PRTC C1602: Cockpit Technology

Module Title:	Cockpit Technology
Language of Instruction:	English

Credits:	10

NFQ Level:	6

Module Delivered In	1 programme(s)

Teaching & Learning Strategies:	A combination of lectures, class discussion, tutorial, laboratory exercises and demonstrations will be used. Emphasis will be placed on active learning including problem and/or project based learning.

Module Aim:	To give students an understanding of digital electronics and avionics systems. Provide an appreciation of how the combination of digital sub-circuits form an overall functioning avionic system.

Learning Outcomes	
On successful completion of this module the learner should be able to:	
LO1	Classify the different numbering systems and their applications in digital electronics.
LO2	Evaluate the different conversion techniques for analogue to digital transmission using different types of transmission media.
LO3	Identify digital systems schematics and test the operation of these systems.
LO4	Describe the principle of operation of different microprocessors and demonstrate how these devices are interfaced to peripherals.
LO5	Perform fundamental calculations on a range of avionic circuits

Pre-requisite learning
Module Recommendations *This is prior learning (or a practical skill) that is recommended before enrolment in this module.*
No recommendations listed
Incompatible Modules *These are modules which have learning outcomes that are too similar to the learning outcomes of this module.*
No incompatible modules listed
Co-requisite Modules
No Co-requisite modules listed
Requirements *This is prior learning (or a practical skill) that is mandatory before enrolment in this module is allowed.*
No requirements listed

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Module Content & Assessment

Indicative Content
Numbering Systems and digital electronics Numbering Systems: Binary, Octal and Hexadecimal; Demonstration of conversions between Decimal and Binary, Octal and Hexadecimal systems and vice versa
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.
Logic Circuits Identification of common logic gate symbols, tables and equivalent circuits; Applications used for aircraft systems, schematic diagrams. Interpretation of logic diagrams.
Basic Computer Structure 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). 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.
Microprocessors 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
Integrated Circuits Operation and use of encoders and decoders; Function of encoder types
Multiplexing Operation, application, and identification in logic diagrams of multiplexers and demultiplexers.
Software Management Control Awareness of restrictions, airworthiness requirements and possible catastrophic effects of unapproved changes to software programmes
Typical Electronic/Digital Aircraft Systems Cockpit layout, general arrangement of typical electronic/digital Aircraft Systems and associated BITE (Built In Test Equipment) testing such as: ACARS-ARINC Communication and Addressing and Reporting System, ECAM-Electronic Centralised Aircraft Monitoring, ADS,EFIS-Electronic Flight Instrument System, EICAS-Engine Indication and Crew Alerting System, FBW-Fly by Wire, FMS-Flight Management System, GPS-Global Positioning System, IRS-Inertial Reference System, TCAS-Traffic Alert Collision Avoidance System. MEMS sensors
Data-buses Operation of data bus in aircraft systems including knowledge of ARINC and other applications. Aircraft Network / Ethernet
Transistors Transistor symbols; Component description and orientation; Transistor characteristics and properties. Construction and operation of PNP and NPN transistors; Operation of Transistor Amplifiers; Construction and operation of FETs.

Assessment Breakdown	%
Continuous Assessment	10.00%
Practical	30.00%
End of Module Formal Examination	60.00%

Continuous Assessment

Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Other	Various assessments to reinforce learnings given throughout the semester.	1,2,4	10.00	Ongoing

No Project

Practical

Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Practical/Skills Evaluation	A set of practical exercises to complement the theory elements of the module.	2,3,4,5	30.00	n/a

End of Module Formal Examination

Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Formal Exam	Final Exam	1,2,4,5	60.00	End-of-Semester

Continuous Assessment				
Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Other	Various assessments to reinforce learnings given throughout the semester.	1,2,4	10.00	Ongoing

No Project

Practical				
Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Practical/Skills Evaluation	A set of regular practical exercises to complement the theory elements of the module.	2,3,4,5	30.00	n/a

End of Module Formal Examination				
Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Formal Exam	n/a	1,2,4,5	60.00	End-of-Semester

SETU Carlow Campus reserves the right to alter the nature and timings of assessment

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Module Workload

Workload: Full Time		
Workload Type	*Frequency*	*Average Weekly Learner Workload*
Lecture	12 Weeks per Stage	5.00
Laboratory	12 Weeks per Stage	4.00
Independent Learning Time	15 Weeks per Stage	9.47
	Total Hours	250.00

Module Delivered In

Programme Code	Programme	Semester	Delivery
CW_EEPLT_D	Bachelor of Science in Pilot Studies	2	Mandatory