

Note: Please read Guidance 3 (vi) on how to write the Programme Specification

## **MSc Financial Mathematics**

# Programme Specification



<b>1. Programme title</b>	MSc Financial Mathematics
<b>2. Awarding institution</b>	Middlesex University
<b>3. Teaching institution</b>	Middlesex University
<b>4. Details of accreditation by professional/statutory/regulatory body</b>	
<b>5. Final qualification(s) available</b>	MSc Financial Mathematics PGDip Financial Mathematics
<b>6. Year of validation / last review</b> <b>Year of amendment</b>	2021
<b>7. Language of study</b>	English
<b>8. Mode of study</b>	Full-time/Part-time

<b>9. Criteria for admission to the programme</b>
<p>An Honours degree normally classified 2.2 or above, or equivalent, with a significant mathematical element in its curriculum.</p> <p>Successful applicants must have competence in English language. For international applicants whose first language is not English the requirement is that they have IELTS 6.5 (with minimum 6.0 in all four components) or TOEFL internet based 87 (with at least 21 in listening &amp; writing, 22 in speaking and 23 in reading).</p>

## 10. Aims of the programme

The programme aims to:

- develop awareness and understanding, at an advanced level, of financial mathematics concepts and techniques to enable students to understand and analyse financial data;
- develop an advanced knowledge of stochastic analysis and applied probability, mathematical modelling and analysis in order to solve problems in finance;
- develop the mathematical and financial skills needed to quantify and manage risk in the modern finance, investment and insurance industries;
- provide a broad overview of the financial sector, familiarise students with the language and culture of the wider financial sector, and support students in real-life and social networking to begin their careers in finance;
- develop an aptitude with a variety of software packages and programming languages for the analysis of financial data.

## 11. Programme outcomes\*

### A. Knowledge and understanding

On completion of this programme the successful student will have knowledge and understanding of :

- A1. the workings of a range of financial instruments;
- A2. various types of financial data;
- A3. theories and methods for portfolio selection and optimisation and their relative merits;
- A4. core concepts and theories of asset pricing and their relative merits;
- A5. a range of methods for measuring risk;
- A6. a broad overview of the financial sector;
- A7. the fundamental mathematical theory underpinning financial mathematics;
- A8. research methods and techniques;

### Teaching/learning methods

Students gain knowledge and understanding through a combination of lectures, directed reading and guided independent study, including use of online resources, case studies, guest/visiting speakers, industry talks organised by a professional body, group work, coursework, critical reflection, facilitated discussion, workshops and the project.

### Assessment methods

Students' knowledge and understanding is assessed by individual and group coursework, professional body examinations, and the project

<p><b>B. Skills</b></p> <p>On completion of this programme the successful student will be able to:</p> <p>B1. explain and evaluate methods for portfolio management;</p> <p>B2. explain and critically compare completing methods for asset pricing;</p> <p>B3. use advanced methods of stochastic analysis and applied probability to quantify and manage risk;</p> <p>B4. critically interpret and evaluate financial data;</p> <p>B5. use stochastic calculus to analyse asset prices;</p> <p>B6. effectively organise, structure and produce a project at an advanced level;</p> <p>B7. adeptly use a variety of software packages, including Bloomberg Terminal, and programming languages to obtain and analyse real-life market data;</p> <p>B8. use a variety of advanced models for portfolio management.</p>	<p><b>Teaching/learning methods</b></p> <p>Students learn practical and cognitive skills through seminar discussion and debate, workshops, labs, individual and group work and independent study and practice.</p> <p><b>Assessment methods</b></p> <p>Students' cognitive skills are assessed by individual and group coursework, and the project.</p>
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<b>12. Programme structure (levels, modules, credits and progression requirements)</b>			
<b>12. 1 Overall structure of the programme</b>			
<b>Full time mode:</b>			
Term 1	MS04354 Probability theory and mathematical analysis [15]	MS04113 Portfolio analysis [15]	MS04115 Fixed income and derivatives [15]
Term 2	Option 1 [15]	MS04110 Risk measurement [15]	MS04116 Stochastic calculus and pricing derivatives [15]
Term 3	MS04991 Project [60]		Key: Module Code Module Name [credits]
Options	MS04351 Time series and forecasting MS04358 Stochastic processes MS04522 Games and decisions MS04117 Current topics in financial mathematics FIN4880 International risk management		In a given year, in consultation with students, we will offer a selection of these options dependent upon student preferences and availability of guest lecturers.

**Part time mode:**

Year 1 Term 1	MSO4354 Probability theory and mathematical analysis [15]	MSO4114 Financial data and professional practice [15]	
Year 1 Term 2	Option 1 [15]	Option 2 [15]	
Year 2 Term 1	MSO4113 Portfolio analysis [15]	MSO4115 Fixed income and derivatives [15]	
Year 2 Term 2	MSO4110 Risk measurement [15]	MSO4116 Stochastic calculus and pricing derivatives [15]	
Year 2 Term 3	MSO4991 Project [60]		
Options	MSO4351 Time series and forecasting MSO4358 Stochastic processes MSO4522 Games and decisions MSO4117 Current topics in financial mathematics FIN4880 International risk management		In a given year, in consultation with students, we will offer a selection of these options dependent upon student preferences and availability of guest lecturers.

Key: 

Module Code Module Name [credits]
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12.2 Levels and modules		
Level 7		
<p><b>COMPULSORY</b></p> <p>Students must take all of the following:</p> <p>MSO4110 MSO4113 MSO4114 MSO4115 MSO4116 MSO4354 MSO4991</p>	<p><b>OPTIONAL</b></p> <p>Students must also choose exactly 2 from the following:</p> <p>MSO4117 MSO4351 MSO4358 MSO4522 FIN4880</p>	<p><b>PROGRESSION REQUIREMENTS</b></p> <p>Students must pass 120 credits to progress to the project (MSO4991).</p> <p>Students who pass 120 credits may exit the course with a PGDip Financial Mathematics.</p>

12.3 Non-compensatable modules	
Module level	Module code
N/A	

13. Information about assessment regulations
Middlesex University Assessment Regulations apply to this programme, without exception.

14. Placement opportunities, requirements and support
N/A

15. Future careers / progression
<p>Graduates of the programme will be equipped for careers in financial product development, pricing, risk analysis and management, investment decision making, portfolio selection and optimisation, in investment banking financial consulting, auditing, risk management and government.</p> <p>Completing this course entitles you to join the Chartered Institute for Securities and Investment at the Affiliate level.</p> <p>Previous students have secured employment as Actuarial Analysts, Tax Analysts, Quantitative Analysts, Research Analysts, Data Scientists and Strategic Information Technicians in a variety of large companies and government bodies.</p>

16. Particular support for learning (if applicable)
<ul style="list-style-type: none"> <li>• Induction and orientation programme</li> <li>• Maths Help Centre – daily drop-in session staffed by maths lecturers.</li> </ul>

<b>17. JACS code (or other relevant coding system)</b>	G130 70%
	N300 30%
<b>18. Relevant QAA subject benchmark group(s)</b>	Mathematics, Statistics and Operational Research

## 19. Reference points

- QAA UK Quality Code, Advice and Guidance: Course Design and Development (Nov 2018)
- QAA The Frameworks for HE Qualifications of UK Degree-Awarding Bodies (Nov 2014)
- QAA Subject Benchmark Statement: Mathematics, Statistics and Operational Research (Oct 2019)
- Middlesex University Regulations
- Middlesex University Academic Policy Statement APS 18: Curriculum Design (Jan 2018)
- CISI website [www.cisi.org](http://www.cisi.org)
- CISI Introduction to Investment FactSheet
- CISI Introduction to Investment Syllabus
- CISI Introduction to Investment Sample Paper.

## 20. Other information

This programme is partnered with the *Chartered Institute for Securities and Investment* (CISI), a professional body in the financial sector. Students will be enrolled as *Student Members* of the CISI

In the core module MSO4114 *Financial Data and Professional Practice* we initially base lectures around CISI resources to support students to pass the CISI exam *Introduction to Investment*. Passing this professional qualification is an essential component for this module.

Students gain access to

- a CPD scheme and CPD events
- a professional refresher course
- an online industry publication “The Review”
- professional forums
- the Training and Competence interest group
- the CISI Annual Integrity Debate
- networking and social opportunities
- the CISI Annual Dinner

Please note programme specifications provide a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve if s/he takes full advantage of the learning opportunities that are provided. More detailed information about the programme can be found in the rest of your programme handbook and the university regulations.

## Curriculum map for MSc Financial Mathematics

This section shows the highest level at which programme outcomes are to be achieved by all graduates, and maps programme learning outcomes against the modules in which they are assessed.

### Programme learning outcomes

Knowledge and understanding	
A1	the workings of a range of financial instruments
A2	various types of financial data
A3	theories and methods for portfolio selection and optimisation and their relative merits
A4	core concepts and theories of asset pricing and their relative merits
A5	a range of methods for measuring risk
A6	a broad overview of the financial sector
A7	the fundamental mathematical theory underpinning financial mathematics
A8	research methods and techniques
Skills	
B1	explain and evaluate methods for portfolio management
B2	explain and critically compare competing methods for asset pricing;
B3	use advanced methods of stochastic analysis and applied probability to quantify and manage risk
B4	critically interpret and evaluate financial data
B5	use stochastic calculus to analyse asset prices
B6	effectively organise, structure and produce a project at an advanced level
B7	adeptly use a variety of software packages, including Bloomberg Terminal, and programming languages to obtain and analyse real-life market data
B8	use a variety of advanced models for portfolio management

Programme outcomes															
A1	A2	A3	A4	A5	A6	A7	A8	B1	B2	B3	B4	B5	B6	B7	B8
Highest level achieved by all graduates															
7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7

Module Title	Module Code by Level	A1	A2	A3	A4	A5	A6	A7	A8									B1	B2	B3	B4	B5	B6	B7	B8
		Risk measurement	MSO4110					✓																✓	
Portfolio analysis	MSO4113	✓	✓	✓		✓																		✓	
Financial data and professional practice	MSO4114	✓	✓				✓																✓	✓	
Fixed income and derivatives	MSO4115	✓	✓		✓	✓																			
Stochastic calculus and pricing derivatives	MSO4116				✓																				
Probability theory and mathematical analysis	MSO4354								✓														✓		
Project	MSO4991								✓													✓			
Optional																									
Current topics in financial mathematics	MSO4117								✓																
Time series and forecasting	MSO4351								✓																
Stochastic processes	MSO4358								✓																
Games and decisions	MSO4522								✓																
International risk management	FIN4880	✓		✓		✓																		✓	