PROGRAMME SPECIFICATION

KEY FACTS

<table>
<thead>
<tr>
<th>Programme name</th>
<th>Financial Mathematics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Award</td>
<td>MSc</td>
</tr>
<tr>
<td>School</td>
<td>Cass Business School</td>
</tr>
<tr>
<td>Department or equivalent</td>
<td>MSc Programme (Cass Business School)</td>
</tr>
<tr>
<td>Programme code</td>
<td>PSFMAT</td>
</tr>
<tr>
<td>Type of study</td>
<td>Full Time</td>
</tr>
<tr>
<td>Total UK credits</td>
<td>180</td>
</tr>
<tr>
<td>Total ECTS</td>
<td>90</td>
</tr>
<tr>
<td>Partner (partnership programmes only)</td>
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<td>Type of partnership</td>
<td>Articulation</td>
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PROGRAMME SUMMARY

You are required to take nine compulsory modules in term 1 (4 modules) and term 2 (5 modules) which form the core of the requirements studying for an MSc Financial Mathematics. Each term has a length of 10 weeks and the modules are usually formally assessed at the end of each term. The MSc Financial Mathematics shares a number of core modules with the MSc Quantitative Finance programme.

The compulsory core modules in terms 1 and 2 are as follows:

Term 1 modules:
- Asset Pricing*
- Mathematical Models for Financial Derivatives
- Numerical Methods 1: Foundations*
- Stochastic Calculus
- Research Methods for Finance Professionals*

Term 2 modules:
- Fixed Income Securities*
- Risk Analysis*
- Numerical Methods 2: Applications to Finance*
- Advanced Stochastic Modelling Methods to Finance

Modules indicated with a * are shared with the MSc Quantitative Finance.

After the core modules, in term 3, students complete the Masters programme with specialisations. There are two routes to complete the MSc:
• **Option 1** Electives only: Students can take 5 specialist electives of 10 credits each.
• **Option 2** Business Research Project plus elective: Students can write a business research project which carries 40 credits and take 1 specialist elective.
• **Option 3** Applied Research Project worth 20 credits and three specialist electives of 10 credits each.

The term three specialist electives can be chosen from a substantial list of modules which are suitable for the degree. The list could change from year to year to ensure that all the modules help achieving the aims and objectives of the MSc Financial Mathematics.

**Aims**

• To develop a good knowledge in the techniques, methodologies and theory relevant in the wider area mathematical finance, financial engineering, pricing complex financial assets and risk management.
• To develop an understanding of the respective roles of stochastic theory, numerical methods and computer programming in pricing securities, risk management, hedging and speculating.
• To help students to acquire the sophisticated mathematical and computer-modelling skills required to perform tasks employ in areas such as pricing, hedging, trading, risk management and portfolio management decisions.
• To help student working in teams and to manage projects.
• To help students in understanding the theoretical frameworks of quantitative finance and its applications including shortcomings.

Students on this programme will acquire an in-depth knowledge which helps them to understanding numerous financial concepts, financial theory, mathematical techniques and practical applications used in decision making processes seen on trading or risk management desks, used by portfolio asset managers or quantitative analysts. It is expected that students will gain the ability to analyse new mathematical problems useful in the areas stated above. Students should choose this degree if they are interested in specialising in mathematical theory and modelling techniques used in asset pricing. For students to be able to achieve those aims it is required that students have a very strong background in mathematics.

The course is also intended to provide the mathematical tools required to carry out high standard research in both financial and academic institutions.

Throughout the course, where possible, lecturers will emphasise the many ethical issues that arise in the context of financial markets. In so doing students will be encouraged to share their views with their lecturers and with their class mates, where a diversity of
On successful completion of this programme, you will be expected to be able to:

Knowledge and understanding:
- have a detailed knowledge and understanding of the financial products available, their risk and returns characteristics and their use in hedging and for speculation.
- obtain the knowledge of understanding the theory and theoretical developments in the field of finance, financial mathematics and asset valuation and their applications
- have acquired a rigorous knowledge and understanding of the existing valuation models used in finance, their assumptions, their weakness, an ability to propose efficient alternatives and their applications
- understand the mathematics used in asset pricing, in particular the valuation of derivatives and fixed income securities, and risk management

Skills:
- acquire the ability to conduct research into issues of quantitative finance, such as pricing financial assets, risk management, asset management as well as the mathematical methodologies, including numerical methods.
- apply the theory and mathematics to real situations and to work with data.
- gain the ability to communicate technical information to a non-specialist audience
- obtain the ability to apply the knowledge acquired in the programme to develop theoretically and computationally sound financial models and to implement analytical systems
- gain the ability to advice on the use of financial securities by institutional investors such as banks or asset management companies for conducting their business
- have achieved the ability to critically analyse existing valuation models, understand the assumptions and their weaknesses and be able to apply them in a real work scenario.
• gain ability to write clear, well-structured and well argued reports

• be able to work effectively in groups to manage projects.

Values and attitudes:
• Students should be highly motivated to achieve high level of performance in the degree

• Students should develop a certain level of excitement for the subject

• Students will be highly challenged in a number of areas which required self-directed studying and critical thinking.

This programme has been developed in accordance with the QAA Subject Benchmark for Mathematics, Statistics and Operational Research.

HOW WILL I LEARN?

Teaching and learning methods include the opportunity for students to apply their knowledge and expertise to problems beyond those generally encountered. A range of teaching and learning strategies are used to help you meet the different learning outcomes and to cater for the varied backgrounds and experiences of you and your fellow students.

• Lectures and directed reading are used to help to help you achieve an understanding of the current level of knowledge in the relevant areas.
• Mini case studies, the use of specialist software package, problem sheets and real life projects as well as contributions from outside speakers are used to achieve integration between theory and practice.
• Substantial pieces of individual work such as a Business Research Project will provide you with the opportunity to acquire research and report writing skills on an individual basis and you will also work in small groups with your fellow students in order to benefit from peer interaction.

The assessment of the course will also support your learning:

• Coursework provides an opportunity to work usually in teams on solving real world problems by applying theoretical concepts introduced in class.
• Tests will assess the knowledge gained.
• Examinations provide a more in-depth assessment of knowledge gained and also assess your problem solving abilities.

The MSc in Financial Mathematics is designed and structured to allow for intellectual
progression through core modules taught in terms 1 and 2. Modules taught in term 2 normally build on the knowledge and skill acquired in term 1. Term three allows for further progression by choosing specialist elective modules or a dissertation/project, where students can apply knowledge and skills acquired earlier in the programme.

Students who fail to meet the requirements for the award of MSc Programme may be awarded a postgraduate diploma provided they have successfully completed all core content.

A minimum of 10 teaching and learning hours (both contact and non-contact) are required for each credit awarded. The precise weighting of different types of teaching and learning depends on the modules you take and the breakdown is therefore provided within the appropriate module specifications.

Non-contact hours are for self-directed study and account for the **minimum** amount of time you should spend studying independently, including subject research, reading, working in groups and completing assignments and other homework.

**Overall teaching and learning hours: approx 1800 hours**  
**Contact hours: approx 348 hours**

**WHAT TYPES OF ASSESSMENT AND FEEDBACK CAN I EXPECT?**

**Assessment and Assessment Criteria**

This course is assessed by coursework and examinations and applies standard MSc grade related criteria.

Assessment Criteria are descriptions, based on the intended learning outcomes, of the skills, knowledge or attitudes that you need to demonstrate in order to complete an assessment successfully, providing a mechanism by which the quality of an assessment can be measured. Grade-Related Criteria are descriptions of the level of skills, knowledge or attributes that you need to demonstrate in order achieve a certain grade or mark in an assessment, providing a mechanism by which the quality of an assessment can be measured and placed within the overall set of marks. Assessment Criteria and Grade-Related Criteria will be made available to you to support you in completing assessments. These may be provided in programme handbooks, module specifications, on the virtual learning environment or attached to a specific assessment task.

**Feedback on assessment**

Feedback will be provided in line with our Assessment and Feedback Policy and will be provided in a variety of ways throughout your course, both formally and informally, in order to support your learning.
You will normally be provided with coursework feedback within three weeks of the submission deadline or assessment date. This would normally include a provisional grade or mark. The timescale for feedback on final projects or dissertations may be longer. Examination grades will be provided once they have been agreed by an Assessment Board.

More details about the feedback you can expect from individual modules and assessments will be provided by your lecturers.

The full policy can be found at: https://www.city.ac.uk/__data/assets/pdf_file/0008/68921/assessment_and_feedback_policy.pdf

Assessment Regulations

In order to pass your Programme, you should complete successfully or be exempted from the relevant modules and assessments and will therefore acquire the required number of credits. The programme is weighted according to the number of credits awarded for each module. Pass / Fail modules are excluded from this calculation.

The pass mark for each module is 50% and there are no minimum qualifying marks for individual components.

If you fail an assessment component or a module, the following will apply:

Re-Sit: you will normally be offered one re-sit attempt.

If you are successful in the re-sit, you will be awarded the credit for that module. The mark for each assessment component that is subject to a re-sit will be capped at the pass mark for the module. This capped mark will be used in the calculation of the final module mark together with the original marks for the component(s) that you passed at first attempt.

If you do not meet the pass requirements for a module and do not complete your re-sit by the date specified you will not progress and the Assessment Board will require that you be withdrawn from the programme.

If you fail to meet the requirements for the Programme, the Assessment Board will consider whether you are eligible for an Exit Award as per the table below.

If you would like to know more about the way in which assessment works at City, please see the full version of the Assessment Regulations at: http://www.city.ac.uk/__data/assets/word_doc/0003/69249/s19.doc
WHAT AWARD CAN I GET?

Master's Degree:

<table>
<thead>
<tr>
<th>HE Level</th>
<th>Credits</th>
<th>Weighting (%)</th>
<th>Class</th>
<th>% required</th>
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<tbody>
<tr>
<td>Degree</td>
<td>7</td>
<td>180</td>
<td>With Distinction</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>With Merit</td>
<td>65</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Without</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Classification</td>
<td></td>
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</tbody>
</table>

Postgraduate Diploma:

A student who has not accumulated enough credits to be awarded a masters degree may be awarded a postgraduate diploma provided that:

- All core / core elective modules (excluding the Business Research Project modules) are included in the calculation.
- That the overall aggregate grade for all modules to be counted is at least 50%.
- Not more than 20 core / core elective credits are between 40% - 49.9%.

<table>
<thead>
<tr>
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<th>% required</th>
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<tr>
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<td>Without</td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Classification</td>
<td></td>
</tr>
</tbody>
</table>

If you are a student joining the programme mid-cycle as part of a dual degree programme, where modules are exempted from term one, credit for the exempted modules will be added to your student record (further details on assessment rules and regulations and calculations of awards will be available in the course/student handbook).

WHAT WILL I STUDY?

The programme is taught over three terms. Students must complete four core modules in term one, five core modules in term two, and a choice of five elective modules, a Business Research Project and one elective or an Applied Research Project and three electives in term three.

<table>
<thead>
<tr>
<th>Module Title</th>
<th>SITS</th>
<th>Module</th>
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7
<table>
<thead>
<tr>
<th>Code</th>
<th>Credits</th>
<th>Elective</th>
<th>Compensated?</th>
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<tbody>
<tr>
<td>Asset Pricing</td>
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<tr>
<td>Fixed Income Securities</td>
<td>SMM269</td>
<td>15</td>
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<tr>
<td>Risk Analysis</td>
<td>SMM272</td>
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<td>C</td>
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<tr>
<td>Mathematical Models for Financial Derivatives</td>
<td>SMM301</td>
<td>15</td>
<td>C</td>
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<td>Stochastic Calculus</td>
<td>SMM302</td>
<td>15</td>
<td>C</td>
</tr>
<tr>
<td>Advanced Stochastic Modelling Methods in Finance</td>
<td>SMM306</td>
<td>15</td>
<td>C</td>
</tr>
<tr>
<td>Numerical Methods 1: Foundations</td>
<td>SMM312</td>
<td>15</td>
<td>C</td>
</tr>
<tr>
<td>Numerical Methods 2: Applications in Finance</td>
<td>SMM313</td>
<td>15</td>
<td>C</td>
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<tr>
<td>Research Methods for Quantitative Professionals</td>
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<td>C</td>
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<tr>
<td>Exotic Options</td>
<td>SMM314</td>
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<td>Energy and Weather Derivatives</td>
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<td>Applied Research Project</td>
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<td>Business Research Project</td>
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**TO WHAT KIND OF CAREER MIGHT I GO ON?**

[http://www.cass.city.ac.uk/more-about-cass/careers-services](http://www.cass.city.ac.uk/more-about-cass/careers-services) - Careers Service

[http://www.cass.city.ac.uk/more-about-cass/alumni-services](http://www.cass.city.ac.uk/more-about-cass/alumni-services) - Alumni Service

**WHAT PLACEMENT OPPORTUNITIES ARE AVAILABLE?**

- Placements are not part of the programme.

**WILL I GET ANY PROFESSIONAL RECOGNITION?**

**Accrediting Body:** Institute and Faculty of Actuaries

**Nature of Accreditation**
Exemptions offered for subjects ST5 and ST6 from the Institute and Faculty of Actuaries.

**HOW DO I ENTER THE PROGRAMME?**
To be accepted on to a Cass MSc degree you will need a good Bachelors degree. This usually means a UK 2.1 or above, or the equivalent from an overseas institution. Some level of previous study in the specific subject area may be required.

Applicants will need to submit two references, one of which must be an academic reference if the candidate does not have previous work experience. Previous work experience is not a requirement of our full time MSc courses.

We require all students who have not previously studied at in English to take an IELTS exam. The IELTS requirement is 7.0 with a minimum of 6.5 in writing.