

MODULE DESCRIPTOR

MODULE TITLE	POWER SYSTEMS OPERATION AND CONTROL		
MODULE CODE	EL3800 (L6)	CREDIT VALUE	20 CREDITS / 10 ECTS
CAMPUS	UCLAN CYPRUS		
SCHOOL	SCHOOL OF SCIENCE		

MODULE AIMS

The aim of this module is to enhance students' knowledge and skills on Electrical power operation as well as to extend students' knowledge and skills on power systems control.

MODULE CONTENT

Conventional and unconventional energy sources: Comparative cost of generation by coal, oil, solar, water and wind power. Daily and annual curves, maximum demand diversity and load factor.

System analysis: Network, transmission lines. power transfer: system disturbances, steady state stability, transient stability, equal area criterion, maintaining system stability. Overload, Transients, Bewly Lattice diagrams, over-voltage protection.

System operation: Control of real power and frequency. Control of reactive power and voltage. Generation and absorption of reactive power in power systems.

Circuit breakers, system protection

Three-phase induction Motor, starting, electric braking, speed control.

Synchronous generators permanent magnet and induction generators: Types, characteristics, power-angle relation, excitation systems, parallel operation. Transformers: Construction, insulation, windings, connections, commissioning tests, parallel operation and cooling. Low power and special machines used in domestic and computer installations.

Dc Motor and permanent magnet dc motors: Application to small vehicles, electric braking and speed control.

INTENDED LEARNING OUTCOMES

On successful completion of this module a student will be able to:	
1.	Evaluate and analyse power systems giving emphasis to Network and Transmission Lines representation as well Power transfer transients and stability.
2.	To apply the acquired knowledge and skills to control the real and reactive power of power systems as well as frequency.
3.	Evaluate and analyse the operation characteristics of various motors like reluctance motors, stepper motors and linear motors.
4.	Apply relevant skills and knowledge to use programmable controllers and/or microprocessors for the control of machine drives.

TEACHING METHODS

The class contact will consist of lectures, tutorials, and practical sessions. Lectures will introduce new material and provide examples. During the tutorials, students will apply lecture theory to solve related problems. Practical session will be used to familiarise students with laboratory equipment and develop their practical skills. Whenever possible guest lecturers (industry experts and/or researchers) will be invited to provide specific seminars within their expertise so as they can demonstrate to the students' real-life applications of the relevant theory.

The module will be assessed by three short tests and a number of practical assignments (laboratory work). To assess how well students understand all the topics covered in the module, given the benefit of the feedback from the short test and practical assignments, a final exam will be used.

ASSESSMENT METHODS

This module is assessed through Practical assignments over several weeks (laboratory work) and a Written Examination.