ELEC C1611: Electrical and Electronic Fundamentals

Module Title:	Electrical and Electronic Fundamentals
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 give the students an understanding of the concept of an electric circuit and its associated parameters. To develop their ability to apply circuit laws to simplify basic electric circuits. To introduce students to the field of electronics and understand the properties of electronic devices.

Learning Outcomes	
On successful completion of this module the learner should be able to:	
LO1	Demonstrate an understanding of electric circuits.
LO2	Describe the characteristics of basic electronic components and the functional operation of common electronic systems.
LO3	Describe the characteristics of common electronic digital and analogue signals.
LO4	Perform calculations to permit the analysis of basic electrical (DC) and electronic circuits.
LO5	Using schematic diagrams, build and test electrical and electronic circuits in a laboratory environment.

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
Quantities and Units Units of Measurement and Metric Prefixes.
Voltage, Current and Resistance The Electric Circuit. Basic Circuit Measurements.
Ohm's Law The Relationship of Current, Voltage, and Resistance.
Energy and Power Power in an Electric Circuit. Resistor Power Ratings.
Series Circuits Resistors in Series. Kirchhoff's Voltage Law. Troubleshooting.
Parallel Circuits Resistors in Parallel. Kirchhoff's Current Law. Parallel Circuit Applications.
Series-Parallel Circuits Analysis of Series-Parallel Resistive Circuits. Ladder Networks.
Block Diagrams System design using block diagrams.
Signals Generation and Characteristics of signals.
Semiconductors Basic semiconductor devices e.g. diodes, zener diodes
AC to DC Conversion Designing a AC to DC converter using rectifiers, transformers, filters and regulators.
Number systems Binary and Hexadecimal Number Systems
Logic Gates Digital Schematic design using logic gates
Timing Diagrams Timing diagrams for combinational and sequential digital circuits.
Flip Flops D, JK, SR flip flop and latches

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.	1,2,3,4	40.00	n/a

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.	1,4,5	20.00	Every Week
Practical/Skills Evaluation	Learners will complete practical tasks for summative assessment.	1,4,5	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	1,2,3,4	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	1	Mandatory
CW_EESYS_B	Bachelor of Engineering (Honours) in Electronic Engineering	1	Mandatory
CW_EEROB_B	Bachelor of Engineering (Honours) in Robotics and Automated Systems	1	Mandatory
CW_EEBEE_D	Bachelor of Engineering in Biomedical Electronics	1	Mandatory
CW_EEROO_D	Bachelor of Engineering in Robotics and Automated Systems	1	Mandatory