

# Study Programmes

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## Disclaimer

This handbook attempts to provide advice but please see the Queen Mary Academic Regulations for definitive information. Nothing in this handbook overrides the Academic Regulations, which always take precedence, and are available online at [www.arcs.qmul.ac.uk/policy\\_zone](http://www.arcs.qmul.ac.uk/policy_zone).

## Which study programme applies to me?

If you began your undergraduate course in September 2007 or later then you must follow the study programme for your degree that follows in this handbook. The 2007–08 handbook advised students starting their courses in 2007 that, because of changes to regulations from September 2007, there would be changes to study programmes that would affect mainly the third and final years of study. The current study programmes reflects those changes.

If you began your undergraduate course in September 2006 or earlier then you may follow the study programme for your degree that we published in the 2007–08 handbook, subject to the modules listed in that study programme still being available and appropriate. The appropriate study programmes are also available on the web.

## When might the general regulations not apply?

We can suspend the regulations, as outlined in the following study programmes, if necessary in special cases.

If you change study programme we will allow you to take more than 150 credits (10 modules) at level 4 if this is necessary to meet the requirements of your new programme and you have written agreement from the programme director for the new programme.

If you take a year abroad, we will not require you to pass the full number of Queen Mary credits, although we may require you to meet an equivalent requirement from your year abroad.

## What happens if I do not follow my study programme?

Normally, your degree title will be the title of your study programme. If you fail to meet any of the specific requirements of your study programme then we may give you the degree title "Mathematical Studies". Failure to pass specific modules will affect only the title and not the class of your degree.

## Guidance for students in the first year

### What is Essential Mathematical Skills?

Essential Mathematical Skills is a progression hurdle, which you must pass in order to progress from the first to the second year of any Mathematical Sciences degree programme, i.e. those listed in the rest of this part of the handbook. It does not contribute to your progression or degree classification in any other way although it will appear on your results transcript. If you are in your first year then you must register for Essential Mathematical Skills **in addition** to the other eight modules shown on your study programme. (In fact, we should automatically pre-register you for all nine modules.) Essential Mathematical Skills does not count towards the limit of 150 credits at level 3 or 4.

We will allow you seven attempts at the Essential Mathematical Skills exam during your first year. As soon as you pass, you can stop attending the module and you will not need to take the exam again. You will have three attempts during the first semester and one attempt towards the end of January. These all count as first attempts and if you pass, your transcript will show a mark of 100% and an A grade. If you pass later, your transcript will show a mark of 40% (a bare pass) and an E grade. Hence, your transcript will look better if you pass Essential Mathematical Skills before the end of January.

Note that you should take Essential Mathematical Skills only if your home department is the School of Mathematical Sciences, i.e. your study programme is one of G100, G110, GG31, G1N1, GN13, GL11, G1N4, G1L1, GG14, FG31, G102 or G1G3. In particular, you should not take Essential Mathematical Skills if your study programme is one of LG11 or GG41. Students who have progressed from the SEFP and already passed Essential Foundation Mathematics must still pass Essential Mathematical Skills, which covers different, although similar, material.

## Guidance for students in the second and later years

### Can I take modules not listed in my study programme?

The study programmes list only the modules that you must take. In principle, you can take any additional modules you choose to make up 60 credits per semester provided:

- the department teaching the module will allow you to take it (see below);
- you satisfy the prerequisites;
- it does not overlap with any module you have already taken, are taking or must take later;
- your adviser agrees.

If you want to take an intercollegiate module then (except for I24001) you also require the approval of the Senior Tutor and Registry.

### **Can I take Business Management (BUS) modules?**

You can take Business Management (BUS) modules only if they are in the current version of your study programme. The Business Management modules in our study programmes are all compulsory and there are no Business Management options. If you register for any modules that you are not allowed to take then you will be deregistered later and you may have difficulty finding replacements.

### **Can I take Economics (ECN) modules?**

You can take Economics (ECN) modules only if they are in the current version of your study programme or your study programme is GL11. If you register for any modules that you are not allowed to take then you will be deregistered later and you may have difficulty finding replacements.

### **How are credits, course units and modules related?**

The Queen Mary Academic Credit Framework came into effect for students entering Queen Mary in September 2008 and defines academic credit in such a way that 15 academic credit points (credits) are equivalent to 1 course unit. Queen Mary is phasing out the term “course unit”. We now call the smallest unit of teaching a “module”. All modules offered by the School of Mathematical Sciences are worth 15 credits except for the Advanced Statistics Project and the MSci Project, which are “double modules” and carry 30 credits each.

### **What are academic levels?**

The academic level of a module reflects its target study year, although you can take modules in other years, which is common in joint honours programmes. The Queen Mary Academic Credit Framework follows the National Qualifications Framework in which levels 4–7 correspond to developmental years 1–4, which is consistent with university entry qualifications (such as GCE A-levels) being level 3. Modules in our foundation programmes and Essential Mathematical Skills are also at level 3. The first digit in current Mathematical Sciences module codes is the level, but this is not (yet) the case for modules taught by most other departments.

The following study programmes show the level of each module explicitly in square brackets between the module code and title. There are requirements on the numbers of credits you must take at various levels, which we have incorporated into our current study programmes.

### **Can I take level-4 modules in my final year?**

Yes, provided you satisfy the requirements of your study programme. However, you are less likely to benefit from the exam board's discretion to push you up if you end up just below a degree class boundary than if you take only modules at level 5 or higher. If you began your undergraduate course in September 2007 or later then you cannot take more than 150 credits (10 modules) overall at level 3 or 4, which means at most 30 credits (2 modules) after your first year. If you began your undergraduate course in September 2006 or earlier then you are not subject to this restriction.

### **What does “choose another $n$ credits” mean?**

A requirement of this general form in a study programme means you must choose another  $n$  credits (normally  $n/15$  modules of 15 credits each), subject to any constraints included in the requirement. The constraints may be that you can choose only MTH modules or only modules at certain levels. However, **you can choose more modules from any lists of modules from which you have already chosen some modules** (provided they satisfy any constraints).

## G100 BSc in Mathematics

Programme director: Professor Bill Jackson

### To obtain a BSc degree:

- You must take 360 credits (normally 24 modules of 15 credits each) including at most 30 credits (2 modules) at level 3, at most 150 credits (10 modules) at level 3 or 4, and at least 90 credits (normally 6 modules) at level 6 or higher.
- You must pass at least 270 credits (normally 18 modules) at level 4 or higher. Special regulations apply if you take a year abroad.

### To obtain a BSc in Mathematics:

- You must pass Essential Mathematical Skills, which is a 0-credit level-3 core module, to progress from the first to the second year of this programme.
- You must take all compulsory modules and the required number of compulsory options as shown in the outline programme or as agreed with the programme director.
- At least  $\frac{3}{4}$  of the credits you take must be from MTH modules.

If you graduate but fail to meet these requirements then your degree title may be “Mathematical Studies”.

### Outline programme

Modules in **bold** are compulsory and must normally be taken in the year shown. You must take modules to the value of 120 credits (normally 8 modules) in each developmental year. The value of each module is 15 credits unless otherwise indicated. The square brackets show levels.

**Year 1** – take the following modules:

Semester 1	Semester 2
<b>MTH3100 [3] Essential Mathematical Skills (core)</b>	
<b>MTH4100 [4] Calculus I</b>	<b>MTH4101 [4] Calculus II</b>
<b>MTH4103 [4] Geometry I</b>	<b>MTH4102 [4] Differential Equations</b>
<b>MTH4105 [4] Intro. to Math. Computing</b>	<b>MTH4104 [4] Introduction to Algebra</b>
<b>MTH4108 [4] Probability I</b>	<b>MTH4106 [4] Introduction to Statistics</b>

**Year 2** – take modules worth 120 credits (normally 8 modules) in total including the following:

Semester 3	Semester 4
<b>MTH5112 [5] Linear Algebra I</b>	<b>Choose <u>two</u> of:</b>
<b>Choose <u>two</u> of:</b>	MTH5100 [5] Algebraic Structures I
MTH5102 [5] Calculus III	MTH5103 [5] Complex Variables
MTH5104 [5] Convergence & Continuity	MTH5105 [5] Differential & Integral Analysis
MTH5106 [5] Dynamics of Physical Systems	MTH5109 [5] Geometry II: Knots and Surfaces
MTH5117 [5] Mathematical Writing	MTH5110 [5] Intro. to Numerical Computing
MTH5118 [5] Probability II	MTH5120 [5] Statistical Modelling I
<b>Choose another 15 credits at level 3, 4 or 5.</b>	<b>Choose <u>one</u> of:</b>
	MTH6105 [6] Algorithmic Graph Theory
	MTH6128 [6] Number Theory
	MTH6129 [6] Oscillations, Waves & Patterns
	MTH6136 [6] Statistical Theory
	<b>Choose another 15 credits at level 3, 4 or 5.</b>

**Year 3** – take modules worth 120 credits (normally 8 modules) in total including the following:

Semester 5	Semester 6
<b>Choose 75 credits from MTH modules at level 6 or 7. Then choose another 45 credits.</b>	

## G110 BSc in Pure Mathematics

Programme director: Professor Bill Jackson

### To obtain a BSc degree:

- You must take 360 credits (normally 24 modules of 15 credits each) including at most 30 credits (2 modules) at level 3, at most 150 credits (10 modules) at level 3 or 4, and at least 90 credits (normally 6 modules) at level 6 or higher.
- You must pass at least 270 credits (normally 18 modules) at level 4 or higher. Special regulations apply if you take a year abroad.

### To obtain a BSc in Pure Mathematics:

- You must pass Essential Mathematical Skills, which is a 0-credit level-3 core module, to progress from the first to the second year of this programme.
- You must take all compulsory modules and the required number of compulsory options as shown in the outline programme or as agreed with the programme director.
- At least  $\frac{3}{4}$  of the credits you take must be from MTH modules.

If you graduate but fail to meet these requirements then your degree title may be “Mathematical Studies”.

### Outline programme

Modules in **bold** are compulsory and must normally be taken in the year shown. You must take modules to the value of 120 credits (normally 8 modules) in each developmental year. The value of each module is 15 credits unless otherwise indicated. The square brackets show levels.

**Year 1** – take the following modules:

Semester 1	Semester 2
<b>MTH3100 [3] Essential Mathematical Skills (core)</b>	
<b>MTH4100 [4] Calculus I</b>	<b>MTH4101 [4] Calculus II</b>
<b>MTH4103 [4] Geometry I</b>	<b>MTH4102 [4] Differential Equations</b>
<b>MTH4105 [4] Intro. to Math. Computing</b>	<b>MTH4104 [4] Introduction to Algebra</b>
<b>MTH4108 [4] Probability I</b>	<b>MTH4106 [4] Introduction to Statistics</b>

**Year 2** – take modules worth 120 credits (normally 8 modules) in total including the following:

Semester 3	Semester 4
<b>MTH5104 [5] Convergence &amp; Continuity</b>	<b>MTH5100 [5] Algebraic Structures I</b>
<b>MTH5112 [5] Linear Algebra I</b>	<b>MTH5103 [5] Complex Variables</b>
<b>MTH5117 [5] Mathematical Writing</b>	<b>MTH5105 [5] Differential &amp; Integral Analysis</b>
<b>Choose another 15 credits at level 3, 4 or 5.</b>	<b>Choose <u>one</u> of:</b>
	MTH6105 [6] Algorithmic Graph Theory
	MTH6128 [6] Number Theory

**Year 3** – take modules worth 120 credits (normally 8 modules) in total including the following:

Semester 5	Semester 6
<b>Choose <u>three</u> modules from the lists below:</b>	
MTH6104 [6] Algebraic Structures II	MTH6108 [6] Coding Theory
MTH6107 [6] Chaos & Fractals	MTH6115 [6] Cryptography
MTH6109 [6] Combinatorics	MTH716U [7] Measure Theory and Probability
MTH6111 [6] Complex Analysis	MTH732U [7] Topology
MTH6126 [6] Metric Spaces	MTH733U [7] Fields and Galois Theory
MTH6140 [6] Linear Algebra II	
<b>Choose another 30 credits from MTH modules at level 6 or 7. Then choose another 45 credits.</b>	

## G300 BSc in Statistics for students who entered in 2007–08 or earlier

Programme director: Dr Heiko Grossmann

### To obtain a BSc degree:

- You must take 360 credits (normally 24 modules of 15 credits each) including at most 30 credits (2 modules) at level 3, at most 150 credits (10 modules) at level 3 or 4, and at least 90 credits (normally 6 modules) at level 6 or higher.
- You must pass at least 270 credits (normally 18 modules) at level 4 or higher. Special regulations apply if you take a year abroad.

### To obtain a BSc in Statistics:

- You must pass Essential Mathematical Skills, which is a 0-credit level-3 core module, to progress from the first to the second year of this programme.
- You must take all compulsory modules and the required number of compulsory options as shown in the outline programme or as agreed with the programme director.
- At least  $\frac{3}{4}$  of the credits you take must be from MTH modules.

If you graduate but fail to meet these requirements then your degree title may be “Mathematical Studies”.

### Outline programme

Modules in **bold** are compulsory and must normally be taken in the year shown. You must take modules to the value of 120 credits (normally 8 modules) in each developmental year. The value of each module is 15 credits unless otherwise indicated. The square brackets show levels.

**Year 2** – take modules worth 120 credits (normally 8 modules) in total including the following:

Semester 3	Semester 4
<b>MTH5112 [5] Linear Algebra I</b> <b>MTH5118 [5] Probability II</b> <b>MTH5119 [5] Sampling, Surveys &amp; Simulation</b> Choose another 15 credits at level 3, 4 or 5.	<b>MTH5120 [5] Statistical Modelling I</b> <b>MTH6136 [6] Statistical Theory</b> Choose another 30 credits at level 3, 4 or 5.

**Year 3** – take modules worth 120 credits (normally 8 modules) in total including the following:

Semester 5	Semester 6
<b>MTH6103 [6] Advanced Statistics Project (30 credits, double module over both semesters)</b>	
Choose <u>five</u> modules from the lists below:	
MTH6134 [6] Statistical Modelling II MTH6139 [6] Time Series	MTH6116 [6] Design of Experiments MTH6130 [6] Probability III MTH709U [7] Bayesian Statistics MTH731U [7] Computational Statistics MTH734U [7] Topics in Prob. and Stoch. Proc.
Then choose another 15 credits.	

## GG31 BSc in Mathematics and Statistics

Programme director: Dr Heiko Grossmann

### To obtain a BSc degree:

- You must take 360 credits (normally 24 modules of 15 credits each) including at most 30 credits (2 modules) at level 3, at most 150 credits (10 modules) at level 3 or 4, and at least 90 credits (normally 6 modules) at level 6 or higher.
- You must pass at least 270 credits (normally 18 modules) at level 4 or higher. Special regulations apply if you take a year abroad.

### To obtain a BSc in Mathematics and Statistics:

- You must pass Essential Mathematical Skills, which is a 0-credit level-3 core module, to progress from the first to the second year of this programme.
- You must take all compulsory modules and the required number of compulsory options as shown in the outline programme or as agreed with the programme director.
- At least  $\frac{3}{4}$  of the credits you take must be from MTH modules.

If you graduate but fail to meet these requirements then your degree title may be “Mathematical Studies”.

### Outline programme

Modules in **bold** are compulsory and must normally be taken in the year shown. You must take modules to the value of 120 credits (normally 8 modules) in each developmental year. The value of each module is 15 credits unless otherwise indicated. The square brackets show levels.

**Year 1** – take the following modules:

Semester 1	Semester 2
<b>MTH3100 [3] Essential Mathematical Skills (core)</b>	
<b>MTH4100 [4] Calculus I</b>	<b>MTH4101 [4] Calculus II</b>
<b>MTH4103 [4] Geometry I</b>	<b>MTH4102 [4] Differential Equations</b>
<b>MTH4105 [4] Intro. to Math. Computing</b>	<b>MTH4104 [4] Introduction to Algebra</b>
<b>MTH4108 [4] Probability I</b>	<b>MTH4106 [4] Introduction to Statistics</b>

**Year 2** – take modules worth 120 credits (normally 8 modules) in total including the following:

Semester 3	Semester 4
<b>MTH5112 [5] Linear Algebra I</b>	<b>MTH5120 [5] Statistical Modelling I</b>
<b>MTH5118 [5] Probability II</b>	<b>MTH6136 [6] Statistical Theory</b>
Choose <u>two</u> modules from the lists below:	
MTH5102 [5] Calculus III	MTH5100 [5] Algebraic Structures I
MTH5104 [5] Convergence & Continuity	MTH5103 [5] Complex Variables
MTH5106 [5] Dynamics of Physical Systems	MTH5105 [5] Differential & Integral Analysis
MTH5117 [5] Mathematical Writing	MTH5109 [5] Geometry II: Knots and Surfaces
MTH5119 [5] Sampling, Surveys & Simulation	
Then choose another 30 credits at level 3, 4 or 5.	

**Year 3** – take modules worth 120 credits (normally 8 modules) in total including the following:

Semester 5	Semester 6
Choose <u>five</u> modules from the lists below:	
MTH6134 [6] Statistical Modelling II	MTH6100 [6] Actuarial Mathematics
MTH6139 [6] Time Series	MTH6105 [6] Algorithmic Graph Theory
	MTH6116 [6] Design of Experiments
	MTH6129 [6] Oscillations, Waves & Patterns
	MTH6130 [6] Probability III
	MTH709U [7] Bayesian Statistics
	MTH731U [7] Computational Statistics
	MTH734U [7] Topics in Prob. and Stoch. Proc.
Then choose another 45 credits.	

## G1N1 BSc in Mathematics with Business Management

Programme director: Dr Roger Sugden

### To obtain a BSc degree:

- You must take 360 credits (normally 24 modules of 15 credits each) including at most 30 credits (2 modules) at level 3, at most 150 credits (10 modules) at level 3 or 4, and at least 90 credits (normally 6 modules) at level 6 or higher.
- You must pass at least 270 credits (normally 18 modules) at level 4 or higher. Special regulations apply if you take a year abroad.

### To obtain a BSc in Mathematics with Business Management:

- You must pass Essential Mathematical Skills, which is a 0-credit level-3 core module, to progress from the first to the second year of this programme.
- You must take all compulsory modules and the required number of compulsory options as shown in the outline programme or as agreed with the programme director.
- At least  $\frac{1}{2}$  of the credits you take must be from MTH modules and at least  $\frac{1}{4}$  of the credits you take must be from BUS modules.

If you graduate but fail to meet these requirements then your degree title may be “Mathematical Studies”.

### Outline programme

Modules in **bold** are compulsory and must normally be taken in the year shown. You must take modules to the value of 120 credits (normally 8 modules) in each developmental year. The value of each module is 15 credits unless otherwise indicated. The square brackets show levels.

**Year 1** – take the following modules:

Semester 1	Semester 2
<b>MTH3100 [3] Essential Mathematical Skills (core)</b>	
<b>MTH4100 [4] Calculus I</b> <b>MTH4103 [4] Geometry I</b> <b>MTH4108 [4] Probability I</b> <b>BUS001 [4] Fundamentals of Management</b>	<b>MTH4101 [4] Calculus II</b> <b>MTH4102 [4] Differential Equations</b> <b>MTH4106 [4] Introduction to Statistics</b> <b>BUS017 [4] Economics for Business</b>

**Year 2** – take modules worth 120 credits (normally 8 modules) in total including the following:

Semester 3	Semester 4
<b>MTH5112 [5] Linear Algebra I</b> <b>BUS021 [4] Financial Accounting</b>	<b>BUS011 [5] Marketing</b>
Choose <b>two</b> modules from the lists below:	
MTH5102 [5] Calculus III MTH5106 [5] Dynamics of Physical Systems MTH5118 [5] Probability II MTH5119 [5] Sampling, Surveys & Simulation	MTH4104 [4] Introduction to Algebra MTH5103 [5] Complex Variables MTH5109 [5] Geometry II: Knots and Surfaces MTH5120 [5] Statistical Modelling I
Choose <b>one</b> of:	
MTH6129 [6] Oscillations, Waves & Patterns MTH6136 [6] Statistical Theory	
Then choose another 30 credits at level 3, 4 or 5.	

**Year 3** – take modules worth 120 credits (normally 8 modules) in total including the following:

Semester 5	Semester 6
<b>BUS204 [5] Strategy</b>	<b>BUS324 [6] Management of Human Resources</b>
Choose 60 credits from MTH modules at level 6 or 7. Then choose another 30 credits.	

## GN13 BSc in Mathematics, Business Management and Finance for students entering in 2008–09 or later

Programme director: Dr Roger Sugden

### To obtain a BSc degree:

- You must take 360 credits (normally 24 modules of 15 credits each) including at most 30 credits (2 modules) at level 3, at most 150 credits (10 modules) at level 3 or 4, and at least 90 credits (normally 6 modules) at level 6 or higher.
- You must pass at least 270 credits (normally 18 modules) at level 4 or higher. Special regulations apply if you take a year abroad.

### To obtain a BSc in Mathematics, Business Management and Finance:

- You must pass Essential Mathematical Skills, which is a 0-credit level-3 core module, to progress from the first to the second year of this programme.
- You must take all compulsory modules and the required number of compulsory options as shown in the outline programme or as agreed with the programme director.
- At least  $\frac{1}{3}$  of the credits you take must be from MTH modules, at least  $\frac{1}{3}$  of the credits you take must be from BUS modules, and no more than  $\frac{1}{4}$  of the credits you take may have module codes other than MTH or BUS.

If you graduate but fail to meet these requirements then your degree title may be “Mathematical Studies”.

### Outline programme

Modules in **bold** are compulsory and must normally be taken in the year shown. You must take modules to the value of 120 credits (normally 8 modules) in each developmental year. The value of each module is 15 credits unless otherwise indicated. The square brackets show levels.

**Year 1** – take the following modules:

Semester 1	Semester 2
<b>MTH3100 [3] Essential Mathematical Skills (core)</b>	
<b>MTH4100 [4] Calculus I</b> <b>MTH4103 [4] Geometry I</b> <b>MTH4108 [4] Probability I</b> <b>BUS001 [4] Fundamentals of Management</b>	<b>MTH4101 [4] Calculus II</b> <b>MTH4102 [4] Differential Equations</b> <b>MTH4106 [4] Introduction to Statistics</b> <b>BUS017 [4] Economics for Business</b>

**Year 2** – take modules worth 120 credits (normally 8 modules) in total including the following:

Semester 3	Semester 4
<b>MTH5112 [5] Linear Algebra I</b> <b>MTH5118 [5] Probability II</b> <b>BUS021 [4] Financial Accounting</b> <b>Choose another 15 credits at level 3, 4 or 5.</b>	<b>MTH5120 [5] Statistical Modelling I</b> <b>MTH6100 [6] Actuarial Mathematics</b> <b>BUS011 [5] Marketing</b> <b>BUS022 [5] Managerial Accounting</b>

**Year 3** – take modules worth 120 credits (normally 8 modules) in total including the following:

Semester 5	Semester 6
<b>BUS204 [5] Strategy</b> <b>BUS306 [6] Financial Management</b> <b>MTH6121 [6] Introduction to Math. Finance</b>	<b>BUS324 [6] Management of Human Resources</b> <b>Choose <u>one</u> of:</b> <b>MTH6120 [6] Further Topics in Math. Finance</b> <b>MTH6130 [6] Probability III</b>
<b>Choose <u>one</u> module from the lists below:</b>	
<b>MTH6134 [6] Statistical Modelling II</b> <b>MTH6139 [6] Time Series</b>	<b>MTH6136 [6] Statistical Theory</b>
<b>Then choose another 30 credits.</b>	

## GN13 BSc in Mathematics, Business Management and Finance for students who entered in 2007–08 or earlier

Programme director: Dr Roger Sugden

### To obtain a BSc degree:

- You must take 360 credits (normally 24 modules of 15 credits each) including at most 30 credits (2 modules) at level 3, at most 150 credits (10 modules) at level 3 or 4, and at least 90 credits (normally 6 modules) at level 6 or higher.
- You must pass at least 270 credits (normally 18 modules) at level 4 or higher. Special regulations apply if you take a year abroad.

### To obtain a BSc in Mathematics, Business Management and Finance:

- You must pass Essential Mathematical Skills, which is a 0-credit level-3 core module, to progress from the first to the second year of this programme.
- You must take all compulsory modules and the required number of compulsory options as shown in the outline programme or as agreed with the programme director.
- At least  $\frac{1}{3}$  of the credits you take must be from MTH modules, at least  $\frac{1}{3}$  of the credits you take must be from BUS or ECN modules, and no more than  $\frac{1}{4}$  of the credits you take may have module codes other than MTH/ECN/BUS.

If you graduate but fail to meet these requirements then your degree title may be “Mathematical Studies”.

### Outline programme

Modules in **bold** are compulsory and must normally be taken in the year shown. You must take modules to the value of 120 credits (normally 8 modules) in each developmental year. The value of each module is 15 credits unless otherwise indicated. The square brackets show levels.

**Year 2** – take modules worth 120 credits (normally 8 modules) in total including the following:

Semester 3	Semester 4
<b>MTH5112 [5] Linear Algebra I</b>	<b>MTH5120 [5] Statistical Modelling I</b>
<b>MTH5118 [5] Probability II</b>	<b>MTH6100 [6] Actuarial Mathematics</b>
<b>BUS021 [4] Financial Accounting</b>	<b>BUS011 [5] Marketing</b>
<b>ECN222 [5] Financial Markets and Institutions</b>	<b>Choose another 15 credits at level 3, 4 or 5.</b>

**Year 3** – take modules worth 120 credits (normally 8 modules) in total including the following:

Semester 5	Semester 6
<b>BUS204 [5] Strategy</b>	<b>BUS324 [6] Management of Human Resources</b>
	<b>ECN273 [5] Capital Markets</b>
	<b>ECN358 [6] Futures and Options</b>
Take enough modules at level 6 or 7 to have at least 90 credits (normally 6 modules) overall in the degree programme, of which at least 60 credits must be from MTH modules including at least <u>two</u> from the lists below:	
MTH6121 [6] Introduction to Math. Finance	MTH6120 [6] Further Topics in Math. Finance
MTH6134 [6] Statistical Modelling II	MTH6130 [6] Probability III
MTH6139 [6] Time Series	

## GL11 BSc in Mathematics, Statistics and Financial Economics

Programme director: Dr Roger Sugden

### To obtain a BSc degree:

- You must take 360 credits (normally 24 modules of 15 credits each) including at most 30 credits (2 modules) at level 3, at most 150 credits (10 modules) at level 3 or 4, and at least 90 credits (normally 6 modules) at level 6 or higher.
- You must pass at least 270 credits (normally 18 modules) at level 4 or higher. Special regulations apply if you take a year abroad.

### To obtain a BSc in Mathematics, Statistics and Financial Economics:

- You must pass Essential Mathematical Skills, which is a 0-credit level-3 core module, to progress from the first to the second year of this programme.
- You must take all compulsory modules and the required number of compulsory options as shown in the outline programme or as agreed with the programme director.
- At least  $\frac{1}{3}$  of the credits you take must be from MTH modules, at least  $\frac{1}{3}$  of the credits you take must be from ECN modules, and no more than  $\frac{1}{4}$  of the credits you take may be in subjects not related to mathematics, statistics, or financial economics.

If you graduate but fail to meet these requirements then your degree title may be “Mathematical Studies”.

### Outline programme

Modules in **bold** are compulsory and must normally be taken in the year shown. You must take modules to the value of 120 credits (normally 8 modules) in each developmental year. The value of each module is 15 credits unless otherwise indicated. The square brackets show levels.

**Year 1** – take the following modules:

Semester 1	Semester 2
<b>MTH3100 [3] Essential Mathematical Skills (core)</b>	
<b>MTH4100 [4] Calculus I</b> <b>MTH4103 [4] Geometry I</b> <b>MTH4108 [4] Probability I</b> <b>ECN199 [4] Economic Principles</b>	<b>MTH4101 [4] Calculus II</b> <b>MTH4106 [4] Introduction to Statistics</b> <b>ECN106 [4] Macroeconomics I</b> <b>ECN111 [4] Microeconomics I</b>

**Year 2** – take modules worth 120 credits (normally 8 modules) in total including the following:

Semester 3	Semester 4
<b>MTH5112 [5] Linear Algebra I</b> <b>MTH5118 [5] Probability II</b> <b>ECN214 [5] Games and Strategies</b> <b>ECN222 [5] Financial Markets and Institutions</b>	<b>MTH5120 [5] Statistical Modelling I</b> <b>MTH6136 [6] Statistical Theory</b> <b>ECN211 [5] Microeconomics II</b> <b>ECN273 [5] Capital Markets</b>

**Year 3** – take modules worth 120 credits (normally 8 modules) in total including the following:

Semester 5	Semester 6
<b>ECN371 [6] Corporate Finance I</b>	<b>Choose at least <u>one</u> of:</b> <b>ECN273 [5] Capital Markets (2009–10 only)</b> <b>ECN372 [6] Corporate Finance II</b>
----- <b>Then choose another 15 credits from ECN modules at level 6.</b> <b>Choose <u>two</u> modules from the lists below:</b>	
MTH6134 [6] Statistical Modelling II MTH6139 [6] Time Series	MTH6116 [6] Design of Experiments MTH6130 [6] Probability III MTH731U [7] Computational Statistics
----- <b>Then choose another 30 credits to ensure at least 90 credits at level 6 or 7 overall in the degree programme.</b>	

**G1N4 BSc in Mathematics with Finance and Accounting**  
**G1L1 BSc in Mathematics and Statistics with Finance**  
**for students who entered in 2008–09**

Programme director: Dr Roger Sugden

(G1L1 students who entered in 2008–09 may transfer to G1N4.)

**To obtain a BSc degree:**

- You must take 360 credits (normally 24 modules of 15 credits each) including at most 30 credits (2 modules) at level 3, at most 150 credits (10 modules) at level 3 or 4, and at least 90 credits (normally 6 modules) at level 6 or higher.
- You must pass at least 270 credits (normally 18 modules) at level 4 or higher. Special regulations apply if you take a year abroad.

**To obtain a BSc in Mathematics with Finance and Accounting or Mathematics and Statistics with Finance:**

- You must pass Essential Mathematical Skills, which is a 0-credit level-3 core module, to progress from the first to the second year of this programme.
- You must take all compulsory modules and the required number of compulsory options as shown in the outline programme or as agreed with the programme director.
- At least  $\frac{1}{2}$  of the credits you take must be from MTH modules and at least  $\frac{1}{4}$  of the credits you take must be from BUS modules.

If you graduate but fail to meet these requirements then your degree title may be “Mathematical Studies”.

**Outline programme**

Modules in **bold** are compulsory and must normally be taken in the year shown. You must take modules to the value of 120 credits (normally 8 modules) in each developmental year. The value of each module is 15 credits unless otherwise indicated. The square brackets show levels.

**Year 1** – take the following modules:

Semester 1	Semester 2
<b>MTH3100 [3] Essential Mathematical Skills (core)</b>	
<b>MTH4100 [4] Calculus I</b> <b>MTH4103 [4] Geometry I</b> <b>MTH4108 [4] Probability I</b> <b>BUS021 [4] Financial Accounting</b>	<b>MTH4101 [4] Calculus II</b> <b>MTH4102 [4] Differential Equations</b> <b>MTH4106 [4] Introduction to Statistics</b> <b>BUS017 [4] Economics for Business</b>

**Year 2** – take modules worth 120 credits (normally 8 modules) in total including the following:

Semester 3	Semester 4
<b>MTH5112 [5] Linear Algebra I</b> <b>MTH5118 [5] Probability II</b> <b>BUS201 [5] Financial Institutions</b> <b>Choose another 15 credits at level 3, 4 or 5.</b>	<b>MTH5120 [5] Statistical Modelling I</b> <b>MTH6100 [6] Actuarial Mathematics</b> <b>BUS022 [5] Managerial Accounting</b> <b>Choose another 15 credits at level 3, 4 or 5.</b>

**Year 3** – take modules worth 120 credits (normally 8 modules) in total including the following:

Semester 5	Semester 6
<b>MTH6121 [6] Introduction to Math. Finance</b> <b>BUS306 [6] Financial Management</b>	<b>MTH6136 [6] Statistical Theory</b>
Choose <b>two</b> modules from the lists below:	
MTH6134 [6] Statistical Modelling II MTH6139 [6] Time Series	MTH6116 [6] Design of Experiments MTH6120 [6] Further Topics in Math. Finance MTH6130 [6] Probability III
<b>Then choose another 45 credits.</b>	

## G1L1 BSc in Mathematics and Statistics with Finance for students who entered in 2007–08 or earlier

Programme director: Dr Roger Sugden

### To obtain a BSc degree:

- You must take 360 credits (normally 24 modules of 15 credits each) including at most 30 credits (2 modules) at level 3, at most 150 credits (10 modules) at level 3 or 4, and at least 90 credits (normally 6 modules) at level 6 or higher.
- You must pass at least 270 credits (normally 18 modules) at level 4 or higher. Special regulations apply if you take a year abroad.

### To obtain a BSc in Mathematics and Statistics with Finance:

- You must pass Essential Mathematical Skills, which is a 0-credit level-3 core module, to progress from the first to the second year of this programme.
- You must take all compulsory modules and the required number of compulsory options as shown in the outline programme or as agreed with the programme director.
- At least  $\frac{1}{2}$  of the credits you take must be from MTH modules and at least  $\frac{1}{4}$  of the credits you take must be from ECN and BUS modules.

If you graduate but fail to meet these requirements then your degree title may be “Mathematical Studies”.

### Outline programme

Modules in **bold** are compulsory and must normally be taken in the year shown. You must take modules to the value of 120 credits (normally 8 modules) in each developmental year. The value of each module is 15 credits unless otherwise indicated. The square brackets show levels.

**Year 2** – take modules worth 120 credits (normally 8 modules) in total including the following:

Semester 3	Semester 4
MTH5112 [5] <b>Linear Algebra I</b>	MTH5120 [5] <b>Statistical Modelling I</b>
MTH5118 [5] <b>Probability II</b>	MTH6100 [6] <b>Actuarial Mathematics</b>
BUS021 [4] <b>Financial Accounting</b>	MTH6136 [6] <b>Statistical Theory</b>
ECN222 [5] <b>Financial Markets and Institutions</b>	<b>Choose another 15 credits at level 3, 4 or 5.</b>

**Year 3** – take modules worth 120 credits (normally 8 modules) in total including the following:

Semester 5	Semester 6
	ECN273 [5] <b>Capital Markets</b>
	ECN358 [6] <b>Futures and Options</b>
----- <b>Take enough modules at level 6 or 7 to have at least 90 credits (normally 6 modules) overall in the degree programme, of which at least 60 credits (normally 4 modules) must be from MTH modules including at least <u>two</u> from the lists below:</b>	
MTH6121 [6] Introduction to Math. Finance	MTH6116 [6] Design of Experiments
MTH6134 [6] Statistical Modelling II	MTH6120 [6] Further Topics in Math. Finance
MTH6139 [6] Time Series	MTH6130 [6] Probability III

## GG14 BSc in Mathematics and Computing

Programme director: Professor Mark Jerrum

### To obtain a BSc degree:

- You must take 360 credits (normally 24 modules of 15 credits each) including at most 30 credits (2 modules) at level 3, at most 150 credits (10 modules) at level 3 or 4, and at least 90 credits (normally 6 modules) at level 6 or higher.
- You must pass at least 270 credits (normally 18 modules) at level 4 or higher. Special regulations apply if you take a year abroad.

### To obtain a BSc in Mathematics and Computing:

- You must pass Essential Mathematical Skills, which is a 0-credit level-3 core module, to progress from the first to the second year of this programme.
- You must take all compulsory modules and the required number of compulsory options as shown in the outline programme or as agreed with the programme director.
- At least  $\frac{1}{3}$  of the credits you take must be from MTH modules, at least  $\frac{1}{3}$  of the credits you take must be from DCS modules or MTH modules approved by the programme director to have sufficient computing content, and no more than  $\frac{1}{4}$  of the credits you take may be in subjects not related to mathematics or computing.

If you graduate but fail to meet these requirements then your degree title may be “Mathematical Studies”.

### Outline programme

Modules in **bold** are compulsory and must normally be taken in the year shown. You must take modules to the value of 120 credits (normally 8 modules) in each developmental year. The value of each module is 15 credits unless otherwise indicated. The square brackets show levels.

**Year 1** – take the following modules:

Semester 1	Semester 2
<b>MTH3100 [3] Essential Mathematical Skills (core)</b>	
<b>MTH4100 [4] Calculus I</b> <b>MTH4103 [4] Geometry I</b> <b>MTH4108 [4] Probability I</b> <b>DCS100 [4] Procedural Programming</b>	<b>MTH4101 [4] Calculus II</b> <b>MTH4104 [4] Introduction to Algebra</b> <b>DCS104 [4] Object Oriented Programming</b> Choose <b>one</b> of: MTH4102 [4] Differential Equations MTH4106 [4] Introduction to Statistics

**Year 2** – take modules worth 120 credits (normally 8 modules) in total including the following:

Semester 3	Semester 4
<b>MTH4105 [4] Intro. to Math. Computing</b> <b>MTH5112 [5] Linear Algebra I</b> <b>DCS210 [5] Algorithms and Data</b>	<b>MTH5110 [5] Intro. to Numerical Computing</b> <b>DCS103 [4] Language and Communication</b>
Choose <b>one</b> module from the lists below:	
MTH5102 [5] Calculus III MTH5117 [5] Mathematical Writing MTH5118 [5] Probability II	MTH5100 [5] Algebraic Structures I MTH5103 [5] Complex Variables
Choose <b>one</b> of:	
MTH6105 [6] Algorithmic Graph Theory MTH6128 [6] Number Theory MTH6136 [6] Statistical Theory	
Choose another 15 credits at level 3, 4 or 5.	

**Year 3** – take modules worth 120 credits (normally 8 modules) in total including the following:

Semester 5	Semester 6
<b>Choose 60 credits from MTH modules at level 6. Choose 15 credits from DCS modules at level 6 and 15 credits from DCS modules at level 5 or 6. Then choose another 30 credits.</b> (Approval from the Department of Computer Science may be required for some DCS modules.)	

## FG31 BSc in Mathematics and Physics

Programme director: Dr Will Sutherland

### To obtain a BSc degree:

- You must take 360 credits (normally 24 modules of 15 credits each) including at most 30 credits (2 modules) at level 3, at most 150 credits (10 modules) at level 3 or 4, and at least 90 credits (normally 6 modules) at level 6 or higher.
- You must pass at least 270 credits (normally 18 modules) at level 4 or higher. Special regulations apply if you take a year abroad.

### To obtain a BSc in Mathematics and Physics:

- You must pass Essential Mathematical Skills, which is a 0-credit level-3 core module, to progress from the first to the second year of this programme.
- You must take all compulsory modules and the required number of compulsory options as shown in the outline programme or as agreed with the programme director.
- At least  $\frac{1}{3}$  of the credits you take must be from MTH modules, at least  $\frac{1}{3}$  of the credits you take must be from PHY modules or MTH modules approved by the programme director to have sufficient physics content, and no more than  $\frac{1}{4}$  of the credits you take may be in subjects not related to mathematics or physics.

If you graduate but fail to meet these requirements then your degree title may be “Mathematical Studies”.

### Outline programme

Modules in **bold** are compulsory and must normally be taken in the year shown. You must take modules to the value of 120 credits (normally 8 modules) in each developmental year. The value of each module is 15 credits unless otherwise indicated. The square brackets show levels.

**Year 1** – take the following modules:

Semester 1	Semester 2
<b>MTH3100 [3] Essential Mathematical Skills (core)</b>	
<b>MTH4100 [4] Calculus I</b> <b>MTH4103 [4] Geometry I</b> <b>MTH4108 [4] Probability I</b> <b>PHY116 [4] From Newton to Einstein</b>	<b>MTH4101 [4] Calculus II</b> <b>MTH4102 [4] Differential Equations</b> <b>MTH4106 [4] Introduction to Statistics</b> <b>PHY215 [4] Quantum Physics</b>

**Year 2** – take the following modules:

Semester 3	Semester 4
<b>MTH5102 [5] Calculus III</b> <b>MTH5106 [5] Dynamics of Physical Systems</b> <b>MTH5112 [5] Linear Algebra I</b> <b>PHY214 [5] Thermal and Kinetic Physics</b>	<b>MTH6129 [6] Oscillations, Waves &amp; Patterns</b> <b>PHY210 [4] Electric and Magnetic Fields</b> <b>PHY304 [5] Physical Dynamics</b> <b>PHY319 [5] Quantum Mechanics A</b>

**Year 3** – take modules worth 120 credits (normally 8 modules) in total including the following:

Semester 5	Semester 6
<b>PHY403 [6] Statistical Physics</b>	
Choose either (a) <u>one</u> of: MTH6138 [6] Third Year Project PHY709 [6] Independent Project <b>and 45 credits from MTH or PHY modules at level 6 or 7;</b> or (b) PHY776 [6] Extended Independent Project (30 credits, double module over both semesters) <b>and 30 credits from MTH or PHY modules at level 6 or 7.</b>	
<b>Then choose another 45 credits.</b>	

## G102 MSci in Mathematics

Programme director: Professor Bill Jackson

### Degree requirements

- You must take 480 credits (normally the MSci Project and 32 modules of 15 credits each) including at most 30 credits (2 modules) at level 3, at most 150 credits (10 modules) at level 3 or 4, and at least 90 credits (normally the MSci Project and 4 other modules) at level 7.
- You must pass Essential Mathematical Skills, which is a 0-credit level-3 core module, to progress from the first to the second year of this programme.
- You must pass at least 420 MTH credits at level 4 or higher or other approved modules, and comply with the outline programme.
- You must take the MSci Project and in addition at least 60 MTH credits (normally 4 modules) at level 7 or approved MSc modules at Queen Mary or other colleges of the University of London.

If you graduate but fail to meet these requirements then your degree title may be “Mathematical Studies”.

### Outline programme

Modules in **bold** are compulsory and must normally be taken in the year shown. You must take modules to the value of 120 credits (normally 8 modules) in each developmental year. The value of each module is 15 credits unless otherwise indicated. The square brackets show levels.

**Year 1** – take the following modules:

Semester 1	Semester 2
<b>MTH3100 [3] Essential Mathematical Skills (core)</b>	
<b>MTH4100 [4] Calculus I</b> <b>MTH4103 [4] Geometry I</b> <b>MTH4105 [4] Intro. to Math. Computing</b> <b>MTH4108 [4] Probability I</b>	<b>MTH4101 [4] Calculus II</b> <b>MTH4102 [4] Differential Equations</b> <b>MTH4104 [4] Introduction to Algebra</b> <b>MTH4106 [4] Introduction to Statistics</b>

**Year 2** – take modules worth 120 credits (normally 8 modules) in total including the following:

Semester 3	Semester 4
<b>MTH5104 [5] Convergence &amp; Continuity</b> <b>MTH5112 [5] Linear Algebra I</b> <b>MTH5117 [5] Mathematical Writing</b>	<b>MTH5100 [5] Algebraic Structures I</b> <b>MTH5105 [5] Differential &amp; Integral Analysis</b>
Choose <u>two</u> modules from the lists below:	
MTH5102 [5] Calculus III MTH5106 [5] Dynamics of Physical Systems MTH5118 [5] Probability II	MTH5103 [5] Complex Variables MTH5109 [5] Geometry II: Knots and Surfaces MTH5110 [5] Intro. to Numerical Computing MTH5120 [5] Statistical Modelling I MTH6105 [6] Algorithmic Graph Theory MTH6128 [6] Number Theory MTH6129 [6] Oscillations, Waves & Patterns MTH6136 [6] Statistical Theory
Then choose another 15 credits at level 3, 4, 5 or 6.	

**Year 3** – take modules worth 120 credits (normally 8 modules) in total including the following:

Semester 5	Semester 6
Choose <u>six</u> modules from the lists below:	
MTH6104 [6] Algebraic Structures II MTH6107 [6] Chaos & Fractals MTH6109 [6] Combinatorics MTH6111 [6] Complex Analysis MTH6122 [6] Linear Ops. & Diff. Equations MTH6126 [6] Metric Spaces MTH6132 [6] Relativity MTH6140 [6] Linear Algebra II	MTH6108 [6] Coding Theory MTH6115 [6] Cryptography MTH6123 [6] Math. Aspects of Cosmology MTH6130 [6] Probability III MTH733U [7] Fields and Galois Theory MTH737U [7] Fluid Dynamics
Then choose another 30 credits at level 3, 4, 5 or 6.	

**Year 4** – take modules worth 120 credits (normally 8 modules) in total including the following:

Semester 7	Semester 8
<b>MTH717U [7] MSci Project (30 credits, double module over both semesters)</b>	
<b>Take enough MTH modules at level 6 or 7 to have at least 210 credits (normally 14 modules) overall in the degree programme, of which at least 90 credits (normally 6 modules) must be at level 7 (including the MSci Project).</b>	

## G1G3 MSci in Mathematics with Statistics

Programme director: Dr Heiko Grossmann

### Degree requirements

- You must take 480 credits (normally the MSci Project and 32 modules of 15 credits each) including at most 30 credits (2 modules) at level 3, at most 150 credits (10 modules) at level 3 or 4, and at least 90 credits (normally the MSci Project and 4 other modules) at level 7.
- You must pass Essential Mathematical Skills, which is a 0-credit level-3 core module, to progress from the first to the second year of this programme.
- You must pass at least 420 MTH credits at level 4 or higher or other approved modules, and comply with the outline programme.
- You must take the MSci Project and in addition at least 60 MTH credits (normally 4 modules) at level 7 or approved MSc modules at Queen Mary or other colleges of the University of London.

If you graduate but fail to meet these requirements then your degree title may be “Mathematical Studies”.

### Outline programme

Modules in **bold** are compulsory and must normally be taken in the year shown. You must take modules to the value of 120 credits (normally 8 modules) in each developmental year. The value of each module is 15 credits unless otherwise indicated. The square brackets show levels.

**Year 1** – take the following modules:

Semester 1	Semester 2
<b>MTH3100 [3] Essential Mathematical Skills (core)</b>	
<b>MTH4100 [4] Calculus I</b> <b>MTH4103 [4] Geometry I</b> <b>MTH4105 [4] Intro. to Math. Computing</b> <b>MTH4108 [4] Probability I</b>	<b>MTH4101 [4] Calculus II</b> <b>MTH4102 [4] Differential Equations</b> <b>MTH4104 [4] Introduction to Algebra</b> <b>MTH4106 [4] Introduction to Statistics</b>

**Year 2** – take modules worth 120 credits (normally 8 modules) in total including the following:

Semester 3	Semester 4
<b>MTH5104 [5] Convergence &amp; Continuity</b> <b>MTH5112 [5] Linear Algebra I</b> <b>MTH5118 [5] Probability II</b> <b>Choose another 15 credits at level 3, 4 or 5.</b>	<b>MTH5100 [5] Algebraic Structures I</b> <b>MTH5105 [5] Differential &amp; Integral Analysis</b> <b>MTH5120 [5] Statistical Modelling I</b> <b>MTH6136 [6] Statistical Theory</b>

**Year 3** – take modules worth 120 credits (normally 8 modules) in total including the following:

Semester 5	Semester 6
<b>Choose <u>two</u> modules from the lists below:</b>	
<b>MTH6104 [6] Algebraic Structures II</b> <b>MTH6107 [6] Chaos &amp; Fractals</b> <b>MTH6126 [6] Metric Spaces</b> <b>MTH6140 [6] Linear Algebra II</b>	<b>MTH6108 [6] Coding Theory</b> <b>MTH6115 [6] Cryptography</b>
<b>Choose <u>three</u> modules from the lists below:</b>	
<b>MTH6134 [6] Statistical Modelling II</b> <b>MTH6139 [6] Time Series</b>	<b>MTH6116 [6] Design of Experiments</b> <b>MTH6130 [6] Probability III</b> <b>MTH709U [7] Bayesian Statistics</b> <b>MTH731U [7] Computational Statistics</b>
<b>Then choose another 45 credits at level 3, 4, 5 or 6.</b>	

**Year 4** – take modules worth 120 credits (normally 8 modules) in total including the following:

Semester 7	Semester 8
<b>MTH717U [7] MSci Project (30 credits, double module over both semesters)</b>	
<b>Take enough MTH modules at level 6 or 7 to have at least 210 credits (normally 14 modules) overall in the degree programme, of which at least 90 credits (normally 6 modules) must be at level 7 (including the MSci Project).</b>	