

Title:	Electrical Circuit Analysis APPROVED
Long Title:	Electrical Circuit Analysis
Module Code:	ELEC6015
Credits:	5
NFQ Level:	Fundamental
Field of Study:	Electrical Engineering
Valid From:	Semester 1 - 2014/15 (September 2014)
Module Delivered in	3 programme(s)
Module Coordinator:	JOSEPH CONNELL
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Module Description:	This module introduces the fundamentals of electrical engineering principles and provides the underpinning knowledge needed by a wide range of technician engineers.
Learning Outcomes	
<i>On successful completion of this module the learner will be able to:</i>	
LO1	analyse ac circuits, containing resistors, inductors and capacitors using complex notation.
LO2	perform calculations involving balanced and unbalanced three phase circuits.
LO3	determine ratings of static power factor correction equipment.
LO4	explain that electrical transients are generated by circuits containing components that store and dissipate energy.
LO5	perform calculations using Star-Delta and Delta-Star transformations to simplify circuits containing resistance and reactance.
Pre-requisite learning	
Module Recommendations	
<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	
Incompatible Modules	
<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	
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. You may not enrol on this module if you have not acquired the learning specified in this section.</i>	
No requirements listed	
Co-requisites	
No Co Requisites listed	

Module Content & Assessment

Indicative Content

AC Circuits

Solutions using complex numbers. Real and reactive power flow. Voltage drop and regulation calculations. Load current and fault current calculations.

Three phase AC circuits

Star and delta connections. Three phase, three wire and three phase, four wire systems. Relationships between line and phase quantities. Calculation of currents, voltages and power in a balanced three-phase system; calculation in unbalanced delta and four-wire star systems.

Delta-star and Star-Delta Transformations

Delta-Star transformation, Star-Delta transformation, maximum power transfer theorems, impedance matching.

Transients

Concept of electrical transient, oscillatory response and damping with reference to step change in RLC circuits. Growth and decay of current and voltages in resistance-inductance circuits and resistance-capacitance circuits.

Filter networks

Purpose of filter network, low pass, high pass, band pass and band stop filters. Cut off frequency, two port networks and characteristic impedance. Ideal and practical filters.

Assessment Breakdown

	%
Course Work	40.00%
End of Module Formal Examination	60.00%

Course Work

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Practical/Skills Evaluation	A weekly assessment of competency through laboratory-based experiments.	1,2	30.0	Every Week
Multiple Choice Questions	Assessment of lecture material covered in weeks 1-6	1,2,3	10.0	Week 7

End of Module Formal Examination

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Formal Exam	End-of-Semester Final Examination	1,2,3,4,5	60.0	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	Electrical Theory	3.0	Every Week	3.00
Lab	Experiments	1.0	Every Week	1.00
Independent & Directed Learning (Non-contact)	Further study of class notes and problems.	3.0	Every Week	3.00
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"> • John Bird 2010, <i>Electrical Circuit Theory and Technology</i>, 4th Ed., Routledge [ISBN: 978-1856177702]
<i>Supplementary Book Resources</i>
<ul style="list-style-type: none"> • Edward Hughes, Dr John Hiley et al 2012, <i>Electrical & Electronic Technology</i>, 11th Ed., Pearson [ISBN: 978-0273755104] • Robert L. Boylestad 2006, <i>Introductory Circuit Analysis</i>, Prentice Hall [ISBN: 0131988263]
<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_EEPSY_8	<u>Bachelor of Engineering (Honours) in Electrical Engineering</u>	3	Mandatory
CR_EELEC_7	<u>Bachelor of Engineering in Electrical Engineering</u>	3	Mandatory
CR_EELEC_6	<u>Higher Certificate in Engineering in Electrical Engineering</u>	3	Mandatory