F1FM-QFM Master of Science in Quantitative Finance and Mathematics

PROGRAMME DETAILS
Programme Code: F1FM-QFM
Department: Mathematics
Main Award: MSC - Master of Science
Full Award Title: Master of Science in Quantitative Finance and Mathematics
Level: Postgraduate Taught

LOCATION OF STUDY

<table>
<thead>
<tr>
<th>Location</th>
<th>Study Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Edinburgh</td>
<td>Y</td>
</tr>
<tr>
<td>Scottish Borders</td>
<td>N</td>
</tr>
<tr>
<td>Orkney</td>
<td>N</td>
</tr>
<tr>
<td>Edinburgh</td>
<td>N</td>
</tr>
<tr>
<td>Scottish Borders</td>
<td>N</td>
</tr>
<tr>
<td>Dubai</td>
<td>N</td>
</tr>
<tr>
<td>Malaysia</td>
<td>N</td>
</tr>
<tr>
<td>Orkney</td>
<td>N</td>
</tr>
<tr>
<td>Approved Learning Partner</td>
<td>N</td>
</tr>
<tr>
<td>Independent Distance Learners</td>
<td>N</td>
</tr>
<tr>
<td>Collaborative Learning Partner</td>
<td>N</td>
</tr>
<tr>
<td>Other</td>
<td>N</td>
</tr>
</tbody>
</table>

ASSOCIATED AWARDS

<table>
<thead>
<tr>
<th>Programme Code</th>
<th>Award</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1FC-ZZZ</td>
<td>PGCERT</td>
<td>Postgraduate Certificate in Quantitative Finance and Mathematics</td>
</tr>
<tr>
<td>F1FD-QFM</td>
<td>PGDIP</td>
<td>Postgraduate Diploma in Quantitative Finance and Mathematics</td>
</tr>
<tr>
<td>F1FM-QFM</td>
<td>MSC</td>
<td>Master of Science in Quantitative Finance and Mathematics</td>
</tr>
</tbody>
</table>

ACCREDITIATION

N/A

LEARNING OUTCOMES – SUBJECT MASTERY

Understanding, Knowledge and Cognitive Skills

- extensive and detailed knowledge, and critical understanding, of the use of mathematics to evaluate uncertainty and quantify risk
- expertise in using appropriate techniques and tools in the solution of realistic practical risk management problems
- the acquisition of a range of new skills required in contemporary quantitative finance and risk management, including skills in applied mathematical modelling
- ability to critical analysis and evaluation of a wide range of theories, concepts, and computational techniques which arise in the study and practice of mathematics and quantitative finance and risk management
- demonstrate that they have developed an informed, analytical approach to identifying and resolving problems.

Scholarship, Enquiry and Research (Research Informed Learning)

- identify, analyse and solve problems, and discuss issues; at a professional level critically review existing practices and move on to professional careers with confidence
- awareness and understanding of current issues in quantitative risk management
- ability to access, use and demonstrate an understanding of the appropriate research literature
- detailed and critical understanding of a selected recent developments in mathematics related to quantitative finance and risk.

LEARNING OUTCOMES – PERSONAL ABILITIES

Industrial, Commercial and Professional Practice
On completion of the course, students will be in a strong position to move on to a professional environment, with sound knowledge and awareness of the nature of that environment and the demands it will make. They will also have the necessary background and experience to enable them to be ready and able to communicate on technical and general matters with peers and senior colleagues.

**Autonomy, Accountability and Working With Others**

- Plan and organise own learning through self-management and time management
- Communicate effectively at all levels and using a range of media
- Adopt a mature and professional attitude to the solution of technical problems, act with professional integrity and accept professional responsibility
- Demonstrate use of computer packages such as Matlab problems in finance

**Communication, Numeracy & Information and Communications Technology**

Will develop strong communication numeracy and ICT skills.

**APPROACHES TO TEACHING AND LEARNING**

Achievement of the course outcomes demonstrates skill and mastery of the subject at an advanced level. Teaching on the course is student-focused, with students encouraged to take responsibility for their own learning and development. The full-time MSc/Diploma course is offered in a traditional campus-based model. The material is organised with 8 full taught courses. Material is presented in a manner appropriate to postgraduate study. Some lecture courses may be given jointly with final-year Honours undergraduate students.

The Department of Mathematics and the Department of Actuarial Mathematics and Statistics use a wide range of L&T approaches and techniques to achieve this, from traditional lectures and discussions to demanding tutorial and computer lab work and guided reading. Lecturers use a range of tools from chalk to extensive use of web-based materials. Approaches to teaching and learning are continually reviewed and developed with the aim of matching them to the abilities and experiences of our students with regard to the subject area and the development of attributes required for success in industry. Specific details about teaching and learning methods are provided in the appropriate course descriptors.

**EDUCATIONAL AIMS OF THE PROGRAMME**

The principal aims are to
- provide intensive and high-quality education in a postgraduate context in a wide range of subjects related to quantitative finance, in particular quantitative financial risk, and mathematics, including theory and practice
- enable students to develop detailed knowledge and critical understanding, and acquire a range of
new skills relevant to modelling, quantitative finance and risk.

- provide coverage of derivative pricing and markets along with key mathematical tools used in practice.
- enable students to communicate and work effectively with peers and academic staff, demonstrating appropriate levels of autonomy, initiative, and responsibility
- provide students at Master's level with the opportunity to plan and execute a significant investigation and write a project requiring detailed and critical understanding in an area of study related to financial mathematics

ASSESSMENT POLICIES

The assessment policy for the programme incorporates a range of assessment types. Continuous assessment during some courses and summative assessment at the conclusion of courses both contribute to the overall assessment and are used to formally measure achievement in specified learning outcomes.

Understanding, knowledge and subject-specific skills are assessed by coursework assignments and written examinations. Approaches to assessment are continually reviewed. Specific details about methods of assessment are provided in the appropriate course descriptors.

The programme consists of two phases:

A taught phase, defined in the programme structure, which students will normally study over two semesters.
- Assessment of the taught phase is through a variety of methods including coursework and/or examination.

A project phase, consisting of a project over the summer.
- Progression to the project phase is dependent on assessed performance. To progress, students must meet the criteria set out in the programme structure document. Students meeting the required standards for Masters in the taught phase will be permitted to progress.
- Students meeting the required standards for Postgraduate Diploma and Postgraduate Certificate in the taught phase, but not meeting the Masters standard, will not be permitted to progress to the dissertation phase.
- Students failing to meet the required standards for Postgraduate Diploma and Postgraduate Certificate in coursework and examination in the taught phase will not be permitted to progress to the dissertation phase, nor will they be eligible for any award.

Any student will be able to retake the assessment of up to a maximum of 3 courses at the next opportunity, subject to payment of the appropriate fees to the University, and may be required to do so to obtain the necessary credits for completion of their programme or for progression. Students may
only resit courses for which their examination grade is E or F and have the opportunity to resit examinations where a D grade is achieved in line with University Regulation 48, paragraph 17.3. The method of reassessment for each course is specified in the appropriate course descriptor.

### PROGRAMME STRUCTURE

#### Mandatory Courses

<table>
<thead>
<tr>
<th>Edinburgh</th>
<th>SBC</th>
<th>Orkney</th>
<th>Dubai</th>
<th>HWUM</th>
<th>IDL</th>
<th>Coll. Partner</th>
<th>ALP</th>
<th>Other</th>
<th>Stage</th>
<th>Semester</th>
<th>Phase</th>
<th>Course Code</th>
<th>Course Title</th>
<th>SCQF Cr</th>
<th>SCQF Lvl</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>F11MT</td>
<td>Modelling and Tools</td>
<td>15</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>F71DV</td>
<td>Derivatives Markets and Pricing</td>
<td>15</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>F71SR</td>
<td>Research and Industry Topics</td>
<td>15</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>F11HM</td>
<td>Masters Project</td>
<td>60</td>
<td>11</td>
</tr>
</tbody>
</table>

#### Optional Courses

<table>
<thead>
<tr>
<th>Edinburgh</th>
<th>SBC</th>
<th>Orkney</th>
<th>Dubai</th>
<th>HWUM</th>
<th>IDL</th>
<th>Coll. Partner</th>
<th>ALP</th>
<th>Other</th>
<th>Stage</th>
<th>Semester</th>
<th>Phase</th>
<th>Course Code</th>
<th>Course Title</th>
<th>SCQF Cr</th>
<th>SCQF Lvl</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>C31FM</td>
<td>Financial Markets</td>
<td>15</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>F11FM</td>
<td>Functional Analysis</td>
<td>15</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>F11MM</td>
<td>Optimisation</td>
<td>15</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>F21BC</td>
<td>Biologically Inspired Computation</td>
<td>15</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>F21DL</td>
<td>Data Mining and Machine Learning</td>
<td>15</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>F71QR</td>
<td>Quantitative Risk Analysis</td>
<td>15</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>F71SM</td>
<td>Statistical Methods</td>
<td>15</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>C21FE</td>
<td>Financial Econometrics</td>
<td>7.5</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>F11DA</td>
<td>Data Assimilation with Applications to Climate Change</td>
<td>15</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>F11ND</td>
<td>Numerical Analysis (PDEs)</td>
<td>15</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>F11SS</td>
<td>Stochastic Simulation</td>
<td>15</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>F71AP</td>
<td>Advanced Derivative Pricing</td>
<td>15</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>F71AR</td>
<td>Applied Risk Management</td>
<td>15</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>F71CM</td>
<td>Credit Risk Modelling</td>
<td>15</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>F71NT</td>
<td>Numerical Techniques for PDEs</td>
<td>7.5</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>F71PT</td>
<td>Portfolio Theory</td>
<td>15</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>F71TS</td>
<td>Time Series Analysis</td>
<td>7.5</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>F79BI</td>
<td>Bayesian Inference &amp; Computational Methods</td>
<td>15</td>
<td>9</td>
</tr>
</tbody>
</table>
COMPOSITION NOTES(PG)

3 mandatory courses at 15 credits each or equivalent. Either 5 optional courses at 15 credits each or 6 optional courses (4 at 15 credits each and 2 at 7.5 credits each) or equivalent plus MSc Dissertation.

Note: Only one of F21DL Data Mining and Machine Learning or F21BC Biologically Inspired Computation can be taken.

Only one of F71NT or F11ND can be taken.

Any 7.5 credit course should be taken in conjunction with another 7.5 credit course, to achieve full 15 credits.

Some optional courses may not be available in some years because of timetabling constraints.

Under exceptional circumstances the Programme Director may approve the substitution of a mandatory course with an alternative course at SCQF level 11 taking into account timetable constraints.

Students are given a range of dissertation choices. Students also have the opportunity to propose their own topics but such proposals are subject to the approval of the Programme Director.

Required Credits | Credits | Specific Requirements
--- | --- | ---
Mandatory | 45 | 180 SCQF credits including a minimum of 150 credit at Level 11
Optional | 75 | 120 SCQF credits including a minimum of 90 credit at Level 11
Elective | 0 | 60 SCQF credits including a minimum of 40 credit at Level 11
Dissertation | 60 | 180

Total | 180 |

AWARDS, CREDITS AND CRITERIA(PG)

<table>
<thead>
<tr>
<th>Awards, Credits and Levels</th>
<th>Overall Credits</th>
<th>Specific Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Masters Degree</td>
<td>180</td>
<td>180 SCQF credits including a minimum of 150 credit at Level 11</td>
</tr>
<tr>
<td>Postgraduate Diploma</td>
<td>120</td>
<td>120 SCQF credits including a minimum of 90 credit at Level 11</td>
</tr>
<tr>
<td>Postgraduate Certificate</td>
<td>60</td>
<td>60 SCQF credits including a minimum of 40 credit at Level 11</td>
</tr>
</tbody>
</table>

Award Requirements

<table>
<thead>
<tr>
<th>Award Requirements</th>
<th>Total Course Passes</th>
<th>Overall Mark</th>
<th>Overall Grade</th>
<th>Basis of Overall Mark/Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Master (Distinction)</td>
<td>8+Dissertation</td>
<td>70</td>
<td>A</td>
<td>Credit Weighted Average greater than or equal 70% over 8 courses at grades A-C plus a Dissertation at grade A.</td>
</tr>
<tr>
<td>Master</td>
<td>8+Dissertation</td>
<td>50</td>
<td>C</td>
<td>Credit Weighted Average greater than or equal 50% over 8 courses at grades A-D plus a Dissertation at minimum grade C.</td>
</tr>
<tr>
<td>Diploma (Distinction)</td>
<td>8</td>
<td>70</td>
<td>A</td>
<td>Credit Weighted Average greater than or equal 70%</td>
</tr>
</tbody>
</table>
F1FM-QFM Master of Science in Quantitative Finance and Mathematics

<table>
<thead>
<tr>
<th>Diploma</th>
<th>8</th>
<th>40</th>
<th>D</th>
<th>Credit Weighted Average greater than or equal 40% over 8 courses at grades A-C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Certificate</td>
<td>4</td>
<td>40</td>
<td>D</td>
<td>Credit Weighted Average greater than or equal 40% over 4 courses at grades A-E</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DURATION OF STUDY</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Full-time</td>
<td>Part-time</td>
<td></td>
</tr>
<tr>
<td>Masters</td>
<td>12</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>Diploma</td>
<td>9</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Certificate</td>
<td>6</td>
<td>12</td>
<td></td>
</tr>
</tbody>
</table>

RE-ASSESSMENT (PG)

1. A student who has been awarded a Grade E or F in a course may be re-assessed in that course. A student who has been awarded a Grade D in a course may be re-assessed in that course in order to proceed to or be eligible to receive the award of Masters.
2. A student shall be permitted only one re-assessment opportunity in a maximum of three taught courses. The opportunity for re-assessment in four or more taught courses shall be at the discretion of the Progression Board.
3. Any further re-assessment opportunities in a course will require the approval of the Postgraduate Studies Committee.
4. A student may be permitted, at the discretion of the Progression Board, to be re-assessed in the dissertation, project or other supervised research component of the course of study.

Re-assessment takes place in the following academic year.

PROGRESSION TO DISSERTATION/PROJECT

In accordance with University Regulations, to progress to Masters level a minimum of Grade C is required.