		
	-	**-**

Module 2

PHYSICS

PART-66 Syllabuses	Cross-reference	Level
MODULE 2. PHYSICS – A CATEGORY		
2.1. MATTER		
Nature of matter: the chemical elements, structure of atoms, molecules; Chemical compounds. States: solid, liquid and gaseous; Changes between states.	**AG-02-01-A-B1-B2-B3**	**1**
2.2. MECHANICS		
2.2.1. Statics	**AG-02-02-01-A-B2-B3**	**1**
Forces, moments and couples, representation as vectors; Centre of gravity. Elements of theory of stress, strain and elasticity: tension, compression, shear and torsion; Nature and properties of solid, fluid and gas; Pressure and buoyancy in liquids (barometers).		
2.2.2. Kinetics	**AG-02-02-02-A-B2-B3**	**1**
Linear movement: uniform motion in a straight line, motion under constant acceleration (motion under gravity) ; Rotational movement: uniform circular motion (centrifugal/centripetal forces);		

Periodic motion: pendular movement; Simple theory of vibration, harmonics and resonance; Velocity ratio mechanical advantage and efficiency.		
2.2.3. Dynamics	**AG-02-02-02-A-B2-B3**	**1**
(a) Mass	**AG-02-02-03a-A-B2-B3**	**1**
Mass, force, inertia, work, power, energy (potential, kinetic and total energy), heat, efficiency.		
(b) Momentum, conservation of momentum	**AG-02-02-03b-A-B3**	**1**
Momentum, conservation of momentum; Impulse; Gyroscopic principles. Friction: nature and effects, coefficient of friction (rolling resistance).		
2.2.4. Fluid dynamics		
(a)	**AG-02-02-04a-A-B1-B2-B3**	**2**
Specific gravity and density		
(b)	**AG-02-02-04b-A-B2-B3**	**1**
Viscosity, fluid resistance, effects of streamlining; Effects of compressibility on fluids ; Static, dynamic and total pressure: Bernoulli's Theorem, Venturi		
2.3. THERMODYNAMICS		
(a)	**AG-02-03a-A-B1-B2-B3**	**2**

Temperature: thermometers and temperature scales: Celsius, Fahrenheit and Kelvin. Heat definition.		
(b)	-	-
Heat capacity, specific heat; Heat transfer: convection, radiation and conduction; Volumetric expansion; First and second law of thermodynamics; Isothermal, adiabatic expansion and compression, engine cycles, constant volume and constant pressure, refrigerators and heat pumps; Gases: ideal gases laws; specific heat at constant volume and constant pressure, work done by expanding gas; Latent heat of fusion and evaporation, thermal energy, heat of combustion.		
2.4. OPTICS (LIGHT)		
Nature of light; speed of light; Laws of reflection and refraction: reflection at plane surfaces, Reflection by spherical mirrors, refraction, lenses, fibre optics.	**-**	**-**
2.5. WAVE MOTION AND SOUND		
Wave motion: mechanical waves, sinusoidal wave motion, Interference phenomena, standing waves; Sound: speed of sound, production of sound, intensity, Pitch and quality, Doppler effect.	**-**	**-**
	-	**-**

Module 3

ELECTRICAL FUNDAMENTALS

PART-66 Syllabuses	Cross-reference	Level
MODULE 3. ELECTRICAL FUNDAMENTALS – A CATEGORY		
3.1. ELECTRON THEORY		
Structure and distribution of electrical charges within: atoms, molecules, ions, compounds; Molecular structure of conductors, semiconductors and insulators.	**AG-03-01-A-B1-B2-B3**	**1**
3.2. STATIC ELECTRICITY AND CONDUCTION		
Static electricity and distribution of electrostatic charges; Electro static laws of attraction and repulsion; Units of charge, Coulomb's Law; Conduction of electricity in solids, liquids, gases and vacuum.	**AG-03-02-A-B3**	**1**
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.	**AG-03-03-A-B3**	**1**
3.4. GENERATION OF ELECTRICITY		
Production of electricity by the following methods: light, heat, friction, pressure, chemical action, magnetism and motion.	**AG-03-04-A-B1-B2-B3**	**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 of thermocouples; Operation of photo-cells.	**AG-03-05-A**	**1**
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.	**-**	**-**
3.7. RESISTANCE/RESISTOR		
(a)	-	-
Resistance and affecting factors Specific resistance; Resistor colour 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.		
(b)	-	-
Positive and negative temperature coefficient conductance		

Fixed resistors, stability, tolerance and limitations, methods of construction; Variable resistors, thermistors, voltage dependent resistors; construction of potentiometers and rheostats; Construction of Wheatstone Bridge.		
3.8. POWER		
Power, work and energy (kinetic and potential); Dissipation of power by a resistor; Power formula; Calculations involving power, work and energy.	-	-
3.9. CAPACITANCE/CAPACITOR		
Operation and function of a capacitor; Factors affecting capacitance area of plates, distance between plates, number of plates, dielectric and dielectric constant, working voltage, voltage rating; Capacitor types, Construction and function; Capacitor colour 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		
(a)	**-**	**-**
Theory of magnetism Properties of a magnet; Action of a magnet suspended in the Earth's magnetic field;		

Magnetisation and demagnetisation; Magnetic shielding; Various types of magnetic material; Electromagnets construction and principles of operation; Hand clasp rules to determine: magnetic field around current carrying conductor.		
(b)	-	-
Magnetomotive force, field strength, magnetic flux density, permeability, hysteresis loop, retentivity, coercive force reluctance, saturation point, eddy currents; Precautions for care and storage of magnets.		
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, 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;	-	-
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; Principle uses of inductors.		
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.	-	-
3.13. AC THEORY		
Sinusoidal waveform: phase, period, frequency, cycle; Instantaneous, average, root mean square, peak, peak to peak current values and calculations of the values, in relation voltage, current and power; Triangular/Square waves; Single/3 phase principles.	**AG-03-13-A-B3**	**1**
3.14. RESISTIVE (R), CAPACITIVE (C) AND INDUCTIVE (L) CIRCUITS		
Phase relation ship of voltage and current in L, C and R circuits, parallel, series and series parallel; Impedance, phase angle, power factor and current calculations;	-	**-**
True power, apparent power and reactive power calculations.		
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; Primary and Secondary current, voltage, turns ratio, power, efficiency; Auto transformers.		
3.16. FILTERS		
Operation, application and uses of the following filters: Low pass, high pass, band pass, band stop.	-	-
3.17. AC GENERATORS		
Rotation of loop in a magnetic field and waveform produced; Operation and construction of 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.		

Module 5

DIGITAL TECHNIQUES / ELECTRONIC INSTRUMENT SYSTEMS

PART-66 Syllabuses	Cross-reference	Level
MODULE 5. DIGITAL TECHNIQUES – A CATEGORY		
5.1. ELECTRONIC INSTRUMENT SYSTEMS		
Typical systems arrangements and cockpit layout of electronic instrument systems.	**AG-05-01-A-B3**	**1**
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.	**-**	**-**
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.	**-**	**-**
5.4. DATA BUSES		
Operation of data buses in aircraft systems including knowledge of ARINC and other specifications; Aircraft network/Ethernet.	**-**	**-**
5.5. LOGIC CIRCUITS		
(a)	**-**	**-**
Identification of common logic gate symbols, tables and equivalent circuits;		

Applications used for aircraft systems, schematic diagrams.		
(b)	**-**	**-**
Interpretation of logic diagrams.		
5.6. BASIC COMPUTER STRUCTURE		
(a)	**AG-05-06a-A**	**1**
Computer terminology (including bit, byte, software, hard ware, CPU, IC, and various memory devices such as RAM, ROM, PROM); Computer technology (as applied in aircraft systems).		
(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.		
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.	**-**	**-**
5.8. INTEGRATED CIRCUITS		
Operation and use of encoders and decoders;	**-**	**-**

Function of encoder types; Uses of medium, large and very large scale integration.		
5.9. MULTIPLEXING		
Operation, application and identification in logic diagrams of multiplexers and demultiplexers.	**-**	**-**
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.	**-**	**-**
5.11. ELECTRONIC DISPLAYS		
Principles of operation of common types of displays used in modern aircraft, including : cathode ray tubes, light emitting diodes, liquid crystal display.	**-**	**-**
5.12. ELECTRONIC SENSITIVE DEVICES		
Special handling of components sensitive to electrostatic discharges; Awareness of risks and possible damage, component and personnel anti-static protection devices.	**AG-05-12-A-B3**	**1**
5.13. SOFTWARE MANAGEMENT CONTROL		
Awareness of restrictions, airworthiness requirements and possible catastrophic effects of unapproved changes to software programmes.	**-**	**-**
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.		
5.15. TYPICAL ELECTRONIC/DIGITAL AIRCRAFT SYSTEM		
General arrangement of typical electronic / digital aircraft systems and associated BITE (Built In Test Equipment) testing such as: ▪ ACARS – ARINC Communication and Addressing and Reporting System; ▪ ECAM – Electronic Centralised Aircraft Monitoring; ▪ EFIS – Electronic Flight Instrument System; ▪ EICAS – Engine Indication and Crew Alerting System; ▪ FBW – Fly-By-Wire: ▪ FMS – Flight Management System; ▪ GPS – Global Positioning System; ▪ IRS – Inertial Reference System; ▪ TCAS – Traffic Alert Collision Avoidance System; ▪ IMA – Integrated Modular Avionics; ▪ Cabin systems; ▪ Information systems.	-	-

Module 6

MATERIALS AND HARDWARE

PART-66 Syllabuses	Cross-reference	Level
MODULE 6. MATERIALS AND HARDWARE – A CATEGORY		
6.1. AIRCRAFT MATERIALS - FERROUS		
(a)	**AG-06-01a-A-B2**	**1**
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.		
6.2. AIRCRAFT MATERIALS – NON-FERROUS		
(a)	**AG-06-02a-A-B2**	**1**
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.		
6.3. AIRCRAFT MATERIALS – COMPOSITE AND NON-METALLIC		
6.3.1. Composite and non-metallic other than wood and fabric		

(a)	**AG-06-03-01a-A**	**1**
Characteristics, properties and identification of common composite and non-metallic materials, other than wood, used in aircraft; Sealant and bonding agents.		
(b)	**AG-06-03-01b-A**	**1**
The detection of defects/deterioration in composite and non-metallic material. Repair of composite and non-metallic material.		
6.3.2. Wooden structures		
Construction methods of wooden airframe structures; Characteristics, properties and types of wood and glue used in aeroplanes; 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.	**AG-06-03-02-A**	**1**
6.3.3. Fabric covering		
Characteristics, properties and types of fabrics used in aeroplanes; Inspections methods for fabric; Types of defects in fabric; repair of fabric covering.	**AG-06-03-03-A**	**1**
6.4. CORROSION		
(a)	**AG-06-04a-A-B1-B2-B3**	**1**
Chemical fundamentals;		

Formation by, galvanic action process, microbiological, stress.		
(b)	**AG-06-04b-A-B2-B3**	**2**
Types of corrosion and their identification; Causes of corrosion; Material types, susceptibility to corrosion.		
6.5. FASTENERS		
6.5.1. Screw threads	**AG-06-05-01-A-B1-B2-B3**	**2**
Screw nomenclature; Thread forms, dimension and tolerances for standard thread used in aircraft; Measuring screw threads		
6.5.2. Bolts, studs and screws	**AG-06-05-02-A-B1-B2-B3**	**2**
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.		
6.5.3. Locking devices	**AG-06-05-03-A-B1-B2-B3**	**2**
Tab and spring washers, locking plates, split pins, pal-nuts, wire locking, quick release fasteners, keys, circlips, cotter pins.		
6.5.4. Aircraft rivets	**AG-06-05-04-A-B2**	**1**
Types of solid and blind rivets: specifications and identification;		

Heat treatment.		
6.6. PIPES AND UNIONS		
(a)	**AG-06-06a-A-B1-B2-B3**	**2**
Identification of, and types of rigid and flexible pipes and their connectors used in aircraft.		
(b)	**AG-06-06b-A-B1-B3**	**2**
Standard unions for aircraft hydraulic, fuel, oil, pneumatic and air system pipes.		
6.7. SPRINGS		
Types of springs, materials, characteristics and applications.	**-**	**-**
6.8. BEARINGS		
Purpose of bearings, loads, material, construction; Types of bearings and their application.	**AG-06-08-A-B3**	**1**
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.	**AG-06-09-A-B3**	**1**
6.10. CONTROL CABLES		
Types of cables; End fittings, turnbuckles and compensation devices; Pulleys and cable system components;	**AG-06-10-A-B2**	**1**
Bowden cables; Aircraft flexible control systems.		

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.	**AG-06-11-A**	**1**

Module 7

MAINTENANCE PRACTICES

PART-66 Syllabuses	Cross-reference	Level
MODULE 7A. MAINTENANCE PRACTICES – A CATEGORY		
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.	**AG-07A-01-A-B1-B2**	**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.	**AG-07A-02-A-B1-B2**	**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.	**AG-07A-03-A-B1-B2**	**3**
7.4. AVIONIC TEST EQUIPMENT		

Operation, function and use of avionic general test equipment.	-	-
7.5. ENGINEERING DRAWINGS, DIAGRAMS AND STANDARDS		
Drawing types and diagrams, their symbols, dimensions, tolerances and projections; Identifying title block information; Microfilm, microfiche and computerised 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.	**AG-07A-05-A**	**1**
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.	**AG-07A-06-A-B2**	**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;	**AG-07A-07-A**	**1**
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; EWIS installations, inspection, repair, maintenance and cleanliness standards.		
7.8. RIVETING		
Riveted joints, rivet spacing and pitch; Tools used for riveting and dimpling; Inspection of riveted joints.	**AG-07A-08-A**	**1**
7.9. PIPES AND HOSES		
Bending and belling / flaring aircraft pipes; Inspection and testing of aircraft pipes and hoses; Installation and clamping of pipes.	**AG-07A-09-A**	**1**
7.10. SPRINGS		
Inspection and testing of springs.	**AG-07A-10-A**	**1**
7.11. BEARINGS		
Testing, cleaning and inspection of bearings; Lubrication requirements of bearings; Defects in bearings and their causes.	**AG-07A-11-A**	**1**
7.12. TRANSMISSIONS		
Inspection of gears, backlash; Inspection of belts and pulleys, chains and sprockets;	**AG-07A-12-A**	**1**
Inspection of screw jacks, lever devices, push-pull rod systems.		

7.13. CONTROL CABLES		
Swaging of end fittings; Inspection and testing of control cables; Bowden cables; aircraft flexible control systems.	**AG-07A-13-A**	**1**
7.14. MATERIAL HANDLING		
7.14.1. Sheet metal	**-**	**-**
Marking out and calculation of bend allowance; Sheet metal working, including bending and forming; Inspection of sheet metal work.		
7.14.2. Composite and non-metallic	**-**	**-**
Bonding practices; Environmental conditions Inspection methods		
7.15. WELDING, BRAZING, SOLDERING AND BONDING		
(a)	**-**	**-**
Soldering methods; inspection of soldered joints.		
(b)	**-**	**-**
Welding and brazing methods; Inspection of welded and brazed joints;		
Bonding methods and inspection of bonded joints.		

7.16. AIRCRAFT WEIGHT AND BALANCE		
(a)	**-**	**-**
Centre of gravity/Balance limits calculation: use of relevant documents.		
(b)	**-**	**-**
Preparation of aircraft for weighing; Aircraft weighing.		
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 / de-fuelling procedures; De-icing / anti-icing procedures; Electrical, hydraulic and pneumatic ground supplies; Effects of environmental conditions on aircraft handling and operation.	**AG-07A-17-A-B1-B2**	**2**
7.18. DISASSEMBLY, INSPECTION, REPAIR, AND ASSEMBLY TECHNIQUES		
(a)		
Types of defects and visual inspection techniques. Corrosion removal, assessment and re-protection.	**AG-07A-18a-A**	**2**
(b)	**-**	**-**
General repair methods, Structural Repair Manual;		

Ageing, fatigue and corrosion control programmes.		
(c)	**-**	**-**
Non destructive inspection techniques including, penetrant, radiographic, eddy current, ultrasonic and boroscope methods.		
(d)		
Disassembly and re-assembly techniques.	**AG-07A-18d-A-B1-B2**	**2**
(e)		
Trouble shooting techniques.	**-**	**-**
7.19. ABNORMAL EVENTS		
(a)	**AG-07A-19a-A-B1-B2**	**2**
Inspections following lightning strikes and HIRF penetration.		
(b)	**AG-07A-19b-A-B1**	**2**
Inspections following abnormal events such as heavy landings and flight through turbulence.		
7.20. MAINTENANCE PROCEDURES		
Maintenance planning; Modification procedures; Stores procedures; Certification / release procedures;	**AG-07A-20-A**	**1**
Interface with aircraft operation; Maintenance Inspection / Quality Control / Quality Assurance ;		

Additional maintenance procedures. Control of life limited components.		

Module 8

BASIC AERODYNAMICS

PART-66 Syllabuses	Cross-reference	Level
MODULE 8. BASIC AERODYNAMICS – A & B3 CATEGORIES		
8.1. PHYSICS OF THE ATMOSPHERE		
International Standard Atmosphere (ISA), application to aerodynamics.	**AG-08-01-B1-B2**	**2**
8.2. AERODYNAMICS		
Airflow around a body; Boundary layer, laminar and turbulent flow, free stream flow, relative airflow, upwash 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.	**AG-08-02-B1-B2**	**2**
8.3. THEORY OF FLIGHT		
Relation ship between lift, weight, thrust and drag; Glide ratio; Steady stable flights, performance; Theory of the turn;	**AG-08-03-B1-B2**	**2**
Influence of load factor: stall, flight envelope and structural limitations;		

Lift augmentation.		
8.4. FLIGHT STABILITY AND DYNAMICS		
Longitudinal, lateral and directional stability (active and passive).	**AG-08-04-B1-B2**	**2**

Module 9

HUMAN FACTORS

PART-66 Syllabuses	Cross-reference	Level
MODULE 9A. HUMAN FACTORS – A CATEGORY		
9.1. GENERAL		
The need to take human factors into account; Incidents attributable to human factors / human error; 'Murphy's' law.	**AG-09A-01-A**	**1**
9.2. HUMAN PERFORMANCE AND LIMITATIONS		
Vision; Hearing; Information processing; Attention and perception; Memory; Claustrophobia and physical access.	**AG-09A-02-A**	**1**
9.3. SOCIAL PSYCHOLOGY		
Responsibility: individual and group; Motivation and de-motivation; Peer pressure;	**AG-09A-03-A-B1-B2**	**1**

'Culture' issues; Team working; Management, Supervision and leadership.		
9.4. FACTORS AFFECTING PERFORMANCE		
Fitness / health; Stress: domestic and work related; Time pressure and deadlines; Workload: over load and underload; Sleep and fatigue, shiftwork; Alcohol, medication, drug abuse.	**AG-09A-04-A-B1-B2**	**2**
9.5. PHYSICAL ENVIRONMENT		
Noise and fumes; Illumination; Climate and temperature; Motion and vibration; Working environment.	**AG-09A-05-A-B1-B2**	**1**
9.6. TASKS		
Physical work; Repetitive tasks; Visual inspection; Complex systems.	**AG-09A-06-A-B1-B2**	**1**
9.7. COMMUNICATION		

Within and between teams; Work logging and recording; Keeping up to date, currency; Dissemination of information.	**AG-09A-07-A-B1-B2**	**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.	**AG-09A-08-A**	**1**
9.9. HAZARDS IN THE WORKPLACE		
Recognising and avoiding hazards; Dealing with emergencies.	**AG-09A-09-A**	**1**

Module 10

AVIATION LEGISLATION

PART-66 Syllabuses	Cross-reference	Level
MODULE 10. AVIATION LEGISLATION – A CATEGORY		
10.1. REGULATORY FRAMEWORK		
Role of International Civil Aviation Organisation; Role of the European Commission; Role of EASA; Role of the Member States and the National Aviation Authorities Regulation (EC) N° 1321/2014 and its implementing rules Regulations (EC) N° 216/2008 and (EC) N° 2042/2003. Relationships between the various Annexes (Parts) such as Part-21, Part-M, Part-145, Part-66, Part-147 and EO-OPS.	**AD-10-01-A-B1-B2-B3**	**1**
10.2. CERTIFYING STAFF - MAINTENANCE		
Detailed understanding of Part-66.	**AD-10-02-A-B1-B2-B3**	**2**
10.3. APPROVED MAINTENANCE ORGANIZATIONS		
Detailed understanding of Part-145 and Part-M Subpart F.	**AD-10-03-A-B1-B2-B3**	**2**
10.4. AIR OPERATIONS		
General understanding of EU-OPS;	**AD-10-04-A-B1-B2-B3**	**1**

Air Operators Certificates; Operators Responsibilities, in particular regarding continuing airworthiness and maintenance; Aircraft Maintenance Programme; MEL/CDL; Documents to be carried on board; Aircraft placarding (markings).		
10.5. CERTIFICATION OF AIRCRAFT, PARTS AND APPLIANCES		
(a) General	-	-
General understanding of Part-21 and EASA certification specifications CS-23, 25, 27, 29.		
(b) Documents	-	-
Certificate of Airworthiness; restricted certificates of airworthiness and permit to fly; Certificate of registration; Noise certificate; Weight schedule; Radio station licence and approval.		
10.6. CONTINUING AIRWORTHINESS		
Detailed understanding of Part-21 provisions related to continuing airworthiness; Detailed understanding of Part-M.	**AD-10-06-A-B1-B2-B3**	**2**
10.7. APPLICABLE NATIONAL AND INTERNATIONAL REQUIREMENTS FOR (IF NOT SUPERSEDED BY EU REQUIREMENTS).		
(a)		

Maintenance programmes, maintenance checks and inspections; Airworthiness directives; Service bulletins, manufacturers service information; Modifications and repairs; Maintenance documentation: maintenance manuals, structural repair manual, illustrated parts catalogue, etc. Master Minimum Equipment Lists, Minimum equipment lists, Dispatch Deviation lists.	**AD-10-07a-A**	**1**
(b)	**-**	**-**
Continuing airworthiness; Minimum equipment requirements – Test flights.		

Module 11B

TURBINE AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS

PART-66 Syllabuses	Cross-reference	Level
MODULE 11B. PISTON AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS – A2 CATEGORY		
11B.1. THEORY OF FLIGHT		
11B.1.1. Aeroplane Aerodynamics and Flight controls	**AG-11B-01-01-A2**	**1**
Operation and effect of: ▪ roll control: ailerons and spoilers; ▪ pitch control: elevators, stabilators, variable incidence stabilisers and canards; ▪ yaw control, rudder limiters; Control using elevons, ruddervators; High lift devices, slots, slats, flaps, flaperons; Drag inducing devices, spoilers, lift dumpers, speed brakes; Effects of wing fences, saw tooth leading edges; Boundary layer control using, vortex generators, stall wedges or leading edge devices; Operation and effect of trim tabs, balance and antibalance (leading) tabs, servo tabs, spring tabs, mass balance, control surface bias, aerodynamic balance panels.		
11B.1.2. High Speed Flight	N/A	

11B.2. AIRFRAME STRUCTURES – GENERAL CONCEPTS		
(a)	**AG-11B-02a-A2-B12**	**2**
Airworthiness requirements for structural strength; Structural classification, primary, secondary and tertiary; Fail safe, safe life, damage tolerance concepts; Zonal and station identification systems; Stress, strain, bending, compression, shear, torsion, tension, hoop stress, fatigue; Drains and ventilation provisions; System installation provisions; Lightning strike protection provision; Aircraft bonding.		
(b)	**AG-11B-02A2**	**1**
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; Structure assembly techniques: riveting, bolting, bonding Methods of surface protection, such as chromating, anodising, painting ; Surface cleaning; Airframe symmetry: methods of alignment and symmetry checks.		
11B.3. AIRFRAME STRUCTURES – AEROPLANES		
11B.3.1. Fuselage (ATA 52/53/56)	**AG-11B-03-01-A2**	**1**
Construction and pressurisation sealing;		

Wing, stabiliser, pylon and under carriage attachments; Seat installation and cargo loading system; Doors and emergency exits : construction, mechanisms, operation and safety devices ; Windows and windscreen construction and mechanisms.		
11B.3.2. Wings (ATA 57)	**AG-11B-03-02-A2**	**1**
Construction; Fuel storage; Landing gear, pylon, control surface and high lift/drag attachments.		
11B.3.3. Stabilizers (ATA 55)	**AG-11B-03-03-A2**	**1**
Construction; Control surface attachment.		
11B.3.4. Flight Control Surfaces (ATA 55/57)	**AG-11B-03-04-A2**	**1**
Construction and attachment; Balancing – mass and aerodynamic.		
11B.3.5. Nacelles/Pylons (ATA 54)	**AG-11B-03-05-A2**	**1**
Construction; Firewalls; Engine mounts.		
11B.4. AIR CONDITIONING AND CABIN PRESSURIZATION (ATA 21)		
Pressurisation and air conditioning systems; Cabin pressure controllers, protection and warning devices;	**AG-11B-04-01-A2**	**1**

Heating systems.		
11B.5. INSTRUMENT/AVIONIC SYSTEMS		
11B.5.1. Instrument Systems (ATA 31)	**AG-11B-05-01-A2**	**1**
Pitot static: altimeter, air speed indicator, vertical speed indicator; Gyroscopic: artificial horizon, attitude director, direction indicator, horizontal situation indicator, turn and slip indicator, turn coordinator; Compasses: direct reading, remote reading; Angle of attack indication, stall warning systems; Glass cockpit; Other aircraft system indication.		
11B.5.2. Avionic Systems	**AG-11B-05-01-A2-B12**	**1**
Fundamentals of system lay-outs and operation of: ▪ Auto Flight (ATA 22); ▪ Communications (ATA 23); ▪ Navigation Systems (ATA 34).		
11B.6. ELECTRICAL POWER		
Batteries installation and operation; DC power generation; AC power generation; Emergency power generation;	**AG-11B-06-A2**	**1**
Voltage regulation; Power distribution;		

Inverters, transformers, rectifiers; Circuit protection; External / Ground power		
11B.7. EQUIPMENT AND FURNISHINGS (ATA 25)		
(a)	**AG-11B-07a-A2-B12**	**2**
Emergency equipment requirements; Seats, harnesses and belts.		
(b)	**AG-11B-07a-A2-B12**	**1**
Cabin lay-out; Equipment lay-out; Cabin Furnishing Installation; Cabin entertainment equipment; Galley installation; Cargo handling and retention equipment; Airstairs.		
11B.8. FIRE PROTECTION (ATA 26)		
(a)	**AG-11B-08-A2**	**1**
Fire and smoke detection and warning systems; Fire extinguishing systems;		
System tests.		
(b)	**AG-11B-08b-A2**	**1**

Portable fire extinguisher.		
11B.9. 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.	**AG-11B-09-A2**	**1**
11B.10. FUEL SYSTEMS (ATA 28)		
System lay-out; Fuel tanks; Supply systems; Dumping, venting and draining; Cross-feed and transfer; Indications and warnings; Refuelling and defuelling; Longitudinal balance fuel systems.	**AG-11B-10-A2**	**1**
11B.11. HYDRAULIC POWER (ATA 29)		
System lay-out;	**AG-11B-11-A2**	**1**

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.		
11B.12. 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 and chemical ; Rain repellent; Probe and drain heating; Wiper systems.	**AG-11B-12-A2**	**1**
11B.13. LANDING GEAR (ATA 32)		
Construction, shock absorbing; Extension and retraction systems: normal and emergency; Indications and warning;	**AG-11B-13-A2**	**2**
Wheels, brakes, antiskid and auto braking; Tyres; Steering;		

Air-ground sensing.		
11B.14. LIGHTS (ATA 33)		
External: navigation, anti-collision, landing, taxiing, ice; Internal: cabin, cockpit, cargo; Emergency.	**AG-11B-14-A2**	**2**
11B.15. OXYGEN (ATA 35)		
System lay-out: ▪ cockpit, ▪ cabin;	**AG-11B-15-A2**	**1**
Sources, storage, charging and distribution; Supply regulation; Indications and warnings.		
11B.16. PNEUMATIC/VACUUM (ATA 36)		
System lay-out; Sources: ▪ engine / APU, ▪ compressors, ▪ reservoirs,	**AG-11B-16-A2**	**1**
▪ Ground supply; Pressure and vacuum pumps; Pressure control; Distribution;		

Indications and warnings; Interfaces with other systems.		
11B.17. WATER/WASTE (ATA 38)		
Water system lay-out, supply, distribution, servicing and draining; Toilet system lay-out, flushing and servicing; Corrosion aspects.	**AG-11B-17-A2**	**2**

Module 16

PISTON ENGINE

PART-66 Syllabuses	Cross-reference	Level
MODULE 16. PISTON ENGINE – A2 & A4 CATEGORIES		
16.1. FUNDAMENTALS		
Mechanical, thermal and volumetric efficiencies; Operating principles: 2 stroke, 4 stroke, Otto and Diesel; Piston displacement and compression ratio; Engine configuration and firing order.	**AG-16-01-A2-A4**	**1**
16.2. ENGINE PERFORMANCE		
Power calculation and measurement; Factors affecting engine power; Mixtures/leaning, pre-ignition.	**AG-16-02-A2-A4**	**1**
16.3. ENGINE CONSTRUCTION		
Crank case, crank shaft, cam shafts, sumps; Accessory gearbox; Cylinder and piston assemblies; Connecting rods, inlet and exhaust manifolds; Valve mechanisms;	**AG-15-03-A2-A4**	**1**

Propeller reduction gearboxes.		
16.4. ENGINE FUEL SYSTEMS		
16.4.1. Carburettors		
Types, construction and principles of operation; Icing and heating.	**AG-16-04-01- A2-A4**	**1**
16.4.2. Fuel injection systems		
Types, construction and principles of operation.	**AG-16-04-02- A2-A4**	**1**
16.4.3. Electronic engine control		
Operation of engine control and fuel metering systems including electronic engine control (FADEC); Systems lay-out and components.	**AG-16-04-03- A2-A4**	**1**
16.5. STARTING AND IGNITION YSTEMS		
Starting systems, pre-heat systems; Magneto types, construction and principles of operation; Ignition harnesses, spark plugs; Low and high tension systems.	**AG-16-05- A2-A4**	**1**
16.6. INDUCTION, EXHAUST AND COOLING SYSTEMS		
Construction and operation of: induction systems including alternate air systems; Exhaust systems, engine cooling systems — air and liquid.	**AG-16-06- A2-A4**	**1**
16.7. SUPERCHARGING/TURBOCHARGING		
Principles and purpose of supercharging and its effects on engine parameters;	**AG-16-07- A2-A4**	**1**

Construction and operation of supercharging/turbocharging systems; System terminology; Control systems; System protection..		
16.8. LUBRICNTS AND FUELS		
Properties and specifications; Fuel additives; Safety precautions.	**AG-16-08- A2-A4**	**1**
16.9. LUBRICATION SYSTEMS		
System operation/lay-out and components.	**AG-16-09- A2-A4**	**1**
16.10. ENGINE INDICATION SYSTEMS		
Engine speed; Cylinder head temperature; Coolant temperature; Oil pressure and temperature; Exhaust Gas Temperature; Fuel pressure and flow; Manifold pressure.	**AG-16-10- A2-A4**	**1**
16.11. POWERPLANT INSTLLATION		
Configuration of firewalls, cowlings, acoustic panels, engine mounts, anti-vibration mounts, hoses, pipes, feeders, connectors, wiring looms, control cables and rods, lifting points and drains.	**AG-16-11- A2-A4**	**1**
16.12. ENGINE MONITORING AND GROUND OPERATIONS		

Procedures for starting and ground run-up; Interpretation of engine power output and parameters; Inspection of engine and components: criteria, tolerances, and data specified by engine manufacturer.	**AG-16-12- A2-A4**	**1**
16.13. ENGINE STORAGE AND PRESERVATION		
Preservation and depreservation for the engine and accessories/systems.	**AG-16-13- A2-A4**	**-**

Module 17

PROPELLER

PART-66 Syllabuses	Cross-reference	Level
MODULE 17A. PROPELLER – A1 CATEGORY		
17A.1. FUNDAMENTALS		
Blade element theory; High/low blade angle, reverse angle, angle of attack, rotational speed; Propeller slip; Aerodynamic, centrifugal, and thrust forces; Torque; Relative airflow on blade angle of attack; vibration and resonance.	**AG-17A-01-A**	**1**
17A.2. PROPELLER CONSTRUCTION		
Construction methods and materials used in composite and metal propellers; Blade station, blade face, blade shank, blade back and hub assembly; Fixed pitch, controllable pitch, constant speeding propeller; Propeller/spinner installation.	**AG-17A-02-A**	**1**
17A.3. PROPELLER PITCH CONTROL		
Speed control and pitch change methods; Feathering and reverse pitch;	**AG-17A-03-A**	**1**

Overspeed protection.		
17A.4. PROPELLER SYNCHRONIZING		
Synchronising and synchrophasing equipment.	**-**	**-**
17A.5. PROPELLER ICE PROTECTION		
Fluid and electrical de-icing equipment.	**AG-17A-05-A**	**1**
17A.6. PROPELLER MAINTENANCE		
Static and dynamic balancing; Blade tracking; Assessment of blade damage, erosion, corrosion, impact damage, delamination; Propeller treatment/repair schemes; Propeller engine running.	**AG-17A-06-A**	**1**
17A.7. PROPELLER STORAGE ANDPRESERVATION		
Propeller preservation and depreservation	**AG-17A-07-A**	**1**

A3 CATEGORY

Module 1

MATHEMATICS

PART-66 Syllabuses	Cross-reference	Level
MODULE 1. MATHEMATICS – A CATEGORY		
1.1. ARITHMETIC		
Arithmetical terms and signs, Methods of multiplication and division, Fractions and decimals, Factors and multiples, Weights, measures and conversion factors, Ratio and proportion, Averages and percentages, Areas and volumes, squares, cubes, Square and cube roots.	**AG-01-01-A**	**1**
1.2. ALGEBRA		
(a)	**AG-01-02a-A**	**1**
Evaluating simple algebraic expressions, addition, subtraction, multiplication and division, use of brackets, simple algebraic fractions.		
(b)	-	-

Linear equations and their solutions, Indices and powers, negative and fractional indices, Binary and other applicable numbering systems, Simultaneous equations, Second degree equations with one unknown, Logarithms.		
1.3. GEOMETRY		
(a)	**-**	**-**
Simple geometrical constructions.		
(b)	**AG-01-03b-A-B1-B2-B3**	**2**
Graphical representation; nature and uses of graphs, Graphs of equations/functions.		
(c)	-	-
Simple trigonometry; trigonometrical relationships, use of tables and rectangular and polar coordinates.		
	-	**-**

Module 2

PHYSICS

PART-66 Syllabuses	Cross-reference	Level
MODULE 2. PHYSICS – A CATEGORY		
2.1. MATTER		
Nature of matter: the chemical elements, structure of atoms, molecules; Chemical compounds. States: solid, liquid and gaseous; Changes between states.	**AG-02-01-A-B1-B2-B3**	**1**
2.2. MECHANICS		
2.2.1. Statics	**AG-02-02-01-A-B2-B3**	**1**
Forces, moments and couples, representation as vectors; Centre of gravity. Elements of theory of stress, strain and elasticity: tension, compression, shear and torsion; Nature and properties of solid, fluid and gas; Pressure and buoyancy in liquids (barometers).		
2.2.2. Kinetics	**AG-02-02-02-A-B2-B3**	**1**
Linear movement: uniform motion in a straight line, motion under constant acceleration (motion under gravity) ; Rotational movement: uniform circular motion (centrifugal/centripetal forces);		

Periodic motion: pendular movement; Simple theory of vibration, harmonics and resonance; Velocity ratio mechanical advantage and efficiency.		
2.2.3. Dynamics	**AG-02-02-02-A-B2-B3**	**1**
(a) Mass	**AG-02-02-03a-A-B2-B3**	**1**
Mass, force, inertia, work, power, energy (potential, kinetic and total energy), heat, efficiency.		
(b) Momentum, conservation of momentum	**AG-02-02-03b-A-B3**	**1**
Momentum, conservation of momentum; Impulse; Gyroscopic principles. Friction: nature and effects, coefficient of friction (rolling resistance).		
2.2.4. Fluid dynamics		
(a)	**AG-02-02-04a-A-B1-B2-B3**	**2**
Specific gravity and density		
(b)	**AG-02-02-04b-A-B2-B3**	**1**
Viscosity, fluid resistance, effects of streamlining; Effects of compressibility on fluids ; Static, dynamic and total pressure: Bernoulli's Theorem, Venturi		
2.3. THERMODYNAMICS		
(a)	**AG-02-03a-A-B1-B2-B3**	**2**

Temperature: thermometers and temperature scales: Celsius, Fahrenheit and Kelvin. Heat definition.		
(b)	-	-
Heat capacity, specific heat; Heat transfer: convection, radiation and conduction; Volumetric expansion; First and second law of thermodynamics; Isothermal, adiabatic expansion and compression, engine cycles, constant volume and constant pressure, refrigerators and heat pumps; Gases: ideal gases laws; specific heat at constant volume and constant pressure, work done by expanding gas; Latent heat of fusion and evaporation, thermal energy, heat of combustion.		
2.4. OPTICS (LIGHT)		
Nature of light; speed of light; Laws of reflection and refraction: reflection at plane surfaces, Reflection by spherical mirrors, refraction, lenses, fibre optics.	**-**	**-**
2.5. WAVE MOTION AND SOUND		
Wave motion: mechanical waves, sinusoidal wave motion, Interference phenomena, standing waves; Sound: speed of sound, production of sound, intensity, Pitch and quality, Doppler effect.	**-**	**-**
	-	**-**

Module 3

ELECTRICAL FUNDAMENTALS

PART-66 Syllabuses	Cross-reference	Level
MODULE 3. ELECTRICAL FUNDAMENTALS – A CATEGORY		
3.1. ELECTRON THEORY		
Structure and distribution of electrical charges within: atoms, molecules, ions, compounds; Molecular structure of conductors, semiconductors and insulators.	**AG-03-01-A-B1-B2-B3**	**1**
3.2. STATIC ELECTRICITY AND CONDUCTION		
Static electricity and distribution of electrostatic charges; Electro static laws of attraction and repulsion; Units of charge, Coulomb's Law; Conduction of electricity in solids, liquids, gases and vacuum.	**AG-03-02-A-B3**	**1**
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.	**AG-03-03-A-B3**	**1**
3.4. GENERATION OF ELECTRICITY		
Production of electricity by the following methods: light, heat, friction, pressure, chemical action, magnetism and motion.	**AG-03-04-A-B1-B2-B3**	**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 of thermocouples; Operation of photo-cells.	**AG-03-05-A**	**1**
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.	**-**	**-**
3.7. RESISTANCE/RESISTOR		
(a)	-	-
Resistance and affecting factors Specific resistance; Resistor colour 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.		
(b)	-	-
Positive and negative temperature coefficient conductance		

Fixed resistors, stability, tolerance and limitations, methods of construction; Variable resistors, thermistors, voltage dependent resistors; construction of potentiometers and rheostats; Construction of Wheatstone Bridge.		
3.8. POWER		
Power, work and energy (kinetic and potential); Dissipation of power by a resistor; Power formula; Calculations involving power, work and energy.	-	-
3.9. CAPACITANCE/CAPACITOR		
Operation and function of a capacitor; Factors affecting capacitance area of plates, distance between plates, number of plates, dielectric and dielectric constant, working voltage, voltage rating; Capacitor types, Construction and function; Capacitor colour 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		
(a)	**-**	**-**
Theory of magnetism Properties of a magnet; Action of a magnet suspended in the Earth's magnetic field;		

Magnetisation and demagnetisation; Magnetic shielding; Various types of magnetic material; Electromagnets construction and principles of operation; Hand clasp rules to determine: magnetic field around current carrying conductor.		
(b)	-	-
Magnetomotive force, field strength, magnetic flux density, permeability, hysteresis loop, retentivity, coercive force reluctance, saturation point, eddy currents; Precautions for care and storage of magnets.		
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, 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; Principle uses of inductors.		
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.	-	-
3.13. AC THEORY		
Sinusoidal waveform: phase, period, frequency, cycle; Instantaneous, average, root mean square, peak, peak to peak current values and calculations of the values, in relation voltage, current and power; Triangular/Square waves; Single/3 phase principles.	**AG-03-13-A-B3**	**1**
3.14. RESISTIVE (R), CAPACITIVE (C) AND INDUCTIVE (L) CIRCUITS		
Phase relation ship of voltage and current in L, C and R circuits, parallel, series and series parallel; Impedance, phase angle, power factor and current calculations; True power, apparent power and reactive power calculations.	-	**-**
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; Primary and Secondary current, voltage, turns ratio, power, efficiency; Auto transformers.		
3.16. FILTERS		
Operation, application and uses of the following filters: Low pass, high pass, band pass, band stop.	-	-
3.17. AC GENERATORS		
Rotation of loop in a magnetic field and waveform produced; Operation and construction of 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.	-	-

Module 5

DIGITAL TECHNIQUES / ELECTRONIC INSTRUMENT SYSTEMS

PART-66 Syllabuses	Cross-reference	Level
MODULE 5. DIGITAL TECHNIQUES – A CATEGORY		
5.1. ELECTRONIC INSTRUMENT SYSTEMS		
Typical systems arrangements and cockpit layout of electronic instrument systems.	**AG-05-01-A-B3**	**1**
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.	**-**	**-**
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.	**-**	**-**
5.4. DATA BUSES		
Operation of data buses in aircraft systems including knowledge of ARINC and other specifications; Aircraft network/Ethernet.	**-**	**-**
5.5. LOGIC CIRCUITS		
(a)	**-**	**-**
Identification of common logic gate symbols, tables and equivalent circuits;		

Applications used for aircraft systems, schematic diagrams.		
(b)	**-**	**-**
Interpretation of logic diagrams.		
5.6. BASIC COMPUTER STRUCTURE		
(a)	**AG-05-06a-A**	**1**
Computer terminology (including bit, byte, software, hard ware, CPU, IC, and various memory devices such as RAM, ROM, PROM); Computer technology (as applied in aircraft systems).		
(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.		
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.	**-**	**-**
5.8. INTEGRATED CIRCUITS		
Operation and use of encoders and decoders;	**-**	**-**

Function of encoder types; Uses of medium, large and very large scale integration.		
5.9. MULTIPLEXING		
Operation, application and identification in logic diagrams of multiplexers and demultiplexers.	**-**	**-**
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.	**-**	**-**
5.11. ELECTRONIC DISPLAYS		
Principles of operation of common types of displays used in modern aircraft, including : cathode ray tubes, light emitting diodes, liquid crystal display.	**-**	**-**
5.12. ELECTRONIC SENSITIVE DEVICES		
Special handling of components sensitive to electrostatic discharges; Awareness of risks and possible damage, component and personnel anti-static protection devices.	**AG-05-12-A-B3**	**1**
5.13. SOFTWARE MANAGEMENT CONTROL		
Awareness of restrictions, airworthiness requirements and possible catastrophic effects of unapproved changes to software programmes.	**-**	**-**
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.		
5.15. TYPICAL ELECTRONIC/DIGITAL AIRCRAFT SYSTEM		
General arrangement of typical electronic / digital aircraft systems and associated BITE (Built In Test Equipment) testing such as: ▪ ACARS – ARINC Communication and Addressing and Reporting System; ▪ ECAM – Electronic Centralised Aircraft Monitoring; ▪ EFIS – Electronic Flight Instrument System; ▪ EICAS – Engine Indication and Crew Alerting System; ▪ FBW – Fly-By-Wire: ▪ FMS – Flight Management System; ▪ GPS – Global Positioning System; ▪ IRS – Inertial Reference System; ▪ TCAS – Traffic Alert Collision Avoidance System; ▪ IMA – Integrated Modular Avionics; ▪ Cabin systems; ▪ Information systems.	-	-

Module 6

MATERIALS AND HARDWARE

PART-66 Syllabuses	Cross-reference	Level
MODULE 6. MATERIALS AND HARDWARE – A CATEGORY		
6.1. AIRCRAFT MATERIALS - FERROUS		
(a)	**AG-06-01a-A-B2**	**1**
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.		
6.2. AIRCRAFT MATERIALS – NON-FERROUS		
(a)	**AG-06-02a-A-B2**	**1**
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.		
6.3. AIRCRAFT MATERIALS – COMPOSITE AND NON-METALLIC		
6.3.1. Composite and non-metallic other than wood and fabric		

(a)	**AG-06-03-01a-A**	**1**
Characteristics, properties and identification of common composite and non-metallic materials, other than wood, used in aircraft; Sealant and bonding agents.		
(b)	**AG-06-03-01b-A**	**1**
The detection of defects/deterioration in composite and non-metallic material. Repair of composite and non-metallic material.		
6.3.2. Wooden structures		
Construction methods of wooden airframe structures; Characteristics, properties and types of wood and glue used in aeroplanes; 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.	**AG-06-03-02-A**	**1**
6.3.3. Fabric covering		
Characteristics, properties and types of fabrics used in aeroplanes; Inspections methods for fabric; Types of defects in fabric; repair of fabric covering.	**AG-06-03-03-A**	**1**
6.4. CORROSION		
(a)	**AG-06-04a-A-B1-B2-B3**	**1**
Chemical fundamentals;		

Formation by, galvanic action process, microbiological, stress.		
(b)	**AG-06-04b-A-B2-B3**	**2**
Types of corrosion and their identification; Causes of corrosion; Material types, susceptibility to corrosion.		
6.5. FASTENERS		
6.5.1. Screw threads	**AG-06-05-01-A-B1-B2-B3**	**2**
Screw nomenclature; Thread forms, dimension and tolerances for standard thread used in aircraft; Measuring screw threads		
6.5.2. Bolts, studs and screws	**AG-06-05-02-A-B1-B2-B3**	**2**
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.		
6.5.3. Locking devices	**AG-06-05-03-A-B1-B2-B3**	**2**
Tab and spring washers, locking plates, split pins, pal-nuts, wire locking, quick release fasteners, keys, circlips, cotter pins.		
6.5.4. Aircraft rivets	**AG-06-05-04-A-B2**	**1**
Types of solid and blind rivets: specifications and identification;		

Heat treatment.		
6.6. PIPES AND UNIONS		
(a)	**AG-06-06a-A-B1-B2-B3**	**2**
Identification of, and types of rigid and flexible pipes and their connectors used in aircraft.		
(b)	**AG-06-06b-A-B1-B3**	**2**
Standard unions for aircraft hydraulic, fuel, oil, pneumatic and air system pipes.		
6.7. SPRINGS		
Types of springs, materials, characteristics and applications.	**-**	**-**
6.8. BEARINGS		
Purpose of bearings, loads, material, construction; Types of bearings and their application.	**AG-06-08-A-B3**	**1**
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.	**AG-06-09-A-B3**	**1**
6.10. CONTROL CABLES		
Types of cables; End fittings, turnbuckles and compensation devices; Pulleys and cable system components; Bowden cables; Aircraft flexible control systems.	**AG-06-10-A-B2**	**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.	**AG-06-11-A**	**1**

Module 7

MAINTENANCE PRACTICES

PART-66 Syllabuses	Cross-reference	Level
MODULE 7A. MAINTENANCE PRACTICES – A CATEGORY		
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.	**AG-07A-01-A-B1-B2**	**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.	**AG-07A-02-A-B1-B2**	**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.	**AG-07A-03-A-B1-B2**	**3**
7.4. AVIONIC TEST EQUIPMENT		

Operation, function and use of avionic general test equipment.	-	-
7.5. ENGINEERING DRAWINGS, DIAGRAMS AND STANDARDS		
Drawing types and diagrams, their symbols, dimensions, tolerances and projections; Identifying title block information; Microfilm, microfiche and computerised 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.	**AG-07A-05-A**	**1**
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.	**AG-07A-06-A-B2**	**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;	**AG-07A-07-A**	**1**

EWIS installations, inspection, repair, maintenance and cleanliness standards.		
7.8. RIVETING		
Riveted joints, rivet spacing and pitch; Tools used for riveting and dimpling; Inspection of riveted joints.	**AG-07A-08-A**	**1**
7.9. PIPES AND HOSES		
Bending and belling / flaring aircraft pipes; Inspection and testing of aircraft pipes and hoses; Installation and clamping of pipes.	**AG-07A-09-A**	**1**
7.10. SPRINGS		
Inspection and testing of springs.	**AG-07A-10-A**	**1**
7.11. BEARINGS		
Testing, cleaning and inspection of bearings; Lubrication requirements of bearings; Defects in bearings and their causes.	**AG-07A-11-A**	**1**
7.12. TRANSMISSIONS		
Inspection of gears, backlash; Inspection of belts and pulleys, chains and sprockets; Inspection of screw jacks, lever devices, push-pull rod systems.	**AG-07A-12-A**	**1**
7.13. CONTROL CABLES		

Swaging of end fittings; Inspection and testing of control cables; Bowden cables; aircraft flexible control systems.	**AG-07A-13-A**	**1**
7.14. MATERIAL HANDLING		
7.14.1. Sheet metal	**-**	**-**
Marking out and calculation of bend allowance; Sheet metal working, including bending and forming; Inspection of sheet metal work.		
7.14.2. Composite and non-metallic	**-**	**-**
Bonding practices; Environmental conditions Inspection methods		
7.15. WELDING, BRAZING, SOLDERING AND BONDING		
(a)	**-**	**-**
Soldering methods; inspection of soldered joints.		
(b)	**-**	**-**
Welding and brazing methods; Inspection of welded and brazed joints; Bonding methods and inspection of bonded joints.		
7.16. AIRCRAFT WEIGHT AND BALANCE		

(a)	**-**	**-**
Centre of gravity/Balance limits calculation: use of relevant documents.		
(b)	**-**	**-**
Preparation of aircraft for weighing; Aircraft weighing.		
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 / de-fuelling procedures; De-icing / anti-icing procedures; Electrical, hydraulic and pneumatic ground supplies; Effects of environmental conditions on aircraft handling and operation.	**AG-07A-17-A-B1-B2**	**2**
7.18. DISASSEMBLY, INSPECTION, REPAIR, AND ASSEMBLY TECHNIQUES		
(a)		
Types of defects and visual inspection techniques. Corrosion removal, assessment and re-protection.	**AG-07A-18a-A**	**2**
(b)	**-**	**-**
General repair methods, Structural Repair Manual; Ageing, fatigue and corrosion control programmes.		

(c)	**-**	**-**
Non destructive inspection techniques including, penetrant, radiographic, eddy current, ultrasonic and boroscope methods.		
(d)		
Disassembly and re-assembly techniques.	**AG-07A-18d-A-B1-B2**	**2**
(e)		
Trouble shooting techniques.	**-**	**-**
7.19. ABNORMAL EVENTS		
(a)	**AG-07A-19a-A-B1-B2**	**2**
Inspections following lightning strikes and HIRF penetration.		
(b)	**AG-07A-19b-A-B1**	**2**
Inspections following abnormal events such as heavy landings and flight through turbulence.		
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.	**AG-07A-20-A**	**1**

Control of life limited components.		

Module 8

BASIC AERODYNAMICS

PART-66 Syllabuses	Cross-reference	Level
MODULE 8. BASIC AERODYNAMICS – A & B3 CATEGORIES		
8.1. PHYSICS OF THE ATMOSPHERE		
International Standard Atmosphere (ISA), application to aerodynamics.	**AG-08-01-B1-B2**	**2**
8.2. AERODYNAMICS		
Airflow around a body; Boundary layer, laminar and turbulent flow, free stream flow, relative airflow, upwash 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.	**AG-08-02-B1-B2**	**2**
8.3. THEORY OF FLIGHT		
Relation ship between lift, weight, thrust and drag; Glide ratio; Steady stable flights, performance; Theory of the turn; Influence of load factor: stall, flight envelope and structural limitations;	**AG-08-03-B1-B2**	**2**

Lift augmentation.		
8.4. FLIGHT STABILITY AND DYNAMICS		
Longitudinal, lateral and directional stability (active and passive).	**AG-08-04-B1-B2**	**2**

Module 9

HUMAN FACTORS

PART-66 Syllabuses	Cross-reference	Level
MODULE 9A. HUMAN FACTORS – A CATEGORY		
9.1. GENERAL		
The need to take human factors into account; Incidents attributable to human factors / human error; 'Murphy's' law.	**AG-09A-01-A**	**1**
9.2. HUMAN PERFORMANCE AND LIMITATIONS		
Vision; Hearing; Information processing; Attention and perception; Memory; Claustrophobia and physical access.	**AG-09A-02-A**	**1**
9.3. SOCIAL PSYCHOLOGY		
Responsibility: individual and group; Motivation and de-motivation; Peer pressure; 'Culture' issues;	**AG-09A-03-A-B1-B2**	**1**

Team working; Management, Supervision and leadership.		
9.4. FACTORS AFFECTING PERFORMANCE		
Fitness / health; Stress: domestic and work related; Time pressure and deadlines; Workload: over load and underload; Sleep and fatigue, shiftwork; Alcohol, medication, drug abuse.	**AG-09A-04-A-B1-B2**	**2**
9.5. PHYSICAL ENVIRONMENT		
Noise and fumes; Illumination; Climate and temperature; Motion and vibration; Working environment.	**AG-09A-05-A-B1-B2**	**1**
9.6. TASKS		
Physical work; Repetitive tasks; Visual inspection; Complex systems.	**AG-09A-06-A-B1-B2**	**1**
9.7. COMMUNICATION		
Within and between teams;	**AG-09A-07-A-B1-B2**	**2**

Work logging and recording; Keeping up to date, currency; Dissemination of information.		
9.8. HUMAN ERROR		
Error models and theories; Types of error in maintenance tasks; Implications of errors (i.e accidents); Avoiding and managing errors.	**AG-09A-08-A**	**1**
9.9. HAZARDS IN THE WORKPLACE		
Recognising and avoiding hazards; Dealing with emergencies.	**AG-09A-09-A**	**1**

Module 10

AVIATION LEGISLATION

PART-66 Syllabuses	Cross-reference	Level
MODULE 10. AVIATION LEGISLATION – A CATEGORY		
10.1. REGULATORY FRAMEWORK		
Role of International Civil Aviation Organisation; Role of the European Commission; Role of EASA; Role of the Member States and the National Aviation Authorities Regulation (EC) N° 1321/2014 and its implementing rules Regulations (EC) N° 216/2008 and (EC) N° 2042/2003. Relationships between the various Annexes (Parts) such as Part-21, Part-M, Part-145, Part-66, Part-147 and EO-OPS.	**AD-10-01-A-B1-B2-B3**	**1**
10.2. CERTIFYING STAFF - MAINTENANCE		
Detailed understanding of Part-66.	**AD-10-02-A-B1-B2-B3**	**2**
10.3. APPROVED MAINTENANCE ORGANIZATIONS		
Detailed understanding of Part-145 and Part-M Subpart F.	**AD-10-03-A-B1-B2-B3**	**2**
10.4. AIR OPERATIONS		
General understanding of EU-OPS; Air Operators Certificates;	**AD-10-04-A-B1-B2-B3**	**1**

Operators Responsibilities, in particular regarding continuing airworthiness and maintenance; Aircraft Maintenance Programme; MEL/CDL; Documents to be carried on board; Aircraft placarding (markings).		
10.5. CERTIFICATION OF AIRCRAFT, PARTS AND APPLIANCES		
(a) General	-	-
General understanding of Part-21 and EASA certification specifications CS-23, 25, 27, 29.		
(b) Documents	-	-
Certificate of Airworthiness; restricted certificates of airworthiness and permit to fly; Certificate of registration; Noise certificate; Weight schedule; Radio station licence and approval.		
10.6. CONTINUING AIRWORTHINESS		
Detailed understanding of Part-21 provisions related to continuing airworthiness; Detailed understanding of Part-M.	**AD-10-06-A-B1-B2-B3**	**2**
10.7. APPLICABLE NATIONAL AND INTERNATIONAL REQUIREMENTS FOR (IF NOT SUPERSEDED BY EU REQUIREMENTS).		
(a)		
Maintenance programmes, maintenance checks and inspections;	**AD-10-07a-A**	**1**

Airworthiness directives; Service bulletins, manufacturers service information; Modifications and repairs; Maintenance documentation: maintenance manuals, structural repair manual, illustrated parts catalogue, etc. Master Minimum Equipment Lists, Minimum equipment lists, Dispatch Deviation lists.		
(b)	**-**	**-**
Continuing airworthiness; Minimum equipment requirements – Test flights.		

Module 12

HELICOPTER AERODYNAMICS, STRUCTURES AND SYSTEMS

PART-66 Syllabuses	Cross-reference	Level
MODULE 12. HELICOPTER AERODYNAMICS, STRUCTURES AND SYSTEMS – A3 & A4 CATEGORIES		
12.1. THEORY OF FLIGHT – ROTARY WING AERODYNAMICS		
Terminology; Effects of gyroscopic precession; Torque reaction and directional control; Dissymmetry of lift, Blade tip stall; Translating tendency and its correction; Coriolis effect and compensation; Vortex ring state, power settling, overpitching; Auto-rotation; Ground effect.	**AG-12-01-A3-A4**	**1**
12.2. FLIGHT CONTROL SYSTEMS		
Cyclic control; Collective control; Swashplate;	**AG-12-02-A3-A4**	**2**
Yaw control: Anti-Torque Control, Tail rotor, bleed air;		

Main Rotor Head: Design and Operation features; Blade Dampers: Function and construction; Rotor Blades: Main and tail rotor blade construction and attachment; Trim control, fixed and adjustable stabilisers; System operation: manual, hydraulic, electrical and fly-by-wire; Artificial feel; Balancing and rigging.		
12.3. BLADE TRACKING AND VIBRATION ANALYSIS		
Rotor alignment; Main and tail rotor tracking; Static and dynamic balancing; Vibration types, vibration reduction methods; Ground resonance.	**AG-12-03-A3-A4**	**1**
12.4. TRANSMISSION		
Gear boxes, main and tail rotors; Clutches, free wheel units and rotor brake; Tail rotor drive shafts, flexible couplings, bearings, vibration dampers and bearing hangers.	**AG-12-04-A3-A4**	**1**
12.5. AIRFRAME STRUCTURES		
(a)	**AG-12-05a-A3-A4-B1**	**2**
Airworthiness requirements for structural strength;		
Structural classification, primary, secondary and tertiary; Fail safe, safe life, damage tolerance concepts;		

Zonal and station identification systems; Stress, strain, bending, compression, shear, torsion, tension, hoop stress, fatigue; Drains and ventilation provisions; System installation provisions; Lightning strike protection provision.		
(b)	**AG-12-05b-A3-A4**	**1**
Construction methods of: stressed skin fuselage, formers, stringers, longerons, bulkheads, frames, doublers, struts, ties, beams, floor structures, reinforcement, methods of skinning and anti-corrosive protection; Pylon, stabiliser and undercarriage attachments; Seat installation; Doors: construction, mechanisms, operation and safety devices; Windows and windscreen construction; Fuel storage; Firewalls; Engine mounts; Structure assembly techniques: riveting, bolting, bonding; Methods of surface protection, such as chromating, anodising, painting; Surface cleaning; Airframe symmetry: methods of alignment and symmetry checks.		
12.6. AIR CONDITIONING (ATA 21)		
12.6.1. Air Supply	**AG-12-06-01-A3-A4**	**1**
Sources of air supply including engine bleed and ground cart.		

12.6.2. Air Conditioning	**AG-12-06-02-A3-A4**	**1**
Air conditioning systems; Distribution systems; Flow and temperature control systems; Protection and warning devices.		
12.7. INSTRUMENTS – AVIONIC SYSTEMS		
12.7.1. Instrument Systems (ATA 31)	**AG-12-07-01-B1**	**2**
Pitot static: altimeter, air speed indicator, vertical speed indicator; Gyroscopic: artificial horizon, attitude director, direction indicator, horizontal situation indicator, turn and slip indicator, turn coordinator; Compasses: direct reading, remote reading; Vibration indicating systems — HUMS; Glass cockpit; Other aircraft system indication.		
12.7.2. Avionic Systems (ATA 31)	**AG-12-07-02-A3-A4-B1**	**1**
Fundamentals of system layouts and operation of: ▪ Auto Flight (ATA 22); ▪ Communications (ATA 23); ▪ Navigation Systems (ATA 34).		
12.8. ELECTRICAL POWER (ATA 24)		
Batteries Installation and Operation; DC power generation, AC power generation;	**AG-12-08-A3-A4**	**1**

Emergency power generation; Voltage regulation, Circuit protection. Power distribution; Inverters, transformers, rectifiers; External/Ground power.		
12.9. EQUIPMENT AND FURNISHINGS (ATA 25)		
(a)	**AG-12-09a-A3-A4-B1**	**2**
Emergency equipment requirements; Seats, harnesses and belts; Lifting systems.		
(b)	**AG-12-09a-A3-A4-B1**	**1**
Emergency flotation systems; Cabin lay-out, cargo retention; Equipment lay-out; Cabin furnishing installation.		
12.10. FIRE PROTECTION (ATA 26)		
Fire and smoke detection and warning systems; Fire extinguishing systems;	**AG-12-10-A3-A4**	**1**
System tests.		
12.11. FUEL SYSTEMS (ATA 28)		
System lay-out;	**AG-12-11-A3-A4**	**1**

Fuel tanks; Supply systems; Dumping, venting and draining; Cross-feed and transfer; Indications and warnings; Refuelling and defuelling.		
12.12. 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.	**AG-12-12-A3-A4**	**1**
12.13. ICE AND RAIN PROTECTION (ATA 30)		
Ice formation, classification and detection; Anti-icing and De-icing systems: electrical, hot air and chemical; Rain repellent and removal; Probe and drain heating; Wiper system.	**AG-12-13-A3-A4**	**1**

12.14. LANDING GEARS (ATA 32)		
Construction, shock absorbing; Extension and retraction systems: normal and emergency; Indications and warning; Wheels, Tyres, brakes; Steering; Air-ground sensing; Skids, floats.	**AG-12-14-A3-A4**	**2**
12.15. LIGHTS (ATA 33)		
External: navigation, landing, taxiing, ice; Internal: cabin, cockpit, cargo; Emergency.	**AG-12-15-A3-A4**	**2**
12.16. PNEUMATIC/VACUUM (ATA 36)		
System lay-out; Sources: engine/APU, compressors, reservoirs, ground supply; Pressure control; Distribution;	**AG-12-16-A3-A4**	**1**
Indications and warnings; Interfaces with other systems.		
12.17. INTEGRATED MODULAR AVIONICS (ATA 42)		
Functions that may be typically integrated in the Integrated Modular Avionic (IMA) modules are, among others:	**AG-12-17-A3-A4**	**1**

▪ 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,		
Brake temperature monitoring, etc. Core system; Network components.		
12.18. ON BOARD MAINTENANCE (ATA 45)		
Central maintenance computers; Data loading system; Electronic library system; Printing; Structure monitoring (damage tolerance monitoring).	**AG-12-18-A3-A4**	**1**

12.19. INFORMATION SYSTEMS (ATA 46)		
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.	**AG-12-19-A3-A4**	**1**

Module 15

GAS TURBINE ENGINE

PART-66 Syllabuses	Cross-reference	Level
MODULE 15. GAS TURBINE ENGINE – A1 & A3 CATEGORIES		
15.1. FUNDAMENTALS		
Potential energy, kinetic energy, Newton's laws of motion, Brayton cycle; The relationship between force, work, power, energy, velocity, acceleration; Constructional arrangement and operation of turbojet, turbofan, turboshaft, turboprop.	**AG-15-01-A1-A3**	**1**
15.2. ENGINE PERFORMANCE		
Gross thrust, net thrust, choked nozzle thrust, thrust distribution, resultant thrust, thrust horsepower, equivalent shaft horsepower, specific fuel consumption; Engine efficiencies; By-pass ratio and engine pressure ratio; Pressure, temperature and velocity of the gas flow Engine ratings, static thrust, influence of speed, altitude and hot climate, flat rating, limitations.	-	-
15.3. INLET		
Compressor inlet ducts; Effects of various inlet configurations; Ice protection.	**AG-15-03- A1-A3 -B1**	**2**
15.4. COMPRESSORS		

Axial and centrifugal types; Constructional features and operating principles and applications; Fan balancing; Operation; Causes and effects of compressors tall and surge; Methods of air flow control: bleed valves, variable inlet guide vanes, variable stator vanes, rotating stator blades; Compressor ratio.	**AG-15-04- A1-A3**	**1**
15.5. COMBUSTION SECTION		
Constructional features and principles of operation.	**AG-15-05- A1-A3**	**1**
15.6. TURBINE SECTION		
Operation and characteristics of different turbine blade types; Blade to disk attachment; Nozzle guide vanes; Causes and effects of turbine blade stress and creep.	**AG-15-06- A1-A3-B1**	**2**
15.7. EXHAUST		
Constructional features and principles of operation; Convergent, divergent and variable area nozzles; Engine noise reduction; Thrust reversers.	**AG-15-07- A1-A3**	**1**
15.8. BEARINGS AND SEALS		
Constructional features and principles of operation.	-	-

15.9. LUBRICANTS AND FUELS		
Properties and specifications; Fuel additives; Safety precautions.	**AG-15-09- A1-A3**	**1**
15.10. LUBRICATION SYSTEMS		
System operation / lay-out and components.	**AG-15-10- A1-A3**	**1**
15.11. FUEL SYSTEMS		
Operation of engine control and fuel metering systems including electronic engine control (FADEC); Systems lay-out and components.	**AG-15-11- A1-A3**	**1**
15.12. AIR SYSTEMS		
Operation of engine air distribution and anti-ice control systems, including internal cooling, sealing and external air services.	**AG-15-12- A1-A3**	**1**
15.13. STARTING AND IGNITION SYSTEMS		
Operation of engine start systems and components; Ignition systems and components; Maintenance safety requirements.	**AG-15-13- A1-A3**	**1**
15.14. ENGINE INDICATION SYSTEMS		
Exhaust gas temperature/ Interstage turbine temperature; Engine thrust Indication: ▪ engine pressure ratio, ▪ engine turbine discharge pressure or jet pipe pressure systems;	**AG-15-14- A1-A3**	**1**

Oil pressure and temperature; Fuel pressure and flow; Engine speed; Vibration measurement and indication; Torque; Power.		
15.15. POWER AUGMENTATION SYSTEMS		
Operation and applications; Water injection, water methanol; Afterburner systems.	-	**-**
15.16. TURBO-PROP ENGINES		
Gas coupled / free turbine and gear coupled turbines; Reduction gears; Integrated engine and propeller controls; Overspeed safety devices.	**AG-15-16- A1-A3**	**1**
15.17. TURBO-SHAFT ENGINES		
Arrangements drive systems, reduction gearing, couplings, control systems.	**AG-15-17- A1-A3**	**1**
15.18. AUXILIARY POWER UNITS (APUs)		
Purpose, operation, protective systems.	**AG-15-18- A1-A3**	**1**
15.19. POWERPLANT INSTALLATION		
Configuration of firewalls, cowlings, acoustic panels, engine mounts, anti-vibration mounts, hoses, pipes,	**AG-15-19- A1-A3**	**1**

feeders, connectors, wiring looms, control cables and rods, lifting points and drains.		
15.20. FIRE PROTECTION SYSTEMS		
Operation of detection and extinguishing systems.	**AG-15-20- A1-A3**	**1**
15.21. ENGINE MONITORING AND GROUND INSTALLATION		
Procedures for starting and ground run-up; Interpretation of engine power output and parameters; Trend (including oil analysis, vibration and boroscope) monitoring; Inspection of engine and components to criteria, tolerances and data specified by engine manufacturer; Compressor washing / cleaning; Foreign object damage.	**AG-15-21- A1-A3**	**1**
15.22. ENGINE STORAGE AND PRESERVATION		
Preservation and depreservation for accessories/systems	-	-

A4 CATEGORY

B1 CATEGORIES

A1 - CATEGORY

A1 - CATEGORY

A1 - CATEGORY

A1 - CATEGORY

A1 - CATEGORY

A1 - CATEGORY

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A1 - CATEGORY

Module 1

MATHEMATICS

PART-66 Syllabuses	Cross-reference	Level
MODULE 1. MATHEMATICS – A CATEGORY		
1.1. ARITHMETIC		
Arithmetical terms and signs, Methods of multiplication and division, Fractions and decimals, Factors and multiples, Weights, measures and conversion factors, Ratio and proportion, Averages and percentages, Areas and volumes, squares, cubes, Square and cube roots.	**AG-01-01-A**	**1**
1.2. ALGEBRA		
(a)	**AG-01-02a-A**	**1**
Evaluating simple algebraic expressions, addition, subtraction, multiplication and division, use of brackets, simple algebraic fractions.		
(b)	-	-

Linear equations and their solutions, Indices and powers, negative and fractional indices, Binary and other applicable numbering systems, Simultaneous equations, Second degree equations with one unknown, Logarithms.		
1.3. GEOMETRY		
(a)	**-**	**-**
Simple geometrical constructions.		
(b)	**AG-01-03b-A-B1-B2-B3**	**2**
Graphical representation; nature and uses of graphs, Graphs of equations/functions.		
(c)	-	-
Simple trigonometry; trigonometrical relationships, use of tables and rectangular and polar coordinates.		
	-	**-**

Module 2

PHYSICS

PART-66 Syllabuses	Cross-reference	Level
MODULE 2. PHYSICS – A CATEGORY		
2.1. MATTER		
Nature of matter: the chemical elements, structure of atoms, molecules; Chemical compounds. States: solid, liquid and gaseous; Changes between states.	**AG-02-01-A-B1-B2-B3**	**1**
2.2. MECHANICS		
2.2.1. Statics	**AG-02-02-01-A-B2-B3**	**1**
Forces, moments and couples, representation as vectors; Centre of gravity. Elements of theory of stress, strain and elasticity: tension, compression, shear and torsion; Nature and properties of solid, fluid and gas; Pressure and buoyancy in liquids (barometers).		
2.2.2. Kinetics	**AG-02-02-02-A-B2-B3**	**1**
Linear movement: uniform motion in a straight line, motion under constant acceleration (motion under gravity) ; Rotational movement: uniform circular motion (centrifugal/centripetal forces);		

Periodic motion: pendular movement; Simple theory of vibration, harmonics and resonance; Velocity ratio mechanical advantage and efficiency.		
2.2.3. Dynamics	**AG-02-02-02-A-B2-B3**	**1**
(a) Mass	**AG-02-02-03a-A-B2-B3**	**1**
Mass, force, inertia, work, power, energy (potential, kinetic and total energy), heat, efficiency.		
(b) Momentum, conservation of momentum	**AG-02-02-03b-A-B3**	**1**
Momentum, conservation of momentum; Impulse; Gyroscopic principles. Friction: nature and effects, coefficient of friction (rolling resistance).		
2.2.4. Fluid dynamics		
(a)	**AG-02-02-04a-A-B1-B2-B3**	**2**
Specific gravity and density		
(b)	**AG-02-02-04b-A-B2-B3**	**1**
Viscosity, fluid resistance, effects of streamlining; Effects of compressibility on fluids ; Static, dynamic and total pressure: Bernoulli's Theorem, Venturi		
2.3. THERMODYNAMICS		
(a)	**AG-02-03a-A-B1-B2-B3**	**2**

Temperature: thermometers and temperature scales: Celsius, Fahrenheit and Kelvin. Heat definition.		
(b)	-	-
Heat capacity, specific heat; Heat transfer: convection, radiation and conduction; Volumetric expansion; First and second law of thermodynamics; Isothermal, adiabatic expansion and compression, engine cycles, constant volume and constant pressure, refrigerators and heat pumps; Gases: ideal gases laws; specific heat at constant volume and constant pressure, work done by expanding gas; Latent heat of fusion and evaporation, thermal energy, heat of combustion.		
2.4. OPTICS (LIGHT)		
Nature of light; speed of light; Laws of reflection and refraction: reflection at plane surfaces, Reflection by spherical mirrors, refraction, lenses, fibre optics.	-	-
2.5. WAVE MOTION AND SOUND		
Wave motion: mechanical waves, sinusoidal wave motion, Interference phenomena, standing waves; Sound: speed of sound, production of sound, intensity, Pitch and quality, Doppler effect.	-	-
	-	-

Module 3

ELECTRICAL FUNDAMENTALS

PART-66 Syllabuses	Cross-reference	Level
MODULE 3. ELECTRICAL FUNDAMENTALS – A CATEGORY		
3.1. ELECTRON THEORY		
Structure and distribution of electrical charges within: atoms, molecules, ions, compounds; Molecular structure of conductors, semiconductors and insulators.	**AG-03-01-A-B1-B2-B3**	**1**
3.2. STATIC ELECTRICITY AND CONDUCTION		
Static electricity and distribution of electrostatic charges; Electro static laws of attraction and repulsion; Units of charge, Coulomb's Law; Conduction of electricity in solids, liquids, gases and vacuum.	**AG-03-02-A-B3**	**1**
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.	**AG-03-03-A-B3**	**1**
3.4. GENERATION OF ELECTRICITY		
Production of electricity by the following methods: light, heat, friction, pressure, chemical action, magnetism and motion.	**AG-03-04-A-B1-B2-B3**	**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 of thermocouples; Operation of photo-cells.	**AG-03-05-A**	**1**
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.	**-**	**-**
3.7. RESISTANCE/RESISTOR		
(a)	-	-
Resistance and affecting factors Specific resistance; Resistor colour 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.		
(b)	-	-
Positive and negative temperature coefficient conductance		

Fixed resistors, stability, tolerance and limitations, methods of construction; Variable resistors, thermistors, voltage dependent resistors; construction of potentiometers and rheostats; Construction of Wheatstone Bridge.		
3.8. POWER		
Power, work and energy (kinetic and potential); Dissipation of power by a resistor; Power formula; Calculations involving power, work and energy.	-	-
3.9. CAPACITANCE/CAPACITOR		
Operation and function of a capacitor; Factors affecting capacitance area of plates, distance between plates, number of plates, dielectric and dielectric constant, working voltage, voltage rating; Capacitor types, Construction and function; Capacitor colour 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		
(a)	**-**	**-**
Theory of magnetism Properties of a magnet; Action of a magnet suspended in the Earth's magnetic field;		

Magnetisation and demagnetisation; Magnetic shielding; Various types of magnetic material; Electromagnets construction and principles of operation; Hand clasp rules to determine: magnetic field around current carrying conductor.		
(b)	-	-
Magnetomotive force, field strength, magnetic flux density, permeability, hysteresis loop, retentivity, coercive force reluctance, saturation point, eddy currents; Precautions for care and storage of magnets.		
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, 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;	-	-
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; Principle uses of inductors.		
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.	-	-
3.13. AC THEORY		
Sinusoidal waveform: phase, period, frequency, cycle; Instantaneous, average, root mean square, peak, peak to peak current values and calculations of the values, in relation voltage, current and power; Triangular/Square waves; Single/3 phase principles.	**AG-03-13-A-B3**	**1**
3.14. RESISTIVE (R), CAPACITIVE (C) AND INDUCTIVE (L) CIRCUITS		
Phase relation ship of voltage and current in L, C and R circuits, parallel, series and series parallel; Impedance, phase angle, power factor and current calculations;	-	**-**
True power, apparent power and reactive power calculations.		
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; Primary and Secondary current, voltage, turns ratio, power, efficiency; Auto transformers.		
3.16. FILTERS		
Operation, application and uses of the following filters: Low pass, high pass, band pass, band stop.	-	-
3.17. AC GENERATORS		
Rotation of loop in a magnetic field and waveform produced; Operation and construction of 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.		

Module 5

DIGITAL TECHNIQUES / ELECTRONIC INSTRUMENT SYSTEMS

PART-66 Syllabuses	Cross-reference	Level
MODULE 5. DIGITAL TECHNIQUES – A CATEGORY		
5.1. ELECTRONIC INSTRUMENT SYSTEMS		
Typical systems arrangements and cockpit layout of electronic instrument systems.	**AG-05-01-A-B3**	**1**
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.	**-**	**-**
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.	**-**	**-**
5.4. DATA BUSES		
Operation of data buses in aircraft systems including knowledge of ARINC and other specifications; Aircraft network/Ethernet.	**-**	**-**
5.5. LOGIC CIRCUITS		
(a)	**-**	**-**
Identification of common logic gate symbols, tables and equivalent circuits;		

Applications used for aircraft systems, schematic diagrams.		
(b)	**-**	**-**
Interpretation of logic diagrams.		
5.6. BASIC COMPUTER STRUCTURE		
(a)	**AG-05-06a-A**	**1**
Computer terminology (including bit, byte, software, hard ware, CPU, IC, and various memory devices such as RAM, ROM, PROM); Computer technology (as applied in aircraft systems).		
(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.		
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.	**-**	**-**
5.8. INTEGRATED CIRCUITS		
Operation and use of encoders and decoders;	**-**	**-**

Function of encoder types; Uses of medium, large and very large scale integration.		
5.9. MULTIPLEXING		
Operation, application and identification in logic diagrams of multiplexers and demultiplexers.	**-**	**-**
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.	**-**	**-**
5.11. ELECTRONIC DISPLAYS		
Principles of operation of common types of displays used in modern aircraft, including : cathode ray tubes, light emitting diodes, liquid crystal display.	**-**	**-**
5.12. ELECTRONIC SENSITIVE DEVICES		
Special handling of components sensitive to electrostatic discharges; Awareness of risks and possible damage, component and personnel anti-static protection devices.	**AG-05-12-A-B3**	**1**
5.13. SOFTWARE MANAGEMENT CONTROL		
Awareness of restrictions, airworthiness requirements and possible catastrophic effects of unapproved changes to software programmes.	**-**	**-**
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.		
5.15. TYPICAL ELECTRONIC/DIGITAL AIRCRAFT SYSTEM		
General arrangement of typical electronic / digital aircraft systems and associated BITE (Built In Test Equipment) testing such as: ▪ ACARS – ARINC Communication and Addressing and Reporting System; ▪ ECAM – Electronic Centralised Aircraft Monitoring; ▪ EFIS – Electronic Flight Instrument System; ▪ EICAS – Engine Indication and Crew Alerting System; ▪ FBW – Fly-By-Wire: ▪ FMS – Flight Management System; ▪ GPS – Global Positioning System; ▪ IRS – Inertial Reference System; ▪ TCAS – Traffic Alert Collision Avoidance System; ▪ IMA – Integrated Modular Avionics; ▪ Cabin systems; ▪ Information systems.	-	-

Module 6

MATERIALS AND HARDWARE

PART-66 Syllabuses	Cross-reference	Level
MODULE 6. MATERIALS AND HARDWARE – A CATEGORY		
6.1. AIRCRAFT MATERIALS - FERROUS		
(a)	**AG-06-01a-A-B2**	**1**
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.		
6.2. AIRCRAFT MATERIALS – NON-FERROUS		
(a)	**AG-06-02a-A-B2**	**1**
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.		
6.3. AIRCRAFT MATERIALS – COMPOSITE AND NON-METALLIC		
6.3.1. Composite and non-metallic other than wood and fabric		

(a)	**AG-06-03-01a-A**	**1**
Characteristics, properties and identification of common composite and non-metallic materials, other than wood, used in aircraft; Sealant and bonding agents.		
(b)	**AG-06-03-01b-A**	**1**
The detection of defects/deterioration in composite and non-metallic material. Repair of composite and non-metallic material.		
6.3.2. Wooden structures		
Construction methods of wooden airframe structures; Characteristics, properties and types of wood and glue used in aeroplanes; 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.	**AG-06-03-02-A**	**1**
6.3.3. Fabric covering		
Characteristics, properties and types of fabrics used in aeroplanes; Inspections methods for fabric; Types of defects in fabric; repair of fabric covering.	**AG-06-03-03-A**	**1**
6.4. CORROSION		
(a)	**AG-06-04a-A-B1-B2-B3**	**1**
Chemical fundamentals;		

Formation by, galvanic action process, microbiological, stress.		
(b)	**AG-06-04b-A-B2-B3**	**2**
Types of corrosion and their identification; Causes of corrosion; Material types, susceptibility to corrosion.		
6.5. FASTENERS		
6.5.1. Screw threads	**AG-06-05-01-A-B1-B2-B3**	**2**
Screw nomenclature; Thread forms, dimension and tolerances for standard thread used in aircraft; Measuring screw threads		
6.5.2. Bolts, studs and screws	**AG-06-05-02-A-B1-B2-B3**	**2**
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.		
6.5.3. Locking devices	**AG-06-05-03-A-B1-B2-B3**	**2**
Tab and spring washers, locking plates, split pins, pal-nuts, wire locking, quick release fasteners, keys, circlips, cotter pins.		
6.5.4. Aircraft rivets	**AG-06-05-04-A-B2**	**1**
Types of solid and blind rivets: specifications and identification;		

Heat treatment.		
6.6. PIPES AND UNIONS		
(a)	**AG-06-06a-A-B1-B2-B3**	**2**
Identification of, and types of rigid and flexible pipes and their connectors used in aircraft.		
(b)	**AG-06-06b-A-B1-B3**	**2**
Standard unions for aircraft hydraulic, fuel, oil, pneumatic and air system pipes.		
6.7. SPRINGS		
Types of springs, materials, characteristics and applications.	**-**	**-**
6.8. BEARINGS		
Purpose of bearings, loads, material, construction; Types of bearings and their application.	**AG-06-08-A-B3**	**1**
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.	**AG-06-09-A-B3**	**1**
6.10. CONTROL CABLES		
Types of cables; End fittings, turnbuckles and compensation devices; Pulleys and cable system components;	**AG-06-10-A-B2**	**1**
Bowden cables; Aircraft flexible control systems.		

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.	**AG-06-11-A**	**1**

Module 7A

MAINTENANCE PRACTICES

PART-66 Syllabuses	Cross-reference	Level
MODULE 7A. MAINTENANCE PRACTICES – A CATEGORY		
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.	**AG-07A-01-A-B1-B2**	**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.	**AG-07A-02-A-B1-B2**	**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.	**AG-07A-03-A-B1-B2**	**3**
7.4. AVIONIC TEST EQUIPMENT		

Operation, function and use of avionic general test equipment.	-	-
7.5. ENGINEERING DRAWINGS, DIAGRAMS AND STANDARDS		
Drawing types and diagrams, their symbols, dimensions, tolerances and projections; Identifying title block information; Microfilm, microfiche and computerised 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.	**AG-07A-05-A**	**1**
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.	**AG-07A-06-A-B2**	**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;	**AG-07A-07-A**	**1**
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; EWIS installations, inspection, repair, maintenance and cleanliness standards.		
7.8. RIVETING		
Riveted joints, rivet spacing and pitch; Tools used for riveting and dimpling; Inspection of riveted joints.	**AG-07A-08-A**	**1**
7.9. PIPES AND HOSES		
Bending and belling / flaring aircraft pipes; Inspection and testing of aircraft pipes and hoses; Installation and clamping of pipes.	**AG-07A-09-A**	**1**
7.10. SPRINGS		
Inspection and testing of springs.	**AG-07A-10-A**	**1**
7.11. BEARINGS		
Testing, cleaning and inspection of bearings; Lubrication requirements of bearings; Defects in bearings and their causes.	**AG-07A-11-A**	**1**
7.12. TRANSMISSIONS		
Inspection of gears, backlash; Inspection of belts and pulleys, chains and sprockets;	**AG-07A-12-A**	**1**
Inspection of screw jacks, lever devices, push-pull rod systems.		

7.13. CONTROL CABLES		
Swaging of end fittings; Inspection and testing of control cables; Bowden cables; aircraft flexible control systems.	**AG-07A-13-A**	**1**
7.14. MATERIAL HANDLING		
7.14.1. Sheet metal	**-**	**-**
Marking out and calculation of bend allowance; Sheet metal working, including bending and forming; Inspection of sheet metal work.		
7.14.2. Composite and non-metallic	**-**	**-**
Bonding practices; Environmental conditions Inspection methods		
7.15. WELDING, BRAZING, SOLDERING AND BONDING		
(a)	**-**	**-**
Soldering methods; inspection of soldered joints.		
(b)	**-**	**-**
Welding and brazing methods; Inspection of welded and brazed joints;		
Bonding methods and inspection of bonded joints.		

7.16. AIRCRAFT WEIGHT AND BALANCE		
(a)	**-**	**-**
Centre of gravity/Balance limits calculation: use of relevant documents.		
(b)	**-**	**-**
Preparation of aircraft for weighing; Aircraft weighing.		
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 / de-fuelling procedures; De-icing / anti-icing procedures; Electrical, hydraulic and pneumatic ground supplies; Effects of environmental conditions on aircraft handling and operation.	**AG-07A-17-A-B1-B2**	**2**
7.18. DISASSEMBLY, INSPECTION, REPAIR, AND ASSEMBLY TECHNIQUES		
(a)		
Types of defects and visual inspection techniques. Corrosion removal, assessment and re-protection.	**AG-07A-18a-A**	**2**
(b)	**-**	**-**
General repair methods, Structural Repair Manual;		

Ageing, fatigue and corrosion control programmes.		
(c)	**-**	**-**
Non destructive inspection techniques including, penetrant, radiographic, eddy current, ultrasonic and boroscope methods.		
(d)		
Disassembly and re-assembly techniques.	**AG-07A-18d-A-B1-B2**	**2**
(e)		
Trouble shooting techniques.	**-**	**-**
7.19. ABNORMAL EVENTS		
(a)	**AG-07A-19a-A-B1-B2**	**2**
Inspections following lightning strikes and HIRF penetration.		
(b)	**AG-07A-19b-A-B1**	**2**
Inspections following abnormal events such as heavy landings and flight through turbulence.		
7.20. MAINTENANCE PROCEDURES		
Maintenance planning; Modification procedures; Stores procedures; Certification / release procedures;	**AG-07A-20-A**	**1**
Interface with aircraft operation; Maintenance Inspection / Quality Control / Quality Assurance ;		

Additional maintenance procedures. Control of life limited components.		

Module 8

BASIC AERODYNAMICS

PART-66 Syllabuses	Cross-reference	Level
MODULE 8. BASIC AERODYNAMICS – A & B3 CATEGORIES		
8.1. PHYSICS OF THE ATMOSPHERE		
International Standard Atmosphere (ISA), application to aerodynamics.	**AG-08-01-B1-B2**	**2**
8.2. AERODYNAMICS		
Airflow around a body; Boundary layer, laminar and turbulent flow, free stream flow, relative airflow, upwash 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.	**AG-08-02-B1-B2**	**2**
8.3. THEORY OF FLIGHT		
Relation ship between lift, weight, thrust and drag; Glide ratio; Steady stable flights, performance; Theory of the turn;	**AG-08-03-B1-B2**	**2**
Influence of load factor: stall, flight envelope and structural limitations;		

Lift augmentation.		
8.4. FLIGHT STABILITY AND DYNAMICS		
Longitudinal, lateral and directional stability (active and passive).	**AG-08-04-B1-B2**	**2**

Module 9A

HUMAN FACTORS

PART-66 Syllabuses	Cross-reference	Level
MODULE 9A. HUMAN FACTORS – A CATEGORY		
9.1. GENERAL		
The need to take human factors into account; Incidents attributable to human factors / human error; 'Murphy's' law.	**AG-09A-01-A**	**1**
9.2. HUMAN PERFORMANCE AND LIMITATIONS		
Vision; Hearing; Information processing; Attention and perception; Memory; Claustrophobia and physical access.	**AG-09A-02-A**	**1**
9.3. SOCIAL PSYCHOLOGY		
Responsibility: individual and group; Motivation and de-motivation; Peer pressure;	**AG-09A-03-A-B1-B2**	**1**

'Culture' issues; Team working; Management, Supervision and leadership.		
9.4. FACTORS AFFECTING PERFORMANCE		
Fitness / health; Stress: domestic and work related; Time pressure and deadlines; Workload: over load and underload; Sleep and fatigue, shiftwork; Alcohol, medication, drug abuse.	**AG-09A-04-A-B1-B2**	**2**
9.5. PHYSICAL ENVIRONMENT		
Noise and fumes; Illumination; Climate and temperature; Motion and vibration; Working environment.	**AG-09A-05-A-B1-B2**	**1**
9.6. TASKS		
Physical work; Repetitive tasks; Visual inspection; Complex systems.	**AG-09A-06-A-B1-B2**	**1**
9.7. COMMUNICATION		

Within and between teams; Work logging and recording; Keeping up to date, currency; Dissemination of information.	**AG-09A-07-A-B1-B2**	**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.	**AG-09A-08-A**	**1**
9.9. HAZARDS IN THE WORKPLACE		
Recognising and avoiding hazards; Dealing with emergencies.	**AG-09A-09-A**	**1**

Module 10

AVIATION LEGISLATION

PART-66 Syllabuses	Cross-reference	Level
MODULE 10. AVIATION LEGISLATION – A CATEGORY		
10.1. REGULATORY FRAMEWORK		
Role of International Civil Aviation Organisation; Role of the European Commission; Role of EASA; Role of the Member States and the National Aviation Authorities Regulation (EC) N° 1321/2014 and its implementing rules Regulations (EC) N° 216/2008 and (EC) N° 2042/2003. Relationships between the various Annexes (Parts) such as Part-21, Part-M, Part-145, Part-66, Part-147 and EO-OPS.	**AD-10-01-A-B1-B2-B3**	**1**
10.2. CERTIFYING STAFF - MAINTENANCE		
Detailed understanding of Part-66.	**AD-10-02-A-B1-B2-B3**	**2**
10.3. APPROVED MAINTENANCE ORGANIZATIONS		
Detailed understanding of Part-145 and Part-M Subpart F.	**AD-10-03-A-B1-B2-B3**	**2**
10.4. AIR OPERATIONS		
General understanding of EU-OPS;	**AD-10-04-A-B1-B2-B3**	**1**

Air Operators Certificates; Operators Responsibilities, in particular regarding continuing airworthiness and maintenance; Aircraft Maintenance Programme; MEL/CDL; Documents to be carried on board; Aircraft placarding (markings).		
10.5. CERTIFICATION OF AIRCRAFT, PARTS AND APPLIANCES		
(a) General	-	-
General understanding of Part-21 and EASA certification specifications CS-23, 25, 27, 29.		
(b) Documents	-	-
Certificate of Airworthiness; restricted certificates of airworthiness and permit to fly; Certificate of registration; Noise certificate; Weight schedule; Radio station licence and approval.		
10.6. CONTINUING AIRWORTHINESS		
Detailed understanding of Part-21 provisions related to continuing airworthiness; Detailed understanding of Part-M.	**AD-10-06-A-B1-B2-B3**	**2**
10.7. APPLICABLE NATIONAL AND INTERNATIONAL REQUIREMENTS FOR (IF NOT SUPERSEDED BY EU REQUIREMENTS).		
(a)		

Maintenance programmes, maintenance checks and inspections; Airworthiness directives; Service bulletins, manufacturers service information; Modifications and repairs; Maintenance documentation: maintenance manuals, structural repair manual, illustrated parts catalogue, etc. Master Minimum Equipment Lists, Minimum equipment lists, Dispatch Deviation lists.	**AD-10-07a-A**	**1**
(b)	**-**	**-**
Continuing airworthiness; Minimum equipment requirements – Test flights.		

Module 11A

TURBINE AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS

PART-66 Syllabuses	Cross-reference	Level
MODULE 11A. TURBINE AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS – A1 CATEGORY		
11A.1. THEORY OF FLIGHT		
11A.1.1. Aeroplane Aerodynamics and Flight controls	**AG-11A-01-01-A1**	**1**
Operation and effect of: ▪ roll control: ailerons and spoilers; ▪ pitch control: elevators, stabilators, variable incidence stabilisers and canards; ▪ yaw control, rudder limiters; Control using elevons, ruddervators; High lift devices, slots, slats, flaps, flaperons; Drag inducing devices, spoilers, lift dumpers, speed brakes; Effects of wing fences, saw tooth leading edges; Boundary layer control using, vortex generators, stall wedges or leading edge devices; Operation and effect of trim tabs, balance and antibalance (leading) tabs, servo tabs, spring tabs, mass balance, control surface bias, aerodynamic balance panels.		
11A.1.2. High Speed flight	**AG-11A-01-02-A1**	**1**
Speed of sound, subsonic flight, transonic flight, supersonic flight,		

Mach number, critical Mach number, compressibility buffet, shock wave, aerodynamic heating, area rule; Factors affecting airflow in engine intakes of high speed aircraft; Effects of sweepback on critical Mach number.		
11A.2. AIRFRAME STRUCTURES – GENERAL CONCEPTS		
(a)	**AG-11A-02a-A1-B11**	**2**
Airworthiness requirements for structural strength; Structural classification, primary, secondary and tertiary; Fail safe, safe life, damage tolerance concepts; Zonal and station identification systems; Stress, strain, bending, compression, shear, torsion, tension, hoop stress, fatigue; Drains and ventilation provisions; System installation provisions; Lightning strike protection provision; Aircraft bonding.		
(b)	**AG-11A-02a-A1**	**1**
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; Structure assembly techniques: riveting, bolting, bonding Methods of surface protection, such as chromating, anodising, painting ; Surface cleaning; Airframe symmetry: methods of alignment and symmetry checks.		
11A.3. AIRFRAME STRUCTURES – AEROPLANES		

11A.3.1. Fuselage (ATA 52/53/56)	**AG-11A-03-01-A1**	**1**
Construction and pressurisation sealing; Wing, stabiliser, pylon and under carriage attachments; Seat installation and cargo loading system; Doors and emergency exits : construction, mechanisms, operation and safety devices ; Windows and windscreen construction and mechanisms.		
11A.3.2. Wings (ATA 57)	**AG-11A-03-02-A1**	**1**
Construction; Fuel storage; Landing gear, pylon, control surface and high lift/drag attachments.		
11A.3.3. Stabilizers (ATA 55)	**AG-11A-03-03-A1**	**1**
Construction; Control surface attachment.		
11A.3.4. Flight Control Surfaces (ATA 55/57)	**AG-11A-03-04-A1**	**1**
Construction and attachment; Balancing – mass and aerodynamic.		
11A.3.5. Nacelles/Pylons (ATA 54)	**AG-11A-03-05-A1**	**1**
Construction; Firewalls;		
Engine mounts.		

11A.4. AIR CONDITIONING AND CABIN PRESSURIZATION (ATA 21)		
11A.4.1. Air supply	**AG-11A-04-01-A1**	**1**
Sources of air supply including engine bleed, APU and ground cart.		
11A.4.2. Air conditioning	**AG-11A-04-02-A1**	**1**
Air conditioning systems; Air cycle and vapour cycle machines; Distribution systems; Flow, temperature and humidity control system.		
11A.4.3. Pressurization	**AG-11A-04-03-A1**	**1**
Pressurisation systems; Control and indication including control and safety valves; Cabin pressure controllers.		
11A.4.4. Safety and warning devices	**AG-11A-04-04-A1**	**1**
Protection and warning devices.		
11A.5. INSTRUMENT/AVIONIC SYSTEMS		
11A.5.1. Instrument Systems (ATA 31)	**AG-11A-05-01-A1**	**1**
Pitot static: altimeter, air speed indicator, vertical speed indicator; Gyroscopic: artificial horizon, attitude director, direction indicator, horizontal situation indicator, turn and slip indicator, turn coordinator;		
Compasses: direct reading, remote reading;		

Angle of attack indication, stall warning systems; Glass cockpit; Other aircraft system indication.		
11A.5.2. Avionic Systems	**AG-11A-05-01-A1-B11**	**1**
Fundamentals of system lay-outs and operation of: ▪ Auto Flight (ATA 22); ▪ Communications (ATA 23); ▪ Navigation Systems (ATA 34).		
11A.6. ELECTRICAL POWER		
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	**AG-11A-06-A1**	**1**
11A.7. EQUIPMENT AND FURNISHINGS (ATA 25)		
(a)	**AG-11A-07a-A1-B11**	**2**
Emergency equipment requirements; Seats, harnesses and belts.		

(b)	**AG-11A-07a-A1-B11**	**1**
Cabin lay-out; Equipment lay-out; Cabin Furnishing Installation; Cabin entertainment equipment; Galley installation; Cargo handling and retention equipment; Airstairs.		
11A.8. FIRE PROTECTION (ATA 26)		
(a)	**AG-11A-08a-A1**	**1**
Fire and smoke detection and warning systems; Fire extinguishing systems; System tests.		
(b)	**AG-11A-08b-A1-B11**	**1**
Portable fire extinguisher.		
11A.9. FLIGHT CONTROLS (ATA 27)		
Primary controls: aileron, elevator, rudder, spoiler; Trim control; Active load control;	**AG-11A-09-A1**	**1**
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.		
11A.10. FUEL SYSTEMS (ATA 28)		
System lay-out; Fuel tanks; Supply systems; Dumping, venting and draining; Cross-feed and transfer; Indications and warnings; Refuelling and defuelling; Longitudinal balance fuel systems.	**AG-11A-10-A1**	**1**
11A.11. HYDRAULIC POWER (ATA 29)		
System lay-out; Hydraulic fluids; Hydraulic reservoirs and accumulators; Pressure generation: electric, mechanical, pneumatic; Emergency pressure generation; Filters;	**AG-11A-11-A1**	**1**
Pressure Control; Power distribution; Indication and warning systems;		

Interface with other systems.		
11A.12. 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 and chemical ; Rain repellent; Probe and drain heating; Wiper systems.	**AG-11A-12-A1**	**1**
11A.13. 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.	**AG-11A-13-A1**	**2**
11A.14. LIGHTS (ATA 33)		
External: navigation, anti-collision, landing, taxiing, ice; Internal: cabin, cockpit, cargo;	**AG-11A-14-A1**	**2**
Emergency.		
11A.15. OXYGEN (ATA 35)		

System lay-out: ▪ cockpit, ▪ cabin; Sources, storage, charging and distribution; Supply regulation; Indications and warnings.	**AG-11A-15-A1**	**1**
11A.16. PNEUMATIC/VACUUM (ATA 36)		
System lay-out; Sources: ▪ engine / APU, ▪ compressors, ▪ reservoirs, ▪ ground supply; Pressure and vacuum pumps; Pressure control; Distribution; Indications and warnings; Interfaces with other systems.	**AG-11A-16-A1**	**1**
11A.17. WATER/WASTE (ATA 38)		
Water system lay-out, supply, distribution, servicing and draining; Toilet system lay-out, flushing and servicing; Corrosion aspects.	**AG-11A-17-A1**	**2**
11A.18. ON BOARD MAINTENANCE SYSTEMS (ATA 45)		

Central maintenance computers; Data loading system; Electronic library system; Printing; Structure monitoring (damage tolerance monitoring).	**AG-11A-18-A1**	**1**
11A.19. INTEGRATED MODULAR AVIONICS (ATA 42)		
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,	**1**	**1**
▪ Braking control, ▪ Steering control, ▪ Landing gear extension and retraction, ▪ Tyre pressure indication, ▪ Oleo pressure indication,		

▪ Brake temperature monitoring, etc. Core system; Network components.		
11A.20. CABIN SYSTEMS (ATA 44)		
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 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;	**AG-11A-20-A1**	**1**
▪ External Communication System; ▪ Cabin Mass Memory System; ▪ Cabin Monitoring System; ▪ Miscellaneous Cabin System.		
11A.21. INFORMATION SYSTEMS (ATA 46)		

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.	**AG-11A-21-A1**	**1**

Module 15

GAS TURBINE ENGINE

PART-66 Syllabuses	Cross-reference	Level
MODULE 15. GAS TURBINE ENGINE – A1 & A3 CATEGORIES		
15.1. FUNDAMENTALS		
Potential energy, kinetic energy, Newton's laws of motion, Brayton cycle; The relationship between force, work, power, energy, velocity, acceleration; Constructional arrangement and operation of turbojet, turbofan, turboshaft, turboprop.	**AG-15-01-A1-A3**	**1**
15.2. ENGINE PERFORMANCE		
Gross thrust, net thrust, choked nozzle thrust, thrust distribution, resultant thrust, thrust horsepower, equivalent shaft horsepower, specific fuel consumption; Engine efficiencies; By-pass ratio and engine pressure ratio; Pressure, temperature and velocity of the gas flow Engine ratings, static thrust, influence of speed, altitude and hot climate, flat rating, limitations.	-	-
15.3. INLET		
Compressor inlet ducts; Effects of various inlet configurations; Ice protection.	**AG-15-03- A1-A3 -B1**	**2**
15.4. COMPRESSORS		

Axial and centrifugal types; Constructional features and operating principles and applications; Fan balancing; Operation; Causes and effects of compressors tall and surge; Methods of air flow control: bleed valves, variable inlet guide vanes, variable stator vanes, rotating stator blades; Compressor ratio.	**AG-15-04- A1-A3**	**1**
15.5. COMBUSTION SECTION		
Constructional features and principles of operation.	**AG-15-05- A1-A3**	**1**
15.6. TURBINE SECTION		
Operation and characteristics of different turbine blade types; Blade to disk attachment; Nozzle guide vanes; Causes and effects of turbine blade stress and creep.	**AG-15-06- A1-A3-B1**	**2**
15.7. EXHAUST		
Constructional features and principles of operation; Convergent, divergent and variable area nozzles; Engine noise reduction; Thrust reversers.	**AG-15-07- A1-A3**	**1**
15.8. BEARINGS AND SEALS		
Constructional features and principles of operation.	-	-

15.9. LUBRICANTS AND FUELS		
Properties and specifications; Fuel additives; Safety precautions.	**AG-15-09- A1-A3**	**1**
15.10. LUBRICATION SYSTEMS		
System operation / lay-out and components.	**AG-15-10- A1-A3**	**1**
15.11. FUEL SYSTEMS		
Operation of engine control and fuel metering systems including electronic engine control (FADEC); Systems lay-out and components.	**AG-15-11- A1-A3**	**1**
15.12. AIR SYSTEMS		
Operation of engine air distribution and anti-ice control systems, including internal cooling, sealing and external air services.	**AG-15-12- A1-A3**	**1**
15.13. STARTING AND IGNITION SYSTEMS		
Operation of engine start systems and components; Ignition systems and components; Maintenance safety requirements.	**AG-15-13- A1-A3**	**1**
15.14. ENGINE INDICATION SYSTEMS		
Exhaust gas temperature/ Interstage turbine temperature; Engine thrust Indication: ▪ engine pressure ratio, ▪ engine turbine discharge pressure or jet pipe pressure systems;	**AG-15-14- A1-A3**	**1**

Oil pressure and temperature; Fuel pressure and flow; Engine speed; Vibration measurement and indication; Torque; Power.		
15.15. POWER AUGMENTATION SYSTEMS		
Operation and applications; Water injection, water methanol; Afterburner systems.	-	**-**
15.16. TURBO-PROP ENGINES		
Gas coupled / free turbine and gear coupled turbines; Reduction gears; Integrated engine and propeller controls; Overspeed safety devices.	**AG-15-16- A1-A3**	**1**
15.17. TURBO-SHAFT ENGINES		
Arrangements drive systems, reduction gearing, couplings, control systems.	**AG-15-17- A1-A3**	**1**
15.18. AUXILIARY POWER UNITS (APUs)		
Purpose, operation, protective systems.	**AG-15-18- A1-A3**	**1**
15.19. POWERPLANT INSTALLATION		
Configuration of firewalls, cowlings, acoustic panels, engine mounts, anti-vibration mounts, hoses, pipes,	**AG-15-19- A1-A3**	**1**

feeders, connectors, wiring looms, control cables and rods, lifting points and drains.		
15.20. FIRE PROTECTION SYSTEMS		
Operation of detection and extinguishing systems.	**AG-15-20- A1-A3**	**1**
15.21. ENGINE MONITORING AND GROUND INSTALLATION		
Procedures for starting and ground run-up; Interpretation of engine power output and parameters; Trend (including oil analysis, vibration and boroscope) monitoring; Inspection of engine and components to criteria, tolerances and data specified by engine manufacturer; Compressor washing / cleaning; Foreign object damage.	**AG-15-21- A1-A3**	**1**
15.22. ENGINE STORAGE AND PRESERVATION		
Preservation and depreservation for accessories/systems	-	-

Module 17

PROPELLER

PART-66 Syllabuses	Cross-reference	Level
MODULE 17A. PROPELLER – A1 CATEGORY		
17A.1. FUNDAMENTALS		
Blade element theory; High/low blade angle, reverse angle, angle of attack, rotational speed; Propeller slip; Aerodynamic, centrifugal, and thrust forces; Torque; Relative airflow on blade angle of attack; vibration and resonance.	**AG-17A-01-A**	**1**
17A.2. PROPELLER CONSTRUCTION		
Construction methods and materials used in composite and metal propellers; Blade station, blade face, blade shank, blade back and hub assembly; Fixed pitch, controllable pitch, constant speeding propeller; Propeller/spinner installation.	**AG-17A-02-A**	**1**
17A.3. PROPELLER PITCH CONTROL		
Speed control and pitch change methods; Feathering and reverse pitch;	**AG-17A-03-A**	**1**

Overspeed protection.		
17A.4. PROPELLER SYNCHRONIZING		
Synchronising and synchrophasing equipment.	**-**	**-**
17A.5. PROPELLER ICE PROTECTION		
Fluid and electrical de-icing equipment.	**AG-17A-05-A**	**1**
17A.6. PROPELLER MAINTENANCE		
Static and dynamic balancing; Blade tracking; Assessment of blade damage, erosion, corrosion, impact damage, delamination; Propeller treatment/repair schemes; Propeller engine running.	**AG-17A-06-A**	**1**
17A.7. PROPELLER STORAGE ANDPRESERVATION		
Propeller preservation and depreservation	**AG-17A-07-A**	**1**

A4 CATEGORY

Module 1

MATHEMATICS

PART-66 Syllabuses	Cross-reference	Level
MODULE 1. MATHEMATICS – A CATEGORY		
1.1. ARITHMETIC		
Arithmetical terms and signs, Methods of multiplication and division, Fractions and decimals, Factors and multiples, Weights, measures and conversion factors, Ratio and proportion, Averages and percentages, Areas and volumes, squares, cubes, Square and cube roots.	**AG-01-01-A**	**1**
1.2. ALGEBRA		
(a)	**AG-01-02a-A**	**1**
Evaluating simple algebraic expressions, addition, subtraction, multiplication and division, use of brackets, simple algebraic fractions.		
(b)	-	-

Linear equations and their solutions, Indices and powers, negative and fractional indices, Binary and other applicable numbering systems, Simultaneous equations, Second degree equations with one unknown, Logarithms.		
1.3. GEOMETRY		
(a)	**-**	**-**
Simple geometrical constructions.		
(b)	**AG-01-03b-A-B1-B2-B3**	**2**
Graphical representation; nature and uses of graphs, Graphs of equations/functions.		
(c)	-	-
Simple trigonometry; trigonometrical relationships, use of tables and rectangular and polar coordinates.		
	-	**-**

Module 2

PHYSICS

PART-66 Syllabuses	Cross-reference	Level
MODULE 2. PHYSICS – A CATEGORY		
2.1. MATTER		
Nature of matter: the chemical elements, structure of atoms, molecules; Chemical compounds. States: solid, liquid and gaseous; Changes between states.	**AG-02-01-A-B1-B2-B3**	**1**
2.2. MECHANICS		
2.2.1. Statics	**AG-02-02-01-A-B2-B3**	**1**
Forces, moments and couples, representation as vectors; Centre of gravity. Elements of theory of stress, strain and elasticity: tension, compression, shear and torsion; Nature and properties of solid, fluid and gas; Pressure and buoyancy in liquids (barometers).		
2.2.2. Kinetics	**AG-02-02-02-A-B2-B3**	**1**
Linear movement: uniform motion in a straight line, motion under constant acceleration (motion under gravity) ; Rotational movement: uniform circular motion (centrifugal/centripetal forces);		

Periodic motion: pendular movement; Simple theory of vibration, harmonics and resonance; Velocity ratio mechanical advantage and efficiency.		
2.2.3. Dynamics	**AG-02-02-02-A-B2-B3**	**1**
(a) Mass	**AG-02-02-03a-A-B2-B3**	**1**
Mass, force, inertia, work, power, energy (potential, kinetic and total energy), heat, efficiency.		
(b) Momentum, conservation of momentum	**AG-02-02-03b-A-B3**	**1**
Momentum, conservation of momentum; Impulse; Gyroscopic principles. Friction: nature and effects, coefficient of friction (rolling resistance).		
2.2.4. Fluid dynamics		
(a)	**AG-02-02-04a-A-B1-B2-B3**	**2**
Specific gravity and density		
(b)	**AG-02-02-04b-A-B2-B3**	**1**
Viscosity, fluid resistance, effects of streamlining; Effects of compressibility on fluids ; Static, dynamic and total pressure: Bernoulli's Theorem, Venturi		
2.3. THERMODYNAMICS		
(a)	**AG-02-03a-A-B1-B2-B3**	**2**

Temperature: thermometers and temperature scales: Celsius, Fahrenheit and Kelvin. Heat definition.		
(b)	-	-
Heat capacity, specific heat; Heat transfer: convection, radiation and conduction; Volumetric expansion; First and second law of thermodynamics; Isothermal, adiabatic expansion and compression, engine cycles, constant volume and constant pressure, refrigerators and heat pumps; Gases: ideal gases laws; specific heat at constant volume and constant pressure, work done by expanding gas; Latent heat of fusion and evaporation, thermal energy, heat of combustion.		
2.4. OPTICS (LIGHT)		
Nature of light; speed of light; Laws of reflection and refraction: reflection at plane surfaces, Reflection by spherical mirrors, refraction, lenses, fibre optics.	**-**	**-**
2.5. WAVE MOTION AND SOUND		
Wave motion: mechanical waves, sinusoidal wave motion, Interference phenomena, standing waves; Sound: speed of sound, production of sound, intensity, Pitch and quality, Doppler effect.	**-**	**-**
	-	**-**

Module 3

ELECTRICAL FUNDAMENTALS

PART-66 Syllabuses	Cross-reference	Level
MODULE 3. ELECTRICAL FUNDAMENTALS – A CATEGORY		
3.1. ELECTRON THEORY		
Structure and distribution of electrical charges within: atoms, molecules, ions, compounds; Molecular structure of conductors, semiconductors and insulators.	**AG-03-01-A-B1-B2-B3**	**1**
3.2. STATIC ELECTRICITY AND CONDUCTION		
Static electricity and distribution of electrostatic charges; Electro static laws of attraction and repulsion; Units of charge, Coulomb's Law; Conduction of electricity in solids, liquids, gases and vacuum.	**AG-03-02-A-B3**	**1**
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.	**AG-03-03-A-B3**	**1**
3.4. GENERATION OF ELECTRICITY		
Production of electricity by the following methods: light, heat, friction, pressure, chemical action, magnetism and motion.	**AG-03-04-A-B1-B2-B3**	**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 of thermocouples; Operation of photo-cells.	**AG-03-05-A**	**1**
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.	**-**	**-**
3.7. RESISTANCE/RESISTOR		
(a)	-	-
Resistance and affecting factors Specific resistance; Resistor colour 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.		
(b)	-	-
Positive and negative temperature coefficient conductance		

Fixed resistors, stability, tolerance and limitations, methods of construction; Variable resistors, thermistors, voltage dependent resistors; construction of potentiometers and rheostats; Construction of Wheatstone Bridge.		
3.8. POWER		
Power, work and energy (kinetic and potential); Dissipation of power by a resistor; Power formula; Calculations involving power, work and energy.	-	-
3.9. CAPACITANCE/CAPACITOR		
Operation and function of a capacitor; Factors affecting capacitance area of plates, distance between plates, number of plates, dielectric and dielectric constant, working voltage, voltage rating; Capacitor types, Construction and function; Capacitor colour 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		
(a)	**-**	**-**
Theory of magnetism Properties of a magnet; Action of a magnet suspended in the Earth's magnetic field;		

Magnetisation and demagnetisation; Magnetic shielding; Various types of magnetic material; Electromagnets construction and principles of operation; Hand clasp rules to determine: magnetic field around current carrying conductor.		
(b)	-	-
Magnetomotive force, field strength, magnetic flux density, permeability, hysteresis loop, retentivity, coercive force reluctance, saturation point, eddy currents; Precautions for care and storage of magnets.		
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, 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;	-	-
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; Principle uses of inductors.		
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.	-	-
3.13. AC THEORY		
Sinusoidal waveform: phase, period, frequency, cycle; Instantaneous, average, root mean square, peak, peak to peak current values and calculations of the values, in relation voltage, current and power; Triangular/Square waves; Single/3 phase principles.	**AG-03-13-A-B3**	**1**
3.14. RESISTIVE (R), CAPACITIVE (C) AND INDUCTIVE (L) CIRCUITS		
Phase relation ship of voltage and current in L, C and R circuits, parallel, series and series parallel; Impedance, phase angle, power factor and current calculations;	-	**-**
True power, apparent power and reactive power calculations.		
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; Primary and Secondary current, voltage, turns ratio, power, efficiency; Auto transformers.		
3.16. FILTERS		
Operation, application and uses of the following filters: Low pass, high pass, band pass, band stop.	-	-
3.17. AC GENERATORS		
Rotation of loop in a magnetic field and waveform produced; Operation and construction of 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.		

Module 5

DIGITAL TECHNIQUES / ELECTRONIC INSTRUMENT SYSTEMS

PART-66 Syllabuses	Cross-reference	Level
MODULE 5. DIGITAL TECHNIQUES – A CATEGORY		
5.1. ELECTRONIC INSTRUMENT SYSTEMS		
Typical systems arrangements and cockpit layout of electronic instrument systems.	**AG-05-01-A-B3**	**1**
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.	**-**	**-**
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.	**-**	**-**
5.4. DATA BUSES		
Operation of data buses in aircraft systems including knowledge of ARINC and other specifications; Aircraft network/Ethernet.	**-**	**-**
5.5. LOGIC CIRCUITS		
(a)	**-**	**-**
Identification of common logic gate symbols, tables and equivalent circuits;		

Applications used for aircraft systems, schematic diagrams.		
(b)	**-**	**-**
Interpretation of logic diagrams.		
5.6. BASIC COMPUTER STRUCTURE		
(a)	**AG-05-06a-A**	**1**
Computer terminology (including bit, byte, software, hard ware, CPU, IC, and various memory devices such as RAM, ROM, PROM); Computer technology (as applied in aircraft systems).		
(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.		
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.	**-**	**-**
5.8. INTEGRATED CIRCUITS		
Operation and use of encoders and decoders;	**-**	**-**

Function of encoder types; Uses of medium, large and very large scale integration.		
5.9. MULTIPLEXING		
Operation, application and identification in logic diagrams of multiplexers and demultiplexers.	**-**	**-**
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.	**-**	**-**
5.11. ELECTRONIC DISPLAYS		
Principles of operation of common types of displays used in modern aircraft, including : cathode ray tubes, light emitting diodes, liquid crystal display.	**-**	**-**
5.12. ELECTRONIC SENSITIVE DEVICES		
Special handling of components sensitive to electrostatic discharges; Awareness of risks and possible damage, component and personnel anti-static protection devices.	**AG-05-12-A-B3**	**1**
5.13. SOFTWARE MANAGEMENT CONTROL		
Awareness of restrictions, airworthiness requirements and possible catastrophic effects of unapproved changes to software programmes.	**-**	**-**
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.		
5.15. TYPICAL ELECTRONIC/DIGITAL AIRCRAFT SYSTEM		
General arrangement of typical electronic / digital aircraft systems and associated BITE (Built In Test Equipment) testing such as: ▪ ACARS – ARINC Communication and Addressing and Reporting System; ▪ ECAM – Electronic Centralised Aircraft Monitoring; ▪ EFIS – Electronic Flight Instrument System; ▪ EICAS – Engine Indication and Crew Alerting System; ▪ FBW – Fly-By-Wire: ▪ FMS – Flight Management System; ▪ GPS – Global Positioning System; ▪ IRS – Inertial Reference System; ▪ TCAS – Traffic Alert Collision Avoidance System; ▪ IMA – Integrated Modular Avionics; ▪ Cabin systems; ▪ Information systems.	-	-

Module 6

MATERIALS AND HARDWARE

PART-66 Syllabuses	Cross-reference	Level
MODULE 6. MATERIALS AND HARDWARE – A CATEGORY		
6.1. AIRCRAFT MATERIALS - FERROUS		
(a)	**AG-06-01a-A-B2**	**1**
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.		
6.2. AIRCRAFT MATERIALS – NON-FERROUS		
(a)	**AG-06-02a-A-B2**	**1**
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.		
6.3. AIRCRAFT MATERIALS – COMPOSITE AND NON-METALLIC		
6.3.1. Composite and non-metallic other than wood and fabric		

(a)	**AG-06-03-01a-A**	**1**
Characteristics, properties and identification of common composite and non-metallic materials, other than wood, used in aircraft; Sealant and bonding agents.		
(b)	**AG-06-03-01b-A**	**1**
The detection of defects/deterioration in composite and non-metallic material. Repair of composite and non-metallic material.		
6.3.2. Wooden structures		
Construction methods of wooden airframe structures; Characteristics, properties and types of wood and glue used in aeroplanes; 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.	**AG-06-03-02-A**	**1**
6.3.3. Fabric covering		
Characteristics, properties and types of fabrics used in aeroplanes; Inspections methods for fabric; Types of defects in fabric; repair of fabric covering.	**AG-06-03-03-A**	**1**
6.4. CORROSION		
(a)	**AG-06-04a-A-B1-B2-B3**	**1**
Chemical fundamentals;		

Formation by, galvanic action process, microbiological, stress.		
(b)	**AG-06-04b-A-B2-B3**	**2**
Types of corrosion and their identification; Causes of corrosion; Material types, susceptibility to corrosion.		
6.5. FASTENERS		
6.5.1. Screw threads	**AG-06-05-01-A-B1-B2-B3**	**2**
Screw nomenclature; Thread forms, dimension and tolerances for standard thread used in aircraft; Measuring screw threads		
6.5.2. Bolts, studs and screws	**AG-06-05-02-A-B1-B2-B3**	**2**
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.		
6.5.3. Locking devices	**AG-06-05-03-A-B1-B2-B3**	**2**
Tab and spring washers, locking plates, split pins, pal-nuts, wire locking, quick release fasteners, keys, circlips, cotter pins.		
6.5.4. Aircraft rivets	**AG-06-05-04-A-B2**	**1**
Types of solid and blind rivets: specifications and identification;		

Heat treatment.		
6.6. PIPES AND UNIONS		
(a)	**AG-06-06a-A-B1-B2-B3**	**2**
Identification of, and types of rigid and flexible pipes and their connectors used in aircraft.		
(b)	**AG-06-06b-A-B1-B3**	**2**
Standard unions for aircraft hydraulic, fuel, oil, pneumatic and air system pipes.		
6.7. SPRINGS		
Types of springs, materials, characteristics and applications.	**-**	**-**
6.8. BEARINGS		
Purpose of bearings, loads, material, construction; Types of bearings and their application.	**AG-06-08-A-B3**	**1**
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.	**AG-06-09-A-B3**	**1**
6.10. CONTROL CABLES		
Types of cables; End fittings, turnbuckles and compensation devices; Pulleys and cable system components;	**AG-06-10-A-B2**	**1**
Bowden cables; Aircraft flexible control systems.		

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.	**AG-06-11-A**	**1**

Module 7

MAINTENANCE PRACTICES

PART-66 Syllabuses	Cross-reference	Level
MODULE 7A. MAINTENANCE PRACTICES – A CATEGORY		
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.	**AG-07A-01-A-B1-B2**	**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.	**AG-07A-02-A-B1-B2**	**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.	**AG-07A-03-A-B1-B2**	**3**
7.4. AVIONIC TEST EQUIPMENT		

Operation, function and use of avionic general test equipment.	-	-
7.5. ENGINEERING DRAWINGS, DIAGRAMS AND STANDARDS		
Drawing types and diagrams, their symbols, dimensions, tolerances and projections; Identifying title block information; Microfilm, microfiche and computerised 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.	**AG-07A-05-A**	**1**
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.	**AG-07A-06-A-B2**	**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;	**AG-07A-07-A**	**1**
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; EWIS installations, inspection, repair, maintenance and cleanliness standards.		
7.8. RIVETING		
Riveted joints, rivet spacing and pitch; Tools used for riveting and dimpling; Inspection of riveted joints.	**AG-07A-08-A**	**1**
7.9. PIPES AND HOSES		
Bending and belling / flaring aircraft pipes; Inspection and testing of aircraft pipes and hoses; Installation and clamping of pipes.	**AG-07A-09-A**	**1**
7.10. SPRINGS		
Inspection and testing of springs.	**AG-07A-10-A**	**1**
7.11. BEARINGS		
Testing, cleaning and inspection of bearings; Lubrication requirements of bearings; Defects in bearings and their causes.	**AG-07A-11-A**	**1**
7.12. TRANSMISSIONS		
Inspection of gears, backlash; Inspection of belts and pulleys, chains and sprockets;	**AG-07A-12-A**	**1**
Inspection of screw jacks, lever devices, push-pull rod systems.		

7.13. CONTROL CABLES		
Swaging of end fittings; Inspection and testing of control cables; Bowden cables; aircraft flexible control systems.	**AG-07A-13-A**	**1**
7.14. MATERIAL HANDLING		
7.14.1. Sheet metal	**-**	**-**
Marking out and calculation of bend allowance; Sheet metal working, including bending and forming; Inspection of sheet metal work.		
7.14.2. Composite and non-metallic	**-**	**-**
Bonding practices; Environmental conditions Inspection methods		
7.15. WELDING, BRAZING, SOLDERING AND BONDING		
(a)	**-**	**-**
Soldering methods; inspection of soldered joints.		
(b)	**-**	**-**
Welding and brazing methods; Inspection of welded and brazed joints;		
Bonding methods and inspection of bonded joints.		

7.16. AIRCRAFT WEIGHT AND BALANCE		
(a)	**-**	**-**
Centre of gravity/Balance limits calculation: use of relevant documents.		
(b)	**-**	**-**
Preparation of aircraft for weighing; Aircraft weighing.		
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 / de-fuelling procedures; De-icing / anti-icing procedures; Electrical, hydraulic and pneumatic ground supplies; Effects of environmental conditions on aircraft handling and operation.	**AG-07A-17-A-B1-B2**	**2**
7.18. DISASSEMBLY, INSPECTION, REPAIR, AND ASSEMBLY TECHNIQUES		
(a)		
Types of defects and visual inspection techniques. Corrosion removal, assessment and re-protection.	**AG-07A-18a-A**	**2**
(b)	**-**	**-**
General repair methods, Structural Repair Manual;		

Ageing, fatigue and corrosion control programmes.		
(c)	**-**	**-**
Non destructive inspection techniques including, penetrant, radiographic, eddy current, ultrasonic and boroscope methods.		
(d)		
Disassembly and re-assembly techniques.	**AG-07A-18d-A-B1-B2**	**2**
(e)		
Trouble shooting techniques.	**-**	**-**
7.19. ABNORMAL EVENTS		
(a)	**AG-07A-19a-A-B1-B2**	**2**
Inspections following lightning strikes and HIRF penetration.		
(b)	**AG-07A-19b-A-B1**	**2**
Inspections following abnormal events such as heavy landings and flight through turbulence.		
7.20. MAINTENANCE PROCEDURES		
Maintenance planning; Modification procedures; Stores procedures; Certification / release procedures;	**AG-07A-20-A**	**1**
Interface with aircraft operation; Maintenance Inspection / Quality Control / Quality Assurance ;		

Additional maintenance procedures. Control of life limited components.		

Module 8

BASIC AERODYNAMICS

PART-66 Syllabuses	Cross-reference	Level
MODULE 8. BASIC AERODYNAMICS – A & B3 CATEGORIES		
8.1. PHYSICS OF THE ATMOSPHERE		
International Standard Atmosphere (ISA), application to aerodynamics.	**AG-08-01-B1-B2**	**2**
8.2. AERODYNAMICS		
Airflow around a body; Boundary layer, laminar and turbulent flow, free stream flow, relative airflow, upwash 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.	**AG-08-02-B1-B2**	**2**
8.3. THEORY OF FLIGHT		
Relation ship between lift, weight, thrust and drag; Glide ratio; Steady stable flights, performance; Theory of the turn;	**AG-08-03-B1-B2**	**2**
Influence of load factor: stall, flight envelope and structural limitations;		

Lift augmentation.		
8.4. FLIGHT STABILITY AND DYNAMICS		
Longitudinal, lateral and directional stability (active and passive).	**AG-08-04-B1-B2**	**2**

Module 9

HUMAN FACTORS

PART-66 Syllabuses	Cross-reference	Level
MODULE 9A. HUMAN FACTORS – A CATEGORY		
9.1. GENERAL		
The need to take human factors into account; Incidents attributable to human factors / human error; 'Murphy's' law.	**AG-09A-01-A**	**1**
9.2. HUMAN PERFORMANCE AND LIMITATIONS		
Vision; Hearing; Information processing; Attention and perception; Memory; Claustrophobia and physical access.	**AG-09A-02-A**	**1**
9.3. SOCIAL PSYCHOLOGY		
Responsibility: individual and group; Motivation and de-motivation; Peer pressure;	**AG-09A-03-A-B1-B2**	**1**

'Culture' issues; Team working; Management, Supervision and leadership.		
9.4. FACTORS AFFECTING PERFORMANCE		
Fitness / health; Stress: domestic and work related; Time pressure and deadlines; Workload: over load and underload; Sleep and fatigue, shiftwork; Alcohol, medication, drug abuse.	**AG-09A-04-A-B1-B2**	**2**
9.5. PHYSICAL ENVIRONMENT		
Noise and fumes; Illumination; Climate and temperature; Motion and vibration; Working environment.	**AG-09A-05-A-B1-B2**	**1**
9.6. TASKS		
Physical work; Repetitive tasks; Visual inspection; Complex systems.	**AG-09A-06-A-B1-B2**	**1**
9.7. COMMUNICATION		

Within and between teams; Work logging and recording; Keeping up to date, currency; Dissemination of information.	**AG-09A-07-A-B1-B2**	**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.	**AG-09A-08-A**	**1**
9.9. HAZARDS IN THE WORKPLACE		
Recognising and avoiding hazards; Dealing with emergencies.	**AG-09A-09-A**	**1**

Module 10

AVIATION LEGISLATION

PART-66 Syllabuses	Cross-reference	Level
MODULE 10. AVIATION LEGISLATION – A CATEGORY		
10.1. REGULATORY FRAMEWORK		
Role of International Civil Aviation Organisation; Role of the European Commission; Role of EASA; Role of the Member States and the National Aviation Authorities Regulation (EC) N° 1321/2014 and its implementing rules Regulations (EC) N° 216/2008 and (EC) N° 2042/2003. Relationships between the various Annexes (Parts) such as Part-21, Part-M, Part-145, Part-66, Part-147 and EO-OPS.	**AD-10-01-A-B1-B2-B3**	**1**
10.2. CERTIFYING STAFF - MAINTENANCE		
Detailed understanding of Part-66.	**AD-10-02-A-B1-B2-B3**	**2**
10.3. APPROVED MAINTENANCE ORGANIZATIONS		
Detailed understanding of Part-145 and Part-M Subpart F.	**AD-10-03-A-B1-B2-B3**	**2**
10.4. AIR OPERATIONS		
General understanding of EU-OPS;	**AD-10-04-A-B1-B2-B3**	**1**

Air Operators Certificates; Operators Responsibilities, in particular regarding continuing airworthiness and maintenance; Aircraft Maintenance Programme; MEL/CDL; Documents to be carried on board; Aircraft placarding (markings).		
10.5. CERTIFICATION OF AIRCRAFT, PARTS AND APPLIANCES		
(a) General	-	-
General understanding of Part-21 and EASA certification specifications CS-23, 25, 27, 29.		
(b) Documents	-	-
Certificate of Airworthiness; restricted certificates of airworthiness and permit to fly; Certificate of registration; Noise certificate; Weight schedule; Radio station licence and approval.		
10.6. CONTINUING AIRWORTHINESS		
Detailed understanding of Part-21 provisions related to continuing airworthiness; Detailed understanding of Part-M.	**AD-10-06-A-B1-B2-B3**	**2**
10.7. APPLICABLE NATIONAL AND INTERNATIONAL REQUIREMENTS FOR (IF NOT SUPERSEDED BY EU REQUIREMENTS).		
(a)		

Maintenance programmes, maintenance checks and inspections; Airworthiness directives; Service bulletins, manufacturers service information; Modifications and repairs; Maintenance documentation: maintenance manuals, structural repair manual, illustrated parts catalogue, etc. Master Minimum Equipment Lists, Minimum equipment lists, Dispatch Deviation lists.	**AD-10-07a-A**	**1**
(b)	**-**	**-**
Continuing airworthiness; Minimum equipment requirements – Test flights.		

Module 12

HELICOPTER AERODYNAMICS, STRUCTURES AND SYSTEMS

PART-66 Syllabuses	Cross-reference	Level
MODULE 12. HELICOPTER AERODYNAMICS, STRUCTURES AND SYSTEMS – A3 & A4 CATEGORIES		
12.1. THEORY OF FLIGHT – ROTARY WING AERODYNAMICS		
Terminology; Effects of gyroscopic precession; Torque reaction and directional control; Dissymmetry of lift, Blade tip stall; Translating tendency and its correction; Coriolis effect and compensation; Vortex ring state, power settling, overpitching; Auto-rotation; Ground effect.	**AG-12-01-A3-A4**	**1**
12.2. FLIGHT CONTROL SYSTEMS		
Cyclic control; Collective control; Swashplate;	**AG-12-02-A3-A4**	**2**
Yaw control: Anti-Torque Control, Tail rotor, bleed air;		

Main Rotor Head: Design and Operation features; Blade Dampers: Function and construction; Rotor Blades: Main and tail rotor blade construction and attachment; Trim control, fixed and adjustable stabilisers; System operation: manual, hydraulic, electrical and fly-by-wire; Artificial feel; Balancing and rigging.		
12.3. BLADE TRACKING AND VIBRATION ANALYSIS		
Rotor alignment; Main and tail rotor tracking; Static and dynamic balancing; Vibration types, vibration reduction methods; Ground resonance.	**AG-12-03-A3-A4**	**1**
12.4. TRANSMISSION		
Gear boxes, main and tail rotors; Clutches, free wheel units and rotor brake; Tail rotor drive shafts, flexible couplings, bearings, vibration dampers and bearing hangers.	**AG-12-04-A3-A4**	**1**
12.5. AIRFRAME STRUCTURES		
(a)	**AG-12-05a-A3-A4-B1**	**2**
Airworthiness requirements for structural strength;		
Structural classification, primary, secondary and tertiary; Fail safe, safe life, damage tolerance concepts;		

Zonal and station identification systems; Stress, strain, bending, compression, shear, torsion, tension, hoop stress, fatigue; Drains and ventilation provisions; System installation provisions; Lightning strike protection provision.		
(b)	**AG-12-05b-A3-A4**	**1**
Construction methods of: stressed skin fuselage, formers, stringers, longerons, bulkheads, frames, doublers, struts, ties, beams, floor structures, reinforcement, methods of skinning and anti-corrosive protection; Pylon, stabiliser and undercarriage attachments; Seat installation; Doors: construction, mechanisms, operation and safety devices; Windows and windscreen construction; Fuel storage; Firewalls; Engine mounts; Structure assembly techniques: riveting, bolting, bonding; Methods of surface protection, such as chromating, anodising, painting; Surface cleaning; Airframe symmetry: methods of alignment and symmetry checks.		
12.6. AIR CONDITIONING (ATA 21)		
12.6.1. Air Supply	**AG-12-06-01-A3-A4**	**1**
Sources of air supply including engine bleed and ground cart.		

12.6.2. Air Conditioning	**AG-12-06-02-A3-A4**	**1**
Air conditioning systems; Distribution systems; Flow and temperature control systems; Protection and warning devices.		
12.7. INSTRUMENTS – AVIONIC SYSTEMS		
12.7.1. Instrument Systems (ATA 31)	**AG-12-07-01-B1**	**2**
Pitot static: altimeter, air speed indicator, vertical speed indicator; Gyroscopic: artificial horizon, attitude director, direction indicator, horizontal situation indicator, turn and slip indicator, turn coordinator; Compasses: direct reading, remote reading; Vibration indicating systems — HUMS; Glass cockpit; Other aircraft system indication.		
12.7.2. Avionic Systems (ATA 31)	**AG-12-07-02-A3-A4-B1**	**1**
Fundamentals of system layouts and operation of: ▪ Auto Flight (ATA 22); ▪ Communications (ATA 23); ▪ Navigation Systems (ATA 34).		
12.8. ELECTRICAL POWER (ATA 24)		
Batteries Installation and Operation; DC power generation, AC power generation;	**AG-12-08-A3-A4**	**1**

Emergency power generation; Voltage regulation, Circuit protection. Power distribution; Inverters, transformers, rectifiers; External/Ground power.		
12.9. EQUIPMENT AND FURNISHINGS (ATA 25)		
(a)	**AG-12-09a-A3-A4-B1**	**2**
Emergency equipment requirements; Seats, harnesses and belts; Lifting systems.		
(b)	**AG-12-09a-A3-A4-B1**	**1**
Emergency flotation systems; Cabin lay-out, cargo retention; Equipment lay-out; Cabin furnishing installation.		
12.10. FIRE PROTECTION (ATA 26)		
Fire and smoke detection and warning systems; Fire extinguishing systems;	**AG-12-10-A3-A4**	**1**
System tests.		
12.11. FUEL SYSTEMS (ATA 28)		
System lay-out;	**AG-12-11-A3-A4**	**1**

Fuel tanks; Supply systems; Dumping, venting and draining; Cross-feed and transfer; Indications and warnings; Refuelling and defuelling.		
12.12. 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.	**AG-12-12-A3-A4**	**1**
12.13. ICE AND RAIN PROTECTION (ATA 30)		
Ice formation, classification and detection; Anti-icing and De-icing systems: electrical, hot air and chemical; Rain repellent and removal; Probe and drain heating; Wiper system.	**AG-12-13-A3-A4**	**1**

12.14. LANDING GEARS (ATA 32)		
Construction, shock absorbing; Extension and retraction systems: normal and emergency; Indications and warning; Wheels, Tyres, brakes; Steering; Air-ground sensing; Skids, floats.	**AG-12-14-A3-A4**	**2**
12.15. LIGHTS (ATA 33)		
External: navigation, landing, taxiing, ice; Internal: cabin, cockpit, cargo; Emergency.	**AG-12-15-A3-A4**	**2**
12.16. PNEUMATIC/VACUUM (ATA 36)		
System lay-out; Sources: engine/APU, compressors, reservoirs, ground supply; Pressure control; Distribution;	**AG-12-16-A3-A4**	**1**
Indications and warnings; Interfaces with other systems.		
12.17. INTEGRATED MODULAR AVIONICS (ATA 42)		
Functions that may be typically integrated in the Integrated Modular Avionic (IMA) modules are, among others:	**AG-12-17-A3-A4**	**1**

▪ 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,		
Brake temperature monitoring, etc. Core system; Network components.		
12.18. ON BOARD MAINTENANCE (ATA 45)		
Central maintenance computers; Data loading system; Electronic library system; Printing; Structure monitoring (damage tolerance monitoring).	**AG-12-18-A3-A4**	**1**

12.19. INFORMATION SYSTEMS (ATA 46)		
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.	**AG-12-19-A3-A4**	**1**

Module 16

PISTON ENGINE

PART-66 Syllabuses	Cross-reference	Level
MODULE 16. PISTON ENGINE – A2 & A4 CATEGORIES		
16.1. FUNDAMENTALS		
Mechanical, thermal and volumetric efficiencies; Operating principles: 2 stroke, 4 stroke, Otto and Diesel; Piston displacement and compression ratio; Engine configuration and firing order.	**AG-16-01-A2-A4**	**1**
16.2. ENGINE PERFORMANCE		
Power calculation and measurement; Factors affecting engine power; Mixtures/leaning, pre-ignition.	**AG-16-02-A2-A4**	**1**
16.3. ENGINE CONSTRUCTION		
Crank case, crank shaft, cam shafts, sumps; Accessory gearbox; Cylinder and piston assemblies; Connecting rods, inlet and exhaust manifolds; Valve mechanisms;	**AG-15-03-A2-A4**	**1**

Propeller reduction gearboxes.		
16.4. ENGINE FUEL SYSTEMS		
16.4.1. Carburettors		
Types, construction and principles of operation; Icing and heating.	**AG-16-04-01- A2-A4**	**1**
16.4.2. Fuel injection systems		
Types, construction and principles of operation.	**AG-16-04-02- A2-A4**	**1**
16.4.3. Electronic engine control		
Operation of engine control and fuel metering systems including electronic engine control (FADEC); Systems lay-out and components.	**AG-16-04-03- A2-A4**	**1**
16.5. STARTING AND IGNITION YSTEMS		
Starting systems, pre-heat systems; Magneto types, construction and principles of operation; Ignition harnesses, spark plugs; Low and high tension systems.	**AG-16-05- A2-A4**	**1**
16.6. INDUCTION, EXHAUST AND COOLING SYSTEMS		
Construction and operation of: induction systems including alternate air systems; Exhaust systems, engine cooling systems — air and liquid.	**AG-16-06- A2-A4**	**1**
16.7. SUPERCHARGING/TURBOCHARGING		
Principles and purpose of supercharging and its effects on engine parameters;	**AG-16-07- A2-A4**	**1**

Construction and operation of supercharging/turbocharging systems; System terminology; Control systems; System protection..		
16.8. LUBRICNTS AND FUELS		
Properties and specifications; Fuel additives; Safety precautions.	**AG-16-08- A2-A4**	**1**
16.9. LUBRICATION SYSTEMS		
System operation/lay-out and components.	**AG-16-09- A2-A4**	**1**
16.10. ENGINE INDICATION SYSTEMS		
Engine speed; Cylinder head temperature; Coolant temperature; Oil pressure and temperature; Exhaust Gas Temperature; Fuel pressure and flow; Manifold pressure.	**AG-16-10- A2-A4**	**1**
16.11. POWERPLANT INSTLLATION		
Configuration of firewalls, cowlings, acoustic panels, engine mounts, anti-vibration mounts, hoses, pipes, feeders, connectors, wiring looms, control cables and rods, lifting points and drains.	**AG-16-11- A2-A4**	**1**
16.12. ENGINE MONITORING AND GROUND OPERATIONS		

Procedures for starting and ground run-up; Interpretation of engine power output and parameters; Inspection of engine and components: criteria, tolerances, and data specified by engine manufacturer.	**AG-16-12- A2-A4**	**1**
16.13. ENGINE STORAGE AND PRESERVATION		
Preservation and depreservation for the engine and accessories/systems.	**AG-16-13- A2-A4**	**-**

B1 CATEGORIES

B1.1 CATEGORY

Module 1

MATHEMATICS

PART-66 Syllabuses	Cross-reference	Level
MODULE 1. MATHEMATICS – B1, B2 & B3 CATEGORIES		
1.1. ARITHMETIC		
Arithmetical terms and signs, Methods of multiplication and division, Fractions and decimals, Factors and multiples, Weights, measures and conversion factors, Ratio and proportion, Averages and percentages, Areas and volumes, squares, cubes, Square and cube roots.	**AG-01-01-B1-B2-B3**	**2**
1.2. ALGEBRA		
(a)	**AG-01-02a-B1-B2-B3**	**2**
Evaluating simple algebraic expressions, addition, subtraction, multiplication and division, use of brackets, simple algebraic fractions.		
(b)	**AG-01-02b-A-B1-B2-B3**	**1**

Linear equations and their solutions, Indices and powers, negative and fractional indices, Binary and other applicable numbering systems, Simultaneous equations, Second degree equations with one unknown, Logarithms.		
1.3. GEOMETRY		
(a)	**AG-01-3a-B1-B2-B3**	**1**
Simple geometrical constructions.		
(b)	**AG-01-03b-A-B1-B2-B3**	**2**
Graphical representation; nature and uses of graphs, Graphs of equations/functions.		
(c)	**AG-01-3c-B1-B2-B3**	**1**
Simple trigonometry; trigonometrical relationships, use of tables and rectangular and polar coordinates.		
	-	**-**

Module 2

PHYSICS

PART-66 Syllabuses	Cross-reference	Level
MODULE 2. PHYSICS – B1 CATEGORY		
2.1. MATTER		
Nature of matter: the chemical elements, structure of atoms, molecules; Chemical compounds. States: solid, liquid and gaseous; Changes between states.	**AG-02-01-A-B1-B2-B3**	**1**
2.2. MECHANICS		
2.2.1. Statics	**AG-02-02-01-B1**	**2**
Forces, moments and couples, representation as vectors; Centre of gravity. Elements of theory of stress, strain and elasticity: tension, compression, shear and torsion; Nature and properties of solid, fluid and gas; Pressure and buoyancy in liquids (barometers).		
2.2.2. Kinetics	**AG-02-02-02-B1**	**2**
Linear movement: uniform motion in a straight line, motion under constant acceleration (motion under gravity) ;		

Rotational movement: uniform circular motion (centrifugal/centripetal forces); Periodic motion: pendular movement; Simple theory of vibration, harmonics and resonance; Velocity ratio mechanical advantage and efficiency.		
2.2.3. Dynamics		
(a) Mass	**AG-02-02-03a-B1**	**2**
Mass, force, inertia, work, power, energy (potential, kinetic and total energy), heat, efficiency.		
(b) Momentum, conservation of momentum	**AG-02-02-03b-B1-B2**	**2**
Momentum, conservation of momentum; Impulse; Gyroscopic principles. Friction: nature and effects, coefficient of friction (rolling resistance).		
2.2.4. Fluid dynamics		
(a)	**AG-02-02-04a-A-B1-B2-B3**	**2**
Specific gravity and density		
(b)	**AG-02-02-04b-B1**	**2**
Viscosity, fluid resistance, effects of streamlining; Effects of compressibility on fluids ; Static, dynamic and total pressure: Bernoulli's Theorem, Venturi		
2.3. THERMODYNAMICS		

(a)	**AG-02-03a-A-B1-B2-B3**	**2**
Temperature: thermometers and temperature scales: Celsius, Fahrenheit and Kelvin. Heat definition.		
(b)	**AG-02-03b-B1-B2**	**2**
Heat capacity, specific heat; Heat transfer: convection, radiation and conduction; Volumetric expansion; First and second law of thermodynamics; Isothermal, adiabatic expansion and compression, engine cycles, constant volume and constant pressure, refrigerators and heat pumps; Gases: ideal gases laws; specific heat at constant volume and constant pressure, work done by expanding gas; Latent heat of fusion and evaporation, thermal energy, heat of combustion.		
2.4. OPTICS (LIGHT)		
Nature of light; speed of light; Laws of reflection and refraction: reflection at plane surfaces, Reflection by spherical mirrors, refraction, lenses, fibre optics.	**AG-02-04-B1-B2**	**2**
2.5. WAVE MOTION AND SOUND		
Wave motion: mechanical waves, sinusoidal wave motion, Interference phenomena, standing waves; Sound: speed of sound, production of sound, intensity, Pitch and quality, Doppler effect.	**AG-02-05-B1-B2**	**2**
	-	**-**

Module 3

ELECTRICAL FUNDAMENTALS

PART-66 Syllabuses	Cross-reference	Level
MODULE 3. ELECTRICAL FUNDAMENTALS – B1 & B2 CATEGORIES		
3.1. ELECTRON THEORY		
Structure and distribution of electrical charges within: atoms, molecules, ions, compounds; Molecular structure of conductors, semiconductors and insulators.	**AG-03-01-A-B1-B2-B3**	**1**
3.2. STATIC ELECTRICITY AND CONDUCTION		
Static electricity and distribution of electrostatic charges; Electro static laws of attraction and repulsion; Units of charge, Coulomb's Law; Conduction of electricity in solids, liquids, gases and vacuum.	**AG-03-02-B1-B2**	**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.	**AG-03-03- B1-B2**	**2**
3.4. GENERATION OF ELECTRICITY		
Production of electricity by the following methods: light, heat, friction, pressure, chemical action, magnetism and motion.	**AG-03-04-A-B1-B2-B3**	**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 of thermocouples; Operation of photo-cells.	**AG-03-05-B1-B2-B3**	**2**
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.	**AG-03-06-B1-B2**	**2**
3.7. RESISTANCE/RESISTOR		
(a)	**AG-03-07a-B1-B2**	**2**
Resistance and affecting factors Specific resistance; Resistor colour 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.		
(b)	**AG-03-07b-B1-B2**	**1**
Positive and negative temperature coefficient conductance		

Fixed resistors, stability, tolerance and limitations, methods of construction; Variable resistors, thermistors, voltage dependent resistors; construction of potentiometers and rheostats; Construction of Wheatstone Bridge.		
3.8. POWER		
Power, work and energy (kinetic and potential); Dissipation of power by a resistor; Power formula; Calculations involving power, work and energy.	**AG-03-08-B1-B2**	**2**
3.9. CAPACITANCE/CAPACITOR		
Operation and function of a capacitor; Factors affecting capacitance area of plates, distance between plates, number of plates, dielectric and dielectric constant, working voltage, voltage rating; Capacitor types, Construction and function; Capacitor colour coding; Calculations of capacitance and voltage in series and parallel circuits; Exponential charge and discharge of a capacitor, time constants; Testing of capacitors.	**AG-03-09-B1-B2**	**2**
3.10. MAGNETISM		
(a)	**AG-03-10a-B1-B2**	**2**
Theory of magnetism		
Properties of a magnet;		

Action of a magnet suspended in the Earth's magnetic field; Magnetisation and demagnetisation; Magnetic shielding; Various types of magnetic material; Electromagnets construction and principles of operation; Hand clasp rules to determine: magnetic field around current carrying conductor.		
(b)	**AG-03-10b-B1-B2**	**2**
Magnetomotive force, field strength, magnetic flux density, permeability, hysteresis loop, retentivity, coercive force reluctance, saturation point, eddy currents; Precautions for care and storage of magnets.		
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, 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; 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;	**AG-03-11-B1-B2**	**2**
Principle uses of inductors.		

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.	**AG-03-12-B1-B2**	**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 the values, in relation voltage, current and power; Triangular/Square waves; Single/3 phase principles.	**AG-03-13-B1-B2**	**2**
3.14. RESISTIVE (R), CAPACITIVE (C) AND INDUCTIVE (L) CIRCUITS		
Phase relation ship of voltage and current in L, C and R circuits, parallel, series and series parallel; Impedance, phase angle, power factor and current calculations; True power, apparent power and reactive power calculations.	**AG-03-14-B1-B2**	**2**
3.15. TRANSFORMERS		
Transformer construction principles and operation; Transformer losses and methods for overcoming them;	**AG-03-15-B1-B2**	**2**
Transformer action under load and no-load conditions; Power transfer, efficiency, polarity markings;		

Calculation of line and phase voltages and currents; Primary and Secondary current, voltage, turns ratio, power, efficiency; Auto transformers.		
3.16. FILTERS		
Operation, application and uses of the following filters: Low pass, high pass, band pass, band stop.	**AG-03-16-B1-B2**	**1**
3.17. AC GENERATORS		
Rotation of loop in a magnetic field and waveform produced; Operation and construction of 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.	**AG-03-17-B1-B2**	**2**
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.	**AG-03-18-B1-B2**	**2**

Module 4

ELECTRONIC FUNDAMENTALS

PART-66 Syllabuses	Cross-reference	Level
MODULE 4. ELECTRONIC FUNDAMENTALS – B1 CATEGORY		
4.1. SEMICONDUCTORS		
4.1.1. Diodes		
(a)	**AG-04-01-01a-B1-B2**	**2**
Diode symbols; Diode characteristics and properties; Diodes in series and parallel; Main characteristics and use of silicon controlled rectifiers (thyristors), light emitting diode, photo conductive diode, varistor, rectifier diodes; Functional testing of diodes.		
(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;		
Diode parameters: peak inverse voltage, maximum forward current, temperature, frequency, leakage		

current, power dissipation; 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, Schottky diode, photo conductive diode, varactor diode, varistor, rectifier diodes, and Zener diode.		
4.1.2. Transistors		
(a)	**AG-04-01-02a-B1-B3**	**1**
Transistor symbols; Component description and orientation; Transistor characteristics and properties.		
(b)	**-**	**-**
Construction and operation of PNP and NPN transistors; 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 stabilisation; Multistage circuit principles: cascades, push-pull, oscillators, multivibrators, flip-flop circuits.		
4.1.3. Integrated circuits		
(a)	**AG-04-01-03a-B1-B3**	**1**
Description and operation of logic circuits and linear circuits/operational amplifiers.		
(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.		
4.2. PRINTED CIRCUIT BOARDS		
Description and use of printed circuit boards.	**AG-04-02-B1**	**1**
4.3. SERVOMECHANISMS		
(a)	**AG-04-03-B1**	**1**
Understanding of the following terms: Open and closed loop systems, feedback, follow up, analogue transducers; Principles of operation and use of following synchro system components/features: resolvers, differential, control and torque, transformers, inductance and capacitance transmitters.		
(b)	**-**	**-**
Understanding of the following terms: Open and closed loop, follow-up, servomechanism, analogue, transducer, null, damping, feedback, dead band; 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.		

Module 5

DIGITAL TECHNIQUES / ELECTRONIC INSTRUMENT SYSTEMS

PART-66 Syllabuses	Cross-reference	Level
MODULE 5. DIGITAL TECHNIQUES – B1.1 & B1.3 CATEGORIES		
5.1. ELECTRONIC INSTRUMENT SYSTEMS		
Typical systems arrangements and cockpit layout of electronic instrument systems.	**AG-05-01-B11-B13**	**2**
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.	**AG-05-02-B11-B13**	**1**
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.	**AG-05-03-B11-B13**	**1**
5.4. DATA BUSES		
Operation of data buses in aircraft systems including knowledge of ARINC and other specifications; Aircraft network/Ethernet.	**AG-05-04-B11-B13-B2**	**2**
5.5. LOGIC CIRCUITS		
(a)	**AG-05-05a-B11-B13-B2**	**2**
Identification of common logic gate symbols, tables and equivalent circuits;		

Applications used for aircraft systems, schematic diagrams.		
(b)	**-**	**-**
Interpretation of logic diagrams.		
5.6. BASIC COMPUTER STRUCTURE		
(a)	**AG-05-06a-B11-B13**	**2**
Computer terminology (including bit, byte, software, hard ware, CPU, IC, and various memory devices such as RAM, ROM, PROM); Computer technology (as applied in aircraft systems).		
(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.		
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.	**-**	**-**
5.8. INTEGRATED CIRCUITS		
Operation and use of encoders and decoders;	**-**	**-**

Function of encoder types; Uses of medium, large and very large scale integration.		
5.9. MULTIPLEXING		
Operation, application and identification in logic diagrams of multiplexers and demultiplexers.	**-**	**-**
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.	**AG-05-10-B11-B13**	**1**
5.11. ELECTRONIC DISPLAYS		
Principles of operation of common types of displays used in modern aircraft, including : cathode ray tubes, light emitting diodes, liquid crystal display.	**AG-05-11-B11-B13-B2**	**2**
5.12. ELECTRONIC SENSITIVE DEVICES		
Special handling of components sensitive to electrostatic discharges; Awareness of risks and possible damage, component and personnel anti-static protection devices.	**AG-05-12-B11-B13-B2**	**2**
5.13. SOFTWARE MANAGEMENT CONTROL		
Awareness of restrictions, airworthiness requirements and possible catastrophic effects of unapproved changes to software programmes.	**AG-05-13-B11-B13-B2**	**2**
5.14. ELECTROMAGNETIC ENVIRONMENT		
Influence of the following phenomena on maintenance practices for electronic system: ▪ EMC - ElectroMagnetic Compatibility;	**AG-05-14-B11-B13-B2**	**2**

▪ EMI - ElectroMagnetic Interference; ▪ HIRF- High Intensity Radiated Field; ▪ Lightning/lightning protection.		
5.15. TYPICAL ELECTRONIC/DIGITAL AIRCRAFT SYSTEM		
General arrangement of typical electronic / digital aircraft systems and associated BITE (Built In Test Equipment) testing such as: ▪ ACARS – ARINC Communication and Addressing and Reporting System; ▪ ECAM – Electronic Centralised Aircraft Monitoring; ▪ EFIS – Electronic Flight Instrument System; ▪ EICAS – Engine Indication and Crew Alerting System; ▪ FBW – Fly-By-Wire: ▪ FMS – Flight Management System; ▪ GPS – Global Positioning System; ▪ IRS – Inertial Reference System; ▪ TCAS – Traffic Alert Collision Avoidance System; ▪ IMA – Integrated Modular Avionics; ▪ Cabin systems; ▪ Information systems.	**AG-05-15-B11-B13-B2**	**2**

Module 6

MATERIALS AND HARDWARE

PART-66 Syllabuses	Cross-reference	Level
MODULE 6. MATERIALS AND HARDWARE – B1 CATEGORY		
6.1. AIRCRAFT MATERIALS - FERROUS		
(a)	**AG-06-01a-B1-B3**	**2**
Characteristics, properties and identification of common alloy steels used in aircraft; Heat treatment and application of alloy steels.		
(b)	**AG-06-01b-B1-B2-B3**	**1**
Testing of ferrous materials for hardness, tensile strength, fatigue strength and impact resistance.		
6.2. AIRCRAFT MATERIALS – NON-FERROUS		
(a)	**AG-06-02a-B1-B3**	**2**
Characteristics, properties and identification of common non-ferrous materials used in aircraft; Heat treatment and application of non-ferrous materials.		
(b)	**AG-06-02a-B1-B2-B3**	**1**
Testing of non-ferrous material for hardness, tensile strength, fatigue strength and impact resistance.		
6.3. AIRCRAFT MATERIALS – COMPOSITE AND NON-METALLIC		

6.3.1. Composite and non-metallic other than wood and fabric		
(a)	**AG-06-03-01a-B1-B2-B3**	**2**
Characteristics, properties and identification of common composite and non-metallic materials, other than wood, used in aircraft; Sealant and bonding agents.		
(b)	**AG-06-03-01b-B1-B3**	**2**
The detection of defects/deterioration in composite and non-metallic material. Repair of composite and non-metallic material.		
6.3.2. Wooden structures		
Construction methods of wooden airframe structures; Characteristics, properties and types of wood and glue used in aeroplanes; 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.	**AG-06-03-02-B1-B3**	**2**
6.3.3. Fabric covering		
Characteristics, properties and types of fabrics used in aeroplanes; Inspections methods for fabric; Types of defects in fabric; repair of fabric covering.	**AG-06-03-03-B1-B3**	**2**
6.4. CORROSION		
(a)	**AG-06-04a-A-B1-B2-B3**	**1**

Chemical fundamentals; Formation by, galvanic action process, microbiological, stress.		
(b)	**AG-06-04b-B1**	**3**
Types of corrosion and their identification; Causes of corrosion; Material types, susceptibility to corrosion.		
6.5. FASTENERS		
6.5.1. Screw threads	**AG-06-05-01-A-B1-B2-B3**	**2**
Screw nomenclature; Thread forms, dimension and tolerances for standard thread used in aircraft; Measuring screw threads		
6.5.2. Bolts, studs and screws	**AG-06-05-02-A-B1-B2-B3**	**2**
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.		
6.5.3. Locking devices	**AG-06-05-03-A-B1-B2-B3**	**2**
Tab and spring washers, locking plates, split pins, pal-nuts, wire locking, quick release fasteners, keys, circlips, cotter pins.		
6.5.4. Aircraft rivets	**AG-06-05-04-B1-B3**	**2**

Types of solid and blind rivets: specifications and identification; Heat treatment.		
6.6. PIPES AND UNIONS		
(a)	**AG-06-06a-A-B1-B2-B3**	**2**
Identification of, and types of rigid and flexible pipes and their connectors used in aircraft.		
(b)	**AG-06-06b-A-B1-B3**	**2**
Standard unions for aircraft hydraulic, fuel, oil, pneumatic and air system pipes.		
6.7. SPRINGS		
Types of springs, materials, characteristics and applications.	**AG-06-07-B1**	**2**
6.8. BEARINGS		
Purpose of bearings, loads, material, construction; Types of bearings and their application.	**AG-06-08-B1-B2**	**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.	**AG-06-09-B1-B2**	**2**
6.10. CONTROL CABLES		
Types of cables; End fittings, turnbuckles and compensation devices; Pulleys and cable system components;	**6.9. TRANSMISSIONS**	

Bowden cables; Aircraft flexible control systems.	**AG-06-10-B1-B3**	**2**
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.	**AG-06-11-B1-B2-B3**	**2**

Module 7

MAINTENANCE PRACTICES

PART-66 Syllabuses	Cross-reference	Level
MODULE 7A. MAINTENANCE PRACTICES – B1 CATEGORY		
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.	**AG-07A-01-A-B1-B2**	**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.	**AG-07A-02-A-B1-B2**	**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.	**AG-07A-03-A-B1-B2**	**3**
7.4. AVIONIC TEST EQUIPMENT		

Operation, function and use of avionic general test equipment.	**AG-07A-04-B1**	**2**
7.5. ENGINEERING DRAWINGS, DIAGRAMS AND STANDARDS		
Drawing types and diagrams, their symbols, dimensions, tolerances and projections; Identifying title block information; Microfilm, microfiche and computerised 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.	**AG-07A-05-B1-B2**	**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.	**AG-07A-06-B1**	**2**
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;	**AG-07A-07-B1-B2**	**3**
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; EWIS installations, inspection, repair, maintenance and cleanliness standards.		
7.8. RIVETING		
Riveted joints, rivet spacing and pitch; Tools used for riveting and dimpling; Inspection of riveted joints.	**AG-07A-08-B1**	**2**
7.9. PIPES AND HOSES		
Bending and belling / flaring aircraft pipes; Inspection and testing of aircraft pipes and hoses; Installation and clamping of pipes.	**AG-07A-09-B1**	2
7.10. SPRINGS		
Inspection and testing of springs.	**AG-07A-10-B1**	**2**
7.11. BEARINGS		
Testing, cleaning and inspection of bearings; Lubrication requirements of bearings; Defects in bearings and their causes.	**AG-07A-11-B1**	**2**
7.12. TRANSMISSIONS		
Inspection of gears, backlash; Inspection of belts and pulleys, chains and sprockets;	**AG-07A-12-B1**	**2**
Inspection of screw jacks, lever devices, push-pull rod systems.		

7.13. CONTROL CABLES		
Swaging of end fittings; Inspection and testing of control cables; Bowden cables; aircraft flexible control systems.	**AG-07A-13-B1**	**2**
7.14. MATERIAL HANDLING		
7.14.1. Sheet metal	**AG-07A-14a-B1**	**2**
Marking out and calculation of bend allowance; Sheet metal working, including bending and forming; Inspection of sheet metal work.		
7.14.2. Composite and non-metallic	**AG-07A-14b-B1**	**2**
Bonding practices; Environmental conditions Inspection methods		
7.15. WELDING, BRAZING, SOLDERING AND BONDING		
(a)	**AG-07A-15a-B1-B2**	**2**
Soldering methods; inspection of soldered joints.		
(b)	**AG-07A-15b-B1**	**2**
Welding and brazing methods; Inspection of welded and brazed joints;		
Bonding methods and inspection of bonded joints.		

7.16. AIRCRAFT WEIGHT AND BALANCE		
(a)	**AG-07A-16a-B1-B2**	**2**
Centre of gravity/Balance limits calculation: use of relevant documents.		
(b)	**AG-07A-16b-B1**	**2**
Preparation of aircraft for weighing; Aircraft weighing.		
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 / de-fuelling procedures; De-icing / anti-icing procedures; Electrical, hydraulic and pneumatic ground supplies; Effects of environmental conditions on aircraft handling and operation.	**AG-07A-17-A-B1-B2**	**2**
7.18. DISASSEMBLY, INSPECTION, REPAIR, AND ASSEMBLY TECHNIQUES		
(a)		
Types of defects and visual inspection techniques. Corrosion removal, assessment and re-protection.	**AG-07A-18a-B1-B2**	**3**
(b)	**AG-07A-18b-B1**	**2**
General repair methods, Structural Repair Manual;		

Ageing, fatigue and corrosion control programmes.		
(c)	**AG-07A-18c-B1**	**2**
Non destructive inspection techniques including, penetrant, radiographic, eddy current, ultrasonic and boroscope methods.		
(d)	**AG-07A-18d-A-B1-B2**	**2**
Disassembly and re-assembly techniques.		
(e)	**AG-07A-18e-B1-B2**	**2**
Trouble shooting techniques.		
7.19. ABNORMAL EVENTS		
(a)	**AG-07A-19a-A-B1-B2**	**2**
Inspections following lightning strikes and HIRF penetration.		
(b)	**AG-07A-19b-A-B1**	**2**
Inspections following abnormal events such as heavy landings and flight through turbulence.		
7.20. MAINTENANCE PROCEDURES		
Maintenance planning; Modification procedures; Stores procedures; Certification / release procedures;	**AG-07A-20-B1-B2**	**2**
Interface with aircraft operation; Maintenance Inspection / Quality Control / Quality Assurance ;		

Additional maintenance procedures. Control of life limited components.		

Module 8

BASIC AERODYNAMICS

PART-66 Syllabuses	Cross-reference	Level
MODULE 8. BASIC AERODYNAMICS – B1 & B2 CATEGORIES		
8.1. PHYSICS OF THE ATMOSPHERE		
International Standard Atmosphere (ISA), application to aerodynamics.	**AG-08-01-A-B3**	**1**
8.2. AERODYNAMICS		
Airflow around a body; Boundary layer, laminar and turbulent flow, free stream flow, relative airflow, upwash 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.	**AG-08-02-A-B3**	**1**
8.3. THEORY OF FLIGHT		
Relation ship between lift, weight, thrust and drag; Glide ratio; Steady stable flights, performance; Theory of the turn;	**AG-08-03-A-B3**	**1**
Influence of load factor: stall, flight envelope and structural limitations;		

Lift augmentation.		
8.4. FLIGHT STABILITY AND DYNAMICS		
Longitudinal, lateral and directional stability (active and passive).	**AG-08-04-A-B3**	**1**

Module 9

HUMAN FACTORS

PART-66 Syllabuses	Cross-reference	Level
MODULE 9A. HUMAN FACTORS – B1 & B2 CATEGORIES		
9.1. GENERAL		
The need to take human factors into account; Incidents attributable to human factors / human error; 'Murphy's' law.	**AG-09A-01-B1-B2**	**2**
9.2. HUMAN PERFORMANCE AND LIMITATIONS		
Vision; Hearing; Information processing; Attention and perception; Memory; Claustrophobia and physical access.	**AG-09A-02-B1-B2**	**2**
9.3. SOCIAL PSYCHOLOGY		
Responsibility: individual and group; Motivation and de-motivation;	**AG-09A-03-A-B1-B2**	**1**
Peer pressure;		

'Culture' issues; Team working; Management, Supervision and leadership.		
9.4. FACTORS AFFECTING PERFORMANCE		
Fitness / health; Stress: domestic and work related; Time pressure and deadlines; Workload: over load and underload; Sleep and fatigue, shiftwork; Alcohol, medication, drug abuse.	**AG-09A-04-A-B1-B2**	**2**
9.5. PHYSICAL ENVIRONMENT		
Noise and fumes; Illumination; Climate and temperature; Motion and vibration; Working environment.	**AG-09A-05-A-B1-B2**	**1**
9.6. TASKS		
Physical work; Repetitive tasks; Visual inspection; Complex systems.	**AG-09A-06-A-B1-B2**	**1**
9.7. COMMUNICATION		

Within and between teams; Work logging and recording; Keeping up to date, currency; Dissemination of information.	**AG-09A-07-A-B1-B2**	**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.	**AG-09A-08-B1-B2**	**2**
9.9. HAZARDS IN THE WORKPLACE		
Recognising and avoiding hazards; Dealing with emergencies.	**AG-09A-09-B1-B2**	**2**

Module 10

AVIATION LEGISLATION

PART-66 Syllabuses	Cross-reference	Level
MODULE 10. AVIATION LEGISLATION – B1, B2 & B3 CATEGORIES		
10.1. REGULATORY FRAMEWORK		
Role of International Civil Aviation Organisation; Role of the European Commission; Role of EASA; Role of the Member States and the National Aviation Authorities Regulation (EC) N° 1321/2014 and its implementing rules Regulations (EC) N° 216/2008 and (EC) N° 2042/2003. Relationships between the various Annexes (Parts) such as Part-21, Part-M, Part-145, Part-66, Part-147 and EO-OPS.	**AG-10-01-A-B1-B2-B3**	**1**
10.2. CERTIFYING STAFF - MAINTENANCE		
Detailed understanding of Part-66.	**AG-10-02-A-B1-B2-B3**	**2**
10.3. APPROVED MAINTENANCE ORGANIZATIONS		
Detailed understanding of Part-145 and Part-M Subpart F.	**AG-10-03-A-B1-B2-B3**	**2**
10.4. AIR OPERATIONS		
General understanding of EU-OPS;	**AG-10-04-A-B1-B2-B3**	**1**

Air Operators Certificates; Operators Responsibilities, in particular regarding continuing airworthiness and maintenance; Aircraft Maintenance Programme; MEL/CDL; Documents to be carried on board; Aircraft placarding (markings).		
10.5. CERTIFICATION OF AIRCRAFT, PARTS AND APPLIANCES		
(a) General	**AG-10-05a-B1-B2-B3**	**1**
General understanding of Part-21 and EASA certification specifications CS-23, 25, 27, 29.		
(b) Documents	**AG-10-05b-B1-B2-B3**	**2**
Certificate of Airworthiness; restricted certificates of airworthiness and permit to fly; Certificate of registration; Noise certificate; Weight schedule; Radio station licence and approval.		
10.6. CONTINUING AIRWORTHINESS		
Detailed understanding of Part-21 provisions related to continuing airworthiness; Detailed understanding of Part-M.	**AG-10-06-A-B1-B2-B3**	**2**
10.7. APPLICABLE NATIONAL AND INTERNATIONAL REQUIREMENTS FOR (IF NOT SUPERSEDED BY EU REQUIREMENTS).		
(a)	**AG-10-07a-B1-B2-B3**	**2**

Maintenance programmes, maintenance checks and inspections; Airworthiness directives; Service bulletins, manufacturers service information; Modifications and repairs; Maintenance documentation: maintenance manuals, structural repair manual, illustrated parts catalogue, etc. Master Minimum Equipment Lists, Minimum equipment lists, Dispatch Deviation lists.		
(b)	**AG-10-07b-B1-B2-B3**	**1**
Continuing airworthiness; Minimum equipment requirements – Test flights.		

Module 11

TURBINE AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS

PART-66 Syllabuses	Cross-reference	Level
MODULE 11A. TURBINE AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS – B1.1 CATEGORY		
11A.1. THEORY OF FLIGHT		
11A.1.1. Aeroplane Aerodynamics and Flight controls	**AG-11A-01-01-B11**	**2**
Operation and effect of: ▪ roll control: ailerons and spoilers; ▪ pitch control: elevators, stabilators, variable incidence stabilisers and canards; ▪ yaw control, rudder limiters; Control using elevons, ruddervators; High lift devices, slots, slats, flaps, flaperons; Drag inducing devices, spoilers, lift dumpers, speed brakes; Effects of wing fences, saw tooth leading edges; Boundary layer control using, vortex generators, stall wedges or leading edge devices; Operation and effect of trim tabs, balance and antibalance (leading) tabs, servo tabs, spring tabs, mass balance, control surface bias, aerodynamic balance panels.		
11A.1.2. High Speed flight	**AG-11A-01-02-B11**	**2**

Speed of sound, subsonic flight, transonic flight, supersonic flight, Mach number, critical Mach number, compressibility buffet, shock wave, aerodynamic heating, area rule; Factors affecting airflow in engine intakes of high speed aircraft; Effects of sweepback on critical Mach number.		
11A.2. AIRFRAME STRUCTURES – GENERAL CONCEPTS		
(a)	**AG-11A-02a-A1-B11**	**2**
Airworthiness requirements for structural strength; Structural classification, primary, secondary and tertiary; Fail safe, safe life, damage tolerance concepts; Zonal and station identification systems; Stress, strain, bending, compression, shear, torsion, tension, hoop stress, fatigue; Drains and ventilation provisions; System installation provisions; Lightning strike protection provision; Aircraft bonding.		
(b)	**AG-11A-02A1-B11**	**2**
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; Structure assembly techniques: riveting, bolting, bonding Methods of surface protection, such as chromating, anodising, painting ; Surface cleaning; Airframe symmetry: methods of alignment and symmetry checks.		

11A.3. AIRFRAME STRUCTURES – AEROPLANES		
11A.3.1. Fuselage (ATA 52/53/56)	**AG-11A-03-01-B11**	**2**
Construction and pressurisation sealing; Wing, stabiliser, pylon and under carriage attachments; Seat installation and cargo loading system; Doors and emergency exits : construction, mechanisms, operation and safety devices ; Windows and windscreen construction and mechanisms.		
11A.3.2. Wings (ATA 57)	**AG-11A-03-02-B11**	**2**
Construction; Fuel storage; Landing gear, pylon, control surface and high lift/drag attachments.		
11A.3.3. Stabilizers (ATA 55)	**AG-11A-03-03-B11**	**2**
Construction; Control surface attachment.		
11A.3.4. Flight Control Surfaces (ATA 55/57)	**AG-11A-03-04-B11**	**2**
Construction and attachment; Balancing – mass and aerodynamic.		
11A.3.5. Nacelles/Pylons (ATA 54)	**AG-11A-03-05-B11**	**2**
Construction; Firewalls;		

Engine mounts.		
11A.4. AIR CONDITIONING AND CABIN PRESSURIZATION (ATA 21)		
11A.4.1. Air supply	**AG-11A-04-01-B11**	**2**
Sources of air supply including engine bleed, APU and ground cart.		
11A.4.2. Air conditioning	**AG-11A-04-02-B11**	**3**
Air conditioning systems; Air cycle and vapour cycle machines; Distribution systems; Flow, temperature and humidity control system.		
11A.4.3. Pressurization	**AG-11A-04-03-B11**	**3**
Pressurisation systems; Control and indication including control and safety valves; Cabin pressure controllers.		
11A.4.4. Safety and warning devices	**AG-11A-04-04-B11**	**3**
Protection and warning devices.		
11A.5. INSTRUMENT/AVIONIC SYSTEMS		
11A.5.1. Instrument Systems (ATA 31)	**AG-11A-05-01-B11**	**2**
Pitot static: altimeter, air speed indicator, vertical speed indicator; Gyroscopic: artificial horizon, attitude director, direction indicator, horizontal situation indicator, turn and slip indicator, turn coordinator;		

Compasses: direct reading, remote reading; Angle of attack indication, stall warning systems; Glass cockpit; Other aircraft system indication.		
11A.5.2. Avionic Systems	**AG-11A-05-01-A1-B11**	**1**
Fundamentals of system lay-outs and operation of: ▪ Auto Flight (ATA 22); ▪ Communications (ATA 23); ▪ Navigation Systems (ATA 34).		
11A.6. ELECTRICAL POWER		
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	**AG-11A-06-B11**	**3**
11A.7. EQUIPMENT AND FURNISHINGS (ATA 25)		
(a)	**AG-11A-07a-A1-B11**	**2**
Emergency equipment requirements;		

Seats, harnesses and belts.		
(b)	**AG-11A-07a-A1-B11**	**1**
Cabin lay-out; Equipment lay-out; Cabin Furnishing Installation; Cabin entertainment equipment; Galley installation; Cargo handling and retention equipment; Airstairs.		
11A.8. FIRE PROTECTION (ATA 26)		
(a)	**AG-11A-08A1-B11**	**3**
Fire and smoke detection and warning systems; Fire extinguishing systems; System tests.		
(b)	**AG-11A-08b-A1-B11**	**1**
Portable fire extinguisher.		
11A.9. FLIGHT CONTROLS (ATA 27)		
Primary controls: aileron, elevator, rudder, spoiler; Trim control; Active load control;	**AG-11A-09-B11**	**3**
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.		
11A.10. FUEL SYSTEMS (ATA 28)		
System lay-out; Fuel tanks; Supply systems; Dumping, venting and draining; Cross-feed and transfer; Indications and warnings; Refuelling and defuelling; Longitudinal balance fuel systems.	**AG-11A-10-B11**	**3**
11A.11. HYDRAULIC POWER (ATA 29)		
System lay-out; Hydraulic fluids; Hydraulic reservoirs and accumulators; Pressure generation: electric, mechanical, pneumatic; Emergency pressure generation; Filters; Pressure Control;	**AG-11A-11-B11**	**3**
Pressure Control;		

Power distribution; Indication and warning systems; Interface with other systems.		
11A.12. 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 and chemical ; Rain repellent; Probe and drain heating; Wiper systems.	**AG-11A-12-B11**	**3**
11A.13. 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.	**AG-11A-13-B11**	**3**
11A.14. LIGHTS (ATA 33)		
External: navigation, anti-collision, landing, taxiing, ice; Internal: cabin, cockpit, cargo;	**AG-11A-14-B11**	**3**
Emergency.		

11A.15. OXYGEN (ATA 35)		
System lay-out: ▪ cockpit, ▪ cabin; Sources, storage, charging and distribution; Supply regulation; Indications and warnings.	**AG-11A-15-B11**	**3**
11A.16. PNEUMATIC/VACUUM (ATA 36)		
System lay-out; Sources: ▪ engine / APU, ▪ compressors, ▪ reservoirs, ▪ ground supply; Pressure and vacuum pumps; Pressure control; Distribution; Indications and warnings; Interfaces with other systems.	**AG-11A-16-B11**	**3**
11A.17. WATER/WASTE (ATA 38)		
Water system lay-out, supply, distribution, servicing and draining; Toilet system lay-out, flushing and servicing; Corrosion aspects.	**AG-11A-17-B11**	**3**

11A.18. ON BOARD MAINTENANCE SYSTEMS (ATA 45)		
Central maintenance computers; Data loading system; Electronic library system; Printing; Structure monitoring (damage tolerance monitoring).	**AG-11A-18-B11**	**2**
11A.19. INTEGRATED MODULAR AVIONICS (ATA 42)		
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,	**AG-11A-19-B11**	**2**
▪ Braking control, ▪ Steering control, ▪ Landing gear extension and retraction,		

▪ Tyre pressure indication, ▪ Oleo pressure indication, ▪ Brake temperature monitoring, etc. Core system; Network components.		
11A.20. CABIN SYSTEMS (ATA 44)		
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 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;	**AG-11A-20-B11**	**2**
External Communication System; Cabin Mass Memory System; Cabin Monitoring System; Miscellaneous Cabin System.		

11A.21. INFORMATION SYSTEMS (ATA 46)		
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.	**AG-11A-21-B11**	**2**

Module 15

GAS TURBINE ENGINE

PART-66 Syllabuses	Cross-reference	Level
MODULE 15. GAS TURBINE ENGINE – B1.1 & B1.3 CATEGORIES		
15.1. FUNDAMENTALS		
Potential energy, kinetic energy, Newton's laws of motion, Brayton cycle; The relationship between force, work, power, energy, velocity, acceleration; Constructional arrangement and operation of turbojet, turbofan, turboshaft, turboprop.	**AG-15-01-B11-B13**	**2**
15.2. ENGINE PERFORMANCE		
Gross thrust, net thrust, choked nozzle thrust, thrust distribution, resultant thrust, thrust horsepower, equivalent shaft horsepower, specific fuel consumption; Engine efficiencies; By-pass ratio and engine pressure ratio; Pressure, temperature and velocity of the gas flow Engine ratings, static thrust, influence of speed, altitude and hot climate, flat rating, limitations.	**AG-15-02- B11-B13**	**2**
15.3. INLET		
Compressor inlet ducts; Effects of various inlet configurations;	**AG-15-03-A- B11-B13**	**2**
Ice protection.		

15.4. COMPRESSORS		
Axial and centrifugal types; Constructional features and operating principles and applications; Fan balancing; Operation; Causes and effects of compressors tall and surge; Methods of air flow control: bleed valves, variable inlet guide vanes, variable stator vanes, rotating stator blades; Compressor ratio.	**AG-15-04- B11-B13**	**2**
15.5. COMBUSTION SECTION		
Constructional features and principles of operation.	**AG-15-05- B11-B13**	**2**
15.6. TURBINE SECTION		
Operation and characteristics of different turbine blade types; Blade to disk attachment; Nozzle guide vanes; Causes and effects of turbine blade stress and creep.	**AG-15-06-A- B11-B13**	**2**
15.7. EXHAUST		
Constructional features and principles of operation; Convergent, divergent and variable area nozzles; Engine noise reduction;	**AG-15-07- B11-B13**	**2**
Thrust reversers.		

15.8. BEARINGS AND SEALS		
Constructional features and principles of operation.	**AG-15-08- B11-B13**	**2**
15.9. LUBRICANTS AND FUELS		
Properties and specifications; Fuel additives; Safety precautions.	**AG-15-09- B11-B13**	**2**
15.10. LUBRICATION SYSTEMS		
System operation / lay-out and components.	**AG-15-10- B11-B13**	**2**
15.11. FUEL SYSTEMS		
Operation of engine control and fuel metering systems including electronic engine control (FADEC); Systems lay-out and components.	**AG-15-11- B11-B13**	**2**
15.12. AIR SYSTEMS		
Operation of engine air distribution and anti-ice control systems, including internal cooling, sealing and external air services.	**AG-15-12- B11-B13**	**2**
15.13. STARTING AND IGNITION SYSTEMS		
Operation of engine start systems and components; Ignition systems and components; Maintenance safety requirements.	**AG-15-13- B11-B13**	**2**
15.14. ENGINE INDICATION SYSTEMS		
Exhaust gas temperature/ Interstage turbine temperature;	**AG-15-14- B11-B13**	**2**

Engine thrust Indication: ▪ engine pressure ratio, ▪ engine turbine discharge pressure or jet pipe pressure systems; Oil pressure and temperature; Fuel pressure and flow; Engine speed; Vibration measurement and indication; Torque; Power.		
15.15. POWER AUGMENTATION SYSTEMS		
Operation and applications; Water injection, water methanol; Afterburner systems.	**AG-15-15- B11-B13**	**2**
15.16. TURBO-PROP ENGINES		
Gas coupled / free turbine and gear coupled turbines; Reduction gears; Integrated engine and propeller controls; Overspeed safety devices.	**AG-15-16- B11-B13**	**2**
15.17. TURBO-SHAFT ENGINES		
Arrangements drive systems, reduction gearing, couplings, control systems.	**AG-15-17- B11-B13**	**2**
15.18. AUXILIARY POWER UNITS (APUs)		
Purpose, operation, protective systems.	**AG-15-18- B11-B13**	**2**

15.19. POWERPLANT INSTALLATION		
Configuration of firewalls, cowlings, acoustic panels, engine mounts, anti-vibration mounts, hoses, pipes, feeders, connectors, wiring looms, control cables and rods, lifting points and drains.	**AG-15-19- B11-B13**	**2**
15.20. FIRE PROTECTION SYSTEMS		
Operation of detection and extinguishing systems.	**AG-15-20- B11-B13**	**2**
15.21. ENGINE MONITORING AND GROUND INSTALLATION		
Procedures for starting and ground run-up; Interpretation of engine power output and parameters; Trend (including oil analysis, vibration and boroscope) monitoring; Inspection of engine and components to criteria, tolerances and data specified by engine manufacturer; Compressor washing / cleaning; Foreign object damage.	**AG-15-21- B11-B13**	**3**
15.22. ENGINE STORAGE AND PRESERVATION		
Preservation and depreservation for accessories/systems	**AG-15-22- B11-B13**	**2**

Module 17

PROPELLER

PART-66 Syllabuses	Cross-reference	Level
MODULE 17A. PROPELLER – B1 CATEGORY		
17A.1. FUNDAMENTALS		
Blade element theory; High/low blade angle, reverse angle, angle of attack, rotational speed; Propeller slip; Aerodynamic, centrifugal, and thrust forces; Torque; Relative airflow on blade angle of attack; vibration and resonance.	**AG-17A-01-B1**	**2**
17A.2. PROPELLER CONSTRUCTION		
Construction methods and materials used in composite and metal propellers; Blade station, blade face, blade shank, blade back and hub assembly; Fixed pitch, controllable pitch, constant speeding propeller; Propeller/spinner installation.	**AG-17A-02-B1**	**2**
17A.3. PROPELLER PITCH CONTROL		
Speed control and pitch change methods;	**AG-17A-03-B1**	**2**

Feathering and reverse pitch; Overspeed protection.		
17A.4. PROPELLER SYNCHRONIZING		
Synchronising and synchrophasing equipment.	**AG-17A-04-B1**	2
17A.5. PROPELLER ICE PROTECTION		
Fluid and electrical de-icing equipment.	**AG-17A-05-B1**	2
17A.6. PROPELLER MAINTENANCE		
Static and dynamic balancing; Blade tracking; Assessment of blade damage, erosion, corrosion, impact damage, delamination; Propeller treatment/repair schemes; Propeller engine running.	**AG-17A-06-B1**	**3**
17A.7. PROPELLER STORAGE AND PRESERVATION		
Propeller preservation and depreservation	**AG-17A-07-B1**	2

B1.2 CATEGORY

Module 1

MATHEMATICS

PART-66 Syllabuses	Cross-reference	Level
MODULE 1. MATHEMATICS – B1, B2 & B3 CATEGORIES		
1.1. ARITHMETIC		
Arithmetical terms and signs, Methods of multiplication and division, Fractions and decimals, Factors and multiples, Weights, measures and conversion factors, Ratio and proportion, Averages and percentages, Areas and volumes, squares, cubes, Square and cube roots.	**AG-01-01-B1-B2-B3**	**2**
1.2. ALGEBRA		
(a)	**AG-01-02a-B1-B2-B3**	**2**
Evaluating simple algebraic expressions, addition, subtraction, multiplication and division, use of brackets, simple algebraic fractions.		
(b)	**AG-01-02b-A-B1-B2-B3**	**1**

Linear equations and their solutions, Indices and powers, negative and fractional indices, Binary and other applicable numbering systems, Simultaneous equations, Second degree equations with one unknown, Logarithms.		
1.3. GEOMETRY		
(a)	**AG-01-3a-B1-B2-B3**	**1**
Simple geometrical constructions.		
(b)	**AG-01-03b-A-B1-B2-B3**	**2**
Graphical representation; nature and uses of graphs, Graphs of equations/functions.		
(c)	**AG-01-3c-B1-B2-B3**	**1**
Simple trigonometry; trigonometrical relationships, use of tables and rectangular and polar coordinates.		
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Module 2

PHYSICS

PART-66 Syllabuses	Cross-reference	Level
MODULE 2. PHYSICS – B1 CATEGORY		
2.1. MATTER		
Nature of matter: the chemical elements, structure of atoms, molecules; Chemical compounds. States: solid, liquid and gaseous; Changes between states.	**AG-02-01-A-B1-B2-B3**	**1**
2.2. MECHANICS		
2.2.1. Statics	**AG-02-02-01-B1**	**2**
Forces, moments and couples, representation as vectors; Centre of gravity. Elements of theory of stress, strain and elasticity: tension, compression, shear and torsion; Nature and properties of solid, fluid and gas; Pressure and buoyancy in liquids (barometers).		
2.2.2. Kinetics	**AG-02-02-02-B1**	**2**
Linear movement: uniform motion in a straight line, motion under constant acceleration (motion under gravity) ;		

Rotational movement: uniform circular motion (centrifugal/centripetal forces); Periodic motion: pendular movement; Simple theory of vibration, harmonics and resonance; Velocity ratio mechanical advantage and efficiency.		
2.2.3. Dynamics		
(a) Mass	**AG-02-02-03a-B1**	**2**
Mass, force, inertia, work, power, energy (potential, kinetic and total energy), heat, efficiency.		
(b) Momentum, conservation of momentum	**AG-02-02-03b-B1-B2**	**2**
Momentum, conservation of momentum; Impulse; Gyroscopic principles. Friction: nature and effects, coefficient of friction (rolling resistance).		
2.2.4. Fluid dynamics		
(a)	**AG-02-02-04a-A-B1-B2-B3**	**2**
Specific gravity and density		
(b)	**AG-02-02-04b-B1**	**2**
Viscosity, fluid resistance, effects of streamlining; Effects of compressibility on fluids ; Static, dynamic and total pressure: Bernoulli's Theorem, Venturi		
2.3. THERMODYNAMICS		

(a)	**AG-02-03a-A-B1-B2-B3**	**2**
Temperature: thermometers and temperature scales: Celsius, Fahrenheit and Kelvin. Heat definition.		
(b)	**AG-02-03b-B1-B2**	**2**
Heat capacity, specific heat; Heat transfer: convection, radiation and conduction; Volumetric expansion; First and second law of thermodynamics; Isothermal, adiabatic expansion and compression, engine cycles, constant volume and constant pressure, refrigerators and heat pumps; Gases: ideal gases laws; specific heat at constant volume and constant pressure, work done by expanding gas; Latent heat of fusion and evaporation, thermal energy, heat of combustion.		
2.4. OPTICS (LIGHT)		
Nature of light; speed of light; Laws of reflection and refraction: reflection at plane surfaces, Reflection by spherical mirrors, refraction, lenses, fibre optics.	**AG-02-04-B1-B2**	**2**
2.5. WAVE MOTION AND SOUND		
Wave motion: mechanical waves, sinusoidal wave motion, Interference phenomena, standing waves; Sound: speed of sound, production of sound, intensity, Pitch and quality, Doppler effect.	**AG-02-05-B1-B2**	**2**
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Module 3

ELECTRICAL FUNDAMENTALS

PART-66 Syllabuses	Cross-reference	Level
MODULE 3. ELECTRICAL FUNDAMENTALS – B1 & B2 CATEGORIES		
3.1. ELECTRON THEORY		
Structure and distribution of electrical charges within: atoms, molecules, ions, compounds; Molecular structure of conductors, semiconductors and insulators.	**AG-03-01-A-B1-B2-B3**	**1**
3.2. STATIC ELECTRICITY AND CONDUCTION		
Static electricity and distribution of electrostatic charges; Electro static laws of attraction and repulsion; Units of charge, Coulomb's Law; Conduction of electricity in solids, liquids, gases and vacuum.	**AG-03-02-B1-B2**	**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.	**AG-03-03- B1-B2**	**2**
3.4. GENERATION OF ELECTRICITY		
Production of electricity by the following methods: light, heat, friction, pressure, chemical action, magnetism and motion.	**AG-03-04-A-B1-B2-B3**	**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 of thermocouples; Operation of photo-cells.	**AG-03-05-B1-B2-B3**	**2**
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.	**AG-03-06-B1-B2**	**2**
3.7. RESISTANCE/RESISTOR		
(a)	**AG-03-07a-B1-B2**	**2**
Resistance and affecting factors Specific resistance; Resistor colour 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.		
(b)	**AG-03-07b-B1-B2**	**1**
Positive and negative temperature coefficient conductance		

Fixed resistors, stability, tolerance and limitations, methods of construction; Variable resistors, thermistors, voltage dependent resistors; construction of potentiometers and rheostats; Construction of Wheatstone Bridge.		
3.8. POWER		
Power, work and energy (kinetic and potential); Dissipation of power by a resistor; Power formula; Calculations involving power, work and energy.	**AG-03-08-B1-B2**	**2**
3.9. CAPACITANCE/CAPACITOR		
Operation and function of a capacitor; Factors affecting capacitance area of plates, distance between plates, number of plates, dielectric and dielectric constant, working voltage, voltage rating; Capacitor types, Construction and function; Capacitor colour coding; Calculations of capacitance and voltage in series and parallel circuits; Exponential charge and discharge of a capacitor, time constants; Testing of capacitors.	**AG-03-09-B1-B2**	**2**
3.10. MAGNETISM		
(a)	**AG-03-10a-B1-B2**	**2**
Theory of magnetism		
Properties of a magnet;		

Action of a magnet suspended in the Earth's magnetic field; Magnetisation and demagnetisation; Magnetic shielding; Various types of magnetic material; Electromagnets construction and principles of operation; Hand clasp rules to determine: magnetic field around current carrying conductor.		
(b)	**AG-03-10b-B1-B2**	**2**
Magnetomotive force, field strength, magnetic flux density, permeability, hysteresis loop, retentivity, coercive force reluctance, saturation point, eddy currents; Precautions for care and storage of magnets.		
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, 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; 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;	**AG-03-11-B1-B2**	**2**
Principle uses of inductors.		

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.	**AG-03-12-B1-B2**	**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 the values, in relation voltage, current and power; Triangular/Square waves; Single/3 phase principles.	**AG-03-13-B1-B2**	**2**
3.14. RESISTIVE (R), CAPACITIVE (C) AND INDUCTIVE (L) CIRCUITS		
Phase relation ship of voltage and current in L, C and R circuits, parallel, series and series parallel; Impedance, phase angle, power factor and current calculations; True power, apparent power and reactive power calculations.	**AG-03-14-B1-B2**	**2**
3.15. TRANSFORMERS		
Transformer construction principles and operation; Transformer losses and methods for overcoming them;	**AG-03-15-B1-B2**	**2**
Transformer action under load and no-load conditions; Power transfer, efficiency, polarity markings;		

Calculation of line and phase voltages and currents; Primary and Secondary current, voltage, turns ratio, power, efficiency; Auto transformers.		
3.16. FILTERS		
Operation, application and uses of the following filters: Low pass, high pass, band pass, band stop.	**AG-03-16-B1-B2**	**1**
3.17. AC GENERATORS		
Rotation of loop in a magnetic field and waveform produced; Operation and construction of 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.	**AG-03-17-B1-B2**	**2**
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.	**AG-03-18-B1-B2**	**2**

Module 4

ELECTRONIC FUNDAMENTALS

PART-66 Syllabuses	Cross-reference	Level
MODULE 4. ELECTRONIC FUNDAMENTALS – B1 CATEGORY		
4.1. SEMICONDUCTORS		
4.1.1. Diodes		
(a)	**AG-04-01-01a-B1-B2**	**2**
Diode symbols; Diode characteristics and properties; Diodes in series and parallel; Main characteristics and use of silicon controlled rectifiers (thyristors), light emitting diode, photo conductive diode, varistor, rectifier diodes; Functional testing of diodes.		
(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;		
Diode parameters: peak inverse voltage, maximum forward current, temperature, frequency, leakage		

current, power dissipation; 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, Schottky diode, photo conductive diode, varactor diode, varistor, rectifier diodes, and Zener diode.		
4.1.2. Transistors		
(a)	**AG-04-01-02a-B1-B3**	**1**
Transistor symbols; Component description and orientation; Transistor characteristics and properties.		
(b)	**-**	**-**
Construction and operation of PNP and NPN transistors; 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 stabilisation; Multistage circuit principles: cascades, push-pull, oscillators, multivibrators, flip-flop circuits.		
4.1.3. Integrated circuits		
(a)	**AG-04-01-03a-B1-B3**	**1**
Description and operation of logic circuits and linear circuits/operational amplifiers.		
(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.		
4.2. PRINTED CIRCUIT BOARDS		
Description and use of printed circuit boards.	**AG-04-02-B1**	**1**
4.3. SERVOMECHANISMS		
(a)	**AG-04-03-B1**	**1**
Understanding of the following terms: Open and closed loop systems, feedback, follow up, analogue transducers; Principles of operation and use of following synchro system components/features: resolvers, differential, control and torque, transformers, inductance and capacitance transmitters.		
(b)	**-**	**-**
Understanding of the following terms: Open and closed loop, follow-up, servomechanism, analogue, transducer, null, damping, feedback, dead band; 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.		

Module 5

DIGITAL TECHNIQUES / ELECTRONIC INSTRUMENT SYSTEMS

PART-66 Syllabuses	Cross-reference	Level
MODULE 5. DIGITAL TECHNIQUES – B1.2 & B1.4 CATEGORIES		
5.1. ELECTRONIC INSTRUMENT SYSTEMS		
Typical systems arrangements and cockpit layout of electronic instrument systems.	**AG-05-01-B12-B14**	**2**
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.	-	-
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.	-	-
5.4. DATA BUSES		
Operation of data buses in aircraft systems including knowledge of ARINC and other specifications; Aircraft network/Ethernet.	-	-
5.5. LOGIC CIRCUITS		
(a)	**-**	**-**
Identification of common logic gate symbols, tables and equivalent circuits;		

Applications used for aircraft systems, schematic diagrams.		
(b)		
Interpretation of logic diagrams.		
5.6. BASIC COMPUTER STRUCTURE		
(a)	**-**	**-**
Computer terminology (including bit, byte, software, hard ware, CPU, IC, and various memory devices such as RAM, ROM, PROM); Computer technology (as applied in aircraft systems).		
(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.		
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.	-	-
5.8. INTEGRATED CIRCUITS		
Operation and use of encoders and decoders;	-	-

Function of encoder types; Uses of medium, large and very large scale integration.		
5.9. MULTIPLEXING		
Operation, application and identification in logic diagrams of multiplexers and demultiplexers.	-	-
5.10. FIBRE OPTICS	**AG-05-10-B12-B14**	**1**
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.		
5.11. ELECTRONIC DISPLAYS		
Principles of operation of common types of displays used in modern aircraft, including: cathode ray tubes, light emitting diodes, liquid crystal display.	**AG-05-11-B12-B14**	**1**
5.12. ELECTRONIC SENSITIVE DEVICES		
Special handling of components sensitive to electrostatic discharges; Awareness of risks and possible damage, component and personnel anti-static protection devices.	**AG-05-12-B12-B14**	**2**
5.13. SOFTWARE MANAGEMENT CONTROL		
Awareness of restrictions, airworthiness requirements and possible catastrophic effects of unapproved changes to software programmes.	**AG-05-13-B12-B14**	**1**
5.14. ELECTROMAGNETIC ENVIRONMENT		
Influence of the following phenomena on maintenance practices for electronic system: ▪ EMC-ElectroMagnetic Compatibility;	**AG-05-14-B12-B14**	**2**

▪ EMI-ElectroMagnetic Interference; ▪ HIRF-High Intensity Radiated Field; ▪ Lightning/lightning protection.		
5.15. TYPICAL ELECTRONIC/DIGITAL AIRCRAFT SYSTEM		
General arrangement of typical electronic / digital aircraft systems and associated BITE (Built In Test Equipment) testing such as: ▪ ACARS – ARINC Communication and Addressing and Reporting System; ▪ ECAM – Electronic Centralised Aircraft Monitoring; ▪ EFIS – Electronic Flight Instrument System; ▪ EICAS – Engine Indication and Crew Alerting System; ▪ FBW – Fly-By-Wire: ▪ FMS – Flight Management System; ▪ GPS – Global Positioning System; ▪ IRS – Inertial Reference System; ▪ TCAS – Traffic Alert Collision Avoidance System; ▪ IMA – Integrated Modular Avionics; ▪ Cabin systems; ▪ Information systems.	**AG-05-15-B12-B14**	**2**

Module 6

MATERIALS AND HARDWARE

PART-66 Syllabuses	Cross-reference	Level
MODULE 6. MATERIALS AND HARDWARE – B1 CATEGORY		
6.1. AIRCRAFT MATERIALS - FERROUS		
(a)	**AG-06-01a-B1-B3**	**2**
Characteristics, properties and identification of common alloy steels used in aircraft; Heat treatment and application of alloy steels.		
(b)	**AG-06-01b-B1-B2-B3**	**1**
Testing of ferrous materials for hardness, tensile strength, fatigue strength and impact resistance.		
6.2. AIRCRAFT MATERIALS – NON-FERROUS		
(a)	**AG-06-02a-B1-B3**	**2**
Characteristics, properties and identification of common non-ferrous materials used in aircraft; Heat treatment and application of non-ferrous materials.		
(b)	**AG-06-02a-B1-B2-B3**	**1**
Testing of non-ferrous material for hardness, tensile strength, fatigue strength and impact resistance.		
6.3. AIRCRAFT MATERIALS – COMPOSITE AND NON-METALLIC		

6.3.1. Composite and non-metallic other than wood and fabric		
(a)	**AG-06-03-01a-B1-B2-B3**	**2**
Characteristics, properties and identification of common composite and non-metallic materials, other than wood, used in aircraft; Sealant and bonding agents.		
(b)	**AG-06-03-01b-B1-B3**	**2**
The detection of defects/deterioration in composite and non-metallic material. Repair of composite and non-metallic material.		
6.3.2. Wooden structures		
Construction methods of wooden airframe structures; Characteristics, properties and types of wood and glue used in aeroplanes; 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.	**AG-06-03-02-B1-B3**	**2**
6.3.3. Fabric covering		
Characteristics, properties and types of fabrics used in aeroplanes; Inspections methods for fabric; Types of defects in fabric; repair of fabric covering.	**AG-06-03-03-B1-B3**	**2**
6.4. CORROSION		
(a)	**AG-06-04a-A-B1-B2-B3**	**1**

Chemical fundamentals; Formation by, galvanic action process, microbiological, stress.		
(b)	**AG-06-04b-B1**	**3**
Types of corrosion and their identification; Causes of corrosion; Material types, susceptibility to corrosion.		
6.5. FASTENERS		
6.5.1. Screw threads	**AG-06-05-01-A-B1-B2-B3**	**2**
Screw nomenclature; Thread forms, dimension and tolerances for standard thread used in aircraft; Measuring screw threads		
6.5.2. Bolts, studs and screws	**AG-06-05-02-A-B1-B2-B3**	**2**
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.		
6.5.3. Locking devices	**AG-06-05-03-A-B1-B2-B3**	**2**
Tab and spring washers, locking plates, split pins, pal-nuts, wire locking, quick release fasteners, keys, circlips, cotter pins.		
6.5.4. Aircraft rivets	**AG-06-05-04-B1-B3**	**2**

Types of solid and blind rivets: specifications and identification; Heat treatment.		
6.6. PIPES AND UNIONS		
(a)	**AG-06-06a-A-B1-B2-B3**	**2**
Identification of, and types of rigid and flexible pipes and their connectors used in aircraft.		
(b)	**AG-06-06b-A-B1-B3**	**2**
Standard unions for aircraft hydraulic, fuel, oil, pneumatic and air system pipes.		
6.7. SPRINGS		
Types of springs, materials, characteristics and applications.	**AG-06-07-B1**	**2**
6.8. BEARINGS		
Purpose of bearings, loads, material, construction; Types of bearings and their application.	**AG-06-08-B1-B2**	**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.	**AG-06-09-B1-B2**	**2**
6.10. CONTROL CABLES		
Types of cables; End fittings, turnbuckles and compensation devices; Pulleys and cable system components;	**6.9. TRANSMISSIONS**	

Bowden cables; Aircraft flexible control systems.	**AG-06-10-B1-B3**	**2**
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.	**AG-06-11-B1-B2-B3**	**2**

Module 7

MAINTENANCE PRACTICES

PART-66 Syllabuses	Cross-reference	Level
MODULE 7A. MAINTENANCE PRACTICES – B1 CATEGORY		
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.	**AG-07A-01-A-B1-B2**	**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.	**AG-07A-02-A-B1-B2**	**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.	**AG-07A-03-A-B1-B2**	**3**
7.4. AVIONIC TEST EQUIPMENT		

Operation, function and use of avionic general test equipment.	**AG-07A-04-B1**	**2**
7.5. ENGINEERING DRAWINGS, DIAGRAMS AND STANDARDS		
Drawing types and diagrams, their symbols, dimensions, tolerances and projections; Identifying title block information; Microfilm, microfiche and computerised 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.	**AG-07A-05-B1-B2**	**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.	**AG-07A-06-B1**	**2**
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;	**AG-07A-07-B1-B2**	**3**
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; EWIS installations, inspection, repair, maintenance and cleanliness standards.		
7.8. RIVETING		
Riveted joints, rivet spacing and pitch; Tools used for riveting and dimpling; Inspection of riveted joints.	**AG-07A-08-B1**	**2**
7.9. PIPES AND HOSES		
Bending and belling / flaring aircraft pipes; Inspection and testing of aircraft pipes and hoses; Installation and clamping of pipes.	**AG-07A-09-B1**	2
7.10. SPRINGS		
Inspection and testing of springs.	**AG-07A-10-B1**	**2**
7.11. BEARINGS		
Testing, cleaning and inspection of bearings; Lubrication requirements of bearings; Defects in bearings and their causes.	**AG-07A-11-B1**	**2**
7.12. TRANSMISSIONS		
Inspection of gears, backlash; Inspection of belts and pulleys, chains and sprockets;	**AG-07A-12-B1**	**2**
Inspection of screw jacks, lever devices, push-pull rod systems.		

7.13. CONTROL CABLES		
Swaging of end fittings; Inspection and testing of control cables; Bowden cables; aircraft flexible control systems.	**AG-07A-13-B1**	**2**
7.14. MATERIAL HANDLING		
7.14.1. Sheet metal	**AG-07A-14a-B1**	**2**
Marking out and calculation of bend allowance; Sheet metal working, including bending and forming; Inspection of sheet metal work.		
7.14.2. Composite and non-metallic	**AG-07A-14b-B1**	**2**
Bonding practices; Environmental conditions Inspection methods		
7.15. WELDING, BRAZING, SOLDERING AND BONDING		
(a)	**AG-07A-15a-B1-B2**	**2**
Soldering methods; inspection of soldered joints.		
(b)	**AG-07A-15b-B1**	**2**
Welding and brazing methods; Inspection of welded and brazed joints;		
Bonding methods and inspection of bonded joints.		

7.16. AIRCRAFT WEIGHT AND BALANCE		
(a)	**AG-07A-16a-B1-B2**	**2**
Centre of gravity/Balance limits calculation: use of relevant documents.		
(b)	**AG-07A-16b-B1**	**2**
Preparation of aircraft for weighing; Aircraft weighing.		
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 / de-fuelling procedures; De-icing / anti-icing procedures; Electrical, hydraulic and pneumatic ground supplies; Effects of environmental conditions on aircraft handling and operation.	**AG-07A-17-A-B1-B2**	**2**
7.18. DISASSEMBLY, INSPECTION, REPAIR, AND ASSEMBLY TECHNIQUES		
(a)		
Types of defects and visual inspection techniques. Corrosion removal, assessment and re-protection.	**AG-07A-18a-B1-B2**	**3**
(b)	**AG-07A-18b-B1**	**2**
General repair methods, Structural Repair Manual;		

Ageing, fatigue and corrosion control programmes.		
(c)	**AG-07A-18c-B1**	**2**
Non destructive inspection techniques including, penetrant, radiographic, eddy current, ultrasonic and boroscope methods.		
(d)	**AG-07A-18d-A-B1-B2**	**2**
Disassembly and re-assembly techniques.		
(e)	**AG-07A-18e-B1-B2**	**2**
Trouble shooting techniques.		
7.19. ABNORMAL EVENTS		
(a)	**AG-07A-19a-A-B1-B2**	**2**
Inspections following lightning strikes and HIRF penetration.		
(b)	**AG-07A-19b-A-B1**	**2**
Inspections following abnormal events such as heavy landings and flight through turbulence.		
7.20. MAINTENANCE PROCEDURES		
Maintenance planning; Modification procedures; Stores procedures; Certification / release procedures;	**AG-07A-20-B1-B2**	**2**
Interface with aircraft operation; Maintenance Inspection / Quality Control / Quality Assurance ;		

Additional maintenance procedures. Control of life limited components.		

Module 8

BASIC AERODYNAMICS

PART-66 Syllabuses	Cross-reference	Level
MODULE 8. BASIC AERODYNAMICS – B1 & B2 CATEGORIES		
8.1. PHYSICS OF THE ATMOSPHERE		
International Standard Atmosphere (ISA), application to aerodynamics.	**AG-08-01-A-B3**	**1**
8.2. AERODYNAMICS		
Airflow around a body; Boundary layer, laminar and turbulent flow, free stream flow, relative airflow, upwash 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.	**AG-08-02-A-B3**	**1**
8.3. THEORY OF FLIGHT		
Relation ship between lift, weight, thrust and drag; Glide ratio; Steady stable flights, performance; Theory of the turn;	**AG-08-03-A-B3**	**1**
Influence of load factor: stall, flight envelope and structural limitations;		

Lift augmentation.		
8.4. FLIGHT STABILITY AND DYNAMICS		
Longitudinal, lateral and directional stability (active and passive).	**AG-08-04-A-B3**	**1**

Module 9

HUMAN FACTORS

PART-66 Syllabuses	Cross-reference	Level
MODULE 9A. HUMAN FACTORS – B1 & B2 CATEGORIES		
9.1. GENERAL		
The need to take human factors into account; Incidents attributable to human factors / human error; 'Murphy's' law.	**AG-09A-01-B1-B2**	**2**
9.2. HUMAN PERFORMANCE AND LIMITATIONS		
Vision; Hearing; Information processing; Attention and perception; Memory; Claustrophobia and physical access.	**AG-09A-02-B1-B2**	**2**
9.3. SOCIAL PSYCHOLOGY		
Responsibility: individual and group; Motivation and de-motivation;	**AG-09A-03-A-B1-B2**	**1**
Peer pressure;		

'Culture' issues; Team working; Management, Supervision and leadership.		
9.4. FACTORS AFFECTING PERFORMANCE		
Fitness / health; Stress: domestic and work related; Time pressure and deadlines; Workload: over load and underload; Sleep and fatigue, shiftwork; Alcohol, medication, drug abuse.	**AG-09A-04-A-B1-B2**	**2**
9.5. PHYSICAL ENVIRONMENT		
Noise and fumes; Illumination; Climate and temperature; Motion and vibration; Working environment.	**AG-09A-05-A-B1-B2**	**1**
9.6. TASKS		
Physical work; Repetitive tasks; Visual inspection; Complex systems.	**AG-09A-06-A-B1-B2**	**1**
9.7. COMMUNICATION		

Within and between teams; Work logging and recording; Keeping up to date, currency; Dissemination of information.	**AG-09A-07-A-B1-B2**	**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.	**AG-09A-08-B1-B2**	**2**
9.9. HAZARDS IN THE WORKPLACE		
Recognising and avoiding hazards; Dealing with emergencies.	**AG-09A-09-B1-B2**	**2**

Module 10

AVIATION LEGISLATION

PART-66 Syllabuses	Cross-reference	Level
MODULE 10. AVIATION LEGISLATION – B1, B2 & B3 CATEGORIES		
10.1. REGULATORY FRAMEWORK		
Role of International Civil Aviation Organisation; Role of the European Commission; Role of EASA; Role of the Member States and the National Aviation Authorities Regulation (EC) N° 1321/2014 and its implementing rules Regulations (EC) N° 216/2008 and (EC) N° 2042/2003. Relationships between the various Annexes (Parts) such as Part-21, Part-M, Part-145, Part-66, Part-147 and EO-OPS.	**AG-10-01-A-B1-B2-B3**	**1**
10.2. CERTIFYING STAFF - MAINTENANCE		
Detailed understanding of Part-66.	**AG-10-02-A-B1-B2-B3**	**2**
10.3. APPROVED MAINTENANCE ORGANIZATIONS		
Detailed understanding of Part-145 and Part-M Subpart F.	**AG-10-03-A-B1-B2-B3**	**2**
10.4. AIR OPERATIONS		
General understanding of EU-OPS;	**AG-10-04-A-B1-B2-B3**	**1**

Air Operators Certificates; Operators Responsibilities, in particular regarding continuing airworthiness and maintenance; Aircraft Maintenance Programme; MEL/CDL; Documents to be carried on board; Aircraft placarding (markings).		
10.5. CERTIFICATION OF AIRCRAFT, PARTS AND APPLIANCES		
(a) General	**AG-10-05a-B1-B2-B3**	**1**
General understanding of Part-21 and EASA certification specifications CS-23, 25, 27, 29.		
(b) Documents	**AG-10-05b-B1-B2-B3**	**2**
Certificate of Airworthiness; restricted certificates of airworthiness and permit to fly; Certificate of registration; Noise certificate; Weight schedule; Radio station licence and approval.		
10.6. CONTINUING AIRWORTHINESS		
Detailed understanding of Part-21 provisions related to continuing airworthiness; Detailed understanding of Part-M.	**AG-10-06-A-B1-B2-B3**	**2**
10.7. APPLICABLE NATIONAL AND INTERNATIONAL REQUIREMENTS FOR (IF NOT SUPERSEDED BY EU REQUIREMENTS).		
(a)	**AG-10-07a-B1-B2-B3**	**2**

Maintenance programmes, maintenance checks and inspections; Airworthiness directives; Service bulletins, manufacturers service information; Modifications and repairs; Maintenance documentation: maintenance manuals, structural repair manual, illustrated parts catalogue, etc. Master Minimum Equipment Lists, Minimum equipment lists, Dispatch Deviation lists.		
(b)	**AG-10-07b-B1-B2-B3**	**1**
Continuing airworthiness; Minimum equipment requirements – Test flights.		

Module 11B

TURBINE AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS

PART-66 Syllabuses	Cross-reference	Level
MODULE 11B. PISTON AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS – B1.2 CATEGORY		
11B.1. THEORY OF FLIGHT		
11B.1.1. Aeroplane Aerodynamics and Flight controls	**AG-11B-01-01-B12**	**2**
Operation and effect of: ▪ roll control: ailerons and spoilers; ▪ pitch control: elevators, stabilators, variable incidence stabilisers and canards; ▪ yaw control, rudder limiters; Control using elevons, ruddervators; High lift devices, slots, slats, flaps, flaperons; Drag inducing devices, spoilers, lift dumpers, speed brakes; Effects of wing fences, saw tooth leading edges; Boundary layer control using, vortex generators, stall wedges or leading edge devices; Operation and effect of trim tabs, balance and antibalance (leading) tabs, servo tabs, spring tabs, mass balance, control surface bias, aerodynamic balance panels.		
11B.1.2. High Speed Flight	N/A	

11B.2. AIRFRAME STRUCTURES – GENERAL CONCEPTS		
(a)	**AG-11B-02a-A2-B12**	**2**
Airworthiness requirements for structural strength; Structural classification, primary, secondary and tertiary; Fail safe, safe life, damage tolerance concepts; Zonal and station identification systems; Stress, strain, bending, compression, shear, torsion, tension, hoop stress, fatigue; Drains and ventilation provisions; System installation provisions; Lightning strike protection provision; Aircraft bonding.		
(b)	**AG-11B-02A2-B12**	**2**
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; Structure assembly techniques: riveting, bolting, bonding Methods of surface protection, such as chromating, anodising, painting ; Surface cleaning; Airframe symmetry: methods of alignment and symmetry checks.		
11B.3. AIRFRAME STRUCTURES – AEROPLANES		
11B.3.1. Fuselage (ATA 52/53/56)	**AG-11B-03-01-B12**	**2**
Construction and pressurisation sealing;		

Wing, stabiliser, pylon and under carriage attachments; Seat installation and cargo loading system; Doors and emergency exits : construction, mechanisms, operation and safety devices ; Windows and windscreen construction and mechanisms.		
11B.3.2. Wings (ATA 57)	**AG-11B-03-02-B12**	**2**
Construction; Fuel storage; Landing gear, pylon, control surface and high lift/drag attachments.		
11B.3.3. Stabilizers (ATA 55)	**AG-11B-03-03-B12**	**2**
Construction; Control surface attachment.		
11B.3.4. Flight Control Surfaces (ATA 55/57)	**AG-11B-03-04-B12**	**2**
Construction and attachment; Balancing – mass and aerodynamic.		
11B.3.5. Nacelles/Pylons (ATA 54)	**AG-11B-03-05-B12**	**2**
Construction; Firewalls; Engine mounts.		
11B.4. AIR CONDITIONING AND CABIN PRESSURIZATION (ATA 21)		
Pressurisation and air conditioning systems;	**AG-11B-04-01-B12**	**3**

Cabin pressure controllers, protection and warning devices; Heating systems.		
11B.5. INSTRUMENT/AVIONIC SYSTEMS		
11B.5.1. Instrument Systems (ATA 31)	**AG-11B-05-01-B12**	**2**
Pitot static: altimeter, air speed indicator, vertical speed indicator; Gyroscopic: artificial horizon, attitude director, direction indicator, horizontal situation indicator, turn and slip indicator, turn coordinator; Compasses: direct reading, remote reading; Angle of attack indication, stall warning systems; Glass cockpit; Other aircraft system indication.		
11B.5.2. Avionic Systems	**AG-11B-05-01-A2-B12**	**1**
Fundamentals of system lay-outs and operation of: ▪ Auto Flight (ATA 22); ▪ Communications (ATA 23); ▪ Navigation Systems (ATA 34).		
11B.6. ELECTRICAL POWER		
Batteries installation and operation; DC power generation; AC power generation; Emergency power generation; Voltage regulation;	**AG-11B-06-B12**	**3**

Power distribution; Inverters, transformers, rectifiers; Circuit protection; External / Ground power		
11B.7. EQUIPMENT AND FURNISHINGS (ATA 25)		
(a)	**AG-11B-07a-A2-B12**	**2**
Emergency equipment requirements; Seats, harnesses and belts.		
(b)	**AG-11B-07a-A2-B12**	**1**
Cabin lay-out; Equipment lay-out; Cabin Furnishing Installation; Cabin entertainment equipment; Galley installation; Cargo handling and retention equipment; Airstairs.		
11B.8. FIRE PROTECTION (ATA 26)		
(a)	**AG-11B-08-B12**	**3**
Fire and smoke detection and warning systems; Fire extinguishing systems; System tests.		

(b)	**AG-11B-08b-B12**	**3**
Portable fire extinguisher.		
11B.9. 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.	**AG-11B-09-B12**	**3**
11B.10. FUEL SYSTEMS (ATA 28)		
System lay-out; Fuel tanks; Supply systems; Dumping, venting and draining; Cross-feed and transfer; Indications and warnings; Refuelling and defuelling; Longitudinal balance fuel systems.	**AG-11B-10-B12**	**3**
11B.11. 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.	**AG-11B-11-B12**	**3**
11B.12. 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 and chemical ; Rain repellent; Probe and drain heating; Wiper systems.	**AG-11B-12-B12**	**3**
11B.13. LANDING GEAR (ATA 32)		
Construction, shock absorbing; Extension and retraction systems: normal and emergency; Indications and warning; Wheels, brakes, antiskid and auto braking; Tyres;	**AG-11B-13-B12**	**3**

Steering; Air-ground sensing.		
11B.14. LIGHTS (ATA 33)		
External: navigation, anti-collision, landing, taxiing, ice; Internal: cabin, cockpit, cargo; Emergency.	**AG-11B-14-B12**	**3**
11B.15. OXYGEN (ATA 35)		
System lay-out: ▪ cockpit, ▪ cabin;	**AG-11B-15-B12**	**3**
Sources, storage, charging and distribution; Supply regulation; Indications and warnings.		
11B.16. PNEUMATIC/VACUUM (ATA 36)		
System lay-out; Sources: ▪ engine / APU, ▪ compressors, ▪ reservoirs, ▪ ground supply; Pressure and vacuum pumps;	**AG-11B-16-B12**	**3**

Pressure control; Distribution; Indications and warnings; Interfaces with other systems.		
11B.17. WATER/WASTE (ATA 38)		
Water system lay-out, supply, distribution, servicing and draining; Toilet system lay-out, flushing and servicing; Corrosion aspects.	**AG-11B-17-B12**	**3**

Module 16

PISTON ENGINE

PART-66 Syllabuses	Cross-reference	Level
MODULE 16. PISTON ENGINE – B1.2 & B1.4 CATEGORIES		
16.1. FUNDAMENTALS		
Mechanical, thermal and volumetric efficiencies; Operating principles: 2 stroke, 4 stroke, Otto and Diesel; Piston displacement and compression ratio; Engine configuration and firing order.	**AG-16-01-B12-B14**	**2**
16.2. ENGINE PERFORMANCE		
Power calculation and measurement; Factors affecting engine power; Mixtures/leaning, pre-ignition.	**AG-16-02- B12-B14**	**2**
16.3. ENGINE CONSTRUCTION		
Crank case, crank shaft, cam shafts, sumps; Accessory gearbox; Cylinder and piston assemblies; Connecting rods, inlet and exhaust manifolds;	**AG-15-03-A- B12-B14**	**2**
Valve mechanisms;		

Propeller reduction gearboxes.		
16.4. ENGINE FUEL SYSTEMS		
16.4.1. Carburettors		
Types, construction and principles of operation; Icing and heating.	**AG-16-04-01- B12-B14**	**2**
16.4.2. Fuel injection systems		
Types, construction and principles of operation.	**AG-16-04-02- B12-B14**	**2**
16.4.3. Electronic engine control		
Operation of engine control and fuel metering systems including electronic engine control (FADEC); Systems lay-out and components.	**AG-16-04-03-A- B12-B14**	**2**
16.5. STARTING AND IGNITION YSTEMS		
Starting systems, pre-heat systems; Magneto types, construction and principles of operation; Ignition harnesses, spark plugs; Low and high tension systems.	**AG-16-05- B12-B14**	**2**
16.6. INDUCTION, EXHAUST AND COOLING SYSTEMS		
Construction and operation of: induction systems including alternate air systems; Exhaust systems, engine cooling systems — air and liquid.	**AG-16-06- B12-B14**	**2**
16.7. SUPERCHARGING/TURBOCHARGING		
Principles and purpose of supercharging and its effects on engine parameters;	**AG-16-07- B12-B14**	**2**

Construction and operation of supercharging/turbocharging systems; System terminology; Control systems; System protection..		
16.8. LUBRICNTS AND FUELS		
Properties and specifications; Fuel additives; Safety precautions.	**AG-16-08- B12-B14**	**2**
16.9. LUBRICATION SYSTEMS		
System operation/lay-out and components.	**AG-16-09- B12-B14**	**2**
16.10. ENGINE INDICATION SYSTEMS		
Engine speed; Cylinder head temperature; Coolant temperature; Oil pressure and temperature; Exhaust Gas Temperature; Fuel pressure and flow; Manifold pressure.	**AG-16-10- B12-B14**	**2**
16.11. POWERPLANT INSTLLATION		
	AG-16-11- B12-B14	**2**
Configuration of firewalls, cowlings, acoustic panels, engine mounts, anti-vibration mounts, hoses, pipes, feeders, connectors, wiring looms, control cables and rods, lifting points and drains.		

16.12. ENGINE MONITORING AND GROUND OPERATIONS		
Procedures for starting and ground run-up; Interpretation of engine power output and parameters; Inspection of engine and components: criteria, tolerances, and data specified by engine manufacturer.	**AG-16-12- B12-B14**	**3**
16.13. ENGINE STORAGE AND PRESERVATION		
Preservation and depreservation for the engine and accessories/systems.	**AG-16-13- B12-B14**	**2**

Module 17

PROPELLER

PART-66 Syllabuses	Cross-reference	Level
MODULE 17A. PROPELLER – B1 CATEGORY		
17A.1. FUNDAMENTALS		
Blade element theory; High/low blade angle, reverse angle, angle of attack, rotational speed; Propeller slip; Aerodynamic, centrifugal, and thrust forces; Torque; Relative airflow on blade angle of attack; vibration and resonance.	**AG-17A-01-B1**	**2**
17A.2. PROPELLER CONSTRUCTION		
Construction methods and materials used in composite and metal propellers; Blade station, blade face, blade shank, blade back and hub assembly; Fixed pitch, controllable pitch, constant speeding propeller; Propeller/spinner installation.	**AG-17A-02-B1**	**2**
17A.3. PROPELLER PITCH CONTROL		
Speed control and pitch change methods;	**AG-17A-03-B1**	**2**

Feathering and reverse pitch; Overspeed protection.		
17A.4. PROPELLER SYNCHRONIZING		
Synchronising and synchrophasing equipment.	**AG-17A-04-B1**	2
17A.5. PROPELLER ICE PROTECTION		
Fluid and electrical de-icing equipment.	**AG-17A-05-B1**	2
17A.6. PROPELLER MAINTENANCE		
Static and dynamic balancing; Blade tracking; Assessment of blade damage, erosion, corrosion, impact damage, delamination; Propeller treatment/repair schemes; Propeller engine running.	**AG-17A-06-B1**	**3**
17A.7. PROPELLER STORAGE AND PRESERVATION		
Propeller preservation and depreservation	**AG-17A-07-B1**	2

B1.3 CATEGORY

Module 1

MATHEMATICS

PART-66 Syllabuses	Cross-reference	Level
MODULE 1. MATHEMATICS – B1, B2 & B3 CATEGORIES		
1.1. ARITHMETIC		
Arithmetical terms and signs, Methods of multiplication and division, Fractions and decimals, Factors and multiples, Weights, measures and conversion factors, Ratio and proportion, Averages and percentages, Areas and volumes, squares, cubes, Square and cube roots.	**AG-01-01-B1-B2-B3**	**2**
1.2. ALGEBRA		
(a)	**AG-01-02a-B1-B2-B3**	**2**
Evaluating simple algebraic expressions, addition, subtraction, multiplication and division, use of brackets, simple algebraic fractions.		
(b)	**AG-01-02b-A-B1-B2-B3**	**1**

Linear equations and their solutions, Indices and powers, negative and fractional indices, Binary and other applicable numbering systems, Simultaneous equations, Second degree equations with one unknown, Logarithms.		
1.3. GEOMETRY		
(a)	**AG-01-3a-B1-B2-B3**	**1**
Simple geometrical constructions.		
(b)	**AG-01-03b-A-B1-B2-B3**	**2**
Graphical representation; nature and uses of graphs, Graphs of equations/functions.		
(c)	**AG-01-3c-B1-B2-B3**	**1**
Simple trigonometry; trigonometrical relationships, use of tables and rectangular and polar coordinates.		
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Module 2

PHYSICS

PART-66 Syllabuses	Cross-reference	Level
MODULE 2. PHYSICS – B1 CATEGORY		
2.1. MATTER		
Nature of matter: the chemical elements, structure of atoms, molecules; Chemical compounds. States: solid, liquid and gaseous; Changes between states.	**AG-02-01-A-B1-B2-B3**	**1**
2.2. MECHANICS		
2.2.1. Statics	**AG-02-02-01-B1**	**2**
Forces, moments and couples, representation as vectors; Centre of gravity. Elements of theory of stress, strain and elasticity: tension, compression, shear and torsion; Nature and properties of solid, fluid and gas; Pressure and buoyancy in liquids (barometers).		
2.2.2. Kinetics	**AG-02-02-02-B1**	**2**
Linear movement: uniform motion in a straight line, motion under constant acceleration (motion under gravity) ;		

Rotational movement: uniform circular motion (centrifugal/centripetal forces); Periodic motion: pendular movement; Simple theory of vibration, harmonics and resonance; Velocity ratio mechanical advantage and efficiency.		
2.2.3. Dynamics		
(a) Mass	**AG-02-02-03a-B1**	**2**
Mass, force, inertia, work, power, energy (potential, kinetic and total energy), heat, efficiency.		
(b) Momentum, conservation of momentum	**AG-02-02-03b-B1-B2**	**2**
Momentum, conservation of momentum; Impulse; Gyroscopic principles. Friction: nature and effects, coefficient of friction (rolling resistance).		
2.2.4. Fluid dynamics		
(a)	**AG-02-02-04a-A-B1-B2-B3**	**2**
Specific gravity and density		
(b)	**AG-02-02-04b-B1**	**2**
Viscosity, fluid resistance, effects of streamlining; Effects of compressibility on fluids ; Static, dynamic and total pressure: Bernoulli's Theorem, Venturi		
2.3. THERMODYNAMICS		

(a)	**AG-02-03a-A-B1-B2-B3**	**2**
Temperature: thermometers and temperature scales: Celsius, Fahrenheit and Kelvin. Heat definition.		
(b)	**AG-02-03b-B1-B2**	**2**
Heat capacity, specific heat; Heat transfer: convection, radiation and conduction; Volumetric expansion; First and second law of thermodynamics; Isothermal, adiabatic expansion and compression, engine cycles, constant volume and constant pressure, refrigerators and heat pumps; Gases: ideal gases laws; specific heat at constant volume and constant pressure, work done by expanding gas; Latent heat of fusion and evaporation, thermal energy, heat of combustion.		
2.4. OPTICS (LIGHT)		
Nature of light; speed of light; Laws of reflection and refraction: reflection at plane surfaces, Reflection by spherical mirrors, refraction, lenses, fibre optics.	**AG-02-04-B1-B2**	**2**
2.5. WAVE MOTION AND SOUND		
Wave motion: mechanical waves, sinusoidal wave motion, Interference phenomena, standing waves; Sound: speed of sound, production of sound, intensity, Pitch and quality, Doppler effect.	**AG-02-05-B1-B2**	**2**
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Module 3

ELECTRICAL FUNDAMENTALS

PART-66 Syllabuses	Cross-reference	Level
MODULE 3. ELECTRICAL FUNDAMENTALS – B1 & B2 CATEGORIES		
3.1. ELECTRON THEORY		
Structure and distribution of electrical charges within: atoms, molecules, ions, compounds; Molecular structure of conductors, semiconductors and insulators.	**AG-03-01-A-B1-B2-B3**	**1**
3.2. STATIC ELECTRICITY AND CONDUCTION		
Static electricity and distribution of electrostatic charges; Electro static laws of attraction and repulsion; Units of charge, Coulomb's Law; Conduction of electricity in solids, liquids, gases and vacuum.	**AG-03-02-B1-B2**	**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.	**AG-03-03- B1-B2**	**2**
3.4. GENERATION OF ELECTRICITY		
Production of electricity by the following methods: light, heat, friction, pressure, chemical action, magnetism and motion.	**AG-03-04-A-B1-B2-B3**	**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 of thermocouples; Operation of photo-cells.	**AG-03-05-B1-B2-B3**	**2**
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.	**AG-03-06-B1-B2**	**2**
3.7. RESISTANCE/RESISTOR		
(a)	**AG-03-07a-B1-B2**	**2**
Resistance and affecting factors Specific resistance; Resistor colour 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.		
(b)	**AG-03-07b-B1-B2**	**1**
Positive and negative temperature coefficient conductance		

Fixed resistors, stability, tolerance and limitations, methods of construction; Variable resistors, thermistors, voltage dependent resistors; construction of potentiometers and rheostats; Construction of Wheatstone Bridge.		
3.8. POWER		
Power, work and energy (kinetic and potential); Dissipation of power by a resistor; Power formula; Calculations involving power, work and energy.	**AG-03-08-B1-B2**	**2**
3.9. CAPACITANCE/CAPACITOR		
Operation and function of a capacitor; Factors affecting capacitance area of plates, distance between plates, number of plates, dielectric and dielectric constant, working voltage, voltage rating; Capacitor types, Construction and function; Capacitor colour coding; Calculations of capacitance and voltage in series and parallel circuits; Exponential charge and discharge of a capacitor, time constants; Testing of capacitors.	**AG-03-09-B1-B2**	**2**
3.10. MAGNETISM		
(a)	**AG-03-10a-B1-B2**	**2**
Theory of magnetism		
Properties of a magnet;		

Action of a magnet suspended in the Earth's magnetic field; Magnetisation and demagnetisation; Magnetic shielding; Various types of magnetic material; Electromagnets construction and principles of operation; Hand clasp rules to determine: magnetic field around current carrying conductor.		
(b)	**AG-03-10b-B1-B2**	**2**
Magnetomotive force, field strength, magnetic flux density, permeability, hysteresis loop, retentivity, coercive force reluctance, saturation point, eddy currents; Precautions for care and storage of magnets.		
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, 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; 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;	**AG-03-11-B1-B2**	**2**
Principle uses of inductors.		

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.	**AG-03-12-B1-B2**	**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 the values, in relation voltage, current and power; Triangular/Square waves; Single/3 phase principles.	**AG-03-13-B1-B2**	**2**
3.14. RESISTIVE (R), CAPACITIVE (C) AND INDUCTIVE (L) CIRCUITS		
Phase relation ship of voltage and current in L, C and R circuits, parallel, series and series parallel; Impedance, phase angle, power factor and current calculations; True power, apparent power and reactive power calculations.	**AG-03-14-B1-B2**	**2**
3.15. TRANSFORMERS		
Transformer construction principles and operation; Transformer losses and methods for overcoming them;	**AG-03-15-B1-B2**	**2**
Transformer action under load and no-load conditions; Power transfer, efficiency, polarity markings;		

Calculation of line and phase voltages and currents; Primary and Secondary current, voltage, turns ratio, power, efficiency; Auto transformers.		
3.16. FILTERS		
Operation, application and uses of the following filters: Low pass, high pass, band pass, band stop.	**AG-03-16-B1-B2**	**1**
3.17. AC GENERATORS		
Rotation of loop in a magnetic field and waveform produced; Operation and construction of 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.	**AG-03-17-B1-B2**	**2**
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.	**AG-03-18-B1-B2**	**2**

Module 4

ELECTRONIC FUNDAMENTALS

PART-66 Syllabuses	Cross-reference	Level
MODULE 4. ELECTRONIC FUNDAMENTALS – B1 CATEGORY		
4.1. SEMICONDUCTORS		
4.1.1. Diodes		
(a)	**AG-04-01-01a-B1-B2**	**2**
Diode symbols; Diode characteristics and properties; Diodes in series and parallel; Main characteristics and use of silicon controlled rectifiers (thyristors), light emitting diode, photo conductive diode, varistor, rectifier diodes; Functional testing of diodes.		
(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;		
Diode parameters: peak inverse voltage, maximum forward current, temperature, frequency, leakage		

current, power dissipation; 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, Schottky diode, photo conductive diode, varactor diode, varistor, rectifier diodes, and Zener diode.		
4.1.2. Transistors		
(a)	**AG-04-01-02a-B1-B3**	**1**
Transistor symbols; Component description and orientation; Transistor characteristics and properties.		
(b)	**-**	**-**
Construction and operation of PNP and NPN transistors; 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 stabilisation; Multistage circuit principles: cascades, push-pull, oscillators, multivibrators, flip-flop circuits.		
4.1.3. Integrated circuits		
(a)	**AG-04-01-03a-B1-B3**	**1**
Description and operation of logic circuits and linear circuits/operational amplifiers.		
(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.		
4.2. PRINTED CIRCUIT BOARDS		
Description and use of printed circuit boards.	**AG-04-02-B1**	**1**
4.3. SERVOMECHANISMS		
(a)	**AG-04-03-B1**	**1**
Understanding of the following terms: Open and closed loop systems, feedback, follow up, analogue transducers; Principles of operation and use of following synchro system components/features: resolvers, differential, control and torque, transformers, inductance and capacitance transmitters.		
(b)	**-**	**-**
Understanding of the following terms: Open and closed loop, follow-up, servomechanism, analogue, transducer, null, damping, feedback, dead band; 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.		

Module 5

DIGITAL TECHNIQUES / ELECTRONIC INSTRUMENT SYSTEMS

PART-66 Syllabuses	Cross-reference	Level
MODULE 5. DIGITAL TECHNIQUES – B1.1 & B1.3 CATEGORIES		
5.1. ELECTRONIC INSTRUMENT SYSTEMS		
Typical systems arrangements and cockpit layout of electronic instrument systems.	**AG-05-01-B11-B13**	**2**
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.	**AG-05-02-B11-B13**	**1**
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.	**AG-05-03-B11-B13**	**1**
5.4. DATA BUSES		
Operation of data buses in aircraft systems including knowledge of ARINC and other specifications; Aircraft network/Ethernet.	**AG-05-04-B11-B13-B2**	**2**
5.5. LOGIC CIRCUITS		
(a)	**AG-05-05a-B11-B13-B2**	**2**
Identification of common logic gate symbols, tables and equivalent circuits;		

Applications used for aircraft systems, schematic diagrams.		
(b)	**-**	**-**
Interpretation of logic diagrams.		
5.6. BASIC COMPUTER STRUCTURE		
(a)	**AG-05-06a-B11-B13**	**2**
Computer terminology (including bit, byte, software, hard ware, CPU, IC, and various memory devices such as RAM, ROM, PROM); Computer technology (as applied in aircraft systems).		
(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.		
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.	**-**	**-**
5.8. INTEGRATED CIRCUITS		
Operation and use of encoders and decoders;	**-**	**-**

Function of encoder types; Uses of medium, large and very large scale integration.		
5.9. MULTIPLEXING		
Operation, application and identification in logic diagrams of multiplexers and demultiplexers.	**-**	**-**
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.	**AG-05-10-B11-B13**	**1**
5.11. ELECTRONIC DISPLAYS		
Principles of operation of common types of displays used in modern aircraft, including : cathode ray tubes, light emitting diodes, liquid crystal display.	**AG-05-11-B11-B13-B2**	**2**
5.12. ELECTRONIC SENSITIVE DEVICES		
Special handling of components sensitive to electrostatic discharges; Awareness of risks and possible damage, component and personnel anti-static protection devices.	**AG-05-12-B11-B13-B2**	**2**
5.13. SOFTWARE MANAGEMENT CONTROL		
Awareness of restrictions, airworthiness requirements and possible catastrophic effects of unapproved changes to software programmes.	**AG-05-13-B11-B13-B2**	**2**
5.14. ELECTROMAGNETIC ENVIRONMENT		
Influence of the following phenomena on maintenance practices for electronic system: ▪ EMC - ElectroMagnetic Compatibility;	**AG-05-14-B11-B13-B2**	**2**

▪ EMI - ElectroMagnetic Interference; ▪ HIRF- High Intensity Radiated Field; ▪ Lightning/lightning protection.		
5.15. TYPICAL ELECTRONIC/DIGITAL AIRCRAFT SYSTEM		
General arrangement of typical electronic / digital aircraft systems and associated BITE (Built In Test Equipment) testing such as: ▪ ACARS – ARINC Communication and Addressing and Reporting System; ▪ ECAM – Electronic Centralised Aircraft Monitoring; ▪ EFIS – Electronic Flight Instrument System; ▪ EICAS – Engine Indication and Crew Alerting System; ▪ FBW – Fly-By-Wire: ▪ FMS – Flight Management System; ▪ GPS – Global Positioning System; ▪ IRS – Inertial Reference System; ▪ TCAS – Traffic Alert Collision Avoidance System; ▪ IMA – Integrated Modular Avionics; ▪ Cabin systems; ▪ Information systems.	**AG-05-15-B11-B13-B2**	**2**

Module 6

MATERIALS AND HARDWARE

PART-66 Syllabuses	Cross-reference	Level
MODULE 6. MATERIALS AND HARDWARE – B1 CATEGORY		
6.1. AIRCRAFT MATERIALS - FERROUS		
(a)	**AG-06-01a-B1-B3**	**2**
Characteristics, properties and identification of common alloy steels used in aircraft; Heat treatment and application of alloy steels.		
(b)	**AG-06-01b-B1-B2-B3**	**1**
Testing of ferrous materials for hardness, tensile strength, fatigue strength and impact resistance.		
6.2. AIRCRAFT MATERIALS – NON-FERROUS		
(a)	**AG-06-02a-B1-B3**	**2**
Characteristics, properties and identification of common non-ferrous materials used in aircraft; Heat treatment and application of non-ferrous materials.		
(b)	**AG-06-02a-B1-B2-B3**	**1**
Testing of non-ferrous material for hardness, tensile strength, fatigue strength and impact resistance.		
6.3. AIRCRAFT MATERIALS – COMPOSITE AND NON-METALLIC		

6.3.1. Composite and non-metallic other than wood and fabric		
(a)	**AG-06-03-01a-B1-B2-B3**	**2**
Characteristics, properties and identification of common composite and non-metallic materials, other than wood, used in aircraft; Sealant and bonding agents.		
(b)	**AG-06-03-01b-B1-B3**	**2**
The detection of defects/deterioration in composite and non-metallic material. Repair of composite and non-metallic material.		
6.3.2. Wooden structures		
Construction methods of wooden airframe structures; Characteristics, properties and types of wood and glue used in aeroplanes; 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.	**AG-06-03-02-B1-B3**	**2**
6.3.3. Fabric covering		
Characteristics, properties and types of fabrics used in aeroplanes; Inspections methods for fabric; Types of defects in fabric; repair of fabric covering.	**AG-06-03-03-B1-B3**	**2**
6.4. CORROSION		
(a)	**AG-06-04a-A-B1-B2-B3**	**1**

Chemical fundamentals; Formation by, galvanic action process, microbiological, stress.		
(b)	**AG-06-04b-B1**	**3**
Types of corrosion and their identification; Causes of corrosion; Material types, susceptibility to corrosion.		
6.5. FASTENERS		
6.5.1. Screw threads	**AG-06-05-01-A-B1-B2-B3**	**2**
Screw nomenclature; Thread forms, dimension and tolerances for standard thread used in aircraft; Measuring screw threads		
6.5.2. Bolts, studs and screws	**AG-06-05-02-A-B1-B2-B3**	**2**
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.		
6.5.3. Locking devices	**AG-06-05-03-A-B1-B2-B3**	**2**
Tab and spring washers, locking plates, split pins, pal-nuts, wire locking, quick release fasteners, keys, circlips, cotter pins.		
6.5.4. Aircraft rivets	**AG-06-05-04-B1-B3**	**2**

Types of solid and blind rivets: specifications and identification; Heat treatment.		
6.6. PIPES AND UNIONS		
(a)	**AG-06-06a-A-B1-B2-B3**	**2**
Identification of, and types of rigid and flexible pipes and their connectors used in aircraft.		
(b)	**AG-06-06b-A-B1-B3**	**2**
Standard unions for aircraft hydraulic, fuel, oil, pneumatic and air system pipes.		
6.7. SPRINGS		
Types of springs, materials, characteristics and applications.	**AG-06-07-B1**	**2**
6.8. BEARINGS		
Purpose of bearings, loads, material, construction; Types of bearings and their application.	**AG-06-08-B1-B2**	**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.	**AG-06-09-B1-B2**	**2**
6.10. CONTROL CABLES		
Types of cables; End fittings, turnbuckles and compensation devices; Pulleys and cable system components;	**6.9. TRANSMISSIONS**	

Bowden cables; Aircraft flexible control systems.	**AG-06-10-B1-B3**	**2**
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.	**AG-06-11-B1-B2-B3**	**2**

Module 7

MAINTENANCE PRACTICES

PART-66 Syllabuses	Cross-reference	Level
MODULE 7A. MAINTENANCE PRACTICES – B1 CATEGORY		
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.	**AG-07A-01-A-B1-B2**	**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.	**AG-07A-02-A-B1-B2**	**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.	**AG-07A-03-A-B1-B2**	**3**
7.4. AVIONIC TEST EQUIPMENT		

Operation, function and use of avionic general test equipment.	**AG-07A-04-B1**	**2**
7.5. ENGINEERING DRAWINGS, DIAGRAMS AND STANDARDS		
Drawing types and diagrams, their symbols, dimensions, tolerances and projections; Identifying title block information; Microfilm, microfiche and computerised 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.	**AG-07A-05-B1-B2**	**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.	**AG-07A-06-B1**	**2**
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;	**AG-07A-07-B1-B2**	**3**
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; EWIS installations, inspection, repair, maintenance and cleanliness standards.		
7.8. RIVETING		
Riveted joints, rivet spacing and pitch; Tools used for riveting and dimpling; Inspection of riveted joints.	**AG-07A-08-B1**	**2**
7.9. PIPES AND HOSES		
Bending and belling / flaring aircraft pipes; Inspection and testing of aircraft pipes and hoses; Installation and clamping of pipes.	**AG-07A-09-B1**	2
7.10. SPRINGS		
Inspection and testing of springs.	**AG-07A-10-B1**	**2**
7.11. BEARINGS		
Testing, cleaning and inspection of bearings; Lubrication requirements of bearings; Defects in bearings and their causes.	**AG-07A-11-B1**	**2**
7.12. TRANSMISSIONS		
Inspection of gears, backlash; Inspection of belts and pulleys, chains and sprockets;	**AG-07A-12-B1**	**2**
Inspection of screw jacks, lever devices, push-pull rod systems.		

7.13. CONTROL CABLES		
Swaging of end fittings; Inspection and testing of control cables; Bowden cables; aircraft flexible control systems.	**AG-07A-13-B1**	**2**
7.14. MATERIAL HANDLING		
7.14.1. Sheet metal	**AG-07A-14a-B1**	**2**
Marking out and calculation of bend allowance; Sheet metal working, including bending and forming; Inspection of sheet metal work.		
7.14.2. Composite and non-metallic	**AG-07A-14b-B1**	**2**
Bonding practices; Environmental conditions Inspection methods		
7.15. WELDING, BRAZING, SOLDERING AND BONDING		
(a)	**AG-07A-15a-B1-B2**	**2**
Soldering methods; inspection of soldered joints.		
(b)	**AG-07A-15b-B1**	**2**
Welding and brazing methods; Inspection of welded and brazed joints;		
Bonding methods and inspection of bonded joints.		

7.16. AIRCRAFT WEIGHT AND BALANCE		
(a)	**AG-07A-16a-B1-B2**	**2**
Centre of gravity/Balance limits calculation: use of relevant documents.		
(b)	**AG-07A-16b-B1**	**2**
Preparation of aircraft for weighing; Aircraft weighing.		
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 / de-fuelling procedures; De-icing / anti-icing procedures; Electrical, hydraulic and pneumatic ground supplies; Effects of environmental conditions on aircraft handling and operation.	**AG-07A-17-A-B1-B2**	**2**
7.18. DISASSEMBLY, INSPECTION, REPAIR, AND ASSEMBLY TECHNIQUES		
(a)		
Types of defects and visual inspection techniques. Corrosion removal, assessment and re-protection.	**AG-07A-18a-B1-B2**	**3**
(b)	**AG-07A-18b-B1**	**2**
General repair methods, Structural Repair Manual;		

Ageing, fatigue and corrosion control programmes.		
(c)	**AG-07A-18c-B1**	**2**
Non destructive inspection techniques including, penetrant, radiographic, eddy current, ultrasonic and boroscope methods.		
(d)	**AG-07A-18d-A-B1-B2**	**2**
Disassembly and re-assembly techniques.		
(e)	**AG-07A-18e-B1-B2**	**2**
Trouble shooting techniques.		
7.19. ABNORMAL EVENTS		
(a)	**AG-07A-19a-A-B1-B2**	**2**
Inspections following lightning strikes and HIRF penetration.		
(b)	**AG-07A-19b-A-B1**	**2**
Inspections following abnormal events such as heavy landings and flight through turbulence.		
7.20. MAINTENANCE PROCEDURES		
Maintenance planning; Modification procedures; Stores procedures; Certification / release procedures;	**AG-07A-20-B1-B2**	**2**
Interface with aircraft operation; Maintenance Inspection / Quality Control / Quality Assurance ;		

Additional maintenance procedures. Control of life limited components.		

Module 8

BASIC AERODYNAMICS

PART-66 Syllabuses	Cross-reference	Level
MODULE 8. BASIC AERODYNAMICS – B1 & B2 CATEGORIES		
8.1. PHYSICS OF THE ATMOSPHERE		
International Standard Atmosphere (ISA), application to aerodynamics.	**AG-08-01-A-B3**	**1**
8.2. AERODYNAMICS		
Airflow around a body; Boundary layer, laminar and turbulent flow, free stream flow, relative airflow, upwash 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.	**AG-08-02-A-B3**	**1**
8.3. THEORY OF FLIGHT		
Relation ship between lift, weight, thrust and drag; Glide ratio; Steady stable flights, performance; Theory of the turn;	**AG-08-03-A-B3**	**1**
Influence of load factor: stall, flight envelope and structural limitations;		

Lift augmentation.		
8.4. FLIGHT STABILITY AND DYNAMICS		
Longitudinal, lateral and directional stability (active and passive).	**AG-08-04-A-B3**	**1**

Module 9

HUMAN FACTORS

PART-66 Syllabuses	Cross-reference	Level
MODULE 9A. HUMAN FACTORS – B1 & B2 CATEGORIES		
9.1. GENERAL		
The need to take human factors into account; Incidents attributable to human factors / human error; 'Murphy's' law.	**AG-09A-01-B1-B2**	**2**
9.2. HUMAN PERFORMANCE AND LIMITATIONS		
Vision; Hearing; Information processing; Attention and perception; Memory; Claustrophobia and physical access.	**AG-09A-02-B1-B2**	**2**
9.3. SOCIAL PSYCHOLOGY		
Responsibility: individual and group; Motivation and de-motivation;	**AG-09A-03-A-B1-B2**	**1**
Peer pressure;		

'Culture' issues; Team working; Management, Supervision and leadership.		
9.4. FACTORS AFFECTING PERFORMANCE		
Fitness / health; Stress: domestic and work related; Time pressure and deadlines; Workload: over load and underload; Sleep and fatigue, shiftwork; Alcohol, medication, drug abuse.	**AG-09A-04-A-B1-B2**	**2**
9.5. PHYSICAL ENVIRONMENT		
Noise and fumes; Illumination; Climate and temperature; Motion and vibration; Working environment.	**AG-09A-05-A-B1-B2**	**1**
9.6. TASKS		
Physical work; Repetitive tasks; Visual inspection; Complex systems.	**AG-09A-06-A-B1-B2**	**1**
9.7. COMMUNICATION		

Within and between teams; Work logging and recording; Keeping up to date, currency; Dissemination of information.	**AG-09A-07-A-B1-B2**	**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.	**AG-09A-08-B1-B2**	**2**
9.9. HAZARDS IN THE WORKPLACE		
Recognising and avoiding hazards; Dealing with emergencies.	**AG-09A-09-B1-B2**	**2**

Module 10

AVIATION LEGISLATION

PART-66 Syllabuses	Cross-reference	Level
MODULE 10. AVIATION LEGISLATION – B1, B2 & B3 CATEGORIES		
10.1. REGULATORY FRAMEWORK		
Role of International Civil Aviation Organisation; Role of the European Commission; Role of EASA; Role of the Member States and the National Aviation Authorities Regulation (EC) N° 1321/2014 and its implementing rules Regulations (EC) N° 216/2008 and (EC) N° 2042/2003. Relationships between the various Annexes (Parts) such as Part-21, Part-M, Part-145, Part-66, Part-147 and EO-OPS.	**AG-10-01-A-B1-B2-B3**	**1**
10.2. CERTIFYING STAFF - MAINTENANCE		
Detailed understanding of Part-66.	**AG-10-02-A-B1-B2-B3**	**2**
10.3. APPROVED MAINTENANCE ORGANIZATIONS		
Detailed understanding of Part-145 and Part-M Subpart F.	**AG-10-03-A-B1-B2-B3**	**2**
10.4. AIR OPERATIONS		
General understanding of EU-OPS;	**AG-10-04-A-B1-B2-B3**	**1**

Air Operators Certificates; Operators Responsibilities, in particular regarding continuing airworthiness and maintenance; Aircraft Maintenance Programme; MEL/CDL; Documents to be carried on board; Aircraft placarding (markings).		
10.5. CERTIFICATION OF AIRCRAFT, PARTS AND APPLIANCES		
(a) General	**AG-10-05a-B1-B2-B3**	**1**
General understanding of Part-21 and EASA certification specifications CS-23, 25, 27, 29.		
(b) Documents	**AG-10-05b-B1-B2-B3**	**2**
Certificate of Airworthiness; restricted certificates of airworthiness and permit to fly; Certificate of registration; Noise certificate; Weight schedule; Radio station licence and approval.		
10.6. CONTINUING AIRWORTHINESS		
Detailed understanding of Part-21 provisions related to continuing airworthiness; Detailed understanding of Part-M.	**AG-10-06-A-B1-B2-B3**	**2**
10.7. APPLICABLE NATIONAL AND INTERNATIONAL REQUIREMENTS FOR (IF NOT SUPERSEDED BY EU REQUIREMENTS).		
(a)	**AG-10-07a-B1-B2-B3**	**2**

Maintenance programmes, maintenance checks and inspections; Airworthiness directives; Service bulletins, manufacturers service information; Modifications and repairs; Maintenance documentation: maintenance manuals, structural repair manual, illustrated parts catalogue, etc. Master Minimum Equipment Lists, Minimum equipment lists, Dispatch Deviation lists.		
(b)	**AG-10-07b-B1-B2-B3**	**1**
Continuing airworthiness; Minimum equipment requirements – Test flights.		

Module 12

HELICOPTER AERODYNAMICS, STRUCTURES AND SYSTEMS

PART-66 Syllabuses	Cross-reference	Level
MODULE 12. HELICOPTER AERODYNAMICS, STRUCTURES AND SYSTEMS – B1.3 & B1.4 CATEGORIES		
12.1. THEORY OF FLIGHT – ROTARY WING AERODYNAMICS		
Terminology; Effects of gyroscopic precession; Torque reaction and directional control; Dissymmetry of lift, Blade tip stall; Translating tendency and its correction; Coriolis effect and compensation; Vortex ring state, power settling, overpitching; Auto-rotation; Ground effect.	**AG-12-01-B13-B14**	**3**
12.2. FLIGHT CONTROL SYSTEMS		
Cyclic control; Collective control; Swashplate;	**AG-12-02-B13-B14**	**3**

Yaw control: Anti-Torque Control, Tail rotor, bleed air; Main Rotor Head: Design and Operation features; Blade Dampers: Function and construction; Rotor Blades: Main and tail rotor blade construction and attachment; Trim control, fixed and adjustable stabilisers; System operation: manual, hydraulic, electrical and fly-by-wire; Artificial feel; Balancing and rigging.		
12.3. BLADE TRACKING AND VIBRATION ANALYSIS		
Rotor alignment; Main and tail rotor tracking; Static and dynamic balancing; Vibration types, vibration reduction methods; Ground resonance.	**AG-12-03-B13-B14**	**3**
12.4. TRANSMISSION		
Gear boxes, main and tail rotors; Clutches, free wheel units and rotor brake; Tail rotor drive shafts, flexible couplings, bearings, vibration dampers and bearing hangers.	**AG-12-04-B13-B14**	**3**
12.5. AIRFRAME STRUCTURES		
(a)	**AG-12-05a-A-B13-B14**	**2**
Airworthiness requirements for structural strength; Structural classification, primary, secondary and tertiary;		

Fail safe, safe life, damage tolerance concepts; Zonal and station identification systems; Stress, strain, bending, compression, shear, torsion, tension, hoop stress, fatigue; Drains and ventilation provisions; System installation provisions; Lightning strike protection provision.		
(b)	**AG-12-05b-B13-B14**	**2**
Construction methods of: stressed skin fuselage, formers, stringers, longerons, bulkheads, frames, doublers, struts, ties, beams, floor structures, reinforcement, methods of skinning and anti-corrosive protection; Pylon, stabiliser and undercarriage attachments; Seat installation; Doors: construction, mechanisms, operation and safety devices; Windows and windscreen construction; Fuel storage; Firewalls; Engine mounts; Structure assembly techniques: riveting, bolting, bonding; Methods of surface protection, such as chromating, anodising, painting; Surface cleaning; Airframe symmetry: methods of alignment and symmetry checks.		
12.6. AIR CONDITIONING (ATA 21)		
12.6.1. Air Supply	**AG-12-06-01-B13-B14**	**2**

Sources of air supply including engine bleed and ground cart.		
12.6.2. Air Conditioning	**AG-12-06-02-B13-B14**	**3**
Air conditioning systems; Distribution systems; Flow and temperature control systems; Protection and warning devices.		
12.7. INSTRUMENTS – AVIONIC SYSTEMS		
12.7.1. Instrument Systems (ATA 31)	**AG-12-07-01-B13-B14**	**2**
Pitot static: altimeter, air speed indicator, vertical speed indicator; Gyroscopic: artificial horizon, attitude director, direction indicator, horizontal situation indicator, turn and slip indicator, turn coordinator; Compasses: direct reading, remote reading; Vibration indicating systems — HUMS; Glass cockpit; Other aircraft system indication.		
12.7.2. Avionic Systems (ATA 31)	**AG-12-07-02-A-B13-B14**	**1**
Fundamentals of system layouts and operation of: ▪ Auto Flight (ATA 22); ▪ Communications (ATA 23);		
▪ Navigation Systems (ATA 34).		
12.8. ELECTRICAL POWER (ATA 24)		

Batteries Installation and Operation; DC power generation, AC power generation; Emergency power generation; Voltage regulation, Circuit protection. Power distribution; Inverters, transformers, rectifiers; External/Ground power.	**AG-12-08-B13-B14**	**3**
12.9. EQUIPMENT AND FURNISHINGS (ATA 25)		
(a)	**AG-12-09a-A-B13-B14**	**2**
Emergency equipment requirements; Seats, harnesses and belts; Lifting systems.		
(b)	**AG-12-09a-A-B13-B14**	**1**
Emergency flotation systems; Cabin lay-out, cargo retention; Equipment lay-out; Cabin furnishing installation.		
12.10. FIRE PROTECTION (ATA 26)		
Fire and smoke detection and warning systems; Fire extinguishing systems; System tests.	**AG-12-10-B13-B14**	**3**

12.11. FUEL SYSTEMS (ATA 28)		
System lay-out; Fuel tanks; Supply systems; Dumping, venting and draining; Cross-feed and transfer; Indications and warnings; Refuelling and defuelling.	**AG-12-11-B13-B14**	**3**
12.12. 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.	**AG-12-12-B13-B14**	**3**
12.13. ICE AND RAIN PROTECTION (ATA 30)		
Ice formation, classification and detection; Anti-icing and De-icing systems: electrical, hot air and chemical; Rain repellent and removal;	**AG-12-13-B13-B14**	**3**

Probe and drain heating; Wiper system.		
12.14. LANDING GEARS (ATA 32)		
Construction, shock absorbing; Extension and retraction systems: normal and emergency; Indications and warning; Wheels, Tyres, brakes; Steering; Air-ground sensing; Skids, floats.	**AG-12-14-B13-B14**	**3**
12.15. LIGHTS (ATA 33)		
External: navigation, landing, taxiing, ice; Internal: cabin, cockpit, cargo; Emergency.	**AG-12-15-B13-B14**	**3**
12.16. PNEUMATIC/VACUUM (ATA 36)		
System lay-out; Sources: engine/APU, compressors, reservoirs, ground supply;	**AG-12-16-B13-B14**	**3**
Pressure control; Distribution; Indications and warnings; Interfaces with other systems.		
12.17. INTEGRATED MODULAR AVIONICS (ATA 42)		

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,	**AG-12-17-B13-B14**	**2**
▪ Brake temperature monitoring, etc. Core system; Network components.		
12.18. ON BOARD MAINTENANCE (ATA 45)		
Central maintenance computers; Data loading system;	**AG-12-18-B13-B14**	**2**

Electronic library system; Printing; Structure monitoring (damage tolerance monitoring).		
12.19. INFORMATION SYSTEMS (ATA 46)		
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.	**AG-12-19-B13-B14**	**2**

Module 15

GAS TURBINE ENGINE

PART-66 Syllabuses	Cross-reference	Level
MODULE 15. GAS TURBINE ENGINE – B1.1 & B1.3 CATEGORIES		
15.1. FUNDAMENTALS		
Potential energy, kinetic energy, Newton's laws of motion, Brayton cycle; The relationship between force, work, power, energy, velocity, acceleration; Constructional arrangement and operation of turbojet, turbofan, turboshaft, turboprop.	**AG-15-01-B11-B13**	**2**
15.2. ENGINE PERFORMANCE		
Gross thrust, net thrust, choked nozzle thrust, thrust distribution, resultant thrust, thrust horsepower, equivalent shaft horsepower, specific fuel consumption; Engine efficiencies; By-pass ratio and engine pressure ratio; Pressure, temperature and velocity of the gas flow Engine ratings, static thrust, influence of speed, altitude and hot climate, flat rating, limitations.	**AG-15-02- B11-B13**	**2**
15.3. INLET		
Compressor inlet ducts; Effects of various inlet configurations;	**AG-15-03-A- B11-B13**	**2**
Ice protection.		

15.4. COMPRESSORS		
Axial and centrifugal types; Constructional features and operating principles and applications; Fan balancing; Operation; Causes and effects of compressors tall and surge; Methods of air flow control: bleed valves, variable inlet guide vanes, variable stator vanes, rotating stator blades; Compressor ratio.	**AG-15-04- B11-B13**	**2**
15.5. COMBUSTION SECTION		
Constructional features and principles of operation.	**AG-15-05- B11-B13**	**2**
15.6. TURBINE SECTION		
Operation and characteristics of different turbine blade types; Blade to disk attachment; Nozzle guide vanes; Causes and effects of turbine blade stress and creep.	**AG-15-06-A- B11-B13**	**2**
15.7. EXHAUST		
Constructional features and principles of operation; Convergent, divergent and variable area nozzles; Engine noise reduction;	**AG-15-07- B11-B13**	**2**
Thrust reversers.		

15.8. BEARINGS AND SEALS		
Constructional features and principles of operation.	**AG-15-08- B11-B13**	**2**
15.9. LUBRICANTS AND FUELS		
Properties and specifications; Fuel additives; Safety precautions.	**AG-15-09- B11-B13**	**2**
15.10. LUBRICATION SYSTEMS		
System operation / lay-out and components.	**AG-15-10- B11-B13**	**2**
15.11. FUEL SYSTEMS		
Operation of engine control and fuel metering systems including electronic engine control (FADEC); Systems lay-out and components.	**AG-15-11- B11-B13**	**2**
15.12. AIR SYSTEMS		
Operation of engine air distribution and anti-ice control systems, including internal cooling, sealing and external air services.	**AG-15-12- B11-B13**	**2**
15.13. STARTING AND IGNITION SYSTEMS		
Operation of engine start systems and components; Ignition systems and components; Maintenance safety requirements.	**AG-15-13- B11-B13**	**2**
15.14. ENGINE INDICATION SYSTEMS		
Exhaust gas temperature/ Interstage turbine temperature;	**AG-15-14- B11-B13**	**2**

Engine thrust Indication: ▪ engine pressure ratio, ▪ engine turbine discharge pressure or jet pipe pressure systems; Oil pressure and temperature; Fuel pressure and flow; Engine speed; Vibration measurement and indication; Torque; Power.		
15.15. POWER AUGMENTATION SYSTEMS		
Operation and applications; Water injection, water methanol; Afterburner systems.	**AG-15-15- B11-B13**	**2**
15.16. TURBO-PROP ENGINES		
Gas coupled / free turbine and gear coupled turbines; Reduction gears; Integrated engine and propeller controls; Overspeed safety devices.	**AG-15-16- B11-B13**	**2**
15.17. TURBO-SHAFT ENGINES		
Arrangements drive systems, reduction gearing, couplings, control systems.	**AG-15-17- B11-B13**	**2**
15.18. AUXILIARY POWER UNITS (APUs)		
Purpose, operation, protective systems.	**AG-15-18- B11-B13**	**2**

15.19. POWERPLANT INSTALLATION		
Configuration of firewalls, cowlings, acoustic panels, engine mounts, anti-vibration mounts, hoses, pipes, feeders, connectors, wiring looms, control cables and rods, lifting points and drains.	**AG-15-19- B11-B13**	**2**
15.20. FIRE PROTECTION SYSTEMS		
Operation of detection and extinguishing systems.	**AG-15-20- B11-B13**	**2**
15.21. ENGINE MONITORING AND GROUND INSTALLATION		
Procedures for starting and ground run-up; Interpretation of engine power output and parameters; Trend (including oil analysis, vibration and boroscope) monitoring; Inspection of engine and components to criteria, tolerances and data specified by engine manufacturer; Compressor washing / cleaning; Foreign object damage.	**AG-15-21- B11-B13**	**3**
15.22. ENGINE STORAGE AND PRESERVATION		
Preservation and depreservation for accessories/systems	**AG-15-22- B11-B13**	**2**

B1.4 CATEGORY

Module 1

MATHEMATICS

PART-66 Syllabuses	Cross-reference	Level
MODULE 1. MATHEMATICS – B1, B2 & B3 CATEGORIES		
1.1. ARITHMETIC		
Arithmetical terms and signs, Methods of multiplication and division, Fractions and decimals, Factors and multiples, Weights, measures and conversion factors, Ratio and proportion, Averages and percentages, Areas and volumes, squares, cubes, Square and cube roots.	**AG-01-01-B1-B2-B3**	**2**
1.2. ALGEBRA		
(a)	**AG-01-02a-B1-B2-B3**	**2**
Evaluating simple algebraic expressions, addition, subtraction, multiplication and division, use of brackets, simple algebraic fractions.		
(b)	**AG-01-02b-A-B1-B2-B3**	**1**

Linear equations and their solutions, Indices and powers, negative and fractional indices, Binary and other applicable numbering systems, Simultaneous equations, Second degree equations with one unknown, Logarithms.		
1.3. GEOMETRY		
(a)	**AG-01-3a-B1-B2-B3**	**1**
Simple geometrical constructions.		
(b)	**AG-01-03b-A-B1-B2-B3**	**2**
Graphical representation; nature and uses of graphs, Graphs of equations/functions.		
(c)	**AG-01-3c-B1-B2-B3**	**1**
Simple trigonometry; trigonometrical relationships, use of tables and rectangular and polar coordinates.		
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Module 2

PHYSICS

PART-66 Syllabuses	Cross-reference	Level
MODULE 2. PHYSICS – B1 CATEGORY		
2.1. MATTER		
Nature of matter: the chemical elements, structure of atoms, molecules; Chemical compounds. States: solid, liquid and gaseous; Changes between states.	**AG-02-01-A-B1-B2-B3**	**1**
2.2. MECHANICS		
2.2.1. Statics	**AG-02-02-01-B1**	**2**
Forces, moments and couples, representation as vectors; Centre of gravity. Elements of theory of stress, strain and elasticity: tension, compression, shear and torsion; Nature and properties of solid, fluid and gas; Pressure and buoyancy in liquids (barometers).		
2.2.2. Kinetics	**AG-02-02-02-B1**	**2**
Linear movement: uniform motion in a straight line, motion under constant acceleration (motion under gravity) ;		

Rotational movement: uniform circular motion (centrifugal/centripetal forces); Periodic motion: pendular movement; Simple theory of vibration, harmonics and resonance; Velocity ratio mechanical advantage and efficiency.		
2.2.3. Dynamics		
(a) Mass	**AG-02-02-03a-B1**	**2**
Mass, force, inertia, work, power, energy (potential, kinetic and total energy), heat, efficiency.		
(b) Momentum, conservation of momentum	**AG-02-02-03b-B1-B2**	**2**
Momentum, conservation of momentum; Impulse; Gyroscopic principles. Friction: nature and effects, coefficient of friction (rolling resistance).		
2.2.4. Fluid dynamics		
(a)	**AG-02-02-04a-A-B1-B2-B3**	**2**
Specific gravity and density		
(b)	**AG-02-02-04b-B1**	**2**
Viscosity, fluid resistance, effects of streamlining; Effects of compressibility on fluids ; Static, dynamic and total pressure: Bernoulli's Theorem, Venturi		
2.3. THERMODYNAMICS		

(a)	**AG-02-03a-A-B1-B2-B3**	**2**
Temperature: thermometers and temperature scales: Celsius, Fahrenheit and Kelvin. Heat definition.		
(b)	**AG-02-03b-B1-B2**	**2**
Heat capacity, specific heat; Heat transfer: convection, radiation and conduction; Volumetric expansion; First and second law of thermodynamics; Isothermal, adiabatic expansion and compression, engine cycles, constant volume and constant pressure, refrigerators and heat pumps; Gases: ideal gases laws; specific heat at constant volume and constant pressure, work done by expanding gas; Latent heat of fusion and evaporation, thermal energy, heat of combustion.		
2.4. OPTICS (LIGHT)		
Nature of light; speed of light; Laws of reflection and refraction: reflection at plane surfaces, Reflection by spherical mirrors, refraction, lenses, fibre optics.	**AG-02-04-B1-B2**	**2**
2.5. WAVE MOTION AND SOUND		
Wave motion: mechanical waves, sinusoidal wave motion, Interference phenomena, standing waves; Sound: speed of sound, production of sound, intensity, Pitch and quality, Doppler effect.	**AG-02-05-B1-B2**	**2**
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Module 3

ELECTRICAL FUNDAMENTALS

PART-66 Syllabuses	Cross-reference	Level
MODULE 3. ELECTRICAL FUNDAMENTALS – B1 & B2 CATEGORIES		
3.1. ELECTRON THEORY		
Structure and distribution of electrical charges within: atoms, molecules, ions, compounds; Molecular structure of conductors, semiconductors and insulators.	**AG-03-01-A-B1-B2-B3**	**1**
3.2. STATIC ELECTRICITY AND CONDUCTION		
Static electricity and distribution of electrostatic charges; Electro static laws of attraction and repulsion; Units of charge, Coulomb's Law; Conduction of electricity in solids, liquids, gases and vacuum.	**AG-03-02-B1-B2**	**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.	**AG-03-03- B1-B2**	**2**
3.4. GENERATION OF ELECTRICITY		
Production of electricity by the following methods: light, heat, friction, pressure, chemical action, magnetism and motion.	**AG-03-04-A-B1-B2-B3**	**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 of thermocouples; Operation of photo-cells.	**AG-03-05-B1-B2-B3**	**2**
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.	**AG-03-06-B1-B2**	**2**
3.7. RESISTANCE/RESISTOR		
(a)	**AG-03-07a-B1-B2**	**2**
Resistance and affecting factors Specific resistance; Resistor colour 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.		
(b)	**AG-03-07b-B1-B2**	**1**
Positive and negative temperature coefficient conductance		

Fixed resistors, stability, tolerance and limitations, methods of construction; Variable resistors, thermistors, voltage dependent resistors; construction of potentiometers and rheostats; Construction of Wheatstone Bridge.		
3.8. POWER		
Power, work and energy (kinetic and potential); Dissipation of power by a resistor; Power formula; Calculations involving power, work and energy.	**AG-03-08-B1-B2**	**2**
3.9. CAPACITANCE/CAPACITOR		
Operation and function of a capacitor; Factors affecting capacitance area of plates, distance between plates, number of plates, dielectric and dielectric constant, working voltage, voltage rating; Capacitor types, Construction and function; Capacitor colour coding; Calculations of capacitance and voltage in series and parallel circuits; Exponential charge and discharge of a capacitor, time constants; Testing of capacitors.	**AG-03-09-B1-B2**	**2**
3.10. MAGNETISM		
(a)	**AG-03-10a-B1-B2**	**2**
Theory of magnetism		
Properties of a magnet;		

Action of a magnet suspended in the Earth's magnetic field; Magnetisation and demagnetisation; Magnetic shielding; Various types of magnetic material; Electromagnets construction and principles of operation; Hand clasp rules to determine: magnetic field around current carrying conductor.		
(b)	**AG-03-10b-B1-B2**	**2**
Magnetomotive force, field strength, magnetic flux density, permeability, hysteresis loop, retentivity, coercive force reluctance, saturation point, eddy currents; Precautions for care and storage of magnets.		
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, 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; 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;	**AG-03-11-B1-B2**	**2**
Principle uses of inductors.		

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.	**AG-03-12-B1-B2**	**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 the values, in relation voltage, current and power; Triangular/Square waves; Single/3 phase principles.	**AG-03-13-B1-B2**	**2**
3.14. RESISTIVE (R), CAPACITIVE (C) AND INDUCTIVE (L) CIRCUITS		
Phase relation ship of voltage and current in L, C and R circuits, parallel, series and series parallel; Impedance, phase angle, power factor and current calculations; True power, apparent power and reactive power calculations.	**AG-03-14-B1-B2**	**2**
3.15. TRANSFORMERS		
Transformer construction principles and operation; Transformer losses and methods for overcoming them;	**AG-03-15-B1-B2**	**2**
Transformer action under load and no-load conditions; Power transfer, efficiency, polarity markings;		

Calculation of line and phase voltages and currents; Primary and Secondary current, voltage, turns ratio, power, efficiency; Auto transformers.		
3.16. FILTERS		
Operation, application and uses of the following filters: Low pass, high pass, band pass, band stop.	**AG-03-16-B1-B2**	**1**
3.17. AC GENERATORS		
Rotation of loop in a magnetic field and waveform produced; Operation and construction of 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.	**AG-03-17-B1-B2**	**2**
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.	**AG-03-18-B1-B2**	**2**

Module 4

ELECTRONIC FUNDAMENTALS

PART-66 Syllabuses	Cross-reference	Level
MODULE 4. ELECTRONIC FUNDAMENTALS – B1 CATEGORY		
4.1. SEMICONDUCTORS		
4.1.1. Diodes		
(a)	**AG-04-01-01a-B1-B2**	**2**
Diode symbols; Diode characteristics and properties; Diodes in series and parallel; Main characteristics and use of silicon controlled rectifiers (thyristors), light emitting diode, photo conductive diode, varistor, rectifier diodes; Functional testing of diodes.		
(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;		
Diode parameters: peak inverse voltage, maximum forward current, temperature, frequency, leakage		

current, power dissipation; 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, Schottky diode, photo conductive diode, varactor diode, varistor, rectifier diodes, and Zener diode.		
4.1.2. Transistors		
(a)	**AG-04-01-02a-B1-B3**	**1**
Transistor symbols; Component description and orientation; Transistor characteristics and properties.		
(b)	**-**	**-**
Construction and operation of PNP and NPN transistors; 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 stabilisation; Multistage circuit principles: cascades, push-pull, oscillators, multivibrators, flip-flop circuits.		
4.1.3. Integrated circuits		
(a)	**AG-04-01-03a-B1-B3**	**1**
Description and operation of logic circuits and linear circuits/operational amplifiers.		
(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.		
4.2. PRINTED CIRCUIT BOARDS		
Description and use of printed circuit boards.	**AG-04-02-B1**	**1**
4.3. SERVOMECHANISMS		
(a)	**AG-04-03-B1**	**1**
Understanding of the following terms: Open and closed loop systems, feedback, follow up, analogue transducers; Principles of operation and use of following synchro system components/features: resolvers, differential, control and torque, transformers, inductance and capacitance transmitters.		
(b)	**-**	**-**
Understanding of the following terms: Open and closed loop, follow-up, servomechanism, analogue, transducer, null, damping, feedback, dead band; 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.		

Module 5

DIGITAL TECHNIQUES / ELECTRONIC INSTRUMENT SYSTEMS

PART-66 Syllabuses	Cross-reference	Level
MODULE 5. DIGITAL TECHNIQUES – B1.2 & B1.4 CATEGORIES		
5.1. ELECTRONIC INSTRUMENT SYSTEMS		
Typical systems arrangements and cockpit layout of electronic instrument systems.	**AG-05-01-B12-B14**	**2**
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.	-	-
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.	-	-
5.4. DATA BUSES		
Operation of data buses in aircraft systems including knowledge of ARINC and other specifications; Aircraft network/Ethernet.	-	-
5.5. LOGIC CIRCUITS		
(a)	**-**	**-**
Identification of common logic gate symbols, tables and equivalent circuits;		

Applications used for aircraft systems, schematic diagrams.		
(b)		
Interpretation of logic diagrams.		
5.6. BASIC COMPUTER STRUCTURE		
(a)	**-**	**-**
Computer terminology (including bit, byte, software, hard ware, CPU, IC, and various memory devices such as RAM, ROM, PROM); Computer technology (as applied in aircraft systems).		
(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.		
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.	-	-
5.8. INTEGRATED CIRCUITS		
Operation and use of encoders and decoders;	-	-

Function of encoder types; Uses of medium, large and very large scale integration.		
5.9. MULTIPLEXING		
Operation, application and identification in logic diagrams of multiplexers and demultiplexers.	-	-
5.10. FIBRE OPTICS	**AG-05-10-B12-B14**	**1**
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.		
5.11. ELECTRONIC DISPLAYS		
Principles of operation of common types of displays used in modern aircraft, including: cathode ray tubes, light emitting diodes, liquid crystal display.	**AG-05-11-B12-B14**	**1**
5.12. ELECTRONIC SENSITIVE DEVICES		
Special handling of components sensitive to electrostatic discharges; Awareness of risks and possible damage, component and personnel anti-static protection devices.	**AG-05-12-B12-B14**	**2**
5.13. SOFTWARE MANAGEMENT CONTROL		
Awareness of restrictions, airworthiness requirements and possible catastrophic effects of unapproved changes to software programmes.	**AG-05-13-B12-B14**	**1**
5.14. ELECTROMAGNETIC ENVIRONMENT		
Influence of the following phenomena on maintenance practices for electronic system: ▪ EMC-ElectroMagnetic Compatibility;	**AG-05-14-B12-B14**	**2**

▪ EMI-ElectroMagnetic Interference; ▪ HIRF-High Intensity Radiated Field; ▪ Lightning/lightning protection.		
5.15. TYPICAL ELECTRONIC/DIGITAL AIRCRAFT SYSTEM		
General arrangement of typical electronic / digital aircraft systems and associated BITE (Built In Test Equipment) testing such as: ▪ ACARS – ARINC Communication and Addressing and Reporting System; ▪ ECAM – Electronic Centralised Aircraft Monitoring; ▪ EFIS – Electronic Flight Instrument System; ▪ EICAS – Engine Indication and Crew Alerting System; ▪ FBW – Fly-By-Wire: ▪ FMS – Flight Management System; ▪ GPS – Global Positioning System; ▪ IRS – Inertial Reference System; ▪ TCAS – Traffic Alert Collision Avoidance System; ▪ IMA – Integrated Modular Avionics; ▪ Cabin systems; ▪ Information systems.	**AG-05-15-B12-B14**	**2**

Module 6

MATERIALS AND HARDWARE

PART-66 Syllabuses	Cross-reference	Level
MODULE 6. MATERIALS AND HARDWARE – B1 CATEGORY		
6.1. AIRCRAFT MATERIALS - FERROUS		
(a)	**AG-06-01a-B1-B3**	**2**
Characteristics, properties and identification of common alloy steels used in aircraft; Heat treatment and application of alloy steels.		
(b)	**AG-06-01b-B1-B2-B3**	**1**
Testing of ferrous materials for hardness, tensile strength, fatigue strength and impact resistance.		
6.2. AIRCRAFT MATERIALS – NON-FERROUS		
(a)	**AG-06-02a-B1-B3**	**2**
Characteristics, properties and identification of common non-ferrous materials used in aircraft; Heat treatment and application of non-ferrous materials.		
(b)	**AG-06-02a-B1-B2-B3**	**1**
Testing of non-ferrous material for hardness, tensile strength, fatigue strength and impact resistance.		
6.3. AIRCRAFT MATERIALS – COMPOSITE AND NON-METALLIC		

6.3.1. Composite and non-metallic other than wood and fabric		
(a)	**AG-06-03-01a-B1-B2-B3**	**2**
Characteristics, properties and identification of common composite and non-metallic materials, other than wood, used in aircraft; Sealant and bonding agents.		
(b)	**AG-06-03-01b-B1-B3**	**2**
The detection of defects/deterioration in composite and non-metallic material. Repair of composite and non-metallic material.		
6.3.2. Wooden structures		
Construction methods of wooden airframe structures; Characteristics, properties and types of wood and glue used in aeroplanes; 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.	**AG-06-03-02-B1-B3**	**2**
6.3.3. Fabric covering		
Characteristics, properties and types of fabrics used in aeroplanes; Inspections methods for fabric; Types of defects in fabric; repair of fabric covering.	**AG-06-03-03-B1-B3**	**2**
6.4. CORROSION		
(a)	**AG-06-04a-A-B1-B2-B3**	**1**

Chemical fundamentals; Formation by, galvanic action process, microbiological, stress.		
(b)	**AG-06-04b-B1**	**3**
Types of corrosion and their identification; Causes of corrosion; Material types, susceptibility to corrosion.		
6.5. FASTENERS		
6.5.1. Screw threads	**AG-06-05-01-A-B1-B2-B3**	**2**
Screw nomenclature; Thread forms, dimension and tolerances for standard thread used in aircraft; Measuring screw threads		
6.5.2. Bolts, studs and screws	**AG-06-05-02-A-B1-B2-B3**	**2**
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.		
6.5.3. Locking devices	**AG-06-05-03-A-B1-B2-B3**	**2**
Tab and spring washers, locking plates, split pins, pal-nuts, wire locking, quick release fasteners, keys, circlips, cotter pins.		
6.5.4. Aircraft rivets	**AG-06-05-04-B1-B3**	**2**

Types of solid and blind rivets: specifications and identification; Heat treatment.		
6.6. PIPES AND UNIONS		
(a)	**AG-06-06a-A-B1-B2-B3**	**2**
Identification of, and types of rigid and flexible pipes and their connectors used in aircraft.		
(b)	**AG-06-06b-A-B1-B3**	**2**
Standard unions for aircraft hydraulic, fuel, oil, pneumatic and air system pipes.		
6.7. SPRINGS		
Types of springs, materials, characteristics and applications.	**AG-06-07-B1**	**2**
6.8. BEARINGS		
Purpose of bearings, loads, material, construction; Types of bearings and their application.	**AG-06-08-B1-B2**	**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.	**AG-06-09-B1-B2**	**2**
6.10. CONTROL CABLES		
Types of cables; End fittings, turnbuckles and compensation devices; Pulleys and cable system components;	**6.9. TRANSMISSIONS**	

Bowden cables; Aircraft flexible control systems.	**AG-06-10-B1-B3**	**2**
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.	**AG-06-11-B1-B2-B3**	**2**

Module 7

MAINTENANCE PRACTICES

PART-66 Syllabuses	Cross-reference	Level
MODULE 7A. MAINTENANCE PRACTICES – B1 CATEGORY		
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.	**AG-07A-01-A-B1-B2**	**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.	**AG-07A-02-A-B1-B2**	**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.	**AG-07A-03-A-B1-B2**	**3**
7.4. AVIONIC TEST EQUIPMENT		

Operation, function and use of avionic general test equipment.	**AG-07A-04-B1**	**2**
7.5. ENGINEERING DRAWINGS, DIAGRAMS AND STANDARDS		
Drawing types and diagrams, their symbols, dimensions, tolerances and projections; Identifying title block information; Microfilm, microfiche and computerised 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.	**AG-07A-05-B1-B2**	**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.	**AG-07A-06-B1**	**2**
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;	**AG-07A-07-B1-B2**	**3**
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; EWIS installations, inspection, repair, maintenance and cleanliness standards.		
7.8. RIVETING		
Riveted joints, rivet spacing and pitch; Tools used for riveting and dimpling; Inspection of riveted joints.	**AG-07A-08-B1**	**2**
7.9. PIPES AND HOSES		
Bending and belling / flaring aircraft pipes; Inspection and testing of aircraft pipes and hoses; Installation and clamping of pipes.	**AG-07A-09-B1**	2
7.10. SPRINGS		
Inspection and testing of springs.	**AG-07A-10-B1**	**2**
7.11. BEARINGS		
Testing, cleaning and inspection of bearings; Lubrication requirements of bearings; Defects in bearings and their causes.	**AG-07A-11-B1**	**2**
7.12. TRANSMISSIONS		
Inspection of gears, backlash; Inspection of belts and pulleys, chains and sprockets;	**AG-07A-12-B1**	**2**
Inspection of screw jacks, lever devices, push-pull rod systems.		

7.13. CONTROL CABLES		
Swaging of end fittings; Inspection and testing of control cables; Bowden cables; aircraft flexible control systems.	**AG-07A-13-B1**	**2**
7.14. MATERIAL HANDLING		
7.14.1. Sheet metal	**AG-07A-14a-B1**	**2**
Marking out and calculation of bend allowance; Sheet metal working, including bending and forming; Inspection of sheet metal work.		
7.14.2. Composite and non-metallic	**AG-07A-14b-B1**	**2**
Bonding practices; Environmental conditions Inspection methods		
7.15. WELDING, BRAZING, SOLDERING AND BONDING		
(a)	**AG-07A-15a-B1-B2**	**2**
Soldering methods; inspection of soldered joints.		
(b)	**AG-07A-15b-B1**	**2**
Welding and brazing methods; Inspection of welded and brazed joints;		
Bonding methods and inspection of bonded joints.		

7.16. AIRCRAFT WEIGHT AND BALANCE		
(a)	**AG-07A-16a-B1-B2**	**2**
Centre of gravity/Balance limits calculation: use of relevant documents.		
(b)	**AG-07A-16b-B1**	**2**
Preparation of aircraft for weighing; Aircraft weighing.		
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 / de-fuelling procedures; De-icing / anti-icing procedures; Electrical, hydraulic and pneumatic ground supplies; Effects of environmental conditions on aircraft handling and operation.	**AG-07A-17-A-B1-B2**	**2**
7.18. DISASSEMBLY, INSPECTION, REPAIR, AND ASSEMBLY TECHNIQUES		
(a)		
Types of defects and visual inspection techniques. Corrosion removal, assessment and re-protection.	**AG-07A-18a-B1-B2**	**3**
(b)	**AG-07A-18b-B1**	**2**
General repair methods, Structural Repair Manual;		

Ageing, fatigue and corrosion control programmes.		
(c)	**AG-07A-18c-B1**	**2**
Non destructive inspection techniques including, penetrant, radiographic, eddy current, ultrasonic and boroscope methods.		
(d)	**AG-07A-18d-A-B1-B2**	**2**
Disassembly and re-assembly techniques.		
(e)	**AG-07A-18e-B1-B2**	**2**
Trouble shooting techniques.		
7.19. ABNORMAL EVENTS		
(a)	**AG-07A-19a-A-B1-B2**	**2**
Inspections following lightning strikes and HIRF penetration.		
(b)	**AG-07A-19b-A-B1**	**2**
Inspections following abnormal events such as heavy landings and flight through turbulence.		
7.20. MAINTENANCE PROCEDURES		
Maintenance planning; Modification procedures; Stores procedures; Certification / release procedures;	**AG-07A-20-B1-B2**	**2**
Interface with aircraft operation; Maintenance Inspection / Quality Control / Quality Assurance ;		

Additional maintenance procedures. Control of life limited components.		

Module 8

BASIC AERODYNAMICS

PART-66 Syllabuses	Cross-reference	Level
MODULE 8. BASIC AERODYNAMICS – B1 & B2 CATEGORIES		
8.1. PHYSICS OF THE ATMOSPHERE		
International Standard Atmosphere (ISA), application to aerodynamics.	**AG-08-01-A-B3**	**1**
8.2. AERODYNAMICS		
Airflow around a body; Boundary layer, laminar and turbulent flow, free stream flow, relative airflow, upwash 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.	**AG-08-02-A-B3**	**1**
8.3. THEORY OF FLIGHT		
Relation ship between lift, weight, thrust and drag; Glide ratio; Steady stable flights, performance; Theory of the turn;	**AG-08-03-A-B3**	**1**
Influence of load factor: stall, flight envelope and structural limitations;		

Lift augmentation.		
8.4. FLIGHT STABILITY AND DYNAMICS		
Longitudinal, lateral and directional stability (active and passive).	**AG-08-04-A-B3**	**1**

Module 9

HUMAN FACTORS

PART-66 Syllabuses	Cross-reference	Level
MODULE 9A. HUMAN FACTORS – B1 & B2 CATEGORIES		
9.1. GENERAL		
The need to take human factors into account; Incidents attributable to human factors / human error; 'Murphy's' law.	**AG-09A-01-B1-B2**	**2**
9.2. HUMAN PERFORMANCE AND LIMITATIONS		
Vision; Hearing; Information processing; Attention and perception; Memory; Claustrophobia and physical access.	**AG-09A-02-B1-B2**	**2**
9.3. SOCIAL PSYCHOLOGY		
Responsibility: individual and group; Motivation and de-motivation;	**AG-09A-03-A-B1-B2**	**1**
Peer pressure;		

'Culture' issues; Team working; Management, Supervision and leadership.		
9.4. FACTORS AFFECTING PERFORMANCE		
Fitness / health; Stress: domestic and work related; Time pressure and deadlines; Workload: over load and underload; Sleep and fatigue, shiftwork; Alcohol, medication, drug abuse.	**AG-09A-04-A-B1-B2**	**2**
9.5. PHYSICAL ENVIRONMENT		
Noise and fumes; Illumination; Climate and temperature; Motion and vibration; Working environment.	**AG-09A-05-A-B1-B2**	**1**
9.6. TASKS		
Physical work; Repetitive tasks; Visual inspection; Complex systems.	**AG-09A-06-A-B1-B2**	**1**
9.7. COMMUNICATION		

Within and between teams; Work logging and recording; Keeping up to date, currency; Dissemination of information.	**AG-09A-07-A-B1-B2**	**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.	**AG-09A-08-B1-B2**	**2**
9.9. HAZARDS IN THE WORKPLACE		
Recognising and avoiding hazards; Dealing with emergencies.	**AG-09A-09-B1-B2**	**2**

Module 10

AVIATION LEGISLATION

PART-66 Syllabuses	Cross-reference	Level
MODULE 10. AVIATION LEGISLATION – B1, B2 & B3 CATEGORIES		
10.1. REGULATORY FRAMEWORK		
Role of International Civil Aviation Organisation; Role of the European Commission; Role of EASA; Role of the Member States and the National Aviation Authorities Regulation (EC) N° 1321/2014 and its implementing rules Regulations (EC) N° 216/2008 and (EC) N° 2042/2003. Relationships between the various Annexes (Parts) such as Part-21, Part-M, Part-145, Part-66, Part-147 and EO-OPS.	**AG-10-01-A-B1-B2-B3**	**1**
10.2. CERTIFYING STAFF - MAINTENANCE		
Detailed understanding of Part-66.	**AG-10-02-A-B1-B2-B3**	**2**
10.3. APPROVED MAINTENANCE ORGANIZATIONS		
Detailed understanding of Part-145 and Part-M Subpart F.	**AG-10-03-A-B1-B2-B3**	**2**
10.4. AIR OPERATIONS		
General understanding of EU-OPS;	**AG-10-04-A-B1-B2-B3**	**1**

Air Operators Certificates; Operators Responsibilities, in particular regarding continuing airworthiness and maintenance; Aircraft Maintenance Programme; MEL/CDL; Documents to be carried on board; Aircraft placarding (markings).		
10.5. CERTIFICATION OF AIRCRAFT, PARTS AND APPLIANCES		
(a) General	**AG-10-05a-B1-B2-B3**	**1**
General understanding of Part-21 and EASA certification specifications CS-23, 25, 27, 29.		
(b) Documents	**AG-10-05b-B1-B2-B3**	**2**
Certificate of Airworthiness; restricted certificates of airworthiness and permit to fly; Certificate of registration; Noise certificate; Weight schedule; Radio station licence and approval.		
10.6. CONTINUING AIRWORTHINESS		
Detailed understanding of Part-21 provisions related to continuing airworthiness; Detailed understanding of Part-M.	**AG-10-06-A-B1-B2-B3**	**2**
10.7. APPLICABLE NATIONAL AND INTERNATIONAL REQUIREMENTS FOR (IF NOT SUPERSEDED BY EU REQUIREMENTS).		
(a)	**AG-10-07a-B1-B2-B3**	**2**

Maintenance programmes, maintenance checks and inspections; Airworthiness directives; Service bulletins, manufacturers service information; Modifications and repairs; Maintenance documentation: maintenance manuals, structural repair manual, illustrated parts catalogue, etc. Master Minimum Equipment Lists, Minimum equipment lists, Dispatch Deviation lists.		
(b)	**AG-10-07b-B1-B2-B3**	**1**
Continuing airworthiness; Minimum equipment requirements – Test flights.		

Module 12

HELICOPTER AERODYNAMICS, STRUCTURES AND SYSTEMS

PART-66 Syllabuses	Cross-reference	Level
MODULE 12. HELICOPTER AERODYNAMICS, STRUCTURES AND SYSTEMS – B1.3 & B1.4 CATEGORIES		
12.1. THEORY OF FLIGHT – ROTARY WING AERODYNAMICS		
Terminology; Effects of gyroscopic precession; Torque reaction and directional control; Dissymmetry of lift, Blade tip stall; Translating tendency and its correction; Coriolis effect and compensation; Vortex ring state, power settling, overpitching; Auto-rotation; Ground effect.	**AG-12-01-B13-B14**	**3**
12.2. FLIGHT CONTROL SYSTEMS		
Cyclic control; Collective control;	**AG-12-02-B13-B14**	**3**
Swashplate;		

Yaw control: Anti-Torque Control, Tail rotor, bleed air; Main Rotor Head: Design and Operation features; Blade Dampers: Function and construction; Rotor Blades: Main and tail rotor blade construction and attachment; Trim control, fixed and adjustable stabilisers; System operation: manual, hydraulic, electrical and fly-by-wire; Artificial feel; Balancing and rigging.		
12.3. BLADE TRACKING AND VIBRATION ANALYSIS		
Rotor alignment; Main and tail rotor tracking; Static and dynamic balancing; Vibration types, vibration reduction methods; Ground resonance.	**AG-12-03-B13-B14**	**3**
12.4. TRANSMISSION		
Gear boxes, main and tail rotors; Clutches, free wheel units and rotor brake; Tail rotor drive shafts, flexible couplings, bearings, vibration dampers and bearing hangers.	**AG-12-04-B13-B14**	**3**
12.5. AIRFRAME STRUCTURES		
(a)	**AG-12-05a-A-B13-B14**	**2**
Airworthiness requirements for structural strength; Structural classification, primary, secondary and tertiary;		

Fail safe, safe life, damage tolerance concepts; Zonal and station identification systems; Stress, strain, bending, compression, shear, torsion, tension, hoop stress, fatigue; Drains and ventilation provisions; System installation provisions; Lightning strike protection provision.		
(b)	**AG-12-05b-B13-B14**	**2**
Construction methods of: stressed skin fuselage, formers, stringers, longerons, bulkheads, frames, doublers, struts, ties, beams, floor structures, reinforcement, methods of skinning and anti-corrosive protection; Pylon, stabiliser and undercarriage attachments; Seat installation; Doors: construction, mechanisms, operation and safety devices; Windows and windscreen construction; Fuel storage; Firewalls; Engine mounts; Structure assembly techniques: riveting, bolting, bonding; Methods of surface protection, such as chromating, anodising, painting; Surface cleaning; Airframe symmetry: methods of alignment and symmetry checks.		
12.6. AIR CONDITIONING (ATA 21)		
12.6.1. Air Supply	**AG-12-06-01-B13-B14**	**2**

Sources of air supply including engine bleed and ground cart.		
12.6.2. Air Conditioning	**AG-12-06-02-B13-B14**	**3**
Air conditioning systems; Distribution systems; Flow and temperature control systems; Protection and warning devices.		
12.7. INSTRUMENTS – AVIONIC SYSTEMS		
12.7.1. Instrument Systems (ATA 31)	**AG-12-07-01-B13-B14**	**2**
Pitot static: altimeter, air speed indicator, vertical speed indicator; Gyroscopic: artificial horizon, attitude director, direction indicator, horizontal situation indicator, turn and slip indicator, turn coordinator; Compasses: direct reading, remote reading; Vibration indicating systems — HUMS; Glass cockpit; Other aircraft system indication.		
12.7.2. Avionic Systems (ATA 31)	**AG-12-07-02-A-B13-B14**	**1**
Fundamentals of system layouts and operation of: ▪ Auto Flight (ATA 22); ▪ Communications (ATA 23);		
▪ Navigation Systems (ATA 34).		
12.8. ELECTRICAL POWER (ATA 24)		

Batteries Installation and Operation; DC power generation, AC power generation; Emergency power generation; Voltage regulation, Circuit protection. Power distribution; Inverters, transformers, rectifiers; External/Ground power.	**AG-12-08-B13-B14**	**3**
12.9. EQUIPMENT AND FURNISHINGS (ATA 25)		
(a)	**AG-12-09a-A-B13-B14**	**2**
Emergency equipment requirements; Seats, harnesses and belts; Lifting systems.		
(b)	**AG-12-09a-A-B13-B14**	**1**
Emergency flotation systems; Cabin lay-out, cargo retention; Equipment lay-out; Cabin furnishing installation.		
12.10. FIRE PROTECTION (ATA 26)		
Fire and smoke detection and warning systems; Fire extinguishing systems; System tests.	**AG-12-10-B13-B14**	**3**

12.11. FUEL SYSTEMS (ATA 28)		
System lay-out; Fuel tanks; Supply systems; Dumping, venting and draining; Cross-feed and transfer; Indications and warnings; Refuelling and defuelling.	**AG-12-11-B13-B14**	**3**
12.12. 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.	**AG-12-12-B13-B14**	**3**
12.13. ICE AND RAIN PROTECTION (ATA 30)		
Ice formation, classification and detection; Anti-icing and De-icing systems: electrical, hot air and chemical; Rain repellent and removal;	**AG-12-13-B13-B14**	**3**

Probe and drain heating; Wiper system.		
12.14. LANDING GEARS (ATA 32)		
Construction, shock absorbing; Extension and retraction systems: normal and emergency; Indications and warning; Wheels, Tyres, brakes; Steering; Air-ground sensing; Skids, floats.	**AG-12-14-B13-B14**	**3**
12.15. LIGHTS (ATA 33)		
External: navigation, landing, taxiing, ice; Internal: cabin, cockpit, cargo; Emergency.	**AG-12-15-B13-B14**	**3**
12.16. PNEUMATIC/VACUUM (ATA 36)		
System lay-out; Sources: engine/APU, compressors, reservoirs, ground supply;	**AG-12-16-B13-B14**	**3**
Pressure control; Distribution; Indications and warnings; Interfaces with other systems.		
12.17. INTEGRATED MODULAR AVIONICS (ATA 42)		

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,	**AG-12-17-B13-B14**	**2**
▪ Brake temperature monitoring, etc. Core system; Network components.		
12.18. ON BOARD MAINTENANCE (ATA 45)		
Central maintenance computers; Data loading system;	**AG-12-18-B13-B14**	**2**

Electronic library system; Printing; Structure monitoring (damage tolerance monitoring).		
12.19. INFORMATION SYSTEMS (ATA 46)		
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.	**AG-12-19-B13-B14**	**2**

Module 16

PISTON ENGINE

PART-66 Syllabuses	Cross-reference	Level
MODULE 16. PISTON ENGINE – B1.2 & B1.4 CATEGORIES		
16.1. FUNDAMENTALS		
Mechanical, thermal and volumetric efficiencies; Operating principles: 2 stroke, 4 stroke, Otto and Diesel; Piston displacement and compression ratio; Engine configuration and firing order.	**AG-16-01-B12-B14**	**2**
16.2. ENGINE PERFORMANCE		
Power calculation and measurement; Factors affecting engine power; Mixtures/leaning, pre-ignition.	**AG-16-02- B12-B14**	**2**
16.3. ENGINE CONSTRUCTION		
Crank case, crank shaft, cam shafts, sumps; Accessory gearbox; Cylinder and piston assemblies; Connecting rods, inlet and exhaust manifolds;	**AG-15-03-A- B12-B14**	**2**
Valve mechanisms;		

Propeller reduction gearboxes.		
16.4. ENGINE FUEL SYSTEMS		
16.4.1. Carburettors		
Types, construction and principles of operation; Icing and heating.	**AG-16-04-01- B12-B14**	**2**
16.4.2. Fuel injection systems		
Types, construction and principles of operation.	**AG-16-04-02- B12-B14**	**2**
16.4.3. Electronic engine control		
Operation of engine control and fuel metering systems including electronic engine control (FADEC); Systems lay-out and components.	**AG-16-04-03-A- B12-B14**	**2**
16.5. STARTING AND IGNITION YSTEMS		
Starting systems, pre-heat systems; Magneto types, construction and principles of operation; Ignition harnesses, spark plugs; Low and high tension systems.	**AG-16-05- B12-B14**	**2**
16.6. INDUCTION, EXHAUST AND COOLING SYSTEMS		
Construction and operation of: induction systems including alternate air systems; Exhaust systems, engine cooling systems — air and liquid.	**AG-16-06- B12-B14**	**2**
16.7. SUPERCHARGING/TURBOCHARGING		
Principles and purpose of supercharging and its effects on engine parameters;	**AG-16-07- B12-B14**	**2**

Construction and operation of supercharging/turbocharging systems; System terminology; Control systems; System protection..		
16.8. LUBRICANTS AND FUELS		
Properties and specifications; Fuel additives; Safety precautions.	**AG-16-08- B12-B14**	**2**
16.9. LUBRICATION SYSTEMS		
System operation/lay-out and components.	**AG-16-09- B12-B14**	**2**
16.10. ENGINE INDICATION SYSTEMS		
Engine speed; Cylinder head temperature; Coolant temperature; Oil pressure and temperature; Exhaust Gas Temperature; Fuel pressure and flow; Manifold pressure.	**AG-16-10- B12-B14**	**2**
16.11. POWERPLANT INSTLLATION		
	AG-16-11- B12-B14	**2**
Configuration of firewalls, cowlings, acoustic panels, engine mounts, anti-vibration mounts, hoses, pipes, feeders, connectors, wiring looms, control cables and rods, lifting points and drains.		

16.12. ENGINE MONITORING AND GROUND OPERATIONS		
Procedures for starting and ground run-up; Interpretation of engine power output and parameters; Inspection of engine and components: criteria, tolerances, and data specified by engine manufacturer.	**AG-16-12- B12-B14**	**3**
16.13. ENGINE STORAGE AND PRESERVATION		
Preservation and depreservation for the engine and accessories/systems.	**AG-16-13- B12-B14**	**2**

B2 CATEGORY

Module 1

MATHEMATICS

PART-66 Syllabuses	Cross-reference	Level
MODULE 1. MATHEMATICS – B1, B2 & B3 CATEGORIES		
1.1. ARITHMETIC		
Arithmetical terms and signs, Methods of multiplication and division, Fractions and decimals, Factors and multiples, Weights, measures and conversion factors, Ratio and proportion, Averages and percentages, Areas and volumes, squares, cubes, Square and cube roots.	**AG-01-01-B1-B2-B3**	**2**
1.2. ALGEBRA		
(a)	**AG-01-02a-B1-B2-B3**	**2**
Evaluating simple algebraic expressions, addition, subtraction, multiplication and division, use of brackets, simple algebraic fractions.		
(b)	**AG-01-02b-A-B1-B2-B3**	**1**

Linear equations and their solutions, Indices and powers, negative and fractional indices, Binary and other applicable numbering systems, Simultaneous equations, Second degree equations with one unknown, Logarithms.		
1.3. GEOMETRY		
(a)	**AG-01-3a-B1-B2-B3**	**1**
Simple geometrical constructions.		
(b)	**AG-01-03b-A-B1-B2-B3**	**2**
Graphical representation; nature and uses of graphs, Graphs of equations/functions.		
(c)	**AG-01-3c-B1-B2-B3**	**1**
Simple trigonometry; trigonometrical relationships, use of tables and rectangular and polar coordinates.		
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Module 2

PHYSICS

PART-66 Syllabuses	Cross-reference	Level

MODULE 2. PHYSICS – B2 CATEGORY		
2.1. MATTER		
Nature of matter: the chemical elements, structure of atoms, molecules; Chemical compounds. States: solid, liquid and gaseous; Changes between states.	**AG-02-01-A-B1-B2-B3**	**1**
2.2. MECHANICS		
2.2.1. Statics	**AG-02-02-01-A-B2-B3**	**1**
Forces, moments and couples, representation as vectors; Centre of gravity. Elements of theory of stress, strain and elasticity: tension, compression, shear and torsion; Nature and properties of solid, fluid and gas; Pressure and buoyancy in liquids (barometers).		
2.2.2. Kinetics	**AG-02-02-02-A-B2-B3**	**1**
Linear movement: uniform motion in a straight line, motion under constant acceleration (motion under gravity) ;		
Rotational movement: uniform circular motion (centrifugal/centripetal forces); Periodic motion: pendular movement; Simple theory of vibration, harmonics and resonance; Velocity ratio mechanical advantage and efficiency.		

2.2.3. Dynamics		
(a) Mass	**AG-02-02-03a-A-B2-B3**	**1**
Mass, force, inertia, work, power, energy (potential, kinetic and total energy), heat, efficiency.		
(b) Momentum, conservation of momentum	**AG-02-02-03b-B1-B2**	**2**
Momentum, conservation of momentum; Impulse; Gyroscopic principles. Friction: nature and effects, coefficient of friction (rolling resistance).		
2.2.4. Fluid dynamics		
(a)	**AG-02-02-04a-A-B1-B2-B3**	**2**
Specific gravity and density		
(b)	**AG-02-02-04b-A-B2-B3**	**1**
Viscosity, fluid resistance, effects of streamlining; Effects of compressibility on fluids ; Static, dynamic and total pressure: Bernoulli's Theorem, Venturi		
2.3. THERMODYNAMICS		
(a)	**AG-02-03a-A-B1-B2-B3**	**2**
Temperature: thermometers and temperature scales: Celsius, Fahrenheit and Kelvin. Heat definition.		
(b)	**AG-02-03b-B1-B2**	**2**

Heat capacity, specific heat; Heat transfer: convection, radiation and conduction; Volumetric expansion; First and second law of thermodynamics; Isothermal, adiabatic expansion and compression, engine cycles, constant volume and constant pressure, refrigerators and heat pumps; Gases: ideal gases laws; specific heat at constant volume and constant pressure, work done by expanding gas; Latent heat of fusion and evaporation, thermal energy, heat of combustion.		
2.4. OPTICS (LIGHT)		
Nature of light; speed of light; Laws of reflection and refraction: reflection at plane surfaces, Reflection by spherical mirrors, refraction, lenses, fibre optics.	**AG-02-04-B1-B2**	**2**
2.5. WAVE MOTION AND SOUND		
Wave motion: mechanical waves, sinusoidal wave motion, Interference phenomena, standing waves; Sound: speed of sound, production of sound, intensity, Pitch and quality, Doppler effect.	**AG-02-05-B1-B2**	**2**
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Module 3

ELECTRICAL FUNDAMENTALS

PART-66 Syllabuses	Cross-reference	Level
MODULE 3. ELECTRICAL FUNDAMENTALS – B1 & B2 CATEGORIES		
3.1. ELECTRON THEORY		
Structure and distribution of electrical charges within: atoms, molecules, ions, compounds; Molecular structure of conductors, semiconductors and insulators.	**AG-03-01-A-B1-B2-B3**	**1**
3.2. STATIC ELECTRICITY AND CONDUCTION		
Static electricity and distribution of electrostatic charges; Electro static laws of attraction and repulsion; Units of charge, Coulomb's Law; Conduction of electricity in solids, liquids, gases and vacuum.	**AG-03-02-B1-B2**	**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.	**AG-03-03- B1-B2**	**2**
3.4. GENERATION OF ELECTRICITY		
Production of electricity by the following methods: light, heat, friction, pressure, chemical action, magnetism and motion.	**AG-03-04-A-B1-B2-B3**	**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 of thermocouples; Operation of photo-cells.	**AG-03-05-B1-B2-B3**	**2**
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.	**AG-03-06-B1-B2**	**2**
3.7. RESISTANCE/RESISTOR		
(a)	**AG-03-07a-B1-B2**	**2**
Resistance and affecting factors Specific resistance; Resistor colour 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.		
(b)	**AG-03-07b-B1-B2**	**1**
Positive and negative temperature coefficient conductance		

Fixed resistors, stability, tolerance and limitations, methods of construction; Variable resistors, thermistors, voltage dependent resistors; construction of potentiometers and rheostats; Construction of Wheatstone Bridge.		
3.8. POWER		
Power, work and energy (kinetic and potential); Dissipation of power by a resistor; Power formula; Calculations involving power, work and energy.	**AG-03-08-B1-B2**	**2**
3.9. CAPACITANCE/CAPACITOR		
Operation and function of a capacitor; Factors affecting capacitance area of plates, distance between plates, number of plates, dielectric and dielectric constant, working voltage, voltage rating; Capacitor types, Construction and function; Capacitor colour coding; Calculations of capacitance and voltage in series and parallel circuits; Exponential charge and discharge of a capacitor, time constants; Testing of capacitors.	**AG-03-09-B1-B2**	**2**
3.10. MAGNETISM		
(a)	**AG-03-10a-B1-B2**	**2**
Theory of magnetism;		
Properties of a magnet;		

Action of a magnet suspended in the Earth's magnetic field; Magnetisation and demagnetisation; Magnetic shielding; Various types of magnetic material; Electromagnets construction and principles of operation; Hand clasp rules to determine: magnetic field around current carrying conductor.		
(b)	**AG-03-10b-B1-B2**	**2**
Magnetomotive force, field strength, magnetic flux density, permeability, hysteresis loop, retentivity, coercive force reluctance, saturation point, eddy currents; Precautions for care and storage of magnets.		
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, 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;	**AG-03-11-B1-B2**	**2**
Back emf, self induction;		

Principle uses of inductors.		
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.	**AG-03-12-B1-B2**	**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 the values, in relation voltage, current and power; Triangular/Square waves; Single/3 phase principles.	**AG-03-13-B1-B2**	**2**
3.14. RESISTIVE (R), CAPACITIVE (C) AND INDUCTIVE (L) CIRCUITS		
Phase relation ship of voltage and current in L, C and R circuits, parallel, series and series parallel; Impedance, phase angle, power factor and current calculations; True power, apparent power and reactive power calculations.	**AG-03-14-B1-B2**	**2**
3.15. TRANSFORMERS		
Transformer construction principles and operation;	**AG-03-15-B1-B2**	**2**
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; Primary and Secondary current, voltage, turns ratio, power, efficiency; Auto transformers.		
3.16. FILTERS		
Operation, application and uses of the following filters: Low pass, high pass, band pass, band stop.	**AG-03-16-B1-B2**	**1**
3.17. AC GENERATORS		
Rotation of loop in a magnetic field and waveform produced; Operation and construction of 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.	**AG-03-17-B1-B2**	**2**
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.	**AG-03-18-B1-B2**	**2**

Module 4

ELECTRONIC FUNDAMENTALS

PART-66 Syllabuses	Cross-reference	Level
MODULE 4. ELECTRONIC FUNDAMENTALS – B2 CATEGORY		
4.1. SEMICONDUCTORS		
4.1.1. Diodes		
(a)	**AG-04-01-01a-B1-B2**	**2**
Diode symbols; Diode characteristics and properties; Diodes in series and parallel; Main characteristics and use of silicon controlled rectifiers (thyristors), light emitting diode, photo conductive diode, varistor, rectifier diodes; Functional testing of diodes.		
(b)	**AG-04-01-01b-B2**	**2**
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; Diode parameters: peak inverse voltage, maximum forward current, temperature, frequency, leakage current, power dissipation;		

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, Schottky diode, photo conductive diode, varactor diode, varistor, rectifier diodes, and Zener diode.		
4.1.2. Transistors		
(a)	**AG-04-01-02a-B2**	**2**
Transistor symbols; Component description and orientation; Transistor characteristics and properties.		
(b)	**AG-04-01-02b-B2**	**2**
Construction and operation of PNP and NPN transistors; 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 stabilisation; Multistage circuit principles: cascades, push-pull, oscillators, multivibrators, flip-flop circuits.		
4.1.3. Integrated circuits		
(a)	**-**	**-**
Description and operation of logic circuits and linear circuits/operational amplifiers.		
(b)	**AG-04-01-03a-B2**	**2**
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.		
4.2. PRINTED CIRCUIT BOARDS		
Description and use of printed circuit boards.	**AG-04-02-B1**	**2**
4.3. SERVOMECHANISMS		
(a)	**-**	**-**
Understanding of the following terms: Open and closed loop systems, feedback, follow up, analogue transducers; Principles of operation and use of following synchro system components/features: resolvers, differential, control and torque, transformers, inductance and capacitance transmitters.		
(b)	**AG-04-03-B2**	**2**
Understanding of the following terms: Open and closed loop, follow-up, servomechanism, analogue, transducer, null, damping, feedback, dead band; 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.		

Module 5

DIGITAL TECHNIQUES / ELECTRONIC INSTRUMENT SYSTEMS

PART-66 Syllabuses	Cross-reference	Level
MODULE 5. DIGITAL TECHNIQUES – B2 CATEGORY		
5.1. ELECTRONIC INSTRUMENT SYSTEMS		
Typical systems arrangements and cockpit layout of electronic instrument systems.	**AG-05-01-B2**	**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.	**AG-05-02-B2**	**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.	**AG-05-03-B2**	**2**
5.4. DATA BUSES		
Operation of data buses in aircraft systems including knowledge of ARINC and other specifications; Aircraft network/Ethernet.	**AG-05-04-B2**	**2**
5.5. LOGIC CIRCUITS		
(a)	**AG-05-05a-B2**	**2**
Identification of common logic gate symbols, tables and equivalent circuits;		

Applications used for aircraft systems, schematic diagrams.		
(b)	**AG-05-05b-B2**	**2**
Interpretation of logic diagrams.		
5.6. BASIC COMPUTER STRUCTURE		
(a)	**-**	**-**
Computer terminology (including bit, byte, software, hard ware, CPU, IC, and various memory devices such as RAM, ROM, PROM); Computer technology (as applied in aircraft systems).		
(b)	**AG-05-06b-B2**	**2**
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.		
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.	**AG-05-07-B2**	**2**
5.8. INTEGRATED CIRCUITS		
Operation and use of encoders and decoders;	**AG-05-08-B2**	**2**

Function of encoder types; Uses of medium, large and very large scale integration.		
5.9. MULTIPLEXING		
Operation, application and identification in logic diagrams of multiplexers and demultiplexers.	**AG-05-09-B2**	**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.	**AG-05-10-B2**	**2**
5.11. ELECTRONIC DISPLAYS		
Principles of operation of common types of displays used in modern aircraft, including : cathode ray tubes, light emitting diodes, liquid crystal display.	**AG-05-11-B2**	**2**
5.12. ELECTRONIC SENSITIVE DEVICES		
Special handling of components sensitive to electrostatic discharges; Awareness of risks and possible damage, component and personnel anti-static protection devices.	**AG-05-12-B2**	**2**
5.13. SOFTWARE MANAGEMENT CONTROL		
Awareness of restrictions, airworthiness requirements and possible catastrophic effects of unapproved changes to software programmes.	**AG-05-13-B2**	**2**
5.14. ELECTROMAGNETIC ENVIRONMENT		
Influence of the following phenomena on maintenance practices for electronic system: ▪ EMC-ElectroMagnetic Compatibility;	**AG-05-14-B2**	**2**

▪ EMI-ElectroMagnetic Interference; ▪ HIRF-High Intensity Radiated Field; ▪ Lightning/lightning protection.		
5.15. TYPICAL ELECTRONIC/DIGITAL AIRCRAFT SYSTEM		
General arrangement of typical electronic / digital aircraft systems and associated BITE (Built In Test Equipment) testing such as: ▪ ACARS – ARINC Communication and Addressing and Reporting System; ▪ ECAM – Electronic Centralised Aircraft Monitoring; ▪ EFIS – Electronic Flight Instrument System; ▪ EICAS – Engine Indication and Crew Alerting System; ▪ FBW – Fly-By-Wire: ▪ FMS – Flight Management System; ▪ GPS – Global Positioning System; ▪ IRS – Inertial Reference System; ▪ TCAS – Traffic Alert Collision Avoidance System; ▪ IMA – Integrated Modular Avionics; ▪ Cabin systems; ▪ Information systems.	**AG-05-15-B2**	**2**

Module 6

MATERIALS AND HARDWARE

PART-66 Syllabuses	Cross-reference	Level
MODULE 6. MATERIALS AND HARDWARE – B2 CATEGORY		
6.1. AIRCRAFT MATERIALS - FERROUS		
(a)	**AG-06-01a-A-B2**	**1**
Characteristics, properties and identification of common alloy steels used in aircraft; Heat treatment and application of alloy steels.		
(b)	**AG-06-01b-B1-B2-B3**	**1**
Testing of ferrous materials for hardness, tensile strength, fatigue strength and impact resistance.		
6.2. AIRCRAFT MATERIALS – NON-FERROUS		
(a)	**AG-06-02a-A-B2**	**1**
Characteristics, properties and identification of common non-ferrous materials used in aircraft; Heat treatment and application of non-ferrous materials.		
(b)	**AG-06-02a-B1-B2-B3**	**1**
Testing of non-ferrous material for hardness, tensile strength, fatigue strength and impact resistance.		
6.3. AIRCRAFT MATERIALS – COMPOSITE AND NON-METALLIC		

6.3.1. Composite and non-metallic other than wood and fabric		
(a)	**AG-06-03-01a-B1-B2-B3**	**2**
Characteristics, properties and identification of common composite and non-metallic 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.		
6.3.2. Wooden structures		
Construction methods of wooden airframe structures; Characteristics, properties and types of wood and glue used in aeroplanes; 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.	**-**	**-**
6.3.3. Fabric covering		
Characteristics, properties and types of fabrics used in aeroplanes; Inspections methods for fabric; Types of defects in fabric; repair of fabric covering.	**-**	**-**
6.4. CORROSION		
(a)	**AG-06-04a-A-B1-B2-B3**	**1**

Chemical fundamentals; Formation by, galvanic action process, microbiological, stress.		
(b)	**AG-06-04b-A-B2-B3**	**2**
Types of corrosion and their identification; Causes of corrosion; Material types, susceptibility to corrosion.		
6.5. FASTENERS		
6.5.1. Screw threads	**AG-06-05-01-A-B1-B2-B3**	**2**
Screw nomenclature; Thread forms, dimension and tolerances for standard thread used in aircraft; Measuring screw threads		
6.5.2. Bolts, studs and screws	**AG-06-05-02-A-B1-B2-B3**	**2**
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.		
6.5.3. Locking devices	**AG-06-05-03-A-B1-B2-B3**	**2**
Tab and spring washers, locking plates, split pins, pal-nuts, wire locking, quick release fasteners, keys, circlips, cotter pins.		
6.5.4. Aircraft rivets	**AG-06-05-04-A-B2**	**1**

Types of solid and blind rivets: specifications and identification; Heat treatment.		
6.6. PIPES AND UNIONS		
(a)	**AG-06-06a-A-B1-B2-B3**	**2**
Identification of, and types of rigid and flexible pipes and their connectors used in aircraft.		
(b)	**AG-06-06b-B2**	**1**
Standard unions for aircraft hydraulic, fuel, oil, pneumatic and air system pipes.		
6.7. SPRINGS		
Types of springs, materials, characteristics and applications.	**AG-06-07-B2-B3**	**1**
6.8. BEARINGS		
Purpose of bearings, loads, material, construction; Types of bearings and their application.	**AG-06-08-B1-B2**	**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.	**AG-06-09-B1-B2**	**2**
6.10. CONTROL CABLES		
Types of cables; End fittings, turnbuckles and compensation devices;	**AG-06-10-A-B2**	**1**

Pulleys and cable system components; Bowden cables; Aircraft flexible control systems.		
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.	**AG-06-11-B1-B2-B3**	**2**

Module 7

MAINTENANCE PRACTICES

PART-66 Syllabuses	Cross-reference	Level
MODULE 7A. MAINTENANCE PRACTICES – B2 CATEGORY		
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.	**AG-07A-01-A-B1-B2**	**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.	**AG-07A-02-A-B1-B2**	**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.	**AG-07A-03-A-B1-B2**	**3**
7.4. AVIONIC TEST EQUIPMENT		

Operation, function and use of avionic general test equipment.	**AG-07A-04-B2**	**3**
7.5. ENGINEERING DRAWINGS, DIAGRAMS AND STANDARDS		
Drawing types and diagrams, their symbols, dimensions, tolerances and projections; Identifying title block information; Microfilm, microfiche and computerised 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.	**AG-07A-05-B1-B2**	**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.	**AG-07A-06-A-B2**	**2**
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;	**AG-07A-07-B1-B2**	**3**
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; EWIS installations, inspection, repair, maintenance and cleanliness standards.		
7.8. RIVETING		
Riveted joints, rivet spacing and pitch; Tools used for riveting and dimpling; Inspection of riveted joints.	-	-
7.9. PIPES AND HOSES		
Bending and belling / flaring aircraft pipes; Inspection and testing of aircraft pipes and hoses; Installation and clamping of pipes.	-	-
7.10. SPRINGS		
Inspection and testing of springs.	-	-
7.11. BEARINGS		
Testing, cleaning and inspection of bearings; Lubrication requirements of bearings; Defects in bearings and their causes.	-	-
7.12. TRANSMISSIONS		
Inspection of gears, backlash; Inspection of belts and pulleys, chains and sprockets; Inspection of screw jacks, lever devices, push-pull rod systems.	-	-
7.13. CONTROL CABLES		

Swaging of end fittings; Inspection and testing of control cables; Bowden cables; aircraft flexible control systems.	-	-
7.14. MATERIAL HANDLING		
7.14.1. Sheet metal	-	-
Marking out and calculation of bend allowance; Sheet metal working, including bending and forming; Inspection of sheet metal work.		
7.14.2. Composite and non-metallic	-	-
Bonding practices; Environmental conditions Inspection methods		
7.15. WELDING, BRAZING, SOLDERING AND BONDING		
(a)	**AG-07A-15a-B1-B2**	**2**
Soldering methods; inspection of soldered joints.		
(b)	-	-
Welding and brazing methods; Inspection of welded and brazed joints; Bonding methods and inspection of bonded joints.		
7.16. AIRCRAFT WEIGHT AND BALANCE		

(a)	**AG-07A-16a-B1-B2**	**2**
Centre of gravity/Balance limits calculation: use of relevant documents.		
(b)	-	-
Preparation of aircraft for weighing; Aircraft weighing.		
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 / de-fuelling procedures; De-icing / anti-icing procedures; Electrical, hydraulic and pneumatic ground supplies; Effects of environmental conditions on aircraft handling and operation.	**AG-07A-17-A-B1-B2**	**2**
7.18. DISASSEMBLY, INSPECTION, REPAIR, AND ASSEMBLY TECHNIQUES		
(a)		
Types of defects and visual inspection techniques.	**AG-07A-18a-B1-B2**	**3**
Corrosion removal, assessment and re-protection.		
(b)	-	-
General repair methods, Structural Repair Manual; Ageing, fatigue and corrosion control programmes.		

(c)	**AG-07A-18c-B2**	**1**
Non destructive inspection techniques including, penetrant, radiographic, eddy current, ultrasonic and boroscope methods.		
(d)	**AG-07A-18d-A-B1-B2**	**2**
Disassembly and re-assembly techniques.		
(e)	**AG-07A-18e-B1-B2**	**2**
Trouble shooting techniques.		
7.19. ABNORMAL EVENTS		
(a)	**AG-07A-19a-A-B1-B2**	**2**
Inspections following lightning strikes and HIRF penetration.		
(b)	-	-
Inspections following abnormal events such as heavy landings and flight through turbulence.		
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.	**AG-07A-20-B1-B2**	**2**

Control of life limited components.		

Module 8

BASIC AERODYNAMICS

PART-66 Syllabuses	Cross-reference	Level
MODULE 8. BASIC AERODYNAMICS – B1 & B2 CATEGORIES		
8.1. PHYSICS OF THE ATMOSPHERE		
International Standard Atmosphere (ISA), application to aerodynamics.	**AG-08-01-A-B3**	**1**
8.2. AERODYNAMICS		
Airflow around a body; Boundary layer, laminar and turbulent flow, free stream flow, relative airflow, upwash 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.	**AG-08-02-A-B3**	**1**
8.3. THEORY OF FLIGHT		
Relation ship between lift, weight, thrust and drag; Glide ratio; Steady stable flights, performance; Theory of the turn;	**AG-08-03-A-B3**	**1**
Influence of load factor: stall, flight envelope and structural limitations;		

Lift augmentation.		
8.4. FLIGHT STABILITY AND DYNAMICS		
Longitudinal, lateral and directional stability (active and passive).	**AG-08-04-A-B3**	**1**

Module 9

HUMAN FACTORS

PART-66 Syllabuses	Cross-reference	Level
MODULE 9A. HUMAN FACTORS – B1 & B2 CATEGORIES		
9.1. GENERAL		
The need to take human factors into account; Incidents attributable to human factors / human error; 'Murphy's' law.	**AG-09A-01-B1-B2**	**2**
9.2. HUMAN PERFORMANCE AND LIMITATIONS		
Vision; Hearing; Information processing; Attention and perception; Memory; Claustrophobia and physical access.	**AG-09A-02-B1-B2**	**2**
9.3. SOCIAL PSYCHOLOGY		
Responsibility: individual and group; Motivation and de-motivation;	**AG-09A-03-A-B1-B2**	**1**
Peer pressure;		

'Culture' issues; Team working; Management, Supervision and leadership.		
9.4. FACTORS AFFECTING PERFORMANCE		
Fitness / health; Stress: domestic and work related; Time pressure and deadlines; Workload: over load and underload; Sleep and fatigue, shiftwork; Alcohol, medication, drug abuse.	**AG-09A-04-A-B1-B2**	**2**
9.5. PHYSICAL ENVIRONMENT		
Noise and fumes; Illumination; Climate and temperature; Motion and vibration; Working environment.	**AG-09A-05-A-B1-B2**	**1**
9.6. TASKS		
Physical work; Repetitive tasks; Visual inspection; Complex systems.	**AG-09A-06-A-B1-B2**	**1**
9.7. COMMUNICATION		

Within and between teams; Work logging and recording; Keeping up to date, currency; Dissemination of information.	**AG-09A-07-A-B1-B2**	**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.	**AG-09A-08-B1-B2**	**2**
9.9. HAZARDS IN THE WORKPLACE		
Recognising and avoiding hazards; Dealing with emergencies.	**AG-09A-09-B1-B2**	**2**

Module 10

AVIATION LEGISLATION

PART-66 Syllabuses	Cross-reference	Level
MODULE 10. AVIATION LEGISLATION – B1, B2 & B3 CATEGORIES		
10.1. REGULATORY FRAMEWORK		
Role of International Civil Aviation Organisation; Role of the European Commission; Role of EASA; Role of the Member States and the National Aviation Authorities Regulation (EC) N° 1321/2014 and its implementing rules Regulations (EC) N° 216/2008 and (EC) N° 2042/2003. Relationships between the various Annexes (Parts) such as Part-21, Part-M, Part-145, Part-66, Part-147 and EO-OPS.	**AG-10-01-A-B1-B2-B3**	**1**
10.2. CERTIFYING STAFF - MAINTENANCE		
Detailed understanding of Part-66.	**AG-10-02-A-B1-B2-B3**	**2**
10.3. APPROVED MAINTENANCE ORGANIZATIONS		
Detailed understanding of Part-145 and Part-M Subpart F.	**AG-10-03-A-B1-B2-B3**	**2**
10.4. AIR OPERATIONS		
General understanding of EU-OPS;	**AG-10-04-A-B1-B2-B3**	**1**

Air Operators Certificates; Operators Responsibilities, in particular regarding continuing airworthiness and maintenance; Aircraft Maintenance Programme; MEL/CDL; Documents to be carried on board; Aircraft placarding (markings).		
10.5. CERTIFICATION OF AIRCRAFT, PARTS AND APPLIANCES		
(a) General	**AG-10-05a-B1-B2-B3**	**1**
General understanding of Part-21 and EASA certification specifications CS-23, 25, 27, 29.		
(b) Documents	**AG-10-05b-B1-B2-B3**	**2**
Certificate of Airworthiness; restricted certificates of airworthiness and permit to fly; Certificate of registration; Noise certificate; Weight schedule; Radio station licence and approval.		
10.6. CONTINUING AIRWORTHINESS		
Detailed understanding of Part-21 provisions related to continuing airworthiness; Detailed understanding of Part-M.	**AG-10-06-A-B1-B2-B3**	**2**
10.7. APPLICABLE NATIONAL AND INTERNATIONAL REQUIREMENTS FOR (IF NOT SUPERSEDED BY EU REQUIREMENTS).		
(a)	**AG-10-07a-B1-B2-B3**	**2**

Maintenance programmes, maintenance checks and inspections; Airworthiness directives; Service bulletins, manufacturers service information; Modifications and repairs; Maintenance documentation: maintenance manuals, structural repair manual, illustrated parts catalogue, etc. Master Minimum Equipment Lists, Minimum equipment lists, Dispatch Deviation lists.		
(b)	**AG-10-07b-B1-B2-B3**	**1**
Continuing airworthiness; Minimum equipment requirements – Test flights.		

Module 13

AIRCRAFT AERODYNAMICS, STRUCTURES AND SYSTEMS

PART-66 Syllabuses	Cross-reference	Level
MODULE 13. AIRCRAFT AERODYNAMICS, STRUCTURES AND SYSTEMS – B2 CATEGORY		
13.1. THEORY OF FLIGHT		
(a) Aeroplane aerodynamics and flight controls	**AG-13-01a-B2**	**1**
Operation and effect of: roll control: ailerons and spoilers, pitch control: elevators, stabilators, variable incidence stabilisers 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.		
(b) High speed flight	**AG-13-01b-B2**	**1**
Speed of sound, subsonic flight, transonic flight, super sonic flight, Mach number, critical Mach number.		
(c) Rotary wing aerodynamics	**AG-13-01c-B2**	**1**

Terminology; Operation and effect of cyclic, collective and anti-torque controls.		
13.2. STRUCTURES – GENERAL CONCEPTS		
(a)	**AG-13-02a-B2**	**1**
Fundamentals of structural systems.		
(b)	**AG-13-02a-B2**	**1**
Zonal and station identification systems; Electrical bonding; Lightning strike protection provision.		
13.3. AUTOFLIGHT (ATA 22)		
Fundamentals of automatic flight control including working principles and current terminology; Command signal processing; Modes of operation: roll, pitch and yaw channels; Yaw dampers; Stability Augmentation System in helicopters; Automatic trim control; Autopilot navigation aids interface; Autothrottle systems. Automatic landing systems: principles and categories, modes of operation, approach, glideslope, land, go-around, system monitors and failure conditions.	**AG-13-03-B2**	**3**
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 omni directional range (VOR); Automatic Direction Finding (ADF); Instrument Landing System (ILS); Microwave Landing System (MLS); Very Low Frequency and hyperbolic navigation (VLF/Omega); Doppler navigation; Flight Director systems; Distance Measuring Equipment (DME); Area navigation, RNAV systems; Hyperbolic navigation systems Flight Management Systems (FMS) and ARINC communication and reporting(ACARS). Global Positioning System (GPS), Global Navigation Satellite Systems(GNSS); Inertial Navigation System; Air Traffic Control transponder, secondary surveillance radar; Weather avoidance radar; Traffic Alert and Collision Avoidance System (TCAS);	**AG-13-04-B2**	**3**
Radio altimeter;		

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.	**AG-13-05-B2**	**3**
13.6 EQUIPMENT AND FURNISHINGS (ATA 25)		
Electronic emergency equipment requirements; Cabin entertainment equipment.	**AG-13-06-B2**	**3**
13.7 FLIGHT CONTROLS (ATA 27)		
(a)	**AG-13-07a-B2**	**1**
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.		

(b)		
System operation: electrical, fly by wire.	**AG-13-07b-B2**	**2**
13.8 INSTRUMENT SYSTEMS (ATA 31)		
Classification; Atmosphere; Terminology; Pressure measuring devices and systems; Pitot static systems; Altimeters; Vertical speed indicators; Air speed 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;	**AG-13-08-B2**	**3**
Compass systems; Electronic Flight Instrument Systems		

Instrument warning systems including master warning systems and centralised warning panels; Stall warning systems and angle of attack indicating systems; Vibration measurement and indication. Glass cockpit.		
13.9 LIGHTS (ATA 33)		
External: navigation, landing, taxiing, ice; Internal: cabin, cockpit, cargo; Emergency.	**AG-13-09-B2**	**3**
13.10 ON BOARD MAINTENANCE SYSTEMS (ATA 45)		
Central maintenance computers; Data loading system; Electronic library system; Printing; Structure monitoring (damage tolerance monitoring).	**AG-13-10-B2**	**3**
13.11 AIR CONDITIONING AND CABIN PRESSURIZATION (ATA 21)		
13.11.1. Air supply	**AG-13-11-01-B2**	**2**
Sources of air supply including engine bleed, APU and ground cart.		
13.11.2. Air conditioning	**AG-13-11-02-B2**	**3**
Air conditioning systems; Air cycle and vapour cycle machines; Distribution systems;		

Flow, temperature and humidity control system.		
13.11.3. Pressurization	**AG-13-11-03-B2**	**3**
Pressurisation systems; Control and indication including control and safety valves; Cabin pressure controllers.		
13.11.4. Safety and warning devices	**AG-13-11-03-B2**	**3**
Protection and warning devices.		
13.12 FIRE PROTECTION (ATA 26)		
(a)	**AG-13-12a-B2**	**3**
Fire and smoke detection and warning systems; Fire extinguishing systems; System tests.		
(b)	**AG-13-12b-B2**	**1**
Portable fire extinguisher.		
13.13 FUEL SYSTEMS (ATA 28)	**AG-13-13-B2**	**3**
System lay-out; Fuel tanks;		**1** **1**
Supply systems; Dumping, venting and draining; Cross-feed and transfer;		**1** **1** **2**

Indications and warnings; Refuelling and defuelling; Longitudinal balance fuel systems.		**3** **2** **3**
13.14 HYDRAULIC POWER (ATA 29)	**AG-13-14-B2**	**3**
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.		**1** **1** **1** **3** **3** **1** **3** **1** **3** **3**
13.15 ICE AND RAIN PROTECTION (ATA 30)	**AG-13-15-B2**	**3**
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;		**2** **2** **3** **1** **3**
Wiper systems.		**1**
13.16. LANDING GEAR (ATA 32)	**AG-13-16-B2**	**3**

Construction, shock absorbing; Extension and retraction systems: normal and emergency; Indications and warning; Wheels, brakes, antiskid and auto braking; Tyres; Steering; Air-ground sensing.		**1** **3** **3** **3** **1** **3** **3**
13.17. OXYGEN (ATA 35)	**AG-13-17-B2**	**3**
System lay-out: ▪ - cockpit, ▪ - cabin; Sources, storage, charging and distribution; Supply regulation; Indications and warnings.		**3** **3** **3** **3**
13.18. PNEUMATIC/VACUUM (ATA 36)	**AG-13-18-B2**	**3**
System lay-out; Sources: engine / APU, compressors, reservoirs, ground supply; Pressure control; Distribution; Indications and warnings;		**2** **2** **3** **1** **3**
Interfaces with other systems.		**3**
13.19. WATER/WASTE (ATA 38)		

Water system lay-out, supply, distribution, servicing and draining; Toilet system lay-out, flushing and servicing; Corrosion aspects.	**AG-13-19-B2**	**2**
13.20. INTEGRATED MODULAR AVIONICS (ATA 42)		
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.	**AG-13-20-B2**	**3**
13.21. CABIN SYSTEMS (ATA 44)		
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 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.	**AG-13-21-B2**	**3**
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. INFORMTION SYSTEMS (ATA 46)		
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.	**AG-13-18-B2**	**3**

Module 14

PROPULSION

PART-66 Syllabuses	Cross-reference	Level
MODULE 14. PROPULSION – B2 CATEGORY		
14.1. TURBINE ENGINES		
(a)	**AG-14-01a-B2**	**1**
Constructional arrangement and operation of turbojet, turbofan, turbo shaft and turbopropeller engines;		
(b)	**AG-14-01b-B2**	**2**
Electronic Engine control and fuel metering systems (FADEC).		
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.	**AG-14-02-B2**	**2**

14.3. STARTING AND IGNITION SYSTEMS		
Operation of engine start systems and components; Ignition systems and components; Maintenance safety requirements.	**AG-14-03-B2**	**2**

B3 CATEGORY

Module 1

MATHEMATICS

PART-66 Syllabuses	Cross-reference	Level
MODULE 1. MATHEMATICS – B1, B2 & B3 CATEGORIES		
1.1. ARITHMETIC		
Arithmetical terms and signs, Methods of multiplication and division, Fractions and decimals, Factors and multiples, Weights, measures and conversion factors, Ratio and proportion, Averages and percentages, Areas and volumes, squares, cubes, Square and cube roots.	**AG-01-01-B1-B2-B3**	**2**
1.2. ALGEBRA		
(a)	**AG-01-02a-B1-B2-B3**	**2**
Evaluating simple algebraic expressions, addition, subtraction, multiplication and division, use of brackets, simple algebraic fractions.		
(b)	**AG-01-02b-A-B1-B2-B3**	**1**

Linear equations and their solutions, Indices and powers, negative and fractional indices, Binary and other applicable numbering systems, Simultaneous equations, Second degree equations with one unknown, Logarithms.		
1.3. GEOMETRY		
(a)	**AG-01-3a-B1-B2-B3**	**1**
Simple geometrical constructions.		
(b)	**AG-01-03b-A-B1-B2-B3**	**2**
Graphical representation; nature and uses of graphs, Graphs of equations/functions.		
(c)	**AG-01-3c-B1-B2-B3**	**1**
Simple trigonometry; trigonometrical relationships, use of tables and rectangular and polar coordinates.		
	-	**-**

Module 2

PHYSICS

PART-66 Syllabuses	Cross-reference	Level
MODULE 2. PHYSICS – B3 CATEGORY		
2.1. MATTER		
Nature of matter: the chemical elements, structure of atoms, molecules; Chemical compounds. States: solid, liquid and gaseous; Changes between states.	**AG-02-01-A-B1-B2-B3**	**1**
2.2. MECHANICS		
2.2.1. Statics	**AG-02-02-01-A-B2-B3**	**1**
Forces, moments and couples, representation as vectors; Centre of gravity. Elements of theory of stress, strain and elasticity: tension, compression, shear and torsion; Nature and properties of solid, fluid and gas; Pressure and buoyancy in liquids (barometers).		
2.2.2. Kinetics	**AG-02-02-02-A-B2-B3**	**1**
Linear movement: uniform motion in a straight line, motion under constant acceleration (motion under		

gravity) ; Rotational movement: uniform circular motion (centrifugal/centripetal forces); Periodic motion: pendular movement; Simple theory of vibration, harmonics and resonance; Velocity ratio mechanical advantage and efficiency.		
2.2.3. Dynamics		
(a) Mass	**AG-02-02-03a-A-B2-B3**	**1**
Mass, force, inertia, work, power, energy (potential, kinetic and total energy), heat, efficiency.		
(b) Momentum, conservation of momentum	**AG-02-02-03b-A-B3**	**1**
Momentum, conservation of momentum; Impulse; Gyroscopic principles. Friction: nature and effects, coefficient of friction (rolling resistance).		
2.2.4. Fluid dynamics		
(a)	**AG-02-02-04a-A-B1-B2-B3**	**2**
Specific gravity and density		
(b)	**AG-02-02-04b-A-B2-B3**	**1**
Viscosity, fluid resistance, effects of streamlining; Effects of compressibility on fluids ; Static, dynamic and total pressure: Bernoulli's Theorem, Venturi		
2.3. THERMODYNAMICS		

(a)	**AG-02-03a-A-B1-B2-B3**	**2**
Temperature: thermometers and temperature scales: Celsius, Fahrenheit and Kelvin. Heat definition.		
(b)	**AG-02-03a-B3**	**1**
Heat capacity, specific heat; Heat transfer: convection, radiation and conduction; Volumetric expansion; First and second law of thermodynamics; Isothermal, adiabatic expansion and compression, engine cycles, constant volume and constant pressure, refrigerators and heat pumps; Gases: ideal gases laws; specific heat at constant volume and constant pressure, work done by expanding gas; Latent heat of fusion and evaporation, thermal energy, heat of combustion.		
2.4. OPTICS (LIGHT)		
Nature of light; speed of light; Laws of reflection and refraction: reflection at plane surfaces, Reflection by spherical mirrors, refraction, lenses, fibre optics.	-	**-**
2.5. WAVE MOTION AND SOUND		
Wave motion: mechanical waves, sinusoidal wave motion, Interference phenomena, standing waves; Sound: speed of sound, production of sound, intensity, Pitch and quality, Doppler effect.	-	**-**
	-	**-**

Module 3

ELECTRICAL FUNDAMENTALS

PART-66 Syllabuses	Cross-reference	Level
MODULE 3. ELECTRICAL FUNDAMENTALS – B3 CATEGORY		
3.1. ELECTRON THEORY		
Structure and distribution of electrical charges within: atoms, molecules, ions, compounds; Molecular structure of conductors, semiconductors and insulators.	**AG-03-01-A-B1-B2-B3**	**1**
3.2. STATIC ELECTRICITY AND CONDUCTION		
Static electricity and distribution of electrostatic charges; Electro static laws of attraction and repulsion; Units of charge, Coulomb's Law; Conduction of electricity in solids, liquids, gases and vacuum.	**AG-03-02-A-B3**	**1**
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.	**AG-03-03-A-B3**	**1**
3.4. GENERATION OF ELECTRICITY		
Production of electricity by the following methods: light, heat, friction, pressure, chemical action, magnetism and motion.	**AG-03-04-A-B1-B2-B3**	**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 of thermocouples; Operation of photo-cells.	**AG-03-05-B1-B2-B3**	**1**
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.	**AG-03-06-B3**	**1**
3.7. RESISTANCE/RESISTOR		
(a)	**AG-03-07a-B3**	**1**
Resistance and affecting factors Specific resistance; Resistor colour 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.		
(b)	-	-
Positive and negative temperature coefficient conductance		

Fixed resistors, stability, tolerance and limitations, methods of construction; Variable resistors, thermistors, voltage dependent resistors; construction of potentiometers and rheostats; Construction of Wheatstone Bridge.		
3.8. POWER		
Power, work and energy (kinetic and potential); Dissipation of power by a resistor; Power formula; Calculations involving power, work and energy.	**AG-03-08-B3**	**1**
3.9. CAPACITANCE/CAPACITOR		
Operation and function of a capacitor; Factors affecting capacitance area of plates, distance between plates, number of plates, dielectric and dielectric constant, working voltage, voltage rating; Capacitor types, Construction and function; Capacitor colour coding; Calculations of capacitance and voltage in series and parallel circuits; Exponential charge and discharge of a capacitor, time constants; Testing of capacitors.	**AG-03-09-B3**	**1**
3.10. MAGNETISM		
(a)	**AG-03-10a-B3**	**1**
Theory of magnetism;		
Properties of a magnet;		

Action of a magnet suspended in the Earth's magnetic field; Magnetisation and demagnetisation; Magnetic shielding; Various types of magnetic material; Electromagnets construction and principles of operation; Hand clasp rules to determine: magnetic field around current carrying conductor.		
(b)	**AG-03-10b-B3**	**1**
Magnetomotive force, field strength, magnetic flux density, permeability, hysteresis loop, retentivity, coercive force reluctance, saturation point, eddy currents; Precautions for care and storage of magnets.		
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, 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;	**AG-03-11-B3**	**1**
Lenz's Law and polarity determining rules;		

Back emf, self induction; Principle uses of inductors.		
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.	**AG-03-12-B3**	**1**
3.13. AC THEORY		
Sinusoidal waveform: phase, period, frequency, cycle; Instantaneous, average, root mean square, peak, peak to peak current values and calculations of the values, in relation voltage, current and power; Triangular/Square waves; Single/3 phase principles.	**AG-03-13-A-B3**	**1**
3.14. RESISTIVE (R), CAPACITIVE (C) AND INDUCTIVE (L) CIRCUITS		
Phase relation ship of voltage and current in L, C and R circuits, parallel, series and series parallel; Impedance, phase angle, power factor and current calculations; True power, apparent power and reactive power calculations.	**AG-03-14-B3**	**1**
3.15. TRANSFORMERS		
Transformer construction principles and operation; Transformer losses and methods for overcoming them;	**AG-03-15-B3**	**1**

Transformer action under load and no-load conditions; Power transfer, efficiency, polarity markings; Calculation of line and phase voltages and currents; Primary and Secondary current, voltage, turns ratio, power, efficiency; Auto transformers.		
3.16. FILTERS		
Operation, application and uses of the following filters: Low pass, high pass, band pass, band stop.	-	**-**
3.17. AC GENERATORS		
Rotation of loop in a magnetic field and waveform produced; Operation and construction of 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.	**AG-03-17-B3**	**1**
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.	**AG-03-18-B3**	**1**

Module 4

ELECTRONIC FUNDAMENTALS

PART-66 Syllabuses	Cross-reference	Level
MODULE 4. ELECTRONIC FUNDAMENTALS – B3 CATEGORY		
4.1. SEMICONDUCTORS		
4.1.1. Diodes		
(a)	**AG-04-01-01a-B3**	**1**
Diode symbols; Diode characteristics and properties; Diodes in series and parallel; Main characteristics and use of silicon controlled rectifiers (thyristors), light emitting diode, photo conductive diode, varistor, rectifier diodes; Functional testing of diodes.		
(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; Diode parameters: peak inverse voltage, maximum forward current, temperature, frequency, leakage current, power dissipation;		

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, Schottky diode, photo conductive diode, varactor diode, varistor, rectifier diodes, and Zener diode.		
4.1.2. Transistors		
(a)	**AG-04-01-02a-B1-B3**	**1**
Transistor symbols; Component description and orientation; Transistor characteristics and properties.		
(b)	**-**	**-**
Construction and operation of PNP and NPN transistors; 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 stabilisation; Multistage circuit principles: cascades, push-pull, oscillators, multivibrators, flip-flop circuits.		
4.1.3. Integrated circuits		
(a)	**AG-04-01-03a-B1-B3**	**1**
Description and operation of logic circuits and linear circuits/operational amplifiers.		
(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.		
4.2. PRINTED CIRCUIT BOARDS		
Description and use of printed circuit boards.	-	-
4.3. SERVOMECHANISMS		
(a)	-	-
Understanding of the following terms: Open and closed loop systems, feedback, follow up, analogue transducers; Principles of operation and use of following synchro system components/features: resolvers, differential, control and torque, transformers, inductance and capacitance transmitters.		
(b)	-	-
Understanding of the following terms: Open and closed loop, follow-up, servomechanism, analogue, transducer, null, damping, feedback, dead band; 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.		

Module 5

DIGITAL TECHNIQUES / ELECTRONIC INSTRUMENT SYSTEMS

PART-66 Syllabuses	Cross-reference	Level
MODULE 5. DIGITAL TECHNIQUES – B3 CATEGORY		
5.1. ELECTRONIC INSTRUMENT SYSTEMS		
Typical systems arrangements and cockpit layout of electronic instrument systems.	**AG-05-01-B3**	**1**
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.	**-**	**-**
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.	**-**	**-**
5.4. DATA BUSES		
Operation of data buses in aircraft systems including knowledge of ARINC and other specifications; Aircraft network/Ethernet.	**-**	**-**
5.5. LOGIC CIRCUITS		
(a)	**AG-05-05a-B3**	**1**

Identification of common logic gate symbols, tables and equivalent circuits; Applications used for aircraft systems, schematic diagrams.		
(b)	**-**	**-**
Interpretation of logic diagrams.		
5.6. BASIC COMPUTER STRUCTURE		
(a)	**-**	**-**
Computer terminology (including bit, byte, software, hard ware, CPU, IC, and various memory devices such as RAM, ROM, PROM); Computer technology (as applied in aircraft systems).		
(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.		
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.	**-**	**-**

5.8. INTEGRATED CIRCUITS		
Operation and use of encoders and decoders; Function of encoder types; Uses of medium, large and very large scale integration.	-	-
5.9. MULTIPLEXING		
Operation, application and identification in logic diagrams of multiplexers and demultiplexers.	-	-
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.	-	-
5.11. ELECTRONIC DISPLAYS		
Principles of operation of common types of displays used in modern aircraft, including : cathode ray tubes, light emitting diodes, liquid crystal display.	**AG-05-11-B3**	**1**
5.12. ELECTRONIC SENSITIVE DEVICES		
Special handling of components sensitive to electrostatic discharges; Awareness of risks and possible damage, component and personnel anti-static protection devices.	**AG-05-12-B3**	**1**
5.13. SOFTWARE MANAGEMENT CONTROL		
Awareness of restrictions, airworthiness requirements and possible catastrophic effects of unapproved changes to software programmes.	**AG-05-13-B3**	**1**
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.	**AG-05-14-B3**	**1**
5.15. TYPICAL ELECTRONIC/DIGITAL AIRCRAFT SYSTEM		
General arrangement of typical electronic / digital aircraft systems and associated BITE (Built In Test Equipment) testing such as: ▪ ACARS – ARINC Communication and Addressing and Reporting System; ▪ ECAM – Electronic Centralised Aircraft Monitoring; ▪ EFIS – Electronic Flight Instrument System; ▪ EICAS – Engine Indication and Crew Alerting System; ▪ FBW – Fly-By-Wire: ▪ FMS – Flight Management System; ▪ GPS – Global Positioning System; ▪ IRS – Inertial Reference System; ▪ TCAS – Traffic Alert Collision Avoidance System; ▪ IMA – Integrated Modular Avionics; ▪ Cabin systems; ▪ Information systems.	**AG-05-15-B3**	**1**

Module 6

MATERIALS AND HARDWARE

PART-66 Syllabuses	Cross-reference	Level
MODULE 6. MATERIALS AND HARDWARE – B3 CATEGORY		
6.1. AIRCRAFT MATERIALS - FERROUS		
(a)	**AG-06-01a-B1-B3**	**2**
Characteristics, properties and identification of common alloy steels used in aircraft; Heat treatment and application of alloy steels.		
(b)	**AG-06-01b-B1-B2-B3**	**1**
Testing of ferrous materials for hardness, tensile strength, fatigue strength and impact resistance.		
6.2. AIRCRAFT MATERIALS – NON-FERROUS		
(a)	**AG-06-02a-B1-B3**	**2**
Characteristics, properties and identification of common non-ferrous materials used in aircraft; Heat treatment and application of non-ferrous materials.		
(b)	**AG-06-02a-B1-B2-B3**	**1**
Testing of non-ferrous material for hardness, tensile strength, fatigue strength and impact resistance.		
6.3. AIRCRAFT MATERIALS – COMPOSITE AND NON-METALLIC		

6.3.1. Composite and non-metallic other than wood and fabric		
(a)	**AG-06-03-01a-B1-B2-B3**	**2**
Characteristics, properties and identification of common composite and non-metallic materials, other than wood, used in aircraft; Sealant and bonding agents.		
(b)	**AG-06-03-01b-B1-B3**	**2**
The detection of defects/deterioration in composite and non-metallic material. Repair of composite and non-metallic material.		
6.3.2. Wooden structures		
Construction methods of wooden airframe structures; Characteristics, properties and types of wood and glue used in aeroplanes; 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.	**AG-06-03-02-B1-B3**	**2**
6.3.3. Fabric covering		
Characteristics, properties and types of fabrics used in aeroplanes; Inspections methods for fabric; Types of defects in fabric; repair of fabric covering.	**AG-06-03-03-B1-B3**	**2**
6.4. CORROSION		
(a)	**AG-06-04a-A-B1-B2-B3**	**1**

Chemical fundamentals; Formation by, galvanic action process, microbiological, stress.		
(b)	**AG-06-04b-A-B2-B3**	**2**
Types of corrosion and their identification; Causes of corrosion; Material types, susceptibility to corrosion.		
6.5. FASTENERS		
6.5.1. Screw threads	**AG-06-05-01-A-B1-B2-B3**	**2**
Screw nomenclature; Thread forms, dimension and tolerances for standard thread used in aircraft; Measuring screw threads		
6.5.2. Bolts, studs and screws	**AG-06-05-02-A-B1-B2-B3**	**2**
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.		
6.5.3. Locking devices	**AG-06-05-03-A-B1-B2-B3**	**2**
Tab and spring washers, locking plates, split pins, pal-nuts, wire locking, quick release fasteners, keys, circlips, cotter pins.		
6.5.4. Aircraft rivets	**AG-06-05-04-B1-B3**	**2**

Types of solid and blind rivets: specifications and identification; Heat treatment.		
6.6. PIPES AND UNIONS		
(a)	**AG-06-06a-A-B1-B2-B3**	**2**
Identification of, and types of rigid and flexible pipes and their connectors used in aircraft.		
(b)	**AG-06-06b-A-B1-B3**	**2**
Standard unions for aircraft hydraulic, fuel, oil, pneumatic and air system pipes.		
6.7. SPRINGS		
Types of springs, materials, characteristics and applications.	**AG-06-07-B2-B3**	**1**
6.8. BEARINGS		
Purpose of bearings, loads, material, construction; Types of bearings and their application.	**AG-06-08-A-B3**	**1**
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.	**AG-06-09-A-B3**	**1**
6.10. CONTROL CABLES		
Types of cables; End fittings, turnbuckles and compensation devices; Pulleys and cable system components;	**AG-06-10-B1-B3**	**2**

Pulleys and cable system components; Bowden cables; Aircraft flexible control systems.		
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.	**AG-06-11-B1-B2-B3**	**2**

Module 7

MAINTENANCE PRACTICES

PART-66 Syllabuses	Cross-reference	Level
MODULE 7B. MAINTENANCE PRACTICES – B3 CATEGORY		
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.	**AG-07B-01-B3**	**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.	**AG-07B-02-B3**	**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.	**AG-07B-03-B3**	**3**
7.4. AVIONIC TEST EQUIPMENT		

Operation, function and use of avionic general test equipment.	-	-
7.5. ENGINEERING DRAWINGS, DIAGRAMS AND STANDARDS		
Drawing types and diagrams, their symbols, dimensions, tolerances and projections; Identifying title block information; Microfilm, microfiche and computerised 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.	**AG-07B-05-B3**	**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.	**AG-07B-06-B3**	**2**
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;	**AG-07B-07-B3**	**2**
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; EWIS installations, inspection, repair, maintenance and cleanliness standards.		
7.8. RIVETING		
Riveted joints, rivet spacing and pitch; Tools used for riveting and dimpling; Inspection of riveted joints.	**AG-07B-08-B3**	**2**
7.9. PIPES AND HOSES		
Bending and belling / flaring aircraft pipes; Inspection and testing of aircraft pipes and hoses; Installation and clamping of pipes.	**AG-07B-09-B3**	2
7.10. SPRINGS		
Inspection and testing of springs.	**AG-07B-10-B3**	**1**
7.11. BEARINGS		
Testing, cleaning and inspection of bearings; Lubrication requirements of bearings; Defects in bearings and their causes.	**AG-07B-11-B3**	**2**
7.12. TRANSMISSIONS		
Inspection of gears, backlash; Inspection of belts and pulleys, chains and sprockets; Inspection of screw jacks, lever devices, push-pull rod systems.	**AG-07B-12-B3**	**2**

7.13. CONTROL CABLES		
Swaging of end fittings; Inspection and testing of control cables; Bowden cables; aircraft flexible control systems.	**AG-07B-13-B3**	**2**
7.14. MATERIAL HANDLING		
7.14.1. Sheet metal	**AG-07B-14a-B3**	**2**
Marking out and calculation of bend allowance; Sheet metal working, including bending and forming; Inspection of sheet metal work.		
7.14.2. Composite and non-metallic	**AG-07B-14b-B3**	**2**
Bonding practices; Environmental conditions Inspection methods		
7.15. WELDING, BRAZING, SOLDERING AND BONDING		
(a)	**AG-07B-15a-B3**	**2**
Soldering methods; inspection of soldered joints.		
(b)	**AG-07B-15b-B3**	**2**
Welding and brazing methods; Inspection of welded and brazed joints; Bonding methods and inspection of bonded joints.		

7.16. AIRCRAFT WEIGHT AND BALANCE		
(a)	**AG-07B-16a-B3**	**2**
Centre of gravity/Balance limits calculation: use of relevant documents.		
(b)	**AG-07B-16b-B3**	**2**
Preparation of aircraft for weighing; Aircraft weighing.		
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 / de-fuelling procedures; De-icing / anti-icing procedures; Electrical, hydraulic and pneumatic ground supplies; Effects of environmental conditions on aircraft handling and operation.	**AG-07B-17-B3**	**2**
7.18. DISASSEMBLY, INSPECTION, REPAIR, AND ASSEMBLY TECHNIQUES		
(a)		
Types of defects and visual inspection techniques. Corrosion removal, assessment and re-protection.	**AG-07B-18a-B3**	**3**
(b)	**AG-07B-18b-B3**	**2**
General repair methods, Structural Repair Manual;		

Ageing, fatigue and corrosion control programmes.		
(c)	**AG-07B-18c-B3**	**2**
Non destructive inspection techniques including, penetrant, radiographic, eddy current, ultrasonic and boroscope methods.		
(d)		
Disassembly and re-assembly techniques.	**AG-07B-18d-B3**	**2**
(e)		
Trouble shooting techniques.	**AG-07B-18e-B3**	**2**
7.19. ABNORMAL EVENTS		
(a)	**AG-07B-19a-B3**	**2**
Inspections following lightning strikes and HIRF penetration.		
(b)	**AG-07B-19b-B3**	**2**
Inspections following abnormal events such as heavy landings and flight through turbulence.		
7.20. MAINTENANCE PROCEDURES		
Maintenance planning; Modification procedures; Stores procedures; Certification / release procedures; Interface with aircraft operation; Maintenance Inspection / Quality Control / Quality Assurance ;	**AG-07B-20-B3**	**2**

Additional maintenance procedures. Control of life limited components.		

Module 8

BASIC AERODYNAMICS

PART-66 Syllabuses	Cross-reference	Level
MODULE 8. BASIC AERODYNAMICS – A & B3 CATEGORIES		
8.1. PHYSICS OF THE ATMOSPHERE		
International Standard Atmosphere (ISA), application to aerodynamics.	**AG-08-01-A-B3**	**1**
8.2. AERODYNAMICS		
Airflow around a body; Boundary layer, laminar and turbulent flow, free stream flow, relative airflow, upwash 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.	**AG-08-02-A-B3**	**1**
8.3. THEORY OF FLIGHT		
Relation ship between lift, weight, thrust and drag; Glide ratio; Steady stable flights, performance; Theory of the turn;	**AG-08-03-A-B3**	**1**
Influence of load factor: stall, flight envelope and structural limitations;		

Lift augmentation.		
8.4. FLIGHT STABILITY AND DYNAMICS		
Longitudinal, lateral and directional stability (active and passive).	**AG-08-04-A-B3**	**1**

Module 9B

HUMAN FACTORS

PART-66 Syllabuses	Cross-reference	Level
MODULE 9B. HUMAN FACTORS – B3 CATEGORY		
9.1. GENERAL		
The need to take human factors into account; Incidents attributable to human factors / human error; 'Murphy's' law.	**AG-09B-01-B3**	**2**
9.2. HUMAN PERFORMANCE AND LIMITATIONS		
Vision; Hearing; Information processing; Attention and perception; Memory; Claustrophobia and physical access.	**AG-09B-02-B3**	**2**
9.3. SOCIAL PSYCHOLOGY		
Responsibility: individual and group; Motivation and de-motivation;	**AG-09B-03-B3**	**1**
Peer pressure;		

'Culture' issues; Team working; Management, Supervision and leadership.		
9.4. FACTORS AFFECTING PERFORMANCE		
Fitness / health; Stress: domestic and work related; Time pressure and deadlines; Workload: over load and underload; Sleep and fatigue, shiftwork; Alcohol, medication, drug abuse.	**AG-09B-04-B3**	**2**
9.5. PHYSICAL ENVIRONMENT		
Noise and fumes; Illumination; Climate and temperature; Motion and vibration; Working environment.	**AG-09B-05-B3**	**1**
9.6. TASKS		
Physical work; Repetitive tasks; Visual inspection; Complex systems.	**AG-09B-06-B3**	**1**
9.7. COMMUNICATION		

Within and between teams; Work logging and recording; Keeping up to date, currency; Dissemination of information.	**AG-09B-07-B3**	**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.	**AG-09B-08-B3**	**2**
9.9. HAZARDS IN THE WORKPLACE		
Recognising and avoiding hazards; Dealing with emergencies.	**AG-09B-09-B3**	**2**

PART-66 Syllabuses	Cross-reference	Level
MODULE 9B. HUMAN FACTORS – B3 CATEGORY		
9.1. GENERAL		
The need to take human factors into account; Incidents attributable to human factors / human error; 'Murphy's' law.	**AG-09B-01-B3**	**2**
9.2. HUMAN PERFORMANCE AND LIMITATIONS		
Vision; Hearing; Information processing; Attention and perception; Memory; Claustrophobia and physical access.	**AG-09B-02-B3**	**2**
9.3. SOCIAL PSYCHOLOGY		
Responsibility: individual and group; Motivation and de-motivation; Peer pressure; 'Culture' issues;	**AG-09B-03-B3**	**1**

Team working; Management, Supervision and leadership.		
9.4. FACTORS AFFECTING PERFORMANCE		
Fitness / health; Stress: domestic and work related; Time pressure and deadlines; Workload: over load and underload; Sleep and fatigue, shiftwork; Alcohol, medication, drug abuse.	**AG-09B-04-B3**	**2**
9.5. PHYSICAL ENVIRONMENT		
Noise and fumes; Illumination; Climate and temperature; Motion and vibration; Working environment.	**AG-09B-05-B3**	**1**
9.6. TASKS		
Physical work; Repetitive tasks; Visual inspection; Complex systems.	**AG-09B-06-B3**	**1**
9.7. COMMUNICATION		
Within and between teams;	**AG-09B-07-B3**	**2**

Work logging and recording; Keeping up to date, currency; Dissemination of information.		
9.8. HUMAN ERROR		
Error models and theories; Types of error in maintenance tasks; Implications of errors (i.e accidents); Avoiding and managing errors.	**AG-09B-08-B3**	**2**
9.9. HAZARDS IN THE WORKPLACE		
Recognising and avoiding hazards; Dealing with emergencies.	**AG-09B-09-B3**	**2**

Module 10

AVIATION LEGISLATION

PART-66 Syllabuses	Cross-reference	Level
MODULE 10. AVIATION LEGISLATION – B3 CATEGORY		
10.1. REGULATORY FRAMEWORK		
Role of International Civil Aviation Organisation; Role of the European Commission; Role of EASA; Role of the Member States and the National Aviation Authorities Regulation (EC) N° 1321/2014 and its implementing rules Regulations (EC) N° 216/2008 and (EC) N° 2042/2003. Relationships between the various Annexes (Parts) such as Part-21, Part-M, Part-145, Part-66, Part-147 and EO-OPS.	**AG-10-01-A-B1-B2-B3**	**1**
10.2. CERTIFYING STAFF - MAINTENANCE		
Detailed understanding of Part-66.	**AG-10-02-A-B1-B2-B3**	**2**
10.3. APPROVED MAINTENANCE ORGANIZATIONS		
Detailed understanding of Part-145 and Part-M Subpart F.	**AG-10-03-A-B1-B2-B3**	**2**
10.4. AIR OPERATIONS		
General understanding of EU-OPS; Air Operators Certificates;	**AG-10-04-A-B1-B2-B3**	**1**

Operators Responsibilities, in particular regarding continuing airworthiness and maintenance; Aircraft Maintenance Programme; MEL/CDL; Documents to be carried on board; Aircraft placarding (markings).		
10.5. CERTIFICATION OF AIRCRAFT, PARTS AND APPLIANCES		
(a) General	**AG-10-05a-B1-B2-B3**	1
General understanding of Part-21 and EASA certification specifications CS-23, 25, 27, 29.		
(b) Documents	**AG-10-05b-B1-B2-B3**	2
Certificate of Airworthiness; restricted certificates of airworthiness and permit to fly; Certificate of registration; Noise certificate; Weight schedule; Radio station licence and approval.		
10.6. CONTINUING AIRWORTHINESS		
Detailed understanding of Part-21 provisions related to continuing airworthiness; Detailed understanding of Part-M.	**AG-10-06-A-B1-B2-B3**	**2**
10.7. APPLICABLE NATIONAL AND INTERNATIONAL REQUIREMENTS FOR (IF NOT SUPERSEDED BY EU REQUIREMENTS).		
(a)		
Maintenance programmes, maintenance checks and inspections;	**AG-10-07a-B1-B2-B3**	**2**

Airworthiness directives; Service bulletins, manufacturers service information; Modifications and repairs; Maintenance documentation: maintenance manuals, structural repair manual, illustrated parts catalogue, etc. Master Minimum Equipment Lists, Minimum equipment lists, Dispatch Deviation lists.		
(b)	**AG-10-07b-B1-B2-B3**	**1**
Continuing airworthiness; Minimum equipment requirements; Test flights.		

PART-66 Syllabuses	Cross-reference	Level
MODULE 10. AVIATION LEGISLATION – B1, B2 & B3 CATEGORIES		
10.1. REGULATORY FRAMEWORK		
Role of International Civil Aviation Organisation; Role of the European Commission; Role of EASA; Role of the Member States and the National Aviation Authorities Regulation (EC) N° 1321/2014 and its implementing rules Regulations (EC) N° 216/2008 and (EC) N° 2042/2003. Relationships between the various Annexes (Parts) such as Part-21, Part-M, Part-145, Part-66, Part-147 and EO-OPS.	**AG-10-01-A-B1-B2-B3**	**1**
10.2. CERTIFYING STAFF - MAINTENANCE		
Detailed understanding of Part-66.	**AG-10-02-A-B1-B2-B3**	**2**
10.3. APPROVED MAINTENANCE ORGANIZATIONS		
Detailed understanding of Part-145 and Part-M Subpart F.	**AG-10-03-A-B1-B2-B3**	**2**
10.4. AIR OPERATIONS		
General understanding of EU-OPS; Air Operators Certificates;	**AG-10-04-A-B1-B2-B3**	**1**

Operators Responsibilities, in particular regarding continuing airworthiness and maintenance; Aircraft Maintenance Programme; MEL/CDL; Documents to be carried on board; Aircraft placarding (markings).		
10.5. CERTIFICATION OF AIRCRAFT, PARTS AND APPLIANCES		
(a) General	**AG-10-05a-B1-B2-B3**	**1**
General understanding of Part-21 and EASA certification specifications CS-23, 25, 27, 29.		
(b) Documents	**AG-10-05b-B1-B2-B3**	**2**
Certificate of Airworthiness; restricted certificates of airworthiness and permit to fly; Certificate of registration; Noise certificate; Weight schedule; Radio station licence and approval.		
10.6. CONTINUING AIRWORTHINESS		
Detailed understanding of Part-21 provisions related to continuing airworthiness; Detailed understanding of Part-M.	**AG-10-06-A-B1-B2-B3**	**2**
10.7. APPLICABLE NATIONAL AND INTERNATIONAL REQUIREMENTS FOR (IF NOT SUPERSEDED BY EU REQUIREMENTS).		
(a)	**AG-10-07a-B1-B2-B3**	**2**
Maintenance programmes, maintenance checks and inspections;		

Airworthiness directives; Service bulletins, manufacturers service information; Modifications and repairs; Maintenance documentation: maintenance manuals, structural repair manual, illustrated parts catalogue, etc. Master Minimum Equipment Lists, Minimum equipment lists, Dispatch Deviation lists.		
(b)	**AG-10-07b-B1-B2-B3**	**1**
Continuing airworthiness; Minimum equipment requirements – Test flights.		

Module 11

TURBINE AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS

PART-66 Syllabuses	Cross-reference	Level
MODULE 11C. PISTON AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS – B3 CATEGORY		
11C.1. THEORY OF FLIGHT		
Operation and effect of: ▪ roll control: ailerons and spoilers; ▪ pitch control: elevators, stabilators, variable incidence stabilisers and canards; ▪ yaw control, rudder limiters; Control using elevons, ruddervators; High lift devices, slots, slats, flaps, flaperons; Drag inducing devices, spoilers, lift dumpers, speed brakes; Effects of wing fences, saw tooth leading edges; Boundary layer control using, vortex generators, stall wedges or leading edge devices; Operation and effect of trim tabs, balance and antibalance (leading) tabs, servo tabs, spring tabs, mass balance, control surface bias, aerodynamic balance panels.	**AG-11C-01-B3**	**1**
11C.2. AIRFRAME STRUCTURES – GENERAL CONCEPTS		
(a)	**AG-11C-02-B3**	**2**
Airworthiness requirements for structural strength;		

Structural classification, primary, secondary and tertiary; Fail safe, safe life, damage tolerance concepts; Zonal and station identification systems; Stress, strain, bending, compression, shear, torsion, tension, hoop stress, fatigue; Drains and ventilation provisions; System installation provisions; Lightning strike protection provision; Aircraft bonding.		
(b)	**AG-11C-02-B3**	**2**
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; Structure assembly techniques: riveting, bolting, bonding Methods of surface protection, such as chromating, anodising, painting ; Surface cleaning; Airframe symmetry: methods of alignment and symmetry checks.		
11C.3. AIRFRAME STRUCTURES – AEROPLANES		
11C.3.1. Fuselage (ATA 52/53/56)	**AG-11C-03-01-B3**	**1**
Construction and pressurisation sealing; Wing, stabiliser, pylon and under carriage attachments; Seat installation and cargo loading system; Doors and emergency exits : construction, mechanisms, operation and safety devices;		
Doors and emergency exits : construction, mechanisms, operation and safety devices ;		

Windows and windscreen construction and mechanisms.		
11C.3.2. Wings (ATA 57)	**AG-11C-03-02-B3**	**1**
Construction; Fuel storage; Landing gear, pylon, control surface and high lift/drag attachments.		
11C.3.3. Stabilizers (ATA 55)	**AG-11C-03-03-B3**	**1**
Construction; Control surface attachment.		
11C.3.4. Flight Control Surfaces (ATA 55/57)	**AG-11C-03-04-B3**	**1**
Construction and attachment; Balancing – mass and aerodynamic.		
11C.3.5. Nacelles/Pylons (ATA 54)	**AG-11C-03-05-B3**	**1**
Construction; Firewalls; Engine mounts.		
11C.4. AIR CONDITIONING (ATA 21)		
Heating and ventilation systems	**AG-11C-04-B3**	**1**
11C.5. INSTRUMENT/AVIONIC SYSTEMS		
11C.5.1. Instrument Systems (ATA 31)	**AG-11C-05-01-B3**	**1**
Pitot static: altimeter, air speed indicator, vertical speed indicator;		

Gyroscopic: artificial horizon, attitude director, direction indicator, horizontal situation indicator, turn and slip indicator, turn coordinator; Compasses: direct reading, remote reading; Angle of attack indication, stall warning systems; Glass cockpit; Other aircraft system indication.		
11C.5.2. Avionic Systems	**AG-11C-05-01-B3**	**1**
Fundamentals of system lay-outs and operation of: ▪ Auto Flight (ATA 22); ▪ Communications (ATA 23); ▪ Navigation Systems (ATA 34).		
11C.6. ELECTRICAL POWER		
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	**AG-11C-06-B3**	**2**
11C.7. EQUIPMENT AND FURNISHINGS (ATA 25)		
Emergency equipment requirements;	**AG-11C-07-B3**	**2**

Seats, harnesses and belts.		
11C.8. FIRE PROTECTION (ATA 26)		
Portable fire extinguisher.	**AG-11C-08-B3**	**2**
11C.9. 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.	**AG-11C-09-B3**	**3**
11C.10. FUEL SYSTEMS (ATA 28)		
System lay-out; Fuel tanks; Supply systems; Dumping, venting and draining; Cross-feed and transfer; Indications and warnings; Refuelling and defuelling;	**AG-11C-10-B3**	**2**
Longitudinal balance fuel systems.	**AG-11C-10-B3**	**2**

11C.11. 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.	**AG-11C-11-B3**	**2**
11C.12. 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 and chemical ; Rain repellent; Probe and drain heating; Wiper systems.	**AG-11C-12-B3**	**1**
11C.13. LANDING GEAR (ATA 32)		
Construction, shock absorbing; Extension and retraction systems: normal and emergency;	**AG-11C-13-B3**	**2**
Construction, shock absorbing;		

Extension and retraction systems: normal and emergency; Indications and warning; Wheels, brakes, antiskid and auto braking; Tyres; Steering; Air-ground sensing.		
11C.14. LIGHTS (ATA 33)		
External: navigation, anti-collision, landing, taxiing, ice; Internal: cabin, cockpit, cargo; Emergency.	**AG-11C-14-B3**	**2**
11C.15. OXYGEN (ATA 35)		
System lay-out: ▪ cockpit, ▪ cabin; Sources, storage, charging and distribution; Supply regulation; Indications and warnings.	**AG-11C-15-B3**	**2**
11.16. PNEUMATIC/VACUUM (ATA 36)		
System lay-out; Sources: ▪ engine / APU,	**AG-11C-16-B3**	**2**
▪ compressors,	**AG-11C-16-B3**	**2**

▪ reservoirs, ▪ ground supply; Pressure and vacuum pumps; Pressure control; Distribution; Indications and warnings; Interfaces with other systems.		

Module 16

PISTON ENGINE

PART-66 Syllabuses	Cross-reference	Level
MODULE 16. PISTON ENGINE – B3 CATEGORY		
16.1. FUNDAMENTALS		
Mechanical, thermal and volumetric efficiencies; Operating principles: 2 stroke, 4 stroke, Otto and Diesel; Piston displacement and compression ratio; Engine configuration and firing order.	**AG-16-01-B3**	**2**
16.2. ENGINE PERFORMANCE		
Power calculation and measurement; Factors affecting engine power; Mixtures/leaning, pre-ignition.	**AG-16-02-B3**	**2**
16.3. ENGINE CONSTRUCTION		
Crank case, crank shaft, cam shafts, sumps; Accessory gearbox; Cylinder and piston assemblies; Connecting rods, inlet and exhaust manifolds;	**AG-15-03-A-B1**	**2**
Valve mechanisms;		

Propeller reduction gearboxes.		
16.4. ENGINE FUEL SYSTEMS		
16.4.1. Carburettors		
Types, construction and principles of operation; Icing and heating.	**AG-16-04-01-B3**	**2**
16.4.2. Fuel injection systems		
Types, construction and principles of operation.	**AG-16-04-02-B3**	**2**
16.4.3. Electronic engine control		
Operation of engine control and fuel metering systems including electronic engine control (FADEC); Systems lay-out and components.	**AG-16-04-03-A-B3**	**2**
16.5. STARTING AND IGNITION YSTEMS		
Starting systems, pre-heat systems; Magneto types, construction and principles of operation; Ignition harnesses, spark plugs; Low and high tension systems.	**AG-16-05-B3**	**2**
16.6. INDUCTION, EXHAUST AND COOLING SYSTEMS		
Construction and operation of: induction systems including alternate air systems; Exhaust systems, engine cooling systems — air and liquid.	**AG-16-06-B3**	**2**
16.7. SUPERCHARGING/TURBOCHARGING		
Principles and purpose of supercharging and its effects on engine parameters;	**AG-16-07-B3**	**2**

Construction and operation of supercharging/turbocharging systems; System terminology; Control systems; System protection..		
16.8. LUBRICNTS AND FUELS		
Properties and specifications; Fuel additives; Safety precautions.	**AG-16-08-B3**	**2**
16.9. LUBRICATION SYSTEMS		
System operation/lay-out and components.	**AG-16-09-B3**	**2**
16.10. ENGINE INDICATION SYSTEMS		
Engine speed; Cylinder head temperature; Coolant temperature; Oil pressure and temperature; Exhaust Gas Temperature; Fuel pressure and flow; Manifold pressure.	**AG-16-10-B3**	**2**
16.11. POWERPLANT INSTLLATION		
Configuration of firewalls, cowlings, acoustic panels, engine mounts, anti-vibration mounts, hoses, pipes, feeders, connectors, wiring looms, control cables and rods, lifting points and drains.	**AG-16-11-B3**	**2**
16.12. ENGINE MONITORING AND GROUND OPERATIONS		

Procedures for starting and ground run-up; Interpretation of engine power output and parameters; Inspection of engine and components: criteria, tolerances, and data specified by engine manufacturer.	**AG-16-12-B3**	**2**
16.13. ENGINE STORAGE AND PRESERVATION		
Preservation and depreservation for the engine and accessories/systems.	**AG-16-13-B3**	**1**

Module 17

PROPELLER

PART-66 Syllabuses	Cross-reference	Level
MODULE 17B. PROPELLER – B3 CATEGORY		
17B.1. FUNDAMENTALS		
Blade element theory; High/low blade angle, reverse angle, angle of attack, rotational speed; Propeller slip; Aerodynamic, centrifugal, and thrust forces; Torque; Relative airflow on blade angle of attack; vibration and resonance.	**AG-17B-01-B3**	**2**
17B.2. PROPELLER CONSTRUCTION		
Construction methods and materials used in composite and metal propellers; Blade station, blade face, blade shank, blade back and hub assembly; Fixed pitch, controllable pitch, constant speeding propeller; Propeller/spinner installation.	**AG-17B-02-B3**	**2**
17B.3. PROPELLER PITCH CONTROL		
Speed control and pitch change methods; Feathering and reverse pitch;	**AG-17B-03-B3**	**2**

Overspeed protection.		
17B.4. PROPELLER SYNCHRONIZING		
Synchronising and synchrophasing equipment.	**AG-17B-04-B3**	2
17B.5. PROPELLER ICE PROTECTION		
Fluid and electrical de-icing equipment.	**AG-17B-05-B3**	2
17B.6. PROPELLER MAINTENANCE		
Static and dynamic balancing; Blade tracking; Assessment of blade damage, erosion, corrosion, impact damage, delamination; Propeller treatment/repair schemes; Propeller engine running.	**AG-17B-06-B3**	**2**
17B.7. PROPELLER STORAGE AND PRESERVATION		
Propeller preservation and depreservation	**AG-17B-07-B3**	2