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:	MSci Financial Mathematics; MSci Financial Mathematics with Year Abroad; MSci Financial Mathematics with Professional Placement;
Name of interim award(s):	CertHE, DipHE
Duration of study / period of registration:	4/5 years
QMUL programme code / UCAS code(s):	UMIF-QMMATH1-USFIM/GN1H;UMIF-QMMATG1-USFIA/GNHY;UMIF-QM
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

The MSci in Financial Mathematics is a 4-year taught programme which combines all the elements of a generalist undergraduate mathematics with business management degree with a number of specialist modules in mathematical finance and related areas. Modules taken in the 4th year are all at Master's level, and most are shared with our MSc degrees in Mathematics and Mathematical Finance.

On completion of the programme, students will have gained a solid understanding of all the key areas of pure and applied mathematics, together with more specialist knowledge of financial mathematics, numerical methods and computing, and elements of business and management, and will be well-positioned to apply for quantitative roles in the financial services sector and elsewhere.

In the first two years, students will gain a solid foundation in all the important areas of pure and applied mathematics, attending many of the same modules as students on our traditional mathematics degree programmes. However, in the third and final years, students will also take a series of specialist modules. These comprise not only modules on financial mathematics, but also computer programming and numerical methods – skills that are in particularly high demand in the finance sector. Additionally,

in the final year, students will undertake a research project in financial mathematics, introducing them to some of the latest, cutting-edge research in the field.

Aims of the programme

This programme aims to give students the knowledge and skills that they will need to pursue successful careers in the finance sector (investment and commercial banking, financial markets, fund management, insurance, hedge funds, etc.). However, it has sufficient general content in mathematics to prepare students for any career where a good mathematics degree is required, as well as for future academic research in mathematics or mathematical finance.

It is particularly targeted at students with strong analytical skills, who want to develop these further, and learn how to apply them in practice in mathematical finance. The programme contains a range of both general and specialist modules, covering not just mathematics and mathematical finance, but also numerical methods and computing. These applied skills are in particular demand from employers.

What will you be expected to achieve?

Students who successfully complete this programme will be expected to achieve all of the learning outcomes listed 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	A solid foundation in all the key areas of pure and applied mathematics, with special emphasis on mathematical finance;
A 2	The techniques and tools of financial modelling;
A 3	Numerical methods and computer programming;

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Disciplinary Skills - able to:	
B 1	Solve mathematical problems using a range of analytical tools;
B 2	Understand how theoretical techniques can be used to solve problems in applied finance;
B 3	Write computer programs to find numerical solutions to applied problems;

Attributes:	
C 1	Integrate knowledge from many different fields;
C 2	Choose the appropriate mathematical tools for solving particular problems;
C 3	Develop independent research skills by undertaking a substantial project dissertation;

How will you learn?

Throughout the four year programme, you will attend lectures in a range of subject areas. Many lecturers make their lecture notes and other resources available to students via our online learning environment, QMplus.

You will also attend examples classes and tutorials, where you can receive one-to-one support in learning how to solve mathematical problems. For the computing modules, you will undertake practical assignments in the computer laboratories, again with plenty of personal support.

In addition, you will be expected to spend a considerable amount of your own time in independent study, reviewing the material covered in the lectures, and working through various coursework assignments to help you fully understand how to apply your new knowledge.

In your final year, you will undertake a project culminating in the preparation of a written dissertation, giving you experience of undertaking independent research in a field of interest to you. During this period, you will meet regularly with your project supervisor to discuss your progress and future research plans.

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 20% 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). At the end of year two, students have the opportunity to take a placement year in industry - GN2H Financial Mathematics with Professional Placement. Students also have the option to take advantage of studying abroad - GNHY Financial Mathematics with Year Abroad.

(All modules carry 15 credits except where stated.)

Year 1

Semester A
2 compulsory level 4 modules

MTH4000 [4] Programming in Python
MTH4113 [4] Numbers, Sets and Functions

Semester B
2 compulsory level 4 modules

BUS137 [4] Economics for Business Management
MTH4115 [4] Vectors and Matrices

Semester A & B
2 compulsory level 4 modules

MTH4400 [4] Applied Calculus (30 credits)
MTH4600 [4] Applied Probability & Statistics (30 credits)

Year 2

Semester 1
Compulsory
MTH5212 [5] Applied Linear Algebra
MTH5129 [5] Probability and Statistics II
MTH5123 [5] Differential Equations

Choose one from:

BUS283 [5] Financial Markets and Securities
MTH5124 [5] Actuarial Mathematics I

Semester 2
Compulsory
MTH5005 [5] Programming in Python II
MTH5120 [5] Statistical Modelling I

Choose two from:
MTH5103 [5] Complex Variables
MTH5115 [5] Linear Optimisation and Game Theory
MTH5126 [5] Statistics for Insurance

Semester 1&2
Compulsory
MTH5205 [5] Professional Skills for Mathematicians (0 credits)

Year 3
Semester 1
Compulsory
MTH6141 [6] Random Processes

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MTH6151 [6] Partial Differential Equations
MTH6154 [6] Financial Mathematics I

Choose one from:
MTH6134 [6] Statistical Modelling II
MTH6101 [6] Introduction to Machine Learning
BUS341 [6] Corporate Financial Management

Semester 2
Compulsory
MTH6113 [6] Mathematical Tools for Asset Management
MTH6155 [6] Financial Mathematics II
MTH6150 [6] Numerical Computing with C and C++

Choose one from:
MTH6142 [6] Complex Networks
MTH6139 [6] Time Series
MTH6102 [6] Bayesian Statistical Methods

Year 4

Semester 1&2
Compulsory
MTH798U [7] MSci Financial Mathematics Project (30 credits)

Semester 1
Compulsory
MTH761U [7] Financial Instruments and Markets
MTH771U [7] Foundations of Mathematical Modelling in Finance

Choose one from:
MTH786U [7] Machine Learning with Python
MTH790U [7] Programming in C++ for Finance

Semester 2
Choose three from:
MTH787U [7] Advanced Derivatives Pricing and Risk Management
MTH773U [7] Advanced Computing in Finance
MTH741U [7] Digital and Real Asset Analytics
MTH767U [7] Neural Networks and Deep Learning(*)
MTH793U [7] Advanced Machine Learning(*)
(*) requires MTH786U

Academic Year of Study FT - Year 1

Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester
Programming in Python	MTH4000	15	4	Compulsory	1	Semester 1

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Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester
Numbers, Sets and Functions	MTH4113	15	4	Compulsory	1	Semester 1
Economics for Business Management	BUS137	15	4	Compulsory	1	Semester 1
Vectors and Matrices	MTH4115	15	4	Compulsory	1	Semester 1
Applied Calculus	MTH4400	30	4	Compulsory	1	Semester 2
Applied Probability & Statistics	MTH4600	30	4	Compulsory	1	Semester 2

Academic Year of Study FT - Year 2

Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester
Differential Equations	MTH5123	15	5	Compulsory	2	Semester 1
Applied Linear Algebra	MTH5212	15	5	Compulsory	2	Semester 1
Financial Markets and Securities	BUS283	15	5	Elective	2	Semester 1
Statistical Modelling I	MTH5120	15	5	Compulsory	2	Semester 2
Complex Variables	MTH5103	15	5	Elective	2	Semester 2
Linear Optimisation and Game Theory	MTH5115	15	5	Elective	2	Semester 2
Probability and Statistics II	MTH5129	15	5	Compulsory	2	Semester 1
Statistics for Insurance	MTH5126	15	5	Elective	2	Semester 2
Programming in Python II	MTH5005	15	5	Compulsory	2	Semester 2
Professional Skills for Mathematicians	MTH5205	0	5	Compulsory	2	Semesters 1 & 2

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Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester
Actuarial Mathematics I	MTH5124	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
Random Processes	MTH6141	15	6	Compulsory	3	Semester 1
Partial Differential Equations	MTH6151	15	6	Compulsory	3	Semester 1
Financial Mathematics I	MTH6154	15	6	Compulsory	3	Semester 1
Statistical Modelling II	MTH6134	15	6	Elective	3	Semester 1
Bayesian Statistical Methods	MTH6102	15	6	Elective	3	Semester 2
Mathematical Tools for Asset Management	MTH6113	15	6	Compulsory	3	Semester 2
Financial Mathematics II	MTH6155	15	6	Compulsory	3	Semester 2
Numerical Computing with C and C++	MTH6150	15	6	Compulsory	3	Semester 2
Complex Networks	MTH6142	15	6	Elective	3	Semester 2
Time Series	MTH6139	15	6	Elective	3	Semester 2
Introduction to Machine Learning	MTH6101	15	6	Elective	3	Semester 1
Corporate Financial Management	BUS341	15	6	Elective	3	Semester 1

Academic Year of Study FT - Year 4

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Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester
Financial Instruments and Markets	MTH761U	15	7	Compulsory	4	Semester 1
Foundations of Mathematical Modelling in Finance	MTH771U	15	7	Compulsory	4	Semester 1
Programming in C++ for Finance	MTH790U	15	7	Elective	4	Semester 1
Advanced Derivatives Pricing and Risk Management	MTH787U	15	7	Elective	4	Semester 2
Advanced Computing in Finance	MTH773U	15	7	Elective	4	Semester 2
MSci Financial Mathematics Project	MTH798U	30	7	Compulsory	4	Semesters 1 & 2
Digital and Real Asset Analytics	MTH741U	15	7	Elective	4	Semester 2
Machine Learning with Python	MTH786U	15	7	Elective	4	Semester 1
Neural Networks and Deep Learning	MTH767U	15	7	Elective	4	Semester 2
Advanced Machine Learning	MTH793U	15	7	Elective	4	Semester 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.

All Schools operate a periodic Programme Review of their taught undergraduate and postgraduate provision. This 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 Student Voice 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 Student Voice 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.

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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.

Programme Specification Approval

Person completing Programme Specification:	Matthew Fayers (DoE for School of Mathematical Sciences)
Person responsible for management of programme:	Matthew Fayers (DoE for School of Mathematical Sciences)
Date Programme Specification produced / amended by School / Institute Learning and Teaching Committee:	30 Oct 2024
Date Programme Specification approved by Taught Programmes Board:	

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