

<b>Module Code:</b>	ENG358
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<b>Module Title:</b>	Electrical and Electronic Science
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<b>Level:</b>	3	<b>Credit Value:</b>	20
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<b>Cost Centre(s):</b>	GAAE	<u>JACS3</u> code:	H100
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<b>Faculty:</b>	Faculty of Arts, Science and Technology	<b>Module Leader:</b>	A Sharp
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Scheduled learning and teaching hours	40 hrs
Guided independent study	160 hrs
Placement	0 hrs
<b>Module duration (total hours)</b>	<b>200 hrs</b>

<b>Programme(s) in which to be offered (not including exit awards)</b>	Core	Option
BEng (Hons) Aeronautical and Mechanical Engineering (with Foundation Year)	✓	<input type="checkbox"/>
BEng (Hons) Electrical and Electronic Engineering (with Foundation Year)	✓	<input type="checkbox"/>
BEng (Hons) Automotive Engineering (with Foundation Year)	✓	<input type="checkbox"/>
BEng (Hons) Renewable and Sustainable Engineering (with Foundation Year)	✓	<input type="checkbox"/>
BEng (Hons) Automation Engineering	✓	<input type="checkbox"/>

<b>Pre-requisites</b>
None

**Office use only**

Initial approval: 12/12/2018

With effect from: 01/09/2019

Date and details of revision:

Version no:1

Version no:

**Module Aims**

To introduce the fundamental electrical and electronic principles;  
To use theoretical and practical analysis techniques in order to predict behaviour of various configurations of electrical/electronic circuits (AC / DC) by means of calculation, laboratory, and by computer simulation.

**Intended Learning Outcomes**

Key skills for employability

- KS1 Written, oral and media communication skills
- KS2 Leadership, team working and networking skills
- KS3 Opportunity, creativity and problem solving skills
- KS4 Information technology skills and digital literacy
- KS5 Information management skills
- KS6 Research skills
- KS7 Intercultural and sustainability skills
- KS8 Career management skills
- KS9 Learning to learn (managing personal and professional development, self-management)
- KS10 Numeracy

At the end of this module, students will be able to

Key Skills

1	Analyse ac and dc circuits and component characteristics;	KS10	KS3
2	Determine suitable ac and dc circuit components to meet specifications;	KS10	KS9
3	Construct circuits, take measurements to analyse performance and report on activity, results, and findings.	KS1	KS3
		KS5	KS6
4	Demonstrate awareness of environmental and sustainability issues in the field of electrical science.	KS10	KS5

**Transferable skills and other attributes**

Solving engineering problems;  
Mathematical applications;  
Application of experimental methods;  
Application of software.

**Derogations**

N/A

**Assessment:**

Indicative Assessment Tasks:

Assessment One: is by means of a portfolio of coursework and laboratory exercises spread throughout the module, covering outcome 1, 2, 3 and 4.

Examples of work to be included in the portfolio might be:

1. Theoretical based exercises to assess underpinning knowledge
2. Simulations of electronic circuits using appropriate software to predict the circuit behaviour then compared to practical measurements and results.
3. Practical based exercises embedding correct use of test equipment and good workshop practices such as adhering to Health & Safety regulations.
4. Investigating case studies to see the role of engineering in a wider context, for instance considering environmental and sustainable issues faced in modern engineering.

Assessment number	Learning Outcomes to be met	Type of assessment	Weighting (%)	Duration (if exam)	Word count (or equivalent if appropriate)
1	1,2,3,4	Portfolio	100%	n/a	2,500

**Learning and Teaching Strategies:**

The module will be presented to students through lectures, tutorials and laboratory experiments. Learning materials including computer tools will be used together with demonstrations and directed learning opportunities.

Formative assessment takes place throughout the module during tutorials and feedback is given during these tutorials.

**Syllabus outline:**

Quantities and units  
 Voltage, current and Resistance  
 Ohms Law  
 Kirchoffs Laws  
 Components, capacitors, inductors,  
 Capacitor charge discharge time constants  
 Series DC circuits  
 Parallel DC circuits  
 Combination DC circuits  
 Power DC circuits  
 Basic magnetism  
 Basic AC  
 AC waveforms, average, RMS  
 Diodes  
 Transformers  
 Basic Motor and Generator Principles

**Indicative Bibliography:** Reading lists will be provided in advance of each lecture as per subject basis, along with relevant academic papers and articles.

**Essential reading**

Bird, J. (2017), *Electrical Circuit Theory and Technology*. 6th ed. Milton Park: Routledge.

**Other indicative reading**

Hughes, E. (2016), *Hughes Electrical and Electronic Technology*. 12th ed. Harlow: Pearson Education Limited.