ES1A1-15 Engineering Mathematics

23/24

Department
> School of Engineering

Level
> Undergraduate Level 1

Module leader
> Elia Gironacci

Credit value
> 15

Module duration
> 24 weeks

Assessment
> 30% coursework, 70% exam

Study location
> University of Warwick main campus, Coventry

Description

Introductory description

ES1A1-15 Engineering Mathematics

[Module web page](#)

Module aims

To present, in context, and provide skills in the application of fundamental mathematics and systems modelling concepts that underpin all of Engineering. To encourage the development of problem solving and modelling skills as required in other Year 1 modules and in order that more advanced material can be tackled in modules taught in later years.

Within the context of the syllabus, students should be able to manipulate mathematical formulae, to follow mathematical argument, to formulate engineering problems in mathematical form and to solve these. In particular, this module provides the necessary mathematical background for the technical modules in year 1 for those students without 'A' level, or equivalent, Mathematics.

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.

Functions, Algebra and Algebraic Manipulation, Co-ordinate Geometry, Differentiation, Vector Algebra, Matrices and Determinants, Matrix Algebra and Linear equations, Complex Numbers, Integration, Applications of Integration, Solution of 1st and 2nd Order Ordinary Differential Equations, Laplace Transforms, Probability Theory, Discrete and Continuous Probability Distributions. Partial Differentiation

Learning outcomes

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

- Recognise and be able to apply mathematical tools and techniques to solve engineering based problems.
- Recognise and be able to apply probabilistic and statistical tools and techniques to solve engineering based problems.
- Develop mathematical models of engineering based systems via the physical laws that they obey.
- Make structured assumptions to simplify and thus model real-life Engineering problems.
- Analyse models using basic mathematical techniques including statistical and numerical techniques.
- Demonstrate an understanding of mathematics and mathematical processes consistent with the syllabus. Reason logically and recognise incorrect reasoning.

Indicative reading list

"Mathematics for Engineers: A Modern Interactive Approach (fourth Edition)" by Anthony Croft and Robert Davison, Pearson/Prentice Hall, 2015, ISBN 978-0-13-205156-9

Subject specific skills

1. Numeracy: apply mathematical and computational methods to communicate parameters, model and optimize solutions

Transferable skills

1. Apply problem solving skills, information retrieval, and the effective use of general IT facilities
2. Communicate (written and oral; to technical and non-technical audiences) and work with others
3. Overcome difficulties by employing skills, knowledge and understanding in a flexible manner

Study

Study time

Type	Required
Lectures	24 sessions of 1 hour (16%)
Tutorials	15 sessions of 1 hour (10%)
Other activity	33 hours (22%)
Private study	78 hours (52%)
Total	150 hours

Private study description

78 hours of guided independent learning (including VLE use and support from Employer)

Other activity description

2 hours of revision lectures
1x1 hour of computer-based test
20 hours of online extra support for foundation maths
10 hours of online learning via MOBIUS supported by apprenticeship tutor including formative activities and self-assessment

Costs

No further costs have been identified for this module.

Assessment

You must pass all assessment components to pass the module.

Assessment group D5

	Weighting	Study time
Computer-based test	30%	
Online Examination	70%	
QMP EXAM		

~Platforms - QMP

- Online examination: No Answerbook required
- Students may use a calculator

	Weighting	Study time

- Engineering Data Book 8th Edition
- Graph paper

Feedback on assessment

- Model solutions to questions for exam preparation.
- Cohort-level feedback to computer-based test.
- Cohort level feedback on examination.
- Support through advice and feedback hours.

Past exam papers for ES1A1

Availability

Courses

This module is Core for:

- Year 1 of DESA-H221 Undergraduate Civil and Infrastructure Engineering (Non-integrated Degree Apprenticeship)