

Module Title Electrical Power	Reference EN2560 SCQF LevelSCQF 8 SCQF Points 15 ECTS Points 7.5 Created December 2003 Approved March 2004 Amended August 2011 Version No. 2
Keywords 3-phase systems, DC motors, AC motors, power rectifiers	

This Version is No Longer Current

The latest version of this module is available [here](#)

Prerequisites for Module

Introduction to Electrical Engineering (EN1560) or equivalent

Power rectification, single-phase and 3-phase diode rectifier circuits, single-phase controlled rectifier, principles of operation, voltage and current relationships, resistive and inductive loads.

Corequisite Modules

None.

Indicative Student Workload

Precluded Modules

None.

Aims of Module

To provide the student with an understanding of electric power circuits and the ability to apply fundamental electromechanical energy conversion principles to drive problems

	Full Time	Part Time
<i>Contact Hours</i>		
Assessment	6	6
Laboratory	6	6
Lectures	24	24
Tutorials	18	12
<i>Directed Study</i>	48	48
<i>Private Study</i>	48	54

active problems.

Learning Outcomes for Module

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

1. Solve simple electric circuit problems involving real and reactive power and power factor in single and 3-phase circuits.
2. Describe the physical structure of a single- phase power transformer and use an equivalent circuit model to analyse the performance of the transformer.
3. Explain the principles of operation of dc and ac machines and analyse their performance when loaded.
4. Explain the basic operation of 1-phase and 3-phase diode rectifiers and 1-phase controlled rectifiers.

Indicative Module Content

1-phase and 3-phase circuits, real and reactive power, principle of three phase generation.

Characteristics of single-phase ideal and practical transformers. Principle of operation, concept of leakage inductance and influence on transformer operation. use of

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	2
Component 2	1,2,3,4

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

Component 1 is coursework which will consist of one laboratory report.(30% weighting)

Indicative Bibliography

1. WILDI, T., 2013, Electrical Machines, Drives and Power Systems. 6th ed. London: Prentice Hall.
2. BIRD, J.O., 2017. Electrical and Electronic Principles and Technology. 6th ed. Oxford: Newnes.
3. O'MALLEY, J., 1990. Schaum's outline of theory and problems of basic circuit analysis. 2nd ed. New York, NY: McGraw-Hill.

equivalent circuit for performance analysis.

DC machines, equivalent circuit, emf and torque equations, motor drive characteristics, motor control.

3-phase induction motor, construction and operating principle, basic drive characteristics.

Synchronous machine principles, construction, simple equivalent circuit, phasor diagram with constant terminal voltage.

4. CHAPMAN, S. J., 2011. Electric Machinery Fundamentals. 5th ed. New York, NY: McGraw-Hill.

5. MELKEBEEK, J. A., 2018. Electrical Machines and Drives Fundamentals and Advanced Modelling. Switzerland: Springer

Additional Notes

An Indicative Bibliography will normally reference the latest edition of a text. In some cases, older editions are equally useful for students and therefore, those are the editions that may be stocked.