DIGT C2602: Analogue and Digital Electronics 1

Module Title:	Analogue and Digital Electronics 1
Language of Instruction:	English

Credits:	10

NFQ Level:	6

Module Delivered In	3 programme(s)

Teaching & Learning Strategies:	a) This will take the form of problem-based learning during tutorials and practical classes. (b) An emphasis will be placed on relating individual circuits to useful application systems both in theory and practical classes. (c) Circuit simulation software may be used in the problem-solving sessions to validate student solutions.

Module Aim:	To give the students the knowledge, competencies and skills to analyse commonly used analogue and digital systems.

Learning Outcomes	
On successful completion of this module the learner should be able to:	
LO1	Understand and analyse the operation of common amplifiers and electronic switches using BJT transistors
LO2	Understand and analyse the operation of common amplifiers and electronic switches using FETs transistors
LO3	Undertand and explain the operation of common aplifiers using operational amplifiers.
LO4	Design and implement significant combinatorial digital circuits using conventional gates and logic components.
LO5	Analyse a problem scenario leading to the design and implementation of a digital logic based solution using appropriate techniques.

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
Bipolar Transistor Amplifiers Describe the operation of basic BJT bias circuits. - Explain the meaning of transistor parameters and characteristics. - Describe and analyse the operation of a common-emitter amplifier. - Describe and analyse the operation of a common-collector amplifier. - Describe and analyse the operation of a common-base amplifier. - Explain how a transistor can be used as a switch.
FET Transistor Amplifiers Describe the operation of basic JFET and MOSFET bias circuits. - Explain the meaning of transistor parameters and characteristics. - Describe and analyse the operation of a common-source amplifier. - Describe and analyse the operation of a common-drain amplifier. - Describe and analyse the operation of a common-gate amplifier. - Explain how a transistor can be used as a switch.
Operational Amplifiers Describe the operation of a differential amplifier. - Describe the effects of negative feedback in op-amp circuits. - Calculate the input and output impedances and gains of basic op-amp configurations. - Describe the open and closed loop responses of op-amps. - Discuss the concepts of positive feedback and stability in op-amp circuits. - Discuss the parameters of typical commercial operational amplifiers.
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.
Sequential logic design Sequential logic - counters, state machines etc
Memory Semiconductor memory
Timing Considerations Static Timing analysis for small gate level designs.
Memory Addressing Memory Addressing

Assessment Breakdown	%
Continuous Assessment	30.00%
Practical	20.00%
End of Module Formal Examination	50.00%

Continuous Assessment

Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Other	Class Test, Mini Project	1,2,3,4,5	30.00	n/a

No Project

Practical

Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Practical/Skills Evaluation	Laboratory Experiments, Problem Solving practical exercises	1,2,3,4,5	20.00	n/a

End of Module Formal Examination

Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Formal Exam	Formal written exam	1,2,3,4	50.00	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	6.00
Laboratory	Every Week	4.00
Independent Learning Time	Every Week	3.00
	Total Hours	13.00

Module Delivered In

Programme Code	Programme	Semester	Delivery
CW_EEBEE_B	Bachelor of Engineering (Honours) in Biomedical Electronics	3	Mandatory
CW_EESYS_B	Bachelor of Engineering (Honours) in Electronic Engineering	3	Mandatory
CW_EEBEE_D	Bachelor of Engineering in Biomedical Electronics	3	Mandatory