Programme Title: MSci Mathematics with Statistics;Msci Mathematics with Statistics with Year Abroad;

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 with Statistics MSci Mathematics with Statistics with Year Abroad
Name of interim award(s):	CertHE, DipHE
Duration of study / period of registration:	4/5 years
QMUL programme code / UCAS code(s):	UMIF-QMMATH1-UMMASSTA/G1G3 / UMIF-QMMATG1-UJMAASTY/GG1
QAA Benchmark Group:	Mathematics, statistics and operational research
FHEQ Level of Award :	Level 6
Programme accredited by:	Royal Statistical Society
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 combines training to an advanced level in rigorous mathematics, probability and statistical theory with analysis of data using statistical computing packages. Graduates from the programme are well-placed to embark on further research in mathematics and/or statistics leading to a PhD, or to undertake employment requiring advanced mathematical and statistical skills. These jobs are in diverse areas such as finance, government, industry, and teaching.

Aims of the programme

This programme is an extension of GG31 (BSc Mathematics and Statistics). It aims to build statistical theory and methodology on mathematical foundations, especially probability theory. It aims to produce graduates who can apply probabilistic modelling to areas such as genetics, quantum physics and risk analysis, and increasingly in the financial sector. Applications of probability and

statistics are included, notably design of experiments, time series and financial mathematics. If students are interested in specialising in statistical theory or statistical applications, such as finance, 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 and statistics.

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:

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A 1	reason clearly, critically and with rigour within an advanced mathematical and statistical context, both theoretical and practical;
A 2	choose appropriate mathematical and statistical methods and understand how to apply them in practical situations;
A 3	verify that there is no obvious mismatch between the data, the real situation and the conclusions of the analysis;
A 4	understand and use mathematics at graduate level such as algebra, topology, group theory, dynamical systems, measure theory, probability and stochastic processes, as well as applied statistics;

Disciplinary Skills - able to:	
B 1	be fluent and accurate in basic numerical skills;
B 2	comprehend fundamental concepts and techniques of calculus, linear and abstract algebra, probability theory, statistical inference, linear models and other mathematical and statistical 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 how to use them in statistics, analyse a problem within a mathematical or statistical context and select appropriate mathematical or statistical tools to solve it;
B 6	explain mathematical work, in appropriate detail, both to specialists and non-specialists, and discuss statistical aspects of a practical problem presented by a scientist;
B 7	construct appropriate written mathematical or statistical arguments, tackle a substantial practical statistical problem independently, for example design an experiment involving statistical modelling and data analysis, and complete an advanced mathematical and/or statistical project;
B 8	use statistical computer packages and interpret their output critically;

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
MTH4215 [4] Vectors and Matrices
MTH4104 [4] Introduction to Algebra
MTH4216 [4] Probability and Statistics I

Year 2
Semester A
Three compulsory modules
MTH5112 [5] Linear Algebra I
MTH5104 [5] Convergence and Continuity
MTH5129 [5] Probability and Statistics II

Choose one from:
MTH5002 [5] Professional Skills and Data Analysis with SAS
MTH5123 [5] Differential Equations

Semester B
One compulsory module
MTH5120 [5] Statistical Modelling I

Choose three from:
MTH5101 [5] Ring Theory
MTH5103 [5] Complex Variables
MTH5113 [5] Introduction to Differential Geometry
MTH5105 [5] Differential and Integral Analysis

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MTH5126 [5] Statistics for Insurance
MTH5114 [5] Linear Programming and Games
MTH5001 [5] Introduction to Computer Programming

Year 3
Two compulsory modules
MTH6134 [6] Statistical Modelling II
MTH6141 [6] Random Processes

Choose one of
MTH6101 [6] Introduction to Machine Learning
MTH6139 [6] Time Series

Choose 45 credits of level 6 MTH modules (not MTH6102 Bayesian Statistical Methods)

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

Year 4
Two compulsory modules
MTH717U [7] MSci Project (30 credits, double module over both semesters)
MTH700U [7] Research Methods in Mathematical Sciences

Choose two modules from:
MTH734U [7] Topics in Probability and Stochastic Processes
MTH709U [7] Bayesian Statistics
MTH716U [7] Measure Theory and Probability
MTH791U/P [7] Computational Statistics with R

Choose 15 credits from undergraduate MTH or SPA modules at level 7,
and another 30 credits at level 7.

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	No
Calculus I	MTH4200	15	4	Compulsory	1	Semester 1	No
Computing and Data Analysis with Excel	MTH4114	15	4	Compulsory	1	Semester 1	Yes
Numbers, Sets and Functions	MTH4213	15	4	Compulsory	1	Semester 1	Yes
Introduction to Probability	MTH4207	15	4	Compulsory	1	Semester 1	No
Calculus II	MTH4201	15	4	Compulsory	1	Semester 2	No

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Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester	QMUL Model
Vectors and Matrices	MTH4215	15	4	Compulsory	1	Semester 2	No
Introduction to Algebra	MTH4104	15	4	Compulsory	1	Semester 2	No
Probability and Statistics I	MTH4216	15	4	Compulsory	1	Semester 2	No

Academic Year of Study FT - Year 2

Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester	QMUL Model
Convergence & Continuity	MTH5104	15	5	Compulsory	2	Semester 1	No
Probability and Statistics II	MTH5129	15	5	Compulsory	2	Semester 1	No
Ring Theory	MTH5101	15	5	Elective	2	Semester 2	No
Differential & Integral Analysis	MTH5105	15	5	Elective	2	Semester 2	No
Statistical Modelling I	MTH5120	15	5	Elective	2	Semester 2	No
Professional Skills and Data Analysis with SAS	MTH5002	15	5	Elective	2	Semester 1	Yes
Introduction to Differential Geometry	MTH5113	15	5	Elective	2	Semester 2	No
Linear Programming and Games	MTH5114	15	5	Elective	2	Semester 2	No
Complex Variables	MTH5103	15	5	Elective	2	Semester 2	No
Statistics for Insurance	MTH5126	15	5	Elective	2	Semester 2	No
Introduction to Computer Programming	MTH5001	15	5	Elective	2	Semester 2	Yes
Linear Algebra I	MTH5112	15	5	Compulsory	2	Semester 1	No

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Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester	QMUL Model
Differential Equations	MTH5123	15	5	Elective	2	Semester 1	No

Academic Year of Study FT - Year 3

Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester	QMUL Model
Statistical Modelling II	MTH6134	15	6	Compulsory	3	Semester 1	Yes
Random Processes	MTH6141	15	6	Compulsory	3	Semester 1	No
Introduction to Machine Learning	MTH6101	15	6	Elective	3	Semester 2	Yes
Time Series	MTH6139	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
Topics in Probability and Stochastic Processes	MTH734U	15	7	Elective	4	Semester 1	No
Bayesian Statistics	MTH709U	15	7	Elective	4	Semester 2	No
Measure Theory and Probability	MTH716U	15	7	Elective	4	Semester 2	No
Computational Statistics with R	MTH791U/P	15	7	Elective	4	Semester 2	No

What are the entry requirements?

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

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

The programme is over seen 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.

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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

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:	Dr Mark Walters, DoTP
Person responsible for management of programme:	Dr Lawrence Pettit
Date Programme Specification produced / amended by School / Institute Learning and Teaching Committee:	11 Jan 2019
Date Programme Specification approved by Taught Programmes Board:	

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