Programme Title: MSc Financial Computing

Programme Specification

Awarding Body/Institution	Queen Mary University of London
Teaching Institution	Queen Mary University of London
Name of Final Award and Programme Title	MSc Financial Computing
Name of Interim Award(s)	PG Cert and PG Dip
Duration of Study / Period of Registration	1 year full time, 2 years with industrial experience, 2 years part time
QM Programme Code / UCAS Code(s)	G1SA / G1SB / G1SC
QAA Benchmark Group	N/A
FHEQ Level of Award	Level 7
Programme Accredited by	N/A
Date Programme Specification Approved	TBC
Responsible School / Institute	School of Mathematical Sciences

Schools which will also be involved in teaching part of the programme
School of Electronic Engineering & Computer Science

Institution(s) other than Queen Mary that will provide some teaching for the programme
N/A

Programme Outline

Innovation and revenue generation in the financial industry critically depend on the productive blend of mathematics, technology and finance. During the last five years the industry has witnessed a new wave of technology and a corresponding increase in the demand for technologically savvy numerate personnel. Some examples of new developments in financial institutions that drive this personnel demand are:

1 - Automation of the trading business: electronic trading, algorithmic trading, customer quote/risk management compute performance competitiveness, processing of 'social' trading data (e.g. customer requests, Reuters news items,. . .), etc

2 - New compute-intensive regulatory obligations: CVA/DVA measurements (Credit/Debit Value Adjustments), model risk measurement as requested by OCC in 2011, etc

3 - The need to consolidate quantitative technology that has grown organically in RAD (Rapid Application Development) fashion for the last 15 years.

The function related to these tasks is described in industry as Quant Developer, Quant Technologist or more generally Front Office Technology and it is more technology inclined than the more mathematical Quant function.

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To address this business need we have designed a cutting edge MSc programme that combines key modules in mathematical finance and technology. Students will learn from practitioners and academics about the models used in finance, the relevant numerical methods, and importantly how this is implemented in modern parallel architectures such as GPUs which are massively used by investment banks and hedge funds.

The Quant type business model, consisting in the creative synergies resulting in placing numerate and technologically savvy individuals at the core of business decisions, is now expanding into other industries (e.g. business analytics). We envisage our students accessing this expanding and exciting market segment.

The programme capitalizes on existing modules in offered by SMS and EECS to create a cutting edge industry-oriented programme that offers substantial development potential in a competitive job market.

Aims of the Programme

The aim of this programme is to provide numerate students with the necessary background to gain access to the intellectually stimulating, lucrative and expanding segment of the executive job market in the confluence of mathematics, finance and technology. Additionally the programme will provide students with the intellectual stimulus to enter related research fields (e.g. high performance computing). The job sector aimed at includes investment banks, hedge funds, brokerage providers, as well as financial software companies, and consultancy firms.

What Will You Be Expected to Achieve?

Knowledge and understanding of the following items:

Academic Content:	
A 1	Implementation of mathematical models used in the financial markets
A 2	Programming tools and techniques for high performance computing such as low level and GPU programming
A 3	Understanding of the fundamental principles of finance and financial mathematics

Disciplinary Skills - able to:	
B 1	Evaluate the scientific, mathematical and software 'tools' relevant to the problem domain of Financial Computing
B 2	Learn novel techniques for developing optimal implementations of models in mathematical finance
B 3	Understand the computational and mathematical demands of current finance development

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Attributes:	
C 1	Engage critically with knowledge in the domain of Computational Finance
C 2	Develop a global perspective on the computational demands of the financial industry
C 3	Develop information expertise in the field.

How Will You Learn?

Each non-project-based course unit involves lectures, problem solving coursework and practical sessions. Lectures are used to introduce principles and methods and also to illustrate how they can be applied in practice. Coursework allows students to develop their skills in problem solving and to gain practical experience.

Tutorial sessions actively engage students on applying the techniques and tools presented in the lectures to solve practical problems. These sessions take the form of exercise classes and programming laboratories under the guidance of the teaching staff. In addition to the final year project, other modules introduce project working skills.

How Will You Be Assessed?

The assessment of the taught course units takes place through a written examination and coursework.

The final project is examined on the basis of a written report. In addition, the examiners may request a formal oral presentation, involving perhaps a demonstration of the software developed or a discussion of the insights obtained from analysis carried by the student. The projects will have two examiners each, with a third if there is disagreement.

The industrial placement module is assessed as a pass / fail through a combination of report, viva, learning journal and structured employer evaluations.

How is the Programme Structured?

Please specify the full time and part time programme diets (if appropriate).

The programme is organised in three semesters. The first semester is composed by three compulsory modules plus one optional module that will cover the foundational techniques and tools employed in Computational Finance.

The second semester has one compulsory module (Trading and Risk Systems Development) and three modules that are chosen from a set of options. The module selection allows students to focus on domain-specific research or industry applications for Financial Computing.

Students carry out a large project full time in the third semester, after agreeing to a topic and supervisor in the first semester, and completing the preparation phase over the second semester.

For the "with industrial placement variant", in addition, the Masters Industrial Placement module will be assessed simply as a pass/fail module. Students who pass the Masters Industrial Placement Project will therefore obtain the "with Industrial Experience" title, while those who fail the Masters Industrial Placement Project will transfer off the "with Industrial Experience" variant and obtain the relevant programme title without industrial experience.

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Academic Year of Study FT - Year 1

Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester
Introduction to Object-Oriented Programming	ECS793P	15	7	Compulsory	1	Semester 1
Trading and Risk Systems Development	MTH789P	15	7	Compulsory	1	Semester 2
Foundations of Mathematical Modeling in Finance	MTH771P	15	7	Compulsory	1	Semester 1
Topics in Scientific Computing	MTH739P	15	7	Compulsory	1	Semester 1
Functional Programming	ECS713P	15	7	Elective	1	Semester 1
Big Data Processing	ECS765P	15	7	Elective	1	Semester 1
Machine Learning	ECS708P	15	7	Elective	1	Semester 1
Advanced Objected-Oriented Programming	ECS769P	15	7	Elective	1	Semester 2
Stochastic Calculus and Black Scholes Theory	MTH772P	15	7	Elective	1	Semester 2
Advanced Portfolio Theory and Risk Management	MTH774P	15	7	Elective	1	Semester 2
Advanced Computing in Finance	MTH773P	15	7	Elective	1	Semester 2
Financial Computing Dissertation	MTH778P	60	7	Core	1	Semesters 1-3
Data Analytics	ECS784P	15	7	Elective	1	Semester 2

Academic Year of Study FT - Year 2

Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester
Masters Industrial Placement	ECS768P	0	7	Compulsory	2	Semesters 1-3

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What Are the Entry Requirements?

Entrants must usually have the equivalent of a British first or good second class degree in a subject with a substantial mathematical component (mathematics, statistics, physics, engineering, economics, or computer science). Students should also have some experience in computer programming. The Admissions Tutor assesses applicant suitability for the programme individually, and will liaise with the EECS MSc admissions tutor to ensure consistency of intake.

Entrants for whom English is a second language must meet the minimum IELTS requirement of 6.5 (or equivalent).

How Do We Listen and Act on Your Feedback?

The Staff-Student Liaison Committee provides a formal means of communication and discussion between Schools and its students. The committee consists of student representatives from each year in the school/institute together with appropriate representation from staff within the school/institute. It is designed to respond to the needs of students, as well as act as a forum for discussing programme and module developments. Staff-Student Liaison Committees meet regularly throughout the year.

Each school operates a Learning and Teaching Committee, or equivalent, which advises the School/Institute Director of Taught Programmes on all matters relating to the delivery of taught programmes at school level including monitoring the application of relevant QM policies and reviewing all proposals for module and programme approval and amendment before submission to Taught Programmes Board. Student views are incorporated in this Committee's work in a number of ways, such as through student membership, or consideration of student surveys.

All schools operate an Annual Programme Review of their taught undergraduate and postgraduate provision. The process is normally organised at a School-level basis with the Head of School, or equivalent, responsible for the completion of the school's Annual Programme Reviews. Schools/institutes are required to produce a separate Annual Programme Review for undergraduate programmes and for postgraduate taught programmes using the relevant Undergraduate or Postgraduate Annual Programme Review pro-forma. Students' views are considered in this process through analysis of the NSS and module evaluations.

Academic Support

All students will be assigned a tutor, with whom they will have regular meetings. In addition the students will have all the standard induction, advice and supervisory arrangements normally offered to students within SMS and EECS.

The school handbook will be provided (and made accessible at all times) to students, where all the channels of support will be outlined. These include the support channels within the school and also those available at College level.

Programme-specific Rules and Facts

N/A

Specific Support for Disabled Students

Queen Mary has a central Disability and Dyslexia Service (DDS) that offers support for all students with disabilities, specific learning difficulties and mental health issues. The DDS supports all Queen Mary students: full-time, part-time, undergraduate, postgraduate, UK and international at all campuses and all sites.

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Students can access advice, guidance and support in the following areas:
• Finding out if you have a specific learning difficulty like dyslexia
• Applying for funding through the Disabled Students' Allowance (DSA)
• Arranging DSA assessments of need
• Special arrangements in examinations
• Accessing loaned equipment (e.g. digital recorders)
• Specialist one-to-one "study skills" tuition
• Ensuring access to course materials in alternative formats (e.g. Braille)
• Providing educational support workers (e.g. note-takers, readers, library assistants)
• Mentoring support for students with mental health issues and conditions on the autistic spectrum.

Links With Employers, Placement Opportunities and Transferable Skills

The staff involved in the MSc Financial Computing have strong links and research collaboration with industrial partners including Citigroup, Nomura, Bank of England, Morgan Stanley, UBS, RBS, Lloyds, Moodys, IBM, HP, BBC, and Tech City IT startups. Several of these companies will be involved in the teaching activities, providing guest lectures, as well as business use cases for applying Financial Computing techniques.

Additionally, several of the MSc projects offered to the students may be performed in collaboration with an industry partner, including summer placement opportunities.

Programme Specification Approval

Person completing Programme Specification	Michael Phillips
Person responsible for management of programme	Michael Phillips
Date Programme Specification produced/amended by School Learning and Teaching Committee	TBC
Date Programme Specification approved by Taught Programmes Board	TBC

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