Prifysgol Wrecsam
Wrexham University

Module specification

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Module Code	ENG429
Module Title	Electrical Engineering Science
Level	4
Credit value	20
Faculty	FAST
HECoS Code	100164
Cost Code	GAME
Pre-requisite module	None

Programmes in which module to be offered

Programme title	Core/Optional/Standalone
HNC Electrical & Electronic Technology	Core

Breakdown of module hours

Learning and teaching hours	60 hrs
Placement tutor support hours	0 hrs
Supervised learning hours e.g. practical classes, workshops	0 hrs
Project supervision hours	0 hrs
Active learning and teaching hours total	**60 hrs**
Placement hours	0 hrs
Guided independent study hours	140 hrs
Module duration (Total hours)	**200 hrs**

Module aims

To develop knowledge and understanding of the engineering science principles encountered in electrical engineering and at the electro-mechanical interface.

Module Learning Outcomes

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

1	Apply knowledge to solve problems in series a.c. circuits using j operator
2	Investigate the use of reciprocity in the solution of parallel a.c. circuit problems.
3	Apply knowledge to solve problems relating to inductively coupled circuits.
4	Investigate the applications of d.c. transients.
5	Apply knowledge to convert AND,OR and NOT combinations into both NAND and NOR equivalents
6	Investigate the applications of D-A and A-D convertors

Assessment

Indicative Assessment Tasks:

Assessment is 100% in-course. This section outlines the type of assessment task the student will be expected to complete as part of the module. More details will be made available in the relevant academic year module handbook.

Assessment 1: Outcomes 1, 2, 3 & 4 would be assessed using an in-class test based on a case study covering single phase a.c. theory.

Assessment 2: Outcomes 5, 6 would be assessed using a report which asks students to apply knowledge of convertors to practical problems.

Assessment number	Learning Outcomes to be met	Type of assessment	Duration/Word Count	Weighting (%)	Alternative assessment, if applicable
1	1,2,3,4	In-class test	1hr 30min	50%	
2	5,6	Coursework	2000 words	50%	

Derogations

None

Learning and Teaching Strategies

The module will be presented to students through a specified series of lectures assisted by notes via VLE platform. Lectures will deliver key concepts, ideas, and theories underpinned with numerical examples of ascending levels of complexity.

Welsh Elements

This module will be delivered through the medium of English; however, students have the option to submit their assessments in the medium of Welsh. While this module is not currently offered fully through Welsh, Welsh language support and guidance are available, and some learning materials or tutorial discussions may incorporate Welsh elements where appropriate.

Indicative Syllabus Outline

1. **Single phase a.c. theory:** non-resonant ccts using equivalent impedance and admittance methods series and parallel models. Current flow and potential difference, power factor, true, reactive and reactive power. Resonant circuits, definition of circuit resonance and conditions at resonance both series and parallel. Q-factor and dynamic impedance. Power factor correction. Complex waveforms; synthesis using graphical methodologies.
2. **Information and energy control systems**: . Information systems, block diagram of typical information system such as audio comms, instrumentation, process monitoring, qualitative description of signal paths, also of transducer principles. Boolean algebra and its application to combinational logic. Sequential logic and its applications, A to D and D to A converters.

Indicative Bibliography

Please note the essential reads and other indicative reading are subject to annual review and update.

Essential Reads:

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

Bird, J. (2017) Electrical and Electronic Principles and Technology.6th ed. Routledge

Other indicative reading:

Tooley M., Dingle L. (2004) Higher National Engineering. Routledge.

Tooley M., Dingle L. (2020) Engineering Science: For Foundation Degree and Higher National. 2nd ed. Routledge

Administrative Information

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Initial approval date	August 2016
With effect from date	September 2021
Date and details of revision	6 July 2021, revalidated. 27/05/2026 Updated to new template during re-validation.
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