THE UNIVERSITY OF MANCHESTER
Postgraduate Programme Specification

1. GENERAL INFORMATION

<table>
<thead>
<tr>
<th>Award</th>
<th>Programme Title</th>
<th>Duration</th>
<th>Mode of study</th>
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<tbody>
<tr>
<td>MSc</td>
<td>Mathematical Finance</td>
<td>1 Year</td>
<td>Full Time</td>
</tr>
<tr>
<td>PgD</td>
<td>Mathematical Finance (exit award only)</td>
<td>9 months</td>
<td>Full Time</td>
</tr>
<tr>
<td>PgC</td>
<td>Mathematical Finance (exit award only)</td>
<td>6 months</td>
<td>Full Time</td>
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</tbody>
</table>

School: Manchester Business School
School of Mathematics

Faculty: Humanities
Engineering and Physical Sciences

Awarding Institution: University of Manchester

Programme Accreditation: n/a

Relevant QAA benchmark(s): There are no benchmark statements at postgraduate level for this subject area. The programme conforms to the Framework for Higher Education Qualifications.

2. AIMS OF THE PROGRAMME

The programme aims to:

01. Provide a thorough grounding in the mathematics underlying modern finance theory

02. Develop students’ powers of inquiry, critical analysis and logical thinking and to apply theoretical knowledge to current issues of policy and practice.

03. Provide a thorough training in financial mathematics for careers in such areas as financial engineering, risk and investment management and derivative pricing.

04. Provide many of the tools required to undertake high quality research in academic and financial institutions.

3. INTENDED LEARNING OUTCOMES OF THE PROGRAMME(S) (must include separate outcomes for PG Certificate and PG Diploma awards)

A. Knowledge & Understanding

Students will:

A1. Have advanced knowledge and systematic understanding of the main theoretical and applied concepts in mathematical finance including: hedging strategies; binomial model; risk-neutral valuation; diffusion-type models for stock prices; Black-Scholes equation, stochastic volatility models.

A2. Have a comprehensive knowledge and understanding of derivatives and financial engineering.

A3. Have a critical understanding of stochastic integration and be able to apply stochastic processes in discrete financial models.

A4. Be able to draw from the disciplines of probability theory, scientific computing and partial differential equations to derive relations between fundamental variables such as asset pricing, market movements and interest rates, which can be used to develop models for pricing, monitoring, risk management and product development.
### Learning & Teaching Processes (to allow students to achieve intended learning outcomes)

A variety of teaching methods is utilised which depend on the nature of the subject matter and learning objectives for each course unit.

Teaching methods to deliver most of these outcomes (A1 – A4) include a combination of lectures, case studies, seminars and project-based work.

Students are expected to supplement lecture material with directed reading, including textbooks, journal articles and the preparation of assignments/exercises in advance of workshops and seminars is expected.

A5 and A6 are specifically developed through the dissertation. Students will also enrich their knowledge and understanding of their chosen dissertation topic through research for and preparation for the dissertation.

### Assessment (of intended learning outcomes)

Most courses are assessed partly by an essay/project and an unseen examination paper.

A5 and A6 will primarily be assessed through the dissertation.

Optional units offer a broader range of assessment methods including group projects and the use of specialised software as appropriate.

### B. Intellectual Skills

Students will be able to:

| B1. | Demonstrate comprehensive understanding of theoretical and empirical research and critically evaluate their contribution to financial problems |
| B2. | Creatively apply the most advanced computational empirical and theoretical tools in finance to translate mathematical/financial problems into computational tasks. |
| B3. | Utilise mathematical and software-related problem solving skills. |
| B4. | Analyse, interpret and draw conclusions from financial trends and financial reporting and the results of computational experiments. |
| B5. | Demonstrate autonomy in planning and implementation of tasks through inquiry; logical and critical thinking; formulating and testing hypotheses; and interpretation and evaluation of theoretical arguments and empirical evidence. |
Combination of lectures, case studies, seminars and group project-based work. Much learning is achieved through a problem based approach using case studies. Students are required to evaluate, synthesise, and critique arguments and to collect, analyse and evaluate data.

A mixture of continuous assessment and unseen examinations are used to assess intellectual skills. B6 is assessed primarily through the dissertation.

C. Practical Skills

Students should be able to:

C1. Demonstrate an advanced ability for decision making through intelligent use of financial and mathematical computing software such as VBA/C++, Excel and Eview.

C2. Collect, maintain and manipulate time series data.

C3. Write and maintain sizeable code

C4. Correctly cite, acknowledge and reference sources.

C5. Use communications and information technology in acquiring, analysing and communicating information effectively (spreadsheets, word processing, on-line databases, statistical and econometric packages).

C6. Present information, together with analysis, argument and commentary, in a form appropriate to the intended audience.

C7. Manage project work effectively.

Learning & Teaching Processes

Combination of lectures, case studies, seminars and group project-based work. Much learning is achieved through a problem based approach using case studies. The practical application of techniques are taught and case studies are used to demonstrate application of techniques in the finance profession.

Students are required to evaluate, synthesise, and critique arguments and to collect, analyse and evaluate data.

Teaching and learning methods are evaluated in terms of the quality of the student’s output, student’s effectiveness in providing and communicating the information that is required.

Practical skills are further developed through workshops, group-based projects and assessed coursework and through individual supervision during the dissertation.

Assessment

C1 – C7 are assessed primarily in continuous assessment. The dissertation will also assess C4 - C7 directly.
D. Transferable Skills and Personal Qualities

Students will be able to:

D1. Analyse mathematical and financial problems in a rigorous and constructive fashion
D2. Undertake research in mathematical finance.
D3. Participate in groups.
D4. Manage time and work to deadlines.
D5. Exercise initiative and work independently.
D6. Demonstrate IT skills including use of the internet, word processing, spreadsheets and mathematical software packages.

Learning & Teaching Processes

Combination of lectures, case studies, seminars and group project-based work. Much learning is achieved through a problem-based approach using case studies.

Teaching and learning methods are evaluated in terms of the quality of the student’s output, student’s effectiveness in providing and communicating the information that is required.

Assessment

D1 is assessed through coursework and examinations.
D2 is assessed directly by the dissertation.
D3 is assessed directly by the group project-based work.
D4 is assessed by putting deadlines on coursework submission (penalties for late submission apply) and through examinations.
D5 is assessed through coursework and the dissertation.
D6 is assessed through coursework and formatively throughout the programme.

4. THE STRUCTURE OF THE PROGRAMME(S)

Programme structure and credits

<table>
<thead>
<tr>
<th>Semester One</th>
<th>Credits</th>
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<tbody>
<tr>
<td>Core</td>
<td>60</td>
</tr>
<tr>
<td>FS7141 Derivative Securities</td>
<td></td>
</tr>
<tr>
<td>FS7381 Foundations of Finance Theory</td>
<td></td>
</tr>
<tr>
<td>MT4702 Stochastic Calculus</td>
<td></td>
</tr>
<tr>
<td>MT4xxx Martingales with Applications to Finance</td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Semester Two</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core</td>
<td>60</td>
</tr>
<tr>
<td>* MT4xx2 Computational Finance</td>
<td></td>
</tr>
<tr>
<td>MA4xx2 Stochastic Modelling in Finance</td>
<td></td>
</tr>
<tr>
<td>FS7122 Financial Econometrics</td>
<td></td>
</tr>
<tr>
<td>MT4301 Brownian Motion</td>
<td></td>
</tr>
</tbody>
</table>

| Summer       | 60      |
| Dissertation/Project | |

* There will be a pre-course training session for C++ for students who have not done any C++ programming before.

MSc Mathematical Finance
5. STUDENT INDUCTION, SUPPORT AND DEVELOPMENT

The MSc in Mathematical Finance runs jointly across Manchester Business School (Faculty of Humanities) and the School of Mathematics (Faculty of Engineering and Physical Sciences). The Programme Co-ordinator will be responsible for the administrative management and co-ordination of the programme.

Induction

The induction programme for students on the MSc in Mathematical Finance will include an introduction to both Manchester Business School and the School of Mathematics and some of the sessions will be shared with induction activities for other postgraduate taught programmes in those schools as well as sessions specifically for this programme. The programme is managed jointly with the MSc in Quantitative Finance and Financial Engineering and students will find that some activities are common with students from that programme.

Programme handbook

Students will receive a programme handbook on arrival. This includes comprehensive information on all aspects of the programme and has specific advice on the dissertation process and the support available.

Personal tutoring and student support

All students will be allocated a personal tutor. The personal tutor may be from either Manchester Business School or the School of Mathematics and will be a member of academic staff teaching on the programme. As part of the personal tutorial system, students have the opportunity to undertake a Personal Development Plan which can be facilitated by the personal tutor and the dissertation supervisor when appointed. Personal Development Planning is a structured and supported process undertaken by an individual to reflect upon their own learning, performance and/or achievement and to plan for their personal, educational and career development. The primary objective for PDP is to improve the capacity of individuals to understand what and how they are learning, and to review, plan and take responsibility for their own learning.

The Programme Directors and the Programme Co-ordinator are also available to offer support/advice to the student.

Overseas students

Overseas students are encouraged to attend English Language courses provided by the University Language Centre. Both MBS and Maths liaise with the University’s International Office to ensure that support is provided for overseas students. MBS also has an International Society providing peer support for overseas students and international students on this programme will be eligible to join.

Mathematical Support

It is recognised that some students may find the Mathematical elements of the programme difficult. The School of Mathematics provides students with access to remedial support and counselling in Mathematics. Strong mentoring will take place at the induction and during the first two weeks of the programme. The monitoring and counselling procedures will take place again after the written examinations in semester two and before the dissertation period so that appropriate advice can be provided for students who need to exit early with a Postgraduate Diploma.

Students should also make themselves aware of the University pastoral support structures available to them:

- Careers service: www.careers.manchester.ac.uk
- Office of Student Support and Services: www.campus.manchester.ac.uk/studentsupportandservices
- Student Services Centre: www.campus.manchester.ac.uk/ssc/

Skills Training

IT Support for the curricula will be provided by the School of Mathematics. In particular, Mathematics will provide training in C++ for students who have not done any C++ previously. This will be undertaken during the induction week prior to the programmes starting. Students will be made aware
of this upon registration and will be advised to attend the training as appropriate.

The Graduate School in Mathematics offers students the opportunity to attend various courses on such topics as time management, report writing, etc. Students will also be expected to attend postgraduate research seminars in both Manchester Business School and the School of Mathematics.

**Dissertation support**
Dissertation titles from industry will be sought by MBS and by the School of Mathematics where possible. Dissertations and supervisors are allocated to students based on the interests of students.

Structured support for dissertations will be dependent upon the subject area and the discipline of the supervisor. Mathematics based dissertation students will have a weekly formal one hour session with their supervisor. MBS schedule six formal sessions with the supervisor but students can meet with supervisors in addition to that as required. Dissertation supervisors will also support the students’ PDP through discussion of students’ reflections.

**Student representation**
Students will be asked to nominate student representatives who will sit on the Programme Committee. The Students’ Union offers training and support for students in this role. There is also a Staff Student Liaison Committee in each school open for all students on this programme to raise any issues relating to the programme.
## 6. CURRICULUM MAP OF COURSE UNITS AGAINST INTENDED LEARNING OUTCOMES OF THE PROGRAMME

<table>
<thead>
<tr>
<th>Course Unit Title and Code (including dissertations and other programme components)</th>
<th>Knowledge &amp; Understanding</th>
<th>Intellectual Skills</th>
<th>Practical Skills</th>
<th>Transferable Skills &amp; Personal Qualities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Code</td>
<td>Course Unit title</td>
<td>C/O</td>
<td>A1</td>
<td>A2</td>
</tr>
</tbody>
</table>

### Legend for cells
- **D** = intended learning outcomes of the programme are taught or developed by students within this course unit
- **C** = compulsory course unit
- **A** = intended learning outcomes of the programme are assessed within this course unit
- **O** = optional course unit
7. CRITERIA FOR ADMISSION

A high Upper Second Class Honours degree in mathematics, physics or engineering is normally expected or the overseas equivalent in a related discipline. Exceptional candidates with degrees in other disciplines will also be considered. Applicants not graduating from a UK university may need to take the GMAT test. Students whose first language is not English require a minimum IELTS score of 7.0, TOEFL 623 paper-based or 263 computer-based, or CPE Grade C.

8. PROGRESSION AND ASSESSMENT REGULATIONS

The ordinances and regulations for the degrees of Masters, Postgraduate Diploma and Postgraduate Certificate will apply to this programme. Details of the ordinances and regulations can be found at http://www.manchester.ac.uk/pdfs/policies/thefile.39690,en.pdf

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