

MODULE DESCRIPTOR

MODULE TITLE	ELECTRICAL ENGINEERING FUNDAMENTALS		
MODULE CODE	EL1801 (L4)	CREDIT VALUE	20 CREDITS (10 ECTS)
CAMPUS	UCLAN CYPRUS		
SCHOOL	SCHOOL OF SCIENCE		

MODULE AIMS

Provide knowledge on fundamental theory of Electrical engineering, applicable for understanding and solving simple dc and ac circuits.

MODULE CONTENT

DC Electrical circuits: Ohms law, Kirchhoff's Voltage Law (KVL) and Kirchhoff's Current Law (KCL), resistances in series and parallel, Voltage and current dividers, voltage and current sources. Superposition theorem, Mesh analysis, Thevenin's and Norton's theorems and Millmans theorem. Maximum Power Transfer Theorem

DC Electrical circuits under transient conditions: RC transient circuit, RL transients circuit, time constant and energy stored in an inductance. Charged inductor in the event of an open circuit. Resonance (Series & Parallel). Charging and discharging expressions and curves of voltage and current.

Magnetic circuits: Magnetic flux, Reluctance, Magnetic field strength, B_H curves. Simple and composite magnetic circuits.

Electrostatics: Electric charge, Coulomb's law, Electric field vector E, Gauss's law. Work law and electrostatic potential. Equipotential surfaces. Capacitors, series and parallel connection, permeability.

AC theory: Sinusoidal voltage and current, rms value, phasor diagrams. Active, reactive and apparent power. RLC resonant circuits.

Three phase theorems and power measurement. Star delta transformation.

INTENDED LEARNING OUTCOMES

On successful completion of this module a student will be able to:	
1.	Apply the acquired knowledge on d.c. theory to solve simple d.c. circuit problems.
2.	Evaluate the appropriateness of different methods for solving circuit problems.
3.	Solve problems related to electrostatic and electromagnetism theory.
4.	Apply the acquired knowledge on a.c. theory, to solve simple circuit problems in single phase ac systems.
5.	Perform measurements of different electrical quantities on electrical circuits.

TEACHING METHODS

Lectures will be used to introduce new material and provide examples. During tutorials and workshops students will attempt to solve problems and apply the theory presented during the lectures. Moreover, practical sessions will be used to develop competences in three main areas:

- a) Familiarisation with and use of electrical laboratory equipment.

- b) Implementation and measurement of various electrical quantities using various instruments.
- c) Familiarisation with software tools for the design and simulation of electrical circuits.

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

The module is assessed through a Portfolio of practical assignments in the class and a written exam.