Programme Specification

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

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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 2018

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

Section 2: Programme Overview, Aims and Learning Outcomes

Part A: Programme Overview, Aims and Learning Outcomes

Overview: Students graduating from this programme will use their specialist knowledge in a wide variety of professional contexts. Mathematics graduates are employed across the economy, for example in business and financial modelling, in engineering, in research organisations modelling problems in biology, physics, computer science and social science, in computing, in the development of new technologies, and as statisticians analysing large data sets for government and commercial organisations and in education.

Students are provided with a broad experience of the discipline through a number of interconnected strands or themes that are developed through the programme, such as modern applied mathematics, computational mathematics, algebra and geometry, decision modelling and applied statistics. The programme structure is flexible allowing students to specialize and choose options that support their future career direction. Students are informed about the future employment opportunities open to graduates through stand-alone employability sessions and employer talks.

Educational Aims: The BSc (Hons) Mathematics has the following educational aims:

To produce graduates who are familiar with concepts and skills of Mathematics, Statistics and Operational Research that will enable them to gain employment in a number of sectors including science, technology, government and business;

To develop understanding of the underlying and unifying mathematical concepts that underpin the different branches of the discipline;

To prepare students for progression to study higher degrees in Mathematics,

Statistics and Operational research;

To develop analytical, problem-solving transferable skills that will be valuable to graduates in any career;

To develop the ability to apply mathematical statistical and operational research concepts in a range of contexts;

To develop an understanding of the modelling process as applied to a range of problems in different contexts;

To develop the ability to use a range of specialised computer software to solve problems in the mathematical sciences.

To ensure that graduates can communicate effectively through presentations and through written reports;

To continue the development of those general study skills that will enable students to becomeindependent lifelong learners;

To encourage the discerning use of reference material from a variety of sources.

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

Knowledge and Understanding

A1. Analytical techniques used to solve problems involving linear systems

A2. Analytical techniques used to solve problems involving nonlinear systems;

A3. Analytical techniques used to solve problems involving discrete mathematical objects.

A4. Computational techniques for solving mathematical problems.

A5. The application of computer software to analyse and solve mathematical and statistical problems

A6. Programming concepts and structures for implementing numerical algorithms

A7. The theoretical underpinning and application of a wide range of methods for statistical analysis, design of experiments and data modelling

A8. The modelling process, applied to a variety of problems, using techniques from mathematics, statistics and operational research

A9. The theoretical underpinning of decision modeling and operational research techniques

A10. The application of mathematical and statistical techniques to solve realistic problems drawn from a variety of application areas; e.g. biology, physics, finance, health, business, transport, social science

Intellectual Skills

B1. Think logically and use symbolic language to describe the relationships between real and abstract quantities in the context of mathematical, statistical and operational research problems;

B2. Communicate mathematical and statistical arguments, using appropriate notation, in a clear and precise manner

B3. Construct rigorous logical arguments and mathematical proofs;

B4. Critically interpret solutions obtained using mathematical, statistical and operational research techniques and report conclusions in a clear and appropriate manner;

B5. Design, implement and test simple algorithms;

Subject/Professional Practice Skills

C1. Adopt different problem solving approaches from mathematical, statistical and operational research to problems that arise in a variety of contexts;

C2. Use mathematical language, notation and methods in the description and analysis of problems in appropriate areas of application

C3. Communicate the results from mathematical or statistical investigations in a manner that is appropriate for a non technical audience

C4. Apply mathematical theory in a variety of contexts such as financial mathematics, fluid dynamics, computational mathematics, coding, mathematical biology, transport and decision modelling.

C5. Apply statistical methods in a variety of contexts relevant to government, science and industry.

C6. Develop and implement mathematical and statistical models in a variety of contexts.

Transferable Skills and other attributes

D1. Communicate using professional standards of English, both orally and through written technical reports

D2. Demonstrate the ability to manage their own time and meet deadlines

D3. Work in teams and take responsibility for individual and shared objectives

D4. Use IT skills in context and to learn how to use new software tools to develop and to implement solutions

D5. Take a logical and systematic approach to problem formulation, solution and decision making

D6. Demonstrate the ability to learn independently

D7. To be able to critically to review available literature that is relevant to the subject discipline

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.

Module Code	Module Title	Credit
UFMFK3-30-1	Calculus and Numerical Methods 2019-20	30
UFMFM3-30-1	Modelling and Optimisation 2019-20	30

UFMFL3-30-1	Sets, Functions and Linear Algebra 2019-20	30
UFMFPA-30-1	Statistical Reasoning 2019-20	30

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

Year 2 Compulsory Modules
The student must take 90 credits from the modules in Compulsory modules.

Module Code	Module Title	Credit
UFMFC7-30-2	Algebra, Combinatorics and Graphs 2020-21	30
UFMFF9-30-2	Mathematical Methods 2020-21	30
UFMFNA-30-2	Statistical Modelling 2020-21	30

Year 2 Optional Modules
Select 30 credits from:

Please note: UFMFSK-30-2 Reflection on Practice in Secondary Education is only available for students transferring from the Maths with QTS programme.

Module Code	Module Title	Credit
UFMFQ7-15-2	Coding Theory and Applications 2020-21	15
UFMFT7-15-2	Complex Variables 2020-21	15
UFMFG9-15-2	Mathematical Statistics 2020-21	15
UTLGSW-15-2	Mathematics Education 2020-21	15
UFMF7A-15-2	Operational Research 2020-21	15
UFMFSK-30-2	Reflection on Practice in Secondary Education 2020-21	30

Year 3
Sandwich: Students may elect to spend a minimum of 40 weeks working for an organisation, in a role where mathematical and statistical methods are used in the workplace.

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

Module Code	Module Title	Credit
UFMF89-15-3	Industrial Placement 2021-22	15

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

Year 4 Compulsory Module
The student must take 30 credits from the modules in Compulsory Modules.

Module Code	Module Title	Credit
UFMFVV-30-3	Applications of Computational Mathematics 2022-23	30

Year 4 Optional Modules 1
The student must take 30 credits from the modules in Optional Modules 1.

Module Code	Module Title	Credit
UFMFUV-30-3	Mathematical Sciences Project 2022-23	30
UFMFH9-30-3	Mathematics Education Project 2022-23	30

Year 4 Optional Modules 2
The student must take 45 credits from the modules in Optional Modules 2.

Module Code	Module Title	Credit
UFMFWV-15-3	Clustering and Classification 2022-23	15
UFMFTV-15-3	Dynamical Systems 2022-23	15
UFMFUG-15-3	Financial Mathematics 2022-23	15

UFMFXV-15-3	Networks 2022-23	15
UFMFYV-15-3	Number Theory and Cryptography 2022-23	15
UFMF7W-15-3	Statistical Practice 2022-23	15

Part C: Higher Education Achievement Record (HEAR) Synopsis

Graduates of Mathematics will understand mathematical analysis of discrete and continuous linear and non linear systems. They will be able to use numerical techniques for solving mathematical problems, as well as computer based applications relevant to mathematical sciences.

Graduates will be able to demonstrate understanding of a wide range of methods for the statistical presentation, analysis and modelling of data and processes. They will be able to comprehend the design and analysis of experiments. They will also understand the theoretical underpinning of statistical techniques.

Furthermore, graduates will have the skills to apply the appropriate mathematical, statistical and operational research techniques to critically interpret a solution.

They will have shown during this degree, that they are able to think logically and use symbolic language, as well as report conclusions in a clear and concise manner. They will also have the ability to design, implement, and test simple algorithms.

These graduates will be able to apply mathematical theory in a variety of contexts such as financial derivatives or fluid dynamics. Additionally, they will be able to apply statistical methods in a variety of contexts, including economics and industrial and biomedical applications.

Graduates of Mathematics will have developed effective communication skills and will be able to manage their own time, and work with others in a team. They will be able to analyse and interpret information to make decisions and demonstrate proficient IT skills - including use of software tools in the context of application

development.

During their degree a strong emphasis will have been placed upon independent learning, and graduates will have used this, together with an awareness of professional literature, to support their study.

Part D: External Reference Points and Benchmarks

This programme has been prepared with reference to a number of external benchmarks, including the QAA Subject Benchmark Statements for Mathematics, Statistics and Operational Research, the QAA Framework for HE Qualifications and the University's Learning and Teaching Strategy.

The Subject Benchmark Statements for Mathematics, Statistics and Operational Research emphasises the diversity of programmes that are likely to draw upon this benchmark. It notes that some programmes give a broad coverage of a wide area of topics that fall within the scope of mathematical and statistical subjects, while others develop particular subject areas in depth.

The BSc Mathematics programme provides that broad coverage while allowing specialisation in the later stages of the award. While highlighting certain core topics, such as knowledge of number systems, sets, functions, linear algebra and probability, to be included in any undergraduate mathematics programme, the subject benchmark emphasises the development of logical thinking, proof, problem solving and mathematical modelling as core skills for graduate mathematicians.

The design and content of programme has been informed by employer input through our student placements, by employer participation at our graduate development and outreach events and by our research and consultancy activities.

Part E: Regulations

Approved to University Regulations and Procedures.