

Module 11a

Turbine Aeroplane Aerodynamics, Structures & Systems

	Level		
	A1	B1.1	B2
11.1 Theory of Flight			
Aeroplane Aerodynamics & Flight Controls	1	2	-
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;			
High Speed Flight	1	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.			
11.2 Airframe Structures - General Concepts	A1	B1.1	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	A1	B1.1	B2
Fuselage (ATA 52/53/56)	1	2	-
Construction & pressurisation sealing; Wing, stabiliser, pylon & undercarriage attachments; Seat installation & cargo loading system; Doors & emergency exits: construction, mechanisms, operation & safety devices; Windows & windscreen construction & mechanisms;			
Wings (ATA 57)	1	2	-
Construction; Fuel storage; Landing gear, pylon, control surface & high lift/drag attachments;			
Stabilisers (ATA 55)	1	2	-
Construction; Control surface attachment;			
Flight Control Surfaces (ATA 55/57)	1	2	-
Construction & attachment; Balancing - mass & aerodynamic;			
Nacelles/Pylons (ATA 54)	1	2	-
Construction; Firewalls; Engine mounts.			
11.4 Air Conditioning and Cabin Pressurisation (ATA 21)	A1	B1.1	B2
Air supply	1	2	-
Sources of air supply including engine bleed, APU & ground cart;			
Air Conditioning	1	3	-
Air conditioning systems; Air cycle & vapour cycle machines; Distribution systems; Flow, temperature & humidity control system;			
Pressurisation	1	3	-
Pressurisation systems; Control & indication including control & safety valves; Cabin pressure controllers; Safety & warning devices; Protection & warning devices.			

Module 11a

Turbine Aeroplane Aerodynamics, Structures & Systems

	Level		
	A1	B1.1	B2
11.5 Instruments / Avionic Systems	A1	B1.1	B2
Instrument Systems (ATA 31)	1	2	-
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.			
Avionic Systems	1	1	-
Fundamentals of system layouts & operation of: Auto Flight (ATA 22); Communications (ATA 23); Navigation Systems (ATA 34).			
11.6 Electrical Power (ATA 24)	A1	B1.1	B2
Batteries Installation & Operation; DC power generation; AC power generation; Emergency power generation; Voltage regulation; Power distribution; Inverters, transformers, rectifiers; Circuit protection; External/Ground power.	1	3	-
11.7 Equipment & Furnishings (ATA 25)	A1	B1.1	B2
a) Emergency equipment requirements; Seats, harnesses & belts;	2	2	-
b) Cabin layout; Equipment layout; Cabin Furnishing Installation; Cabin entertainment equipment; Galley installation; Cargo handling & retention equipment; Airstairs	1	1	-
11.8 Fire Protection (ATA 26)	A1	B1.1	B2
a) Fire & smoke detection & warning systems; Fire extinguishing systems; System tests.	1	3	-
b) Portable fire extinguisher.	1	1	-
11.9 Flight Controls (ATA 27)	A1	B1.1	B2
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 system; Balancing & rigging; Stall protection/warning system.	1	3	-
11.10 Fuel Systems (ATA 28)	A1	B1.1	B2
System layout; Fuel tanks; Supply systems; Dumping, venting & draining; Cross-feed & transfer; Indications & warnings; Refuelling & defuelling; Longitudinal balance fuel systems.	1	3	-
11.11 Hydraulic Power (ATA 29)	A1	B1.1	B2
System layout; Hydraulic fluids; Hydraulic reservoirs and accumulators; Pressure generation: electric, mechanical, pneumatic; Emergency pressure generation; Pressure Control; Power distribution; Indication & warning systems; Interface with other systems.	1	3	-
11.12 Ice and Rain Protection (ATA 30)	A1	B1.1	B2
Ice formation, classification & detection; Anti-icing systems: electrical, hot air & chemical; De-icing systems: electrical, hot air, pneumatic & chemical; Rain repellent; Probe & drain heating; Wiper systems.	1	3	-
11.13 Landing Gear (ATA 32)	A1	B1.1	B2
Construction, shock absorbing; Extension & retraction systems: normal & emergency; Indications & warning; Wheels, brakes, antiskid & autobraking; Tyres; Steering.	2	3	-
11.14 Lights (ATA 33)	A1	B1.1	B2
External: navigation, anti-collision, landing, taxiing, ice; Internal: cabin, cockpit, cargo; Emergency.	2	3	-

Module 11a

Turbine Aeroplane Aerodynamics, Structures & Systems

	Level		
	A1	B1.1	B2
11.15 Oxygen (ATA 35) System layout: cockpit, cabin; Sources, storage, charging & distribution; Supply regulation; Indications & warnings.	1	3	-
11.16 Pneumatic/Vacuum (ATA 36) System layout; Sources: engine / APU, compressors, reservoirs, ground supply; Pressure control; Distribution; Indications & warnings; Interfaces with other systems.	1	3	-
11.17 Water/Waste (ATA 38) Water system layout, supply, distribution, servicing & draining; Toilet system layout, flushing & servicing; Corrosion aspects.	2	3	-
11.18 On Board Maintenance Systems (ATA 45) Central maintenance computers; Data loading system; Electronic library system; Printing; Structure monitoring (damage tolerance monitoring).	1	2	-

