

Module Information

2022.01, Approved

Summary Information

Module Code	4604IYO
Formal Module Title	Electrical Engineering and Electrical Circuit Principles
Owning School	Engineering
Career	Undergraduate
Credits	10
Academic level	FHEQ Level 4
Grading Schema	40

Teaching Responsibility

LJMU Schools involved in Delivery
LJMU Partner Taught

Partner Teaching Institution

Institution Name
Study Group

Learning Methods

Learning Method Type	Hours
Lecture	30
Tutorial	15

Module Offering(s)

Display Name	Location	Start Month	Duration Number Duration Unit
SEP-PAR	PAR	September	12 Weeks

Aims and Outcomes

Aims	To enable students to develop an understanding of the physical principles of electrical and electronic systems, and to analyse simple circuits which incorporate passive and active components. To enhance knowledge and understanding of the essential mathematics underpinning electrical and electronic engineering. To develop intellectual abilities in selecting and applying appropriate circuit analysis techniques for analysing various electrical and electronic circuits. To introduce passive electronic components and understand their operating characteristics. To introduce the operating principles of transformers and electronic filters.
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After completing the module the student should be able to:

Learning Outcomes

Code	Number	Description
MLO1	1	Describe and model the physical principles of electrical and electronic systems
MLO2	2	Analyse ac and dc circuits which include passive and active electronic components
MLO3	3	Understand the different powers in ac circuits and perform calculations
MLO4	4	Explain the operating principles of transformers

Module Content

Outline Syllabus	Passive components, AC circuits and phasors Introduction to electric fields, permittivity, Capacitance, impedance of a capacitor. Introduction to magnetic fields, self and mutual inductance, impedance of an inductor. Operating principles of transformers. Alternating current fundamentals, period, frequency and angular frequency. Peak, and rms values. Complex representation of sinusoidal quantities. Phasors. Application of complex numbers in simple ac circuits. Powers in ac circuits. Complex-waveforms and introduction to the Fourier series. Resonance in simple series ac circuits. Series RLC circuit as a band-pass filter. RC circuits as low-pass and high pass filters. Basic Operational Amplifiers Circuit analysis techniques Steady-state dc and ac circuit analysis: Kirchhoff's laws. Voltage and current divider rules. The superposition principle. Mesh current analysis. Nodal potential analysis. Non-ideal current and voltage sources, Thevenin's and Norton's equivalent circuits. Maximum power transfer theory.
Module Overview	
Additional Information	

Assessments

Assignment Category	Assessment Name	Weight	Exam/Test Length (hours)	Module Learning Outcome Mapping
Exam	Exam/test	100	2	MLO1, MLO2, MLO3, MLO4

Module Contacts

Module Leader

Contact Name	Applies to all offerings	Offerings
Mike Shaw	Yes	N/A

Partner Module Team

Contact Name	Applies to all offerings	Offerings
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