Programme Specification

Mathematics [Frenchay]

Version: 2022-23, v0.1, 06 Mar 2023

Contents

Section 1: Key Programme Details

Part A: Programme Information

Programme title: Mathematics [Frenchay]

Highest award: BSc (Hons) Mathematics

Interim award: BSc Mathematics

Interim award: DipHE Mathematics

Interim award: CertHE Mathematics

Awarding institution: UWE Bristol

Affiliated institutions: Not applicable

Teaching institutions: UWE Bristol

Study abroad: No

Year abroad: No

Sandwich year: Yes

Credit recognition: No

Department responsible for the programme: FET Dept of Engineering Design & Mathematics, Faculty of Environment & Technology

Contributing departments: Not applicable

Professional, statutory or regulatory bodies:

Institute of Mathematics and its Applications (IMA)

Apprenticeship: Not applicable

Mode of delivery: Full-time, Sandwich

Entry requirements: For the current entry requirements see the UWE public website.

For implementation from: 01 September 2022

Programme code: G90E00

Section 2: Programme Overview, Aims and Learning Outcomes

Part A: Programme Overview, Aims and Learning Outcomes

Overview: Mathematics is at the root of many of humanity's greatest achievements and it continues to have a strong and enduring impact on the world. It supports innovation and progress in science, engineering, technology, health, finance and economics. The motivation to study mathematics lies in the intellectual challenge of problem solving, an appreciation of the elegance of mathematical concepts and in the power of the discipline in its wide-ranging applications.

The programme has been designed to nurture curiosity in mathematics, to create strong subject knowledge to underpin the application of mathematics and statistics, and to ensure that students are aware of the professional and ethical environment in which mathematical scientists work.

The mathematical content follows three strands, namely pure mathematics, applied mathematics and statistics. Students are exposed to core topics in number systems, sets and functions, linear algebra, calculus, computational methods, graph theory and probability theory. They will develop logical thinking, methods of proof, abstraction, problem solving and mathematical modelling. The final year project provides the opportunity to carry out an extended mathematical investigation, further developing ideas and applications within these mathematical strands, or to conduct a practice-oriented mathematics education project. The final year option structure allows students to specialise in branches of the subject according to their strengths and future career aspirations.

As is necessary for undergraduate programmes in the mathematical sciences, the design of the curriculum facilitates access to a wide range of careers. Mathematics and statistics have many real-life applications. The discipline is used to model, to predict outcomes and to inform strategic decision making in areas such as the

design of industrial and environmental processes, transport systems, communication networks, and complex health systems. Because of the increasing availability and potential of large data sets, graduate mathematicians are in high demand across a variety of public and commercial sectors. The development of programming and IT expertise throughout the programme will ensure that graduates will have the necessary skill set and subject knowledge to access the growing opportunities in data applications and analysis.

The programme is designed to support graduates seeking careers as specialist mathematical scientists working in research and development organisations that require postgraduate qualifications. The curriculum is informed by the activities of our research groups in applied mathematics and applied statistics and provides the necessary rigour to progress to specialist postgraduate programmes in mathematical sciences.

Educational Aims: The aim of this programme is to develop professional mathematical scientists equipped with the required technical knowledge and understanding of methodological approaches used in a variety of application areas. Specifically, the educational aims are for the student:

To develop a strong foundation in advanced mathematical and statistical concepts and methods and to be able to apply their knowledge and skills in different application domains;

To work as an effective member of a team, to be a creative problem solver and to communicate mathematical and statistical information to both technical and non-technical audiences;

To design and to implement software solutions that enable the use of mathematical and statistical methods to solve complex problems.

To demonstrate an understanding of the competencies and social responsibilities required by a professional mathematical scientist in the workplace and in society;

To acquire the requisite academic knowledge and skills to study higher degrees in numerate disciplines.

Programme Learning Outcomes:
On successful completion of this programme graduates will achieve the following learning outcomes.

Programme Learning Outcomes

PO1.   Analyse and solve real-life problems using mathematics, statistics, and operational research techniques.

PO2.   Plan, conduct, and lead a mathematical enquiry in a professional and effective manner.

PO3.   Select, apply, and evaluate appropriate technology for assisting a mathematical or statistical analysis, including writing computer programs, algebraic manipulation software, computer-aided visualization, and statistical software.

PO4.   Communicate any or all aspects of a mathematical or statistical investigation, altering the format or content to suit the needs of the audience.

PO5.   Reflect on the cultural, ethical, or sustainability impact, strengths, and limitations, of mathematical applications and mathematical career pathways

PO6.   Identify, describe, implement, and evaluate numerical algorithms.

PO7.   Design, execute, and evaluate statistical analyses of data.

PO8.   Define and state mathematical concepts clearly and precisely, and construct rigorous proofs.

Part B: Programme Structure

Year 1
Full time and sandwich students must take 120 credits from the modules in Year 1.

Year 1 Compulsory Modules (Full Time and Sandwich)
Full time and sandwich students must take 120 credits from the modules in Compulsory Modules (Full Time and Sandwich).

Module Code	Module Title	Credit

UFMFJV-30-1	Calculus and Numerical Techniques 2022-23	30
UFMFHV-30-1	Mathematical Structures 2022-23	30
UFMFKV-30-1	Statistical Investigations 2022-23	30
UFMFLV-30-1	The Professional Mathematical Scientist I 2022-23	30

Year 2
Full time and sandwich students must take 120 credits from the modules in Year 2.

Year 2 Compulsory Modules (Full Time and Sandwich)
Full time and sandwich students must take 105 credits from the modules in Compulsory Modules (Full Time and Sandwich).

Module Code	Module Title	Credit
UFMFNV-30-2	Calculus and Numerical Analysis 2023-24	30
UFMFMV-30-2	Graphs, Algebra and Algorithms 2023-24	30
UFMFPV-30-2	Statistical Applications 2023-24	30
UFMFQV-15-2	The Professional Mathematical Scientist 2 2023-24	15

Year 2 Optional Modules (Full Time and Sandwich)
Full time and sandwich students must take 15 credits from the modules in Optional Modules (Full Time and Sandwich).

Module Code	Module Title	Credit
UFMFSV-15-2	Markov Chains 2023-24	15
UFMFRV-15-2	Vector Calculus 2023-24	15

Year 3
Full time students must take 120 credits from the modules in Year 3.
Sandwich students must take 15 credits from the modules in Year 3.

Year 3 Compulsory Modules (Full Time)

Full time students must take 30 credits from the modules in Compulsory Modules (Full Time).

Module Code	Module Title	Credit
UFMFVV-30-3	Applications of Computational Mathematics 2024-25	30

Year 3 Compulsory Modules (Sandwich)

Sandwich students take a placement year and study UFCFE6-15-3 Professional Experience.

Module Code	Module Title	Credit
UFCFE6-15-3	Professional Experience 2024-25	15

Year 3 Optional Modules 1 (Full Time)

Full time students must take 30 credits from the modules in Optional Modules 1 (Full Time).

Module Code	Module Title	Credit
UFMFUV-30-3	Mathematical Sciences Project 2024-25	30
UFMFH9-30-3	Mathematics Education Project 2024-25	30

Year 3 Optional Modules 2 (Full Time)

Full time students must take 60 credits from the modules in Optional Modules 2 (Full Time).

Module Code	Module Title	Credit
UFMFWV-15-3	Clustering and Classification 2024-25	15
UFMFTV-15-3	Dynamical Systems 2024-25	15
UFMFUG-15-3	Financial Mathematics 2024-25	15
UFMFXV-15-3	Networks 2024-25	15
UFMFYV-15-3	Number Theory and Cryptography 2024-25	15

| UFMF7W-15-3 | Statistical Practice 2024-25 | 15 |

Year 4
Sandwich students must take 105 credits from the modules in Year 4.

Year 4 Compulsory Modules (Sandwich)
Sandwich students must take 30 credits from the modules in Compulsory Modules (Sandwich).

Module Code	Module Title	Credit
UFMFVV-30-3	Applications of Computational Mathematics 2025-26	30

Year 4 Optional Modules 1 (Sandwich)
Sandwich students must take 30 credits from the modules in Optional Modules 1 (Sandwich).

Module Code	Module Title	Credit
UFMFUV-30-3	Mathematical Sciences Project 2025-26	30
UFMFH9-30-3	Mathematics Education Project 2025-26	30

Year 4 Optional Modules 2 (Sandwich)
Sandwich students must take 45 credits from the modules in Optional Modules 2 (Sandwich).

Module Code	Module Title	Credit
UFMFWV-15-3	Clustering and Classification 2025-26	15
UFMFTV-15-3	Dynamical Systems 2025-26	15
UFMFUG-15-3	Financial Mathematics 2025-26	15
UFMFXV-15-3	Networks 2025-26	15
UFMFYV-15-3	Number Theory and Cryptography 2025-26	15
UFMF7W-15-3	Statistical Practice 2025-26	15

Part C: Higher Education Achievement Record (HEAR) Synopsis

Graduates from this programme will be innovative mathematical scientists, who not only have the technical knowledge and experience to participate in key emerging industries, or continue onto postgraduate study in a mathematical discipline, but also possess the ability to assess the human and global impact of their discipline. The programme will enable the student to become proficient in advanced mathematical and statistical concepts, and to explore real-world applications, by forming them as an innovative, adaptable, enterprising professional mathematical scientist with theoretical understanding who can work across disciplines.

Part D: External Reference Points and Benchmarks

QAA UK Quality Code for HE (May 2018)

Framework for higher education qualifications (FHEQ)(October 2014)

Subject benchmark statement for Higher Education qualifications in Mathematics, Statistics and Operational Research (October 2019)

Strategy 2030

University policies

Staff research projects

Institute of Mathematics and its Applications Guidance: https://ima.org.uk/university-degree-programme-accreditation/

Part E: Regulations

Approved to University Regulations and Procedures.