WM175-15 Engineering Mathematics

24/25

Department
WMG

Level
Undergraduate Level 1

Module leader
Shaheen Hassan

Credit value
15

Module duration
14 weeks

Assessment
100% exam

Study locations
University of Warwick main campus, Coventry Primary
Distance or Online Delivery

Description

Introductory description

This module provides the appropriate knowledge and skills base of principles of mathematics and scientific methods including analytical techniques required to analyse engineering problems effectively. It gives the fundamental knowledge relevant to Degree Apprenticeship Standards ST0023, ST0024, ST0025 and ST 0027.

This module is linked with C1, C2 and C3 of the AHEP 4.

LO1: C1, C3
LO2: C2, C3
LO3: C3
LO4: C1, C3

[Module web page](#)

Module aims

This module aims to provide students with a review of the basic mathematical techniques in the first half of the module, developing concepts further in the second half of the module to enable students to begin to formulate and improve solutions to engineering problems mathematically.

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.

- Algebra refresher
- Calculus refresher
- Introduction to partial derivatives
- Complex numbers
- Matrices, determinants and simultaneous equations
- First & Second order differential equations
- Laplace transforms & their application to solving ordinary differential equations

Learning outcomes

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

- Demonstrate a comprehension of fundamental mathematical terminology and methods [AHEP:4-C1, C3].
- Apply an efficient technique to solve a given basic mathematical problem [AHEP:4-C2, C3].
- Communicate clearly mathematically using logical argument evidencing a sound understanding of the fundamental concepts taught [AHEP:4-C3].
- Manipulate core mathematical techniques to solve given problems including within engineering contexts [AHEP:4-C1, C3].

Indicative reading list

Croft, A., Davison, R., Mathematics for Engineers. 5th edition. Pearson 2019.
ISBN: 1292253649, 9781292253640

Stroud K.A., Booth D.J. Engineering Mathematics. 7th edition. Palgrave Macmillan 2013.
ISBN: 1137031204, 9781137031204

[View reading list on Talis Aspire](#)

Subject specific skills

Select, use and apply problem-solving methods to solve complex problems and determine appropriate solutions (S2 in all DA Standards).
Observe, record and draw accurate and auditable conclusions from data (S5 in all DA Standards).

Communicating mathematically, quantitative reasoning, manipulation of precise and intricate ideas, mastery of a range of appropriate mathematical techniques.

Transferable skills

Problem Solving: Uses rational and logical reasoning to deduce appropriate and well-reasoned

conclusions; Retain an open mind, optimistic of finding solutions, thinking laterally and creatively to look beyond the obvious; Knows how to learn from failure.

Communication: Verbal- Communicate orally in a clear and sensitive manner which is appropriately varied according to different audiences; Written: Present arguments, knowledge and ideas, in a range of formats.

Professionalism: Prepared to operate autonomously. Aware of how to be efficient and resilient. Manages priorities and time.

Study

Study time

Type	Required
Lectures	8 sessions of 1 hour (5%)
Seminars	12 sessions of 1 hour (8%)
Online learning (scheduled sessions)	10 sessions of 1 hour (7%)
Online learning (independent)	6 sessions of 1 hour (4%)
Other activity	4 hours (3%)
Private study	50 hours (33%)
Assessment	60 hours (40%)
Total	150 hours

Private study description

The students will complete solution formatting and mathematical resilience elements.

Recapping of prior learning is expected where necessary.

Reading around the topics covered will provide the depth of understanding required to complete the course to a good standard. This may be both prior to and/or after the teaching and learning sessions.

Support from teaching staff is available but students will be expected to increasingly develop their independent learning skills.

Time spent on preparation for assessments is required - advice regarding this will be given.

Online forum and discussion (asynchronous).

Other activity description

Online support / consultancy before the two assessments.

Costs

No further costs have been identified for this module.

Assessment

You must pass all assessment components to pass the module.

Assessment group B

	Weighting	Study time	Eligible for self-certification
Digital Assessment	40%	24 hours	No

Digital assessment of basic maths concepts - all questions to be answered.

	Weighting	Study time	Eligible for self-certification
Exam	60%	36 hours	No

Maths questions including some within engineering contexts - all questions to be answered.

Feedback on assessment

Formative feedback :

- Cohort level formative feedback on practice digital assessment questions;
- Cohort level formative feedback on mock digital assessment test;
- Cohort level formative feedback on mock exam before results shared;
- Individual, verbal formative feedback on problem sets given during seminar/tutorial sessions throughout the course.

Summative feedback:

- Cohort-level summative feedback on Assessment 1 (Digital Assessment).
- Cohort-level summative feedback on Assessment 2 (Exam).

Past exam papers for WM175

Availability

Courses

This module is Core for:

- Year 1 of UWMS-H7C3 Undergraduate Applied Professional Engineering (Control/Technical Support Engineer)

- Year 1 of DWMS-H7C7 Undergraduate Applied Professional Engineering (Control/Technical Support Engineer) (Degree Apprenticeship)
- Year 1 of UWMS-H7C2 Undergraduate Applied Professional Engineering (Electrical/Electronic Support Engineer)
- Year 1 of DWMS-H7C6 Undergraduate Applied Professional Engineering (Electrical/Electronic Support Engineer) (Degree Apprenticeship)
- Year 1 of UWMS-H7C1 Undergraduate Applied Professional Engineering (Manufacturing Engineer)
- Year 1 of DWMS-H7C5 Undergraduate Applied Professional Engineering (Manufacturing Engineer) (Degree Apprenticeship)
- Year 1 of UWMS-H7C4 Undergraduate Applied Professional Engineering (Product Design and Development Engineer)
- Year 1 of DWMS-H7C8 Undergraduate Applied Professional Engineering (Product Design and Development Engineer) (Degree Apprenticeship)