ELEC C1612: Electrical and Electronic Circuits

Module Title:	Electrical and Electronic Circuits
Language of Instruction:	English

Credits:	10

NFQ Level:	6

Module Delivered In	5 programme(s)

Teaching & Learning Strategies:	A combination of lectures, tutorials, class-based tasks and laboratory exercises will be used. Particular emphasis will be placed on active learning including problem/project-based learning. The practical sessions will be used to back up the theory. The Institute VLE will be used to interactively communicate with students.

Module Aim:	To develop the student's ability to analyse the behaviour of dc electric circuits using a variety of circuit analysis methods. To apply circuit theorems for the analysis of complex electric and electronic circuits. To introduce students to ac signals and the circuit analysis of ac circuits. To give students an appreciation of how different electronic sub circuits are combined to form a complete electronic system.

Learning Outcomes	
On successful completion of this module the learner should be able to:	
LO1	Analyse the operation of common electrical and electronic circuits.
LO2	Perform calculations to permit the analysis of both DC and AC circuits.
LO3	Design, simulate, build and take accurate measurements in electrical/electronic circuits.
LO4	Work in an electronic laboratory with due regard for his/her safety and that of others.

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
Circuit Theorems and Conversions Source Conversions. The Superposition, Thevenin and Maximum Power Transfer Theorems.
Circuit Analysis Methods Branch Current Method. Loop Current Method. Node Voltage Method.
Magnetism and Electromagnetism Electromagnetic Induction and Applications.
Addition of sinewaves Analysis of AC Circuits using Phasors.
Capacitors Operation and function of capacitors in DC and AC circuits.
Boolean Algebra Gate minimization using Boolean algebra rules.
Timing Diagrams Timing diagrams for combinational and sequential digital circuits.
Counters Synchronous and Asynchronous Counters.
Decoders and Multiplexers Decoders and Multiplexers.
Microprocessor Architectures Microprocessor Architectures.
semiconductor Bipolar Junction Transistor Analysis
Filters Basic Analogue Filter Characteristics
Operational Amplifiers Introduction to Operational Amplifiers
AC to DC converter Designing a AC to DC converter using rectifiers, transformers, filters and regulators.

Assessment Breakdown	%
Continuous Assessment	40.00%
Practical	30.00%
End of Module Formal Examination	30.00%

Continuous Assessment

Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Other	Several in-class and/or online assessments/tasks.	1,2,3	40.00	Ongoing

No Project

Practical

Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Practical/Skills Evaluation	The student will complete practical assignments during the module and write a report on each assignment.	1,3,4	20.00	Every Week
Practical/Skills Evaluation	Learners will complete practical tasks for summative assessment	1,3,4	10.00	End-of-Semester

End of Module Formal Examination

Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Formal Exam	The written examination, at the end of the module, will evaluate the extent of the student's knowledge of the learning outcomes	1,2,3	30.00	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	4.00
Lecture	Every Week	2.00
Practicals	Every Week	4.00
Independent Learning	Every Week	6.00
	Total Hours	16.00

Module Delivered In

Programme Code	Programme	Semester	Delivery
CW_EEBEE_B	Bachelor of Engineering (Honours) in Biomedical Electronics	2	Mandatory
CW_EESYS_B	Bachelor of Engineering (Honours) in Electronic Engineering	2	Mandatory
CW_EEROB_B	Bachelor of Engineering (Honours) in Robotics and Automated Systems	2	Mandatory
CW_EEBEE_D	Bachelor of Engineering in Biomedical Electronics	2	Mandatory
CW_EEROO_D	Bachelor of Engineering in Robotics and Automated Systems	2	Mandatory