PRIFYSGOL glyndŵr UNIVERSITY

MODULE SPECIFICATION FORM

Module Title:	**Electrical Circuit Theory**	Level:	**4**	Cedit Value:	**10**

Module code: (if known) **ENG425**	Cost Centre: **GAEE**	JACS2 code: **H620**

Semester(s) in which to be offered: **2**	With effect from: **July 2015**

Office use only: To be completed by AQSU:	Date approved: July 2015 Date revised: Version No: 1

Existing/New: **Existing**	Title of module being replaced (if any): N/A

Originating Academic area: **Engineering and Applied Physics**	Module Leader: **R. Holme**

Module duration (total hours)	100	Status: core/option/elective (identify programme where appropriate):	**Free-standing 10-credit component comprising second half of ENG459 (Electrical Science).**
Scheduled learning and teaching hours	36		
Independent study hours	64		
Placement hours	0		

Percentage taught by Subjects other than originating Subject (please name other Subjects):	**0%**

Programme(s) in which to be offered: **Enginering European Programme** (Non Award Bearing)	Pre-requisites per programme (between levels):	**None**

Module Aims:
To further develop theoretical and practical analysis techniques in order to predict behaviour of various configurations of electrical/electronic circuits (ac and dc) by means of calculation, laboratory and by computer simulation.

Expected Learning Outcomes

Knowledge and Understanding:
At the completion of this module, the student should be able to:

1. define fundamental electrical variables in dc and ac circuits;
2. select and use appropriate methods to analyse electrical circuit behaviour;
3. apply the theoretical principles to practical circuit conditions;
4. use appropriate software packages to simulate and predict circuit performance.

Key skills for employability

1. Written, oral and media communication skills,
2. Leadership, team working and networking skills
3. Opportunity, creativity and problem solving skills
4. Information technology skills and digital literacy
5. Information management skills
6. Research skills
7. Intercultural and sustainability skills
8. Career management skills
9. Learning to learn (managing personal and professional development, self management)
10. Numeracy

Assessment:
Please indicate the type(s) of assessment (eg examination, oral, coursework, project) and the weighting of each (%). ***Details of indicative assessment should also be included****.*

Assessment is by means of an unseen formal examination at the end of the module.
(This corresponds to 'Assessment 1' of ENG459.)

Assessment number (use as appropriate)	Learning Outcomes to be met	Type of assessment	Weighting	Duration (if exam)	Word count (if coursework)
Assessment One:	1, 2, 3, 4	Examination	100%	2 hours	

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.

Syllabus outline:

AC Circuit Analysis: impedance, admittance, conductance, susceptance; Circuit analysis using complex notation:Thevenin and Norton's theorems, mesh current analysis, nodal analysis, power dissipation in circuits - real/apparent/reactive. Series, parallel and series/parallel circuits. Computer tools for AC circuit analysis.

Resonance: Series resonance, Quality factor. Phasor and mathematical analysis of parallel RL, RC, RLC circuits; parallel resonance, Q-factor, effective Q-factor, bandwidth; Imperfect capacitors - equivalent circuits, loss angle, power loss.

Polyphase Voltages: Generation of 3 phase voltages; balanced star and delta systems; phasor diagrams; calculation of line and phase variables; use of complex numbers in the solution of problems.

Bibliography

Essential reading:

Floyd, T. (2009) *Electric Circuit Fundamentals*, 8th Edn, Prentice Hall.

Hughes, E. (2012) *Electrical & Electronic Technology*, 11th Edn, Prentice Hall.

Recommended reading:

Bird, J. (2010) *Electrical Circuit Theory and Technology,* 4th Edn., Newnes.