Engineering Circuit Analysis

Module Information

2022.01, Approved

Summary Information

Module Code	4616IYO
Formal Module Title	Engineering Circuit Analysis
Owning School	Engineering
Career	Undergraduate
Credits	20
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	24
Seminar	36

Module Offering(s)

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

Aims and Outcomes

Aims	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 single-phase transformers and electronic filters.

After completing the module the student should be able to:

Learning Outcomes

Code	Number	Description
MLO1	1	Understand the fundamental relationships governing electric circuits.
MLO2	2	Employ circuit analysis techniques to solve series, parallel and series parallel dc and ac circuits.
MLO3	3	Understand the different powers in ac circuits and perform associated calculations.
MLO4	4	Analyse simple three-phase circuits.
MLO5	5	Explain the operating principles of single-phase transformers and perform calculation to determine the operating efficiency 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.Resonance in simple series ac circuits. Series RLC circuit as a band-pass filter. RC circuits as low-pass and high pass filters.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. Source transformations.Thevenin's and Norton's equivalent circuits. Maximum power transfer theory.
Module Overview	
Additional Information	The material delivered in this module will be complimented by the practical skills module where students will undertake practical experiments to reinforce the material delivered in this module.

Assessments

Assignment Category	Assessment Name	Weight	Exam/Test Length (hours)	Module Learning Outcome Mapping
Portfolio	Portfolio	100	0	MLO1, MLO2, MLO3, MLO4, MLO5

Module Contacts

Module Leader

Contact Name	Applies to all offerings	Offerings

Lonnie Readioff	Yes	N/A

Partner Module Team

Contact Name	Applies to all offerings	Offerings