

ES1B2-15 Electrical Engineering Principles

21/22

Department

School of Engineering

Level

Undergraduate Level 1

Module leader

Mark Dooner

Credit value

15

Module duration

24 weeks

Assessment

40% coursework, 60% exam

Study location

University of Warwick main campus, Coventry

Description

Introductory description

Electrical Engineering Principles: a broad introduction to the subject and application of Electrical Engineering Fundamentals

Module aims

The module aims to present, in context, the fundamental concepts of electricity, magnetism, electrical circuits and devices that underpin electromechanical systems. The module will also encourage the development of problem-solving and modelling skills in order that more advanced material can be tackled in later years.

Outline syllabus

This is an indicative module outline only to give an indication of the sort of topics that may be covered. Actual sessions held may differ.

Introduction to Electricity and Magnetism

DC circuit analysis (including Nodal, Mesh, Thevenin, Norton, Superposition)

Circuit Techniques for Transients (1st and 2nd order)

AC Circuit Analysis

Passive filters, frequency response

AC power (real, reactive, complex and apparent power)

Power factor correction and reactive power compensation in AC systems

3-Phase AC system (Star systems, delta systems, phase quantities, line quantities)

Basics of equipment and systems which use electricity and electromagnetism

Learning outcomes

By the end of the module, students should be able to:

- Appreciate the fundamentals of electrical and magnetic component operation
- Understand the basic principles of electrical and magnetic circuits
- Make appropriate assumptions to simplify and thus model real-life electrical components
- Calculate and measure circuit parameters
- Apply the mathematical principles and formulation behind real, reactive, complex and apparent power
- Evaluate the design and efficiency of electromechanical and electromagnetic systems

Indicative reading list

G. Rizzoni – Fundamentals of Electrical Engineering, McGraw-Hill, 2008, ISBN 978-0-07-128338-0

Stephen J. Chapman, Electric Machinery Fundamentals, 5th edition, McGraw Hill, 2012.

Subject specific skills

Communicate technical information with others at all levels, including technical reports and the use of digital tools.

Follow a methodical approach to engineering problem solving.

Establish and report engineering design briefs.

Produce electrical drawing using Computer Aided Design(CAD) and manual systems.

Integrate electrical and mechanical engineering systems, considering new and emerging technologies.

Design functional electronic systems and circuits from component level.

Communicate effectively with technical and non-technical audiences.

Transferable skills

Hold paramount the health and safety of themselves and others, and model health and safety conscious behaviour.

Self-motivated, work independently and take responsibility for their actions. Set themselves challenging personal targets and make own decisions.

Communicate confidently to create and maintain working relationships. Be respectful.

Exercise responsibilities in an ethical manner, with openness, fairness and honesty.

Commit to personal learning and professional development.

Study

Study time

Type	Required
Lectures	7 sessions of 1 hour (5%)
Tutorials	10 sessions of 1 hour (7%)
Supervised practical classes	5 sessions of 2 hours (7%)
Work-based learning	37 sessions of 1 hour (25%)
Online learning (scheduled sessions)	8 sessions of 1 hour (5%)
Online learning (independent)	13 sessions of 1 hour (9%)
Private study	65 hours (43%)
Total	150 hours

Private study description

65 hours guided independent learning (including VLE use).

WBL = WBL hours plus independent online learning

Costs

No further costs have been identified for this module.

Assessment

You must pass all assessment components to pass the module.

Assessment group D

	Weighting	Study time
Laboratory Assessment	40%	
Online Laboratory Test plus written laboratory report (6 pages).		
The labs will include:		
DC and transient measurement lab		
AC electrical measurement lab		
Filter frequency response lab		
AC/DC motor efficiency lab		
Online Examination	60%	
~Platforms - QMP		

Weighting

Study time

- Online examination: No Answerbook required

Feedback on assessment

- Support through advice and feedback hours.
- Written feedback on marked laboratory report.
- Cohort-level feedback on computer-based Lab quizzes.
- Cohort-level feedback on final examination.

[Past exam papers for ES1B2](#)

Availability

Courses

This module is Core for:

- Year 1 of DESA-H360 Undergraduate Electromechanical Engineering (Degree Apprenticeship)