Liverpool John Moores University

Title:	Circuit Analysis
Status:	Definitive
Code:	**4508ENGIOM** (117267)
Version Start Date:	01-08-2016
Owning School/Faculty:	Maritime and Mechanical Engineering
Teaching School/Faculty:	Maritime and Mechanical Engineering

Team	Leader
Russell English	Y

Academic Level:	FHEQ4	**Credit Value:**	10	**Total Delivered Hours:**	28
Total Learning Hours:	100	**Private Study:**	72		

Delivery Options
Course typically offered: Semester 2

Component	Contact Hours
Lecture	18
Practical	2
Tutorial	6

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Exam	Exam		50	2
Test	Test		20	
Report	Report		30	

Aims

To enhance knowledge and understanding of the essential mathematics underpinning electrical and electronic engineering and to develop intellectual abilities in selecting and applying appropriate mathematical methods for analysing various electrical and electronic circuits.
To develop professional practical skills in the use of relevant test and measurement

equipment in experimental laboratory work.

Learning Outcomes

After completing the module the student should be able to:

1	Employ various methods of network analysis to dc and single-phase ac circuits
2	Calculate various powers in ac circuits
3	Explain operating principles of a transformer
4	Gain practical experience of using standard laboratory equipment to make measurements on electric circuits and analyse the results

Learning Outcomes of Assessments

The assessment item list is assessed via the learning outcomes listed:

Exam	1	2	3
Test	1	2	
Report	1	4	

Outline Syllabus

Review of complex numbers and their application in ac circuits.
Introduction to electric fields: electric flux density, electric field intensity, breakdown strength, permittivity, capacitance, impedance of a capacitor.
Introduction to magnetic fields: magnetic flux density and magnetic field intensity, magneto-motive force, permeability, magnetic reluctance, inductance, impedance of an inductor.
Series and parallel ac and dc circuits, use of Kirchhoff's laws in the analysis. Voltage divider rule and current divider rule.
Powers in dc and ac circuits. Apparent, active and reactive power. Power flows in series, parallel and series-parallel circuits.
Method of mesh-current analysis and its application to dc and ac circuit.
Method of nodal potential analysis and its application to dc and ac circuits.
Thevenin's theorem and Norton's theorem. Voltage and current sources. Application to dc and ac circuits.
Resonance in simple series ac circuits. Series RLC circuit as a band-pass filter. RC circuits as low-pass and high pass filters.
Transformers: concept of an ideal transformer, impedance transformation. Real transformer: losses, leakage and magnetising flux, equivalent circuit.

Learning Activities

A series of lectures supported by tutorials and practical laboratory work.

Notes

The module introduces methods of dc and ac circuit steady state analysis, operating principles of transformers and fundamentals of three-phase systems.