

## Module 11B. Piston Aeroplane Aerodynamics, Structures and Systems

Note 1: This module does not apply to category B3. Relevant subject matters for category B3 are defined in module 11C.

Note 2: The scope of this Module shall reflect the technology of aeroplanes pertinent to the A2 and B1.2 subcategory.

	Level	
	A2	B1.2
11.1 Theory of Flight		
11.1.1. Aeroplane Aerodynamics and Flight Controls	1	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.		
11.1.2. High Speed Flight — N/A	-	-
11.2 Airframe Structures — General Concepts		
(a) Airworthiness requirements for structural strength;	2	2
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) 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;	1	2
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.		
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	Level	
	A2	B1.2
11.3 Airframe Structures — Aeroplanes  11.3.1 Fuselage (ATA 52/53/56)	1	2
Construction and pressurisation sealing;	_	_
Wing, tail-plane, pylon and undercarriage attachments;		
Seat installation;		
Doors and emergency exits: construction and operation;		
Windows and windscreen attachment.		
11.3.2 Wings (ATA 57)	1	2
Construction;		
Fuel storage;		
Landing gear, pylon, control surface and high lift/drag attachments.		
11.3.3 Stabilisers (ATA 55)	1	2
Construction;		
Control surface attachment.		
11.3.4 Flight Control Surfaces (ATA 55/57)	1	2
Construction and attachment;		
Balancing — mass and aerodynamic.		
11.3.5 Nacelles/Pylons (ATA 54)	1	2
Nacelles/Pylons:		
— Construction,		
— Firewalls,		
— Engine mounts.		
11.4 Air Conditioning and Cabin Pressurisation (ATA 21)	1	3
Pressurisation and air conditioning systems;		
Cabin pressure controllers, protection and warning devices;		
Heating systems.		
11.5 Instruments/Avionic Systems		
11.5.1 Instrument Systems (ATA 31)	1	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;		
	l	l



Glass cockpit; Other aircraft system indication.  11.5.2 Awlonic Systems 1 1 1 Fundamentals of system lay-outs and operation of: — Auto Flight (ATA 22), — Communications (ATA 23), — Navigation Systems (ATA 34).  11.6 Electrical Power (ATA 24) 11.6 Electrical Power (ATA 24) 11.6 Electrical Power (ATA 24) 11.7 Equipment and Operation; DC power generation; Voltage regulation; Power distribution; Circuit protection; Inverters, transformers.  11.7 Equipment and Furnishings (ATA 25) (a) Emergency equipment requirements; Seats, harnesses and belts; (b) Cabin lay-out; Cabin entertainment equipment; Gailey installation; Cargo handling and retention equipment; Airstairs.  11.8 Fire Protection (ATA 26) (a) Fire and smoke detection and warning systems; Fire extinguishing systems; System tests; (b) Portable fire extinguisher.  1 3 3 11.9 Flight Controls (ATA 27) Primary controls: aileron, elevator, rudder; Trim tabs; High Ilft devices;		Le	Level	
Other aircraft system indication.  11.5.2 Avionic Systems 1		A2	B1.2	
1 1 Fundamentals of system lay-outs and operation of:  - Auto Flight (ATA 22),  - Communications (ATA 23),  - Navigation Systems (ATA 34).  11.6 Electrical Power (ATA 24)  Batteries Installation and Operation;  CD opwer generation;  Voltage regulation;  Power distribution;  Circuit protection;  Inverters, transformers.  11.7 Equipment and Furnishings (ATA 25)  (a) Emergency equipment requirements;  Seats, harnesses and belts;  (b) Cabin lay-out;  Equipment lay-out;  Cabin Furnishing installation;  Cabin entertainment equipment;  Galley installation;  Cargo handling and retention equipment;  Airstairs.  11.8 Fire Protection (ATA 26)  (a) Fire and smoke detection and warning systems;  Fire extinguishing systems;  System tests;  (b) Portable fire extinguisher.  1 3 11.9 Flight Controls (ATA 27)  Primary controls: aileron, elevator, rudder;  Trim tabs;	Glass cockpit;			
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Inverters, transformers.  11.7 Equipment and Furnishings (ATA 25)  (a) Emergency equipment requirements; 2 2 2 Seats, harnesses and belts;  (b) Cabin lay-out; 1 1 Equipment lay-out; 2 2 Cabin Furnishing installation; 2 3 Cabin entertainment equipment; 3 4 Galley installation; 4 5 Cargo handling and retention equipment; 4 4 Airstairs.  11.8 Fire Protection (ATA 26)  (a) Fire and smoke detection and warning systems; 5 Fire extinguishing systems; 5 System tests;  (b) Portable fire extinguisher. 1 3 11.9 Flight Controls (ATA 27) 1 3 Primary controls: aileron, elevator, rudder; 1 Trim tabs;	Power distribution;			
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Equipment lay-out; Cabin Furnishing installation; Cabin entertainment equipment; Galley installation; Cargo handling and retention equipment; Airstairs.  11.8 Fire Protection (ATA 26)  (a) Fire and smoke detection and warning systems; Fire extinguishing systems; System tests;  (b) Portable fire extinguisher.  1 3 11.9 Flight Controls (ATA 27) Primary controls: aileron, elevator, rudder; Trim tabs;	Seats, harnesses and belts;			
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Cabin entertainment equipment; Galley installation; Cargo handling and retention equipment; Airstairs.  11.8 Fire Protection (ATA 26)  (a) Fire and smoke detection and warning systems; Fire extinguishing systems; System tests;  (b) Portable fire extinguisher.  1 3 11.9 Flight Controls (ATA 27) Primary controls: aileron, elevator, rudder; Trim tabs;	Equipment lay-out;			
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System tests;  (b) Portable fire extinguisher.  1 3  11.9 Flight Controls (ATA 27)  Primary controls: aileron, elevator, rudder;  Trim tabs;	(a) Fire and smoke detection and warning systems;	1	3	
(b) Portable fire extinguisher.  1 3  11.9 Flight Controls (ATA 27)  Primary controls: aileron, elevator, rudder;  Trim tabs;	Fire extinguishing systems;			
11.9 Flight Controls (ATA 27)  Primary controls: aileron, elevator, rudder;  Trim tabs;	System tests;			
Primary controls: aileron, elevator, rudder; Trim tabs;	(b) Portable fire extinguisher.	1	3	
Trim tabs;	11.9 Flight Controls (ATA 27)	1	3	
	Primary controls: aileron, elevator, rudder;			
High lift devices;	Trim tabs;			
	High lift devices;			



System operation: manual;         A2         B1.2           Gust locks;         Balancing and rigging;         Balancing and rigging system.         1         3           Stall warning system.         1         3         3         5ystem lay-out;         1         3         3         5ystem lay-out;         1         3         5ystem lay-out;         1         4		Le	Level	
Gust locks; Balancing and rigging; Stall warning system.  11.10 Fuel Systems (ATA 28)  \$ystem lay-out; Fuel tanks; Supply systems; Cross-feed and transfer; Indications and warnings; Refuelling and defuelling.  11.11 Hydraulic Power (ATA 29)  \$ystem lay-out; Hydraulic fluids; Hydraulic fluids; Hydraulic reservoirs and accumulators; Pressure generation: electric, mechanical; Filters; Pressure generation: electric, mechanical; Filters; Pressure generation and detection; Dever distribution; Indication and warning systems.  11.12 Lee and Rain Protection (ATA 30) Lee formation, classification and detection; De-cicing systems: electrical, hot air, pneumatic and chemical; Probe and drain heating; Wiper systems.  11.13 Landing Gear (ATA 32) Construction, shock absorbing; Extension and retraction systems: normal and emergency; Indications and warning; Wheels, brakes, antiskid and autobraking; Tyres; Steering; Air-ground sensing.  11.14 Lights (ATA 33) 2 3 3		A2	B1.2	
Balancing and rigging;  Stall warning system.  11.10 Fuel Systems (ATA 28)  System lay-out; Fuel tanks; Supply systems; Cross-feed and transfer; Indications and warnings; Refuelling and defuelling.  11.11 Hydraulic Power (ATA 29)  System lay-out; Hydraulic fluids; Hydraulic fluids; Hydraulic reservoirs and accumulators; Pressure generation: electric, mechanical; Filters; Indication and warning systems.  11.12 Ice and Rain Protection (ATA 30) Ice formation, classification and detection; De-icing systems: electrical, hot air, pneumatic and chemical; Probe and drain heating; Wiper systems.  11.13 Landing Gear (ATA 32) Construction, shock absorbing; Extension and retraction systems: normal and emergency; Indications and warning; Wheels, brakes, antiskid and autobraking; Tyres; Steering; Air-ground sensing.  11.14 Lights (ATA 33) 2 3 3	System operation: manual;			
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System lay-out; Fuel tanks; Supply systems; Cross-feed and transfer; Indications and warnings; Refuelling and defuelling.  1.1.1 Hydraulic Power (ATA 29) System lay-out; Hydraulic fluids; Hydraulic reservoirs and accumulators; Pressure generation: electric, mechanical; Filters; Pressure Control; Power distribution; Indication and warning systems.  1.1.2 Ice and Rain Protection (ATA 30) Ice formation, classification and detection; De-icing systems: electrical, hot air, pneumatic and chemical; Probe and drain heating; Wiper systems.  1.1.3 Landing Gear (ATA 32) Construction, shock absorbing; Extension and retraction systems: normal and emergency; Indications and warning; Wheels, brakes, antiskid and autobraking; Tyres; Steering; Air-ground sensing.  1.1.4 Lights (ATA 33) 2 3 3	Balancing and rigging;			
System lay-out; Fuel tanks; Supply systems; Cross-feed and transfer; Indications and warnings; Refuelling and defuelling.  11.11 Hydraulic Power (ATA 29) 1 3 System lay-out; Hydraulic fluids; Hydraulic reservoirs and accumulators; Pressure generation: electric, mechanical; Filters; Pressure Control; Power distribution; Indication and warning systems.  11.12 Lee and Rain Protection (ATA 30) 1 3 Ice formation, classification and detection; De-lcing systems: electrical, hot air, pneumatic and chemical; Probe and drain heating; Wiper systems.  11.13 Landing Gear (ATA 32) Construction, shock absorbing; Extension and retraction systems: normal and emergency; Indications and warning; Wheels, brakes, antiskid and autobraking; Tyres; Steering; Air-ground sensing.  11.14 Lights (ATA 33) 2 3 3	Stall warning system.			
Fuel tanks; Supply systems; Cross-feed and transfer; Indications and warnings; Refuelling and defuelling.  11.11 Hydraulic Power (ATA 29) 1 3 System lay-out; Hydraulic fluids; Hydraulic reservoirs and accumulators; Pressure generation: electric, mechanical; Filters; Pressure Control; Power distribution; Indication and warning systems.  11.12 Lee and Rain Protection (ATA 30) Ice formation, classification and detection; De-icing systems: electrical, hot air, pneumatic and chemical; Probe and drain heating; Wiper systems.  11.13 Landing Gear (ATA 32) Construction, shock absorbing; Extension and retraction systems: normal and emergency; Indications and warning; Wheels, brakes, antiskid and autobraking; Tyres; Steering; Air-ground sensing.  11.14 Lights (ATA 33) 2 3 3	11.10 Fuel Systems (ATA 28)	1	3	
Supply systems; Cross-feed and transfer; Indications and warnings; Refuelling and defuelling.  11.11 Hydraulic Power (ATA 29) System lay-out; Hydraulic fluids; Hydraulic reservoirs and accumulators; Pressure generation: electric, mechanical; Filters; Pressure Control; Power distribution; Indication and warning systems.  11.12 Ice and Rain Protection (ATA 30) 1 3 Ice formation, classification and detection; De-icing systems: electrical, hot air, pneumatic and chemical; Probe and drain heating; Wiper systems.  11.13 Landing Gear (ATA 32) Construction, shock absorbing; Extension and retraction systems: normal and emergency; Indications and warning; Wheels, brakes, antiskid and autobraking; Tyres; Steering; Air-ground sensing.  11.14 Lights (ATA 33) 2 3 3	System lay-out;			
Cross-feed and transfer; Indications and warnings; Refuelling and defuelling.  11.11 Hydraulic Power (ATA 29)  System lay-out; Hydraulic fluids; Hydraulic reservoirs and accumulators; Pressure generation: electric, mechanical; Filters; Pressure Control; Power distribution; Indication and warning systems.  11.12 Ice and Rain Protection (ATA 30)  1	Fuel tanks;			
Indications and warnings; Refuelling and defuelling.  11.11 Hydraulic Power (ATA 29)  System lay-out; Hydraulic fluids; Hydraulic reservoirs and accumulators; Pressure generation: electric, mechanical; Filters; Pressure Control; Power distribution; Indication and warning systems.  11.12 lee and Rain Protection (ATA 30) Ice formation, classification and detection; De-icing systems: electrical, hot air, pneumatic and chemical; Probe and drain heating; Wiper systems.  11.13 Landing Gear (ATA 32) Construction, shock absorbing; Extension and retraction systems: normal and emergency; Indications and warning; Wheels, brakes, antiskid and autobraking; Tyres; Steering; Air-ground sensing.  11.14 Lights (ATA 33) 2 3 3	Supply systems;			
Refuelling and defuelling.  11.11 Hydraulic Power (ATA 29)  System lay-out; Hydraulic fluids; Hydraulic reservoirs and accumulators; Pressure generation: electric, mechanical; Filters; Pressure Control; Power distribution; Indication and warning systems.  11.12 lee and Rain Protection (ATA 30) Ice formation, classification and detection; De-icing systems: electrical, hot air, pneumatic and chemical; Probe and drain heating; Wiper systems.  11.13 Landing Gear (ATA 32) Construction, shock absorbing; Extension and retraction systems: normal and emergency; Indications and warning; Wheels, brakes, antiskid and autobraking; Tyres; Steering; Air-ground sensing.  11.14 Lights (ATA 33) 2 3 3	Cross-feed and transfer;			
11.11 Hydraulic Power (ATA 29)  System lay-out; Hydraulic fluids; Hydraulic reservoirs and accumulators; Pressure generation: electric, mechanical; Filters; Pressure Control; Power distribution; Indication and warning systems.  11.12 Ice and Rain Protection (ATA 30) 1 3 lce formation, classification and detection; De-icing systems: electrical, hot air, pneumatic and chemical; Probe and drain heating; Wiper systems.  11.13 Landing Gear (ATA 32) 2 3 3 Construction, shock absorbing; Extension and retraction systems: normal and emergency; Indications and warning; Wheels, brakes, antiskid and autobraking; Tyres; Steering; Air-ground sensing.  11.14 Lights (ATA 33) 2 3 3	Indications and warnings;			
System lay-out; Hydraulic fluids; Hydraulic reservoirs and accumulators; Pressure generation: electric, mechanical; Filters; Pressure Control; Power distribution; Indication and warning systems.  11.12 Ice and Rain Protection (ATA 30) Ice formation, classification and detection; De-icing systems: electrical, hot air, pneumatic and chemical; Probe and drain heating; Wiper systems.  11.13 Landing Gear (ATA 32) Construction, shock absorbing; Extension and retraction systems: normal and emergency; Indications and warning; Wheels, brakes, antiskid and autobraking; Tyres; Steering; Air-ground sensing.  11.14 Lights (ATA 33) 2 3 3	Refuelling and defuelling.			
Hydraulic fluids; Hydraulic reservoirs and accumulators; Pressure generation: electric, mechanical; Filters; Pressure Control; Power distribution; Indication and warning systems.  11.12 lee and Rain Protection (ATA 30) 1 3 Ice formation, classification and detection; De-icing systems: electrical, hot air, pneumatic and chemical; Probe and drain heating; Wiper systems.  11.13 Landing Gear (ATA 32) 2 3 Construction, shock absorbing; Extension and retraction systems: normal and emergency; Indications and warning; Wheels, brakes, antiskid and autobraking; Tyres; Steering; Air-ground sensing.  11.14 Lights (ATA 33) 2 3	11.11 Hydraulic Power (ATA 29)	1	3	
Hydraulic reservoirs and accumulators;  Pressure generation: electric, mechanical;  Filters;  Pressure Control;  Power distribution;  Indication and warning systems.  11.12 Ice and Rain Protection (ATA 30)  1 3  Ice formation, classification and detection;  De-icing systems: electrical, hot air, pneumatic and chemical;  Probe and drain heating;  Wiper systems.  11.13 Landing Gear (ATA 32)  Construction, shock absorbing;  Extension and retraction systems: normal and emergency; Indications and warning;  Wheels, brakes, antiskid and autobraking;  Tyres;  Steering;  Air-ground sensing.  11.14 Lights (ATA 33)  2 3	System lay-out;			
Pressure generation: electric, mechanical; Filters; Pressure Control; Power distribution; Indication and warning systems.  11.12 Ice and Rain Protection (ATA 30) 1 3 Ice formation, classification and detection; De-icing systems: electrical, hot air, pneumatic and chemical; Probe and drain heating; Wiper systems.  11.13 Landing Gear (ATA 32) 2 3 Construction, shock absorbing; Extension and retraction systems: normal and emergency; Indications and warning; Wheels, brakes, antiskid and autobraking; Tyres; Steering; Air-ground sensing.  11.14 Lights (ATA 33) 2 3	Hydraulic fluids;			
Filters; Pressure Control; Power distribution; Indication and warning systems.  11.12 Ice and Rain Protection (ATA 30) 1 3 Ice formation, classification and detection; De-icing systems: electrical, hot air, pneumatic and chemical; Probe and drain heating; Wiper systems.  11.13 Landing Gear (ATA 32) 2 3 Construction, shock absorbing; Extension and retraction systems: normal and emergency; Indications and warning; Wheels, brakes, antiskid and autobraking; Tyres; Steering; Air-ground sensing.  11.14 Lights (ATA 33) 2 3	Hydraulic reservoirs and accumulators;			
Pressure Control; Power distribution; Indication and warning systems.  11.12 Ice and Rain Protection (ATA 30) 1 3 Ice formation, classification and detection; De-icing systems: electrical, hot air, pneumatic and chemical; Probe and drain heating; Wiper systems.  11.13 Landing Gear (ATA 32) 2 3 Construction, shock absorbing; Extension and retraction systems: normal and emergency; Indications and warning; Wheels, brakes, antiskid and autobraking; Tyres; Steering; Air-ground sensing.  11.14 Lights (ATA 33)	Pressure generation: electric, mechanical;			
Power distribution; Indication and warning systems.  11.12 Ice and Rain Protection (ATA 30) Ice formation, classification and detection; De-icing systems: electrical, hot air, pneumatic and chemical; Probe and drain heating; Wiper systems.  11.13 Landing Gear (ATA 32) Construction, shock absorbing; Extension and retraction systems: normal and emergency; Indications and warning; Wheels, brakes, antiskid and autobraking; Tyres; Steering; Air-ground sensing.  11.14 Lights (ATA 33)  2 3	Filters;			
Indication and warning systems.  11.12 Ice and Rain Protection (ATA 30)  1	Pressure Control;			
11.12 Ice and Rain Protection (ATA 30)  lce formation, classification and detection;  De-icing systems: electrical, hot air, pneumatic and chemical;  Probe and drain heating;  Wiper systems.  11.13 Landing Gear (ATA 32)  Construction, shock absorbing;  Extension and retraction systems: normal and emergency; Indications and warning;  Wheels, brakes, antiskid and autobraking;  Tyres;  Steering;  Air-ground sensing.  11.14 Lights (ATA 33)	Power distribution;			
Ice formation, classification and detection;  De-icing systems: electrical, hot air, pneumatic and chemical;  Probe and drain heating;  Wiper systems.  11.13 Landing Gear (ATA 32)  Construction, shock absorbing;  Extension and retraction systems: normal and emergency; Indications and warning;  Wheels, brakes, antiskid and autobraking;  Tyres;  Steering;  Air-ground sensing.  11.14 Lights (ATA 33)  2 3	Indication and warning systems.			
De-icing systems: electrical, hot air, pneumatic and chemical; Probe and drain heating; Wiper systems.  11.13 Landing Gear (ATA 32) Construction, shock absorbing; Extension and retraction systems: normal and emergency; Indications and warning; Wheels, brakes, antiskid and autobraking; Tyres; Steering; Air-ground sensing.  11.14 Lights (ATA 33)  2  3  12  3	11.12 Ice and Rain Protection (ATA 30)	1	3	
Probe and drain heating; Wiper systems.  11.13 Landing Gear (ATA 32) Construction, shock absorbing; Extension and retraction systems: normal and emergency; Indications and warning; Wheels, brakes, antiskid and autobraking; Tyres; Steering; Air-ground sensing.  11.14 Lights (ATA 33)  2 3	Ice formation, classification and detection;			
Wiper systems.  11.13 Landing Gear (ATA 32)  Construction, shock absorbing;  Extension and retraction systems: normal and emergency; Indications and warning;  Wheels, brakes, antiskid and autobraking;  Tyres; Steering; Air-ground sensing.  11.14 Lights (ATA 33)	De-icing systems: electrical, hot air, pneumatic and chemical;			
11.13 Landing Gear (ATA 32)  Construction, shock absorbing;  Extension and retraction systems: normal and emergency; Indications and warning;  Wheels, brakes, antiskid and autobraking;  Tyres;  Steering; Air-ground sensing.  11.14 Lights (ATA 33)	Probe and drain heating;			
Construction, shock absorbing;  Extension and retraction systems: normal and emergency; Indications and warning; Wheels, brakes, antiskid and autobraking; Tyres; Steering; Air-ground sensing.  11.14 Lights (ATA 33)  2 3	Wiper systems.			
Extension and retraction systems: normal and emergency; Indications and warning; Wheels, brakes, antiskid and autobraking; Tyres; Steering; Air-ground sensing.  11.14 Lights (ATA 33)  2 3	11.13 Landing Gear (ATA 32)	2	3	
Indications and warning; Wheels, brakes, antiskid and autobraking; Tyres; Steering; Air-ground sensing.  11.14 Lights (ATA 33)  2 3	Construction, shock absorbing;			
Wheels, brakes, antiskid and autobraking;  Tyres;  Steering; Air-ground sensing.  11.14 Lights (ATA 33)  2 3	Extension and retraction systems: normal and emergency;			
Tyres; Steering; Air-ground sensing.  11.14 Lights (ATA 33)  2 3	Indications and warning;			
Steering; Air-ground sensing.  11.14 Lights (ATA 33)  2 3	Wheels, brakes, antiskid and autobraking;			
Air-ground sensing.  11.14 Lights (ATA 33)  2 3	Tyres;			
11.14 Lights (ATA 33) 2 3	Steering;			
	Air-ground sensing.			
External: navigation, anti collision, landing, taxiing, ice;	11.14 Lights (ATA 33)	2	3	
	External: navigation, anti collision, landing, taxiing, ice;			



	Level	
	A2	B1.2
Internal: cabin, cockpit, cargo;		
Emergency.		
11.15 <b>Oxygen (ATA 35)</b>	1	3
System lay-out: cockpit, cabin;		
Sources, storage, charging and distribution;		
Supply regulation;		
Indications and warnings.		
11.16 Pneumatic/Vacuum (ATA 36)	1	3
System lay-out;		
Sources: engine/APU, compressors, reservoirs, ground supply;		
Pressure control;		
Distribution;		
Indications and warnings;		
Interfaces with other systems.		
11.17 Water/Waste (ATA 38)	2	3
Water system lay-out, supply, distribution, servicing and draining;		
Toilet system lay-out, flushing and servicing;		
Corrosion aspects.		