



Australian Government

Civil Aviation Safety Authority

I, GRAEME MILLS CRAWFORD, Acting Director of Aviation Safety, on behalf of CASA, make this instrument under regulation 66.015 of the *Civil Aviation Safety Regulations 1998*.

[Signed G.M. Crawford]

Graeme M. Crawford
Acting Director of Aviation Safety

12 May 2021

Part 66 Manual of Standards Amendment Instrument 2021 (No. 1)

1 Name

This instrument is the *Part 66 Manual of Standards Amendment Instrument 2021 (No. 1)*.

2 Commencement

This instrument commences on the day after it is registered.

3 Amendment of Part 66 Manual of Standards

Schedule 1 amends the *Part 66 Manual of Standards*.

Schedule 1 Amendments

[1] Paragraph 66.5 (b), definition of *avionics system*

substitute

avionic system means an aircraft system, as specified in Table 1 in section 66.A.20, which transfers, processes, displays or stores analogue or digital data, using data lines, data buses, coaxial cables, or wireless or other data transmission media, and includes the system's components and connectors.

Note The following are examples of avionic systems:

1. auto flight;
2. communication, radar and navigation;
3. instruments;
4. in-flight entertainment systems;
5. integrated modular avionics (IMA);
6. cabin systems;
7. on-board maintenance systems;
8. information systems;
9. fly-by-wire systems (related to flight control systems (ATA27));
10. fibre-optic control systems.

[2] Paragraph 66.5 (b), definition of *electrical system*

omit

Table 1

insert

Table 1 in section 66.A.20

[3] Paragraph 66.5 (b)

insert

AMC/GM for CASR Part 66 means the CASA publication titled *Acceptable Means of Compliance (AMC) and Guidance Material (GM) CASR Part 66*, as existing from time to time.

[4] After section 66.5

insert

66.6 Meaning of *hold*, or *obtain*, a unit of competency

A person is taken to hold, or have obtained, a unit of competency under this MOS if an MTO:

1. assesses the person as competent in the unit of competency; and
2. gives the person a statement of attainment, or similar document, stating the person holds the unit of competency.

[5] Sub-sub-subparagraph 66A.20 (a) 4. (ii) (E)

omit

avionics

insert

avionic

[6] Paragraphs 66.A.25 (b) to (e)

substitute

- (b) If the application is in relation to a Category A, B1 or B2 licence, or for the addition of a subcategory to a licence, the applicant must demonstrate, by examination conducted by CASA or an MTO:
1. knowledge of each module, applicable for the category or subcategory, in accordance with Part 2 of Appendix I; and
 2. the level of knowledge for each sub-module, applicable for the category or subcategory, in accordance with Part 3 of Appendix I.
- (c) The level of knowledge mentioned in subparagraph (b) 2. must be demonstrated to the examination standard mentioned in Appendix II.
- (d) If the application is in relation to a Category C licence, the applicant must demonstrate, by examination conducted by CASA or an MTO, the same matters mentioned in paragraph (b) and to the same examination standard mentioned in paragraph (c), as if the application is in relation to a Category B1 or B2 licence.
- (e) The knowledge mentioned in paragraph (b) may be gained by:
1. the training of the applicant by an MTO; or
 2. self-study by the applicant of CASA-recognised EASA textbooks.

Note See AMC/GM for CASR Part 66 for information about the CASA-recognised EASA textbooks for this subparagraph.

- (ea) The applicant must have undertaken the training mentioned in subparagraph (e) 1. or 2., and passed the examinations for the modules mentioned in paragraph (b), during the 10-year period before the date of the application.
- (eb) If the applicant was trained by an MTO, the applicant must hold each unit of competency listed and coded in Appendix IV that is marked “X”, or stated to be its alternative, for the relevant category or subcategory of aircraft engineer licence.

[7] Paragraph 66.A.25 (f)

omit

must

insert

, who was trained by an MTO, must

[8] Paragraph 66.A.25 (h)

omit

[9] Paragraph 66.A.25 (ha)

renumber as paragraph 66.A.25 (h)

[10] Paragraph 66.A.25 (i)

omit (wherever occurring)

to (h)

insert

to (g)

[11] Subparagraphs 66.A.30 (a) 1. and 2.

substitute

1. for a Category A, or subcategory B1.2 or B1.4, licence:
 - (i) 3 years’ practical maintenance experience on operating aircraft, if the applicant has not undertaken any relevant technical training; or
Note See AMC/GM for CASR Part 66 for information about what is relevant technical training for this sub-subparagraph.
 - (ii) 2 years’ practical maintenance experience on operating aircraft, and completion of relevant training as a skilled worker in a technical trade; or
Note See AMC/GM for CASR Part 66 for information about what is relevant training for this sub-subparagraph.
 - (iii) 1 year’s practical maintenance experience on operating aircraft, and completion of a category training course conducted by an MTO.
2. for a Category B2, or subcategory B1.1 or B1.3, licence:
 - (i) 5 years’ practical maintenance experience on operating aircraft, if the applicant has not undertaken any relevant technical training; or
Note See AMC/GM for CASR Part 66 for information about what is relevant technical training for this sub-subparagraph.
 - (ii) 3 years’ practical maintenance experience on operating aircraft, and completion of relevant training as a skilled worker in a technical trade; or

Note See AMC/GM for CASR Part 66 for information about what is relevant training for this sub-subparagraph.

- (iii) 2 years' practical maintenance experience on operating aircraft, and completion of a category training course conducted by an MTO.

[12] Sub-subparagraph 66.A.30 (a) 3. (iii)

substitute

- (iii) for an applicant holding an academic degree mentioned in subparagraph 66.A.25 (h) 1. — 3 years' experience working in a civil aircraft maintenance environment on a representative selection of tasks directly associated with aircraft maintenance, including at least 6 months of observation of base maintenance tasks.

Note See AMC/GM for CASR Part 66 for information about what is a representative selection of tasks for this sub-subparagraph.

[13] Paragraphs 66.A.30 (b) to (e)

substitute

- (b) Subject to paragraph (d), if a person who holds an aircraft engineer licence applies to CASA to add a category (other than Category C), or subcategory, to the licence, the person must have gained the minimum period of practical maintenance experience, for the category or subcategory, on operating aircraft in accordance with Table 3.

Table 3

Practical maintenance experience requirements for adding a category, or subcategory, to an aircraft engineer licence

To	A1	A2	A3	A4	B1.1	B1.2	B1.3	B1.4	B2
From									
A1	–	6 months	6 months	6 months	2 years	6 months	2 years	1 year	2 years
A2	6 months	–	6 months	6 months	2 years	6 months	2 years	1 year	2 years
A3	6 months	6 months	–	6 months	2 years	1 year	2 years	6 months	2 years
A4	6 months	6 months	6 months	–	2 years	1 year	2 years	6 months	2 years
B1.1	None	6 months	6 months	6 months	–	6 months	6 months	6 months	1 year
B1.2	6 months	None	6 months	6 months	2 years	–	2 years	6 months	2 years
B1.3	6 months	6 months	None	6 months	6 months	6 months	–	6 months	1 year
B1.4	6 months	6 months	6 months	None	2 years	6 months	2 years	–	2 years
B2	6 months	6 months	6 months	6 months	1 year	1 year	1 year	1 year	–

- (c) The experience mentioned in paragraph (b) must have been gained from a representative cross-section of maintenance tasks on operating aircraft relevant to the category or subcategory.

Note See AMC/GM for CASR Part 66 for information about what is a representative cross-section of maintenance tasks for this paragraph.

- (d) The minimum period of experience mentioned in paragraph (b) is reduced by 50% if the applicant has completed a training course, relevant to the category or subcategory, conducted by an MTO.
- (e) At least 1 year of the experience mentioned in paragraph (a) must be recent experience gained on aircraft relevant to the category, or subcategory, of the initial licence applied for.

Note See AMC/GM for CASR Part 66 for information about what is recent experience for this paragraph.

- (ea) Subject to paragraph (d), at least 3 months of the experience mentioned in paragraph (b) must be recent experience gained on aircraft relevant to the category, or subcategory, of licence sought to be added.

Note See AMC/GM for CASR Part 66 for information about what is recent experience for this paragraph.

- (eb) Aircraft maintenance experience gained outside a civil aircraft maintenance environment is taken to be practical maintenance experience for paragraph (a) if an MTO certifies, in writing, to CASA that:
 1. the experience gained is equivalent to the practical maintenance experience; and
 2. the applicant has adequate additional practical maintenance experience on civil aircraft to ensure an adequate understanding of the civil aircraft maintenance environment.
- (ec) The experience mentioned in paragraph (a) or (b) must have been gained by the applicant during the 10-year period before the date of the application for the licence or the addition of the category, or subcategory, to the licence.

[14] Paragraph 66.A.30 (f)

omit (wherever occurring)

to (e)

insert

to (ec)

[15] Paragraph 66.A.45 (e)

omit

as specified in sub-subparagraph 66.A.30 (a) 3 (iii)

insert

mentioned in subparagraph 66.A.25 (h) 1.

[16] Paragraph 66.A.45 (i)

omit

basic practical

insert

practical maintenance

[17] Paragraph 66.A.55 (c), Note

substitute

Note CASA's assessment and approval are guided by Appendix II of AMC/GM for CASR Part 66 and the CASA publication titled *Advisory Circular AC 66-07 – Practical training*

options for aircraft type training and recording of recent work experience, as existing from time to time.

[18] Appendix I, heading and Part 1, heading

substitute

Basic knowledge requirements

Part 1 — Levels of knowledge for Category A, B1, B2 or C licence

[19] Appendix I, Part 1, subheading “Levels of knowledge” and paragraph immediately following the subheading

substitute

The basic knowledge requirements for a Category A, B1 or B2 licence, or subcategory to an aircraft engineer licence, are indicated by the level of knowledge (1, 2 or 3), for each applicable sub-module, under Part 3 of this appendix. The basic knowledge requirements for a Category C licence are the same as that for a Category B1 or B2 licence. The levels of knowledge are defined as follows:

[20] Appendix I, Part 2, table

omit

11	Aeroplane aerodynamics, structures and systems	X	X			
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insert

11A	Turbine aeroplane aerodynamics, structures and systems	X				
11B	Piston aeroplane aerodynamics, structures and systems		X			

[21] Appendix I, Part 2, table

omit

13	Aircraft structures and systems					X
14	Propulsion — avionic systems					X

insert

13	Aircraft aerodynamics, structures and systems					X
14	Propulsion					X

[22] Appendix I, Part 3, Module 3, item 3.10, paragraph (b)

omit

Magneto-motive force, field strength, magnetic flux density, permeability, hysteresis loop, retentivity, reluctance, saturation point, eddy currents, coercive force;

insert

Magneto-motive force, field strength, magnetic flux density, permeability, hysteresis loop, retentivity, coercive force reluctance, saturation point, eddy currents;

[23] Appendix I, Part 3, Module 5

substitute

Module 5 Digital techniques/electronic instrument systems

	Level of knowledge for the category			
	A	B1.1 B1.3	B1.2 B1.4	B2
5.1 Electronic instrument systems	1	2	2	3
Typical systems arrangements and cockpit layout of electronic instrument systems.				
5.2 Numbering systems	—	1	—	2
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	—	1	—	2
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	—	2	—	2
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;	—	2	—	2

	Level of knowledge for the category			
	A	B1.1 B1.3	B1.2 B1.4	B2
(b) Interpretation of logic diagrams.	—	—	—	2
5.6 Basic computer structure				
(a) Computer terminology (including bit, byte, software, hardware, CPU, IC, and various memory devices, such as RAM, ROM, PROM); Computer technology (as applied in aircraft systems);	1	2	—	—
(b) Computer-related terminology; Operation, layout and interface of the major components in a microcomputer, 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.	—	—	—	2
5.7 Microprocessors	—	—	—	2
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	—	—	—	2
Operation and use of encoders and decoders; Function of encoder types; Uses of medium, large and very large-scale integration.				
5.9 Multiplexing	—	—	—	2
Operation, application and identification in logic diagrams of multiplexers and demultiplexers.				

	Level of knowledge for the category			
	A	B1.1 B1.3	B1.2 B1.4	B2
5.10 Fibre optics	—	1	1	2
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	—	2	1	2
Principles of operation of common types of displays used in modern aircraft, including cathode ray tubes, light emitting diodes and liquid crystal display.				
5.12 Electrostatic sensitive devices	1	2	2	2
Special handling of components sensitive to electrostatic discharges; Awareness of risks and possible damage, component and personnel anti-static protection devices.				
5.13 Software management control	—	2	1	2
Awareness of restrictions, airworthiness requirements and possible catastrophic effects of unapproved changes to software programs.				
5.14 Electromagnetic environment	—	2	2	2
Influence of the following phenomena on maintenance practices for electronic system: <ul style="list-style-type: none"> • EMC – electromagnetic compatibility • EMI – electromagnetic interference • HIRF – high-intensity radiated field • Lightning and lightning protection. 				

	Level of knowledge for the category			
	A	B1.1 B1.3	B1.2 B1.4	B2
5.15 Typical electronic/digital aircraft systems	—	2	2	2
<p>General arrangement of typical electronic/digital aircraft systems and associated built-in test equipment (BITE), such as the following:</p> <ul style="list-style-type: none"> • 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. 				

[24] Appendix I, Part 3, Module 7, item 7.5

omit

of America

[25] Appendix I, Part 3, Module 7, item 7.7

substitute

7.7 Electrical wiring interconnection system (EWIS)	1	3	3
<p>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; EWIS installations, inspection, repair, maintenance and cleanliness standards.</p>			

[26] Appendix I, Part 3, Module 10, item 10.6, heading

omit

Parts 21 and 42

insert

Continuing airworthiness

[27] Appendix I, Part 3, Module 10, item 10.7, paragraph (b)

substitute

(b) Continuing airworthiness; Minimum equipment requirements — test flights; ETOPS, maintenance and dispatch requirements; All weather operations: categories 2 and 3 operations.	—	1	1
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[28] Appendix I, Part 3, Module 11

substitute

Module 11A Turbine aeroplane aerodynamics, structures and systems

	Level of knowledge for the category		
	A1	B1.1	B2
11.1 Theory of flight			—
<i>11.1.1 Aeroplane aerodynamics and flight controls</i>	1	2	
Operation, and effect, of the following: <ul style="list-style-type: none"> 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, sawtooth leading edges; Boundary layer control, using vortex generators, stall wedges or leading-edge devices; Operation and effect of trim tabs, balance and anti-balance (leading) tabs, servo tabs, spring tabs, mass balance, control surface bias, aerodynamic balance panels.			
<i>11.1.2 High-speed flight</i>	1	2	—
Speed of sound, subsonic flight, transonic flight, supersonic flight; Mach number, critical Mach number, compressibility buffet, shockwave, aerodynamic heating, area rule; Factors affecting airflow in engine intakes of high-speed aircraft; Effects of sweepback on critical Mach number.			

	Level of knowledge for the category		
	A1	B1.1	B2
11.2 Airframe structures — general concepts			
(a) Airworthiness requirements for structural strength; Structural classification, primary, secondary and tertiary; Fail-safe, safe-life and 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;	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 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.	1	2	—
11.3 Airframe structures — aeroplanes			
<i>11.3.1 Fuselage (ATA52/53/56)</i>	1	2	—
Construction and pressurisation sealing; Wing, stabiliser, pylon and undercarriage attachments; Seat installation and cargo loading system; Doors and emergency exits: construction, mechanisms, operation and safety devices; Windows and windscreen construction and mechanisms.			
<i>11.3.2 Wings (ATA57)</i>	1	2	—
Construction; Fuel storage; Landing gear, pylon, control surface and high-lift/drag			

	Level of knowledge for the category		
	A1	B1.1	B2
attachments.			
<i>11.3.3 Stabilisers (ATA55)</i>	1	2	—
Construction; Control surface attachment.			
<i>11.3.4 Flight control surfaces (ATA55/57)</i>	1	2	—
Construction and attachment; Balancing — mass and aerodynamic.			
<i>11.3.5 Nacelles and pylons (ATA54)</i>	1	2	—
Construction; Firewalls; Engine mounts.			
11.4 Air-conditioning and cabin pressurisation (ATA21)			
<i>11.4.1 Air supply</i>	1	2	—
Sources of air supply, including engine bleed, APU and ground cart.			
<i>11.4.2 Air-conditioning</i>	1	3	—
Air-conditioning systems; Air cycle and vapour cycle machines; Distribution systems; Flow, temperature and humidity control system.			
<i>11.4.3 Pressurisation</i>	1	3	—
Pressurisation systems; Control and indication, including control and safety valves; Cabin pressure controllers.			
<i>11.4.4 Safety and warning devices</i>	1	3	—
Protection and warning devices.			
11.5 Instruments and avionic systems			
<i>11.5.1 Instrument systems (ATA31)</i>	1	2	—
Pitot static: altimeter, airspeed 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;			

	Level of knowledge for the category		
	A1	B1.1	B2
Angle of attack indication, stall warning systems; Glass cockpit; Other aircraft system indication.			
<i>11.5.2 Avionic systems</i>	1	1	—
Fundamentals of system layouts, and operation of the following: <ul style="list-style-type: none"> • Auto flight (ATA22) • Communications (ATA23) • Navigation systems (ATA34). 			
11.6 Electrical power (ATA24)	1	3	—
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.			
11.7 Equipment and furnishings (ATA25)			
(a) Emergency equipment requirements; Seats, harnesses and belts;	2	2	—
(b) Cabin layout; Equipment layout; Cabin furnishing installation; Cabin entertainment equipment; Galley installation; Cargo handling and retention equipment; Airstairs.	1	1	—

	Level of knowledge for the category		
	A1	B1.1	B2
11.8 Fire protection (ATA26)			
(a) Fire and smoke detection and warning systems; Fire extinguishing systems; System tests;	1	3	—
(b) Portable fire extinguisher.	1	2	—
11.9 Flight controls (ATA27)	1	3	—
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.			
11.10 Fuel systems (ATA28)	1	3	—
System layout; Fuel tanks; Supply systems; Dumping, venting and draining; Cross-feed and transfer; Indications and warnings; Refuelling and defuelling; Longitudinal balance fuel systems.			
11.11 Hydraulic power (ATA29)	1	3	—
System layout; Hydraulic fluids; Hydraulic reservoirs and accumulators; Pressure generation: electric, mechanical, pneumatic; Emergency pressure generation; Filters;			

	Level of knowledge for the category		
	A1	B1.1	B2
Pressure control; Power distribution; Indication and warning systems; Interface with other systems.			
11.12 Ice and rain protection (ATA30)	1	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; Wiper systems.			
11.13 Landing gear (ATA32)	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 (ATA33)	2	3	—
External: navigation, anti-collision, landing, taxiing, ice; Internal: cabin, cockpit, cargo; Emergency.			
11.15 Oxygen (ATA35)	1	3	—
System layout: cockpit, cabin; Sources, storage, charging and distribution; Supply regulation; Indications and warnings.			
11.16 Pneumatic/vacuum (ATA36)	1	3	—
System layout; Sources: engine/APU, compressors, reservoirs, ground supply; Pressure and vacuum pumps; Pressure control; Distribution; Indications and warnings;			

	Level of knowledge for the category		
	A1	B1.1	B2
Interfaces with other systems.			
11.17 Water/waste (ATA38)	2	3	—
Water system layout, supply, distribution, servicing and draining; Toilet system layout, flushing and servicing; Corrosion aspects.			
11.18 On-board maintenance systems (ATA45)	1	2	—
Central maintenance computers; Data-loading system; Electronic library system; Printing; Structure monitoring (damage-tolerance monitoring).			
11.19 Integrated modular avionics (ATA42)	1	2	—
Functions that may be typically integrated in the Integrated modular avionics (IMA) modules include: 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 built-in test equipment (BITE), fuel management, braking control, steering control, landing gear extension and retraction, tyre pressure indication, oleo pressure indication, brake temperature monitoring; Core system; Network components.			
11.20 Cabin systems (ATA44)	1	2	—
The units and components which furnish a means of entertaining the passengers and providing communication within the aircraft (cabin intercommunication data system (<i>CIDS</i>)), and between the aircraft cabin and ground stations (cabin network service (<i>CNS</i>)). These include voice, data, music and video transmissions. The CIDS provides an interface between cockpit/cabin crew and cabin systems. These systems support data exchange of the different related Line Replaceable Units (LRUs) and they are typically operated via Flight Attendant Panels (FAPs). The CNS is typically on a server, interfacing with systems, including the following: <ul style="list-style-type: none"> • data/radio communication • cabin core system (CCS) 			

	Level of knowledge for the category		
	A1	B1.1	B2
<ul style="list-style-type: none"> • in-flight entertainment system (IFES) • external communication system (ECS) • cabin mass memory system (CMMS) • cabin monitoring system (CMS) • miscellaneous cabin systems (MCSs). <p>The CNS may host functions such as the following:</p> <ul style="list-style-type: none"> • access to pre-departure/departure reports • email/intranet/internet access • passenger database. 			
11.21 Information systems (ATA46)	1	2	—
<p>The units and components which furnish a means of storing, updating and retrieving digital information, traditionally provided on paper, microfilm or microfiche. These include units that are dedicated to the information storage and retrieval function, such as the electronic library mass storage and controller. But they do not include units or components installed for other uses and shared with other systems, such as flight deck printer or general use display.</p> <p>Typical examples include the following:</p> <ul style="list-style-type: none"> • air traffic and information management systems • network server systems • aircraft general information system • flight deck information system • maintenance information system • passenger cabin information system • miscellaneous information system. 			

Module 11B Piston aeroplane aerodynamics, structures and systems

Note The scope of this module must reflect the technology of aeroplanes relevant to a subcategory A2, or B1.2, aircraft engineer licence.

	Level of knowledge for the category		
	A2	B1.2	B2
11.1 Theory of flight			—
<i>11.1.1 Aeroplane aerodynamics and flight controls</i>	1	2	
<p>Operation and effect of the following:</p> <ul style="list-style-type: none"> • roll control: ailerons and spoilers • pitch control: elevators, stabilators, variable incidence stabilisers and canards • yaw control, rudder limiters; <p>Control using elevons, ruddervators;</p> <p>High-lift devices, slots, slats, flaps, flaperons;</p> <p>Drag-inducing devices, spoilers, lift dumpers, speed brakes;</p> <p>Effects of wing fences, sawtooth leading edges;</p> <p>Boundary layer control, using vortex generators, stall wedges or leading-edge devices;</p> <p>Operation and effect of trim tabs, balance and anti-balance (leading) tabs, servo tabs, spring tabs, mass balance, control surface bias, aerodynamic balance panels.</p>			
<i>11.1.2 High-speed flight – N/A</i>	—	—	—
11.2 Airframe structures — general concepts			
<p>(a)</p> <p>Airworthiness requirements for structural strength;</p> <p>Structural classification, primary, secondary and tertiary;</p> <p>Fail-safe, safe-life and damage-tolerance concepts;</p> <p>Zonal and station identification systems;</p> <p>Stress, strain, bending, compression, shear, torsion, tension, hoop stress, fatigue;</p> <p>Drains and ventilation provisions;</p> <p>System installation provisions;</p> <p>Lightning-strike protection provision;</p> <p>Aircraft bonding;</p>	2	2	—

	Level of knowledge for the category		
	A2	B1.2	B2
(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; 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.	1	2	—
11.3 Airframe structures — aeroplanes			
<i>11.3.1 Fuselage (ATA52/53/56)</i>	1	2	—
Construction and pressurisation sealing; Wing, tailplane, pylon and undercarriage attachments; Seat installation; Doors and emergency exits: construction and operation; Windows and windscreen attachment.			
<i>11.3.2 Wings (ATA57)</i>	1	2	—
Construction; Fuel storage; Landing gear, pylon, control surface and high-lift/drag attachments.			
<i>11.3.3 Stabilisers (ATA55)</i>	1	2	—
Construction; Control surface attachment.			
<i>11.3.4 Flight control surfaces (ATA55/57)</i>	1	2	—
Construction and attachment; Balancing — mass and aerodynamic.			
<i>11.3.5 Nacelles and pylons (ATA54)</i>	1	2	—
Construction; Firewalls Engine mounts.			

	Level of knowledge for the category		
	A2	B1.2	B2
11.4 Air-conditioning and cabin pressurisation (ATA21)	1	3	—
Pressurisation and air-conditioning systems; Cabin pressure controllers; Protection and warning devices; Heating systems.			
11.5 Instruments and avionic systems			
<i>11.5.1 Instrument systems (ATA31)</i>	1	2	—
Pitot static: altimeter, airspeed 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.			
<i>11.5.2 Avionic systems</i>	1	1	—
Fundamentals of system layouts, and operation of the following: <ul style="list-style-type: none"> • auto flight (ATA22) • communications (ATA23) • navigation systems (ATA34). 			
11.6 Electrical power (ATA24)	1	3	—
Batteries installation and operation; DC-power generation; Voltage regulation; Power distribution; Circuit protection; Inverters, transformers.			
11.7 Equipment and furnishings (ATA25)			
(a) Emergency equipment requirements; Seats, harnesses and belts;	2	2	—

	Level of knowledge for the category		
	A2	B1.2	B2
(b) Cabin layout; Equipment layout; Cabin furnishing installation; Cabin entertainment equipment; Galley installation; Cargo handling and retention equipment; Airstairs.	1	1	—
11.8 Fire protection (ATA26)			
(a) Fire and smoke detection and warning systems; Fire extinguishing systems; System tests;	1	3	—
(b) Portable fire extinguisher.	1	2	—
11.9 Flight controls (ATA27)	1	3	—
Primary controls: aileron, elevator, rudder; Trim tabs; High-lift devices; System operation: manual; Gust locks; Balancing and rigging; Stall warning system.			
11.10 Fuel systems (ATA28)	1	3	—
System layout; Fuel tanks; Supply systems; Cross-feed and transfer; Indications and warnings; Refuelling and defuelling.			
11.11 Hydraulic power (ATA29)	1	3	—
System layout; Hydraulic fluids; Hydraulic reservoirs and accumulators;			

	Level of knowledge for the category		
	A2	B1.2	B2
Pressure generation: electric, mechanical; Filters; Pressure control; Power distribution; Indication and warning systems.			
11.12 Ice and rain protection (ATA30)	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 (ATA32)	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 (ATA33)	2	3	—
External: navigation, anti-collision, landing, taxiing, ice; Internal: cabin, cockpit, cargo; Emergency.			
11.15 Oxygen (ATA35)	1	3	—
System layout: cockpit, cabin; Sources, storage, charging and distribution; Supply regulation; Indications and warnings.			
11.16 Pneumatic and vacuum (ATA36)	1	3	—
System layout; Sources: engine/APU, compressors, reservoirs, ground supply; Pressure and vacuum pumps; Pressure control; Distribution; Indications and warnings; Interfaces with other systems.			

	Level of knowledge for the category		
	A2	B1.2	B2
11.17 Water and waste (ATA38)	2	3	—
Water system layout, supply, distribution, servicing and draining; Toilet system layout, flushing and servicing; Corrosion aspects.			

[29] Appendix I, Part 3, Module 12

omit

	A	B1.3 B1.4	B2

insert

	A3 A4	B1.3 B1.4	B2

[30] Appendix I, Part 3, Module 12, item 12.4

substitute

12.4 Transmission	1	3	—
Gearboxes, main and tail rotors; Clutches, freewheel units and rotor brake; Tail rotor drive shafts, flexible couplings, bearings, vibration dampers and bearing hangers.			

[31] Appendix I, Part 3, Module 12, item 12.12

omit

Emergency pressure generation;

insert

Emergency pressure generation;

Filters;

[32] Appendix I, Part 3, Module 12, item 12.13

omit

Probe and drain heating.

insert

Probe and drain heating;

Wiper system.

[33] Appendix I, Part 3, Module 12, item 12.14

omit

Steering;

insert

Steering;

Air-ground sensing;

[34] Appendix I, Part 3, Module 12, item 12.17

omit

avionic

insert

avionics

[35] Appendix I, Part 3, Module 13, heading

substitute

Module 13 Aircraft aerodynamics, structures and systems

[36] Appendix I, Part 3, Module 13, item 13.8, heading

substitute

13.8 Instruments (ATA31)	—	—	3
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[37] Appendix I, Part 3, Module 13, item 13.8

omit

Vibration measurement and indication.

insert

Vibration measurement and indication;

Glass cockpit.

[38] Appendix I, Part 3, Module 13, item 13.20

omit

Integrated Modular Avionic

insert

integrated modular avionics

[39] Appendix I, Part 3, Module 14, heading

substitute

Module 14 Propulsion

[40] Appendix II, clause 1, heading

substitute

1 General

[41] Appendix II, subclause 1.1

omit

Unless otherwise approved within the CASA approved exposition course syllabus, all

insert

All

[42] Appendix II, subclause 1.4

omit

Part 66,

[43] Appendix II, subclause 1.7

substitute

- 1.7 The pass mark for each module, or sub-module, multi-choice part of the examination is 75%.

[44] Appendix II, subclauses 1.11 to 1.13

substitute

- 1.11 A failed module examination may not be retaken by a candidate for at least 90 days after the date of the examination. However, if the candidate undergoes a course of retraining, tailored to the failed subjects of a module, conducted by an MTO, the examination may be retaken after 30 days.
- 1.12 The period mentioned in paragraph 66.A.25 (ea) for the passing of a module examination does not apply if the examination has been passed by a candidate in relation to another category, or subcategory, of aircraft engineer licence held by the candidate.
- 1.13 After a set of 3 failed attempts by a candidate of a module examination, the candidate must wait 1 year after the date of the third failed attempt before attempting the examination again. The candidate must give written notice to the body (an MTO or CASA) the candidate applies to to sit the examination again, after the third failed attempt, of the following:
- (a) the number, and dates, of attempts by the candidate of the examination;
 - (b) for each examination attempt notified by the candidate — details of the body (an MTO or CASA) that conducted the examination.

Note The MTO or CASA, as applicable, is responsible for verifying the number, and dates, of attempts by the candidate of the examination.

[45] Appendix II, clause 2

substitute

2 Number of questions for each module

2.1 Module 1, Mathematics:

Category A – 16 multi-choice and 0 essay questions. Time allowed 20 minutes.

Category B1 – 32 multi-choice and 0 essay questions. Time allowed 40 minutes.

Category B2 – 32 multi-choice and 0 essay questions. Time allowed 40 minutes.

- 2.2 *Module 2, Physics:*
Category A – 32 multi-choice and 0 essay questions. Time allowed 40 minutes.
Category B1 – 52 multi-choice and 0 essay questions. Time allowed 65 minutes.
Category B2 – 52 multi-choice and 0 essay questions. Time allowed 65 minutes.
- 2.3 *Module 3, Electrical fundamentals:*
Category A – 20 multi-choice and 0 essay questions. Time allowed 25 minutes.
Category B1 – 52 multi-choice and 0 essay questions. Time allowed 65 minutes.
Category B2 – 52 multi-choice and 0 essay questions. Time allowed 65 minutes.
- 2.4 *Module 4, Electronic fundamentals:*
Category A – None.
Category B1 – 20 multi-choice and 0 essay questions. Time allowed 25 minutes.
Category B2 – 40 multi-choice and 0 essay questions. Time allowed 50 minutes.
- 2.5 *Module 5, Digital techniques/electronic instrument systems:*
Category A – 16 multi-choice and 0 essay questions. Time allowed 20 minutes.
Subcategories B1.1 and B1.3 – 40 multi-choice and 0 essay questions. Time allowed 50 minutes.
Subcategories B1.2 and B1.4 – 20 multi-choice and 0 essay questions. Time allowed 25 minutes.
Category B2 – 72 multi-choice and 0 essay questions. Time allowed 90 minutes.
- 2.6 *Module 6, Materials and hardware:*
Category A – 52 multi-choice and 0 essay questions. Time allowed 65 minutes.
Category B1 – 72 multi-choice and 0 essay questions. Time allowed 90 minutes.
Category B2 – 60 multi-choice and 0 essay questions. Time allowed 75 minutes.
- 2.7 *Module 7, Maintenance practices:*
Category A – 72 multi-choice and 2 essay questions. Time allowed 90 minutes plus 40 minutes.
Category B1 – 80 multi-choice and 2 essay questions. Time allowed 100 minutes plus 40 minutes.
Category B2 – 60 multi-choice and 2 essay questions. Time allowed 75 minutes plus 40 minutes.
- 2.8 *Module 8, Basic aerodynamics:*
Category A – 20 multi-choice and 0 essay questions. Time allowed 25 minutes.
Category B1 – 20 multi-choice and 0 essay questions. Time allowed 25 minutes.
Category B2 – 20 multi-choice and 0 essay questions. Time allowed 25 minutes.
- 2.9 *Module 9, Human factors:*
Category A – 20 multi-choice and 1 essay question. Time allowed 25 minutes plus 20 minutes.
Category B1 – 20 multi-choice and 1 essay question. Time allowed 25 minutes plus 20 minutes.
Category B2 – 20 multi-choice and 1 essay question. Time allowed 25 minutes plus 20 minutes.

- 2.10 *Module 10, Aviation legislation:*
Category A – 32 multi-choice and 1 essay question. Time allowed 40 minutes plus 20 minutes.
Category B1 – 40 multi-choice and 1 essay question. Time allowed 50 minutes plus 20 minutes.
Category B2 – 40 multi-choice and 1 essay question. Time allowed 50 minutes plus 20 minutes.
- 2.11 *Module 11A, Turbine aeroplane aerodynamics, structures and systems:*
Category A – 108 multi-choice and 0 essay questions. Time allowed 135 minutes.
Category B1 – 140 multi-choice and 0 essay questions. Time allowed 175 minutes.
Category B2 – None.
Module 11B, Piston aeroplane aerodynamics, structures and systems:
Category A – 72 multi-choice and 0 essay questions. Time allowed 90 minutes.
Category B1 – 100 multi-choice and 0 essay questions. Time allowed 125 minutes.
Category B2 – None.
- 2.12 *Module 12, Helicopter aerodynamics, structures and systems:*
Category A – 100 multi-choice and 0 essay questions. Time allowed 125 minutes.
Category B1 – 128 multi-choice and 0 essay questions. Time allowed 160 minutes.
Category B2 – None.
- 2.13 *Module 13, Aircraft aerodynamics, structures and systems:*
Category A – None.
Category B1 – None.
Category B2 – 180 multi-choice and 0 essay questions. Time allowed 225 minutes. Questions and time allowed may be split into 2 examinations, as appropriate.
- 2.14 *Module 14, Propulsion:*
Category A – None.
Category B1 – None.
Category B2 – 24 multi-choice and 0 essay questions. Time allowed 30 minutes.
- 2.15 *Module 15, Gas turbine engine:*
Category A – 60 multi-choice and 0 essay questions. Time allowed 75 minutes.
Category B1 – 92 multi-choice and 0 essay questions. Time allowed 115 minutes.
Category B2 – None.
- 2.16 *Module 16, Piston engine:*
Category A – 52 multi-choice and 0 essay questions. Time allowed 65 minutes.
Category B1 – 72 multi-choice and 0 essay questions. Time allowed 90 minutes.
Category B2 – None.
- 2.17 *Module 17, Propeller:*
Category A – 20 multi-choice and 0 essay questions. Time allowed 25 minutes.
Category B1 – 32 multi-choice and 0 essay questions. Time allowed 40 minutes.
Category B2 – None.