

## MODULE 5 – DIGITAL TECHNIQUES ELECTRONIC INSTRUMENT SYSTEMS

Sl. No.	Topics to be Covered		Level
			B2
5.1.	<b>ELECTRONIC INSTRUMENT SYSTEMS</b>		
	a.	Typical systems arrangements and cockpit layout of electronic instrument systems.	3
5.2.	<b>NUMBERING SYSTEM</b>		
	a.	Numbering systems: binary, octal and hexadecimal;	2
	b.	Demonstration of conversions between the decimal and binary, octal and hexadecimal systems and vice versa.	
5.3.	<b>DATA CONVERSION</b>		
	a.	Analogue Data, Digital Data;	2
	b.	Operation and application of analogue to digital, and digital to analogue converters, inputs and outputs, limitations of various types.	
5.4.	<b>DATA BUSES</b>		
	a.	Identification of common logic gate symbols, tables and equivalent circuits;	2
	b.	Applications used for aircraft systems, schematic diagrams.	
	c.	Interpretation of logic diagrams.	
5.5.	<b>LOGIC CIRCUITS</b>		
	a.	Identification of common logic gate symbols, tables and equivalent circuits;	2
	b.	Applications used for aircraft systems, schematic diagrams.	
	c.	Interpretation of logic diagrams.	
5.6.	<b>BASIC COMPUTER STRUCTURE</b>		
	a.	Computer related terminology;	2
	b.	Operation, layout and interface of the major components in a microcomputer including their associated bus systems;	
	c.	Information contained in single and multi-address instruction words;	
	d.	Memory associated terms;	
	e.	Operation of typical memory devices;	
	f.	Operation, advantages and disadvantages of the various data storage systems	
5.7.	<b>MICROPROCESSORS</b>		
	a.	Functions performed and overall operation of a microprocessor;	2
	b.	Basic operation of each of the following microprocessor elements: control and processing unit, clock, register, arithmetic logic unit.	
5.8.	<b>INTEGRATED CIRCUITS</b>		
	a.	Operation and use of encoders and decoders	2
	b.	Function of encoder types	
	c.	Uses of medium, large and very large-scale integration.	

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<b>5.9.</b>	<b>MULTIPLEXING</b>	
	a. Operation, application and identification in logic diagrams of multiplexers and de-multiplexers.	2
<b>5.10.</b>	<b>FIBRE OPTICS</b>	
	a. Advantages and disadvantages of Fibre optic data transmission over electrical wire propagation;	2
	b. Fibre optic data bus;	
	c. Fibre optic related terms;	
	d. Terminations;	
	e. Couplers, control terminals, remote terminals;	
	f. Application of Fibre optics in aircraft systems.	
<b>5.11.</b>	<b>ELECTRONIC DISPLAYS</b>	
	a. Principles of operation of common types of displays used in modern aircraft, including Cathode Ray Tubes, Light Emitting Diodes and Liquid Crystal Display.	2
<b>5.12.</b>	<b>ELECTROSTATIC SENSITIVE DEVICES</b>	
	a. Special handling of components sensitive to electrostatic discharges;	2
	b. Awareness of risks and possible damage, component and personnel anti-static protection devices.	
<b>5.13.</b>	<b>SOFTWARE MANAGEMENT CONTROL</b>	
	a. Awareness of restrictions, airworthiness requirements and possible catastrophic effects of unapproved changes to software programmes.	2
<b>5.14.</b>	<b>ELECTROMAGNETIC ENVIRONMENT</b>	
	a. Influence of the following phenomena on maintenance practices for electronic system:	2
	i. EMC-Electromagnetic Compatibility	
	ii. EMI-Electromagnetic Interference	
	iii. HIRF-High Intensity Radiated Field	
	iv. Lightning/ Lightning protection	
<b>5.15.</b>	<b>TYPICAL ELECTRONIC/ DIGITAL AIRCRAFT SYSTEMS</b>	
	a. General arrangement of typical electronic/digital aircraft systems and associated BITE (Built in Test Equipment) testing such as	2
	i. ACARS-ARINC Communication and Addressing and Reporting System	
	ii. EICAS-Engine Indication and Crew Alerting System	
	iii. FBW-Fly by Wire	
	iv. FMS-Flight Management System	
	v. IRS-Inertial reference system	
	vi. ECAM-Electronic Centralised Aircraft Monitoring	
	vii. EFIS-Electronic Flight Instrument System	

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Sl. No.	Topics to be Covered			Level
				B2
5.15. Cont...	a. Cont..	viii.	GPS-Global Positioning System	2
		ix.	TCAS-Traffic Collision Avoidance system	
		x.	Integrated modular Avionica	
		xi.	Cabin System	
		xii.	Information system	

