Module Title **Electrical Machines And Drives 1** **Keywords** 3-phase motors, 1-phase motors, Special motors, Power Electronics, Simulation.	Reference EN3560 SCQF Level SCQF 9 SCQF Points 15 ECTS Points 7.5 Created December 2003 Approved March 2004 Amended August 2011 Version No. 2

This Version is No Longer Current

The latest version of this module is available here

Prerequisites for Module

Electrical Power (EN2560).

Corequisite Modules

None.

Precluded Modules

None.

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.

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.

Indicative Student Workload

Contact Hours	Full Time	Part Time
Assessment	6	6
Laboratories	6	6
Lectures	24	24
Tutorials	12	12
Directed Study	50	50

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.

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;

Private Study

52 52

Mode of Delivery

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

Assessment Plan

	Learning Outcomes Assessed
Component 1	1
Component 2	1,2,3

Component 2 is a closed book examination (70% weighting)

Component 1 will consist of a laboratory report. (30% weighting)

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.

synchronous reluctance motor.

Special motors; stepper motors, types, principles, characteristics and control; switched reluctance motors, principles and applications; brushless dc motors.

4. MOORTHI, V.R., 2005. Power Electronics. New Delhi: Oxford University Press