MODULE **DESCRIPTOR**

MODULE TITLE	Applied Physics		
MODULE CODE	EL1802 (L4)	**CREDIT VALUE**	20 UK CREDITS / 10 ECTS
SCHOOL	SCHOOL OF SCIENCES		

MODULE **AIMS**

To provide the foundation knowledge on Semiconductor, Electromagnetism, and Optical properties of matter as well as foster problem-solving skills related to the relevant theory.

MODULE **CONTENT**

Indicative syllabus content:

Oscillations
Oscillations waves: Simple harmonic motion and systems performing simple harmonic motion. Forced oscillations, resonance, progressive waves, stationary waves, polarization and sound waves. The decibel scale and acoustics of regions. Doppler Effect

Semiconductor theory
Atom structure, energy levels, Excitation and ionization of the atom. Emission of radiation. The structure of nucleus. Radioactivity, the laws of radioactive decay. Nuclear reactions.
Conduction though metals. Conduction through semiconductors. Electrons and wholes, Depletion layer, Semiconductor devices, P-type, N-type, Zener diode. Conduction through electrolytes, Electrolysis, Principles of the Photovoltaic Cell, Extraction of heat within the content.

Electromagnetism
Electrostatic and magneto-static theory: Coulomb's law, field strength, electric potential, potential differences. Magnetic fields, Biot-Savar law. Forces on current currying conductors. The Hall effect. Gauss Law, Applications, Maxwell equations, Energy flow

Optical properties of matter
Refraction, total internal reflection, optical fibres and fibre bundles. Photometric quantities, lambert's law of illumination. Illumination levels, photometers and light meters. Haugen and Fermat principles, Young experiment. Optical devices.

INTENDED **LEARNING OUTCOMES**

On successful completion of this module a student will be able to:

1. Discuss basic concepts of semiconductor theory and use the operation of various semiconductor devices.
2. Apply the acquired knowledge to evaluate the use of semiconductor devices in electronic circuits.
3. Develop relevant knowledge for solving simple problems related to electromagnetism.
4. Describe the application of electromagnetic theory in various engineering areas.
5. Discuss photometry theory and the use of optical devices.

TEACHING METHODS

The class contact will consist of lectures together with tutorials. Lectures will introduce new material and provide examples. During the tutorials, students will apply lecture theory to solve related problems. Problems will be provided to students prior to the tutorial sessions. Key elements of the learning strategy are the regular sessions during which problems are attempted.

ASSESSMENT METHODS

This module is assessed through a portfolio of in-class tests and a final year exam.