

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:

Institution(s) other than QMUL that will provide some teaching for 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

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 able to:

QMUL Model

The QMUL Model is an innovative teaching and learning initiative that will broaden opportunities for Queen Mary undergraduates within and beyond higher education, supporting them to plan and manage their ongoing professional development. The Model is firmly grounded in the core QMUL values of respect for, and engagement with, the local area and communities, with a distinctive focus on enabling students to make a positive societal impact through leadership in their chosen field. The Model is organised around the key themes of:

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

Students are required to study QMUL Model modules to the value of at least 10 credits at each year of undergraduate study. Model modules may be 5, 10 or 15 credits. Model modules are indicated within this programme specification.

In your first year of study, the Model module will be core or compulsory and will be situated within your home School or Institute. In subsequent years, students will be strongly encouraged to study at least one Model module beyond their home discipline(s), which could, for example, be in another School / Institute or area of QMUL or undertaken as a module outside of QMUL.

If Model module information is not provided on this programme specification for all subsequent years of study, this will be identified as your studies continue.

Where a Model module elective can be selected from an approved group of Model modules, no guarantee can be provided that your first choice of Model module will be available.

Academic Content:

A 1	reason clearly, critically and with rigour within a mathematical context;
A 2	choose appropriate mathematical methods and understand how to apply them in practical situations;
A 3	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:	
B 1	be fluent and accurate in basic numerical skills;
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;

QMUL Model Learning Outcomes - Level 4:

D 1	(Networking) Identify and discuss their own career aspirations or relevant skills and knowledge and how they i
D 2	(Networking) Identify and discuss what their own role in their programme and/or subject discipline might mea
D 3	

QMUL Model Learning Outcomes - Level 5:

E 1	(Networking) Evaluate and demonstrate their own attitudes, values and skills in the workplace and/or in the wider wo
E 2	(Enterprising Perspectives) Recognise and prioritise areas for developing their own enterprising perspectives
E 3	

QMUL Model Learning Outcomes - Level 6:

F 1	
F 2	
F 3	

QMUL Model Learning Outcomes - Level 7:

G 1	
G 2	
G 3	

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 10% 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 full time and part time programme diets (if applicable). Please also outline the QMUL Model arrangements for each year of study. The description should be sufficiently detailed to fully define the structure of the diet.

All first-year Mathematical Sciences students must take and pass MTH3100 Essential Mathematical Skills in order to progress to the second year of a Mathematical Sciences degree programme.

Year 1

MTH3100 [3] Essential Mathematical Skills (0 Credit Core module)

8 compulsory level 4 modules

MTH4200 [4] Calculus I

MTH4114[4] Computing and Data Analysis with Excel

MTH4213 [4] Numbers, Sets and Functions

MTH4207 [4] Introduction to Probability

MTH4201 [4] Calculus II

MTH4104 [4] Introduction to Algebra

MTH42XX (should be the MTH42 version of the new module) Vectors and Matrices (renamed from MTH4203 [4] Geometry I)

MTH42XX (should be the MTH42 version of the new module) Probability and Statistics I (renamed from MTH4206 [4] Introduction to Statistics).

Year 2

Semester A

Three compulsory modules

MTH5104 [5] Convergence and Continuity

MTH5112 [5] Linear Algebra I

MTH5123 [5] Differential Equations

Choose one from:

MTH5XXX [5] Professional Skills and Data Analysis with SAS (QMmodel)

Probability and Statistics II (renamed from MTH5122 Statistical Methods)

Semester B

Choose four from:

MTH5100 [5] Algebraic Structures I

MTH5103 [5] Complex Variables

MTH5XXX [5] Introduction to Differential Geometry

MTH5105 [5] Differential and Integral Analysis

MTH5120 [5] Statistical Modelling I

MTH5XXX [5] Linear Programming and Game Theory

MTH5XXX [5] Introduction to Computer Programming (QMmodel)

[Remark: Students on this programme cannot take a Year 2 QM Model Module outside the school. We expect that to be possible in Year 3]

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Year 3

Choose six from:

- MTH6104 [6] Algebraic Structures II
- MTH6107 [6] Chaos and Fractals
- MTH6109 [6] Combinatorics
- MTH6115 [6] Cryptography
- MTH6132 [6] Relativity
- MTH6138 [6] Third Year Project (or Semester 6)
- MTH6140 [6] Linear Algebra II
- MTH6154 [6] Financial Mathematics I
- MTH6108 [6] Coding Theory
- MTH6124 [6] Mathematical Problem Solving
- MTH6127 [6] Metric Spaces and Topology
- MTH6128 [6] Number Theory
- MTH6136 [6] Statistical Theory
- MTH6141 [6] Random Processes
- MTH6142 [6] Complex Networks
- MTH6155 [6] Financial Mathematics II
- MTH6156 [6] Financial Mathematics III

Choose a further 30 credits of level 5 or 6 modules.

Year 4

- MTH717U [7] MSci Project (30 credits, double module over both semesters)
- MTH700U [7] Research Methods in Mathematical Sciences

Choose 45 credits from undergraduate MTH or SPA modules at level 7, and another 30 credits at level 7.

For full details, please see <http://qmplus.qmul.ac.uk/mod/book/view.php?id=489759>.

Academic Year of Study FT - Year 1

Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester	QMUL Model
Essential Mathematical Skills	MTH3100	0	3	Core	1	Semesters 1 & 2	<input type="checkbox"/> No
Calculus I	MTH4200	15	4	Compulsory	1	Semester 1	<input type="checkbox"/> No
Computing and Data Analysis with Excel	MTH4114	15	4	Compulsory	1	Semester 1	<input type="checkbox"/> Yes
Numbers, Sets and Functions	MTH4213	15	4	Compulsory	1	Semester 1	<input type="checkbox"/> Yes
Introduction to Probability	MTH4207	15	4	Compulsory	1	Semester 1	<input type="checkbox"/> No

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Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester	QMUL Model
Calculus II	MTH4201	15	4	Compulsory	1	Semester 2	<input type="checkbox"/> No
Vectors and Matrices	MTH42XX	15	4	Compulsory	1	Semester 2	<input type="checkbox"/> No
Introduction to Algebra	MTH4104	15	4	Compulsory	1	Semester 2	<input type="checkbox"/> No
Probability and Statistics I	MTH42XX	15	4	Compulsory	1	Semester 2	<input type="checkbox"/> No

Academic Year of Study FT - Year 2

Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester	QMUL Model
Linear Algebra I	MTH5112	15	5	Compulsory	2	Semester 1	<input type="checkbox"/> No
Convergence & Continuity	MTH5104	15	5	Compulsory	2	Semester 1	<input type="checkbox"/> No
Algebraic Structures I	MTH5100	15	5	Elective	2	Semester 2	<input type="checkbox"/> No
Complex Variables	MTH5103	15	5	Elective	2	Semester 2	<input type="checkbox"/> No
Differential & Integral Analysis	MTH5105	15	5	Elective	2	Semester 2	<input type="checkbox"/> No
Statistical Modelling I	MTH5120	15	5	Elective	2	Semester 2	<input type="checkbox"/> No
Differential Equations	MTH5123	15	5	Compulsory	2	Semester 1	<input type="checkbox"/> No
Introduction to Differential Geometry	MTH5XXX	15	5	Elective	2	Semester 2	<input type="checkbox"/> No
Linear Programming and Game Theory	MTH5XXX	15	5	Elective	2	Semester 2	<input type="checkbox"/> No
Introduction to Computer Programming	MTH5XXX	15	5	Elective	2	Semester 2	<input type="checkbox"/> No
Professional Skills and Data Analysis with SAS	MTH5XXX	15	5	Elective	2	Semester 1	<input type="checkbox"/> Yes

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Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester	QMUL Model
Probability and Statistics II	MTH5XXX	15	5	Elective	2	Semester 1	<input type="checkbox"/> No

Academic Year of Study FT - Year 3

Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester	QMUL Model
Algebraic Structures II	MTH6104	15	6	Elective	3	Semester 1	<input type="checkbox"/> No
Chaos & Fractals	MTH6107	15	6	Elective	3	Semester 1	<input type="checkbox"/> No
Combinatorics	MTH6109	15	6	Elective	3	Semester 1	<input type="checkbox"/> No
Cryptography	MTH6115	15	6	Elective	3	Semester 1	<input type="checkbox"/> No
Relativity	MTH6132	15	6	Elective	3	Semester 1	<input type="checkbox"/> No
Linear Algebra II	MTH6140	15	6	Elective	3	Semester 1	<input type="checkbox"/> No
Financial Mathematics I	MTH6154	15	6	Elective	3	Semester 1	<input type="checkbox"/> No
Coding Theory	MTH6108	15	6	Elective	3	Semester 2	<input type="checkbox"/> No
Mathematical Problem Solving	MTH6124	15	6	Elective	3	Semester 2	<input type="checkbox"/> No
Metric Spaces and Topology	MTH6127	15	6	Elective	3	Semester 2	<input type="checkbox"/> No
Number Theory	MTH6128	15	6	Elective	3	Semester 2	<input type="checkbox"/> No
Random Processes	MTH6141	15	6	Elective	3	Semester 2	<input type="checkbox"/> No
Complex Networks	MTH6142	15	6	Elective	3	Semester 2	<input type="checkbox"/> No
Financial Mathematics II	MTH6155	15	6	Elective	3	Semester 2	<input type="checkbox"/> No

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Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester	QMUL Model
Financial Mathematics III	MTH6156	15	6	Elective	3	Semester 2	No

Academic Year of Study FT - Year 4

Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester	QMUL Model
MSci Project	MTH717U	30	7	Compulsory	4	Semesters 1 & 2	No
Research Methods in Mathematical Sciences	MTH700U	15	7	Compulsory	4	Semester 1	No

What are the entry requirements?

Our normal entry requirement is three GCE A-levels at grades AAB including grade A in Mathematics, or equivalent. Applicants also need at least grade C or 4 in GCSE English Language, or equivalent.

How will the quality of the programme be managed and enhanced?

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

The quality of individual modules is monitored by DOTP and DUGS, 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 quality and structure of the programme as a whole is the responsibility of the DoTP with support from DUGS, the Programme Director and the School's Teaching and Learning Committee. This includes revising the syllabuses of modules, and refining the module offering.

How do we listen to and act on your feedback?

The Student-Staff Liaison Committee (SSLC) provides a formal means of communication and discussion between the School and its students. The committee consists of student representatives from each year in the School together with appropriate representation from staff within the School. It is designed to respond to the needs of students, as well as act as a forum for discussing programme and module developments. The Student-Staff Liaison Committee meets regularly throughout the year.

The School operates a Teaching and Learning Committee, which advises the School Director of Taught Programmes 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 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.

The School operates an Annual Programme Review of all its taught provision. 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 student surveys and module evaluations.

What academic support is available?

Each student is allocated a personal academic adviser, 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 Student Support Officer. Each programme is assigned a Programme Director and all teaching is overseen by the Teaching and Learning Committee, which includes the Programme Directors and is chaired by the Director of Taught Programmes. Programmes are monitored continuously and reviewed every few years by the Teaching and Learning Committee.

Programme-specific rules and facts

All first-year Mathematical Sciences students must pass Essential Mathematical Skills in order to progress to the second year of a Mathematical Sciences degree programme. At the end of year two, students have the opportunity to take a placement year in industry - G100 Mathematics with Professional Placement. Students also have the option to take advantage of studying abroad - G100 Mathematics with Year Abroad.

Students must take MTH5117 Mathematical Writing in their second or third year.

Specific support for disabled students

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.

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:

Dr Francis Wright, Director of Undergraduate Studies

Person responsible for management of programme:

Prof. Franco Vivaldi

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

7 Feb 2018

**Date Programme Specification approved by Taught
Programmes Board:**