DIGT H2602: Digital Electronic Systems

Module Title:	Digital Electronic Systems
Language of Instruction:	English

Credits:	10

NFQ Level:	6

Module Delivered In	No Programmes

Teaching & Learning Strategies:	(a) A combination of lectures, class discussion, tutorials, practicals and demonstrations will be used. (b) Particular emphasis will be placed on active learning including problem/project based learning

Module Aim:	To introduce students to the fundamentals of digital electronic systems and microprocessor hardware

Learning Outcomes	
On successful completion of this module the learner should be able to:	
LO1	Describe the operation of, and analyze using Boolean algebra techniques, combinational and sequential components and circuits
LO2	Explain the operation of a microprocessor-based system including operation of bus, memory and input/output.
LO3	Design and implement significant combinatorial digital circuits using conventional gates and logic components.
LO4	Analyse a problem scenario leading to the design and implementation of a digital logic based solution using appropriate techniques.
LO5	Demonstrate the ability to work effectively in a group, undertaking personal, administrative and organisational activities associated with an efficient team.

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.*
“Introduction to Electronics” (section 9.1.1) or equivalent; “Principles of Electricity” (section 9.1.2) or equivalent; “Mathematics 1” (section 0.1.5 or equivalent

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Module Content & Assessment

Indicative Content
Logic Gates CMOS and TTL logic gates. Gate minimization using Karnaugh maps and Boolean Algebra
Number Systems Numbers Systems including 2's complement, floating point.
Multivibrators Bi Stable, Astable and monostable Multivibrators at gate level and using a 555 timer
Sequential logic design Sequential logic - counters, state machines etc
Assembly code Introduction to assembly code instructions.
Memory Semiconductor memory
Embedded C Introduction to Embedded C for microcontrollers.
Timing Considerations Static Timing analysis for small gate level designs.
Microprocessors Microprocessor architecture
Memory Addressing Memory Addressing
Semiconductor memory SRAM, DRAM, ROM and FLASH
Displays LCD, CRT and Plasma technologies

Assessment Breakdown	%
Continuous Assessment	20.00%
Practical	20.00%
End of Module Formal Examination	60.00%

Continuous Assessment

Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Other	Students will be assigned a number of assignments as part of the assessment of this module. Students may be asked to complete assignments during tutorials or as homework	1,2,3,4,5	20.00	n/a

No Project

Practical

Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Practical/Skills Evaluation	Students will complete practical assignments during the course of the module. Students will be required to maintain a laboratory logbook and write a brief report on each assignment. A project based learning approach will be used; hence some assignments may take several weeks to complete.	1,3,4	10.00	n/a
Practical/Skills Evaluation	Each student will complete two formal practical tests. A mark of up to 5% of the overall mark will be assigned for each test.	1,3	10.00	n/a

End of Module Formal Examination

Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Formal Exam	A final written examination will assess the learning outcomes to the full extent	1,2,3	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	Every Week	2.00
Practicals	Every Week	2.00
Tutorial	Every Week	1.00
	Total Hours	5.00