Queen Mary
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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:	MSci Mathematics MSci Mathematics with Year Abroad
Name of interim award(s):	CertHE, DipHE, , BSc
Duration of study / period of registration:	4/5 years
QMUL programme code / UCAS code(s):	UMIF-QMMATH1-USMAS / G102; UMIF-QMMATG1-USMAA / G12Y
QAA Benchmark Group:	Mathematics, statistics and operational research
FHEQ Level of Award :	Level 7
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 mathematical training to an advanced level, with a concentration on the abstract and formal structures that form the core of modern mathematics at research level. Graduates from the programme are well-placed to embark on mathematical research leading to a PhD, or to undertake employment requiring advanced analytical skills and critical judgement.

Aims of the programme

This programme is an extension of G100 (BSc Mathematics) and G110 (BSc Pure Mathematics). It aims to teach a wide range of topics covering pure and applied mathematics, probability and statistics to an advanced level. The exceptionally broad range of second, third and final-year options allows graduates to benefit from our research strengths. The

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first year covers essential fundamentals but the final two years allow students to follow their own preferences. Whether students are interested in specialising in pure mathematics or its applications, the wide range of modules available provides the opportunity. This programme include a final year consisting of a 30-credit project and modules from the School of Mathematical Sciences' MSc programmes. This enables graduates to become independent learners of advanced mathematics.

What will you be expected to achieve?

Students who successfully complete this programme will be expected to achieve all of the learning outcomes listed 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:	
A1	reason clearly, critically and with rigour within a mathematical context;
A2	choose appropriate mathematical methods and understand how to apply them in practical situations;
A3	understand and use mathematics at graduate level such as algebra, topology, group theory, dynamical systems, measure theory, probability and stochastic processes.

Disciplinary Skills - able to:	
B1	be fluent and accurate in basic numerical skills;

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B 2	comprehend fundamental concepts and techniques of calculus, geometry, probability and statistics, mathematical computing, linear and abstract algebra, mathematical analysis, mathematical writing and other mathematical subjects;
B 3	take and write up notes, plan revision, learn independently, manage time and work cooperatively with fellow students;
B 4	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;
B 5	explain the interrelations among mathematical subjects and use them to analyse a problem within a mathematical context and select appropriate tools to solve it;
B 6	explain mathematical work, in appropriate detail, to both specialists and non-specialists;
B 7	construct appropriate written mathematical arguments, carry out a substantial piece of work whose structure and content depends largely on their own initiative and complete an advanced mathematical project.

Attributes:	
C 1	acquire complex knowledge and apply it rigorously;
C 2	connect information and ideas within their field of study;
C 3	use writing for learning, reflection, and communication;
C 4	adapt their understanding to new and unfamiliar settings;
C 5	acquire new learning skills in a range of ways, both individually and collaboratively;
C 6	use quantitative data confidently and competently;
C 7	acquire transferable key skills to help with career goals and continuing education;
C 8	develop effective spoken English and presentation skills;
C 9	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.

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).

Year 1
8 compulsory level 4 modules

Semester A
MTH4114 [4] Computing and Data Analysis with Excel
MTH4200 [4] Calculus I
MTH4207 [4] Introduction to Probability
MTH4213 [4] Numbers, Sets and Functions

Semester B
MTH4104 [4] Introduction to Algebra
MTH4201 [4] Calculus II
MTH4215 [4] Vectors and Matrices
MTH4216 [4] Probability and Statistics I

Year 2

Semester A
Three compulsory modules
MTH5104 [5] Convergence and Continuity
MTH5112 [5] Linear Algebra I
MTH5123 [5] Differential Equations

Choose one from:
MTH5129 [5] Probability and Statistics II
MTH5130 [5] Number Theory
MTH5124 [5] Actuarial Mathematics |

Semester B
One compulsory module
MTH5001 [5] Introduction to Computer Programming

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

Year 3
Students must choose one of three pathways: General, Pure, or Stats and Financial and then choose 60 credits each semester from modules listed for that pathway.

General Pathway

Semester A
Choose four modules:
MTH6141 [6] Random Processes
MTH6154 [6] Financial Mathematics I
MTH6151 [6] Partial Differential Equations
MTH5130 [5] Number Theory
MTH6115 [6] Cryptography
MTH6140 [6] Linear Algebra II
MTH6138 [6] Third Year Project (may be taken in either semester)

Semester B
Choose four modules:
MTH6105 [6] Algorithmic Graph Theory
MTH6155 [6] Financial Mathematics II
MTH6101 [6] Introduction to Machine Learning
MTH6150 [6] Numerical Computing with C and C++*
MTH6142 [6] Complex Networks
MTH6138 [6] Third Year Project (may be taken in either semester)
MTH6110 [6] Communicating and Teaching Mathematics

Pure Pathway

Semester A
Choose four modules:
MTH6151 [6] Partial Differential Equations
MTH5130 [5]Number Theory
MTH6115 [6] Cryptography
MTH6140 [6] Linear Algebra II
MTH6106 [6] Group Theory
MTH6107 [6] Chaos and Fractals
MTH6138 [6] Third Year Project (may be taken in either semester)

Semester B
Choose four modules:
MTH6105 [6] Algorithmic Graph Theory
MTH6158 [6] Ring Theory
MTH6142 [6] Complex Networks
MTH6132 [6] Relativity
MTH6127 [6] Metric Spaces and Topology
MTH6138 [6] Third Year Project (may be taken in either semester)
MTH6110 [6] Communicating and Teaching Mathematics

Statistics and Financial Pathway
To choose this Pathway, students must have studied MTH5129.

Semester A
Choose four modules:
MTH6151 [6] Partial Differential Equations
MTH6141 [6] Random Processes
MTH6154 [6] Financial Mathematics I
MTH6102 [6] Bayesian Statistical Methods
MTH6134 [6] Statistical Modelling II
MTH5124 [5] Actuarial Mathematics I
MTH6138 [6] Third Year Project (may be taken in either semester)

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Semester B
Choose four modules:
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 [6] Third Year Project (may be taken in either semester)
MTH6110 [6] Communicating and Teaching Mathematics

Year 4
Compulsory modules
MTH717U [7] MSci Project

Semester A
MTH700U [7] Research Methods in Mathematical Sciences

Choose 75 credits from undergraduate MTH or SPA modules at Level 7, excluding MTH761U, MTH771U, MTH762U, MTH787U, MTH790U and MTH773U.

Academic Year of Study   FT - Year 1

Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester
Computing and Data Analysis	MTH4114	15	4	Compulsory	1	1
Calculus |	MTH4200	15	4	Compulsory	1	1
Introduction to Probability	MTH4207	15	4	Compulsory	1	1
Number, Sets and Functions	MTH4213	15	4	Compulsory	1	1
Introduction to Algebra	MTH4104	15	4	Compulsory	1	2
Calculus ||	MTH4201	15	4	Compulsory	1	2
Vectors and Matrices	MTH4215	15	4	Compulsory	1	2
Probability and Statistics |	MTH4216	15	4	Compulsory	1	2

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Academic Year of Study   FT - Year 2

Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester
Convergence and Continuity	MTH5104	15	5	Compulsory	2	1
Linear Algebra		MTH5112	15	5	Compulsory	2	1
Differential Equations	MTH5123	15	5	Compulsory	2	1
Probability and Statistics ||	MTH5129	15	5	Elective	2	1
Number Theory	MTH5130	15	5	Elective	2	1
Actuarial Mathematics		MTH5124	15	5	Elective	2	1
Introduction to Computer Programming	MTH5001	15	5	Compulsory	2	2
Complex Variables	MTH5103	15	5	Elective	2	2
Introduction to Differential Geometry	MTH5113	15	5	Elective	2	2
Differential and Integral Analysis	MTH5105	15	5	Elective	2	2
Statistical Modelling		MTH5120	15	5	Elective	2	2
Linear Programming and Games	MTH5114	15	5	Elective	2	2

Academic Year of Study   FT - Year 3

Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester
Introduction to Machine Learning	MTH6101	15	6	Elective	3	Semester 2
Bayesian Statistical Methods	MTH6102	15	6	Elective	3	Semester 1

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Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester
Algorithmic Graph Theory	MTH6105	15	6	Elective	3	Semester 2
Group Theory	MTH6106	15	6	Elective	3	Semester 1
Chaos and Fractals	MTH6107	15	6	Elective	3	Semester 1
Communicating and Teaching Mathematics	MTH6110	15	6	Elective	3	Semester 2
Mathematical Tools for Asset Management	MTH6113	15	6	Elective	3	Semester 2
Cryptography	MTH6115	15	6	Elective	3	Semester 1
Metric Spaces and Topology	MTH6127	15	6	Elective	3	Semester 2
Relativity	MTH6132	15	6	Elective	3	Semester 2
Statistical Modelling II	MTH6134	15	6	Elective	3	Semester 1
Third Year Project	MTH6138	15	6	Elective	3	Semester 1 or 2
Time Series	MTH6139	15	6	Elective	3	Semester 2
Linear Algebra II	MTH6140	15	6	Elective	3	Semester 1
Random Processes	MTH6141	15	6	Elective	3	Semester 1
Complex Networks	MTH6142	15	6	Elective	3	Semester 2
Numerical Computing with C and C++	MTH6150	15	6	Elective	3	Semester 2
Partial Differential Equations	MTH6151	15	6	Elective	3	Semester 1
Financial Mathematics I	MTH6154	15	6	Elective	3	Semester 1
Financial Mathematics II	MTH6155	15	6	Elective	3	Semester 2

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Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester
Number Theory	MTH5130	15	5	Elective	3	Semester 1
Actuarial Mathematics I	MTH5124	15	5	Elective	3	Semester 1
Ring Theory	MTH6158	15	6	Elective	3	Semester 2

Academic Year of Study   FT - Year 4

Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester
Research Methods in Mathematical Sciences	MTH700U	15	7	Compulsory	4	Semester 1
MSci Project	MTH717U	30	7	Compulsory	4	Semesters 1 & 2

What are the entry requirements?

For UK applicants, we require 3 GCE A-levels at AAA–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.

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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

At the end of year two, students have the opportunity to take advantage of studying abroad - G12Y Mathematics with Year Abroad.

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Links with employers, placement opportunities and transferable skills

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, 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.

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. This programme includes a final year of modules from the School of Mathematical Sciences MSc programmes and so leads directly to study for a doctoral degree or to careers in science and engineering requiring advanced technical knowledge.

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:	16 December 2021
Date Programme Specification approved by Taught Programmes Board:	