**PROGRAMME SPECIFICATION**

**KEY FACTS**

| **Programme name** | **Mathematical Trading and Finance** |
|---|---|
| Award | MSc |
| School | Bayes Business School |
| Department or equivalent | Specialist Masters Programme |
| Programme code | PSMTFN |
| Type of study | Full Time |
| Total UK credits | 180 |
| Total ECTS | 90 |
| Partner (partnership programmes only) | KAIST |
| Type of partnership | Articulation |

**PROGRAMME SUMMARY**

You are required to take nine core modules in term 1 and term 2 as outlined in the module list. Eight of the nine core modules are 15 credit modules and one is a 10 credit module.

The core modules in term 1 are *Asset Pricing*, *Derivatives*, *Foundations of Econometrics* and *Stochastic Modelling Methods in FInance*, plus the 10 credit *Applied Research Tools* module on *Matlab and VBA Programming* which prepares you for research activities. They provide you with the core knowledge about financial markets and financial instruments as well as mathematical, statistical and programming tools to pursue a career in a wider range of quantitative positions in the financial service industry. Those skills also provide you with a good foundations to pursue an academic career and continue your studies at PhD level.

In term 2 you will build on those core term 1 modules by focusing in more details on specific areas with a heavily quant content. In particular *Fixed Income* and *Risk Analysis* which are common with the other two quantitative programmes. The term 2 programme

specific modules are *Machine Learning* and *Quantitative Trading*. You will have to use your maths, stats and programming skills, acquired in term 1, for those more subject specialist core modules. Students will also have to complete a Python online course which is a pre-requisit of the Machine Learning core module.

In term 3, you have three options to complete the Masters.

**Option 1:** Electives
You can complete your studies by taking 5 x 10 credit specialist elective modules. Those electives are being chosen from a large pool of electives being most suitable for the MSc Mathematical Trading and Finance.

**Option 2**: Business Research Project
A 'Business Research Project' with a credit value of 40 and a maximum of 10,000 words, together with one elective.

**Option 3**: Applied Research Project
An Applied Research Project with a credit value of 20 credits and a maximum of 5000 words, plus three 10 credit electives forms the third route.

Aims

The aim of the programme is to produce an informed, knowledgeable, confident individual who can interact with non-specialist and work in teams. We would expect that the individual can work under pressure and has obtained the skills required to be successful in the global financial world. This contributes to the University's strategic aim of providing high quality education which makes a significant contribution to the success of London as a world city and enhances its international scope and reputation.

Throughout the course, where possible, lecturers will emphasise the many ethical issues that arise in the context of finance, trading and generally working in the financial environment. In doing so you will be encouraged to share your views with your lecturers and with your class mates, where a diversity of opinion is to be welcomed and encouraged.

The programme aims to develop:

- your intellectual and practical skills, working as individuals as well as in teams.
- a strong academic and vocational background.
- your ability to analyse, interpret and understand issues related to financial asserts, trading, structuring, asset management and risk management.

The programme will make it possible for you to:

- Acquire a solid theoretical background in the areas of asset pricing, asset

management, forecasting and mathematical finance.

- Acquire up-to-date knowledge based both on academic theory and on practical applications and developments.
- Acquire programming skills, being able to work in teams and show critical thinking
- Work under pressure in a competitive environment
- Be able to seek technical analysts or more specialist positions in financial markets, focusing in particular on asset valuation, structuring, asset management or risk management. You would also have the skills to proceed for further postgraduate studies.

**WHAT WILL I BE EXPECTED TO ACHIEVE?**

**On successful completion of this programme, you will be expected to be able to:**

Knowledge and understanding:

- Demonstrate a detailed knowledge and understanding of the financial markets and products, their risk and returns characteristics and their use in hedging and speculation.

- Obtain the knowledge of understanding the theory and theoretical developments in the field of finance, mathematical finance, econometrics and asset valuation with practical applications

- Demonstrate acquisition of 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

- Demonstrate understanding of the use and importance of statistics and mathematical finance in the broad area of financial markets. That includes asset pricing, asset management and risk management

Skills:

- Conduct research into quantitative areas of finance, in particular pricing financial securities, structuring, risk management, asset management as well as the use and applications of sophisticated statistics and mathematical concepts applied to different problems in finance.

- Apply the financial theory and use statistics to help in understanding how the theory applies to data.

- Collect data, work with data and to be able to use specialist software in analysing

data, including programming.

- Communicate technical information and concepts to a non-specialist audience
- Apply the knowledge acquired in the programme to test theoretical models and to understand how the theory works in practice.
- Advise on the use of financial securities or statistical and mathematical techniques by institutional investors such as banks, asset management companies or financial companies in general for conducting their business
- Critically analyse existing valuation models and to apply sophisticated statistics and mathematical concepts to finance.
- Carry out independent research work leading to the write a clear, well-structured and well-argued reports
- To be able to work effectively in groups to manage projects.

<u>Values and attitudes:</u>

- Understand the relationship between risk and return
- Appreciate the importance of financial risk and ways how to measure risk and deal with it.
- Appreciate the importance of programming in quantitative finance
- Appreciate the use of statistics and mathematics in financial modelling

This programme has been developed in accordance with the QAA Subject Benchmark for Business and Management.

**HOW WILL I LEARN?**

Teaching and learning methods include the opportunity for you to apply your 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.

- Lectures and directed reading are used to help you to achieve an understanding of the current level of knowledge in the relevant areas. Some knowledge will be taught

in form of online learning.

- Mini case studies, the use of specialist software package, problem sheets and real life projects as well as contributions from outside speakers and visiting lecturers are used to achieve integration between theory and practice.

- Substantial pieces of individual work such as a Business Research Project or Applied Research Report 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 in order to benefit from peer interaction.

The assessment of the course will also support your learning:

- Coursework provides ongoing feedback on your programme. It allows very often the interaction between theory and real work data.
- Tests will assess the knowledge gained.
- Examinations provide a more in-depth assessment of knowledge gained and also assesses your problem solving abilities.

The MSc in Mathematical Trading and Finance 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 you can apply knowledge and skills acquired earlier in the programme.

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 360 hours**

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

Assessment and Assessment Criteria

This programme 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:

**1. 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.

**2. Compensation:**

Compensation can only be awarded by the Final Assessment Board and must be applied within the following limits and conditions:

Where you fail up to a total of 20 credits (15 for a postgraduate certificate), you may be eligible for compensation if:

- Compensation is permitted for the module involved (see the "What will I Study" section of the programme specification), and
- It can be demonstrated that you have satisfied all the Learning Outcomes of the modules in the Programme, and
- A minimum overall mark of no more than 10% below the module pass mark has been achieved in the module to be compensated, and
- An aggregate mark of 50% has been achieved overall.

If you receive a compensated pass in a module you will be awarded the credit for that module. The original component marks will be retained in the record of marks and your original mark shall be used for the purpose of your award calculation.

If, at the point where you have results for all taught modules:

- You have no more than 20 credits outstanding (15 for a PG Certificate), and
- The grade for this module(s) is 40% or above, and
- Your overall degree average is at least 50%, and
- If the module(s) is eligible for compensation.

Then you will **not** be required to undertake the re-sit for that module, as this will be eligible for compensation.

**Please note:**

- **If you fail more than 20 credits (excluding project modules), then you must retake all outstanding assessments with no exceptions.**

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:

| | HE Level | Credits | Weighting (%) |
|---|---|---|---|
| Degree | 7 | 180 | 100 |

| Class | % required |
|---|---|
| With Distinction | 70 |
| With Merit | 65 |
| Without Classification | 50 |

Postgraduate Diploma:

You must achieve 120 credits with a minimum mark of 50%.

| | HE Level | Credits | Weighting (%) |
|---|---|---|---|
| Degree | 7 | 120 | 100 |

| Class | % required |
|---|---|
| With Distinction | 70 |
| With Merit | 65 |
| Without classification | 50 |

If you are 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?**

| Module Title | SITS Code | Module Credits | Core/ Elective | Can be Compen- | Level |
|---|---|---|---|---|---|

| | | | | **sated?** | |
|---|---|---|---|---|---|
| Applied Research Tools (Matlab and Python Programming) | SMM277 | 10 | C | Y | 7 |
| Asset Pricing | SMM265 | 15 | C | Y | 7 |
| Derivatives | SMM254 | 15 | C | Y | 7 |
| Stochastic Modelling Methods in Finance | SMM302 | 15 | C | Y | 7 |
| Foundations of Econometrics | SMM270 | 15 | C | Y | 7 |
| Fixed Income | SMM269 | 15 | C | Y | 7 |
| Risk Analysis | SMM272 | 15 | C | Y | 7 |
| Machine Learning for Quantitative Professionals | SMM748 | 15 | C | Y | 7 |
| Quantitative Trading | SMM282 | 15 | C | Y | 7 |
| Business Research Project | SMM527 | 40 | E | N | 7 |
| Applied Research Project | SMM799 | 20 | E | N | 7 |
| Alternative Risk Transfer and Risk Securitisation | SMM382 | 10 | E | Y | 7 |
| Behavioural Finance | SMM274 | 10 | E | Y | 7 |
| Financial Statement Analysis and Valuation in Banks | SMM468 | 10 | E | Y | 7 |
| Global Real Estate Markets | SMM545 | 10 | E | Y | 7 |
| Hedge Funds | SMM121 | 10 | E | Y | 7 |
| Mergers and Acquisitions | SMM233 | 10 | E | Y | 7 |
| Private Equity Investment | SMM528 | 10 | E | Y | 7 |
| Technical Analysis and Trading Systems | SMM529 | 10 | E | Y | 7 |
| Trading and Market Microstructure | SMM921 | 10 | E | Y | 7 |

During term three you will be able to choose from a range of electives to personalise your experience.

This list of electives is an indication of the range of modules that can be on offer and is subject to change due to circumstances such as: enhancing or updating the quality and content of educational provision; responding to student feedback; academic staffing changes; the number of students in each programme; a lack of student demand for certain modules; or factors beyond the institution's reasonable control, such as meeting the latest requirements of a commissioning or accrediting body. For these reasons, not all the electives listed will be offered every year. New (additional or replacement) modules may also be added for these reasons.

There may also be pre-requisites for joining a module, and space and timetable availability restrictions may also apply.

The list of electives offered in a given year will be confirmed by February 1st.

**TO WHAT KIND OF CAREER MIGHT I GO ON?**

**http://www.cass.city.ac.uk/more-about-cass/careers-services - Careers Service**

Students from this programme have entered various careers often in quantitative roles of finance where skills covered on this programmes are required. Those companies could be large financial institutions (i.e. investment banks) or smaller specialist finance companies (i.e. hedge funds). The career opportunities are similar to the ones from the MSc Quantitative Finance.

**http://www.cass.city.ac.uk/more-about-cass/alumni-services - Alumni Service**

**WHAT PLACEMENT OPPORTUNITIES ARE AVAILABLE?**

Placements are not an official part of the programme. However, there are opportunities to write their Business Research Report as part of a company sponsored project.

**HOW DO I ENTER THE PROGRAMME?**

To be accepted on to a Bayes 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 to 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.

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