

Module Title Electrical Power And Energy Systems	Reference EN3561 SCQF SCQF 9 Level SCQF Points 15 ECTS Points 7.5 Created December 2003 Approved March 2004 Amended August 2011 Version No. 3
Keywords Electrical energy production; power systems, synchronous generators, steady state operation and control.	

This Version is No Longer Current

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

Prerequisites for Module

Electrical Power (EN2560) is a desirable prerequisite

Synchronous generator operation, equivalent circuit, phasor diagrams; operation on infinite busbars. Control of real power and frequency, control of reactive power and voltage.

Corequisite Modules

None.

Introduction to embedded (distributed) generation.

Precluded Modules

None.

Indicative Student Workload

Aims of Module

To provide the student with the ability to assess the operation and control of electrical power and energy systems.

	Full Time	Part Time
<i>Contact Hours</i>		
Assessment	6	6
Lectures	24	24
Tutorials	12	12
<i>Directed Study</i>		
	50	50
<i>Private Study</i>		
	58	58

Learning Outcomes for Module

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

- 1.Explain how electrical energy is produced, supplied and traded.
- 2.Analyse the operation of synchronous generators and power systems under normal steady state and short circuit operating conditions.
- 3.Explain the principles of control of power, reactive power, voltage and frequency for synchronous generators and power supply systems.

Indicative Module Content

Review of basic concepts, three phase systems, power, apparent power and reactive power.

Electrical energy production, conventional and modern approaches, energy sources used for electrical generation. Power system operation, matching of supply and demand, energy trading.

Basic components of electrical power systems, generation, power transformers, lines and cables, circuit breakers, loads. Representation using single-line diagrams and the per-unit system, steady-state and short circuit analysis.

Mode of Delivery

This is a lecture-based course supplemented with tutorial sessions and student-centred learning.

Assessment Plan

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

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

Component 1 is a homework exercise.(30% weighting)

Indicative Bibliography

- 1.WEEDY, B.M. and CORY, B.J., 2012. 5th ed. Electric Power Systems. Chichester: Wiley
- 2.GLOVER, J. D.SARMA, M. S.and OVERBYE,T.J., 2011. Power System Analysis and Design. 5th ed. New York: Nelson Engineering
- 3.HARRISON, J. A., 1996. The Essence of Electric Power Systems. London: Prentice-Hall

