FP007-30 Mathematics for Science

23/24

Department
Warwick Foundation Studies
Level
Foundation
Module leader
Paul Goodhead
Credit value
30
Module duration
25 weeks
Assessment
40% coursework, 60% exam
Study location
University of Warwick main campus, Coventry

Description

Introductory description

This module covers the essential ideas and techniques that underpin university-level study mathematical subjects such as physics and engineering. It covers a range of fundamental topics – including calculus, vectors, matrices and complex numbers.

Module web page

Module aims

1. To develop the students understanding of mathematics and mathematical processes to enable progression onto a range of undergraduate degree programmes.
2. To develop an understanding of how mathematics can be used in different areas of study.
3. Use mathematics as an effective means of communication.

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 and their graphs to include simple graph transformations.

Algebra to include polynomials, rational functions, partial fractions.
Exponentials and logarithms to include basic properties and modelling.
Statistics to include presenting and summarising data, probability, correlation and regression.
Sequences, series and the binomial expansion
Trigonometry to include geometrical problems, identities and solving trigonometric equations.
Calculus. Differentiation and Integration to include basic functions, rules and applications to real world contexts. Solving first order ordinary differential equations.
Numerical methods to include solution of equations and areas beneath curves.
Matrices to include basic operations (2x2 and 3x3), inverse matrices (2x2 only) and applications.
Vectors to include fundamental properties, vector addition, scalar product and applications to lines and planes in 3D space.
Complex numbers to include basic arithmetic, algebraic, polar and exponential form, Argand diagram, De Moivre's theorem and its applications.

Learning outcomes

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

- From a range of mathematical principles and processes choose and apply appropriate mathematical tools and techniques to solve problems set in a variety of contexts.
- Analyse and interpret results obtained from an application of mathematics to the solution of a real-world problem in the sciences and engineering.
- Construct and present mathematical arguments through appropriate use of logical deduction and precise statements involving correct use of symbols and appropriate mathematical language.

Indicative reading list

- Stewart, J. et al. (2016). Precalculus: mathematics for calculus. Boston: Cengage Learning.
- Sadler, A.J. and Thorning, D.W.S. (1987). Understanding pure mathematics. Oxford: Oxford University Press
- Stroud K. A. and Booth D. J. (2013). Engineering Mathematics. Basingstoke: Palgrave Macmillan.
- Jordan, S., Ross, S. and Murphy, P. (2012). Mathematics for Science. Oxford University Press.
- Stewart, J. (2012). Calculus. Belmont: Brooks/Cole Pub Co

View reading list on Talis Aspire

Subject specific skills

- construct and present mathematical and logical arguments;
- develop advanced numeracy skills;
- understand, interpret and extract information from data presented in various forms;
- convert real-world problems into mathematical problems;
- state a problem, break it down into sub-problems and clearly present solutions using appropriate symbols and terms.

Transferable skills

- use of appropriate technology to help in the solution of mathematical, scientific and engineering problems.

Study

Study time

Type	Required
Lectures	25 sessions of 2 hours (17%)
Seminars	50 sessions of 1 hour (17%)
Private study	140 hours (47%)
Assessment	60 hours (20%)
Total	300 hours

Private study description

Students are expected to review seminar work after the sessions, and also complete the series of Independent Study Questions provided in the seminars and workshops or provided on Moodle.

Costs

No further costs have been identified for this module.

Assessment

You must pass all assessment components to pass the module.

Assessment group D4

Assessment component	Weighting	Study time	Eligible for self-certification
Maths Report	20%	12 hours	Yes (extension)

A report or write up of an application of mathematics to solve a problem set in a real world scientific context.

	Weighting	Study time	Eligible for self-certification

Reassessment component is the same

Assessment component

Class Test 1	20%	12 hours	No

A closed book class test of around 7 or 8 short answer questions testing content taken from the first term' work.

Reassessment component is the same

Assessment component

In-person Examination	60%	36 hours	No

A closed book final examination which will test content from the whole course. The questions may be longer and set in a real world context and they may also link multiple topics together.

- Answerbook Pink (12 page)
- Students may use a calculator

Reassessment component is the same

Feedback on assessment

Feedback is provided to students through written comments on scripts. Students receive a copy (or an e-copy) of their assessments with comments indicating where marks are lost and/or gained.

Past exam papers for FP007

Availability

Courses

This module is Core for:

- FIOE Warwick International Foundation Programme

- Year 1 of FP19 Warwick International Foundation Programme - Engineering
- Year 1 of FP20 Warwick International Foundation Programme - Physical Sciences
- Year 1 of FP12 Warwick International Foundation Programme - Science and Engineering