

<b>Title:</b>	Power Modeling and Protection <b>APPROVED</b>
<b>Long Title:</b>	Power Modeling and Protection
<b>Module Code:</b>	ELEC7024
<b>Credits:</b>	5
<b>NFQ Level:</b>	Intermediate
<b>Field of Study:</b>	Electrical Engineering
<b>Valid From:</b>	Semester 1 - 2017/18 ( September 2017 )
<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>	This module introduces the basic building blocks of an electrical power transmission and distribution system and provides an introduction to system simulation.
<b>Learning Outcomes</b>	
<i>On successful completion of this module the learner will be able to:</i>	
LO1	Characterise the main elements of an electrical power system.
LO2	Simulate electrical power systems using their parameters in current software packages.
LO3	Model the performance of power systems under normal load and fault conditions.
LO4	Utilise software in analysing protective measures for electrical power systems.
<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**

**Renewable power generation and control**

Characteristics of renewable power sources, the role of power electronic converters in grid integration.

**Transmission control**

Equivalent circuit parameters, control of voltage, power, reactive power, system modeling, power electronic converters for transmission control.

**Direct current transmission**

DC transmission systems, economic aspects, power and reactive power control, power electronic converters for DC transmission, modeling.

**Power quality**

Regulation of power factor, harmonics, filtering, static compensation, system modeling.

**Transmission/Distribution Systems**

HV/MV/LV Transmission and Distribution Systems, network protection systems. Coordination of protective devices across networks.

**Assessment Breakdown**

%

Course Work

100.00%

**Course Work**

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Practical/Skills Evaluation	Simulation of Transmission and Distribution Components and Systems	1	25.0	Week 3
Practical/Skills Evaluation	Simulation of Transmission and Distribution Components and Systems	1,2	25.0	Week 6
Practical/Skills Evaluation	Simulation of Transmission and Distribution Components and Systems	2,3	25.0	Week 9
Practical/Skills Evaluation	Simulation and modelling of Transmission and Distribution Components and Systems	1,2,3,4	25.0	Week 12

No End of Module Formal Examination

**Reassessment Requirement**

**Coursework Only**

*This module is reassessed solely on the basis of re-submitted coursework. There is no repeat written examination.*

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 Electrical Transmission and Distribution Systems and component parts.	2.0	Every Week	2.00
Lab	Software simulation of power systems	2.0	Every Week	2.00
Independent & Directed Learning (Non-contact)	Revisit class notes and problems. The student should familiarise and practice with the software environment.	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"> <li>• Théodore Wildi 2006, <i>Electrical machines, drives, and power systems</i>, International Edition Ed., Pearson Prentice Hall Upper Saddle River, New Jersey [ISBN: 978-0131969186]</li> </ul>
<i>Supplementary Book Resources</i>
<ul style="list-style-type: none"> <li>• Syed A. Nasar 1990, <i>Schaum's outline of theory and problems of electric power systems</i>, McGraw-Hill New York [ISBN: 978-0070459175]</li> </ul>
<i>This module does not have any article/paper resources</i>
<i>Other Resources</i>
<ul style="list-style-type: none"> <li>• Website: <i>ERACS User Site</i>  <a href="http://www.eracs.co.uk/">http://www.eracs.co.uk/</a></li> <li>• Computer Program: <i>Simulation Software embedded "Help" files, Press F1 Key</i></li> </ul>

Module Delivered in			
Programme Code	Programme	Semester	Delivery
CR_EEPSY_8	<a href="#"><u>Bachelor of Engineering (Honours) in Electrical Engineering</u></a>	6	Mandatory
CR_EELEC_7	<a href="#"><u>Bachelor of Engineering in Electrical Engineering</u></a>	6	Mandatory