

Programme Specification (PG)

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| Awarding body / institution: | Queen Mary University of London |
| Teaching institution: | Queen Mary University of London |
| Name of final award and programme title: | MSc Mathematics (FT) |
| Name of interim award(s): | PG Cert in Mathematics and PG Dip in Mathematics |
| Duration of study / period of registration: | 1 year [full-time] |
| Queen Mary programme code(s): | PMSF-QMMATH1 / PSMAS / G1S1 |
| 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:

N/A

Programme outline

The MSc in Mathematics gives an in-depth training in advanced mathematics or advanced mathematics and statistics to students who have already done very well in a first degree with high mathematical content. Students successfully completing the MSc will acquire specialist knowledge in chosen areas of mathematics and statistics, and will complete a dissertation demonstrating their ability to work largely independently in an advanced topic in mathematics or statistics.

The MSc programme, which starts in late September, is offered full-time over one year or part-time over two.

The taught modules offered reflect the research strengths of the School of Mathematical Sciences, and are concentrated in pure mathematics, probability and statistics, and data science. Students choose one of two streams: Pure, or Statistics and Data Science.

Aims of the programme

The aim of the MSc is to offer a comprehensive range of advanced mathematical and statistical study options which will explore concepts at higher level, building upon a strong mathematics undergraduate degree. The programme aims to address both

fundamental principles and advanced techniques in mathematics and to provide students with directly applicable knowledge and skills.

The programme is aimed at preparing students for doctoral study or specialist employment, and offers modules in advanced mathematics and statistics as well as a project dissertation component.

What will you be expected to achieve?

Students who successfully complete this programme will achieve the learning outcomes listed below.

Academic Content:

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| A 1 | Become proficient in chosen areas of advanced pure mathematics, or statistics and data science. |
| A 2 | Appreciate applications of advanced computing in mathematics. |
| A 3 | Develop an appreciation of connections between different areas of pure and applied mathematics. |

Disciplinary Skills - able to:

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| B 1 | Use deductive reasoning and to manipulate precise concepts, definitions and notation. |
| B 2 | Write a technical mathematical or statistical report that either draws on and synthesises work in published sources, using the proper scholarly conventions; or that undertakes a detailed investigation in a suitable field. |
| B 3 | Possess the maturity and the technical ability to be independent learners of research level mathematics. |

Attributes:

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| C 1 | Demonstrate report-writing, initiative, planning and time management skills through a substantive MSc research project. |
| C 2 | Work in a team during the classes and in preparation for the lectures. |
| C 3 | Develop skills in reading and critically evaluating mathematical literature. |

How will you learn?

Teaching in most modules is primarily by formal lectures but may include guided reading of text books or web notes. Teaching of

reading and project modules is primarily by guided reading of text books or web notes and weekly supervisions respectively. Learning in most modules is by attending lectures and tutorials, reading lecture notes and recommended text books or web notes, attempting exercises and asking questions of staff.

How will you be assessed?

The assessment of taught modules is normally by a written examination contributing a large percentage of the final mark, supplemented by in-term coursework or tests.

The project module (MTHM038) is assessed by written dissertation, in line with the regulations for projects/dissertations at Masters level.

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.

The programme consists of one compulsory module and eight elective modules as outlined in the module table below. Students will also complete a core 60-credit project dissertation module (MTHM038).

Full-time students are expected to complete eight taught modules and the project dissertation in one academic year.

Students choose their elective modules according to their academic background and interests, in consultation with the Programme Director and other staff as needed.

In addition to the level-7 elective modules in mathematics and statistics outlined below, in consultation with the Programme Director, students can also choose:

- a maximum of two approved modules from the MSc Astrophysics, taught within SPA;
- a maximum of two approved intercollegiate modules.

Modules from other Schools or Colleges will normally only be approved where they are Level 7, have substantial mathematical content and do not overlap with modules offered by SMS.

Semester A

All students

choose one from:

MTH739P Topics in Scientific Computing

MTH766P Programming in Python

Pure stream

choose three from:

MTH722P Group Theory

MTH728P Partial Differential Equations

MTH727P Chaos & Fractals
 SPA7027P Differential Geometry in Theoretical Physics

Statistics and Data Science stream
 choose three from:

MTH786P Machine Learning with Python
 MTH7021P Applied Statistical Modelling
 MTH728P Partial Differential Equations
 MTH729P Random Processes

Semester B

Pure stream

Choose four from:

MTH750P Graphs and Networks
 MTH784P Optimisation for Business Processes
 MTH721P Algorithmic Graph Theory
 MTH723P Metric Spaces and Topology
 MTH725P Ring Theory
 MTH726P Coding Theory

Statistics and Data Science stream

Choose four from:

MTH741P Digital and Real Asset Analytics
 MTH776P Bayesian Statistics
 MTH791P Computational Statistics with R
 MTH793P Advanced Machine Learning
 MTH784P Optimisation for Business Processes
 MTH750P Graphs and Networks

Semester C

MTHM038 Dissertation

Academic Year of Study

| Module Title | Module Code | Credits | Level | Module Selection Status | Academic Year of Study | Semester |
|----------------------------------|-------------|---------|-------|-------------------------|------------------------|------------|
| Machine Learning with Python | MTH786P | 15 | 7 | Elective | 1 | Semester 1 |
| Bayesian Statistics | MTH776P | 15 | 7 | Elective | 1 | Semester 2 |
| Computational Statistics with R | MTH791P | 15 | 7 | Elective | 1 | Semester 2 |
| Digital and Real Asset Analytics | MTH741P | 15 | 7 | Elective | 1 | Semester 2 |
| Dissertation | MTHM038 | 60 | 7 | Compulsory | 1 | Semester 3 |

| Module Title | Module Code | Credits | Level | Module Selection Status | Academic Year of Study | Semester |
|--|-------------|---------|-------|-------------------------|------------------------|------------|
| Topics in Scientific Computing | MTH739P | 15 | 7 | Elective | 1 | Semester 1 |
| Programming in Python | MTH766P | 15 | 7 | Elective | 1 | Semester 1 |
| Group Theory | MTH722P | 15 | 7 | Elective | 1 | Semester 1 |
| Partial Differential Equations | MTH728P | 15 | 7 | Elective | 1 | Semester 1 |
| Chaos & Fractals | MTH727P | 15 | 7 | Elective | 1 | Semester 1 |
| Differential Geometry in Theoretical Physics | SPA7027P | 15 | 7 | Elective | 1 | Semester 1 |
| Applied Statistical Modelling | MTH7021P | 15 | 7 | Elective | 1 | Semester 1 |
| Random Processes | MTH729P | 15 | 7 | Elective | 1 | Semester 1 |
| Graphs and Networks | MTH750P | 15 | 7 | Elective | 1 | Semester 2 |
| Optimisation for Business Processes | MTH784P | 15 | 7 | Elective | 1 | Semester 2 |
| Algorithmic Graph Theory | MTH721P | 15 | 7 | Elective | 1 | Semester 2 |
| Metric Spaces and Topology | MTH723P | 15 | 7 | Elective | 1 | Semester 2 |
| Ring Theory | MTH725P | 15 | 7 | Elective | 1 | Semester 2 |
| Coding Theory | MTH726P | 15 | 7 | Elective | 1 | Semester 2 |
| Advanced Machine Learning | MTH793P | 15 | 7 | Elective | 1 | Semester 2 |

What are the entry requirements?

An upper second class degree is normally required, usually in a STEM related subject (engineering, computer science, mathematics, physics or a related discipline, such as economics). Students with a good lower second class degree may be considered on an individual basis. Applicants with unrelated degrees will be considered if there is evidence of equivalent content in their academic or professional background. For international students we require English language qualifications IELTS 6.5.

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

Student Voice Committees provide a formal means of communication and discussion between Schools and their students. Each committee consists of student representatives from each year in the School/Institute together with appropriate representation from staff within the School/Institute. It is designed to respond to the needs of students, as well as act as a forum for discussing programme and module developments. Staff-Student Liaison Committees meet regularly throughout the year.

Each School operates a Learning and Teaching Committee, or equivalent, which advises the School/Institute Director of Taught Programmes on all matters relating to the delivery of taught programmes at School-level including monitoring the application of relevant QM 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 student membership, or consideration of student surveys.

All Schools operate a periodic Programme Review of their taught undergraduate and postgraduate provision. The process is normally organised at a School-level basis with the Head of School, or equivalent, responsible for the completion of the School's Programme Reviews. Students' views are considered in this process through analysis of the PTES and module evaluations.

What academic support is available?

Every student is assigned an academic adviser to offer academic guidance throughout their studies, for example guidance on selection of modules at the start of the year. The Student Support teams in SMS and SEF ensure that students feel able to consult staff in either School to resolve any difficulties that may arise. The Programme Director, or a nominated delegate, works with SMS and SEF academic staff to organise project supervision for each student.

The Postgraduate Programme Administrator and Student Support Officer in SMS liaise with the Programme Director and with SEF staff to run a full induction programme for new students.

Programme-specific rules and facts

[Numbering relates to the QMUL Academic Regulations 2021/22.]

6.60 Failure may be condoned in up to 30 (MSc/PgDip) or 15 (PgCert) credits of modules where all of the following conditions are met:

- i the module mark for each failed module is 0.0 or higher; and,
- ii the mean average mark across all modules, including the failed module(s), is 50.0 or higher; and,
- iii a failed module is not designated as 'core' (must be passed outright) in the programme regulations.

6.61 A student may take a maximum 30 credits (MSc or PgDip) or 15 credits (PgCert) of taught modules at level 6, selected from a list approved by the Head of School.

6.62 Exceptionally, and at the discretion of the Subject Examination Board, a student may request an alternative field of study that reflects the content of the taught modules and dissertation/project undertaken. The title will be selected from a list approved by the Programme Director. A student must make their request to the Programme Director, in writing, at the time of entry to the examinations.

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.

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 research methods, how to analyse and solve problems, apply mathematical modelling, communicate their ideas and theories effectively, and work independently and manage their own time. These skills are highly desirable to employers ranging from business and finance to the chemicals and materials industries.

Programme Specification Approval

Person completing Programme Specification:

Matthew Fayers (DoE for School of Mathematical Sciences)

Person responsible for management of programme:

Ian Morris (Programme Director)

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

29 Oct 2024

Date Programme Specification approved by Taught Programmes Board: