

# ES1B2-15 Electrical Engineering Principles

**23/24**

**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

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## 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
- Apply theory to the evaluation of electrical and magnetic component/circuit parameters and behaviours
- Apply the mathematical principles and formulation behind real, reactive, complex and apparent power

## **Indicative reading list**

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

Hughes, E. "Electrical and Electronic Technology," 12th Ed, 2016, Pearson Educating Limited

## **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.

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# Study

## Study time

Type	Required
Lectures	27 sessions of 1 hour (18%)
Tutorials	10 sessions of 1 hour (7%)
Supervised practical classes	5 sessions of 2 hours (7%)
Work-based learning	50 sessions of 1 hour (33%)
Online learning (scheduled sessions)	(0%)
Online learning (independent)	(0%)
Private study	53 hours (35%)
Total	150 hours

## Private study description

53 hours of guided independent study (including VLE use)

## Costs

No further costs have been identified for this module.

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## Assessment

You must pass all assessment components to pass the module.

### Assessment group D1

	Weighting	Study time
Laboratory Assessment	40%	
Laboratory report (6 pages).		
Online Examination	60%	
2 x 1hr QMP		
~Platforms - QMP		

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- 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](#)

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## Availability

## Courses

This module is Core for:

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