

Module Title:	Electrical Science
Language of Instruction:	English
Credits:	5
NFQ Level:	6
Module Delivered In	No Programmes
Teaching & Learning Strategies:	This module will be delivered using lectures along with a series of laboratory exercises/demonstrations to support the theory.
Module Aim:	To introduce students to the basic principles of electrical science theory and enable them to perform calculations and measurements on electrical circuits.
Learning Outcomes	
<i>On successful completion of this module the learner should be able to:</i>	
LO1	Recognise common electrical components and instruments; define quantities, symbols, units and notation.
LO2	Describe the electrical properties of components and materials with respect to charge, voltage, current and resistance.
LO3	Apply circuit theory principles to solve problems relating to series and parallel electrical circuits.
LO4	Complete laboratory experiments using appropriate apparatus and test equipment; report on the findings.
LO5	Analyse the transient behaviour of capacitors and inductors.
Pre-requisite learning	
Module Recommendations <i>This is prior learning (or a practical skill) that is recommended before enrolment in this module.</i>	
No recommendations listed	
Incompatible Modules <i>These are modules which have learning outcomes that are too similar to the learning outcomes of this module.</i>	
No incompatible modules listed	
Co-requisite Modules	
No Co-requisite modules listed	
Requirements <i>This is prior learning (or a practical skill) that is mandatory before enrolment in this module is allowed.</i>	
No requirements listed	

Module Content & Assessment

Indicative Content

Electrical Components, Instruments and Experiments

• Electrical components, measurement instruments and schematic symbol representation. • Quantities, SI units and symbols used. • Scientific notation, engineering notation and metric prefix notation. • Electrical safety. • Operation of apparatus and electrical equipment including breadboard, power supplies and digital multi-meters. • Practical laboratory experiments based on class theory.

Electrical Science Theory and Applications

• Electrical properties of materials with respect to atoms, charge, voltage, current and resistance. • Conductors, semiconductors, and insulators with examples of each. • Resistivity and related problems. • Resistors, Capacitors and Inductors. • Ohm's law. • Energy and power (Watts Law). • The kilowatt hour (kWh) and related problems. • Power rating of resistors. • Kirchhoff's circuit laws.

Circuit Analysis

• Series, parallel and series-parallel circuit analysis. • Total power calculations. • Wheatstone bridge. • Transient behaviour of capacitors and inductors (RC and LC time constant).

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
Examination	Combination of written or supervised on-line assessments.	1,2	20.00	Week 7

No Project

Practical

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Practical/Skills Evaluation	Series of Laboratory Exercises	1,4	20.00	Sem 1 End

End of Module Formal Examination

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Formal Exam	A final written examination will assess the extent to which the student has achieved the learning outcomes.	1,2,3,5	60.00	End-of-Semester

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

Module Workload

Workload: Full Time		
<i>Workload Type</i>	<i>Frequency</i>	<i>Average Weekly Learner Workload</i>
Lecture	Every Week	1.00
Laboratory	Every Week	0.50
Estimated Learner Hours	Every Week	2.00
Total Hours		3.50

