MSc in Financial Engineering (full-time)
For students entering in 2015/6

Awarding Institution:	University of Reading
Teaching Institution:	University of Reading
Relevant QAA subject Benchmarking group(s):	
Faculty:	Henley Business School at Univ of Reading
Programme length:	10 months
Date of specification:	17/Apr/2015
Programme Director:	
Programme Advisor:	
Board of Studies:	HBS Pre Exp BOS
Accreditation:	

Summary of programme aims
The aim of the programme is to prepare graduates for a career in financial engineering. The programme will provide participants with the opportunity to develop the skills necessary to price and trade different types of derivatives and demonstrate their understanding of derivatives markets for equities, foreign exchange, interest rates and credit risk.
This MSc programme is offered on a full-time residential basis only which requires full-time attendance on campus at the University of Reading.

Transferable skills
Students will have the opportunity to enhance their skills relating to numeracy, problem-solving, communication, information handling and the use of information technology, programming languages, time management, handling deadlines and career planning. The quantitative skills developed, including the knowledge of derivatives pricing tools and methods and the use of programming languages like C++ and VBA, are much in demand in the financial industry. All other skills are not specific to particular industries. Students will have the opportunity to improve their communication skills both in the preparation of projects and written assignments and during the interaction with their classmates in the online discussions that support their learning. Also, students will have regular tasks to complete, thus developing their problem-solving abilities. The significant role of programming in will enhance the use of information technology in the programme.

Programme content
Compulsory Modules

ICM107	Securities, Futures and Options	20	7
ICM108	Fixed Income and Equity Investments	20	7
ICM127	Stochastic Calculus and Probability	20	7
ICM103	Quantitative Methods for Finance	20	7
ICM112	C++ for Financial Engineering	10	7
ICM292	Derivatives Modelling	20	7
ICM266	Essentials of Financial Engineering	10	7
ICM299	Numerical Methods for Financial Engineering	20	7

Option Modules
Students must choose 40 credits of option modules available from the Programme Director. There is no guarantee that in any one year all modules will be available. New option modules may also be added.

Part-time or modular arrangements
N/A

Progression requirements
N/A

Summary of Teaching and Assessment
Teaching is organised in modules. The method of delivery varies among modules, especially in terms of the proportions of time allocated to lectures, seminars and computer-room sessions. All modules are part-assessed via a multiple-choice test or coursework that can take a variety of forms. Final assessment normally involves a written examination, and also incorporates coursework marks. One exception is the C++ for Financial Engineering module which is fully assessed by coursework.

The full-time programme is taught over two 11-week terms. Part 1 begins at the beginning of Freshers' Week in September of each year. Examinations for Part 1 modules are held in Week 1 of the Spring term. Part 2 occupies 9 weeks of the Spring term and 2 weeks at the beginning of the Summer term. Examinations for Part 2 are normally held in late May / early June.

The University's taught postgraduate marks classification is as follows:
Mark Interpretation
70 - 100% Distinction
60 - 69% Merit
50 - 59% Good standard (Pass)
Failing categories:
40 - 49% Work below threshold standard
0 - 39% Unsatisfactory Work

For Masters Degrees (180 credits)
To pass the MSc students must gain an average mark of 50 or more overall. In addition the total credit value of all modules marked below 40 must not exceed 30 credits and for all modules marked below 50 must not exceed 55 credits.
Students who gain an average mark of 70 or more overall and have no mark below 40 will be eligible for a Distinction. Those gaining an average mark of 60 or more overall and have no mark below 40 will be eligible for a Merit.

For PG Diplomas (120 credits)
To pass the Postgraduate Diploma students must gain an average mark of 50 or more. In addition the total credit value of all modules marked below 40 must not exceed 30 credits and for all modules marked below 50 must not exceed 55 credits.
Students who gain an average mark of 70 or more and have no mark below 40 will be eligible for the award of a Distinction. Those gaining an average mark of 60 or more and have no mark below 40 will be eligible for a Merit.

For PG Certificates (60 credits)
To pass the Postgraduate Certificate students must gain an average mark of 50 or more. In addition the total credit value of all modules marked below 40 must not exceed 10 credits.
After graduation, students may have the opportunity to get involved with various short-term numerical projects linked with investment banks and other financial institutions. Also, as the ICMA Centre has strong links with several international research centres, exchange programs can be offered for interested students. Furthermore, some students will be able to collaborate with staff members undertaking research over the summer months, with the prospect of submitting research papers.

Admission requirements
Entrants to this programme are required to have obtained a first degree the equivalent of a British upper second class honours degree or equivalent from an overseas institution. Degrees should be in a quantitative discipline. For applicants whose first language is not English, proof of proficiency is required.
GMAT
Applicants are strongly recommended to submit a GMAT score with their application, particularly if they have been out of education for more than a few years. The ICMA Centre may ask an applicant to submit a GMAT if it is deemed appropriate.

Admissions Tutor: Dr Simone Varotto

Support for students and their learning
University support for students and their learning falls into two categories. Learning support is provided by a wide array of services across the University, including: the University Library, the Careers, Placement and Experience Centre (CPEC), In-sessional English Support Programme, the Study Advice and Mathematics Support Centre teams, IT Services and the Student Access to Independent Learning (S@il) computer-based teaching and learning facilities. There are language laboratory facilities both for those students studying on a language degree and for those taking modules offered by the Institution-wide Language Programme. Student guidance and welfare support is provided by Personal Tutors, School Senior Tutors, the Students' Union, the Medical Practice and advisers in the Student Services Centre. The Student Services Centre is housed in the

Carrington Building and offers advice on accommodation, careers, disability, finance, and wellbeing, academic issues (eg problems with module selection) and exam related queries. Students can get key information and guidance from the team of Helpdesk Advisers, or make an appointment with a specialist adviser; Student Services also offer drop-in sessions and runs workshops and seminars on a range of topics. For more information see www.reading.ac.uk/student

In addition, the ICMA Centre provides purpose-built dealing rooms that include Thomson Reuters and Bloomberg terminals and high-specification PCs that students routinely use for INVEST trading simulations and course work. The ICMA Centre's Continuing Professional Development Unit provides specialised careers advice targeted at the investment banking industry.
Learning support also includes a student handbook containing full details of the programme structure and administration. Blackboard is used to manage teaching and learning and to monitor student progress.

Career prospects
Graduates of the ICMA Centre have an enviable record of attainment when it comes to gaining employment in the financial services industry. The global investment banking and securities markets attract the very best applicants and competition for entry-level positions remains intense. Despite the volatile nature of the financial markets, demand for well-qualified recruits remains high.
Financial Engineering is a sector of the financial industry that has been growing very rapidly over the past two decades. Demand for well-qualified graduates in this area is high, it greatly exceeds supply and there are strong reasons to suppose that this demand will continue to grow. We have very strong links with the quantitative finance profession mainly through the research and other activities of Faculty members. The ICMA Centre has built a prestigious reputation in the UK for research in quantitative finance. Graduates of this MSc programme would thus have excellent career prospects.
ICMA Centre graduates from the programme will be equipped with knowledge and transferable skills that are also prized by employers inside and outside of the quantitative finance sector. Many of our graduates are currently enjoying successful careers with investment banks, specialist IT firms, multinational companies, global consulting organisations and hedge funds.

Opportunities for study abroad or for placements
These would be in the form of exchange programs during the months after graduation. The ICMA Centre enjoys inter-university relationships and has been previously involved in exchange programs with some of these. Additionally, after graduation, students could get the opportunity to get involved with different short-term numerical projects linked with banks and financial institutions.

Programme Outcomes
The programme provides opportunities for students to develop and demonstrate knowledge and understanding, skills, qualities and other attributes in the following areas:

Knowledge and Understanding

A. Knowledge and understanding of:

- The fundamental theory of finance and asset pricing in complete and incomplete markets.
- The theory of derivatives pricing using probabilistic framework with an overview of stochastic calculus and its applications in different markets: equity, foreign exchange, interest rates and credit risk.
- Analytical techniques used routinely in the valuation of derivative securities, mostly in stochastic calculus.
- Numerical techniques for the valuation and hedging of different derivative securities, like simulations, finite differences and binomial trees.
- Quantitative techniques including: advanced probability concepts, ODE's and PDE's, stochastic differentiation, transform methods,

Teaching/learning methods and strategies

- Formal lectures and tutorials, supervision supported by directed and assessed self-study. Feedback and guidance are an important part of the process.
- This body of knowledge is communicated by detailed, paper-based lecture notes. These are supported by lectures or e-lectures and a Learning Management System (LMS). The LMS provides the students with the ability to participate in online discussion.

Assessment
Knowledge is tested via tests, tutor-marked assignments, tutor-moderated online discussion boards and unseen written examinations.
Courses are assessed through a combination of coursework (assignments and projects), tests and

optimization, calibration and interpolation.

unseen examinations. Practical project work is also assessed and provides a source of feedback on the performance of the students.
Skills and other attributes

Skills and other attributes

B. Intellectual skills - *able to:*

- Use, analyse and assess the pricing methods for different types of derivatives in equity, foreign exchange, interest rates and credit risk markets.
- Read, understand and discuss the relevant literature in books and refereed academic journals.
- Think logically and apply analytical principles to a range of problems in finance, especially is derivatives pricing and trading.
- Gather financial data and validate the hedging models used by derivative securities traders.

Teaching/learning methods and strategies

Substantive problems are illustrated in lectures and smaller group seminars. Project work and assignments provide related opportunities for problem solving. Lectures supported by tutorial discussions provide the basis of ensuring the growing knowledge base becomes comprehensible. These skills are developed by each of the core modules, which are supported by key milestones and submission of tutor-marked assignments. Students will be able to perform and analyse different pricing methodologies for a wide range of derivatives.

Assessment
Through tutor-marked assignments, project work, tests, moderated online discussions and unseen written examinations.

C. Practical skills - *able to:*

- Use different software (C++, VBA) to apply the techniques presented for the valuation of derivatives.
- Use spreadsheet software effectively as an interface and to solve simple problems.
- Utilise Thomson Reuters and Bloomberg business information and analytical tools.
- Communicate ideas online.
- Operate effectively in a simulated front office environment, including the ability to validate quantitative trading models using fundamental principles.

Teaching/learning methods and strategies

Practical skills are introduced in lectures, developed in supporting tutorials and computer-based sessions, and reinforced by problem sets and supervised project work.
Teaching is supported by a LMS that requires students to participate in asynchronous online discussions.
The teaching of essential software (C++, VBA) is included in the programme.
Most modules have practical exercises based on programming and the use of spreadsheets.

Assessment
These are assessed through projects, assignments, computer-based sessions and tutorials.

D. Transferable skills - *able to:*

- Communicate complex issues clearly and effectively both orally and in writing.
- Gather and interpret data, and present results.
- Demonstrate familiarity with the workings of the international financial markets.
- Use IT, including programming, data exchange, graphics, spreadsheet and directed website searches.
- Contribute to online group discussions.
- Use library and web-based resources.
- Manage time to achieve goals.

Teaching/learning methods and strategies

The use of IT is an integral part of the practical side of the course. Programming languages are taught in C++ for Financial Engineering whilst they are applied in almost all of the other modules. Their use is encouraged through applications that require programming and the use of spreadsheet software for interface. These involve programs that price derivatives using different methods, website searches and use of library resources.
Communication and presentation skills are assessed at several points throughout the programme. Good time management is essential for organising a timetable to complete project work.

Assessment

Assessment of transferable skills is incorporated at several points in the programme through projects, assignments and computer-based tutorials. These are also assessed by means of unseen written examinations, tutor-marked assignments and moderated online discussion.

Please note - This specification provides a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. More detailed information on the learning outcomes, content and teaching, learning and assessment methods of each module can be found in the module description and in the programme handbook. The University reserves the right to modify this specification in unforeseen circumstances, or where the process of academic development and feedback from students, quality assurance process or external sources, such as professional bodies, requires a change to be made. In such circumstances, a revised specification will be issued.