



## Programme Specification

Mathematics [Sep][SW][Frenchay][4yrs]

Version: 2020-21, v2.0, 17 Jan 2022

### Contents

<b>Programme Specification</b> .....	<b>1</b>
<b>Section 1: Key Programme Details</b> .....	<b>2</b>
Part A: Programme Information .....	2
<b>Section 2: Programme Overview, Aims and Learning Outcomes</b> .....	<b>3</b>
Part A: Programme Overview, Aims and Learning Outcomes .....	3
Part B: Programme Structure.....	5
Part C: Higher Education Achievement Record (HEAR) Synopsis .....	8
Part D: External Reference Points and Benchmarks .....	8
Part E: Regulations .....	8

## Section 1: Key Programme Details

### Part A: Programme Information

**Programme title:** Mathematics [Sep][SW][Frenchay][4yrs]

**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:** Sandwich

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

**For implementation from:** 01 September 2022

**Programme code:** G90E-SEP-SW-FR-G900

## 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**

The student must take 120 credits from the modules in Year 1.

#### **Year 1 Compulsory Modules**

The student must take 120 credits from the modules in Compulsory Modules.

<b>Module Code</b>	<b>Module Title</b>	<b>Credit</b>
--------------------	---------------------	---------------

UFMFJV-30-1	Calculus and Numerical Techniques 2020-21	30
UFMFHV-30-1	Mathematical Structures 2020-21	30
UFMFKV-30-1	Statistical Investigations 2020-21	30
UFMFLV-30-1	The Professional Mathematical Scientist I 2020-21	30

## Year 2

The student must take 120 credits from the modules in Year 2.

### Year 2 Compulsory Modules

The student must take 105 credits from the modules in Compulsory Modules.

Module Code	Module Title	Credit
UFMFNV-30-2	Calculus and Numerical Analysis 2021-22	30
UFMFMV-30-2	Graphs, Algebra and Algorithms 2021-22	30
UFMFPV-30-2	Statistical Applications 2021-22	30
UFMFQV-15-2	The Professional Mathematical Scientist 2 2021-22	15

### Year 2 Optional Modules

The student must take 15 credits from the modules in Optional Modules.

Module Code	Module Title	Credit
UFMFSV-15-2	Markov Chains 2021-22	15
UTLGSW-15-2	Mathematics Education 2021-22	15
UFMFRV-15-2	Vector Calculus 2021-22	15

## Year 3

The student must take 15 credits from the modules in Year 3.

**Year 3 Compulsory Modules**

Students take a placement year and study UFCFE6-15-3 Professional Experience

<b>Module Code</b>	<b>Module Title</b>	<b>Credit</b>
UFCFE6-15-3	Professional Experience 2022-23	15

**Year 4**

The student must take 105 credits from the modules in Year 4.

**Year 4 Compulsory Modules**

The student must take 30 credits from the modules in Compulsory Modules.

<b>Module Code</b>	<b>Module Title</b>	<b>Credit</b>
UFMFVV-30-3	Applications of Computational Mathematics 2023-24	30

**Year 4 Optional Modules 1**

The student must take 30 credits from the modules in Optional Modules 1.

<b>Module Code</b>	<b>Module Title</b>	<b>Credit</b>
UFMFUV-30-3	Mathematical Sciences Project 2023-24	30
UFMFH9-30-3	Mathematics Education Project 2023-24	30

**Year 4 Optional Modules 2**

The student must take 45 credits from the modules in Optional Modules 2.

<b>Module Code</b>	<b>Module Title</b>	<b>Credit</b>
UFMFVW-15-3	Clustering and Classification 2023-24	15
UFMFTV-15-3	Dynamical Systems 2023-24	15
UFMFXV-15-3	Networks 2023-24	15
UFMFYV-15-3	Number Theory and Cryptography 2023-24	15
UFMF7W-15-3	Statistical Practice 2023-24	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.