

<b>Title:</b>	Electrical Science - AC Theory <b>APPROVED</b>
<b>Long Title:</b>	Electrical Science - AC Theory
<b>Module Code:</b>	ELEC6019
<b>Credits:</b>	5
<b>NFQ Level:</b>	Fundamental
<b>Field of Study:</b>	Electrical Engineering
<b>Valid From:</b>	Semester 1 - 2014/15 ( September 2014 )
<b>Module Delivered in</b>	<a href="#">2 programme(s)</a>
<b>Module Coordinator:</b>	JOSEPH CONNELL
<b>Module Author:</b>	NOEL MULCAHY
<b>Module Description:</b>	An introduction to AC theory including Inductance, Capacitance. An examination of RMS Values. The application of basic formulae and analysis techniques to these circuits.
<b>Learning Outcomes</b>	
<i>On successful completion of this module the learner will be able to:</i>	
LO1	apply single phase AC theory to the solution of practical problems involving electrical AC quantities.
LO2	describe and define electrical, magnetic and physical terms and quantities and perform fundamental calculations involving these quantities.
LO3	design circuits and examine component behaviour to determine parameters within circuits.
LO4	make meaningful measurements on electrical and interpret the information from these measurements to access the circuit and fault find
LO5	build and construct series and parallel circuits in a electrically safe manner.
<b>Pre-requisite learning</b>	
<b>Module Recommendations</b>	
<i>This is prior learning (or a practical skill) that is strongly recommended before enrolment in this module. You may enrol in this module if you have not acquired the recommended learning but you will have considerable difficulty in passing (i.e. achieving the learning outcomes of) the module. While the prior learning is expressed as named CIT module(s) it also allows for learning (in another module or modules) which is equivalent to the learning specified in the named module(s).</i>	
No recommendations listed	
<b>Incompatible Modules</b>	
<i>These are modules which have learning outcomes that are too similar to the learning outcomes of this module. You may not earn additional credit for the same learning and therefore you may not enrol in this module if you have successfully completed any modules in the incompatible list.</i>	
No incompatible modules listed	
<b>Co-requisite Modules</b>	
No Co-requisite modules listed	
<b>Requirements</b>	
<i>This is prior learning (or a practical skill) that is mandatory before enrolment in this module is allowed. You may not enrol on this module if you have not acquired the learning specified in this section.</i>	
No requirements listed	
<b>Co-requisites</b>	
No Co Requisites listed	

**Module Content & Assessment**

**Indicative Content**

**Sinusoidal Waveforms**

R.M.S. values. Solution of AC circuits involving resistance, inductance and capacitance. Solution of networks involving simple series or parallel combinations of these. Work and Energy. Power - True Power, Apparent Power and Reactive Power.

**Electrolysis**

Primary and secondary cells; characteristics of lead acid and nickel alkaline cells.

**Measurements**

Techniques for measurement of voltage, current, resistance and power. Wheatstone Bridge; potentiometer. Moving coil meter; moving iron meter; dynamometer; electronic voltmeter; thermocouple instruments; digital meters. Range extension: multi-meters. Errors in measurement.

**Mechanics**

Vectors and scalars. Dynamics - Newton's Laws of motion, conservation of linear momentum. Work, energy, power, friction and efficiency. Linear and rotational motion, moments, couple and torque.

**Practical exploration of A.C. Electrical Circuits**

AC Waveforms, AC values. Resistance, Inductance, Capacitance and Impedance in AC Circuits. Resonance in AC Circuits.

Assessment Breakdown	%
Course Work	50.00%
End of Module Formal Examination	50.00%

**Course Work**

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Practical/Skills Evaluation	Lab Experiments	1,2,3,4,5	30.0	Every Week
Short Answer Questions	Mid Term Examination	1,2,3	20.0	Week 7

**End of Module Formal Examination**

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Formal Exam	End-of-Semester Final Examination	1,2,3	50.0	End-of-Semester

**Reassessment Requirement**

**Repeat examination**

Reassessment of this module will consist of a repeat examination. It is possible that there will also be a requirement to be reassessed in a coursework element.

The institute reserves the right to alter the nature and timings of assessment

**Module Workload**

**Workload: Full Time**

<i>Workload Type</i>	<i>Workload Description</i>	<i>Hours</i>	<i>Frequency</i>	<i>Average Weekly Learner Workload</i>
Lecture	Lecture on basic AC Theory	2.0	Every Week	2.00
Independent & Directed Learning (Non-contact)	Re-visit notes and solve problems set	3.0	Every Week	3.00
Lab	Weekly assessment of practical competency through laboratory-based assignments with reports.	2.0	Every Week	2.00
Total Hours				7.00
Total Weekly Learner Workload				7.00
Total Weekly Contact Hours				4.00

**This module has no Part Time workload.**

Module Resources
<i>Recommended Book Resources</i>
<ul style="list-style-type: none"> <li>• John Bird 2010, <i>Electrical Circuit Theory and Technology</i>, 4th Ed., Routledge [ISBN: 978-1856177702]</li> </ul>
<i>Supplementary Book Resources</i>
<ul style="list-style-type: none"> <li>• Edward Hughes, Dr John Hiley et al 2012, <i>Electrical &amp; Electronic Technology</i>, 11th Ed., Pearson [ISBN: 978-0273755104]</li> <li>• Christopher R. Robertson 2008, <i>Fundamental electrical and electronic principles</i>, 3rd Ed., Newnes [ISBN: 978-0750687379]</li> <li>• Christopher R. Robertson 2008, <i>Further electrical and electronic principles</i>, 3rd Ed., Newnes Oxford [ISBN: 978-0750687478]</li> </ul>
<i>This module does not have any article/paper resources</i>
<i>This module does not have any other resources</i>

Module Delivered in			
Programme Code	Programme	Semester	Delivery
CR_EELEC_7	<a href="#">Bachelor of Engineering in Electrical Engineering</a>	2	Mandatory
CR_EELEC_6	<a href="#">Higher Certificate in Engineering in Electrical Engineering</a>	2	Mandatory