PROGRAMME SPECIFICATION KEY FACTS

Programme name	MSc in Quantitative Finance
Award	Master of Science
Exit Awards	Postgraduate Diploma Postgraduate Certificate
School	Bayes Business School
Department or equivalent	Specialist Masters Programme
Programme code	PSQUAF
Type of study	Full-time
Mode of Learning	In-Person
Total UK credits	180
Total ECTS	90
Partner	KAIST
Type of Partnership	Articulation Agreement

PROGRAMME SUMMARY

The MSc in Quantitative Finance is designed to equip you with essential quantitative skills and mathematical techniques widely used in financial markets. You will delve into crucial concepts such as stochastic modelling, simulation techniques, and econometrics, which are foundational for quantitative analysts.

As you progress, you'll learn how to develop algorithms for optimal investment decisions across various asset classes, including equities, fixed income, and derivatives. Additionally, you will explore key topics like asset pricing, risk management and the latest advances in financial engineering, preparing you to navigate the complexities of modern finance with confidence.

This programme will allow you to focus on the tools necessary to analyse data and events for informed investment decisions and strategizing effective responses to market changes. The programme will also provide you with core programming skills required by financial institutions, enabling you to leverage data-driven insights and enhance decision-making processes. This comprehensive skill set will pave the way for a rewarding career in asset management or as a quantitative financial analyst.

Aims

The programme aims.

- To use essential quantitative skills and mathematical techniques to analyse and interpret data in financial markets.
- To develop and implement algorithms for making optimal investment decisions across various asset classes.
- To combine knowledge of stochastic modelling, simulation techniques, and econometrics to create comprehensive analyses of financial scenarios.
- To formulate effective investment strategies that incorporate asset pricing, risk management, and the characteristics of different financial securities.
- To critically evaluate data and market events to inform investment decisions and assess their potential impacts on portfolio performance.
- To evaluate and judge the effectiveness of various strategies in response to market changes, recommending optimal approaches based on comprehensive analysis.
- To assess personal competencies in programming and quantitative analysis, aligning them with the demands of careers in asset management and quantitative finance.

Content

In Term 1, you are required to take four compulsory modules as listed below.

Term 1 Compulsory Modules:

BBM130 Asset Pricing and Derivatives
SMM270 Financial Econometrics
BBM131 Programming for Quants
BBM132 Mathematical Finance

These modules provide the foundation knowledge and skills for entering the Quantitative Finance industry.

In Term 2 you take two compulsory modules and choose another two compulsory elective modules out of four. The list is

Term 2 Compulsory modules:

SMM269 Fixed Income
SMM272 Risk Analysis

Choose **two** modules out of:
BBM133 Computational Finance
SMM282 Quantitative Trading

BBM134 Advances in Financial Engineering
BBM135 Machine Learning for Financial Analytics

The compulsory modules complete your knowledge and skill set for entering the Quantitative Finance industry. The compulsory elective modules offer you specialist knowledge which allow to tailor your learning experience in view of your career path of choice. Further support and guidance to help you choose will be provided via Moodle and with guidance form your course director.

In Term 3, you have two options to complete the Masters.

Option 1: Electives
You can complete your studies by taking 5 x 10 credit specialist elective modules plus BBM109 Career Management Skills and Research Methods

Option 2: General Research Project
A 'Research Project' with a credit value of 30 and a maximum of 5,000 words, plus three specialist electives.

Option 3 - A Research Project with a value of 60 credits

Electives are chosen from a large pool of electives deemed most suitable for the MSc Quantitative Finance

Prior to beginning the degree, you will be offered access to pre-study modules that focus building on mathematical and statistical skills, and which introduce you to coding in Python.

Registration Period

It is expected that you will complete this degree within 12 months. The maximum period of registration for the degree is three years full time.

WHAT WILL I BE EXPECTED TO ACHIEVE?

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

Knowledge

- Explain financial markets and products and their characteristics, including their risks and returns, and their applications in hedging and speculation.
- Critically analyse existing valuation models, their assumptions, weaknesses, and propose efficient alternatives with practical applications.
- Evaluate the use and importance of statistics and stochastic methods in asset pricing, asset management, and risk management.
- Evaluate the various algorithms used in financial modelling, including Monte Carlo simulations, optimization algorithms, and numerical methods for pricing derivatives.

- Explore various computational frameworks for assessing financial risk, including credit risk models, market risk models, and operational risk management techniques.

Skills

- Conduct comprehensive risk assessments using quantitative measures such as Value at Risk (VaR), stress testing, and scenario analysis to inform strategic decisions.
- Build and validate financial models using programming languages (e.g., Python, Matlab) to simulate various market conditions and assess the impact on investment portfolios.
- Collect, analyse, and interpret data using specialist software and programming languages, applying financial theory to practical scenarios.
- Effectively communicate complex technical information to non-specialist audiences, ensuring clarity and understanding.
- Conduct in-depth research into quantitative areas of finance, such as pricing financial assets and risk management, utilizing sophisticated statistical techniques.

Values and attitudes

- Develop a reflective understanding of the relationship between risk and return, recognizing its significance in investment decisions.
- Appreciate the critical role of programming in quantitative finance, particularly its applications in real-world scenarios.
- Recognize the importance of statistics and mathematics in financial modelling, fostering a commitment to sound analytical practices.

Graduate Attributes

The graduate attributes you can demonstrate on completion of your programme are key to your future employment. It is therefore central to every programme that there will be opportunities in the learning, teaching and assessment activities for you to engage with these on all modules. Further detail of this will be provided for you by your module leader. The graduate attributes are:

- Always learning
- Engaged in the world
- Technical and digital
- Connected Professional
- Creating Impact

WHAT WILL I STUDY?

The programme is taught over three terms. You must complete four modules in term one, four modules in term two, and either:

Option 1: Electives

You can complete your studies by taking 5 x 10 credit specialist elective modules plus BBM109 Career Management Skills and Research Methods

Option 2: General Research Project

A 'Research Project' with a credit value of 30 and a maximum of 8,000 words, plus three specialist electives.

Option 3 - A Research Project with a value of 60 credits

Taught modules

Module Title	SITS Code	Module Credits	Core / Compulsory / Elective	Compensation	Level
Term one					
Asset Pricing and Derivatives	BBM130	15	Compulsory (Co)	Yes	7
Financial Econometrics	SMM270	15	Compulsory (Co)	Yes	7
Programming for Quants	BBM131	15	Compulsory (Co)	Yes	7
Mathematical Finance	BBM132	15	Compulsory (Co)	Yes	7
Term two					
Fixed Income	SMM269	15	Compulsory (Co)	Yes	7
Risk Analysis	SMM272	15	Compulsory (Co)	Yes	7
Plus two from:					
Computational Finance	BBM133	15	Compulsory/elective (CoE)	Yes	7
Quantitative Trading	SMM282	15	Compulsory/elective (CoE)	Yes	7
Advances in Financial Engineering	BBM134	15	Compulsory/elective (CoE)	Yes	7
Machine Learning for Financial Analytics	BBM135	15	Compulsory/elective (CoE)	Yes	7

Term three					
General Research Project	BBM110	30	Elective (E)	No	7
Research Project	BBM111	60	Elective (E)	No	7
Career Management Skills and Research Methods	BBM109	10	Elective (E)	Yes	7
Trading and Hedging in the FOREX Market	SMM620	10	Elective (E)	Yes	7
FinTech	SMM391	10	Elective (E)	Yes	7
Climate Risk Modelling	BBM019	10	Elective (E)	Yes	7
Advanced Predictive Analytics	SMM069	10	Elective (E)	Yes	7
Hedge Funds	SMM121	10	Elective (E)	Yes	7
Applied Machine Learning	SMM284	10	Elective (E)	Yes	7
Blockchain, Crypto and Decentralised FInance	SMM920	10	Elective (E)	Yes	7
Trading and Market Microstructure	SMM921	10	Elective (E)	Yes	7
Commodity Derivatives Trading	SMM591	10	Elective (E)	Yes	7
Sustainable Finance with ESG	SMM087	10	Elective (E)	Yes	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.

HOW WILL I LEARN?

Learning and teaching 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 you to achieve an understanding of the current level of knowledge in the relevant areas.

- Mini case studies, the use of specialist software packages, 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 General 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 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 Quantitative Finance is designed and structured to allow for intellectual progression through 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 learning and teaching hours (both contact and non-contact) are required for each credit awarded. The precise weighting of different types of learning and teaching 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 indicative 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.

The programme assessment uses a variety of coursework formats that include group essay-based coursework, individual report-based coursework and group presentations as well as tests and other set exercises and a final project. The choice of assessment format is based on the learning objectives and requirements of each specific module.

For some of your modules, coursework will be assessed using peer review, to help you do this Bayes Business School has developed a peer review strategy that is part of the assessment for some of the modules on your degree. You will be asked to grade your fellow group members and comment on their performance.

Your modules will also provide you with formative activities and assessments, alongside model assessments and revision materials to support you in your progress and allow you assess your own strengths and weaknesses as you work through the programme.

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.

These will be provided through different means including in programme handbooks and 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/about/governance/policies/student-policies-and-regulations

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.

- **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 30 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 30 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 30 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.

WHAT AWARD CAN I GET?

Master’s Degree

Following successful completion of the MSc in Quantitative Finance you will have the ability to assess and evaluate all aspects of Quantitative Finance and apply your learning in the appropriate

context. You will also have demonstrated the capacity to undertake business research from an analytical perspective.

Programme credits and weighting

Programme Stage	HE Level	Credits	Weighting (%)
Taught	7	180	100

Class requirements

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

Postgraduate Diploma

Following the award of a Postgraduate Diploma in Quantitative Finance in addition to the below, you will gain a more advanced knowledge and in-depth understanding of these subject areas, from a variety of different perspectives and in order for you to broaden your expertise and skills. You will have developed a sophisticated appreciation of current theories and practice in Quantitative Finance together with the ability to evaluate a range of different approaches to them.

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

Programme credits and weighting

Programme Stage	HE Level	Credits	Weighting (%)
Taught	7	120	100%

Class requirements

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

Postgraduate Certificate:

Following the award of a Postgraduate Certificate in Quantitative Finance, you will be able to examine the theories related to all aspects of Quantitative Finance and apply your learning in the appropriate context. You will possess the skills and knowledge required to develop a career in the Quantitative Finance arena, will have mastered essential skills and knowledge and also developed an appreciation of what it takes to engage with Quantitative Finance in context. The assessments you undertake to achieve this qualification will focus on the skills, knowledge and

attributes that you will need to facilitate your career development and will support you in developing your practical abilities. The postgraduate certificate will enable you to gain confidence in your skills and your future role.

Programme credits and weighting

Programme Stage	HE Level	Credits	Weighting (%)
Taught	7	60	100%

Class requirements

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

EMPLOYABILITY AT CITY

WHAT KIND OF CAREER MIGHT I GO ONTO?

Students from this programme have entered various careers often in quantitative roles of finance where skills covered on this programme are required. Those companies could be large financial institutions (i.e. investment banks) or smaller specialist finance companies (i.e. hedge funds).

For more information on the Careers support available at City, please go to:
https://www.city.ac.uk/careers/your-career

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