

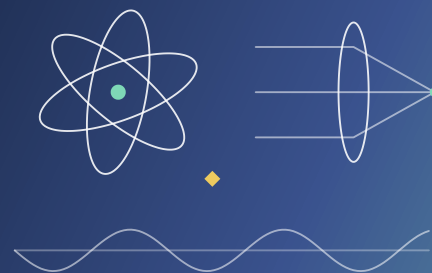
Module code

SPP-1204

Type of module

Undergraduate: Applied Physics – Major Core

Electricity and Magnetism



Modular credits

4

Total student
engagement

56 hours

Prerequisite

None

Anti-requisite

None

Aims

To provide students with fundamental theoretical and practical knowledge of Electricity and Magnetism, and prepare them for more advanced study in this area.

Module learning outcomes (MLO)

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

MLO 1

Interpret the interaction of electromagnetic waves with matter, analyse the motion of charges in electrostatic and magnetic fields, and determine electric field distributions for complex charge arrangements.

MLO 2

Calculate and evaluate magnetic fields generated by moving charges in wires and solenoids, and measure magnetic fields in coils and conductors using techniques such as the Hall probes and search coils.

MLO 3

Analyse the interaction of electromagnetic waves with matter and determine charge carrier mobility in materials (e.g. semiconductors) using electromagnetic methods.

MLO 4

Apply theoretical principles developed in lectures to analyse and solve problems in electricity and magnetism.

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

60% **40%**

Examination

Coursework

Examination
60%

20%

20%

■ Examination — 60% ■ Class tests — 20% ■ Assignment — 20%

Formative assessment

Weekly discussion
and feedback

Summative assessment

COMPONENT		WEIGHTING
Examination		60%
Coursework		40%
Individual		40%
Class tests		20%
Assignment		20%

Graduate attributes and skills

Programme learning objectives (PLO) addressed

- 1 PLO 1 (Core Disciplinary Knowledge)
- 4 PLO 4 (Numerical and Analytical Competence)

- 2 PLO 2 (Critical Thinking and Comparative Analysis)

Sustainability concept addressed

- 7 SDG 7 Affordable and Clean Energy
- 9 SDG 9 Industry, Innovation and Infrastructure

Digital skills/software used (not limited to)

- Word processing software (e.g. Microsoft Word)
- Web Browsers
- Learning Management Systems (e.g. Canvas)

Micro-credentialling option

No

Stackable towards GenBESTARI Undergraduate Degree Programme or other relevant Lifelong Learning Programmes

No

Document details

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