

## Module specification

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Module Code	ENG4B8
Module Title	Fundamentals of Electrical and Electronic Engineering
Level	4
Credit value	20
Faculty	FAST
HECoS Code	100164
Cost Code	GAME

### Programmes in which module to be offered

Programme title	Is the module core or option for this programme
BEng (Hons) Production Engineering	Core
BEng (Hons) Industrial Engineering Design (Mechanical)	Core
BEng (Hons) Industrial Engineering Design (Electrical & Electronic)	Core
FdEng Industrial Engineering (Mechanical)	Core
FdEng Industrial Engineering (Manufacturing and Production)	Core
FdEng Industrial Engineering (Electrical and Automation)	Core

### Pre-requisites

None

### Breakdown of module hours

Learning and teaching hours	40 hrs
Placement tutor support	0 hrs
Supervised learning e.g. practical classes, workshops	0 hrs
Project supervision (level 6 projects and dissertation modules only)	0 hrs
<b>Total active learning and teaching hours</b>	<b>40 hrs</b>

Learning and teaching hours	40 hrs
Placement / work based learning	0 hrs
Guided independent study	160 hrs
<b>Module duration (total hours)</b>	<b>200 hrs</b>

<b>For office use only</b>	
Initial approval date	17/03/2023
With effect from date	September 2023
Date and details of revision	17/03/2023 APSC approval for a new module title and module code to replace ENG497 Electrical Engineering. Amendments made to LOs
Version number	1

## Module aims

The aim of this module is to develop the foundation for the conceptual understanding of electrical engineering.

## Module Learning Outcomes - at the end of this module, students will be able to:

1	Solve engineering problems using basic electrical theory and electronic principles.
2	Demonstrate knowledge of underlying principles to practical circuit conditions
3	Explain the operation of basic semiconductors and passive components including their main areas of application.
4	Simulate and analyse the performance of practical electrical circuits using circuit simulation software

In addition to the module learning outcomes, students will also cover the following accreditation of higher education programme (AHEP) fourth edition learning outcomes: C1, C2 & C12 for BEng degree apprenticeship programmes and F1, F2 & F12 for FdEng programmes.

## Assessment

Indicative Assessment Tasks:

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 One: A portfolio of work covering assignment based tasks covering learning outcomes 2 and 4. Examples of assessment may include practical based laboratory work, case study investigation and electrical engineering design calculations.

Assessment Two: An unseen time-constrained formal examination (2-hour) covering learning outcomes 1 and 3 .

Assessment number	Learning Outcomes to be met	Type of assessment	Weighting (%)
1	2,4	Portfolio	50
2	1,3	Examination	50

## Derogations

A derogation from regulations has been approved for this module which means that whilst the pass mark is 40% overall, each element of assessment (where there is more than one assessment) requires a minimum mark of 30%.

## 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.

Use of VLE such as Moodle will be embedded into this module to support teaching, learning, assessment and feedback.

## Indicative Syllabus Outline

Circuit Analysis:

Charge, Current, Voltage, Resistance, Capacitance and Inductance,

Series and Parallel Circuits, Voltage and Current Dividers, Kirchhoff's Laws, Ohm's Law, Loop Analysis, Superposition Principle, Thevenin's Theorem, AC Waveform and Variables.  
Electronic Devices:

Diode, Clipper, Clamper, Operational Amplifier Based Circuits, Filters, Regulators.

Electrical Principles and Systems:

Motor and Generator Principles, Basic Concepts of Electrical Machines, Basic Power Supply Design including Transformers, Rectification, Smoothing and Regulation, Electrical hazards, EMC, AC and DC Transmission and Distribution Systems, Electrical Instruments and Measurements.

## Indicative Bibliography:

Please note the essential reads and other indicative reading are subject to annual review and update. Please *ensure correct referencing format is being followed as per University Harvard Referencing Guidance*.

## Essential Reads

J. Bird, *Electrical Circuit Theory and Technology*, 6th ed. Newnes, 2017.

### Other indicative reading

E. Hughes, *Electrical and Electronic Technology*, 12th ed. Prentice Hall, 2016.

T. Floyd, *Electric Circuit Fundamentals*, 8th ed. Prentice Hall, 2009.

## Employability skills – the Glyndŵr Graduate

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Each module and programme is designed to cover core Glyndŵr Graduate Attributes with the aim that each Graduate will leave Glyndŵr having achieved key employability skills as part of their study. The following attributes will be covered within this module either through the content or as part of the assessment. The programme is designed to cover all attributes and each module may cover different areas.

### Core Attributes

Engaged  
Enterprising  
Creative  
Ethical

### Key Attitudes

Commitment  
Curiosity  
Resilience  
Confidence  
Adaptability

### Practical Skillsets

Digital Fluency  
Organisation  
Leadership and Team working  
Critical Thinking  
Emotional Intelligence  
Communication