MODULE 5. DIGITAL TECHNIQUES/ELECTRONIC INSTRUMENT SYSTEMS

	LEVEL				
	A	B1-1 B1-3	B1-2 B1-4	B2	B3
5.1 **Electronic Instrument Systems**	1	2	2	3	1
Typical systems arrangements and cockpit layout of electronic instrument systems.					
5.2 **Numbering Systems**	—	1	—	2	—
Numbering systems: binary, octal and hexadecimal;					
Demonstration of conversions between the decimal and binary, octal and hexadecimal systems and vice versa.					
5.3 **Data Conversion**	—	1	—	2	—
Analogue Data, Digital Data;					
Operation and application of analogue to digital, and digital to analogue converters, inputs and outputs, limitations of various types.					
5.4 **Data Buses**	—	2	—	2	—
Operation of data buses in aircraft systems, including knowledge of ARINC and other specifications.					
Aircraft Network/Ethernet.					
5.5 **Logic Circuits**					
(a) Identification of common logic gate symbols, tables and equivalent circuits;	—	2	—	2	1
Applications used for aircraft systems, schematic diagrams.					
(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);	1	2	—	—	—
Computer technology (as applied in aircraft systems).					
(b) Computer related terminology;	—	—	—	2	—
Operation, layout and interface of the major components in a micro computer including their associated bus systems;					
Information contained in single and multiaddress instruction words;					
Memory associated terms;					
Operation of typical memory devices;					
Operation, advantages and disadvantages of the various data storage systems.					

	LEVEL				
	A	B1-1 B1-3	B1-2 B1-4	B2	B3
5.7 **Microprocessors**	—	—	—	2	—
Functions performed and overall operation of a microprocessor;					
Basic operation of each of the following microprocessor elements: control and processing unit, clock, register, arithmetic logic unit.					
5.8 **Integrated Circuits**	—	—	—	2	—
Operation and use of encoders and decoders;					
Function of encoder types;					
Uses of medium, large and very large scale integration.					
5.9 **Multiplexing**	—	—	—	2	—
Operation, application and identification in logic diagrams of multiplexers and demultiplexers.					
5.10 **Fibre Optics**	—	1	1	2	—
Advantages and disadvantages of fibre optic data transmission over electrical wire propagation;					
Fibre optic data bus;					
Fibre optic related terms;					
Terminations;					
Couplers, control terminals, remote terminals;					
Application of fibre optics in aircraft systems.					
5.11 **Electronic Displays**	—	2	1	2	1
Principles of operation of common types of displays used in modern aircraft, including Cathode Ray Tubes, Light Emitting Diodes and Liquid Crystal Display.					
5.12 **Electrostatic Sensitive Devices**	1	2	2	2	1
Special handling of components sensitive to electrostatic discharges;					
Awareness of risks and possible damage, component and personnel anti-static protection devices.					
5.13 **Software Management Control**	—	2	1	2	1
Awareness of restrictions, airworthiness requirements and possible catastrophic effects of unapproved changes to software programmes.					

	LEVEL				
	A	B1-1 B1-3	B1-2 B1-4	B2	B3
5.14 **Electromagnetic Environment**	—	2	2	2	1
Influence of the following phenomena on maintenance practices for electronic system: EMC-Electromagnetic Compatibility EMI-Electromagnetic Interference HIRF-High Intensity Radiated Field Lightning/lightning protection.					
5.15 **Typical Electronic/Digital Aircraft Systems**	—	2	2	2	1
General arrangement of typical electronic/digital aircraft systems and associated BITE (Built In Test Equipment) such as: (a) *For B1 and B2 only:* ACARS-ARINC Communication and Addressing and Reporting System EICAS-Engine Indication and Crew Alerting System FBW-Fly-by-Wire FMS-Flight Management System IRS-Inertial Reference System; (b) *For B1, B2 and B3:* ECAM-Electronic Centralised Aircraft Monitoring EFIS-Electronic Flight Instrument System GPS-Global Positioning System TCAS-Traffic Alert Collision Avoidance System Integrated Modular Avionics Cabin Systems Information Systems.					

MODULE 6. MATERIALS AND HARDWARE

	LEVEL			
	A	B1	B2	B3
6.1 **Aircraft Materials — Ferrous**				
(a) Characteristics, properties and identification of common alloy steels used in aircraft; Heat treatment and application of alloy steels.	1	2	1	2