

Title:	Electrical Power Systems APPROVED
Long Title:	Electrical Power Systems
Module Code:	ELEC6005
Credits:	5
NFQ Level:	Fundamental
Field of Study:	Electrical Engineering
Valid From:	Semester 1 - 2016/17 (September 2016)
Module Delivered in	4 programme(s)
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Module Description:	This module is designed to introduce students to the concepts of electrical power systems in a range of applications and thereby develop an understanding of the relationship between power supply, power consumption, role of different power system components, power system operational safety and personal safety related to the power system operation.
Learning Outcomes	
<i>On successful completion of this module the learner will be able to:</i>	
LO1	Describe the general characteristics of electrical power supplies and electrical loads .
LO2	Describe the different technology of electrical power generation.
LO3	Describe and explain the layout of national electrical power system.
LO4	Describe and explain the role of main electrical power system components.
LO5	Describe and explain the safety aspect related to electrical power system operation.
LO6	Describe and explain the dangers of electrical shock and evaluate practical protection method available.
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

Electrical Power System

General characteristics of electrical power system layout and operational characteristics such as voltage range, power flow, losses, protection and safety of power system operation.

Electrical Power Generation

Electrical power generation technologies: Hydro, Steam, Nuclear, Wind, Photovoltaic, Fuel Cell. Generation technology operational reliability and environmental/economic efficiency.

Electrical Power System Layout

Electrical power system layout: radial, ring and interconnected. Transmission/distribution operational voltage level. National electrical power system layout. regulated and deregulated principle of power system operation.

Components of Electrical Power System

General characteristics and role of main electrical power system components: power transformer, circuit breaker, cables, isolators, instrumentation and protection in power system operation.

Reliability/Safety of Electrical Power System

Introduction to reliability and safety aspect of electrical power system operation regarding the continuity and quality of electrical power supply. Earthing system arrangement.

Electrical shock

Direct and indirect contact. Consumers earthing, Loop impedance. Equipment bonding. RCD construction and operation. Alternative protection arrangements.

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
Short Answer Questions	Electrical Power System Concept, Operation, Components	1,2,3,4	30.0	Week 7
Essay	Sample Topics: Power Generation, Layout of Power Systems, Methods of Power System Analysis	1,2,3,4,5	20.0	Week 10

End of Module Formal Examination

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Formal Exam	End-of-Semester Final Examination	1,2,3,4,5,6	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	Classroom theory + worked examples.	3.0	Every Week	3.00
Lab	Demonstration	1.0	Every Week	1.00
Independent & Directed Learning (Non-contact)	Study	3.0	Every Week	3.00
Total Hours				7.00
Total Weekly Learner Workload				7.00
Total Weekly Contact Hours				4.00

Workload: Part Time

<i>Workload Type</i>	<i>Workload Description</i>	<i>Hours</i>	<i>Frequency</i>	<i>Average Weekly Learner Workload</i>
Lecture	Classroom theory + Worked examples	3.0	Every Week	3.00
Total Hours				3.00
Total Weekly Learner Workload				3.00
Total Weekly Contact Hours				3.00

Module Resources
<i>Recommended Book Resources</i>
<ul style="list-style-type: none"> • Stewen W. Blume 2007, <i>Electrical Power System Basic</i>, John Wiley & Sons, Inc [ISBN: 9780470129876] • Digambar M. Tagare 2010, <i>Electric Power Generation</i>, John Wiley & Sons, Inc [ISBN: 9780470600283] • Electro-technical Council of Ireland 2008, <i>National Rules for Electrical Installations, ET101:2005</i>, 4th Ed., all, ETCI Ireland
<i>Supplementary Book Resources</i>
<ul style="list-style-type: none"> • Brian Scaddan IEng; MIIE (elec), 2011, <i>Electrical Installation Work, Seventh Edition</i>, 7th Ed., Newnes [ISBN: 978-0-08-096981-7]
<i>This module does not have any article/paper resources</i>
<i>Other Resources</i>
<ul style="list-style-type: none"> • Website: etci 2008, <i>National rules for electrical installations</i> , etci http://www.etci.ie

Module Delivered in			
Programme Code	Programme	Semester	Delivery
CR_EEPSY_8	<u>Bachelor of Engineering (Honours) in Electrical Engineering</u>	1	Mandatory
CR_EELEC_7	<u>Bachelor of Engineering in Electrical Engineering</u>	1	Mandatory
CR_EMTEF_6	<u>Certificate in Maintenance Technology Fundamentals</u>	1	Mandatory
CR_EELEC_6	<u>Higher Certificate in Engineering in Electrical Engineering</u>	1	Mandatory