



## 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:	
Responsible School / Institute:	School of Mathematical Sciences

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

School of Business & Management

Collaborative institution(s) / organisation(s) involved in delivering 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

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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 expected to achieve all of the learning outcomes listed outcomes shown 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	acquire a core knowledge of mathematics;
A 2	reason clearly, critically and with rigour within a mathematical context, both theoretical and practical;
A 3	construct appropriate written mathematical arguments;
A 4	analyse a problem within a mathematical context and select appropriate mathematical tools to solve it;
A 5	acquired essential skills in the use of computers for word-processing and spreadsheet computing and the acquisition, manipulation and analysis of data;
A 6	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;

<b>Attributes:</b>	
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;

## 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 problems. 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 25% 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 - G1NN Mathematics with Management with Professional Placement. Students also have the option to take advantage of studying abroad - G13N Mathematics with Management with Year Abroad.

### Year 1

#### Semester A

2 compulsory level 4 modules

BUS001 [4] Fundamentals of Management

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

MTH4600 [4] Applied Probability & Statistics

### Year 2

#### Semester A

Three compulsory modules

BUS281 [5] Management and Organisational Behaviour

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MTH5129 Probability and Statistics II  
MTH5212 [5] Applied Linear Algebra

Choose one from

MTH5124 [5] Actuarial Mathematics  
MTH5123 [5] Differential Equations  
MTH4000 Programming in Python I

Semester B

Two compulsory modules

BUS280 Introduction to Marketing and Communications  
MTH5120 [5] Statistical Modelling I

Choose one from

MTH5005 Programming in Python II  
MTH5114 Linear Programming & Games  
MTH5126 Statistics for Insurance

Year long

MTH5205 Professional Skills for Mathematicians module

Year 3

Semester A

Two compulsory modules

MTH6102 [6] Bayesian Statistical Methods  
BUS359 [6] Contemporary Strategic Analysis

Choose two from:

MTH6154 [6] Financial Mathematics I  
MTH6134 [6] Statistical Modelling II  
MTH6151 [6] Partial Differential Equations  
MTH6138 [6] Third Year Project (may be taken in either semester)

Semester B

One compulsory module

BUS324 [6] The Management of Human Resources

Choose three from:

MTH6142 [6] Complex Networks  
MTH6101 [6] Introduction to Machine Learning  
MTH6139 [6] Time Series  
MTH6138 [5] Third Year Project (may be taken in either semester)  
MTH6110 [6] Communicating and Teaching Mathematics  
MTH6113 [6] Mathematical Tools for Asset Management

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Academic Year of Study FT - Year 1

Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester
Number, Sets and Functions	MTH4113	15	4	Compulsory	1	Semester 1
Fundamentals of Management	BUS001	15	4	Compulsory	1	Semester 1
Vectors and Matrices	MTH4115	15	4	Compulsory	1	Semester 2
Economics for Business Management	BUS137	15	4	Compulsory	1	Semester 2
Applied Calculus	MTH4400	30	4	Compulsory	1	Semesters 1 & 2
Applied Probability & Statistics	MTH4600	30	4	Compulsory	1	Semesters 1 & 2

Academic Year of Study FT - Year 2

Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester
Management and Organisational Behaviour	BUS281	15	5	Compulsory	2	Semester 1
Applied Linear Algebra	MTH5212	15	5	Compulsory	2	Semester 1
Actuarial Mathematics I	MTH5124	15	5	Elective	2	Semester 1
Differential Equations	MTH5123	15	5	Elective	2	Semester 1
Programming in Python	MTH4000	15	4	Elective	2	Semester 1
Introduction to Marketing and Communications	BUS280	15	5	Compulsory	2	Semester 2
Probability and Statistics II	MTH5129	15	5	Compulsory	2	Semester 1
Programming in Python II	MTH5005	15	5	Elective	2	Semester 2

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Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester
Linear Programming & Games	MTH5114	15	5	Elective	2	Semester 2
Statistics for Insurance	MTH5126	15	5	Elective	2	Semester 2
Statistical Modelling I	MTH5120	15	5	Compulsory	2	Semester 2
Professional Skills for Mathematicians	MTH5205	0	5	Compulsory	2	Semesters 1 & 2

Academic Year of Study FT - Year 3

Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester
Bayesian Statistics	MTH6102	15	6	Compulsory	3	Semester 1
The Management of Human Resources	BUS324	15	6	Compulsory	3	Semester 2
Financial Mathematics I	MTH6154	15	6	Elective	3	Semester 1
Statistical Modelling II	MTH6134	15	6	Elective	3	Semester 1
Partial Differential Equations	MTH6151	15	6	Elective	3	Semester 1
Contemporary Strategic Analysis	BUS359	15	6	Compulsory	3	Semester 1
Third Year Project	MTH6138	15	6	Elective	3	Semester 1 or 2
Complex Networks	MTH6142	15	6	Elective	3	Semester 2
Introduction to Machine Learning	MTH6101	15	6	Elective	3	Semester 2
Time Series	MTH6139	15	6	Elective	3	Semester 2
Communicating and Teaching Mathematics	MTH6110	15	6	Elective	3	Semester 2



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Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester
Mathematical Tools for Asset Management	MTH6113	15	6	Elective	3	Semester 2

### What are the entry requirements?

For UK applicants, we require 3 GCE A-levels at ABB—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 Student Voice Committee and consideration of student surveys.

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. 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. Student Voice Committees meet regularly throughout the year.

The Director of Education 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

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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.

### **Programme-specific rules and facts**

### **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

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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.

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## Programme Specification Approval

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**Person completing Programme Specification:**

Simon Rawstron (ESM-Education Services Manager), Shabnam Beheshti

**Person responsible for management of programme:**

Shabnam Beheshti, DoE for School of Mathematical Sciences

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

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