

Module 11b

Piston Aeroplane Aerodynamics, Structures & Systems

	Level		
	A2	B1.2	B2
11.1 Theory of Flight	A2	B1.2	B2
Aeroplane Aerodynamics & Flight Controls Operation and effect of: - roll control: ailerons & spoilers; - pitch control: elevators, stabilators, variable incidence stabilisers & canards; - yaw control, rudder limiters; Controls using elevons, ruddervators; High lift devices, 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 & effect of trim tabs, balance & antibalance (leading) tabs, servo tabs, spring tabs, mass balance, control surface bias, aerodynamic balance panels;	1	2	-
High Speed Flight - N/A	-	-	-
11.2 Airframe Structures - General Concepts	A2	B1.2	B2
a) Airworthiness requirements for structural strength; Structural classification, primary, secondary & tertiary; Fail safe, safe life, damage tolerance concepts; Zonal & station identification systems; Stress, strain, bending, compression, shear, torsion, tension, hoop stress fatigue; Drains & ventilation provisions; System installation provisions; Lightning strike protection provision; Aircraft bonding.	2	2	-
b) 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 & engine attachments; Structure assembly techniques: riveting, bolting, bonding; Methods of surface protection, such as chromating, anodising, painting; Surface cleaning; Airframe symmetry: methods of alignment & symmetry checks.	1	2	-
11.3 Airframe Structures - Aeroplanes	A2	B1.2	B2
Fuselage (ATA 52/53/56) Construction & pressurisation sealing; Wing, stabiliser, pylon & undercarriage attachments; Seat installation & cargo loading system; Doors & emergency exits: construction, mechanisms, operation and safety devices; Windows & windscreen attachment;	1	2	-
Wings (ATA 57) Construction; Fuel storage; Landing gear, pylon, control surface & high lift/drag attachments;	1	2	-
Stabilisers (ATA 55) Construction; Control surface attachment;	1	2	-
Flight Control Surfaces (ATA 55/57) Construction and attachment; Balancing - mass & aerodynamic;	1	2	-
Nacelles/Pylons (ATA 54) Construction; Firewalls; Engine mounts.	1	2	-
11.4 Air Conditioning & Cabin Pressurisation (ATA 21)	A2	B1.2	B2
Pressurisation & Air Conditioning systems; Cabin pressure controllers, protection & warning devices.	1	3	-
11.5 Instruments / Avionic Systems	A2	B1.2	B2
Instrument Systems (ATA 31) Pilot static: altimeter, air speed indicator, vertical speed indicator; Gyroscopic: artificial horizon, attitude director, direction indicator, horizontal situation indicator, turn & slip indicator, turn coordinator; Compasses: direct reading, remote reading; Angle of attack indication, stall warning systems; Other aircraft system indication.	1	2	-
Avionic Systems Fundamentals of system layouts and operation of: Auto Flight (ATA 22); Communications (ATA 23); Navigation Systems (ATA 34).	1	1	-

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	A2	B1.2	B2
11.6 Electrical Power (ATA 24) Batteries Installation & Operation; DC power generation; Voltage regulation; Power distribution; Circuit protection; Inverters, transformers.	A2 1	B1.2 3	B2 -
11.7 Equipment & Furnishings (ATA 25) a) Emergency equipment requirements; Seats, harnesses & belts;	A2 2	B1.2 2	B2 -
b) Cabin layout; Equipment layout; Cabin Furnishing Installation(level 2); Cabin entertainment equipment; Galley installation; Cargo handling & retention equipment; Airstairs.	1	1	-
11.8 Fire Protection (ATA 26) a) Fire & smoke detection & warning systems; Fire extinguishing systems; System tests.	A2 1	B1.2 3	B2 -
b) Portable fire extinguisher.	1	3	-
11.9 Flight Controls (ATA 27) Primary controls: aileron, elevator, rudder, spoiler; Trim control; High lift devices; System operation: manual; Gust locks; Balancing & rigging; Stall warning system.	A2 1	B1.2 3	B2 -
11.10 Fuel Systems (ATA 28) System layout; Fuel tanks; Supply systems; Cross-feed & transfer; Indications & warnings; Refuelling & defuelling;	A2 1	B1.2 3	B2 -
11.11 Hydraulic Power (ATA 29) System layout; Hydraulic fluids; Hydraulic reservoirs & accumulators; Pressure generation: electric, mechanical, pneumatic; Pressure Control; Power distribution; Indication & warning systems;	A2 1	B1.2 3	B2 -
11.12 Ice & Rain Protection (ATA 30) Ice formation, classification & detection; De-icing systems: electrical, hot air, pneumatic & chemical; Probe & drain heating; Wiper systems.	A2 1	B1.2 3	B2 -
11.13 Landing Gear (ATA 32) Construction, shock absorbing; Extension a& retraction systems: normal & emergency; Indications & warning; Wheels, brakes, anti-skid & autobraking; Tyres; Steering.	A2 2	B1.2 3	B2 -
11.14 Lights (ATA 33) External: navigation, anti-collision, landing, taxiing, ice; Internal: cabin, cockpit, cargo; Emergency.	A2 2	B1.2 2	B2 -
11.15 Oxygen (ATA 35) System layout: cockpit, cabin; Sources, storage, charging & distribution; Supply regulation; Indications & warnings.	A2 1	B1.2 3	B2 -
11.16 Pneumatic/Vacuum (ATA 36) System layout; Sources: engine / APU, compressors, reservoirs, ground supply; Pressure control; Distribution; Indications & warnings; Interfaces with other systems.	A2 1	B1.2 3	B2 -
11.17 Water/Waste (ATA 38) Water system layout, supply, distribution, servicing & draining; Toilet system layout, flushing & servicing; Corrosion aspects.	A2 2	B1.2 3	B2 -