Liverpool John Moores University

Title:	Foundation Physics - Particles, Fields and Electricity
Status:	Definitive
Code:	**3005FND** (120965)
Version Start Date:	01-08-2016
Owning School/Faculty:	Electronics and Electrical Engineering
Teaching School/Faculty:	Electronics and Electrical Engineering

Team	Leader
Mahamoud Ahmed	Y
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Academic Level:	FHEQ3	**Credit Value:**	20	**Total Delivered Hours:**	74
Total Learning Hours:	200	**Private Study:**	126		

Delivery Options
Course typically offered: Standard Year Long

Component	Contact Hours
Lecture	48
Tutorial	24

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Exam	AS1	End of year examination	70	2
Test	AS2	Mid-semester in-class test	15	1
Test	AS3	Mid-semester in-class test	15	1

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 and electricity 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	Use 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
In-class test	1	2			
In-class test	3	4	5		

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 and Radioactivity
- *Constituent parts of the atom*
- *Mass and energy of the nucleus*
- *The photoelectric effect*

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

Laboratory experiments, tutorials, online tests

Notes

It is important to recognise that the curriculum contained in this module relies upon a minimum level of competence in a number of areas of mathematics.

This module is complemented by the Engineering and Technology Practice module where topics contained within this syllabus are explored and contextualised further through practical and experimental inquiry.