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MODULE DESCRIPTOR

Module Title

Electrical Machines And Drives 1

Reference	EN3560	Version	4
Created	May 2017	SCQF Level	SCQF 9
Approved	March 2004	SCQF Points	15
Amended	May 2017	ECTS Points	7.5

Aims of Module

To provide the student with the ability to analyse the performance of 3-phase, 1-phase and special machines and drives under steady-state conditions.

Learning Outcomes for Module

On completion of this module, students are expected to be able to:

1	Describe the operating characteristics of three-phase induction motors and analyse their performance under steady-state load conditions.
2	Explain the basic principles of operation of a range of special motors.
3	Apply power electronic converters to dc drive systems.
4	Demonstrate understanding of induction motor and dc drive characteristics in laboratory setup

Indicative Module Content

3-phase induction motor principles, derivation of equivalent circuit, performance equations based on equivalent circuit, starting arrangements and speed control principles. Single phase motors; analysis of steady-state operation of single-phase induction motors, starting arrangements; universal motor; hysteresis motor; synchronous reluctance motor. Special motors; stepper motors, types, principles, characteristics and control; switched reluctance motors, principles and applications; brushless dc motors. 3-phase controlled rectifiers, voltage and current relationships, influence of load inductance, application to speed control of dc motors, dc choppers, quadrant operation, braking and reversing, open and closed loop operation, speed and current control loops. MATLAB Simulation of dc and ac machines: Power system block set, simulink.

Module Delivery

This is a lecture based course supplemented with tutorial sessions, laboratory work and directed study.

Indicative Student Workload	Full Time	Part Time
Contact Hours	48	48
Non-Contact Hours	102	102
Placement/Work-Based Learning Experience [Notional] Hours	N/A	N/A
TOTAL	150	150
Actual Placement hours for professional, statutory or regulatory body		

ASSESSMENT PLAN

If a major/minor model is used and box is ticked, % weightings below are indicative only.

Component 1

Type:	Coursework	Weighting:	30%	Outcomes Assessed:	4
Description:	is a laboratory based report.				

Component 2

Type:	Examination	Weighting:	70%	Outcomes Assessed:	1, 2, 3
Description:	is a closed book examination.				

MODULE PERFORMANCE DESCRIPTOR

Explanatory Text

To pass the module, you must achieve a 40% weighted average mark from the exam and coursework. In addition you need to achieve at least 35% in both individual exam and coursework components.

Module Grade	Minimum Requirements to achieve Module Grade:
A	=>70%
B	60-69%
C	50-59%
D	40-49%
E	35-39%
F	0-34%
NS	Non-submission of work by published deadline or non-attendance for examination

Module Requirements

Prerequisites for Module	Electrical Power (EN2560).
Corequisites for module	None.
Precluded Modules	None.

INDICATIVE BIBLIOGRAPHY

1	FITZGERALD,A.E.,KINGSLEY,C. and UMANS,S.D.,2013. Electric Machinery. 7th ed. Boston: McGraw-Hill.
2	WILDI, T., 2013. Electrical Machines, Drives and Power Systems. 6th ed. London: Prentice Hall.
3	GURU, B. S. and HIZIROGLU, H. R., 2001. Electrical Machinery and Transformers. 3rd ed. Oxford: Oxford University Press.
4	MOORTHI, V.R., 2005. Power Electronics. New Delhi: Oxford University Press