

# FP043-15 Introduction to Interdisciplinary Mathematics

**23/24**

**Department**

Warwick Foundation Studies

**Level**

Foundation

**Module leader**

Joe Alcantara

**Credit value**

15

**Module duration**

10 weeks

**Assessment**

100% coursework

**Study location**

University of Warwick main campus, Coventry

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## Description

### Introductory description

FP043-15 Introduction to Interdisciplinary Mathematics

[Module web page](#)

### Module aims

Recognise and appreciate the scope of the application of mathematics to find solutions to real-world problems in a range of disciplines.

### 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.

A selection of topics from the following disciplines:

Life Sciences

e.g. Population growth

- Using differential equations to describe population growth

e.g. Spread of disease

- Using differential equations to describe the spread of disease

e.g. Forensic Science

- Using Newton's Law of Cooling

Physics

e.g. Classical Mechanics

- Kinematics
- Dynamics
- Statics

e.g. Astronomy

- Using Kepler's laws of planetary motion

Business

e.g. Linear Programming

- Formulation of problems as linear programs
- Graphical solutions of two variable problems
- The Simplex algorithm and tableau for optimising problems

Economics

e.g. Game Theory

- Introduction to two-person games and the pay-off matrix
- Determining play-safe strategies and stable solutions

e.g. Supply and Demand

- Determining supply and demand equations
- Understanding supply and demand curves
- Calculating equilibrium points

e.g. Price Elasticity

- Introduction to the elasticity of a function
- Understanding and calculating the price elasticity of supply
- Understanding and calculating the price elasticity of demand

## **Learning outcomes**

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

- Demonstrate an understanding of, and the ability to describe, real-world scenarios using

mathematics

- Carry out investigations and analysis which will help to form conclusions and/or aid the decision making processes in a variety of contexts
- Critically analyse results, whilst appreciating the limitations of the mathematics used and any assumptions made
- Demonstrate the problem-solving skills required to become an independent undergraduate learner on relevant mathematically related degree programmes

## **Indicative reading list**

General

Saaty, T.L. and Alexander, J.M., 1981. Thinking with models: mathematical models in the physical, biological, and social sciences. RWS Publications.

Humi, M., 2017. Introduction to Mathematical Modeling. Chapman and Hall/CRC.

Life Sciences

Adam, C., 2011. Essential mathematics and statistics for forensic science. John Wiley & Sons.

Katz, E. and Halánek, J. eds., 2016. Forensic science: A multidisciplinary approach. John Wiley & Sons.

Segel, L.A. and Edelstein-Keshet, L., 2013. A Primer in Mathematical Models in Biology (Vol. 129). Siam.

Vynnycky, E. and White, R., 2010. An introduction to infectious disease modelling. Oxford University Press.

Physics

Fitzpatrick, R., 2012. An introduction to celestial mechanics. Cambridge University Press.

Fleisch, D. and Kregenow, J., 2013. A Student's Guide to the Mathematics of Astronomy. Cambridge University Press.

Morin, D., 2008. Introduction to classical mechanics: with problems and solutions. Cambridge University Press.

Business

Towler, M. and Keast, S., 2009. Rational decision making for managers: An introduction. Wiley.

Economics

Carmichael, F., 2005. A guide to game theory. Pearson Education.

Dowling, E.T., 2001. Schaum's outline of theory and problems of introduction to mathematical economics.

Perloff, J.M., 2014. Microeconomics with calculus.

[View reading list on Talis Aspire](#)

## **Interdisciplinary**

The module is interdisciplinary in nature, allowing cross over with many disciplines, including Life Sciences, Physical Sciences, Business and, Economics.

### **Subject specific skills**

Mathematical Skills

Analytical Skills

Problem-solving skills

### **Transferable skills**

Mathematical Skills

Analytical Skills

Problem-solving skills

Communication Skills

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## **Study**

### **Study time**

<b>Type</b>	<b>Required</b>
Seminars	48 sessions of 1 hour (35%)
Private study	90 hours (65%)
Total	138 hours

### **Private study description**

Private Study.

### **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 A2**

	<b>Weighting</b>	<b>Study time</b>
Final examination	60%	
Written Report (1500 words)	40%	5 hours

### **Feedback on assessment**

Written feedback provided on scripts and Tabula.

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## **Availability**

### **Courses**

This module is Core for:

- Year 1 of FIOE Warwick International Foundation Programme