

Liverpool John Moores University

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Title: Foundation Physics - Particles, Fields and Electricity
Status: Definitive
Code: **3505USST** (126428)
Version Start Date: 01-08-2021
Owning School/Faculty: Engineering
Teaching School/Faculty: University of Shanghai For Science and Technology

Team	Leader
John Marsland	Y

Academic Level: FHEQ3 **Credit Value:** 20 **Total Delivered Hours:** 57
Total Learning Hours: 200 **Private Study:** 143

Delivery Options

Course typically offered: Semester 2

Component	Contact Hours
Lecture	33
Tutorial	22

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Exam	AS1	End of semester examination	50	2
Test	AS2	On-line tests	50	

Aims

The aim of this module is to provide students who may not have studied A-level physics with the prerequisite knowledge regarding particles, fields, electricity and electronics which is required to go on to study for an engineering or technology degree.

Learning Outcomes

After completing the module the student should be able to:

- 1 Characterise the constituent parts of the atom, their charge and mass, how they determine the size of the nucleus and the forces that govern their behaviour.
- 2 Explain the behavior of simple resistive circuits and apply the equations which characterise them.
- 3 Illustrate basic techniques to determine the behaviour of digital components and systems.
- 4 Describe simple fields and their applications mathematically.
- 5 Model the behaviour of semiconductors

Learning Outcomes of Assessments

The assessment item list is assessed via the learning outcomes listed:

End of year examination	1	2	3	4	5
On-line tests	1	2			

Outline Syllabus

The list below provides an indicative list of topics which may be covered in this module:

Essential Knowledge

- *Base units*
- *SI Units*
- *Prefixes describing size or quantity*
- *Converting between equivalent units*

Electric Circuits

- *Charge, current and potential difference*
- *Electromotive force (e.m.f.), and internal resistance*
- *Current-voltage characteristics*
- *Resistivity*
- *Electromotive force*
- *Alternating currents*

Electronic Principles

- *Standard circuit symbols in circuit diagrams;*
- *Measuring instruments;*
- *lumped parameter abstraction to analyse circuits;*
- *Passive and active components to generate, process and display signals;*

- *Truth tables, Boolean algebra and graphs to represent the transfer characteristics of components and systems.*
- *The concepts of conductors and insulators in terms of the mobility of charge;*
- *Semiconductors*
- *Electrical Power*
- *The conversion of energy from electrical to other forms as charge moves round a circuit;*
- *The behaviour of currents at a junction, KIL;*
- *The voltage across a series circuit is the sum of the voltage across the components, KVL;*
- *The current in a series circuit is the same in all the components.*

Particles

- *Constituent parts of the atom*

Fields

- *Electric fields, Coulomb's law, electric field strength and electric potential*
- *Magnetic fields, magnetic flux, charge moving in a magnetic field.*
- *Capacitance*
- *Electromagnetic induction*

Learning Activities

Lectures and tutorials

Notes

This module looks at the fundamentals of particles, fields, electricity and electronics, using the maths developed during the Foundation Mathematics modules.