

MODULE DESCRIPTOR

Module Title

Electrical and Electronic Design Principles

Reference	EN1103	Version	6
Created	February 2024	SCQF Level	SCQF 7
Approved	July 2018	SCQF Points	30
Amended	April 2024	ECTS Points	15

Aims of Module

To provide the student with a strong foundation and understanding of the basic concepts and principles of electrical and electronic engineering.

Learning Outcomes for Module

On completion of this module, students are expected to be able to:

- 1 Obtain solutions to electrostatics and electromagnetism design problems using its basic concepts
- 2 Apply principles of electrical circuit and network theorems when analysing AC and DC electrical circuits
- 3 Exercise understanding of electronic systems and circuits at component level
- 4 Exercise knowledge of common types of analogue and digital circuits
- 5 Recognise the performance behaviour of practical electrical/electronic circuits

Indicative Module Content

Basic concepts of electrostatics, electric charge, electric flux, electric field strength, potential and potential difference; Definition of capacitance, parallel plate capacitor. Basic concepts of electromagnetism, magnetic field, magnetic field density, magnetic field strength, Ampere's law, principles of magnetic circuits and inductance of a simple magnetic circuit. Faraday's law of electromagnetic induction. Electric circuits, circuit concepts, voltage and current sources, resistance, current flow and potential distribution. Ohm's and Kirchhoff's laws, simple circuit analysis using Kirchhoff's laws. Reasons for use of alternating current for light and heavy current applications, choice of sinusoidal waveform. Amplitude, frequency and phase concepts. Inductive capacitive impedance concepts, simple time domain analysis of ac circuits, phasor representation of ac quantities, rms representation of voltage and current. Application of theorems to analyse circuits. Techniques for measuring physical parameters. - Design of basic sensor circuits. Signal rectification and associated circuits. Characteristics of: op amps, diodes and logic gates. Flip flops and counters. Numbering systems. DAC/ADC conversion.

The module is delivered in Blended Learning mode using structured online learning materials/activities and directed study, facilitated by regular online tutor support. Workplace Mentor support and work-based learning activities will allow students to contextualise this learning to their own workplace. Face-to-face engagement occurs through annual induction sessions, employer work-site visits, and modular on-campus workshops.

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Contact Hours	30	N/A
Non-Contact Hours	30	N/A
Placement/Work-Based Learning Experience [Notional] Hours	240	N/A
TOTAL	300	N/A
<i>Actual Placement hours for professional, statutory or regulatory body</i>	240	

If a major/minor model is used and box is ticked, % weightings below are indicative only.

Type:	Coursework	Weighting:	60%	Outcomes Assessed:	1, 2, 3, 4
Description:	Logbook of solved tutorials and an online assessment.				

Type:	Coursework	Weighting:	40%	Outcomes Assessed:	5
Description:	Group report based on design project accompanied by a reflective account of their contribution to and their learning from the group work. Both participation in the group report and submission of the reflective summary are required in order to pass the module.				

Explanatory Text

The module has 2 components and to gain an overall pass a minimum D grade must be achieved in each component. The component weighting is as follows: C1 (y-axis) is worth 60% and C2 (x-axis) is worth 40%.

		Coursework:						NS
		A	B	C	D	E	F	
Coursework:	A	A	A	B	B	E	E	
	B	B	B	B	C	E	E	
	C	B	C	C	C	E	E	
	D	C	C	D	D	E	E	
	E	E	E	E	E	E	F	
	F	E	E	E	F	F	F	
	NS	Non-submission of work by published deadline or non-attendance for examination						

Module Requirements

Prerequisites for Module	None.
Corequisites for module	None.
Precluded Modules	None.

INDICATIVE BIBLIOGRAPHY

- 1 BIRD, J. O., 2014. Electrical and Electronic Principles and Technology. Rev 5th ed. Oxford: Routledge.
- 2 STOREY, N., 2013. Electronics - A Systems Approach. 5th Edition. Harlow: Pearson.
- 3 BEARDS, P., 2002. Analog and Digital Electronics. 2nd Edition, Prentice Hall.