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
Total active learning and teaching hours	**40** hrs

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

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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 28/08/2024 APSC approval to change assessment from 50% portfolio and 50% exam to 100% portfolio
Version number	2

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

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 all learning outcomes. Examples of assessment may include practical based laboratory work, case study investigation and electrical engineering design calculations.

Assessment number	Learning Outcomes to be met	Type of assessment	Weighting (%)
1	1,2,3,4	Portfolio	100%

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, Thevrnin'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.

Essential Reads

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

Other indicative reading

E. Hughes, *Electrical and Electronic Technology, 1*2th ed. Prentice Hall, 2016.

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