

Title:	Industrial Motor Applications APPROVED
Long Title:	Industrial Motor Applications
Module Code:	ELEC6026
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:	In this module students will study motor principles and performance, facilitating the selection, application, control and protection of rotating plant.
Learning Outcomes	
<i>On successful completion of this module the learner will be able to:</i>	
LO1	Describe industrial plant specifications and develop suitable control schemes.
LO2	Select industrial drives for a range of applications.
LO3	Summarise starting methods for a variety of common load conditions.
LO4	Select and apply motor protection schemes.
LO5	Describe the operating conditions and protection arrangements for typical power transformers.
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

Plant Control Circuitry.

Control equipment. IEC symbols and graphical representation. Development of control systems. Common applications. Sequencing, timing, latching and interlocking.

Constructional Features.

Common motors. Principle of operation. Characteristics. Speed, torque, efficiency. Motor/load matching. Duty cycles. ingress protection, induction Motor ratings, Types of drives.

Starting Methods.

Starting methods for industrial motors. DOL, reduced voltage/VSDs/auto trafo/Wound rotor induction motors. Comparisons of voltage/current/torque. Load characteristics. Braking systems.

Protection.

MCC and switchgear. Forms of separation. Contactor selection. Breaking capacity. Coordination of protective devices. Single phasing. High inertia starting. Motors types used in hazardous areas. Utilise software to develop protection levels for electrical protective equipment.

Power Factor and Harmonics.

Requirement for PF improvement. Correction strategy. Optimum level. Comparison of pre and post correction. Problems arising from power system harmonics. Solutions. Protection and control.

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	Hardwire various motor power and control circuits.	1,2,3,4	50.0	Every Second Week

End of Module Formal Examination

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Formal Exam	End-of-Semester Final Examination	1,3,4,5	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 material.	2.0	Every Week	2.00
Lab	Practically based instruction.	2.0	Every Week	2.00
Independent & Directed Learning (Non-contact)	Self directed learning.	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	lecture material	2.0	Every Week	2.00
Lab	Practically based instruction.	2.0	Every Week	2.00
Independent & Directed Learning (Non-contact)	Self directed learning	3.0	Every Week	3.00
Total Hours				7.00
Total Weekly Learner Workload				7.00
Total Weekly Contact Hours				4.00

Module Resources
<i>Recommended Book Resources</i>
<ul style="list-style-type: none"> • Geoffrey Stokes 2003, <i>Handbook of Electrcial Installation Practice.</i>, 4th Ed., Blackwell [ISBN: 0.632.06002.6] • Groupe Schneider 1994, <i>Practical Aspects of Industrial Control Technology</i> [ISBN: 2-907314-20-3] • Brian Scaddan IEng; MIIE (elec),2011, <i>Electrical Installation Work, Seventh Edition</i> [ISBN: 978-0080969817]
<i>Supplementary Book Resources</i>
<ul style="list-style-type: none"> • Austin Hughes 2006, <i>Electrical Motors and Drives</i>, 3rd Ed., Newnes [ISBN: 0.7506.4718.3] • Alrich and Herman 2001, <i>Electrical Motor Control</i>, Thompson [ISBN: 0.944107.25.7]
<i>This module does not have any article/paper resources</i>
<i>Other Resources</i>
<ul style="list-style-type: none"> • Website: http://www.automation.siemens.com/ • Website: http://www.etcgi.ie/

Module Delivered in			
Programme Code	Programme	Semester	Delivery
CR_EEPSY_8	<u>Bachelor of Engineering (Honours) in Electrical Engineering</u>	4	Mandatory
CR_EELEC_7	<u>Bachelor of Engineering in Electrical Engineering</u>	4	Mandatory
CR_EELEC_6	<u>Higher Certificate in Engineering in Electrical Engineering</u>	4	Mandatory