



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:	BSc Mathematics with Management BSc Mathematics with Management with Year Abroad BSc Mathematics with Management with Professional Placement
Name of interim award(s):	CertHE, DipHE
Duration of study / period of registration:	3/4 years
QMUL programme code / UCAS code(s):	UBSF-QMMATH1-UMMASMAN/G12N;UBSF-QMMATG1 - UMMAAMNW
QAA Benchmark Group:	Mathematics, statistics and operational research
FHEQ Level of Award :	Level 6
Programme accredited by:	N/A
Date Programme Specification approved:	7 Dec 2017
Responsible School / Institute:	School of Mathematical Sciences

Schools / Institutes which will also be involved in teaching part of the programme:

School of Business & Management

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

Programme outline

The BSc degree in Mathematics with Management comprises three years of full-time study, possibly augmented with a year-long placement or a year of study abroad. It forms part of a suite of programmes which are developed to introduce management subjects appropriately for Science and Engineering undergraduates. The programme includes the core elements of Mathematics in addition to a grounding into the critical and pertinent elements related to management, such as the fundamentals of management and economics for business, with a particular emphasis derived from the ethos of the School of Business and Management related to social justice, sustainability and good governance in the management of private, public and voluntary organisations.

The programme will develop practical skills and experience in the use and applications of mathematics and relate it to management. The programme develops high levels of competence and demonstrable skills in the core technical areas. The programme has been designed uniquely to allow students to undertake more management content in year 2 in order to develop the skills and understanding in this area, whilst also progressing technically. The first two years of the programme comprises 150 credits in Mathematics and 90 credits of Management. The 3rd year will allow students to explore more specialised applications in Mathematics, with a special emphasis on Statistics and Probability, and to demonstrate and

consolidate the skills gained in a project, which can have a management as well as mathematical content.

The Management elements in the programme aim to develop critical analytical skills and introduce students to the core business subjects, whilst acknowledging that the students have strength in analytical and mathematical approaches. The programmes have been designed to support the students in developing a dual approach to both subject areas.

The mathematics component aims to offer as much flexibility as possible within a joint degree programme. Mathematics is a key analytical tool used in management and this programme aims to ensure that graduates have enough mathematical background to fully understand the mathematical tools used in management, whilst also appreciating the environment within which the mathematical analysis is applied. Statistics is used widely in business and management for informative decision-making; accordingly students can specialise in advanced statistics and probability.

Aims of the programme

The aim of this programme is to produce technically aware graduates with an understanding of management who are capable of making a real contribution to their new employer rapidly following graduation. The programme will equip students with key business, technology, interpersonal and project management skills that have been identified by employers and will produce graduates with:-

- a broad background of business operations, procedures and culture applicable to a career in a technical environment
- sufficient technical knowledge to play a key role in a technical environment
- personal and interpersonal skills enabling them to work closely and communicate with employees in non-technical areas of an organisation
- a set of problem-solving and modelling skills appropriate to business and project management operations
- sufficient management and business knowledge to play a management role in projects
- management experience in a project oriented environment

Graduates obtain jobs requiring technical skills in diverse areas such as business, finance, government and teaching. A graduate should be able to enter further training at MSc level or enter any of a number of other careers which use the transferable skills gained during their studies.

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:

A1	acquire a core knowledge of mathematics;
A2	reason clearly, critically and with rigour within a mathematical context, both theoretical and practical;
A3	construct appropriate written mathematical arguments;
A4	analyse a problem within a mathematical context and select appropriate mathematical tools to solve it;
A5	acquired essential skills in the use of computers for word-processing and spreadsheet computing and the acquisition, manipulation and analysis of data;
A6	developed knowledge of business and project management techniques;

Disciplinary Skills - able to:

B 1	be fluent and accurate in basic numerical skills;
B 2	comprehend fundamental concepts and techniques of calculus, linear algebra, probability, statistics and at least one additional main mathematical subject;
B 3	take notes, write up notes, plan revision, and learn independently;
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	manage time and work cooperatively with fellow students;
B 6	choose appropriate mathematical methods and understand how to apply them in practical management problems;
B 7	approach a practical management problem using knowledge of business management and mathematical modelling;
B 8	discuss mathematical aspects of a practical problem presented by a manager;
B 9	understand the principles of business transformations;
B 10	utilise financial awareness for effective decision making in business and management;
B 11	develop a business and management perspective informed by an ethos of social justice, corporate social responsibility and equality and diversity;
B 12	appreciate the strategic importance of business analytics and data to derive business knowledge and of business processes with an ability to document and understand them;
B 13	master basic management skills demonstrating timeliness and focus;
B 14	master basic business functions, organisational structures including an international dimension;
B 15	utilise team working and project management skills to effectively work with colleagues on projects;

Attributes:	
C 1	To engage critically with knowledge, and apply it in a rigorous way;
C 2	To connect information and ideas within their fields of study;
C 3	To adapt their understanding and to apply their analytical skills to new and unfamiliar settings and problems;
C 4	To use quantitative data confidently and competently;
C 5	Develop knowledge and analytical skills that are transferable to employment including negotiation and communication skills;
C 6	To develop effective spoken and written English and to be able to communicate acquired knowledge;
C 7	To use information for evidence-based decision-making and creative thinking;
C 8	To make concise, engaging and well-structured verbal presentations and explanations;

C 9	To be creative, self-motivated and self-aware and able to reflect on successes, failures and their own progress;
C 10	To understand how to gain insight into and utilise the preferences, motivations, strengths of others;
C 11	To be competent in active listening and in leading others;
C 12	Be able to give and receive feedback constructively;
C 13	Be able to conduct effective research into technical and management related topics;
C 14	Appreciate the role and value of collaborative and team working;

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:

G1

G2

G3

How will you learn?

This programme is constructed within a modular programme structure in which each student takes 120 credits of taught modules per year. Our overall strategy is to achieve a balance, appropriate to the aims of each module between teaching (primarily lectures and tutorials) and learning by students (peer discussion; exercise / problem solving classes; coursework). You may undertake an individual research project in the third year, designed to assimilate and utilise knowledge gained throughout the degree towards approaching a real problem. This project allows you to participate in the specialist internationally-recognised research taking place within the School. It provides a valuable insight into real life research and project management and is used to develop students' investigative and communication skills.

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

MTH4100 [4] Calculus I

MTH4113 [4] Numbers, Sets and Functions

MTH4107 [4] Introduction to Probability

MTH4101 [4] Calculus II

MTH4115 [4] Vectors and Matrices

MTH4116 [4] Probability and Statistics I

BUS024 [4] Fundamentals of Management (for Science and Engineering)

BUS017 [4] Economics for Business

Year 2

Semester A

Three compulsory modules

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MTH5112 [5] Applied Linear Algebra
MTH5129 [5] Probability and Statistics II
BUS021 [4] Financial Accounting

Choose one from

MTH5002 [5] Professional Skills and Data Analysis with SAS
MTH4114 [4] Computing and Data Analysis with Excel
MTH5123 [5] Differential Equations

Semester B

Four compulsory modules

MTH5120 [5] Statistical Modelling I
BUS025 [5] Entrepreneurship
BUS029 [5] Business Analytics
BUS027 [5] Project Management

Year 3

Two compulsory modules

MTH6102 [6] Bayesian Statistical Methods
BUS324 [6] Management of Human Resources

Choose 90 Credits from

BUS359 [6] Contemporary Strategic Analysis
and any MTH modules at level 6

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="text" value="No"/>
Calculus I	MTH4100	15	4	Compulsory	1	Semester 1	<input type="text" value="No"/>
Numbers, Sets and Functions	MTH4113	15	4	Compulsory	1	Semester 1	<input type="text" value="Yes"/>
Introduction to Probability	MTH4107	15	4	Compulsory	1	Semester 1	<input type="text" value="No"/>
Calculus II	MTH4101	15	4	Compulsory	1	Semester 2	<input type="text" value="No"/>
Vectors and Matrices	MTH4115	15	4	Compulsory	1	Semester 2	<input type="text" value="No"/>
Probability and Statistics I	MTH4116	15	4	Compulsory	1	Semester 2	<input type="text" value="No"/>

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Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester	QMUL Model
Fundamentals of Management (for Science and Engineering)	BUS024	15	4	Compulsory	1	Semester 1	<input type="checkbox"/> Yes
Economics for Business	BUS017	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
Applied Linear Algebra	MTH5212	15	5	Compulsory	2	Semester 1	<input type="checkbox"/> No
Probability and Statistics II	MTH5129	15	5	Compulsory	2	Semester 1	<input type="checkbox"/> No
Statistical Modelling I	MTH5120	15	5	Elective	2	Semester 2	<input type="checkbox"/> No
Computing and Data Analysis with Excel	MTH4114	15	4	Elective	2	Semester 1	<input type="checkbox"/> Yes
Financial Accounting	BUS021	15	5	Compulsory	2	Semester 1	<input type="checkbox"/> No
Entrepreneurship	BUS025	15	5	Compulsory	2	Semester 2	<input type="checkbox"/> Yes
Business Analytics	BUS029	15	5	Compulsory	2	Semester 2	<input type="checkbox"/> Yes
Professional Skills and Data Analysis with SAS	MTH5002	15	5	Elective	2	Semester 1	<input type="checkbox"/> Yes
Project Management	BUS027	15	5	Compulsory	2	Semester 2	<input type="checkbox"/> Yes
Differential Equations	MTH5123	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
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Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester	QMUL Model
The Management of Human Resources	BUS324	15	6	Compulsory	3	Semester 1	<input type="checkbox"/> No
Contemporary Strategic Analysis	BUS359	15	6	Elective	3	Semester 2	<input type="checkbox"/> No
Bayesian Statistical Methods	MTH6102	15	6	Compulsory	3	Semester 2	<input type="checkbox"/> No
Remaining Modules any MTH level 6				Elective	3		<input type="checkbox"/>

What are the entry requirements?

Minimum Entry Requirements with A-levels are:

AAB or 340 points 3 A-levels

Must include maths A-level at grade A or above

International Baccalaureate: 34 points overall with 3 subjects at HL with 6,6,5 points including Maths

European Baccalaureate: 80 % overall including maths and science.

French Baccalaureate: 14/20 overall, with 14/20 in maths and science.

We consider applicants who offer BTEC Diploma (subsidiary, normal and extended) as equivalent to the A levels corresponding to their UCAS tariff.

Students must offer a maths A-level in addition to their BTEC

We consider applicants who offer Access to HE diploma (level 3) which are Physics and Mathematics based. These qualifications will be considered on a case by case basis. Students should be achieving very high grades in their studies. The typical offer is 'Pass with a minimum of 45 level 3 credits including 30 credits at Distinction and 15 at Merit. The course must contain at least 18 level 3 credits in Mathematics and these must all be at distinction'.

What are the entry requirements?

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

The School operates a Teaching and Learning Committee, which advises the School's 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 for approval to Taught Programmes Board.

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. 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.

How do we listen to and act on your feedback?

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

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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 Taught Programmes and Director of Undergraduate Studies both attend the Staff-Student Liaison Committee and the School's Teaching and Learning 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.

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.

Aside from that, this programme follows the standard QM progression criteria and degree classification algorithm. The final degree classification is determined by the college mark which is a weighted average of the first, second and third year averages in the ratio 1:3:6 respectively.

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

Students who take this degree programme generally have an interest in working in the business and finance sector when they graduate, which is reflected in the jobs they go into. This programme is an improvement of a previous programme that we ran. Graduates of that programme found employment with KPMG, HBOS and Merrill Lynch, to name a few. The roles range from

Securities Analyst to Auditor. 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.

There are a number of opportunities for students to understand the UK labour market, develop employability skills and meet employers during their time at Queen Mary.

This includes one hour careers induction lectures delivered by the School Career Consultant and/or the School Employer Engagement and Internships Co-ordinator at the beginning of each academic year. The first year lecture focuses on what careers help is available and choosing a career direction, the second year focuses on getting internships and work experience, and the third year on CVs and the practicalities of getting a graduate role.

School specific careers events include Maths Impacts, which looks at how maths is used in a range of industries. Employers that have attended this event include Citi, IBM, Bloomberg, PWC, BT, an actuarial consultant, eon, Government Operational Research Service, GMC and digital marketing agencies. We also hold a maths alumni networking event (including actuaries, accountants, consultants, and a sports statistician), and have had an actuarial networking event too. There is also a Science & Engineering faculty job seeking summer boot-camp for third year students.

The Employer Engagement and Internships Co-ordinator sources a range of career/employability opportunities for maths students. These include exclusive, paid summer internships in employment areas such as finance and data science. Maths students also have the opportunity to visit different employers through insight events, to improve their career choice and commercial awareness.

There are a number of university-wide careers events, including a Finance fortnight where students can meet employers such as: Silicon Valley bank, IBM, Capgemini, Deloitte, Barclays, Bloomberg LP, Civil Service Fast Stream, EY, HM Treasury, M&G Investments, National Audit Office, PwC, Santander PLC, SEO London, Teach First and The Economist.

Programme Specification Approval

Person completing Programme Specification:

Dr Mark Walters, DoTP

Person responsible for management of programme:

Professor Oliver Jenkinson

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

11 Jan 2019

Date Programme Specification approved by Taught Programmes Board:

7 Dec 2017