Module code	SP-1302			
Module Title	Electricity and Magnetism			
Degree/Diploma	Bachelor of Science (Applied Physics)			
Type of Module	Major Option			
Modular Credits	4	**Total student Workload**	10	hours/week
		Contact hours	4	hours/week
Prerequisite	A Level Physics or equivalent			
Anti-requisite	SP-1202 Electricity and Magnetism TG-1307 Engineering Electromagnetics			

Aims

The module is designed to provide the students with the fundamental theoretical and practical knowledge of Electricity and Magnetism and prepare them for more advanced study in this area.

Learning Outcomes

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

Lower order :	30%	- describe the interaction of electromagnetic waves with matter - Identify the paths of charges subject to both electrostatic and magnetic fields
Middle order :	50%	- perform calculations to determine the electric field distributions for complex arrangements of charge - calculate the magnetic fields due to moving charges in wires and solenoids - measure magnetic fields in coils and wires using for example Hall probe and search coil techniques - perform calculations on the interaction of electromagnetic waves with matter - measure charge carrier mobilities in for example semiconductors using electromagnetic techniques - use software to plot and interpret electric and magnetic field distributions for various charge arrangements - apply theoretical skills developed in the lectures to analysing and solving problems in electricity and magnetism
Higher order:	20%	- demonstrate their ability to use laboratory equipment by performing experiments relevant to the module - use an investigative approach to study employing resources such as books, lecture notes, the Internet and other sources.

Module Contents

- Introductory vector calculus
- Electric charge, Coulomb's law, electric field and field lines
- Electric dipole, electric potential, Gauss' law, electric flux
- Properties of capacitors, storage of electrostatic energy, dielectrics
- Magnetic field, Hall effect, magnetic dipole
- Magnetic fields due to currents, the Biot-Savart law, Ampere's law
- Faraday's law of induction, Lenz's law, inductance, storage of electromagnetic energy, eddy currents, magnets and magnetic materials

Assessment	Formative assessment	In-class questions, tutorials and feedback
	Summative assessment	Examination: 50%
		Coursework: 50% - 2 work-based problems (20%) - 2 assignments (20%) - 1 class test (10%)