

## MODULE DESCRIPTOR

### Module Title

Electrical Systems

Reference	EN2562	Version	7
Created	August 2021	SCQF Level	SCQF 8
Approved	March 2004	SCQF Points	15
Amended	August 2021	ECTS Points	7.5

### Aims of Module

To provide the student with the necessary skills to analyse practical ac electric circuits and simple electromagnetic problems.

### Learning Outcomes for Module

On completion of this module, students are expected to be able to:

- 1 Quantify the capacitance of conductor systems.
- 2 Quantify the self-inductance of simple conductor arrangements, explain magnetic circuit principles and their analysis methods.
- 3 Apply electric circuit theorems to analysis of ac circuits.
- 4 Model or program, simulate and analyse an electrical system using a software package.

### Indicative Module Content

Calculation of capacitance and inductance for practical conductor systems. Force between current carrying conductors, analysis of series and parallel magnetic circuits, relationships between magnetic and electric circuits, concept of leakage flux and leakage inductance. Electric circuit theorems, including mesh and nodal analysis methods, applied to DC & AC circuits. Solution of transient problems in RL and RC circuits. Series and parallel resonance, Q factor, bandwidth and gain-bandwidth product. Introduction to an engineering software package (e.g. MATLAB/Simulink, COMSOL Multiphysics, ANSYS)

### Module Delivery

This is a lecture based course supplemented with tutorial sessions, laboratory exercises and directed study.

**Indicative Student Workload**

	Full Time	Part Time
Contact Hours	45	45
Non-Contact Hours	105	105
Placement/Work-Based Learning Experience [Notional] Hours	N/A	N/A
TOTAL	150	150
<i>Actual Placement hours for professional, statutory or regulatory body</i>		

**ASSESSMENT PLAN**

If a major/minor model is used and box is ticked, % weightings below are indicative only.

**Component 1**

Type:	Coursework	Weighting:	30%	Outcomes Assessed:	4
Description:	A software package based coursework including a report.				

**Component 2**

Type:	Examination	Weighting:	70%	Outcomes Assessed:	1, 2, 3
Description:	Closed book examination.				

**MODULE PERFORMANCE DESCRIPTOR**

**Explanatory Text**

The module has 2 components and to gain an overall pass a minimum D grade must be achieved in each component. The component weighting is as follows: C1 is worth 30% and C2 is worth 70%.

		Coursework:						NS
		A	B	C	D	E	F	
Examination:	A	A	A	B	B	E	E	
	B	B	B	B	C	E	E	
	C	B	C	C	C	E	E	
	D	C	C	D	D	E	E	
	E	E	E	E	E	E	F	
	F	F	F	F	F	F	F	
	NS	Non-submission of work by published deadline or non-attendance for examination						

**Module Requirements**

Prerequisites for Module	Introduction to Electrical Engineering (EN1560) or equivalent.
Corequisites for module	None.
Precluded Modules	None.

**ADDITIONAL NOTES**

An Indicative Bibliography will normally reference the latest edition of a text. In some cases, older editions are equally useful for students and therefore, those are the editions that may be stocked.

**INDICATIVE BIBLIOGRAPHY**

- 1 BIRD, J.O., 2017. Electrical Circuit Theory and Technology. 6th ed. Oxford: Newnes.
- 2 EDMINSTER, J.A., 2013. Electromagnetics Crash Course. 4th ed. New York, NY: Schaums/McGraw Hill.
- 3 MORRIS, N., 1994. Electrical and Electronic Engineering Principles. Harlow: Pearson/Prentice Hall.
- 4 NAHVI, M., 2013. Electric Circuits. 6th ed. New York, NY: Schaums/McGraw Hill.