

**Bijlage I, behorende bij artikel 1 van de Regeling bewijzen van bevoegdheid
vliegtuigtechnici**

AUA-AMTL



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Aircraft Maintenance Technician License

Part AUA-66 & Part AUA-147



FOREWORD

- (a) The Minister in charge of aviation affairs, through the Department of Civil Aviation of Aruba is known in these regulations as the “authority”

- (b) The editing practices used in this document are as follows:
 - (1) ‘Shall’ is used to indicate a mandatory requirement.

 - (2) ‘Should’ is used to indicate a recommendation.

 - (3) ‘May’ is used to indicate discretion by medical assessor of the Authority, the industry or the applicant, as appropriate.

 - (4) ‘Will’ indicates a mandatory requirement.

Note: The use of the male gender implies the female gender and vice versa.



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PART AUA-66

GENERAL

AUA-66.1 Authority

- (a) For the purpose of this part AUA-66, the authority shall be the Minister responsible for Aviation affairs to whom a person first applies for the issuance of an aircraft maintenance technician license.
- (b) The authority will implement the same definition, as per the aircraft accepted Type Certificate Data Sheet for:
- the list of aircraft types; and
 - what airframe/engine combinations are included in each particular aircraft type rating.
- (c) The Authority shall, where appropriate, establish directives, acceptable means of compliance, as well as any guidance material for the application of this Regulation.



SECTION A — TECHNICAL REQUIREMENTS

SUBPART A — AIRCRAFT MAINTENANCE LICENSE

AUA-66.A.1 Scope

This section defines the aircraft maintenance license and establishes the requirements for application, issue and continuation of its validity.

AUA-66.A.3 License categories and subcategories

Aircraft maintenance licenses include the following categories and, where applicable, subcategories and system ratings:

- (a) Category A, *Reserved*.
- (b) Category B1, divided into the following subcategories:
 - B1.1 Aeroplanes Turbine;
 - B1.2 Aeroplanes Piston;
 - B1.3 Helicopters Turbine;
 - B1.4 Helicopters Piston.
- (c) Category B2
The B2 license is applicable to all aircraft.
- (d) Category B2L
The B2L license is applicable to all aircraft other than those in Group 1 as set out in Point [AUA.66.A.5\(1\)](#) and is divided into the following 'system ratings':
 - communication/navigation (com/nav),
 - instruments,
 - autoflight,
 - surveillance,
 - airframe systems.A B2L license shall contain, as a minimum, one system rating.
- (e) Category B3
The B3 license is applicable to piston-engine non-pressurized aeroplanes of 2 000 kg Maximum Take-off Mass (MTOM) and below.



(f) Category L, *Reserved*.

(g) Category C

The C license is applicable to aeroplanes and helicopters.

AUA.66.A.5 Aircraft groups

For the purpose of ratings on aircraft maintenance licenses, aircraft shall be classified in the following groups:

(1) Group 1: complex motor-powered aircraft, helicopters with multiple engine, aeroplanes with maximum certified operating altitude exceeding FL290, aircraft equipped with fly-by-wire systems and other aircraft requiring an aircraft type rating when defined so by the authority.

The authority may decide to classify into Group 2, Group 3 or Group 4, as appropriate, an aircraft which meets the conditions set out in the first subparagraph, if it considers that the lower complexity of the particular aircraft justifies so.

(2) Group 2: aircraft other than those in Group 1 belonging to the following subgroups:

(i) subgroup 2a:

- single turboprop engine aeroplanes,
- those turbojet and multiple-turboprop aeroplanes classified by the authority in this subgroup because of their lower complexity.

(ii) subgroup 2b:

- single turbine engine helicopters,
- those multiple turbine engine helicopters classified by the authority in this subgroup because of their lower complexity.

(iii) subgroup 2c:

- single piston engine helicopters,
- those multiple piston engine helicopters classified by the authority in this subgroup because of their lower complexity.

(3) Group 3: piston engine aeroplanes other than those in Group 1.

(4) Group 4: *Reserved*.



AUA.66.A.10 Application

- (a) An application for an aircraft maintenance license or change to such license shall be made in a manner established by the Department of Civil Aviation of Aruba and submitted thereto.
- (b) An application for the change to an aircraft maintenance license shall be made to the Department of Civil Aviation of Aruba that issued the aircraft maintenance license.
- (c) In addition to the documents required in points [AUA.66.A.10\(a\)](#) and [AUA.66.A.10\(b\)](#), as appropriate, the applicant for additional basic categories or subcategories to an aircraft maintenance license shall submit his/her current original aircraft maintenance license to the Department of Civil Aviation of Aruba authority together with the DCA Form INS-4.032.
- (d) Each application shall be supported by documentation to demonstrate compliance with the applicable theoretical knowledge, practical training and experience requirements at the time of application.

AUA.66.A.15 Eligibility

An applicant for an aircraft maintenance license shall be at least 18 years of age.

AUA.66.A.20 Privileges

- (a) The following privileges shall apply:
 1. *Reserved.*
 2. A category B1 aircraft maintenance license shall permit the holder to issue certificates of release to service and to act as B1 support staff following:
 - maintenance performed on aircraft structure, powerplant and mechanical and electrical systems,
 - work on avionic systems requiring only simple tests to prove their serviceability and not requiring troubleshooting.
 3. A category B2 aircraft maintenance license shall permit the holder:
 - (i) to issue certificates of release to service and to act as B2 support staff for following:
 - Maintenance performed on avionic and electrical systems, and



- electrical and avionics tasks within powerplant and mechanical systems, requiring only simple test to prove their serviceability; and
- (ii) to issue certificates of release to service following minor scheduled line maintenance and simple defect rectification within the limits of tasks specifically endorsed on the certification authorisation referred to in article 79 sub (2) of AUA-RLW. This certification privilege shall be restricted to work that the licence holder has personally performed in the maintenance organisation which issued the certification authorisation and limited to the ratings already endorsed in the B2 licence.
4. A category B2L aircraft maintenance license shall permit the holder to issue certificates of release to service and to act as B2L support staff for the following:
- maintenance performed on electrical systems;
 - maintenance performed on avionics systems within the limits of the system ratings specifically endorsed on the license, and
 - when holding the 'airframe system' rating, performance of electrical and avionics tasks within power plant and mechanical systems, requiring only simple tests to prove their serviceability.
5. A category B3 aircraft maintenance license shall permit the holder to issue certificates of release to service and to act as B3 support staff for the following:
- maintenance performed on aeroplane structure, power plant and mechanical and electrical systems; and
 - work on avionics systems requiring only simple tests to prove their serviceability and not requiring troubleshooting.
6. *Reserved.*
7. A category C aircraft maintenance license shall permit the holder to issue certificates of release to service following base maintenance of the aircraft. The privileges apply to the aircraft in its entirety.
- (b) The holder of an aircraft maintenance license may not exercise its privileges unless:
1. in compliance with the applicable requirements of AUA-OPS 1 (Part-M), and JAR-OPS 3 for Aruba (Part-M), and AUA-RLW Chapter (II and III), and
 2. in the preceding 2-year period he/she has, either had 6 months of maintenance experience in accordance with the privileges granted by the aircraft maintenance license or, met the provision for the issue of the appropriate privileges; and



3. he/she has the adequate competence to certify maintenance on the corresponding aircraft; and
 4. he/she shall be proficient in the English language,
 - (a) he/she shall be able to read, write and communicate to an understandable level in English language in which the technical documentation and procedures necessary to support the issue of the certificate of release to service are written;
 - (b) The language proficiency shall meet at least Level 4 scale as per the ICAO Annex I Attachment A standard;
 - (c) Language proficiency shall be demonstrated by a certificate attesting the result of the assessment;
 - (d) The validity period of language proficiency as per 4 (b) has no expiration date;
- (c)
1. The demonstration of language proficiency as stated in (b) (4) shall be done through a method of assessment approved by the Department of Civil Aviation Aruba, which shall contain:
 - (i) the process by which an assessment is done;
 - (ii) the qualification of the assessors;
 2. Language assessment bodies shall comply with the requirements established by the Department of Civil Aviation Aruba

AUA.66.A.25 Basic knowledge requirements

- (a) An applicant for an aircraft maintenance license, or the addition of a category or subcategory to such a license, shall demonstrate by examination a level of knowledge in the appropriate subject modules in accordance with the [Appendix I](#) to Part AUA-66. The examination shall be conducted either by a training organisation appropriately approved in accordance with Part AUA-147 or by the authority.
- (b) *Reserved.*
- (c) An applicant for an aircraft maintenance license in category B2L for a particular 'system rating', or for the addition of another 'system rating', shall demonstrate by examination a level of knowledge of the appropriate subject modules in accordance with [Appendix I to Part AUA-66](#). The examination shall comply with the standard set out in [Appendix II to Part AUA-66](#)) and shall be conducted either by a training organisation appropriately approved in accordance with Part AUA-147, or by the authority.
- (d) The training courses and examinations shall have been passed within 10 years prior to the application for an aircraft maintenance license or the addition of a category or subcategory



to such a license. Should this not be the case, examination credits may be obtained in accordance with point (e).

- (e) The applicant may apply to the Minister for full or partial examination credits for the basic knowledge requirements for:
- (i) basic knowledge examinations that do not meet the requirement laid down in point (d);
 - (ii) any other technical qualification considered by the Department of Civil Aviation of Aruba to be equivalent to the knowledge standard of Part AUA-66.

Credits shall be granted in accordance with Subpart E of Section B of this Part AUA-66.

- (f) Credits expire 10 years after they were granted to the applicant by the Minister. The applicant may apply for new credits after expiration.

AUA.66.A.30 Basic experience requirements

- (a) An applicant for an aircraft maintenance license shall have acquired:
1. *Reserved.*
 2. for category B2 and subcategories B1.1 and B1.3:
 - (i) 5 years of practical maintenance experience on operating aircraft if the applicant has no previous relevant technical training; or
 - (ii) 3 years of practical maintenance experience on operating aircraft and completion of training considered relevant by the authority as a skilled worker, in a technical trade; or
 - (iii) 2 years of practical maintenance experience on operating aircraft and completion of a basic training course approved in accordance with [Part AUA-147](#);
 - 2a. for category B2L:
 - (i) 3 years of practical maintenance experience in operating aircraft, covering the corresponding system rating(s), if the applicant has no previous relevant technical training; or
 - (ii) 2 years of practical maintenance experience in operating aircraft, covering the corresponding system rating(s), and completion of training, considered relevant by the authority, as a skilled worker in a technical trade; or



- (iii) 1 year of practical maintenance experience in operating aircraft, covering the corresponding system rating(s), and completion of a Part-147 approved basic training course. For the addition of (a) new system rating(s) to an existing B2L license, 3 months of practical maintenance experience relevant to the new system rating(s) shall be required for each system rating added.
 - 2b. for category L: *Reserved*.
 3. for category C with respect to large aircraft:
 - (i) 3 years of experience exercising category B1.1, B1.3 or B2 privileges on large aircraft or as support staff according to AUA-RLW article 79, or, a combination of both; or
 - (ii) 5 years of experience exercising category B1.2 or B1.4 privileges on large aircraft or as support staff according to AUA-RLW article 79, or a combination of both;
 4. for category C with respect to other than large aircraft: 3 years of experience exercising category B1 or B2 privileges on other than large aircraft or as support staff according to AUA-RLW article 79 or a combination of both;
 5. for category C obtained through the academic route: an applicant holding an academic degree in a technical discipline, from a university or other higher educational institution recognised by the authority, 3 years of experience working in a civil aircraft maintenance environment on a representative selection of tasks directly associated with aircraft maintenance including 6 months of observation of base maintenance tasks.
- (b) An applicant for an extension to an aircraft maintenance license shall have a minimum civil aircraft maintenance experience requirement appropriate to the additional category or subcategory of license applied for as defined in [Appendix IV to this Part AUA-66](#).
- (c) The experience shall be practical and involve a representative cross section of maintenance tasks on aircraft.
- (d) At least 1 year of the required experience shall be recent maintenance experience on aircraft of the category/subcategory for which the initial aircraft maintenance license is sought. For subsequent category/ subcategory additions to an existing aircraft maintenance license, the additional recent maintenance experience required may be less than 1 year, but shall be at least 3 months. The required experience shall be dependent upon the difference between the license category/subcategory held and applied for. Such additional experience



shall be typical of the new license category/subcategory sought.

- (e) Notwithstanding point (a), aircraft maintenance experience gained outside a civil aircraft maintenance environment shall be accepted when such maintenance is equivalent to that required by this Part AUA-66 as established by the authority. Additional experience of civil aircraft maintenance shall, however, be required to ensure adequate understanding of the civil aircraft maintenance environment.
- (f) Experience shall have been acquired within the 10 years preceding the application for an aircraft maintenance license or the addition of a category or subcategory to such a license.

AUA.66.A.40 Continued validity of the aircraft maintenance license

- (a) The aircraft maintenance license becomes invalid 2 years after its last issue or change, unless the holder submits his/her aircraft maintenance license to the authority that issued it, in order to verify that the information contained in the license is the same as that contained in the authority records.
- (b) The holder of an aircraft maintenance license shall complete the relevant parts of DCA Form INS-4.032 (see [Appendix V](#)) and submit it with the holder's copy of the license to the authority that issued the original aircraft maintenance license, unless the holder works in a maintenance organisation approved in accordance with AUA-RLW Chapter III that has a procedure in its exposition whereby such organisation may submit the necessary documentation on behalf of the aircraft maintenance license holder.
- (c) Any certification privilege based upon an aircraft maintenance license becomes invalid as soon as the aircraft maintenance license is invalid.
- (d) The aircraft maintenance license is only valid
 - (i) when issued and/or changed by the Minister, and
 - (ii) when the holder has signed the document.

AUA.66.A.45 Endorsement with aircraft ratings

- (a) In order to be entitled to exercise certification privileges on a specific aircraft type, the holder of an aircraft maintenance license need to have his/her license endorsed with the relevant aircraft ratings.
 - For category B1, B2 or C the relevant aircraft ratings are the following:
 - (i) for group 1 aircraft, the appropriate aircraft type rating.



- (ii) for group 2 aircraft, the appropriate aircraft type rating, manufacturer subgroup rating or full subgroup rating.
 - (iii) for group 3 aircraft, the appropriate aircraft type rating or full group rating.
 - For category B2L, the relevant aircraft ratings are the following:
 - (i) for Group 2 aircraft, the appropriate manufacturer subgroup rating or full subgroup rating;
 - (ii) for Group 3 aircraft, the full group rating;
 - For category B3, the relevant rating is 'piston-engine non-pressurised aeroplanes of 2 000 kg MTOM and below'.
- (b) The endorsement of aircraft type ratings requires the satisfactory completion of one of the relevant category B1, B2 or C aircraft type training in accordance with [Appendix III to Part AUA-66](#);
- (c) For other than category C licenses, in addition to the requirements of point (b), the endorsement of the first aircraft type rating within a given category/subcategory requires satisfactory completion of the corresponding on-the-job training. This on-the-job training shall comply with [Appendix III to Part AUA-66](#).
- (d) By derogation from points (b) and (c), for Group 2 and 3 aircraft, aircraft type ratings may also be endorsed on a license after completing the following steps:
- satisfactory completion of the relevant category B1, B2 or C aircraft type examination in accordance with [Appendix III to this Part AUA-66](#);
 - in the case of B1 and B2 category, demonstration of practical experience in the aircraft type. In that case, the practical experience shall include a representative cross section of maintenance activities relevant to the license category.
- In the case of a category C rating, for a person qualified through the academic route as referred to in point (a)(5) of point [AUA.66.A.30](#), the first relevant aircraft type examination shall be at the category B1 or B2 level.
- e) For Group 2 aircraft:
- (i) the endorsement of manufacturer subgroup ratings for category B1 and C license holders requires complying with the aircraft type rating requirements for at least two aircraft types from the same manufacturer, which combined are representative of the applicable manufacturer subgroup;
 - (ii) the endorsement of full subgroup ratings for category B1 and C license holders requires complying with the aircraft type rating requirements for at least three



- aircraft types from different manufacturers, which combined are representative of the applicable subgroup;
- (iii) the endorsement of manufacturer subgroup and full subgroup ratings for category B2 and B2L license holders requires demonstration of practical experience which shall include a representative cross section of maintenance activities relevant to the license category and to the applicable aircraft subgroup and, in the case of the B2L license, relevant to the applicable system rating(s);
 - (iv) by derogation from point (e)(iii), the holder of a B2 or B2L license, endorsed with a full subgroup 2b, is entitled to be endorsed with a full subgroup 2c.
- (f) For Group 3 aircraft:
- (i) the endorsement of the full Group 3 rating for category B1, B2, B2L and C license holders require demonstration of practical experience, which shall include a representative cross section of maintenance activities relevant to the license category and to Group 3;
 - (ii) for category B1, unless the applicant provides evidence of appropriate experience, Group 3 rating shall be subject to the following limitations, which shall be endorsed on the license:
 - pressurised aeroplanes,
 - metal-structure aeroplanes,
 - composite-structure aeroplanes,
 - wooden-structure aeroplanes,
 - aeroplanes with metal-tubing structure covered with fabric;
 - (iii) by derogation from point (f)(i), the holder of a B2L license, endorsed with a full subgroup 2a or 2b, is entitled to be endorsed with Groups 3.
- (g) For the B3 license:
- (i) the endorsement of the rating 'piston engine non-pressurised aeroplanes of 2 000 kg MTOM and below' requires demonstration of practical experience, which shall include a representative cross section of maintenance activities relevant to the license category;
 - (ii) unless the applicant provides evidence of appropriate experience, the rating referred to in point (i) shall be subject to the following limitations, which shall be endorsed on the license:
 - wooden-structure aeroplanes,
 - aeroplanes with metal-tubing structure covered with fabric,
 - metal-structure aeroplanes,
 - composite-structure aeroplanes.



- (h) *Reserved.*

AUA.66.A.50 Limitations

- (a) Limitations introduced on an aircraft maintenance license are exclusions from the certification privileges and, in the case of limitations referred to in point [AUA.66.A.45](#), they affect the aircraft in its entirety.
- (b) For limitations referred to in point [AUA.66.A.45](#), limitations shall be removed upon:
1. demonstration of appropriate experience; or
 2. after a satisfactory practical assessment performed by the authority.

AUA.66.A.55 Evidence of qualification

Personnel exercising certification privileges as well as support staff shall produce their license, as evidence of qualification, within 24 hours upon request by an DCAA Inspector.

AUA.66.A.70 Conversion provisions

- (a) The holder of a certifying staff qualification valid in Aruba, prior expiration of such qualification, shall be issued an aircraft maintenance licence by the authority without further examination.
- (b) A person undergoing a certifying staff qualification process valid in Aruba, may continue to be qualified for another 2 years before applying for an aircraft maintenance license as defined in AUA.66.A.70(a). The holder of a certifying staff qualification gained following such process shall be issued an aircraft maintenance licence by the authority without further examination.
- (c) Where necessary, the aircraft maintenance licence shall contain limitations in accordance with point AUA.66.A.50 to reflect the differences between:
- (i) the scope of the certifying staff qualification valid in Aruba, and prior expiration of such qualification, the applicable licence category or subcategory provided for in this Annex (AUA Part-66);
 - (ii) the basic knowledge requirements and the basic examination standards laid down in Appendices I and II to this Annex (AUA Part-66).
- (d) By derogation from point (c), the aircraft maintenance licence shall contain limitations in accordance with point 66.A.50 to ensure that the certifying staff privileges valid Aruba before the entry into force of the applicable AUA Part-66 licence category/subcategory and those of the converted AUA Part-66 aircraft maintenance licence remain the same.



APPENDIX I — BASIC KNOWLEDGE REQUIREMENTS

1. Knowledge levels for Category B1, B2, B2L, B3 and C Aircraft Maintenance License

Basic knowledge for categories B1, B2, B2L and B3 are indicated by knowledge levels (1, 2 or 3) against each applicable subject. Category C applicants shall meet either the category B1 or the category B2 basic knowledge levels.

The knowledge level indicators are defined on 3 levels as follows:

— ***LEVEL 1: A familiarization with the principal elements of the subject.***

Objectives:

- (a) The applicant should be familiar with the basic elements of the subject.
- (b) The applicant should be able to give a simple description of the whole subject, using common words and examples.
- (c) The applicant should be able to use typical terms.

— ***LEVEL 2: A general knowledge of the theoretical and practical aspects of the subject and an ability to apply that knowledge.***

Objectives:

- (a) The applicant should be able to understand the theoretical fundamentals of the subject.
- (b) The applicant should be able to give a general description of the subject using, as appropriate, typical examples.
- (c) The applicant should be able to use mathematical formulae in conjunction with physical laws describing the subject.
- (d) The applicant should be able to read and understand sketches, drawings and schematics describing the subject.
- (e) The applicant should be able to apply his knowledge in a practical manner using detailed procedures.

— ***LEVEL 3: A detailed knowledge of the theoretical and practical aspects of the subject and a capacity to combine and apply the separate elements of knowledge in a logical and comprehensive manner.***

Objectives:

- (a) The applicant should know the theory of the subject and interrelationships with other subjects.
- (b) The applicant should be able to give a detailed description of the subject using theoretical fundamentals and specific examples.
- (c) The applicant should understand and be able to use mathematical formulae related to the subject.



- (d) The applicant should be able to read, understand and prepare sketches, simple drawings and schematics describing the subject.
- (e) The applicant should be able to apply his knowledge in a practical manner using manufacturer's instructions.
- (f) The applicant should be able to interpret results from various sources and measurements and apply corrective action where appropriate.

2. Modularization

Qualification on basic subjects for each aircraft maintenance license category or subcategory shall be in accordance with the following matrix, where applicable subjects are indicated by an 'X':



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For categories B1 and B3:

Subject module	B1 aeroplane with:		B1 helicopter with:		B2	B3
	Turbine engine(s)	Piston engine(s)	Turbine engine(s)	Piston engine(s)	Avionics	Piston-engine non-pressurized aeroplanes 2000 kg MTOM
1	X	X	X	X	X	X
2	X	X	X	X	X	X
3	X	X	X	X	X	X
4	X	X	X	X	X	X
5	X	X	X	X	X	X
6	X	X	X	X	X	X
7A	X	X	X	X	X	
7B						X
8	X	X	X	X	X	X
9A	X	X	X	X	X	
9B						X
10	X	X	X	X	X	X
11A	X					
11B		X				
11C						X
12			X	X		
13					X	
14					X	
15	X		X			
16		X		X		X
17A	X	X				
17B						X



For categories B2 and B2L:

Subject module/sub modules	B2	B2L
1	X	X
2	X	X
3	X	X
4	X	X
5	X	X
6	X	X
7A	X	X
7B		
8	X	X
9A	X	X
9B		
10	X	X
11A		
11B		
11C		
12		
13.1 and 13.2	X	X
13.3(a)	X	X (for system rating 'Autoflight')
13.3(b)	X	
13.4(a)	X	X (for system rating 'Com/NAV')
13.4(b)	X	X (for system rating 'Surveillance')
13.4(c)	X	



13.5	X	X
13.6	X	
13.7	X	X (for system rating 'Autoflight')
13.8	X	X (for system rating 'Instruments')
13.9	X	X
13.10	X	
13.11 to 13.18	X	X (for system rating 'Airframe systems')
13.19 to 13.22	X	
14	X	X (for system rating 'instruments' and 'Airframe systems')
15		
16		
17A		
17B		

MODULE 1. MATHEMATICS

MODULE 1. MATHEMATICS	LEVEL		
	B1	B2 B2L	B3
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.	2	2	2



1.2 Algebra	(a) Evaluating simple algebraic expressions, addition, subtraction, multiplication and division, use of brackets, simple algebraic fractions;			
		2	2	2
1.2 Algebra	(b) Linear equations and their solutions; Indices and powers, negative and fractional indices; Binary and other applicable numbering systems; Simultaneous equations and second degree equations with one unknown; Logarithms.			
		1	1	1
1.3 Geometry	(a) Simple geometrical constructions;			
	(b) Graphical representation; nature and uses of graphs, graphs of equations/functions;	1	1	1
	(c) Simple trigonometry; trigonometrical relationships, use of tables and rectangular and polar coordinates.	2	2	2



MODULE 2. PHYSICS

MODULE 2. PHYSICS		LEVEL		
		B1	B2 B2L	B3
2.1	<p>Matter</p> <p>Nature of matter: the chemical elements, structure of atoms, molecules;</p> <p>Chemical compounds;</p> <p>States: solid, liquid and gaseous;</p> <p>Changes between states.</p>	1	1	1
2.2	<p>Mechanics</p> <p>2.2.1 Statics</p> <p>Forces, moments and couples, representation as vectors;</p> <p>Centre of gravity;</p> <p>Elements of theory of stress, strain and elasticity: tension, compression, shear and torsion;</p> <p>Nature and properties of solid, fluid and gas;</p> <p>Pressure and buoyancy in liquids (barometers).</p>	2	1	1
2.2.2	<p>Kinetics</p> <p>Linear movement: uniform motion in a straight line, motion under constant acceleration (motion under gravity);</p> <p>Rotational movement: uniform circular motion (centrifugal/centripetal forces);</p> <p>Periodic motion: pendular movement;</p> <p>Simple theory of vibration, harmonics and resonance;</p> <p>Velocity ratio, mechanical advantage and efficiency.</p>	2	1	1
2.2.3	<p>Dynamics</p> <p>(a) Mass;</p>	2	1	1



<p>Force, inertia, work, power, energy (potential, kinetic and total energy), heat, efficiency;</p> <p>(b) Momentum, conservation of momentum;</p> <p>Impulse;</p> <p>Gyroscopic principles;</p> <p>Friction: nature and effects, coefficient of friction (rolling resistance).</p>				
		2	2	1
<p>2.2.4 Fluid dynamics</p> <p>(a) Specific gravity and density;</p> <p>(b) Viscosity, fluid resistance, effects of streamlining; Effects of compressibility on fluids;</p> <p>Static, dynamic and total pressure: Bernoulli's Theorem, venturi.</p>		2	2	2
		2	1	1
<p>MODEL 2. PHYSICS</p>	<p>LEVEL</p>			
		<p>B1</p>	<p>B2</p> <p>B2L</p>	<p>B3</p>
<p>2.3 Thermodynamics</p> <p>(a) Temperature: thermometers and temperature scales: Celsius, Fahrenheit and Kelvin; Heat definition;</p> <p>(b) Heat capacity, specific heat;</p> <p>Heat transfer: convection, radiation and conduction;</p> <p>Volumetric expansion;</p> <p>First and second law of thermodynamics;</p> <p>Gases: ideal gases laws; specific heat at constant volume and constant pressure, work done by expanding gas;</p> <p>Isothermal, adiabatic expansion and compression, engine cycles, constant volume and constant pressure, refrigerators and heat pumps;</p> <p>Latent heats of fusion and evaporation, thermal energy, heat of combustion.</p>		2	2	2
		2	2	1



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		2	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.		2	2	—



MODULE 3. ELECTRICAL FUNDAMENTALS

MODULE 3. ELECTRICAL FUNDAMENTALS		LEVEL		
		B1	B2 B2L	B3
3.1	<p>Electron Theory</p> <p>Structure and distribution of electrical charges within: atoms, molecules, ions, compounds;</p> <p>Molecular structure of conductors, semiconductors and insulators.</p>	1	1	1
3.2	<p>Static Electricity and Conduction</p> <p>Static electricity and distribution of electrostatic charges;</p> <p>Electrostatic laws of attraction and repulsion;</p> <p>Units of charge, Coulomb's Law;</p> <p>Conduction of electricity in solids, liquids, gases and a vacuum.</p>	2	2	1
3.3	<p>Electrical Terminology</p> <p>The following terms, their units and factors affecting them: potential difference, electromotive force, voltage, current, resistance, conductance, charge, conventional current flow, electron flow.</p>	2	2	1
3.4	<p>Generation of Electricity</p> <p>Production of electricity by the following methods: light, heat, friction, pressure, chemical action, magnetism and motion.</p>	1	1	1
3.5	<p>DC Sources of Electricity</p> <p>Construction and basic chemical action of: primary cells, secondary cells, lead acid cells, nickel cadmium cells, other alkaline cells;</p>	2	2	2



<p>Cells connected in series and parallel; Internal resistance and its effect on a battery; Construction, materials and operation of thermocouples; Operation of photo-cells.</p>				
<p>3.6 DC Circuits</p> <p>Ohms Law, Kirchoff's Voltage and Current Laws;</p> <p>Calculations using the above laws to find resistance, voltage and current;</p> <p>Significance of the internal resistance of a supply.</p>		2	2	1
<p>MODULE 3. ELECTRICAL FUNDAMENTALS</p>	LEVEL			
		B1	B2 B2L	B3
<p>3.7 Resistance/Resistor</p> <p>(a) Resistance and affecting factors;</p> <p>Specific resistance;</p> <p>Resistor colour code, values and tolerances, preferred values, wattage ratings?</p> <p>Resistors in series and parallel;</p> <p>Calculation of total resistance using series, parallel and series parallel combinations;</p> <p>Operation and use of potentiometers and rheostats;</p> <p>Operation of Wheatstone Bridge;</p>		2	2	1
<p>(b) Positive and negative temperature coefficient conductance;</p> <p>Fixed resistors, stability, tolerance and limitations, methods of construction;</p> <p>Variable resistors, thermistors, voltage dependent resistors;</p> <p>Construction of potentiometers and rheostats;</p>		1	1	—



Construction of Wheatstone Bridge.					
3.8	<p>Power</p> <p>Power, work and energy (kinetic and potential); Dissipation of power by a resistor;</p> <p>Power formula;</p> <p>Calculations involving power, work and energy.</p>		2	2	1
3.9	<p>Capacitance/Capacitor</p> <p>Operation and function of a capacitor;</p> <p>Factors affecting capacitance area of plates, distance between plates, number of plates, dielectric and dielectric constant, working voltage, voltage rating;</p> <p>Capacitor types, construction and function;</p> <p>Capacitor colour coding;</p> <p>Calculations of capacitance and voltage in series and parallel circuits;</p> <p>Exponential charge and discharge of a capacitor, time constants;</p> <p>Testing of capacitors.</p>		1	1	—
MODULE 3. ELECTRICAL FUNDAMENTALS		LEVEL			
			B1	B2 B2L	B3
3.10	<p>Magnetism</p> <p>(a) Theory of magnetism; Properties of a magnet;</p> <p>Action of a magnet suspended in the Earth's magnetic field;</p> <p>Magnetization and demagnetization;</p> <p>Magnetic shielding;</p> <p>Various types of magnetic material;</p> <p>Electromagnets construction and principles of operation;</p>		2	2	1



<p>Hand clasp rules to determine: magnetic field around current carrying conductor;</p> <p>(b) Magneto motive force, field strength, magnetic flux density, permeability, hysteresis loop, retentively, coercive force reluctance, saturation point, eddy currents;</p>				
<p>3.11 Inductance/Inductor</p> <p>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, 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, permeability of coil, position of coils with respect to each other; Lenz's Law and polarity determining rules; Back emf, self-induction; Saturation point; Principle uses of inductors.</p>		2	2	1
<p>3.12 DC Motor/Generator Theory</p> <p>Basic motor and generator theory;</p> <p>Construction and purpose of components in DC generator;</p> <p>Operation of, and factors affecting output and direction of current flow in DC generators;</p> <p>Operation of, and factors affecting output power, torque, speed and direction of rotation of DC motors;</p> <p>Series wound, shunt wound and compound motors; Starter Generator construction.</p>		2	2	1



MODULE 3. ELECTRICAL FUNDAMENTALS	LEVEL		
	B1	B2 B2L	B3
<p>3.13 AC Theory</p> <p>Sinusoidal waveform: phase, period, frequency, cycle;</p> <p>Instantaneous, average, root mean square, peak, peak to peak current values and calculations of these values, in relation to voltage, current and power;</p> <p>Triangular/Square waves;</p> <p>Single/3 phase principles.</p>	2	2	1
<p>3.14 Resistive (R), Capacitive (C) and Inductive (L) Circuits</p> <p>Phase relationship of voltage and current in L, C and R circuits, parallel, series and series parallel;</p> <p>Power dissipation in L, C and R circuits;</p> <p>Impedance, phase angle, power factor and current calculations;</p> <p>True power, apparent power and reactive power calculations.</p>	2	2	1
<p>3.15 Transformers</p> <p>Transformer construction principles and operation;</p> <p>Transformer losses and methods for overcoming them;</p> <p>Transformer action under load and no-load conditions;</p> <p>Power transfer, efficiency, polarity markings;</p> <p>Calculation of line and phase voltages and currents;</p> <p>Calculation of power in a three phase system;</p> <p>Primary and Secondary current, voltage, turns ratio, power, efficiency;</p> <p>Auto transformers.</p>	2	2	1
<p>3.16 Filters</p> <p>Operation, application and uses of the following filters: low pass, high pass, band pass, band stop.</p>	1	1	—
<p>3.17 AC Generators</p> <p>Rotation of loop in a magnetic field and waveform produced;</p> <p>Operation and construction of revolving armature and revolving</p>	2	2	1



<p>field type AC generators; Single phase, two phase and three phase alternators; Three phase star and delta connections advantages and uses; Permanent Magnet Generators.</p>				
<p>3.18 AC Motors Construction, principles of operation and characteristics of: AC synchronous and induction motors both single and poly phase; Methods of speed control and direction of rotation; Methods of producing a rotating field: capacitor, inductor, shaded or split pole.</p>		2	2	1

MODULE 4 ELECTRONIC FUNDAMENTALS

MODULE 4. ELECTRONIC FUNDAMENTALS	LEVEL			
		B1	B2 B2L	B3
<p>4.1 Semiconductors 4.1.1 Diodes (a) 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.</p>		2	2	1



<p>(b) Materials, electron configuration, electrical properties;</p> <p>P and N type materials: effects of impurities on conduction, majority and minority characters;</p> <p>PN junction in a semiconductor, development of a potential across a PN junction in unbiased, forward biased and reverse biased conditions;</p> <p>Diode parameters: peak inverse voltage, maximum forward current, temperature, frequency, leakage current, power dissipation;</p> <p>Operation and function of diodes in the following circuits: clippers, clampers, full and half wave rectifiers, bridge rectifiers, voltage doublers and triplers;</p> <p>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, Zener diode.</p>		—	2	—
<p>4.1.2 <i>Transistors</i></p> <p>(a) Transistor symbols;</p> <p>Component description and orientation; Transistor characteristics and properties.</p> <p>(b) Construction and operation of PNP and NPN transistors;</p> <p>Base, collector and emitter configurations;</p> <p>Testing of transistors;</p> <p>Basic appreciation of other transistor types and their uses;</p> <p>Application of transistors: classes of amplifier (A, B, C);</p> <p>Simple circuits including: bias, decoupling, feedback and stabilisation;</p> <p>Multistage circuit principles: cascades, push-pull, oscillators, multivibrators, flip-flop circuits.</p>		1	2	1
		—	2	—



MODULE 4. ELECTRONIC FUNDAMENTALS	LEVEL		
	B1	B2 B2L	B3
<p>4.1.3 Integrated Circuits</p> <p>(a) Description and operation of logic circuits and linear circuits/operational amplifiers;</p> <p>(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.</p>	1	—	1
<p>4.2 Printed Circuit Boards</p> <p>Description and use of printed circuit boards.</p>	1	2	—
<p>4.3 Servomechanisms</p> <p>(a) Understanding of the following terms: Open and closed loop systems, feedback, follow up, analogue transducers; Principles of operation and use of the following synchro system components/features: resolvers, differential, control and torque, transformers, inductance and capacitance transmitters;</p> <p>(b) Understanding of the following terms: Open and closed loop, follow up, servomechanism, analogue, transducer, null, damping, feedback, deadband; 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.</p>	1	—	—
	—	2	—



MODULE 5. DIGITAL TECHNIQUES/ELECTRONIC INSTRUMENT SYSTEMS

MODULE 5. DIGITAL TECHNIQUES/ELECTRONIC INSTRUMENT SYSTEMS		LEVEL				
			B1-1 B1-3	B1-2 B1-4	B2 B2L	B3
5.1	Electronic Instrument Systems Typical systems arrangements and cockpit layout of electronic instrument systems.		2	2	3	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.		1	—	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.		2	—	2	—
5.4	Data Buses Operation of data buses in aircraft systems, including knowledge of ARINC and other specifications. Aircraft Network/Ethernet.		2	—	2	—
5.5	Logic Circuits (a) Identification of common logic gate symbols, tables and equivalent circuits; Applications used for aircraft systems, schematic diagrams.		2	—	2	—
	(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).		2	—	—	—



<p>(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.</p>		—	—	2	—
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MODULE 5. DIGITAL TECHNIQUES/ELECTRONIC INSTRUMENT SYSTEMS		LEVEL				
			B1-1 B1-3	B1-2 B1-4	B2 B2L	B3
<p>5.7 <i>Microprocessors</i> 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.</p>		—	—	2	—	
<p>5.8 <i>Integrated Circuits</i> Operation and use of encoders and decoders; Function of encoder types; Uses of medium, large and very large scale integration.</p>		—	—	2	—	
<p>5.9 <i>Multiplexing</i> Operation, application and identification in logic diagrams of multiplexers and demultiplexers.</p>		—	—	2	—	
<p>5.10 <i>Fibre Optics</i> 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.</p>		1	1	2	—	
<p>5.11 <i>Electronic Displays</i> Principles of operation of common types of displays used in modern aircraft, including Cathode Ray Tubes, Light Emitting Diodes and Liquid Crystal Display.</p>		2	1	2	1	



<p>5.12 Electrostatic Sensitive Devices</p> <p>Special handling of components sensitive to electrostatic discharges; Awareness of risks and possible damage, component and personnel anti-static protection devices.</p>		2	2	2	1
<p>5.13 Software Management Control</p> <p>Awareness of restrictions, airworthiness requirements and possible catastrophic effects of unapproved changes to software programmes.</p>		2	1	2	1
<p>5.14 Electromagnetic Environment</p> <p>Influence of the following phenomena on maintenance practices for electronic system: EMC-Electromagnetic Compatibility EMI-Electromagnetic EMI-Electromagnetic Interference HIRF-High Intensity Radiated Field Lightning/lightning protection.</p>		2	2	2	1
<p>MODULE 5. DIGITAL TECHNIQUES/ELECTRONIC INSTRUMENT SYSTEMS</p>	LEVEL				
	A	B1-1 B1-3	B1-2 B1-4	B2 B2L	B3
<p>5.15 Typical Electronic/Digital Aircraft Systems</p> <p>General arrangement of typical electronic/digital aircraft systems and associated BITE (Built In Test Equipment) such as:</p> <p>(a) For B1 and B2 only:</p> <p>ACARS-ARINC Communication and Addressing and Reporting System</p> <p>EICAS-Engine Indication and Crew Alerting System</p> <p>FBW-Fly-by-Wire</p> <p>FMS-Flight Management System</p> <p>IRS-Inertial Reference System;</p> <p>(b) For B1, B2 and B3:</p> <p>ECAM-Electronic Centralised Aircraft Monitoring</p> <p>EFIS-Electronic Flight Instrument System</p> <p>GPS-Global Positioning System</p>		2	2	2	1



TCAS-Traffic Alert Collision Avoidance System				
Integrated Modular Avionics				
Cabin Systems				
Information Systems.				



MODULE 6. MATERIALS AND HARDWARE

MODULE 6. MATERIALS AND HARDWARE	LEVEL		
	B1	B2 B2L	B3
6.1 Aircraft Materials — Ferrous	2	1	2
(a) 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.	1	1	1
6.2 Aircraft Materials — Non-Ferrous	2	1	2
(a) 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.	1	1	1
6.3 Aircraft Materials — Composite and Non-Metallic	2	2	2
6.3.1 Composite and non-metallic other than wood and fabric			
(a) 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.	2	—	2
6.3.2 Wooden structures	2	—	2
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	2	—	2
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		1	1	1
	(a) Chemical fundamentals;				
	Formation by, galvanic action process, microbiological, stress;				



MODULE 6. MATERIALS AND HARDWARE	LEVEL		
	B1	B2 B2L	B3
(b) Types of corrosion and their identification; Causes of corrosion; Material types, susceptibility to corrosion.	3	2	2
6.5 Fasteners	2	2	2
6.5.1 Screw threads Screw nomenclature; Thread forms, dimensions and tolerances for standard threads used in aircraft; Measuring screw threads.			
6.5.2 Bolts, studs and screws 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.	2	2	2
6.5.3 Locking devices Tab and spring washers, locking plates, split pins, pal-nuts, wire locking, quick release fasteners, keys, circlips, cotter pins.	2	2	2
6.5.4 Aircraft rivets Types of solid and blind rivets: specifications and identification, heat treatment.	2	1	2
6.6. Pipes and Unions			
(a) Identification of, and types of rigid and flexible pipes and their connectors used in aircraft;	2	2	2
(b) Standard unions for aircraft hydraulic, fuel, oil, pneumatic and air system pipes.	2	1	2



6.7	Springs Types of springs, materials, characteristics and applications.		2	1	1
6.8	Bearings Purpose of bearings, loads, material, construction; Types of bearings and their application.		2	2	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.		2	2	1



MODULE 6. MATERIALS AND HARDWARE	LEVEL			
		B1	B2 B2L	B3
<p>6.10 <i>Control Cables</i></p> <p>Types of cables;</p> <p>End fittings, turnbuckles and compensation devices;</p> <p>Pulleys and cable system components;</p> <p>Bowden cables;</p> <p>Aircraft flexible control systems.</p>		2	1	2
<p>6.11 <i>Electrical Cables and Connectors</i></p> <p>Cable types, construction and characteristics; High tension and co-axial cables;</p> <p>Crimping;</p> <p>Connector types, pins, plugs, sockets, insulators, current and voltage rating, coupling, identification codes.</p>		2	2	2



MODULE 7A. MAINTENANCE PRACTICES

Note: This module does not apply to category B3. Relevant subject matters for category B3 are defined in module 7B.

MODULE 7A. MAINTENANCE PRACTICES		LEVEL	
		B1	B2 B2L
7.1	<p><i>Safety Precautions-Aircraft and Workshop</i></p> <p>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.</p>	3	3
7.2	<p><i>Workshop Practices</i></p> <p>Care of tools, control of tools, use of workshop materials; Dimensions, allowances and tolerances, standards of workmanship; Calibration of tools and equipment, calibration standards.</p>	3	
7.3	<p><i>Tools</i></p> <p>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.</p>	3	3
7.4	<p><i>Avionic General Test Equipment</i></p> <p>Operation, function and use of avionic general test equipment.</p>	2	3
7.5	<p><i>Engineering Drawings, Diagrams and Standards</i></p> <p>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.</p>	2	2
7.6	<p><i>Fits and Clearances</i></p> <p>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</p>	2	1



7.7	<i>Electrical Wiring Interconnection System (EWIS)</i> Continuity, insulation and bonding techniques and testing;		3	3
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MODULE 7A. MAINTENANCE PRACTICES	LEVEL		
		B1	B2 B2L
<p>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>			
<p>7.8 <i>Riveting</i> Riveted joints, rivet spacing and pitch; Tools used for riveting and dimpling; Inspection of riveted joints.</p>		2	—
<p>7.9 <i>Pipes and Hoses</i> Bending and belling/flaring aircraft pipes; Inspection Inspection and testing of aircraft pipes and hoses; Installation and clamping of pipes.</p>		2	—
<p>7.10 <i>Springs</i> Inspection and testing of springs.</p>		2	—
<p>7.11 <i>Bearings</i> Testing, cleaning and inspection of bearings; Lubrication requirements of bearings; Defects in bearings and their causes.</p>		2	—
<p>7.12 <i>Transmissions</i> Inspection of gears, backlash; Inspection of belts and pulleys, chains and sprockets; Inspection of screw jacks, lever devices, push-pull rod systems.</p>		2	—
<p>7.13 <i>Control Cables</i> Swaging of end fittings; Inspection and testing of control cables;/ Bowden cables; aircraft flexible control systems.</p>		2	—
<p>7.14 <i>Material handling</i></p>			



MODULE 7A. MAINTENANCE PRACTICES		LEVEL	
		B1	B2 B2L
7.14.1	Sheet Metal Marking out and calculation of bend allowance; Sheet metal working, including bending and forming; Inspection of sheet metal work.	2	—
7.1.4.2	Composite and non-metallic Bonding practices; Environmental conditions; Inspections Methods.	2	—
7.15	Welding, Brazing, Soldering and Bonding (a) Soldering methods; inspection of soldered joints.	2	2
	(b) Welding and brazing methods; Inspection of welded and brazed joints; Bonding methods and inspection of bonded joints.	2	—
7.16	Aircraft Weight and Balance (a) Centre of Gravity/Balance limits calculation: use of relevant documents;	2	2
	(b) Preparation of aircraft for weighing; Aircraft weighing.	2	—
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/defuelling procedures; De-icing/anti-icing procedures; Electrical, hydraulic and pneumatic ground supplies. Effects of environmental conditions on aircraft handling and operation.	2	2
7.18	Disassembly, Inspection, Repair and Assembly Techniques (a) Types of defects and visual inspection techniques; Corrosion removal, assessment and re-protection;	3	3
	(b) General repair methods, Structural Repair Manual; Ageing, fatigue and corrosion control programmes;	2	—
	(c) Non-destructive inspection techniques including, penetrant, radiographic, eddy current, ultrasonic and boroscope methods;	2	1
	(d) Disassembly and re-assembly techniques;	2	2
	(e) Trouble shooting techniques.	2	2



MODULE 7A. MAINTENANCE PRACTICES		LEVEL	
		B1	B2 B2L
7.19	Abnormal Events		
	(a) Inspections following lightning strikes and HIRF penetration.	2	2
	(b) Inspections following abnormal events such as heavy landings and flight through turbulence.	2	—
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; Control of life limited components.	2	2



MODULE 7B. MAINTENANCE PRACTICES

Note: The scope of this module shall reflect the technology of aeroplanes relevant to the B3 category.

<u>MODULE 7B. MAINTENANCE PRACTICES</u>		3 LEVEL
		B3
7.1	<p>Safety Precautions-Aircraft and Workshop</p> <p>Aspects of safe working practices including precautions to take when working with electricity, gases especially oxygen, oils and chemicals.</p> <p>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.</p>	3
7.2	<p>Workshop Practices</p> <p>Care of tools, control of tools, use of workshop materials; Dimensions, allowances and tolerances, standards of workmanship; Calibration of tools and equipment, calibration standards.</p>	3
7.3	<p>Tools</p> <p>Common hand tool types; Common power tool types; Operation and use of precision measuring tools Operation, function and use of electrical general test equipment.</p>	3
7.4	<p>Avionic General Test Equipment</p> <p>Operation, function and use of avionic general test equipment.</p>	1
7.5	<p>Engineering Drawings, Diagrams and Standards</p> <p>Drawing types and diagrams, their symbols, dimensions, tolerances and projections;</p> <p>Identifying title block information;</p> <p>Microfilm, microfiche and computerised presentations;</p> <p>Specification 100 of the Air Transport Association (ATA) of America;</p> <p>Aeronautical and other applicable standards including ISO, AN, MS, NAS and MIL;</p> <p>Wiring diagrams and schematic diagrams.</p>	2



7.6	<p>Fits and Clearances</p> <p>Drill sizes for bolt holes, classes of fits;</p> <p>Common system of fits and clearances;</p> <p>Schedule of fits and clearances for aircraft and engines;</p> <p>Limits for bow, twist and wear;</p> <p>Standard methods for checking shafts, bearings and other parts.</p>	2
7.7.	<p>Electrical Cables and Connectors</p> <p>Continuity, insulation and bonding techniques and testing;</p> <p>Use of crimp tools: hand and hydraulic operated;</p>	2



MODULE 7B. MAINTENANCE PRACTICES		LEVEL
		B3
	<p>Testing of crimp joints;</p> <p>Connector pin removal and insertion;</p> <p>Co-axial cables: testing and installation precautions;</p> <p>Wiring protection techniques: Cable looming and loom support, cable clamps,</p> <p>protective sleeving techniques including heat shrink wrapping, shielding.</p>	
7.8	<p>Riveting</p> <p>Riveted joints, rivet spacing and pitch;</p> <p>Tools used for riveting and dimpling;</p> <p>Inspection of riveted joints.</p>	2
7.9	<p>Pipes and Hoses</p> <p>Bending and belling/flaring aircraft pipes;</p> <p>Inspection and testing of aircraft pipes and hoses;</p> <p>Inspection and testing of aircraft pipes and hoses;</p> <p>Installation and clamping of pipes.</p>	2
7.10	<p>Springs</p> <p>Inspection and testing of springs.</p>	2
7.11	<p>Bearings</p> <p>Testing, cleaning and inspection of bearings;</p> <p>Lubrication requirements of bearings;</p> <p>Defects in bearings and their causes.</p>	2
7.12	<p>Transmissions</p> <p>Inspection of gears, backlash;</p> <p>Inspection of belts and pulleys, chains and sprockets;</p> <p>Inspection of screw jacks, lever devices, push-pull rod systems.</p>	2



7.13	Control Cables Swaging of end fittings; Inspection and testing of control cables; Bowden cables; aircraft flexible control systems.	2
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.	2



MODULE 7B. MAINTENANCE PRACTICES		LEVEL
		B3
7.14.2 Composite and non-metallic Bonding practices; Environmental conditions; Inspection methods.	2	
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.	2	
	2	
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.	2	
	2	
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/defuelling procedures; De-icing/anti-icing procedures; Electrical, hydraulic and pneumatic ground supplies; Effects of environmental conditions on aircraft handling and operation.	2	
7.18 Disassembly, Inspection, Repair and Assembly Techniques (a) Types of defects and visual inspection techniques; (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;	3	
	2	
	2	
	2	



	(d).Trouble shooting techniques.	2
	(e) Trouble shooting techniques.	
7.19	Abnormal Events	2
	(a) Inspections following lightning strikes and HIRF penetration.	
	(b) Inspections following abnormal events such as heavy landings and flight through turbulence.	2
7.20	Maintenance Procedures	2
	Maintenance planning;	



MODULE 7B. MAINTENANCE PRACTICES	LEVEL
	B3
<p>Modification procedures;</p> <p>Stores procedures;</p> <p>Certification/release procedures;</p> <p>Interface with aircraft operation;</p> <p>Maintenance Inspection/Quality Control/Quality Assurance;</p> <p>Additional maintenance procedures;</p> <p>Control of life limited components.</p>	



MODULE 8. BASIC AERODYNAMICS

MODULE 8. BASIC AERODYNAMICS	LEVEL			
		B1	B2 B2L	B3
<p>8.1 Physics of the Atmosphere</p> <p>International Standard Atmosphere (ISA), application to aerodynamics.</p>		2	2	1
<p>8.2 Aerodynamics</p> <p>Airflow around a body;</p> <p>Boundary layer, laminar and turbulent flow, free stream flow, relative airflow, upwash and downwash, vortices, stagnation;</p> <p>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;</p> <p>Thrust, Weight, Aerodynamic Resultant;</p> <p>Generation of Lift and Drag: Angle of Attack, Lift coefficient, Drag coefficient, polar curve, stall;</p> <p>Aerofoil contamination including ice, snow, frost.</p>		2	2	1
<p>8.3 Theory of Flight</p> <p>Relationship between lift, weight, thrust and drag; Glide ratio;</p> <p>Steady state flights, performance; Theory of the turn;</p> <p>Influence of load factor: stall, flight envelope and structural limitations; Lift augmentation.</p>		2	2	1
<p>8.4 Flight Stability and Dynamics</p> <p>Longitudinal, lateral and directional stability(active and passive).</p>		2	2	1



MODULE 9A. HUMAN FACTORS

Note: This module does not apply to category B3. Relevant subject matters for category B3 are defined in module 9B.

MODULE 9A. HUMAN FACTORS	LEVEL		
		B1	B2 B2L
9.1 General The need to take human factors into account; Incidents attributable to human factors/human error; 'Murphy's' law.		2	2
9.2 Human Performance and Limitations Vision; Hearing; Information processing; Attention and perception; Memory; Claustrophobia and physical access.		2	2
9.3 Social Psychology Responsibility: individual and group; Motivation and de-motivation; Peer pressure; 'Culture' issues; Team working; Management, supervision and leadership.		1	1
9.4 Factors Affecting Performance Fitness/health; Stress: domestic and work related; Time pressure and deadlines; Workload: overload and underload; Sleep and fatigue, shiftwork; Alcohol, medication, drug abuse.		2	2
9.5 Physical Environment Noise and fumes; Illumination; Climate and temperature; Motion and vibration; Working environment.		1	1



9.6	Tasks		1	1
	Physical work; Repetitive tasks; Visual inspection; Complex systems.			



MODULE 9A. HUMAN FACTORS	LEVEL		
		B1	B2 B2L
9.7 <i>Communication</i> Within and between teams; Work logging and recording; Keeping up to date, currency; Dissemination of information.		2	2
9.8 <i>Human Error</i> Error models and theories; Types of error in maintenance tasks; Implications of errors (i.e. accidents); Avoiding and managing errors.		2	2
9.9 <i>Hazards in the Workplace</i> Recognising and avoiding hazards; Dealing with emergencies.		2	2



MODULE 9B. HUMAN FACTORS

Note: The scope of this module shall reflect the less demanding environment of maintenance for B3 license holders

MODULE 9B. HUMAN FACTORS		LEVEL
		B3
<p>9.1 <i>General</i></p> <p>The need to take human factors into account; Incidents attributable to human factors/human error; 'Murphy's' law.</p>	2	
<p>9.2 <i>Human Performance and Limitations</i></p> <p>Vision; Hearing; Information processing; Attention and perception; Memory; Claustrophobia and physical access.</p>	2	
<p>9.3 <i>Social Psychology</i></p> <p>Responsibility: individual and group; Motivation and de-motivation; Peer pressure; 'Culture' issues; Team working; Management, supervision and leadership.</p>	1	
<p>9.4 <i>Factors Affecting Performance</i></p> <p>Fitness/health; Stress: domestic and work related; Time pressure and deadlines; Workload: overload and underload; Sleep and fatigue, shiftwork; Alcohol, medication, drug abuse.</p>	2	
<p>9.5 <i>Physical Environment</i></p> <p>Noise and fumes; Illumination; Climate and temperature; Motion and vibration; Working environment.</p>	1	



9.6	Tasks Physical work; Repetitive tasks; Visual inspection; Complex systems.	1
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MODULE 9B. HUMAN FACTORS		LEVEL
		B3
9.7	<i>Communication</i> Within and between teams; Work logging and recording; Keeping up to date, currency; Dissemination of information.	2
9.8	<i>Human Error</i> Error models and theories; Types of error in maintenance tasks; Implications of errors (i.e. accidents); Avoiding and managing errors.	2
9.9	<i>Hazards in the Workplace</i> Recognising and avoiding hazards; Dealing with emergencies.	2



MODULE 10. AVIATION LEGISLATION

MODULE 10. AVIATION LEGISLATION		LEVEL		
		B1	B2 B2L	B3
10.1	<p><i>Regulatory Framework</i></p> <p>Role of the International Civil Aviation Organisation; Role of DCA Aruba Aruba legislation system Aircraft Certification Standards (AUA-RLW, chapter I) Continuing Airworthiness (AUA-RLW, Chapter II) Occurrence reporting and analyses AUA-OPS 1 and JAR-OPS 3 for Aruba SMS</p>	1	1	1
10.2	<p><i>Certifying Staff – Maintenance</i></p> <p>Detailed understanding of AUA Part-66</p>	2	2	2
10.3	<p><i>Approved Maintenance Organisations</i></p> <p>Detailed understanding of AUA-RLW, AUA-OPS 1 (Part-M), JAR-OPS 3 for Aruba (Part-M) AUA-OPS 2(A) & (H) Continuing Airworthiness.</p>	2	2	2
10.4	<p><i>Air operations</i></p> <p>General understanding of AUA-OPS 1 (Part-M), JAR-OPS 3 for Aruba (Part-M).</p> <p>Air Operators Certificates; Operator's responsibilities, in particular regarding continuing airworthiness and maintenance; Aircraft Maintenance Programme; MEL//CDL; Documents to be carried on board; Aircraft placarding (markings).</p>	1	1	1
10.5	<p><i>Certification of aircraft, parts and appliances</i></p> <p>(a) General</p>	1	2	2



<p>General understanding of Part-21 and FAR/EASA certification specifications CS-23, 25, 27, 29.</p> <p>(b) Documents</p> <p>Certificate of Airworthiness; restricted certificates of airworthiness and permit to fly;</p> <p>Certificate of Registration;</p> <p>Noise Certificate;</p> <p>Weight Schedule;</p> <p>Radio Station License and Approval.</p>		2	2	2
<p>10.6 Continuing airworthiness</p> <p>Detailed understanding of FAR/EASA Part-21 provisions related to continuing airworthiness. Detailed understanding of Part-M.</p>		2	2	2



MODULE 10. AVIATION LEGISLATION	LEVEL		
	B1	B2 B2L	B3
<p>10.7 Applicable National and International Requirements for;</p> <p>(a) Maintenance Programmes, Maintenance checks and inspections;</p> <p>Airworthiness Directives;</p> <p>Service Bulletins, manufacturers service information;</p> <p>Modifications and repairs;</p> <p>Maintenance documentation: maintenance manuals, structural repair manual, illustrated parts catalogue, etc.;</p> <p>Only for B1 to B2 licenses:</p> <p>Master Minimum Equipment Lists, Minimum Equipment List, Dispatch Deviation Lists;</p> <p>(b) Continuing airworthiness;</p> <p>Minimum equipment requirements — Test flights;</p> <p>Only for B1 and B2 licenses:</p> <p>ETOPS, maintenance and dispatch requirements;</p> <p>All Weather Operations, Category 2/3 operations.</p>	2	2	2
	1	1	1



MODULE 11A. TURBINE AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS

MODULE 11A. TURBINE AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS		LEVEL	
			B1.1
11.1	Theory of Flight		2
11.1.1.	<p>Aeroplane Aerodynamics and Flight Controls</p> <p>Operation and effect of:</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>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, saw tooth 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 antibalance (leading) tabs, servo tabs, spring tabs, mass balance, control surface bias, aerodynamic balance panels.</p>		
11.1.2.	High Speed Flight — N/A		—
11.2	Airframe Structures — General Concepts		2
	<p>(a) Airworthiness requirements for structural strength;</p> <p>Structural classification, primary, secondary and tertiary;</p> <p>Fail safe, safe life, 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>		
	<p>(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;</p> <p>Structure assembly techniques: riveting, bolting, bonding;</p> <p>Methods of surface protection, such as chromating, anodising, painting;</p>		2



Surface cleaning; Airframe symmetry: methods of alignment and symmetry checks.		
11.3 Airframe Structures — Aeroplanes 11.3.1 Fuselage (ATA 52/53/56) Construction and pressurisation sealing;		



MODULE 11A. TURBINE AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS		LEVEL	
			B1.1
	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.		
11.3.2	Wings (ATA 57) Construction; Fuel storage; Landing gear, pylon, control surface and high lift/drag attachments.		2
11.3.3	Stabilisers (ATA 55) Construction; Control surface attachment.		2
11.3.4	Flight Control Surfaces (ATA 55/57) Construction and attachment; Balancing mass and aerodynamic.		2
11.3.5	Nacelles/Pylons (ATA 54) Nacelles/Pylons: — Construction, — Firewalls, — Engine mounts.		2
11.4	Air Conditioning and Cabin Pressurisation (ATA 21)		2
11.4.1	Air supply Sources of air supply including engine bleed, APU and ground cart.		2
11.4.2	Air Conditioning Air conditioning systems; Air cycle and vapour cycle machines; Distribution systems; Flow, temperature and humidity control system.		3



11.4.3	<i>Pressurisation</i> Pressurisation systems; Control and indication including control and safety valves; Cabin pressure controllers.		3
11.4.4	<i>Safety and warning devices</i> Protection and warning devices.		3



MODULE 11A. TURBINE AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS		LEVEL	
			B1.1
11.5	<i>Instruments/Avionic Systems</i>		2
11.5.1	Instrument Systems (ATA 31) 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.		
11.5.2	Avionic Systems Fundamentals of system lay-outs and operation of: — Auto Flight (ATA 22), — Communications (ATA 23), — Navigation Systems (ATA 34).		1
11.6	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.		3
11.7	Equipment and Furnishings (ATA 25)		2
	(a) Emergency equipment requirements; Seats, harnesses and belts.		1
	(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)		3
	(a) Fire and smoke detection and warning systems;		
	Fire extinguishing systems;		
	System tests;		2
	(b) Portable fire extinguisher.		
11.9	Flight Controls (ATA 27)		3
	Primary controls: aileron, elevator, rudder, spoiler;		



MODULE 11A. TURBINE AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS	LEVEL	
		B1.1
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 lock systems; Balancing and rigging; Stall protection/warning system.		
11.10 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.		3
11.11 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.		3



<p>11.12 Ice and Rain Protection (ATA 30)</p> <p>Ice formation, classification and detection;</p> <p>Anti-icing systems: electrical, hot air and chemical;</p> <p>De-icing systems: electrical, hot air, pneumatic and chemical;</p> <p>Rain repellent;</p> <p>Probe and drain heating;</p> <p>Wiper systems.</p>		3
<p>11.13 <i>Landing Gear (ATA 32)</i></p> <p>Construction, shock absorbing;</p> <p>Extension and retraction systems: normal and emergency; Indications and warning;</p> <p>Wheels, brakes, antiskid and autobraking;</p>		3



MODULE 11A. TURBINE AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS		LEVEL	
			B1.1
	<p>Tyres;</p> <p>Steering;</p> <p>Air-ground sensing.</p>		
11.14	<p>Lights (ATA 33)</p> <p>External: navigation, anti-collision, landing, taxiing, ice;</p> <p>Internal: cabin, cockpit, cargo;</p> <p>Emergency.</p>		3
11.15	<p>Oxygen (ATA 35)</p> <p>System lay-out: cockpit, cabin;</p> <p>Sources, storage, charging and distribution;</p> <p>Supply regulation;</p> <p>Indications and warnings.</p>		3
11.16	<p>Pneumatic/Vacuum (ATA 36)</p> <p>System lay-out;</p> <p>Sources: engine/APU (Auxiliary Power Unit), compressors, reservoirs, ground supply;</p> <p>Pressure and vacuum pumps;</p> <p>Pressure control;</p> <p>Distribution;</p> <p>Indications and warnings; Interfaces with other systems.</p>		3
11.17	<p>Water/Waste (ATA 38)</p> <p>Water system lay-out, supply, distribution, servicing and draining;</p> <p>Toilet system lay-out, flushing and servicing;</p> <p>Corrosion aspects.</p>		3
11.18	<p>On Board Maintenance Systems (ATA 45)</p> <p>Central maintenance computers;</p> <p>Data loading system;</p> <p>Electronic library system;</p> <p>Printing;</p> <p>Structure monitoring (damage tolerance monitoring).</p>		2



11.19 Integrated Modular Avionics (ATA42)

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.

2



MODULE 11A. TURBINE AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS		LEVEL	
			B1.1
11.20	<p>Cabin Systems (ATA44)</p> <p>The units and components which furnish a means of entertaining the passengers and providing communication within the aircraft (Cabin Intercommunication Data System (CIDS)) and between the aircraft cabin and ground stations (Cabin Network Service (CNS)) and between the aircraft cabin and ground stations (Cabin Network Service (CNS)). They Includes voice, data, music and video transmissions.</p> <p>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).</p> <p>CNS typically consists of a sever, interfacing with, among others, the following systems:</p> <ul style="list-style-type: none">— Data/Radio Communication;— .Cabin Core System (CCS);— In-Flight Entertainment System; (IFES);— . External Communication System (ECS);— .Cabin Mass Memory System (CMMS);— Cabin Monitoring System (CMS);— .Miscellaneous Cabin System (MCSs). <p>CNS may host functions such as:</p> <ul style="list-style-type: none">— Access to pre-departure/departure reports,— E-mail/intranet/Internet access; Passenger database;		2



11.21 Information Systems (ATA46)

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.

2



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 B1.2 subcategory.

MODULE 11B. PISTON AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS	LEVEL	
		B1.2
11.1 <i>Theory of Flight</i>		2
11.1.1. <i>Aeroplane Aerodynamics and Flight Controls</i> 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.		2
11.1.2. <i>High Speed Flight — N/A</i>		—
11.2 <i>Airframe Structures — General Concepts</i> (a) 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;		2



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; 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.		2
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MODULE 11B. PISTON AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS		LEVEL	
			B1.2
11.3	Airframe Structures Aeroplanes		2
11.3.1	Fuselage (ATA 52/53/56) Construction and pressurisation sealing; Wing, tail-plane, pylon and undercarriage attachments; Seat installation; Doors and emergency exits: construction and operation; Windows and windscreen attachment.		2
11.3.2	Wings (ATA 57) Construction; Fuel storage; Landing gear, pylon, control surface and high lift/drag attachments.		2
11.3.3	Stabilisers (ATA 55) Construction; Control surface attachment.		2
11.3.4	Flight Control Surfaces (ATA 55/57) Construction and attachment; Balancing — mass and aerodynamic.		2
11.3.5	Nacelles/Pylons (ATA 54) Nacelles/Pylons: — Construction, — Firewalls, — Engine mounts.		2
11.4	Air Conditioning and Cabin Pressurisation (ATA 21) Pressurisation and air conditioning systems; Cabin pressure controllers, protection and warning devices;		3



Heating systems.			
11.5	<i>Instruments/Avionic Systems</i>		2
11.5.1	<i>Instrument Systems (ATA 31)</i> 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.		



MODULE 11B. PISTON AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS		LEVEL	
			B1.2
11.5.2	<p><i>Avionic Systems</i></p> <p>Fundamentals of system lay-outs and operation of:</p> <ul style="list-style-type: none"> — Auto Flight (ATA 22), — Communications (ATA 23), — Navigation Systems (ATA 34). 		1
11.6	<p><i>Electrical Power (ATA 24)</i></p> <p>Batteries Installation and Operation; DC power generation; Voltage regulation; Power distribution; Circuit protection; Inverters, transformers.</p>		3
11.7	<p><i>Equipment and Furnishings (ATA 25)</i></p> <p>(a) Emergency equipment requirements; Seats, harnesses and belts;</p> <p>(b) Cabin lay-out; Equipment lay-out; Cabin Furnishing installation; Cabin entertainment equipment; Galley installation; Cargo handling and retention equipment; Airstairs.</p>		2
			1
11.8	<p><i>Fire Protection (ATA 26)</i></p> <p>(a) Fire and smoke detection and warning systems; Fire extinguishing systems; System tests;</p> <p>(b) Portable fire extinguisher.</p>		3
			2
11.9	<p><i>Flight Controls (ATA 27)</i></p> <p>Primary controls: aileron, elevator, rudder; Trim tabs; High lift devices; System operation: manual; Gust locks; Balancing and rigging; Stall warning system.</p>		3



11.10	<i>Fuel Systems (ATA 28)</i> System lay-out; Fuel tanks; Supply systems; Cross-feed and transfer; Indications and warnings; Refuelling and defuelling.		3
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MODULE 11B. PISTON AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS		LEVEL	
			B1.2
11.11	<p>Hydraulic Power (ATA 29)</p> <p>System lay-out; Hydraulic fluids; Hydraulic reservoirs and accumulators; Pressure generation: electric, mechanical; Filters; Pressure Control; Power distribution; Indication and warning systems.</p>		3
11.12	<p>Ice and Rain Protection (ATA 30)</p> <p>Ice formation, classification and detection; De-icing systems: electrical, hot air, pneumatic and chemical; Probe and drain heating; Wiper systems.</p>		3
11.13	<p>Landing Gear (ATA 32)</p> <p>Construction, shock absorbing; Extension and retraction systems: normal and emergency; Indications and warning; Wheels, brakes, antiskid and auto braking; Tyres; Steering; Air-ground sensing.</p>		3
11.14	<p>Lights (ATA 33)</p> <p>External: navigation, anti-collision, landing, taxiing, ice; Internal: cabin, cockpit, cargo; Emergency.</p>		3
11.15	<p>Oxygen (ATA 35)</p> <p>System lay-out: cockpit, cabin; Sources, storage, charging and distribution; Supply regulation; Indications and warnings.</p>		3
11.16	<p>Pneumatic/Vacuum (ATA 36)</p> <p>System lay-out; Sources: engine/APU, compressors, reservoirs, ground supply; Pressure control; Distribution; Indications and warnings; Interfaces with other systems.</p>		3



MODULE 11B. PISTON AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS		LEVEL	
			B1.2
11.17	<i>Water/Waste (ATA 38)</i> Water system lay-out, supply, distribution, servicing and draining; Toilet system lay-out, flushing and servicing; Corrosion aspects.		3



MODULE 11C. PISTON AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS

Note: The scope of this module shall reflect the technology of aeroplanes pertinent to the B3 category.

MODULE 11C. PISTON AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS		LEVEL
		B3
11.1	<p><i>Theory of Flight</i></p> <p><i>Aeroplane Aerodynamics and Flight Controls</i></p> <p>Operation and effect of:</p> <ul style="list-style-type: none"> — roll control: ailerons, — 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, lift dumpers, speed brakes;</p> <p>Effects of wing fences, saw tooth 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>	1
11.2	<p><i>Airframe Structures — General Concepts</i></p> <p>(a) Airworthiness requirements for structural strength;</p> <p>Structural classification, primary, secondary and tertiary;</p> <p>Fail safe, safe life, 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> <p>(b) Construction methods of: stressed skin fuselage, formers, stringers, longerons, bulkheads, frames,2 doublers, struts, ties, beams, floor structures, reinforcement, methods of skinning, anti-corrosive protection, wing, empennage and engine attachments;</p> <p>Structure assembly techniques: riveting, bolting, bonding;</p> <p>Methods of surface protection, such as chromating, anodising, painting;</p> <p>Surface cleaning;</p> <p>Airframe symmetry: methods of alignment and symmetry checks.</p>	2
		2



11.3	<i>Airframe Structures — Aeroplanes</i>	1
11.3.1	<i>Fuselage (ATA 52/53/56)</i>	
	Construction; Wing, tail-plane, pylon and undercarriage attachments; Seat installation; Doors and emergency exits: construction and operation; Window and windscreen attachment.	



MODULE 11C. PISTON AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS		LEVEL
		B3
<p>11.3.2 <i>Wings (ATA 57)</i></p> <p>Construction; Fuel storage; Landing gear, pylon, control surface and high lift/drag attachments.</p>	1	
<p>11.3.3 <i>Stabilisers (ATA 55)</i></p> <p>Construction; Control surface attachment.</p>	1	
<p>11.3.4 <i>Flight Control Surfaces (ATA 55/57)</i></p> <p>Construction and attachment; Balancing — mass and aerodynamic.</p>	1	
<p>11.3.5 <i>Nacelles/Pylons (ATA 54)</i></p> <p>Nacelles/Pylons:</p> <ul style="list-style-type: none"> — Construction, — Firewalls, — Engine mounts. 	1	
<p>11.4 <i>Air Conditioning (ATA 21)</i></p> <p>Heating and ventilation systems.</p>		
<p>11.5 <i>Instruments/Avionic Systems</i></p> <p>11.5.1 <i>Instrument Systems (ATA 31)</i></p> <p>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.</p>	1	



11.5.2	<i>Avionic Systems</i> Fundamentals of system lay-outs and operation of: <ul style="list-style-type: none">— Auto Flight (ATA 22),— Communications (ATA 23),— Navigation Systems (ATA 34).	1
11.6	<i>Electrical Power (ATA 24)</i> Batteries Installation and Operation; DC power generation; Voltage regulation; Power distribution; Circuit protection; Inverters, transformers.	2



MODULE 11C. PISTON AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS	LEVEL
	B3
<p>11.7 <i>Equipment and Furnishings (ATA 25)</i></p> <p>Emergency equipment requirements; Seats, harnesses and belts.</p>	2
<p>11.8 <i>Fire Protection (ATA 26)</i></p> <p>Portable fire extinguisher.</p>	2
<p>11.9 <i>Flight Controls (ATA 27)</i></p> <p>Primary controls: aileron, elevator, rudder; Trim tabs; High lift devices; System operation: manual; Gust locks; Balancing and rigging; Stall warning system.</p>	3
<p>11.10 <i>Fuel Systems (ATA 28)</i></p> <p>System lay-out; Fuel tanks; Supply systems; Cross-feed and transfer; Indications and warnings; Refuelling and defuelling.</p>	2
<p>11.11 <i>Hydraulic Power (ATA 29)</i></p> <p>System lay-out; Hydraulic fluids; Hydraulic reservoirs and accumulators; Pressure generation: electric, mechanical; Filters; Pressure Control; Power distribution; Indication and warning systems.</p>	2
<p>11.12 <i>Ice and Rain Protection (ATA 30)</i></p> <p>Ice formation, classification and detection; De-icing systems: electrical, hot air, pneumatic and chemical; Probe and drain heating; Wiper systems.</p>	1
<p>11.13 <i>Landing Gear (ATA 32)</i></p> <p>Construction, shock absorbing; Extension and retraction systems: normal and emergency; Indications and warning;</p>	2



Wheels, brakes, antiskid and autobraking;
Tyres;
Steering.



MODULE 11C. PISTON AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS		LEVEL
		B3
11.14	<i>Lights (ATA 33)</i> External: navigation, anti collision, landing, taxiing, ice; Internal: cabin, cockpit, cargo; Emergency.	
11.15	<i>Oxygen (ATA 35)</i> System lay-out: cockpit, cabin; Sources, storage, charging and distribution; Supply regulation; Indications and warnings.	2
11.16	<i>Pneumatic/Vacuum (ATA 36)</i> System lay-out; Sources: engine/APU, compressors, reservoirs, ground supply; Pressure and vacuum pumps Pressure control; Distribution; Indications and warnings; Interfaces with other systems.	2



MODULE 12. HELICOPTER AERODYNAMICS, STRUCTURES AND SYSTEMS

MODULE 12. HELICOPTER AERODYNAMICS, STRUCTURES AND SYSTEMS		LEVEL	
			B1.3 B1.4
12.1	<p><i>Theory of Flight — Rotary Wing Aerodynamics</i></p> <p>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.</p>		2
12.2	<p><i>Flight Control Systems</i></p> <p>Cyclic control; Collective control; 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.</p>		3
12.3	<p><i>Blade Tracking and Vibration Analysis</i></p> <p>Rotor alignment; Main and tail rotor tracking; Static and dynamic balancing; Vibration types, vibration reduction methods; Ground resonance.</p>		3
12.4	<p><i>Transmission</i></p> <p>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.</p>		3



12.5	<i>Airframe Structures</i>		
	(a) 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;		2



MODULE 12. HELICOPTER AERODYNAMICS, STRUCTURES AND SYSTEMS		LEVEL	
			B1.3 B1.4
	Drains and ventilation provisions; System installation provisions; Lightning strike protection provision; (b) 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.		2
12.6	<i>Air Conditioning (ATA 21)</i> 12.6.1 <i>Air supply</i> Sources of air supply including engine bleed and ground cart.		2
12.6.2	<i>Air conditioning</i> Air conditioning systems; Distribution systems; Flow and temperature control systems; Protection and warning devices.		3
12.7	<i>Instruments/Avionic Systems</i> 12.7.1 <i>Instrument Systems (ATA 31)</i> 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.		2



12.7.2 *Avionic Systems*

Fundamentals of system layouts and operation of:
Auto Flight (ATA 22);
Communications (ATA 23);
Navigation Systems (ATA 34).

1



MODULE 12. HELICOPTER AERODYNAMICS, STRUCTURES AND SYSTEMS		LEVEL	
			B1.3 B1.4
12.8	<p><i>Electrical Power (ATA 24)</i></p> <p>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.</p>		3
12.9	<p><i>Equipment and Furnishings (ATA 25)</i></p> <p>(a) Emergency equipment requirements; Seats, harnesses and belts; Lifting systems;</p> <p>(b) Emergency flotation systems; Cabin lay-out, cargo retention; Equipment lay-out; Cabin Furnishing Installation</p>		2
			1
12.10	<p><i>Fire Protection (ATA 26)</i></p> <p>Fire and smoke detection and warning systems; Fire extinguishing systems; System tests.</p>		3
12.11	<p><i>Fuel Systems (ATA 28)</i></p> <p>System lay-out; Fuel tanks; Supply systems; Dumping, venting and draining; Cross-feed and transfer; Indications and warnings; Refuelling and defuelling.</p>		3



12.12 <i>Hydraulic Power (ATA 29)</i>		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.		



MODULE 12. HELICOPTER AERODYNAMICS, STRUCTURES AND SYSTEMS		LEVEL	
			B1.3 B1.4
12.13	<p><i>Ice and Rain Protection (ATA 30)</i></p> <p>Ice formation, classification and detection;</p> <p>Anti-icing and De-icing systems: electrical, hot air and chemical;</p> <p>Rain repellent and removal;</p> <p>Probe and drain heating;</p> <p>Wiper system.</p>		3
12.14	<p><i>Landing Gear (ATA 32)</i></p> <p>Construction, shock absorbing;</p> <p>Extension and retraction systems: normal and emergency;</p> <p>Indications and warning;</p> <p>Wheels, Tyres, brakes;</p> <p>Steering;</p> <p>Air-ground sensing;</p> <p>Skids, floats.</p>		3
12.15	<p><i>Lights (ATA 33)</i></p> <p>External: navigation, landing, taxiing, ice;</p> <p>Internal: cabin, cockpit, cargo;</p> <p>Emergency.</p>		3
12.16	<p><i>Pneumatic/Vacuum (ATA 36)</i></p> <p>System lay-out;</p> <p>Sources: engine/APU, compressors, reservoirs, ground supply;</p> <p>Pressure and vacuum pumps;</p> <p>Pressure control;</p> <p>Distribution;</p> <p>Indications and warnings;</p> <p>Interfaces with other systems.</p>		3



12.17 *Integrated Modular Avionics (ATA42)*

2

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.



MODULE 12. HELICOPTER AERODYNAMICS, STRUCTURES AND SYSTEMS		LEVEL	
			B1.3 B1.4
12.18	<p><i>On Board Maintenance Systems (ATA45)</i></p> <p>Central maintenance computers;</p> <p>Data loading system;</p> <p>Electronic library system;</p> <p>Printing;</p> <p>Structure monitoring (damage tolerance monitoring).</p>		
12.19	<p><i>Information Systems (ATA46)</i></p> <p>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.</p> <p>Typical examples include Air Traffic and Information Management Systems and Network Server Systems.</p> <p>Aircraft General Information System;</p> <p>Flight Deck Information System;</p> <p>Maintenance Information System;</p> <p>Passenger Cabin Information System;</p> <p>Miscellaneous Information System.</p>		2



MODULE 13. AIRCRAFT AERODYNAMICS, STRUCTURES AND SYSTEMS

MODULE 13. AIRCRAFT AERODYNAMICS, STRUCTURES AND SYSTEMS		LEVEL
		B2
		B2L
13.1	<i>Theory of Flight</i>	
	(a) Aeroplane Aerodynamics and Flight Controls	1
	Operation and effect of:	
	— roll control: ailerons and spoilers,	
	— pitch control: elevators, stabilators, variable incidence stabilisers and canards, and	
	— yaw control, rudder limiters;	
	Control using elevons, ruddervators;	
	High lift devices: slots, slats, flaps;	1
	Drag inducing devices: spoilers, lift dumpers, speed brakes; and	
	Operation and effect of trim tabs, servo tabs, control surface bias;	
	(b) High Speed Flight	1
	Speed of sound, subsonic flight, transonic flight, supersonic flight; Mach number, critical Mach number;	
	(c) Rotary Wing Aerodynamics	
	Terminology;	
	Operation and effect of cyclic, collective and anti-torque controls.	
13.2	<i>Structures — General Concepts</i>	1
	Fundamentals of structural systems;	
	Zonal and station identification systems;	2
	Electrical bonding;	2
	Lightning strike protection provision.	2
13.3	<i>Autoflight (ATA 22)</i>	
	(a) Fundamentals of automatic flight control including working principles and current terminology;	3
	Command signal processing;	
	Modes of operation: roll, pitch and yaw channels;	
	Yaw dampers;	
	Stability Augmentation System in helicopters;	
	Automatic trim control;	



<p>Autopilot navigation aids interface;</p> <p>(b) Autothrottle systems;</p> <p>Automatic Landing Systems: principles and categories, modes of operation, approach, glideslope, land, go-around, system monitors and failure conditions.</p>	3
<p>13.4 <i>Communication/Navigation (ATA 23/34)</i></p> <p>(a) Fundamentals of radio wave propagation, antennas, transmission lines, communication, receiver and transmitter; Working principles of following systems: — Very High Frequency (VHF) communication,</p>	3



MODULE 13. AIRCRAFT AERODYNAMICS, STRUCTURES AND SYSTEMS		LEVEL
		B2
		B2L
<ul style="list-style-type: none"> — High Frequency (HF) communication, — Audio, — Emergency Locator Transmitters, — Cockpit Voice Recorder, — Very High Frequency Omnidirectional Range (VOR), — Automatic Direction Finding (ADF), — Instrument Landing System (ILS), — Flight Director systems (FDSs), Distance Measuring Equipment (DME), — Area navigation, RNAV systems, — Flight Management Systems (FMSs), — Global Positioning System (GPS), Global Navigation Satellite Systems (GNSSs), — Data Link. 		
<p>(b)</p> <ul style="list-style-type: none"> — Air Traffic Control transponder, secondary surveillance radar, — Traffic Alert and Collision Avoidance System (TCAS), — Weather avoidance radar, — Radio altimeter, — Automatic Dependent Surveillance — Broadcast (ADS-B). 		3
<p>(c)</p> <ul style="list-style-type: none"> — Microwave Landing System (MLS); — Very Low Frequency and hyperbolic navigation (VLF/Omega); — Doppler navigation; — Inertial Navigation System (INS); — ARINC (Aircraft Radio Incorporated) communication and reporting. 		3
<p>13.5 <i>Electrical Power (ATA 24)</i></p> <p>Batteries Installation and Operation;</p> <p>Direct Current (DC) power generation;</p> <p>Alternating Current (AC) power generation;</p> <p>Emergency power generation;</p> <p>Voltage regulation;</p> <p>Power distribution;</p> <p>Inverters, transformers, rectifiers;</p> <p>Circuit protection;</p> <p>External/Ground power.</p>		3
<p>13.6 <i>Equipment and Furnishings (ATA 25)</i></p> <p>Electronic emergency equipment requirements;</p> <p>Cabin entertainment equipment.</p>		3



13.7 *Flight Controls (ATA 27)*

2

(a) Primary controls: aileron, elevator, rudder, spoiler;

Trim control;

Active load control;



MODULE 13. AIRCRAFT AERODYNAMICS, STRUCTURES AND SYSTEMS		LEVEL
		B2
		B2L
	<p>High lift devices;</p> <p>Lift dump, speed brakes;</p> <p>System operation: manual, hydraulic, pneumatic;</p> <p>Artificial feel, Yaw damper, Mach trim, rudder limiter, gust locks.</p> <p>Stall protection systems;</p> <p>(b) System operation: electrical, fly-by-wire.</p>	3
13.8	<p><i>Instruments (ATA 31)</i></p> <p>Classification;</p> <p>Atmosphere;</p> <p>Terminology;</p> <p>Pressure-measuring devices and systems;</p> <p>Pitot static systems;</p> <p>Altimeters;</p> <p>Vertical speed indicators;</p> <p>Airspeed indicators;</p> <p>Machmeters;</p> <p>Altitude reporting/alerting systems;</p> <p>Air data computers;</p> <p>Instrument pneumatic systems;</p> <p>Direct-reading pressure and temperature gauges;</p> <p>Temperature indicating systems;</p> <p>Fuel quantity indicating systems;</p> <p>Gyroscopic principles;</p> <p>Artificial horizons;</p> <p>Slip indicators;</p> <p>Directional gyros;</p> <p>Ground Proximity Warning Systems (GPWS);</p>	3



Compass systems;
Flight Data Recording systems (FDRSs);
Electronic Flight Instrument Systems (EFISs);
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.

3



MODULE 13. AIRCRAFT AERODYNAMICS, STRUCTURES AND SYSTEMS		LEVEL
		B2
		B2L
13.10 <i>On Board Maintenance Systems (ATA 45)</i> Central maintenance computers; Data loading system; Electronic library system; Printing; Structure monitoring (damage tolerance monitoring).		3
13.11 <i>Air Conditioning and Cabin Pressurisation (ATA21)</i>		2
13.11.1. <i>Air supply</i> Sources of air supply including engine bleed, APU and ground cart;		
13.11.2. <i>Air Conditioning</i> Air conditioning systems; Air cycle and vapour cycle machines; Distribution systems; Flow, temperature and humidity control system.		2
		3
		1
		3
13.11.3. <i>Pressurisation</i> Pressurisation systems; Control and indication including control and safety valves; Cabin pressure controllers.		3
13.11.4. <i>Safety and warning devices</i> Protection and warning devices.		3
13.12 <i>Fire Protection (ATA 26)</i> (a) Fire and smoke detection and warning systems; Fire extinguishing systems; System tests;		3
(b) Portable fire extinguisher.		1



13.13 <i>Fuel Systems (ATA 28)</i>	
System lay-out;	1
Fuel tanks;	1
Supply systems;	1
Dumping, venting and draining;	1
Cross-feed and transfer;	2
Indications and warnings;	3
Refuelling and defuelling;	2
Longitudinal-balance fuel systems.	3



MODULE 13. AIRCRAFT AERODYNAMICS, STRUCTURES AND SYSTEMS		LEVEL
		B2 B2L
13.14 Hydraulic Power (ATA 29) System layout; Hydraulic fluids; Hydraulic reservoirs and accumulators; Pressure generation: electrical, 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) Ice formation, classification and detection; Anti-icing systems: electrical, hot air and chemical; De-icing systems: electrical, hot air, pneumatic, chemical; Rain repellent; Probe and drain heating; Wiper Systems.	2	
	2	
	3	
	1	
	3	
	1	
	1	
13.16 Landing Gear (ATA 32) Construction, shock absorbing; Extension and retraction systems: normal and emergency; Indications and warnings; Wheels, brakes, antiskid and autobraking; Tyres;	1	
	1	
	3	
	3	
	1	
	3	



	Steering;	3
	Air-ground sensing.	
13.17	Oxygen (ATA 35)	
	System lay-out: cockpit, cabin;	3
	Sources, storage, charging and distribution;	3
	Supply regulation;	3
	Indications and warnings.	3
13.18	Pneumatic/Vacuum (ATA 36)	
	System lay-out;	2
	Sources: engine/APU, compressors, reservoirs, ground supply;	2



MODULE 13. AIRCRAFT AERODYNAMICS, STRUCTURES AND SYSTEMS		LEVEL
		B2 B2L
Pressure control; Distribution; Indications and warnings; Interfaces with other systems.		3
		1
		3
		3
13.19 Water/Waste (ATA 38) Water system lay-out, supply, distribution, servicing and draining; Toilet system lay-out, flushing and servicing.		
13.20 <i>Integrated Modular Avionics (ATA42)</i> Core systems. Note: Functions that may be typically integrated into the IMA modules are among others: <ul style="list-style-type: none"> — 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. 		3
13.21 <i>Cabin Systems (ATA44)</i> The units and components which furnish a means of entertaining the passengers and providing communication within the aircraft (Cabin Intercommunication Data System (DCIDS)) and between the aircraft cabin and ground stations (Cabin Network Service (CNS)). Includes voice, data, music and video transmissions.		3



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).

CNS typically consists of a server, typically interfacing with, among others, the following systems:

- Data/Radio Communication;
- Cabin Core System;
- In-Flight Entertainment System (IFES);
- External Communication System (ECS);



MODULE 13. AIRCRAFT AERODYNAMICS, STRUCTURES AND SYSTEMS		LEVEL
		B2
		B2L
<ul style="list-style-type: none"> – Cabin Mass Memory System; – Cabin Monitoring System; – Miscellaneous Cabin System (MCSs). <p>CNS may host functions such as:</p> <ul style="list-style-type: none"> – Access to pre-departure/departure reports; – E-mail/intranet/Internet access; – Passenger database; 		
<p>13.22 Information Systems (ATA46)</p> <p>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.</p> <p>Typical examples include :</p> <ul style="list-style-type: none"> – 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. 	3	



MODULE 14. PROPULSION

MODULE 14. PROPULSION		LEVEL
		B2 B2L
14.1	<p><i>Turbine Engines</i></p> <p>(a) Constructional arrangement and operation of turbojet, turbofan, turboshaft and turbopropeller engines;</p> <p>(b) Electronic Engine control and fuel metering systems (FADEC).</p>	1
		2
14.2	<p><i>Engine Indicating Systems</i></p> <p>Exhaust gas temperature/Interstage turbine temperature systems;</p> <p>Engine speed;</p> <p>Engine Thrust Indication: Engine Pressure Ratio, engine turbine discharge pressure or jet pipe pressure systems;</p> <p>Oil pressure and temperature;</p> <p>Fuel pressure, temperature and flow;</p> <p>Manifold pressure;</p> <p>Engine torque;</p> <p>Propeller speed.</p>	2
14.3	<p><i>Starting and Ignition Systems</i></p> <p>Operation of engine start systems and components;</p> <p>Ignition systems and components;</p> <p>Maintenance safety requirements.</p>	2



MODULE 15. GAS TURBINE ENGINE

MODULE 15. GAS TURBINE ENGINE		LEVEL	
			B1
15.1	<p><i>Fundamentals</i></p> <p>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.</p>		2
15.2	<p><i>Engine Performance</i></p> <p>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.</p>		2
15.3	<p><i>Inlet</i></p> <p>Compressor inlet ducts Effects of various inlet configurations; Ice protection.</p>		2
15.4	<p><i>Compressor</i></p> <p>Axial and centrifugal types; Constructional features and operating principles and applications; Fan balancing; Operation: Causes and effects of compressor stall and surge; Methods of air flow control: bleed valves, variable inlet guide vanes, variable stator vanes, rotating stator blades; Compressor ratio.</p>		2
15.5	<p><i>Combustion Section</i></p> <p>Constructional features and principles of operation.</p>		2
15.6	<p><i>Turbine Section</i></p> <p>Operation and characteristics of different turbine blade types; Blade to disk attachment; Nozzle guide vanes; Causes and effects of turbine blade stress and creep.</p>		2



15.7	<i>Exhaust</i>		2
	Constructional features and principles of operation; Convergent, divergent and variable area nozzles; Engine noise reduction; Thrust reversers.		



MODULE 15. GAS TURBINE ENGINE		LEVEL	
			B1
15.8	<p><i>Bearings and Seals</i></p> <p>Constructional features and principles of operation.</p>		2
15.9	<p><i>Lubricants and Fuels</i></p> <p>Properties and specifications;</p> <p>Fuel additives;</p> <p>Safety precautions.</p>		2
15.10	<p><i>Lubrication Systems</i></p> <p>System operation/lay-out and components.</p>		2
15.11	<p><i>Fuel Systems</i></p> <p>Operation of engine control and fuel metering systems including electronic engine control (FADEC);</p> <p>Systems lay-out and components.</p>		2
15.12	<p><i>Air Systems</i></p> <p>Operation of engine air distribution and anti-ice control systems, including internal cooling, sealing and external air services.</p>		2
15.13	<p><i>Starting and Ignition Systems</i></p> <p>Operation of engine start systems and components;</p> <p>Ignition systems and components;</p> <p>Maintenance safety requirements.</p>		2
15.14	<p><i>Engine Indication Systems</i></p> <p>Exhaust Gas Temperature/Interstage Turbine Temperature;</p> <p>Engine Thrust Indication: Engine Pressure Ratio, engine turbine discharge pressure or jet pipe pressure systems;</p> <p>Oil pressure and temperature;</p> <p>Fuel pressure and f low;</p> <p>Engine speed;</p> <p>Vibration measurement and indication;</p>		2



	Torque; Power.		
15.15	<i>Power Augmentation Systems</i> Operation and applications; Water injection, water methanol; Afterburner systems.		1
15.16	<i>Turbo-prop Engines</i> Gas coupled/free turbine and gear coupled turbines; Reduction gears; Integrated engine and propeller controls; Overspeed safety devices.		2



MODULE 15. GAS TURBINE ENGINE		LEVEL	
			B1
15.17	<i>Turbo-shaft Engines</i> Arrangements, drive systems, reduction gearing, couplings, control systems.		2
15.18	<i>Auxiliary Power Units (APUs)</i> Purpose, operation, protective systems.		2
15.19	<i>Powerplant Installation</i> 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.		2
15.20	<i>Fire Protection Systems</i> Operation of detection and extinguishing systems.		2
15.21	<i>Engine Monitoring and Ground Operation</i> 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.		3
15.22	<i>Engine Storage and Preservation</i> Preservation and depreservation for the engine and accessories/systems.		2



MODULE 16. PISTON ENGINE

MODULE 16. PISTON ENGINE		LEVEL	
		B1	B3
16.1	<p><i>Fundamentals</i></p> <p>Mechanical, thermal and volumetric efficiencies;</p> <p>Operating principles — 2 stroke, 4 stroke, Otto and Diesel;</p> <p>Piston displacement and compression ratio;</p> <p>Engine configuration and firing order.</p>	2	2
16.2	<p><i>Engine Performance</i></p> <p>Power calculation and measurement;</p> <p>Factors affecting engine power;</p> <p>Mixtures/leaning, pre-ignition.</p>	2	2
16.3	<p><i>Engine Construction</i></p> <p>Crank case, crank shaft, cam shafts, sumps;</p> <p>Accessory gearbox;</p> <p>Cylinder and piston assemblies;</p> <p>Connecting rods, inlet and exhaust manifolds;</p> <p>Valve mechanisms;</p> <p>Propeller reduction gearboxes.</p>	2	2
16.4	<p><i>Engine Fuel Systems</i></p>	2	2
16.4.1	<p><i>Carburettors</i></p> <p>Types, construction and principles of operation;</p> <p>Icing and heating.</p>		
16.4.2	<p><i>Fuel injection systems</i></p> <p>Types, construction and principles of operation.</p>	2	2
16.4.3	<p><i>Electronic engine control</i></p> <p>Operation of engine control and fuel metering systems including electronic engine control (FADEC);</p>	2	2



Systems lay-out and components.			
16.5	<i>Starting and Ignition Systems</i> Starting systems, pre-heat systems; Magneto types, construction and principles of operation; Ignition harnesses, spark plugs; Low and high tension systems.	2	2
16.6	<i>Induction, Exhaust and Cooling Systems</i> Construction and operation of: induction systems including alternate air systems; Exhaust systems, engine cooling systems — air and liquid.	2	2



MODULE 16. PISTON ENGINE		LEVEL	
		B1	B3
16.7	<p><i>Supercharging/Turbocharging</i></p> <p>Principles and purpose of supercharging and its effects on engine parameters;</p> <p>Construction and operation of supercharging/turbocharging systems;</p> <p>System terminology;</p> <p>Control systems;</p> <p>System protection.</p>	2	2
16.8	<p><i>Lubricants and Fuels</i></p> <p>Properties and specifications;</p> <p>Fuel additives;</p> <p>Safety precautions.</p>	2	2
216.9	<p><i>Lubrication Systems</i></p> <p>System operation/lay-out and components.</p>	2	2
16.10	<p><i>Engine Indication Systems</i></p> <p>Engine speed;</p> <p>Cylinder head temperature;</p> <p>Coolant temperature;</p> <p>Oil pressure and temperature;</p> <p>Exhaust Gas Temperature;</p> <p>Fuel pressure and flow;</p> <p>Manifold pressure.</p>	2	2
16.11	<p><i>Powerplant Installation</i></p> <p>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.</p>	2	2



16.12	<i>Engine Monitoring and Ground Operation</i> 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.		3	2
16.13	<i>Engine Storage and Preservation</i> Preservation and depreservation for the engine and accessories/systems.		2	1



MODULE 17A. PROPELLER

Note: This module does not apply to category B3. Relevant subject matters for category B3 are defined in module 17B.

MODULE 17A. PROPELLER		LEVEL	
			B1
17.1	<p><i>Fundamentals</i></p> <p>Blade element theory;</p> <p>High/low blade angle, reverse angle, angle of attack, rotational speed;</p> <p>Propeller slip;</p> <p>Aerodynamic, centrifugal, and thrust forces;</p> <p>Torque;</p> <p>Relative air flow on blade angle of attack;</p> <p>Vibration and resonance.</p>		2
17.2	<p><i>Propeller Construction</i></p> <p>Construction methods and materials used in wooden, composite and metal propellers;</p> <p>Blade station, blade face, blade shank, blade back and hub assembly;</p> <p>Fixed pitch, controllable pitch, constant speed propeller;</p> <p>Propeller/spinner installation.</p>		2
17.3	<p><i>Propeller Pitch Control</i></p> <p>Speed control and pitch change methods, mechanical and electrical/electronic;</p> <p>Feathering and reverse pitch;</p> <p>Overspeed protection.</p>		2
17.4	<p><i>Propeller Synchronising</i></p> <p>Synchronising and synchrophasing equipment.</p>		2
17.5	<p><i>Propeller Ice Protection</i></p> <p>Fluid and electrical de-icing equipment.</p>		2



17.6	<i>Propeller Maintenance</i> Static and dynamic balancing; Blade tracking; Assessment of blade damage, erosion, corrosion, impact damage, delamination; Propeller treatment/repair schemes; Propeller engine running.		3
17.7	<i>Propeller Storage and Preservation</i> Propeller preservation and depreservation.		2



MODULE 17B. PROPELLER

Note: The scope of this Module shall reflect the propeller technology of aeroplanes pertinent to the B3 category.

MODULE 17B. PROPELLER		LEVEL
		B3
<p>17.1 <i>Fundamentals</i></p> <p>Blade element theory;</p> <p>High/low blade angle, reverse angle, angle of attack, rotational speed;</p> <p>Propeller slip;</p> <p>Aerodynamic, centrifugal, and thrust forces;</p> <p>Torque;</p> <p>Relative air flow on blade angle of attack;</p> <p>Vibration and resonance.</p>	2	
<p>17.2 <i>Propeller Construction</i></p> <p>Construction methods and material used in wooden, composite and metal propellers;</p> <p>Blade station, blade face, blade shank, blade back and hub assembly;</p> <p>Fixed pitch, controllable pitch, constant speed propeller;</p> <p>Propeller/spinner installation.</p>	2	
<p>17.3 <i>Propeller Pitch Control</i></p> <p>Speed control and pitch change methods, mechanical and electrical/electronic;</p> <p>Feathering and reverse pitch;</p> <p>Overspeed protection.</p>	2	
<p>17.4 <i>Propeller Synchronising</i></p> <p>Synchronising and synchrophasing equipment.</p>	2	
<p>17.5 <i>Propeller Ice Protection</i></p> <p>Fluid and electrical de-icing equipment.</p>	2	



17.6	<i>Propeller Maintenance</i> Static and dynamic balancing; Blade tracking; Assessment of blade damage, erosion, corrosion, impact damage, delamination; Propeller treatment/repair schemes; Propeller engine running.	2
17.7	<i>Propeller Storage and Preservation</i> Propeller preservation and depreservation.	2



APPENDIX II - BASIC EXAMINATION STANDARD

1. *General*

- 1.1. All basic examinations shall be carried out using the multi-choice question format and essay questions as specified below. The incorrect alternatives shall seem equally plausible to anyone ignorant of the subject. All of the alternatives shall be clearly related to the question and of similar vocabulary, grammatical construction and length. In numerical questions, the incorrect answers shall correspond to procedural errors such as corrections applied in the wrong sense or incorrect unit conversions: they shall not be mere random numbers.
- 1.2. Each multi-choice question shall have three alternative answers of which only one shall be the correct answer and the candidate shall be allowed a time per module which is based upon a nominal average of 75 seconds per question.
- 1.3. Each essay question requires the preparation of a written answer and the candidate shall be allowed 20 minutes to answer each such question.
- 1.4. Suitable essay questions shall be drafted and evaluated using the knowledge syllabus in [Appendix I](#) Modules 7A,7B, 9A, 9B and 10.
- 1.5. Each question will have a model answer drafted for it, which will also include any known alternative answers that may be relevant for other subdivisions.
- 1.6. The model answer will also be broken down into a list of the important points known as Key Points.
- 1.7. The pass mark for each module and sub-module multi-choice part of the examination is 75 %.
- 1.8. The pass mark for each essay question is 75 % in that the candidates answer shall contain 75 % of the required key points addressed by the question and no significant error related to any required key point.
- 1.9. If either the multi-choice part only or the essay part only is failed, then it is only necessary to retake the multi- choice or essay part, as appropriate.
- 1.10. Penalty marking systems shall not be used to determine whether a candidate has passed.
- 1.11. A failed module may not be retaken for at least 90 days following the date of the failed module examination, except in the case of a maintenance training organisation approved in accordance with Part AUA-147 which conducts a course of retraining tailored to the failed subjects in the particular module when the failed module may be retaken after 30 days.



- 1.12. The time periods required by point [AUA.66.A.25](#) apply to each individual module examination, with the exception of those module examinations which were passed as part of another category license, where the license has already been issued.
- 1.13. The maximum number of consecutive attempts for each module is three. Further sets of three attempts are allowed with a 1 year waiting period between sets.

The applicant shall confirm in writing to the approved maintenance training organisation or the authority to which they apply for an examination, the number and dates of attempts during the last year and the organisation or the authority where these attempts took place. The maintenance training organisation or the authority is responsible for checking the number of attempts within the applicable timeframes.

2. *Number of questions per module*

2.1. MODULE 1 — MATHEMATICS

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

Category B2 and B2L: 32 multi-choice and 0 essay questions. Time allowed 40 minutes.

Category B3: 28 multi-choice and 0 essay questions. Time allowed 35 minutes.

2.2. MODULE 2 — PHYSICS

Category B1: 52 multi-choice and 0 essay questions. Time allowed 65 minutes.

Category B2 and B2L: 52 multi-choice and 0 essay questions. Time allowed 65 minutes.

Category B3: 28 multi-choice and 0 essay questions. Time allowed 35 minutes.

2.3. MODULE 3 — ELECTRICAL FUNDAMENTALS

Category B1: 52 multi-choice and 0 essay questions. Time allowed 65 minutes.

Category B2 and B2L: 52 multi-choice and 0 essay questions. Time allowed 65 minutes.

Category B3: 24 multi-choice and 0 essay questions. Time allowed 30 minutes.

2.4. MODULE 4 — ELECTRONIC FUNDAMENTALS

Category B1: 20 multi-choice and 0 essay questions. Time allowed 25 minutes.

Category B2 and B2L: 40 multi-choice and 0 essay questions. Time allowed 50 minutes.

Category B3: 8 multi-choice and 0 essay questions. Time allowed 10 minutes.

2.5. MODULE 5 — DIGITAL TECHNIQUES/ELECTRONIC INSTRUMENT SYSTEMS

Category B1.1 and B1.3: 40 multi-choice and 0 essay questions. Time allowed 50 minutes.

Category B1.2 and B1.4: 20 multi-choice and 0 essay questions. Time allowed 25 minutes.



Category B2 and B2L: 72 multi-choice and 0 essay questions. Time allowed 90 minutes.

Category B3: 16 multi-choice and 0 essay questions. Time allowed 20 minutes.

2.6. MODULE 6 — MATERIALS AND HARDWARE

Category B1: 72 multi-choice and 0 essay questions. Time allowed 90 minutes.

Category B2 and B2L: 60 multi-choice and 0 essay questions. Time allowed 75 minutes.

Category B3: 60 multi-choice and 0 essay questions. Time allowed 75 minutes.

2.7. MODULE 7A — MAINTENANCE PRACTICES

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.

MODULE 7B — MAINTENANCE PRACTICES

Category B3: 60 multi-choice and 2 essay questions. Time allowed 75 minutes plus 40 minutes.

2.8. MODULE 8 — BASIC AERODYNAMICS

Category B1: 20 multi-choice and 0 essay questions. Time allowed 25 minutes.

Category B2 and B2L: 20 multi-choice and 0 essay questions. Time allowed 25 minutes.

Category B3: 20 multi-choice and 0 essay questions. Time allowed 25 minutes.

2.9. MODULE 9A — HUMAN FACTORS

Category B1: 20 multi-choice and 1 essay question. Time allowed 25 minutes plus 20 minutes.

Category B2 and B2L: 20 multi-choice and 1 essay question. Time allowed 25 minutes plus 20 minutes.

MODULE 9B — HUMAN FACTORS

Category B3: 16 multi-choice and 1 essay questions. Time allowed 20 minutes plus 20 minutes.

2.10. MODULE 10 — AVIATION LEGISLATION

Category B1: 40 multi-choice and 1 essay question. Time allowed 50 minutes plus 20 minutes.

Category B2 and B2L: 40 multi-choice and 1 essay question. Time allowed 50 minutes plus 20 minutes.



Category B3: 32 multi-choice and 1 essay questions. Time allowed 40 minutes plus 20 minutes.

2.11 MODULE 11A — TURBINE AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS

Category B1: 140 multi-choice and 0 essay questions. Time allowed 175 minutes.

MODULE 11B — PISTON AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS

Category B1: 100 multi-choice and 0 essay questions. Time allowed 125 minutes.

MODULE 11C — PISTON AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS

Category B3: 60 multi-choice and 0 essay questions. Time allowed 75 minutes.

2.12 MODULE 12 — HELICOPTER AERODYNAMICS, STRUCTURES AND SYSTEMS

Category B1: 128 multi-choice and 0 essay questions. Time allowed 160 minutes.

2.13. MODULE 13 — AIRCRAFT AERODYNAMICS, STRUCTURES AND SYSTEMS

Category B2: 180 multi-choice and 0 essay questions. Time allowed 225 minutes. Questions and time allowed may be split into two examinations as appropriate.

Category B2L:

System rating	Number of multiple-choice questions	Time allowed (minutes)
Basic requirements (Submodules 13.1, 13.2, 13.5 and 13.9)	28	35
COM/NAV (Submodule 13.4(a))	24	30
INSTRUMENTS (Submodule 13.8)	20	25
AUTOFLIGHT (Submodules 13.3(a) and 13.7)	28	35
SURVEILLANCE (Submodule 13.4(b))	8	10
AIRFRAME SYSTEMS (Submodules 13.11 to 13.18)	32	40



2.14. MODULE 14 — PROPULSION

Category B2: 24 multi-choice and 0 essay questions. Time allowed 30 minutes.

2.15. MODULE 15 — GAS TURBINE ENGINE

Category B1: 92 multi-choice and 0 essay questions. Time allowed 115 minutes.

2.16. MODULE 16 — PISTON ENGINE

Category B1: 72 multi-choice and 0 essay questions. Time allowed 90 minutes.

Category B3: 68 multi-choice and 0 essay questions. Time allowed 85 minutes.

2.17. MODULE 17A — PROPELLER

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

MODULE 17B — PROPELLER

Category B3: 28 multi-choice and 0 essay questions. Time allowed 35 minutes.

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**APPENDIX III - AIRCRAFT TYPE TRAINING AND EXAMINATION STANDARD -
ON THE JOB TRAINING**

1. General

Aircraft type training shall consist of theoretical training and examination, and, except for the category C ratings, practical training and assessment.

(a) Theoretical training and examination shall comply with the following requirements:

- (i) Shall be conducted by a maintenance training organisation appropriately approved in accordance with Part AUA-147 or, when conducted by other organisations, as directly approved by the authority.
- (iii) Shall comply, except as permitted by the differences training described in point (c), with the relevant standards set out in point 3.1 of this Appendix and, if available the relevant elements defined in the mandatory part of AUA-RLW, Chapter II and the applicable Type Certification Data of the product.
- (iii) In the case of a category C person qualified by holding an academic degree as specified in point [AUA.66.A.30\(a\)\(5\)](#), the first relevant aircraft type theoretical training shall be at the category B1 or B2 level.
- (iv) Shall have been started and completed within the 3 years preceding the application for a type rating endorsement.

(b) Practical training and assessment shall comply with the following requirements:

- (i) Shall be conducted by a maintenance training organisation appropriately approved in accordance with Part AUA-147 or, when conducted by other organisations, as directly approved by the authority.
- (ii) Shall comply, except as permitted by the differences training described in point (c), with the standard set out in point 3.2 of this appendix and if available with the mandatory part of AUA-RLW, Chapter II and the applicable Type Certification Data of the product.



- (iii) Shall include a representative cross section of maintenance activities relevant to the aircraft type.
 - (iv) Shall include demonstrations using equipment, components, simulators, other training devices or aircraft.
 - (v) Shall have been started and completed within the 3 years preceding the application for a type rating endorsement.
- (c) Differences training
- (i) Differences training is the training required in order to cover the differences between two different aircraft type ratings of the same manufacturer as determined by the Authority.
 - (ii) Differences training has to be defined on a case-to-case basis taking into account the requirements contained in this [Appendix III](#) in respect of both theoretical and practical elements of type rating training.
 - (iii) A type rating shall only be endorsed on a license after differences training when the applicant also complies with one of the following conditions:
 - having already endorsed on the license the aircraft type rating from which the differences are being identified, or
 - having completed the type training requirements for the aircraft from which the differences are being identified.

2. *Aircraft type training levels*

The three levels listed below define the objectives, the depth of training and the level of knowledge that the training is intended to achieve.

- *Level 1: A brief overview of the airframe, systems and powerplant as outlined in the Systems Description Section of the Aircraft Maintenance Manual/Instructions for Continued Airworthiness.*



Course objectives: Upon completion of Level 1 training, the student will be able to:

- (a) provide a simple description of the whole subject, using common words and examples, using typical terms and identify safety precautions related to the airframe, its systems and powerplant;
 - (b) identify aircraft manuals, maintenance practices important to the airframe, its systems and powerplant;
 - (c) define the general layout of the aircraft's major systems;
 - (d) define the general layout and characteristics of the powerplant;
 - (e) identify special tooling and test equipment used with the aircraft.
- *Level 2: Basic system overview of controls, indicators, principal components, including their location and purpose, servicing and minor troubleshooting. General knowledge of the theoretical and practical aspects of the subject.*

Course objectives: In addition to the information contained in the Level 1 training, at the completion of Level 2 training, the student will be able to:

- (a) understand the theoretical fundamentals; apply knowledge in a practical manner using detailed procedures;
- (b) recall the safety precautions to be observed when working on or near the aircraft, powerplant and systems;
- (c) describe systems and aircraft handling particularly access, power availability and sources;
- (d) identify the locations of the principal components;
- (e) explain the normal functioning of each major system, including terminology and nomenclature;
- (f) perform the procedures for servicing associated with the aircraft for the following systems: Fuel, Power Plants, Hydraulics, Landing Gear, Water/Waste, and Oxygen;
- (g) demonstrate proficiency in use of crew reports and on-board reporting systems (minor troubleshooting) and determine aircraft airworthiness per the MEL/CDL;



- (h) demonstrate the use, interpretation and application of appropriate documentation including instructions for continued airworthiness, maintenance manual, illustrated parts catalogue, etc.

— *Level 3: Detailed description, operation, component location, removal/installation and bite and troubleshooting procedures to maintenance manual level.*

Course objectives: In addition to the information contained in Level 1 and Level 2 training, at the completion of Level 3 training, the student will be able to:

- (a) demonstrate a theoretical knowledge of aircraft systems and structures and interrelationships with other systems, provide a detailed description of the subject using theoretical fundamentals and specific examples and to interpret results from various sources and measurements and apply corrective action where appropriate;
- (b) perform system, powerplant, component and functional checks as specified in the aircraft maintenance manual;
- (c) demonstrate the use, interpret and apply appropriate documentation including structural repair manual, troubleshooting manual, etc.;
- (d) correlate information for the purpose of making decisions in respect of fault diagnosis and rectification to maintenance manual level;
- (e) describe procedures for replacement of components unique to aircraft type.



3. Aircraft type training standard

Although aircraft type training includes both theoretical and practical elements, courses can be approved for the theoretical element, the practical element or for a combination of both.

3.1. Theoretical element

(a) Objective:

On completion of a theoretical training course the student shall be able to demonstrate, to the levels identified in the [Appendix III](#) syllabus, the detailed theoretical knowledge of the aircraft's applicable systems, structure, operations, maintenance, repair, and troubleshooting according to approved maintenance data. The student shall be able to demonstrate the use of manuals and approved procedures, including the knowledge of relevant inspections and limitations.

(b) Level of training:

Training levels are those levels defined in point 2 above.

After the first type course for category C certifying staff all subsequent courses need only be to level 1.

During a level 3 theoretical training, level 1 and 2 training material may be used to teach the full scope of the chapter if required. However, during the training the majority of the course material and training time shall be at the higher level.

(c) Duration:

The theoretical training minimum tuition hours are contained in the following table:

Category	Hours
Aeroplanes with a maximum take-off mass above 30000 kg:	
B1.1	150
B1.2	120
B2	100
C	30
Aeroplanes with a maximum take-off mass equal or less than 30000 kg and above 5700 kg:	
B1.1	120



B1.2	100
B2	100
C	25
Aeroplanes with a maximum take-off mass of 5700 kg and below¹	
B1.1	80
B1.2	60
Category	Hours
B2	60
C	15
Helicopter²	
B1.3	120
B1.4	100
B2	100
C	25

For the purpose of the table above, a tuition hour means 60 minutes of teaching and exclude any breaks, examination, revision, preparation and aircraft visit.

These hours apply only to theoretical courses for complete aircraft/engine combinations according to the type rating as defined by the Agency.

(d) Justification of course duration:

Training courses carried out in a maintenance training organisation approved in accordance with Part AUA-147 and courses directly approved by the authority shall justify their hour duration and the coverage of the full syllabus by a training needs analysis based on:

- the design of the aircraft type, its maintenance needs and the types of operation,
- detailed analysis of applicable chapters — see contents table in point 3.1(e) below,
- detailed competency analysis showing that the objectives as stated in point 3.1(a) above are fully met.

Where the training needs analysis shows that more hours are needed, course lengths shall be longer than the minimum specified in the table.

Similarly, tuition hours of differences courses or other training course combinations (such as combined B1/B2 courses), and in cases of theoretical type training courses below the figures given in point 3.1(c) above, these shall be justified to the authority by the training needs analysis as described above.

In addition, the course must describe and justify the following:

¹ For non-pressurised piston engine aeroplanes below 2 000 kg MTOM the minimum duration can be reduced by 50 %.

² For helicopters in group 2 (as defined in point [AUA.66.A.5](#)) the minimum duration can be reduced by 30 %



- The minimum attendance required to the trainee, in order to meet the objectives of the course.
- The maximum number of hours of training per day, taking into account pedagogical and human factors principles.

If the minimum attendance required is not met, the certificate of recognition shall not be issued. Additional training may be provided by the training organisation in order to meet the minimum attendance time.

(e) Content:

As a minimum, the elements in the Syllabus below that are specific to the aircraft type shall be covered. Additional elements introduced due to type variations, technological changes, etc. shall also be included.

The training syllabus shall be focused on mechanical and electrical aspects for B1 personnel, and electrical and avionic aspects for B2.

Level Chapters	Aeroplanes turbine		Aeroplanes piston		Helicopters turbine		Helicopters piston		Avionics
	B1	C	B1	C	B1	C	B1	C	
License category.	B1	C	B1	C	B1	C	B1	C	B2
INTRODUCTION MODULE:									
05 Time limits/maintenance checks	1	1	1	1	1	1	1	1	1
06 Dimensions/Areas (MTOM, etc.)	1	1	1	1	1	1	1	1	1
07 Lifting and Shoring	1	1	1	1	1	1	1	1	1
08 Levelling and weighing	1	1	1	1	1	1	1	1	1
09 Towing and taxiing	1	1	1	1	1	1	1	1	1
10 Parking/mooring, Storing and Return to Service	1	1	1	1	1	1	1	1	1
11 Placards and Markings	1	1	1	1	1	1	1	1	1
12 Servicing	1	1	1	1	1	1	1	1	
20 Standard practices — only	1	1	1	1	1	1	1	1	1



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type particular									
HELICOPTERS									
18 Vibration and Noise Analysis (Blade tracking)	—	—	—	—	3	1	3	1	—
60 Standard Practices Rotor	—	—	—	—	3	1	3	1	—
62 Rotors	—	—	—	—	3	1	3	1	1
62A Rotors — Monitoring and indicating	—	—	—	—	3	1	3	1	3
63 Rotor Drives	—	—	—	—	3	1	3	1	1
63A Rotor Drives — Monitoring and indicating	—	—	—	—	3	1	3	1	3
64 Tail Rotor	—	—	—	—	3	1	3	1	1
64A Tail rotor — Monitoring and indicating	—	—	—	—	3	1	3	1	3



Level Chapters	Aeroplanes turbine		Aeroplanes piston		Helicopters turbine		Helicopters piston		Avionics
65A Tail Rotor Drive — Monitoring and indicating	—	—	—	—	3	1	3	1	3
66 Folding Blades/Pylon	—	—	—	—	3	1	3	1	—
67 Rotors Flight Control	—	—	—	—	3	1	3	1	—
53 Airframe Structure (Helicopter)	—	—	—	—	3	1	3	1	—
25 Emergency Flotation Equipment	—	—	—	—	3	1	3	1	1
AIRFRAME STRUCTURES									
51 Standard practices and structures (damage classification, assessment and repair)	3	1	3	1	—	—	—	—	1
53 Fuselage	3	1	3	1	—	—	—	—	1
54 Nacelles/Pylons	3	1	3	1	—	—	—	—	1
55 Stabilisers	3	1	3	1	—	—	—	—	1
56 Windows	3	1	3	1	—	—	—	—	1
57 Wings	3	1	3	1	—	—	—	—	1
27A Flight Control Surfaces (All)	3	1	3	1	—	—	—	—	1
52 Doors	3	1	3	1	—	—	—	—	1
Zonal and Station Identification Systems.	1	1	1	1	1	1	1	1	1
AIRFRAME SYSTEMS:									



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21 Air Conditioning	3	1	3	1	3	1	3	1	3
21A Air Supply	3	1	3	1	3	1	3	1	2
21B Pressurisation	3	1	3	1	3	1	3	1	3



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Level Chapters	Aeroplanes turbine		Aeroplanes piston		Helicopters turbine		Helicopters piston		Avionics
21C Safety and Warning Devices	3	1	3	1	3	1	3	1	3
22 Autoflight	2	1	2	1	2	1	2	1	3
23 Communications	2	1	2	1	2	1	2	1	3
24 Electrical Power	3	1	3	1	3	1	3	1	3
25 Equipment and Furnishings	3	1	3	1	3	1	3	1	1
26 Fire Protection	3	1	3	1	3	1	3	1	3
27 Flight Controls	3	1	3	1	3	1	3	1	2
27A Sys. Operation: Electrical/Fly-by-Wire	3	1	—	—	—	—	—	—	3
28 Fuel Systems	3	1	3	1	3	1	3	1	2
28A Fuel Systems — Monitoring and indicating	3	1	3	1	3	1	3	1	3
29 Hydraulic Power	3	1	3	1	3	1	3	1	3
29A Hydraulic Power — Monitoring and indicating	3	1	3	1	3	1	3	1	3
30 Ice and Rain Protection	3	1	3	1	3	1	3	1	3
31 Indicating/Recording Systems	3	1	3	1	3	1	3	1	3
31A Instrument Systems	3	1	3	1	3	1	3	1	3
32 Landing Gear	3	1	3	1	3	1	3	1	3
32A Landing Gear —	3	1	3	1	3	1	3	1	3



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Monitoring and indicating									
33 Lights	3	1	3	1	3	1	3	1	3
34 Navigation	2	1	2	1	2	1	2	1	3
35 Oxygen	3	1	3	1	—	—	—	—	2



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Level Chapters	Aeroplanes turbine		Aeroplanes piston		Helicopters turbine		Helicopters piston		Avionics
36 Pneumatic	3	1	3	1	3	1	3	1	2
36A Pneumatic — Monitoring and indicating	3	1	3	1	3	1	3	1	3
37 Vacuum	3	1	3	1	3	1	3	1	2
38 Water/Waste	3	1	3	1	—	—	—	—	2
41 Water Ballast	3	1	3	1	—	—	—	—	1
42 Integrated modular avionics	2	1	2	1	2	1	2	1	3
44 Cabin Systems	2	1	2	1	2	1	2	1	3
45 On-Board Maintenance System (or covered in 31)	3	1	3	1	3	1	—	—	3
46 Information Systems	2	1	2	1	2	1	2	1	3
50 Cargo and Accessory Compartments	3	1	3	1	3	1	3	1	1
<i>TURBINE ENGINE</i>									
70 Standard Practices — Engines,	3	1	—	—	3	1	—	—	1
70A constructional arrangement and operation (Installation Inlet, Compressors, Combustion Section, Turbine Section, Bearings and Seals, Lubrication Systems).	3	1	—	—	3	1	—	—	1
70B Engine Performance	3	1	—	—	3	1	—	—	1



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71 Powerplant	3	1	—	—	3	1	—	—	1
72 Engine Turbine/Turbo Prop/Ducted Fan/Unducted fan	3	1	—	—	3	1	—	—	1
73 Engine Fuel and Control	3	1	—	—	3	1	—	—	1
75 Air	3	1	—	—	3	1	—	—	1



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Level Chapters	Aeroplanes turbine		Aeroplanes piston		Helicopters turbine		Helicopters piston		Avionics
76 Engine controls	3	1	—	—	3	1	—	—	1
78 Exhaust	3	1	—	—	3	1	—	—	1
79 Oil	3	1	—	—	3	1	—	—	1
80 Starting	3	1	—	—	3	1	—	—	1
82 Water Injections	3	1	—	—	3	1	—	—	1
83 Accessory Gear Boxes	3	1	—	—	3	1	—	—	1
84 Propulsion Augmentation	3	1	—	—	3	1	—	—	1
73A FADEC	3	1	—	—	3	1	—	—	1
74 Ignition	3	1	—	—	3	1	—	—	1
77 Engine Indication Systems	3	1	—	—	3	1	—	—	3
<i>PROPELLERS</i>									
60A Standard Practices — Propeller	3	1	3	1	—	—	—	—	—
61 Propellers/Propulsion	3	1	3	1	—	—	—	—	1
61A Propeller Construction	2	1	2	1	—	—	—	—	3
61B Propeller Pitch Control	3	1	3	1	—	—	—	—	—
61C Propeller Synchronising	3	1	3	1	—	—	—	—	1
61D Propeller Electronic control	2	1	2	1	—	—	—	—	3
61E Propeller Ice Protection	3	1	3	1	—	—	—	—	—
61F Propeller Maintenance	3	1	3	1	—	—	—	—	1



- (f) Multimedia Based Training (MBT) methods may be used to satisfy the theoretical training element either in the classroom or in a virtual controlled environment subject to the acceptance of the authority approving the training course.



3.2. Practical element

(a) Objective:

The objective of practical training is to gain the required competence in performing safe maintenance, inspections and routine work according to the maintenance manual and other relevant instructions and tasks as appropriate for the type of aircraft, for example troubleshooting, repairs, adjustments, replacements, rigging and functional checks. It includes the awareness of the use of all technical literature and documentation for the aircraft, the use of specialist/special tooling and test equipment for performing removal and replacement of components and modules unique to type, including any on-wing maintenance activity.

(b) Content:

At least 50 % of the crossed items in the table below, which are relevant to the particular aircraft type, shall be completed as part of the practical training.

Tasks crossed represent subjects that are important for practical training purposes to ensure that the operation, function, installation and safety significance of key maintenance tasks is adequately addressed; particularly where these cannot be fully explained by theoretical training alone. Although the list details the minimum practical training subjects, other items may be added where applicable to the particular aircraft type.

Tasks to be completed shall be representative of the aircraft and systems both in complexity and in the technical input required to complete that task. While relatively simple tasks may be included, other more complex tasks shall also be incorporated and undertaken as appropriate to the aircraft type.

Glossary of the table: LOC: Location; FOT: Functional/Operational Test; SGH: Service and Ground Handling; R/ I: Removal/Installation; MEL: Minimum Equipment List; TS: Trouble Shooting.



Chapter	B1/B2	B1					B2				
	LOC	FOT	SHG	R/I	MEL	TS	FOT	SHG	R/I	MEL	TS
INTRODUCTION MODULE:											
5 Time limits / maintenance checks	X/X	—	—	—	—	—	—	—	—	—	—
6 Dimensions/Areas (MTOM, etc.)	X/X	—	—	—	—	—	—	—	—	—	—
7 Lifting and Shoring	X/X	—	—	—	—	—	—	—	—	—	—
8 Levelling and weighing	X/X	—	X	—	—	—	—	X	—	—	—
9 Towing and taxiing	X/X	—	X	—	—	—	—	X	—	—	—
10 Parking/mooring, Storing and Return to Service	X/X	—	X	—	—	—	—	X	—	—	—
Chapter	B1/B2	B1					B2				
	LOC	FOT	SHG	R/I	MEL	TS	FOT	SHG	R/I	MEL	TS
11 Placards and Markings	X/X	—	—	—	—	—	—	—	—	—	—
12 Servicing	X/X	—	X	—	—	—	—	X	—	—	—
20 Standard practices — only type particular	X/X	—	X	—	—	—	—	X	—	—	—
HELICOPTERS:											
18 Vibration	X/—	—	—	—	—	X	—	—	—	—	—
60 Standard Practices Rotor — only type specific	X/X	—	X	—	—	—	—	X	—	—	—
62 Rotors	X/—	—	X	X	—	X	—	—	—	—	—
62A Rotors — Monitoring and indicating	X/X	X	X	X	X	X	—	—	X	—	X
63 Rotor Drives	X/—	X	—	—	—	X	—	—	—	—	—
63A Rotor Drives — Monitoring and indicating	X/X	X	—	X	X	X	—	—	X	—	X
64 Tail Rotor	X/—	—	X	—	—	X	—	—	—	—	—
64A Tail rotor -Monitoring and indicating	X/X	X	—	X	X	X	—	—	X	—	X
65 Tail Rotor Drive	X/—	X	—	—	—	X	—	—	—	—	—
65A Tail Rotor Drive — Monitoring and indicating	X/X	X	—	X	X	X	—	—	X	—	X
66 Folding Blades/Pylon	X/—	X	X	—	—	X	—	—	—	—	—



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67 Rotors Flight Control	X/—	X	X	—	—	X	—	—	—	—	—
53 Airframe Structure (Helicopter) Note: covered under Airframe structures											
25 Emergency Flotation Equipment	X/X	X	X	X	X	X	X	X	—	—	—
<i>Airframe structures:</i>											
51 Standard Practices and Structures (damage classification, assessment and repair)											
53 Fuselage	X/—	—	—	—	—	X	—	—	—	—	—
Chapter	B1/B2	B1					B2				
	LOC	FOT	SHG	R/I	MEL	TS	FOT	SHG	R/I	MEL	TS
54 Nacelles/Pylons	X/—	—	—	—	—	—	—	—	—	—	—
55 Stabilisers	X/—	—	—	—	—	—	—	—	—	—	—
56 Windows	X/—	—	—	—	—	X	—	—	—	—	—
57 Wings	X/—	—	—	—	—	—	—	—	—	—	—
27A Flight Control Surfaces	X/—	—	—	—	—	X	—	—	—	—	—
52 Doors	X/X	X	X	—	—	—	—	X	—	—	—
<i>AIRFRAME SYSTEMS:</i>											
21 Air Conditioning	X/X	X	X	—	X	X	X	X	—	X	X
21A Air Supply	X/X	X	—	—	—	—	X	—	—	—	—
21B Pressurisation	X/X	X	—	—	—	X	X	X	—	X	X
21C Safety and warning Devices	X/X	—	X	—	—	—	—	X	—	—	—
22 Autoflight	X/X	—	—	—	X	—	X	X	X	X	X
23 Communications	X/X	—	X	—	X	—	X	X	X	X	X
24 Electrical Power	X/X	X	X	X	X	X	X	X	X	X	X
25 Equipment and Furnishings	X/X	X	X	X	—	—	X	X	X	—	—
26 Fire Protection	X/X	X	X	X	X	X	X	X	X	X	X



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27 Flight Controls	X/X	X	X	X	X	X	X	—	—	—	—
27A Sys. Operation: Electrical/Fly-by- Wire	X/X	X	X	X	X	—	X	—	X	—	X
28 Fuel Systems	X/X	X	X	X	X	X	X	X	X	X	X
28A Fuel Systems — Monitoring and indicating	X/X	X	—	—	—	—	X	—	X	—	X
29 Hydraulic Power	X/X	X	X	X	X	X	X	X	—	X	—
29A Hydraulic Power — Monitoring and indicating	X/X	X	—	X	X	X	X	—	X	X	X
30 Ice and Rain Protection	X/X	X	X	—	X	X	X	X	—	X	X
31 Indicating/Recording Systems	X/X	X	X	X	X	X	X	X	X	X	X
Chapter	B1/B2	B1					B2				
	LOC	FOT	SHG	R/I	MEL	TS	FOT	SHG	R/I	MEL	TS
31A Instrument Systems	X/X	X	X	X	X	X	X	X	X	X	X
32 Landing Gear	X/X	X	X	X	X	X	X	X	X	X	—
32A Landing Gear — Monitoring and indicating	X/X	X	—	X	X	X	X	—	X	X	X
33 Lights	X/X	X	X	—	X	—	X	X	X	X	—
34 Navigation	X/X	—	X	—	X	—	X	X	X	X	X
35 Oxygen	X/—	X	X	X	—	—	X	X	—	—	—
36 Pneumatic	X/—	X	—	X	X	X	X	—	X	X	X
36A Pneumatic — Monitoring and indicating	X/X	X	X	X	X	X	X	X	X	X	X
37 Vacuum	X/—	X	—	X	X	X	—	—	—	—	—
38 Water/Waste	X/—	X	X	—	—	—	X	X	—	—	—
41 Water Ballast	X/—	—	—	—	—	—	—	—	—	—	—
42 Integrated modular avionics	X/X	—	—	—	—	—	X	X	X	X	X
44 Cabin Systems	X/X	—	—	—	—	—	X	X	X	X	X
45 On-Board Maintenance System (or covered in 31)	X/X	X	X	X	X	X	X	X	X	X	X



46 Information Systems	X/X	—	—	—	—	—	X	—	X	X	X
50 Cargo and Accessory Compartments	X/X	—	X	—	—	—	—	—	—	—	—
TURBINE/PISTON ENGINE MODULE:											
70 Standard Practices — Engines —only type particular	—	—	X	—	—	—	—	X	—	—	—
70A Constructional arrangement and operation(Installation Inlet, Compressors, Combustion Section, Turbine Section, Bearings and Seals, Lubrication Systems)	X/X	—	—	—	—	—	—	—	—	—	—
CHAPTER	B1/B2	B1					B2				
	LOC	FOT	SHG	R/I	MEL	TS	FOT	SHG	R/I	MEL	TS
TURBINE ENGINES:											
70B Engine Performance	—	—	—	—	—	X	—	—	—	—	—
71 Power Plant	X/—	X	X	—	—	—	—	X	—	—	—
72 Engine Turbine/Turbo Prop/Ducted Fan/ Unducted fan	X/—	—	—	—	—	—	—	—	—	—	—
73 Engine Fuel and Control	X/X	X	—	—	—	—	—	—	—	—	—
73A FADEC Systems	X/X	X	—	X	X	X	X	—	X	X	X
74 Ignition	X/X	X	—	—	—	—	X	—	—	—	—
75 Air	X/—	—	—	X	—	X	—	—	—	—	—
76 Engine Controls	X/—	X	—	—	—	X	—	—	—	—	—
77 Engine Indicating	X/X	X	—	—	X	X	X	—	—	X	X
78 Exhaust	X/—	X	—	—	X	—	—	—	—	—	—
79 Oil	X/—	—	X	X	—	—	—	—	—	—	—
80 Starting	X/—	X	—	—	X	X	—	—	—	—	—
82 Water Injection	X/—	X	X	X	X	X	X	X	X	X	X
83 Accessory Gearboxes	X/—	—	X	—	—	—	—	—	—	—	—



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84 Propulsion Augmentation	X/—	X	—	—	—	—	—	—	—	—	—
<i>Auxiliary Power Units (APUs):</i>											
49 Auxiliary Power Units (APUs)	X/—	X	X	—	—	X	—	—	—	—	—
PISTON ENGINES:											
70 Standard Practices — Engines —only type particular	—	—	X	—	—	—	—	X	—	—	—
70A Constructional arrangement and operation(Installation Inlet, Compressors, Combustion Section, Turbine Section, Bearing and Seals, Lubrication Systems)	X/X	—	—	—	—	—	—	—	—	—	—
Chapter	B1/B2	B1					B2				
	LOC	FOT	SHG	R/I	MEL	TS	FOT	SHG	R/I	MEL	TS
70B Engine Performance	—	—	—	—	—	X	—	—	—	—	—
71 Power Plant	X/—	X	X	—	—	—	—	X	—	—	—
73 Engine Fuel and Control	X/X	X	—	—	—	—	—	—	—	—	—
73A FADEC Systems	X/X	X	—	X	X	X	X	X	X	X	X
74 Ignition	X/X	X	—	—	—	—	X	—	—	—	—
76 Engine Controls	X/—	X	—	—	—	X	—	—	—	—	—
77 Engine Indicating	X/X	X	—	—	X	X	X	—	—	X	X
78 Exhaust	X/—	X	—	—	X	X	—	—	—	—	—
79 Oil	X/—	—	X	X	—	—	—	—	—	—	—
80 Starting	X/—	X	—	—	X	X	—	—	—	—	—
81 Turbines	X/—	X	X	X	—	X	—	—	—	—	—
82 Water Injection	X/—	X	—	—	—	—	—	—	—	—	—
83 Accessory Gearboxes	X/—	—	X	X	—	—	—	—	—	—	—
84 Propulsion Augmentation	X/—	X	—	—	—	—	—	—	—	—	—
PROPELLERS:											



60A Standard Practices — Propeller	X/X	X	X	—	X	X	—	—	—	—	—
61 Propellers/Propulsion	X/X	X	X	—	X	X	—	—	—	—	—
61A Propeller Construction	X/X	—	X	—	—	—	—	—	—	—	—
61B Propeller Pitch Control	X/—	X	—	X	X	X	—	—	—	—	—
61C Propeller Synchronising	X/—	X	—	—	—	X	—	—	—	X	—
61D Propeller Electronic control	X/X	X	X	X	X	X	X	X	X	X	X
61E Propeller Ice Protection	X/—	X	—	X	X	X	—	—	—	—	—
61F Propeller Maintenance	X/X	X	X	X	X	X	X	X	X	X	X

4. Type training examination and assessment standard

4.1. Theoretical element examination standard

After the theoretical portion of the aircraft type training has been completed, a written examination shall be performed, which shall comply with the following:

- (a) Format of the examination is of the multi-choice type. Each multi-choice question shall have 3 alternative answers of which only one shall be the correct answer. The total time is based on the total number of questions and the time for answering is based upon a nominal average of 90 seconds per question.
- (b) The incorrect alternatives shall seem equally plausible to anyone ignorant of the subject. All the alternatives shall be clearly related to the question and of similar vocabulary, grammatical construction and length.
- (c) In numerical questions, the incorrect answers shall correspond to procedural errors such as the use of incorrect sense (+ versus -) or incorrect measurement units. They shall not be mere random numbers.



- (d) The level of examination for each chapter³ shall be the one defined in point 2 'Aircraft type training levels'. However, the use of a limited number of questions at a lower level is acceptable.
- (e) The examination shall be of the closed book type. No reference material is permitted. An exception will be made for the case of examining a B1 or B2 candidate's ability to interpret technical documents.
- (f) The number of questions shall be at least 1 question per hour of instruction. The number of questions for each chapter and level shall be proportionate to:
- the effective training hours spent teaching at that chapter and level,
 - the learning objectives as given by the training needs analysis.
- The authority of the Member State will assess the number and the level of the questions when approving the course.
- (g) The minimum examination pass mark is 75 %. When the type training examination is split in several examinations, each examination shall be passed with at least a 75 % mark. In order to be possible to achieve exactly a 75 % pass mark, the number of questions in the examination shall be a multiple of 4.
- (h) Penalty marking (negative points for failed questions) is not to be used.
- (i) End of module phase examinations cannot be used as part of the final examination unless they contain the correct number and level of questions required.

4.2. Practical element assessment standard

After the practical element of the aircraft type training has been completed, an assessment must be performed, which must comply with the following:

- (a) The assessment shall be performed by designated assessors appropriately qualified.
- (b) The assessment shall evaluate the knowledge and skills of the trainee.

³ For the purpose of this point 4, a 'chapter' means each one of the rows preceded by a number in the table contained in point 3.1(e).



5. Type examination standard (Appendix III to Part AUA-66)

Type examination shall be conducted by training organisations appropriately approved under Part AUA-147 or by the authority.

The examination shall be oral, written or practical assessment based, or a combination thereof and it shall comply with the following requirements:

- (a) Oral examination questions shall be open.
- (b) Written examination questions shall be essay type or multi-choice questions.
- (c) Practical assessment shall determine a person's competence to perform a task.
- (d) Examinations shall be on a sample of chapters⁴ drawn from point 3 type training/examination syllabus, at the indicated level.
- (e) The incorrect alternatives shall seem equally plausible to anyone ignorant of the subject. All of the alternatives shall be clearly related to the question and of similar vocabulary, grammatical construction and length.
- (f) In numerical questions, the incorrect answers shall correspond to procedural errors such as corrections applied in the wrong sense or incorrect unit conversions: they shall not be mere random numbers.
- (g) The examination shall ensure that the following objectives are met:
 - 1. Properly discuss with confidence the aircraft and its systems.
 - 2. Ensure safe performance of maintenance, inspections and routine work according to the maintenance manual and other relevant instructions and tasks as appropriate for the type of aircraft, for example troubleshooting, repairs, adjustments, replacements, rigging and functional checks such as engine run, etc., if required.
 - 3. Correctly use all technical literature and documentation for the aircraft.

⁴ For the purpose of this point 5, a 'chapter' means each one of the rows preceded by a number in the tables contained in points 3.1(e) and 3.2(b).



4. Correctly use specialist/special tooling and test equipment, perform removal and replacement of components and modules unique to type, including any on-wing maintenance activity
- (h) The following conditions apply to the examination:
1. The maximum number of consecutive attempts is three. Further sets of three attempts are allowed with a 1 year waiting period between sets. A waiting period of 30 days is required after the first failed attempt within one set, and a waiting period of 60 days is required after the second failed attempt.

The applicant shall confirm in writing to the maintenance training organisation or the authority to which they apply for an examination, the number and dates of attempts during the last year and the maintenance training organisation or the authority where these attempts took place. The maintenance training organisation or the authority is responsible for checking the number of attempts within the applicable timeframes.
 2. The type examination shall be passed and the required practical experience shall be completed within the 3 years preceding the application for the rating endorsement on the aircraft maintenance license.
 3. Type examination shall be performed with at least one examiner present. The examiner(s) shall not have been involved in the applicant's training.
- (i) A written and signed report shall be made by the examiner(s) to explain why the candidate has passed or failed.

6. On the Job Training

On the Job Training (OJT) shall be approved by the authority who has issued the license.

It shall be conducted at and under the control of a maintenance organisation appropriately approved for the maintenance of the particular aircraft type and shall be assessed by designated assessors appropriately qualified.



It shall have been started and completed within the 3 years preceding the application for a type rating endorsement.

(a) Objective:

The objective of OJT is to gain the required competence and experience in performing safe maintenance.

(b) Content:

OJT shall cover a cross section of tasks acceptable to the authority. The OJT tasks to be completed shall be representative of the aircraft and systems both in complexity and in the technical input required to complete that task. While relatively simple tasks may be included, other more complex maintenance tasks shall also be incorporated and undertaken as appropriate to the aircraft type.

Each task shall be signed off by the student and countersigned by a designated supervisor. The tasks listed shall refer to an actual job card/work sheet, etc.

The final assessment of the completed OJT is mandatory and shall be performed by a designated assessor appropriately qualified.

The following data shall be addressed on the OJT worksheets/logbook:

- (1) Name of Trainee;
- (2) Date of Birth;
- (3) Approved Maintenance Organisation;
- (4) Location;
- (5) Name of supervisor(s) and assessor, (including license number if applicable);
- (6) Date of task completion;
- (7) Description of task and job card/work order/tech log, etc.;
- (8) Aircraft type and aircraft registration;
- (9) Aircraft rating applied for.



In order to facilitate the verification by the authority, demonstration of the *OJT* shall consist of (i) detailed worksheets/logbook and (ii) a compliance report demonstrating how the *OJT* meets the requirement of this Part.



APPENDIX IV - EXPERIENCE REQUIREMENTS FOR EXTENDING A PART AUA-66 AIRCRAFT MAINTENANCE LICENSE

The table below shows the experience requirements for adding a new category or subcategory to an existing Part AUA-66 license.

The experience shall be practical maintenance experience on operating aircraft in the subcategory relevant to the application.

The experience requirement will be reduced by 50 % if the applicant has completed an approved Part AUA-147 course relevant to the subcategory.

To Form	B1.1	B1.2	B1.3	B1.4	B2	B3
B1.1	—	6 months	6 months	6 months	1 year	6 months
B1.2	2 years	—	2 years	6 months	2 years	None
B1.3	6 months	6 months	—	6 months	1 year	6 months
B1.4	2 years	6 months	2 years	—	2 years	6 months
B2	1 year	1 year	1 year	1 year	—	1 year
B3	2 years	6 months	2 years	1 year	2 years	—



APPENDIX V - RESERVED



APPENDIX VI - AIRCRAFT MAINTENANCE LICENSE REFERRED TO IN PART AUA-

66 — INS-4.016

1. Each license holder shall have a unique license holder number, established on the basis of:
 - a) License identification for Aruba: AMTL, followed by a “-”;
 - b) The last 2 digits of the applicable year of issue followed by a “/”;
 - c) And the sequential three digits alpha-numeric designator.

2. An example of the above is as follows: AMTL-22/001

3. The holder of the aircraft maintenance license shall keep it in good condition and shall ensure that no unauthorised entries are made. Failure to comply with this rule may invalidate the license or lead to the holder not being permitted to hold any certification privilege. It may also result in prosecution under national law.

4. The aircraft maintenance technician license shall clearly indicate that the limitations are exclusions from the certification privileges. If there are no limitations applicable, the LIMITATIONS page shall state ‘No limitations’.



APPENDIX VII - RESERVED



PART AUA-147

GENERAL

AUA.147.1

For the purpose of this Part, the authority shall be:

1. for the organisations having their principle place of business located in the territory of Aruba, the Minister in charge of aviation affairs, through the Department of Civil Aviation;
2. for the organisations having their principle place of business located in a third country, the ICAO member State Aviation Authority and if recognized by Aruba, the Minister in charge of aviation affairs, through the Department of Civil Aviation.

SECTION A — TECHNICAL REQUIREMENTS

SUBPART A — GENERAL

AUA.147.A.05 Scope

This section establishes the requirements to be met by organisations seeking approval to conduct training and examination as specified in Part AUA-66.

AUA.147.A.15 Application

An application for an approval or for the change of an existing approval shall be made on a form and in a manner established by the authority.



SUBPART B — ORGANISATIONAL REQUIREMENTS

AUA.147.A.100 Facility requirements

- (a) The size and structure of facilities shall ensure protection from the prevailing weather elements and proper operation of all planned training and examination on any particular day.
- (b) Fully enclosed appropriate accommodation separate from other facilities shall be provided for the instruction of theory and the conduct of knowledge examinations.
 - 1. The maximum number of students undergoing knowledge training during any training course shall not exceed 28.
 - 2. The size of accommodation for examination purposes shall be such that no student can read the paperwork or computer screen of any other student from his/her position during examinations.
- (c) The point (b) accommodation environment shall be maintained such that students are able to concentrate on their studies or examination as appropriate, without undue distraction or discomfort.
- (d) In the case of a basic training course, basic training workshops and/or maintenance facilities separate from training classrooms shall be provided for practical instruction appropriate to the planned training course. If, however, the organisation is unable to provide such facilities, arrangements may be made with another organisation to provide such workshops and/or maintenance facilities, in which case a written agreement shall be made with such organisation specifying the conditions of access and use thereof. The authority shall require access to any such contracted organisation and the written agreement shall specify this access.
- (e) In the case of an aircraft type/task training course, access shall be provided to appropriate facilities containing examples of aircraft type as specified in point [AUA.147.A.115\(d\)](#).



- (f) The maximum number of students undergoing practical training during any training course shall not exceed 15 per supervisor or assessor.
- (g) Office accommodation shall be provided for instructors, knowledge examiners and practical assessors of a standard to ensure that they can prepare for their duties without undue distraction or discomfort.
- (h) Secure storage facilities shall be provided for examination papers and training records. The storage environment shall be such that documents remain in good condition for the retention period as specified in point [AUA.147.A.125](#). The storage facilities and office accommodation may be combined, subject to adequate security.
- (i) A library shall be provided containing all technical material appropriate to the scope and level of training undertaken.

AUA.147.A.105 Personnel requirements

- (a) The organisation shall appoint an accountable manager who has corporate authority for ensuring that all training commitments can be financed and carried out to the standard required by this Part.
- (b) A person or group of persons, whose responsibilities include ensuring that the maintenance training organisation is in compliance the requirements of this Part, shall be nominated. Such person(s) must be responsible to the accountable manager. The senior person or one person from the group of persons may also be the accountable manager subject to meeting the requirements for the accountable manager as defined in point (a).
- (c) The maintenance training organisation shall contract sufficient staff to plan/perform knowledge and practical training, conduct knowledge examinations and practical assessments in accordance with the approval.



- (d) By derogation to point (c), when another organisation is used to provide practical training and assessments, such other organisation's staff may be nominated to carry out practical training and assessments.
- (e) Any person may carry out any combination of the roles of instructor, examiner and assessor, subject to compliance with point (f).
- (f) The experience and qualifications of instructors, knowledge examiners and practical assessors shall be established in accordance with criteria published or in accordance with a procedure and to a standard agreed by the authority.
- (g) The knowledge examiners and practical assessors shall be specified in the organisation exposition for the acceptance of such staff.
- (h) Instructors and knowledge examiners shall undergo updating training at least every 24 months relevant to current technology, practical skills, human factors and the latest training techniques appropriate to the knowledge being trained or examined.

AUA.147.A.110 Records of instructors, examiners and assessors

- (a) The organisation shall maintain a record of all instructors, knowledge examiners and practical assessors. These records shall reflect the experience and qualification, training history and any subsequent training undertaken.
- (b) Terms of reference shall be drawn up for all instructors, knowledge examiners and practical assessors.

AUA.147.A.115 Instructional equipment

- (a) Each classroom shall have appropriate presentation equipment of a standard that ensures students can easily read presentation text/drawings/diagrams and figures from any position in the classroom.



Presentation equipment shall include representative synthetic training devices to assist students in their understanding of the particular subject matter where such devices are considered beneficial for such purposes.

- (b) The basic training workshops and/or maintenance facilities as specified in point [AUA.147.A.100\(d\)](#) must have all tools and equipment necessary to perform the approved scope of training.
- (c) The basic training workshops and/or maintenance facilities as specified in point [AUA.147.A.100\(d\)](#) must have an appropriate selection of aircraft, engines, aircraft parts and avionic equipment.
- (d) The aircraft type training organisation as specified in point [AUA.147.A.100\(e\)](#) must have access to the appropriate aircraft type. Synthetic training devices may be used when such synthetic training devices ensure adequate training standards.

AUA.147.A.120 Maintenance training material

- (a) Maintenance training course material shall be provided to the student and cover as applicable:
 - 1. the basic knowledge syllabus specified in Part AUA-66 for the relevant aircraft maintenance license category or subcategory and,
 - 2. the type course content required by Part AUA-66 for the relevant aircraft type and aircraft maintenance license category or subcategory.
- (b) Students shall have access to examples of maintenance documentation and technical information of the library as specified in point [AUA.147.A.100\(i\)](#).

AUA.147.A.125 Records

The organisation shall keep all student training, examination and assessment records for an unlimited period.



AUA.147.A.130 Training procedures and quality system

- (a) The organisation shall establish procedures acceptable to the authority to ensure proper training standards and compliance with all relevant requirements in this Part.
- (b) The organisation shall establish a quality system including:
 1. an independent audit function to monitor training standards, the integrity of knowledge examinations and practical assessments, compliance with and adequacy of the procedures, and
 2. a feedback system of audit findings to the person(s) and ultimately to the accountable manager referred to in point [AUA.147.A.105\(a\)](#) to ensure, as necessary, corrective action.

AUA.147.A.135 Examinations

- (a) The examination staff shall ensure the security of all questions.
- (b) Any student found during a knowledge examination to be cheating or in possession of material pertaining to the examination subject other than the examination papers and associated authorised documentation shall be disqualified from taking the examination and may not take any examination for at least 12 months after the date of the incident. The authority shall be informed of any such incident together with the details of any enquiry within one calendar month.
- (c) Any examiner found during a knowledge examination to be providing question answers to any student being examined shall be disqualified from acting as an examiner and the examination declared void. The authority must be informed of any such occurrence within one calendar month.



AUA.147.A.140 Maintenance training organisation exposition

- (a) The organisation shall provide an exposition for use by the organisation describing the organisation and its procedures and containing the following information:
1. a statement signed by the accountable manager confirming that the maintenance training organisation exposition and any associated manuals define the maintenance training organisation's compliance with this Part and shall be complied with at all times.
 2. the title(s) and name(s) of the person(s) nominated in accordance with point [AUA.147.A.105\(b\)](#).
 3. the duties and responsibilities of the person(s) specified in point 2, including matters on which they may deal directly with the authority on behalf of the maintenance training organisation.
 4. a maintenance training organisation chart showing associated chains of responsibility of the person(s) specified in point (a)(2).
 5. a list of the training instructors, knowledge examiners and practical assessors.
 6. a general description of the training and examination facilities located at each address specified in the maintenance training organisation's approval certificate, and if appropriate any other location, as required by point [AUA.147.A.145\(b\)](#).
 7. a list of the maintenance training courses which form the extent of the approval.
 8. the maintenance training organisation's exposition amendment procedure.
 9. the maintenance training organisation's procedures, as required by point [AUA.147.A.130\(a\)](#).
 10. the maintenance training organisation's control procedure, as required by [AUA.147.A.145\(c\)](#), when authorised to conduct training, examination and assessments in locations different from those specified in point [AUA.147.A.145\(b\)](#).
 11. a list of the locations pursuant to point [AUA.147.A.145\(b\)](#).
 12. a list of organisations, if appropriate, as specified in point [AUA.147.A.145\(d\)](#).
- (b) The maintenance training organisation's exposition and any subsequent amendments shall be approved by the authority.



- (c) Notwithstanding point (b) minor amendments to the exposition may be approved through an exposition procedure (hereinafter called indirect approval).

AUA.147.A.145 Privileges of the maintenance training organisation

- (a) The maintenance training organisation may carry out the following as permitted by and in accordance with the maintenance training organisation exposition:
- (i) basic training courses to the Part AUA-66 syllabus, or part thereof;
 - (ii) aircraft type/task training courses in accordance with Part AUA-66;
 - (iii) the examination of students who attended the basic or aircraft type training course at the maintenance training organisation;
 - (iv) the examination of students who did not attend the aircraft type training course at the maintenance training organisation;
 - (v) the examination of students who did not attend the basic training course at the maintenance training organisation, provided that:
 - (1) the examination is conducted at one of the locations identified in the approval certificate, or
 - (2) if performed at locations not identified in the approval certificate, as permitted by points (b) and (c), either
 - the examination is provided through the DCAA Question Bank (DCAQB), or
 - in the absence of an DCAQB, the authority selects the questions for the examination;
 - (vi) the issue of certificates in accordance with [Appendix III](#) following successful completion of the approved basic or aircraft type training courses and examinations specified in points (a)(i), (a)(ii), (a)(iii), (a)(iv) and (a)(v), as applicable.
- (b) Training, knowledge examinations and practical assessments may only be carried out at the locations identified in the approval certificate and/or at any location specified in the maintenance training organisation exposition.
- (c) By derogation to point (b), the maintenance training organisation may only conduct training, knowledge examinations and practical assessments in locations different from the



point (b) locations in accordance with a control procedure specified in the maintenance training organisation exposition. Such locations need not be listed in the maintenance training organisation exposition.

- (d)
1. The maintenance training organisation may subcontract the conduct of basic theoretical training, type training and related examinations to a non maintenance training organisation only when under the control of the maintenance training organisation quality system.
 2. The subcontracting of basic theoretical training and examination is limited to [Part AUA-66, Appendix I](#), Modules 1, 2, 3, 4, 5, 6, 8, 9 and 10.
 3. The subcontracting of type training and examination is limited to powerplant and avionic systems.
- (e) An organisation may not be approved to conduct examinations unless approved to conduct the corresponding training.
- (f) By derogation from point (e), an organisation approved to provide basic knowledge training or type training may also be approved to provide type examination in the cases where type training is not required.

AUA.147.A.150 Changes to the maintenance training organisation

- (a) The maintenance training organisation shall notify the authority of any proposed changes to the organisation that affect the approval before any such change takes place, in order to enable the authority to determine continued compliance with this Part and to amend if necessary the maintenance training organisation approval certificate.
- (b) The authority may prescribe the conditions under which the maintenance training organisation may operate during such changes unless the authority determines that the maintenance training organisation approval must be suspended.



- (c) Failure to inform the authority of such changes may result in suspension or revocation of the maintenance training organisation approval certificate backdated to the actual date of the changes.

AUA.147.A.155 Continued validity

- (a) An approval shall be issued for an maximum of 3 years. It shall remain valid subject to:
1. the organisation remaining in compliance with this Part, and resolves any findings; and
 2. the authority being granted access to the organisation to determine continued compliance with this [Part AUA-147](#); and
 3. the certificate not being surrendered or revoked.
- (b) Upon surrender or revocation, the approval shall be returned to the authority.

AUA.147.A.160 Findings

- (a) A level 1 finding is one or more of the following:
1. any significant non-compliance with the examination process which would invalidate the examination(s),
 2. failure to give the authority access to the organisation's facilities during normal operating hours after two written requests,
 3. the lack of an accountable manager,
 4. a significant non-compliance with the training process.
- (b) A level 2 finding is any non-compliance with the training process other than level 1 findings.
- (c) After receipt of notification of findings, the holder of the maintenance training organisation approval shall define a corrective action plan and demonstrate corrective action to the satisfaction of the authority within a period agreed with this authority.



SUBPART C — APPROVED BASIC TRAINING COURSE

AUA.147.A.200 The approved basic training course

- (a) The approved basic training course shall consist of knowledge training, knowledge examination, practical training and a practical assessment.
- (b) The knowledge training element shall cover the subject matter for a category or subcategory aircraft maintenance license as specified in Part AUA-66.
- (c) The knowledge examination element shall cover a representative cross section of subject matter from the point (b) training element.
- (d) The practical training element shall cover the practical use of common tooling/equipment, the disassembly/assembly of a representative selection of aircraft parts and the participation in representative maintenance activities being carried out relevant to the particular Part AUA-66 complete module.
- (e) The practical assessment element shall cover the practical training and determine whether the student is at using tools and equipment and working in accordance with maintenance manuals.
- (f) The duration of basic training courses shall be in accordance with [Appendix I](#).
- (g) The duration of conversion courses between (sub)categories shall be determined through an assessment of the basic training syllabus and the related practical training needs.

AUA.147.A.205 Basic knowledge examinations

Basic knowledge examinations shall:

- (a) be in accordance with the standard defined in Part AUA-66.



- (b) be conducted without the use of training notes.
- (c) cover a representative cross section of subjects from the particular module of training completed in accordance with Part AUA-66.

AUA.147.A.210 Basic practical assessment

- (a) Basic practical assessments shall be carried out during the basic maintenance training course by the nominated practical assessors at the completion of each visit period to the practical workshops/maintenance facility.
- (b) The student shall achieve an assessed pass with respect to point [AUA.147.A.200\(e\)](#).

SUBPART D — AIRCRAFT TYPE/TASK TRAINING

AUA.147.A.300 Aircraft type/task training

A maintenance training organisation shall be approved to carry out Part AUA-66 aircraft type and/or task training subject to compliance with the standard specified in point [AUA.66.A.45](#).

AUA.147.A.305 Aircraft type examinations and task assessments

A maintenance training organisation approved in accordance with point [AUA.147.A.300](#) to conduct aircraft type training shall conduct the aircraft type examinations or aircraft task assessments specified in Part AUA-66 subject to compliance with the aircraft type and/or task standard specified in point [AUA.66.A.45](#) of Part AUA-66.



APPENDIX I — BASIC TRAINING COURSE DURATION

The minimum duration of a complete basic training course shall be as follows:

Basic Course	Duration (in hours)	Theoretical Training Ratio (in %)
B1.1	2400	50-60
B1.2	2000	50-60
B1.3	2400	50-60
B1.4	2400	50-60
B2	2400	50-60
B2L	1500 (*)	50-60
B3	1000	50-60

(*) This number of hours shall be increased as follows, depending on the additional system ratings selected:

System Rating	Duration (in hours)	Theoretical Training Ratio (in %)
COM/NAV	90	50-60
INSTRUMENTS	55	
AUTOFLIGHT	80	
SURVEILLANCE	40	
AIRFRAME SYSTEMS	100	



APPENDIX II — MAINTENANCE TRAINING ORGANISATION APPROVAL



Certificate of Approval

NAME OF THE MINISTRY RESPONSIBLE FOR AVIATION AFFAIRS

KINGDOM OF THE NETHERLANDS

ARUBA

CERTIFICATE OF APPROVAL

MAINTENANCE TRAINING AND EXAMINATION ORGANISATION APPROVAL CERTIFICATE

Reference: AUA.147.[XXX]

Pursuant to the State Decree AB 2019 no. 34 and Regulation (Regeling Bewijzen van bevoegdheid Vliegtuigtechnici, for the time being in force and subject to the condition specified below, the Department of Civil Aviation Aruba hereby certifies:

[COMPANY NAME AND ADDRESS]

as a maintenance training organisation in compliance with Section A of Part AUA-147 of Regeling Bewijzen van Bevoegdheid voor Vliegtuigtechnici, approved to provide training and conduct examinations listed in the approval schedule attached and to issue related certificates of recognition to students using the above references.

CONDITIONS:

1. This approval is limited to what is specified in the scope of work section of the approved maintenance training organisation exposition as referred to in Section A of Part AUA-147; and
2. this approval requires compliance with the procedures specified in the approved maintenance training organisation exposition; and



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3. this approval is valid whilst the approved maintenance training organisation remains in compliance with Part AUA-147 of Regeling Bewijzen van bevoegdheid voor Vliegtuigtechnici; and
4. subject to compliance with the foregoing conditions, this approval shall remain valid for an unlimited duration unless the approval has previously been surrendered, superseded, suspended or revoked.

This Approval is valid until:

Aruba, *[date]*

Certificate no.: AUA.147.*[XXX]*

On behalf of the Minister:

Approval Schedule dated:

[Name of Authorized Person]

Date of first issue:



Certificate of Approval

NAME OF THE MINISTRY RESPONSIBLE FOR AVIATION AFFAIRS

KINGDOM OF THE NETHERLANDS

ARUBA

MAINTENANCE TRAINING AND EXAMINATION APPROVAL SCHEDULE

MAINTENANCE TRAINING AND EXAMINATION ORGANISATION APPROVAL SCHEDULE

Reference: AUA.147.*[XXX]*

Organisation: *[COMPANY NAME AND ADDRESS]*

CLASS	LICENSE CATEGORY	LIMITATION	
BASIC (*)	B1 (*)	TB1.1 (*)	AEROPLANES TURBINE (*)
		TB1.2 (*)	AEROPLANES PISTON (*)



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		TB1.3 (*)	HELICOPTERS TURBINE (*)
		TB1.4 (*)	HELICOPTERS PISTON (*)
	B2 (*)/(***)	TB2 (*)	AVIONICS (**)
	B2L (*)	TB2L (*)	AVIONICS (indicate system rating) (*)
	B3 (*)	TB3 (*)	PISTON ENGINE NON-PRESSURISED AERO-PLANES 2 000 KG MTOM AND BELOW (*)
TYPE/TASK (*)	C (*)	T4 (*)	[QUOTE AIRCRAFT TYPE] (**)
	B1 (*)	T1 (*)	[QUOTE AIRCRAFT TYPE] (**)
	B2 (*)	T2 (*)	[QUOTE AIRCRAFT TYPE] (**)

Remarks:

This approval schedule is limited to those trainings and examinations specified in the scope of work section of the approved maintenance training organisation exposition.

Maintenance training organisation exposition reference:

Date of original issue:

Aruba, [date dd/mm/yyyy]

Amendment no.:

On behalf of the Minister:

Effective date:

Supersedes Approval Schedule dated:

[Name of Authorized Person]

(*) Delete as appropriate if the organisation is not approved.

(**) Complete with the appropriate rating and limitation

(***) The approval for the Basic B2 course/examination includes approval for B2L course/examination for all system ratings.



APPENDIX III — CERTIFICATES OF RECOGNITION

1. Basic Training/Examination

The basic training certificate template shall be used for recognition of completion of either the basic training or the basic examination, or both the basic training and basic training examinations.

The training certificate shall clearly identify each individual module examination by date passed together with the corresponding version of [Appendix I of Part AUA-66](#).

Page 1 of 1
Entity Logo (optional)
CERTIFICATE OF RECOGNITION
Reference: AUA.147.[XXXX]
The certificate of recognition is issued to:
[NAME]
[DATE and PLACE OF BIRTH]
By:
[COMPANY NAME AND ADDRESS]
Reference: AUA].147.[XXXX]
a maintenance training organisation approved to provide training and conduct examinations within its approval schedule and in accordance with Part AUA-147 of Regeling Bewijzen van bevoegdheid voor Vliegtuigtechnici.
This certificate confirms that the above named person either successfully passed the approved basic training course (**) or the basic examination (**) stated below in compliance with Regeling Bewijzen van bevoegdheid voor Vliegtuigtechnici for the time being in force.
[BASIC TRAINING COURSE (**)] or/and [BASIC EXAMINATION (**)]
[LIST OF PART AUA-66 MODULES/DATE OF EXAMINATION PASSED]



Date: dd / mm / yyyy

Signed:

For: [COMPANY NAME]

(**) Delete as appropriate if the organisation is not approved.



2. Type Training/Examination (Appendix III to Part AUA-147)

The type training certificate template shall be used for recognition of completion of either the theoretical elements or the practical elements, or both the theoretical and practical elements of the type rating training course.

The certificate shall indicate the airframe/engine combination for which the training was imparted.

The appropriate references shall be deleted as applicable and the course type box shall detail whether only the theoretical elements or the practical elements were covered or whether theoretical and practical elements were covered.

The training certificate shall clearly identify if the course is a complete course or a partial course (such as an airframe or powerplant or avionic/electrical course) or a difference course based upon the applicant previous experience, for instance A340 (CFM) course for A320 technicians. If the course is not a complete one, the certificate shall identify whether the interface areas have been covered or not.

Page 1 of 1	
Entity Logo (optional)	CERTIFICATE OF RECOGNITION
	Reference: AUA147.[XXXX]
The certificate of recognition is issued to:	
	[NAME]
	[DATE and PLACE OF BIRTH]
By:	
	[COMPANY NAME AND ADDRESS]
	Reference: AUA.147.[XXXX]
a maintenance training organisation approved to provide training and conduct examinations within its approval schedule and in accordance with Part AUA-147) of Regeling Bewijzen van bevoegdheid Vliegtechnici.	
This certificate confirms that the above named person either successfully passed the theoretical (**) and/or the practical elements (**) of the approved type training course stated below and the related examinations in compliance with Regeling Bewijzen van bevoegdheid Vliegtechnici for the time being in force.	



<p>[AIRCRAFT TYPE TRAINING COURSE (**)]</p> <p>[START and END DATES]</p> <p>[SPECIFY THEORETICAL ELEMENTS AND/OR PRACTICAL ELEMENTS]</p> <p>and/or</p> <p>[AIRCRAFT TYPE EXAMINATION (**)]</p> <p>[END DATE]</p>
<p>Date: dd / mm / yyyy</p> <p>Signed:</p> <p>For: [COMPANY NAME]</p>

(**) Delete as appropriate.