Queen Mary
University of London

Programme Specification (UG)

Awarding body / institution:	Queen Mary University of London
Teaching institution:	Queen Mary University of London
Name of final award and programme title:	BSc Mathematics;BSc Mathematics with Year Abroad;BSc Mathematics with Professional Placement;
Name of interim award(s):	CertHE, DipHE
Duration of study / period of registration:	3/4 years
QMUL programme code / UCAS code(s):	UBSF-QMMATH1-USMAS/G100;UBSF-QMMATG1-USMAA/G10Y;UBSF-Q
QAA Benchmark Group:	Mathematics, statistics and operational research
FHEQ Level of Award :	Level 6
Programme accredited by:	N/A
Date Programme Specification approved:	
Responsible School / Institute:	School of Mathematical Sciences

Schools / Institutes which will also be involved in teaching part of the programme:

Collaborative institution(s) / organisation(s) involved in delivering the programme:

Programme outline

This programme provides a broad training in the discipline of mathematics, assuring a good foundation in a range of both abstract and applicable areas and offering opportunities for specialisation in the later stages. Graduates from the programme find employment in many different areas, for example in the financial sector and in teaching, or they continue their studies at postgraduate level, in mathematics or an application.

Aims of the programme

This programme aims to teach a wide range of topics covering pure and applied mathematics, probability and statistics. The exceptionally broad range of second and final-year options aims to allow graduates to benefit from our research strengths. The first year covers essential fundamentals but the final-year aims to allow students to follow their own preferences.

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Whether students are interested in specialising in statistics, finance, pure or applied mathematics, the wide range of modules available provides the opportunity.

What will you be expected to achieve?

Students who successfully complete this programme will be expected to achieve all of the learning outcomes shown below.

Please note that the following information is only applicable to students who commenced their Level 4 studies in 2017/18, or 2018/19

In each year of undergraduate study, students are required to study modules to the value of at least 10 credits, which align to one or more of the following themes:

- networking
- multi- and inter-disciplinarity
- international perspectives
- enterprising perspectives.

These modules will be identified through the Module Directory, and / or by your School or Institute as your studies progress.

Academic Content:	
A 1	reason clearly, critically and with rigour within a mathematical context;
A 2	construct appropriate written mathematical arguments;
A 3	analyse a problem within a mathematical context and select appropriate mathematical tools to solve it;

Disciplinary Skills - able to:	
B 1	be fluent and accurate in basic numerical skills;

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B2	comprehend fundamental concepts and techniques of calculus, algebra, probability theory and at least one additional main mathematical subject;
B3	take notes, write up notes, plan revision, and learn independently;
B4	use e-mail for cooperation and the internet as a source of information, and have a sense of right and wrong ways of using these facilities;
B5	manage time and work cooperatively with fellow students;

Attributes:	
C1	acquire complex knowledge and apply it rigorously;
C2	connect information and ideas within their field of study;
C3	use writing for learning, reflection, and communication;
C4	adapt their understanding to new and unfamiliar settings;
C5	acquire new learning skills in a range of ways, both individually and collaboratively;
C6	use quantitative data confidently and competently;
C7	acquire transferable key skills to help with career goals and continuing education;
C8	develop effective spoken English and presentation skills;
C9	use information for evidence-based decision-making and creative thinking;

How will you learn?

Teaching in most modules is primarily by formal lectures but may include guided reading. For all except some higher-level modules, teaching is supported by tutorial classes and/or computer laboratories. Teaching of reading and project modules is primarily by guided reading and weekly seminars or supervisions.

Learning in most modules is by attending lectures, reading lecture notes and recommended text books, attempting exercises and asking questions in tutorial classes and/or computer laboratories and staff office hours.

How will you be assessed?

Assessment is normally primarily by written examination but for some modules may also include continuous assessment of coursework consisting of solutions to exercises, which are set weekly or fortnightly, and/or one or more tests. Summative coursework assessment or tests may typically contribute up to 25% of the assessment. Assessment of project modules is normally by a project report, presentation and, at the examiners' discretion, an oral examination.

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How is the programme structured?

Please specify the structure of the programme diets for all variants of the programme (e.g. full-time, part-time - if applicable). The description should be sufficiently detailed to fully define the structure of the diet.

For degree awarding purposes (in order to deal with special cases like changes of programme) students will be allowed to choose up to 30 credits of off diet modules in any year (with School approval). At the end of year two, students have the opportunity to take a placement year in industry - G10Y Mathematics with Professional Placement. Students also have the option to take advantage of studying abroad - G101 Mathematics with Professional Placement.

Year 1

Semester A
2 compulsory level 4 modules

MTH4000 [4] Programming in Python I
MTH4213 [4] Numbers, Sets and Functions

Semester B
2 compulsory level 4 modules

MTH4104 [4] Introduction to Algebra
MTH4215 [4] Vectors and Matrices

Semester A & B
2 compulsory level 4 modules

MTH4300 [4] Introduction to Analysis with Calculus
MTH4500 [4] Probability & Statistics

Year 2

Semester A
2 compulsory modules

MTH5112 [5] Linear Algebra I
MTH5123 [5] Differential Equations

Choose two from the following list:

MTH5104 [5] Convergence and Continuity
MTH5130 [5] Number Theory
MTH5124 [5] Actuarial Mathematics I
MTH5129 [5] Probability and Statistics II

Semester B
One compulsory module

MTH5005 [5] Programming in Python II

Choose three from:

MTH5103 [5] Complex Variables
MTH5113 [5] Introduction to Differential Geometry
MTH5105 [5] Differential and Integral Analysis
MTH5114 [5] Linear Programming and Games
MTH5120 [5] Statistical Modelling I

Year long
MTH5205 [5] Professional Skills for Mathematicians
Year 3
Students must choose one of three pathways: General , Pure, or Statistics and Financial and then choose 60 credits each semester from modules listed for that pathway.

General

Semester A
Choose four from:
MTH5130 [5] Number Theory
MTH6115 [6] Cryptography
MTH6138 [6] Third Year Project
MTH6140 [6] Linear Algebra II
MTH6141 [6] Random Processes
MTH6151 [6] Partial Differential Equations
MTH6154 [6] Financial Mathematics I

Semester B
Choose four from:
MTH6101 [6] Introduction to Machine Learning
MTH6105 [6] Algorithmic Graph Theory
MTH6110 [6] Communicating and Teaching Mathematics (by approval in semester A)**
MTH6132 [6] Relativity
MTH6138 [6] Third Year Project
MTH6142 [6] Complex Networks
MTH6150 [6] Numerical Computing with C and C++
MTH6155 [6] Financial Mathematics II

Pure Pathway

Semester A
Choose four from:
MTH5130 [5] Number Theory
MTH6106 [6] Group Theory
MTH6115 [6] Cryptography
MTH6138 [6] Third Year Project
MTH6140 [6] Linear Algebra II
MTH6107 [6] Chaos and Fractals
MTH6151 [6] Partial Differential Equations

Semester B
Choose four from:
MTH6105 [6] Algorithmic Graph Theory
MTH6110 [6] Communicating & Teaching Mathematics
MTH6127 [6] Metric Spaces and Topology
MTH6138 [6] Third Year Project
MTH6132 [6] Relativity
MTH6142 [6] Complex Networks
MTH6158 [6] Ring Theory
MTH6150 [6] Numerical Computing with C and C++

Statistics and Financial Pathway

To choose this Pathway, students must have studied MTH5129.

Semester A

Choose four from:
MTH5124 [5] Actuarial Mathematics I
MTH6102 [6] Bayesian Statistical Methods
MTH6134 [6] Statistical Modelling II
MTH6138 [6] Third Year Project*
MTH6141 [6] Random Processes
MTH6151 [6] Partial Differential Equations
MTH6154 [6] Financial Mathematics I

Semester B
Choose four from:

MTH6150 [6] Numerical Computing with C and C++
MTH6142 [6] Complex Networks
MTH6155 [6] Financial Mathematics II
MTH6101 [6] Introduction to Machine Learning
MTH6139 [6] Time Series
MTH6113 [6] Mathematical Tools for Asset Management
MTH6138 Third Year Project
MTH6110 [6] Communicating & Teaching Mathematics

Academic Year of Study   FT - Year 1

Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester
Programming in Python I	MTH4000	15	4	Compulsory	1	Semester 1
Number, Sets and Functions	MTH4213	15	4	Compulsory	1	Semester 1
Introduction to Algebra	MTH4104	15	4	Compulsory	1	Semester 2
Vectors and Matrices	MTH4215	15	4	Compulsory	1	Semester 2
Introduction to Analysis with Calculus	MTH4300	30	4	Compulsory	1	Semesters 1 & 2
Probability & Statistics	MTH4500	30	4	Compulsory	1	Semesters 1 & 2

Academic Year of Study   FT - Year 2

Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester

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Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester
Linear Algebra I	MTH5112	15	5	Compulsory	2	Semester 1
Differential Equations	MTH5123	15	5	Compulsory	2	Semester 1
Convergence and Continuity	MTH5104	15	5	Elective	2	Semester 1
Professional Skills for Mathematicians	MTH5205	0	5	Compulsory	2	Semesters 1 & 2
Number Theory	MTH5130	15	5	Elective	2	Semester 1
Actuarial Mathematics I	MTH5124	15	5	Elective	2	Semester 1
Programming in Python II	MTH5005	15	5	Compulsory	2	Semester 2
Complex Variables	MTH5103	15	5	Elective	2	Semester 2
Differential and Integral Analysis	MTH5105	15	5	Elective	2	Semester 2
Introduction to Differential Geometry	MTH5113	15	5	Elective	2	Semester 2
Linear Programming and Games	MTH5114	15	5	Elective	2	Semester 2
Statistical Modelling I	MTH5120	15	5	Elective	2	Semester 2
Probability and Statistics II	MTH5129	15	5	Elective	2	Semester 1

Academic Year of Study   FT - Year 3

Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester
Algorithmic Graph Theory (General Pathway and Pure Pathway)	MTH6105	15	6	Elective	3	Semester 2
Group Theory (Pure Pathway)	MTH6106	15	6	Elective	3	Semester 1

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Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester
Chaos and Fractals (Pure Pathway)	MTH6107	15	6	Elective	3	Semester 1
Communicating and Teaching Mathematics (All Pathways)	MTH6110	15	6	Elective	3	Semester 2
Mathematical Tools for Asset Management (Statistics and Financial Pathway)	MTH6113	15	6	Elective	3	Semester 2
Metric Spaces and Topology (Pure Pathway)	MTH6127	15	6	Elective	3	Semester 2
Relativity (General Pathway and Pure Pathway)	MTH6132	15	6	Elective	3	Semester 2
Statistical Modelling II (Statistics and Financial Pathway)	MTH6134	15	6	Elective	3	Semester 1
Third Year Project (All Pathways)	MTH6138	15	6	Elective	3	Semester 1 or 2
Time Series (Statistics and Financial Pathway)	MTH6139	15	6	Elective	3	Semester 2
Linear Algebra II (Pure Pathway and General Pathway)	MTH6140	15	6	Elective	3	Semester 1
Random Processes (General Pathway and Statistics and Financial Pathway)	MTH6141	15	6	Elective	3	Semester 1
Complex Networks (All Pathways)	MTH6142	15	6	Elective	3	Semester 2
Numerical Computing with C and C++ (All Pathways)	MTH6150	15	6	Elective	3	Semester 2
Financial Mathematics I (General Pathway and Statistics and Financial Pathway)	MTH6154	15	6	Elective	3	Semester 1
Introduction to Machine Learning (General Pathway and Statistics and Financial Pathway)	MTH6101	15	6	Elective	3	Semester 2
Ring Theory (Pure Pathway)	MTH6158	15	6	Elective	3	Semester 2
Bayesian Statistical Methods (Statistical and Financial Pathway)	MTH6102	15	6	Elective	3	Semester 1
Financial Mathematics II (General Pathway and Statistics and Financial Pathway)	MTH6155	15	6	Elective	3	Semester 2
Partial Differential Equations (All Pathways)	MTH6151	15	6	Elective	3	Semester 1

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Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester
Cryptography (Pure pathway and General Pathway)	MTH6115	15	6	Elective	3	Semester 1
Number Theory (Pure pathway and General Pathway)	MTH5130	15	5	Elective	3	Semester 1
Actuarial Mathematics I (Statistics and Financial Pathway)	MTH5124	15	5	Elective	3	Semester 1

What are the entry requirements?

For UK applicants, we require 3 GCE A-levels at ABB–including Mathematics at Grade A. Grade C or 4 in GCSE English Language is also required.

International Baccalaureate: Acceptable on its own and combined with other qualifications.
Subjects and grades required: 34–36 points total including Higher Level Mathematics at grade 6.

Non-UK applicants: Equivalent qualifications may be accepted. IELTS: 6.0 (with a minimum of 5.5 in all sections) is required.

How will the quality of the programme be managed and enhanced? How do we listen to and act on your feedback?

The programme is over seen by a Programme Director with overall oversight of the programme.

The quality and structure of the programme as a whole is the responsibility of the DoE with support from DDoE, the Programme Director and the School's Education Committee. This includes revising the syllabuses of modules, and refining the module offering.

The quality of individual modules is monitored by DoE and DDoE, and includes evaluation of student feedback through questionnaires, the Student Staff Liaison Committee, module registrations, exam performance, as well as direct observations of the lectures.

The School operates an Education Committee which advises the School's Director of Education on all matters relating to the delivery of taught programmes at School level, including monitoring the application of relevant QMUL policies and reviewing all proposals for module and programme approval and amendment before submission for approval to Taught Programmes Board. Student views are incorporated in this Committee's work in a number of ways, such as through the SSLC and consideration of student surveys.

All Schools operate an Annual Programme Review (APR) of their taught undergraduate and postgraduate provision. APR is a continuous process of reflection and action planning which is owned by those responsible for programme delivery; the main document of reference for this process is the Student Experience Action Plan (SEAP) which is the summary of the School's work throughout the year to monitor academic standards and to improve the student experience. The process is organised at a School-level basis with the Director of Taught Programmes responsible for updating the School's Taught Programmes Action Plan. Students'views are considered in this process through analysis of the NSS and module evaluations.

Every 5-6 years the School undergoes a Periodic Review of its teaching provision, by a panel consisting of experts external to the School. The process is organised at a School-level basis with the Director of Education responsible for updating the School's Taught Programmes Action Plan. Students' views are considered in this process through analysis of student surveys and module evaluations.

The Staff-Student Liaison Committee provides a formal means of communication and discussion between the School and its students. The committee consists of student representatives from each year of the programmes, together with appropriate

representation from staff within the School. It is designed to respond to both the general needs of students, and subject specific concerns, as well as act as a forum for discussing programme and module developments. Staff-Student Liaison Committees meet regularly throughout the year.

The Director of Education and and Deputy Director of Education both attend the Staff-Student Liaison Committee and the School's Education Committee and ensure that student feedback is fed into the review of modules and programmes. Student views are also incorporated in the Committee's work in other ways, such as through the National Student Survey (NSS) and student module evaluations.

What academic support is available?

Each student is allocated a personal academic advisor, who acts as a first point of contact for general academic and pastoral support. Personal tuition is provided primarily through tutorial classes and visits to module organisers during their office hours, which are advertised on the web. Programme induction for new students begins during the enrolment period and extends into the first semester; it includes a series of presentations organised by the Education Services Team. Each programme is assigned a Programme Director and all teaching is overseen by the Education Committee, which includes the Programme Directors and is chaired by the Director of Education. Programmes are monitored continuously and reviewed every few years by the Education Committee.

How inclusive is the programme for all students, including those with disabilities?

Queen Mary has a central Disability and Dyslexia Service (DDS) that offers support for all students with disabilities, specific learning difficulties and mental health issues. The DDS supports all Queen Mary students: full-time, part-time, undergraduate, postgraduate, UK and international at all campuses and all sites.

Students can access advice, guidance and support in the following areas:
• finding out if you have a specific learning difficulty like dyslexia;
• applying for funding through the Disabled Students' Allowance (DSA);
• arranging DSA assessments of need;
• special arrangements in examinations;
• accessing loaned equipment (e.g. digital recorders);
• specialist one-to-one "study skills" tuition;
• ensuring access to course materials in alternative formats (e.g. Braille);
• providing educational support workers (e.g. note-takers, readers, library assistants);
• mentoring support for students with mental health issues and conditions on the autistic spectrum.

Programme-specific rules and facts

Links with employers, placement opportunities and transferable skills

Recent graduates have gone into a wide variety of jobs. Some went into positions in the financial sector ranging from actuarial and accountancy trainees with banks such as Lloyds TSB to a financial analyst with AIG. Teacher training was an option that was taken up by a number of our graduates, as was further study: around one third of our graduates go on to complete a Masters or PhD degree. High-level numeracy is one of the most sought-after skills in the workplace and many opportunities are open to a mathematical sciences graduate. During this degree programme students learn how to analyse and solve problems, apply mathematical modelling, communicate their ideas and theories effectively, and work independently and manage their own time. Students learn to apply mathematical techniques to situations across the sciences and other areas such as finance. These skills are highly desirable to employers ranging from business and finance to the chemicals and materials industries.

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Programme Specification Approval

Person completing Programme Specification:

Simon Rawstron (ESM-Education Services Manager), Shabn

Person responsible for management of programme:

Shabnam Beheshti, DoE

Date Programme Specification produced / amended by School / Institute Learning and Teaching Committee:

19 Dec 2023

Date Programme Specification approved by Taught Programmes Board:

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