UNIVERSITY OF LEICESTER

Programme Specification (Postgraduate)
For students entering in 2019/20
Date amended: May 2019

1. Programme Title(s):

MSc Financial Mathematics and Computation with Industry

2. Awarding body or institution:

University of Leicester

3. a) Mode of study

Full-time

b) Type of study

Campus-based

The Industrial placement is off campus, on the site of the company concerned.

4. Registration periods:

The normal period of registration is 24 months

The maximum period of registration is 36 months

5. Typical entry requirements:

The entry requirements are at least a 2.1 class honours BSc degree or qualification of equivalent standard recognised by the University in physics, engineering or mathematics. In general, it is expected that a student has a solid background in mathematics (calculus, linear algebra, ordinary differential equations, basics of probability and statistics). Because applications are treated on an individual basis, alternative qualifications, including work experience, may be considered.

Students' whose first language is not English will need to satisfy the University's English language requirements, equivalent to IELTS 6.0.

6. Accreditation of Prior Learning:

N/A

7. Programme aims:

Students on this course are expected to acquire knowledge and understanding of Financial Mathematics and computational techniques for finance that will equip them to enter competitively the pool of potential employees of investment banks and other financial institutions. By the end of the course, students should be able to formulate problems from finance in mathematical terms, select and develop an appropriate numerical method, write a computer program to numerically approximate the problem, and present and interpret these results for a potential client. A wide range of career opportunities is available to graduates in Financial Mathematics: commercial and investment banks, brokerage and investment firms, insurance companies, consulting and accounting firms, treasury departments of nonfinancial corporations, public institutions, such as state and local governments and international organizations, software and technology vendors providing products and services to the financial industry.

The programme also aims to

- develop links with the employers to benefit students across the University and research programmes;

- set a precedent for rigorous academic programmes that can respond directly to business needs;
- develop students' interest financial mathematics and its applications in preparation for further study and career;
- foster students' independent learning, organisation skills and employability skills.

8. Reference points used to inform the programme specification:

- QAA Framework for Higher Education Qualifications in England, Wales and Northern Ireland
- QAA Master's Degree Characteristics
- QAA Benchmarking Statement; Mathematics, Statistics and Operational Research (MMath)
- QAA Annex to subject benchmark statement: Mathematics, statistics and operational research (2009)PDR report (April 2011)
- University Learning Strategy
- University Employability Strategy
- Graduate Survey (2014)
- First Destination Survey
- External Examiner's Reports

9. Programme Outcomes:

Intended Learning Outcomes	Teaching and Learning Methods *(a) Subject and Professional skills*	How Demonstrated?
Knowledge		
Advanced knowledge of a range of mathematical topics in financial mathematics and scientific computing. Integration of knowledge across subjects.	Independent research and lectures.	Examinations, coursework, oral presentations, computer demos, project plan, and dissertation.
Concepts		
Computational and Mathematical modelling, mathematical abstraction, generalisation, justification, and precision.	Lectures, computer practicals, coursework assignments.	Examinations, coursework, oral presentations, computer demos, project plan, and dissertation
Techniques		
Programming of mathematical algorithms, mastery of research methods, project planning	Lectures, computer labs.	Oral presentations, computer demos, project plan, and dissertation.
Critical analysis		
Ability to apply understanding of concepts and techniques with independence, rigour & self- reflexivity.	Independent research, lectures, coursework in modules.	Oral presentations, participation in group discussions, essays/demos, project plan, and dissertation.
Presentation		
Ability to organise research material and or technology demonstration in a manner appropriate to the medium that is to be assessed; to distinguish between relevant and non-relevant material; to write-up and deliver oral reports on findings to a professional standard; to engage in scientific discussion with peers.	Supervision for project	Oral presentations, Computer demos, project plan, and dissertation.

Intended Learning Outcomes	Teaching and Learning Methods *(b) Transferable skills*	How Demonstrated?
Appraisal of evidence		
Ability to apply a numerical method for the solution of some real world problem. Ability to assess the efficacy of method used, both qualitatively and quantitatively. Ability to assess the quality of a presentation, both oral and written.	Lectures, project supervision.	Oral presentations, project plan, and dissertation.
Research skills		
Progressive improvement in the ability to locate, organise and marshal evidence, report on findings, analyse complex ideas and construct sophisticated critical arguments.	Through progressive modes of assessment, to the project plan, culminating in the dissertation.	Oral presentations, demos, Project plan, and dissertation.
Communication skills		
Ability to deliver oral presentations to professional standard; ability to respond to questioning; ability to write cogently and clearly; ability to choose a format and communication appropriate to the work environment.	Presentations during taught modules. Lectures. Discussions with the colleagues at the workspace and with the mentor.	Oral presentations in company and University, demos, project plan, dissertation.
Data presentation		
Ability to present research clearly and effectively using appropriate IT resources.	Presentations during taught modules.	Oral presentations, demos, and dissertation.
Information technology		
Ability to programme in a high level language.	Various Computing modules, computing assignments in other taught modules.	Computer practicals.
Problem solving		
Analysis, breakdown, synthesis, critical examination. Computational modeling skills.	Practical sessions. Tutorials. Project. Coursework. Project	Written examinations, assessed coursework, project. Assessed coursework, project.
Working relationships		
Knowing how and when to draw on the knowledge and expertise of others; awareness of the importance of Health and Safety aspects of the working place; ability to assess dangers associated with the work.	Project supervision, lectures. Training to fill risk assessment forms, supervised by a mentor.	Completed risk assessment form returned to the University.

Managing learning		
Identifying a credible Research project, drawing up a realistic research time-table, reflecting on and 'writing up' results. Ability to identify key issues affecting the effectivity of a company by using the internal and external sources of business information.	Coursework in modules. Discussion with a mentor.	Oral presentations, completion of coursework, project plan, and dissertation. Written summary about the factors that determine the effectiveness of a company in comparison with other companies.

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
Career management		
Scientific discussion. Organisation. Time management. Careers and business awareness. Ability to assess training needs and evaluate self-progress	Practical sessions. Tutorials. Project (MSc only). Structured support decreasing through year. Project (MSc only). Careers workshops. Industry-led project. Guest speakers. Discussions with the industrial supervisor and with a mentor.	Project. Meeting deadlines. Destination data. Student feedback. Written summary

10. Special features:

<u>Placements</u>

Students registered on the 'with Industry' variant of their degree programme undertake an industrial placement after completing the taught modules of their programme and before undertaking the final project/dissertation. The placement must be 12 months in duration.

As a condition of the 'with Industry' programme, students are required to undertake preparatory training during the first year of the degree.

Students are responsible for securing their own placement but will receive support in this from the Career Development Service.

<u>Progression criteria for placements</u>

Students on the "with Industry" programme are subject to the following four progression rules (in addition to any rules applicable to their core programme):

1. If a student does not achieve an overall merit level or fail (<50) more than 15 credits at the end of their first taught semester or fail (<40) 15 or more credits at the end of their first semester they will revert to the degree without industry.

2. If a student fails more than 60 credits at the end of their second semester they will not be able to proceed with the programme, in accordance with Senate Regulation 6.28, and will have to cancel any arrangements made for placements.

3. If a student fails to secure a placement they will revert to the non-industry variant of their degree programme and will continue on to their final project/dissertation.

4. Failure to satisfactorily perform (attendance, participation and completion of set tasks) in the employability modules will lead to the student being transferred to the degree without industry.

In the course of their placement the student will receive one or two support visits from a member of staff. The second 'visit' can be in the form of a Skype call. Typically where an overseas placement is secured both visits will be conducted via a Skype call.

Assessment of the Year in Industry

Students will be required to undertake reflective activities whilst on placement which are marked on a pass/fail basis.

11. Indications of programme quality:
External examiners reports.

12. Scheme of Assessment
This programme follows the regulations governing taught postgraduate programmes as published in Senate Regulation 6. This programme follows the 120 taught credits and a 60 credit research project structure.

13. Progression points
As defined in Senate Regulation 6: Regulations governing Taught Postgraduate Programmes of Study (see Senate Regulations). See also Progression criteria for placements above.

In cases where a student has failed to meet a requirement to progress he or she will be required to withdraw from the course and a recommendation will be made to the Board of Examiners for an intermediate award where appropriate.

14. Rules relating to re-sits or re-submissions:
As defined in Senate Regulation 6: Regulations governing Taught Postgraduate Programmes of Study (see Senate Regulations)

15. Additional information [e.g. timetable for admissions]
There will be one intake a year in October and applications are accepted throughout the year. The department has a small number of academic scholarships for students expecting first class degrees, applications are assessed at the point of receipt, and no additional application is required to be considered for a scholarship.

Modules are also taught by the School of Business and the Departments of Informatics and Physics.

Former University of Leicester undergraduate students who have taken the equivalent module as part of their undergraduate studies will not be permitted to sit the same module again. An alternative module will be agreed with them on an individual basis.

16. External Examiners

The details of the External Examiner(s) for this programme and the most recent External Examiners' reports can be found here

Appendix 1: Programme structure (programme regulations)
See below.

All programmes to formally include range of non-credit bearing attendance only activities for careers, student support etc.:

MA7905 -Employability: Core Skills

MA7906 - Employability: Placement Preparation

Appendix 2: Module Specifications

See module specification database http://www.le.ac.uk/sas/courses/documentation

MSc/PGDip in Financial Mathematics and Computation

SEMESTER 1

Core Modules		**Credits**
MA7071	FINANCIAL MATHEMATICS I	15
MA7012	SCIENTIFIC COMPUTING	15
CO7105*	ADVANCED C++ PROGRAMMING	15
OR		
PA7081*	PRACTICAL PROGRAMMING	15

***One of these modules must be taken**

Optional Modules

One selected from:

MA7077	OPERATIONAL RESEARCH	15
MA7404	MARKOV PROCESSES	15
MA7403	STATISTICAL DISTRIBUTIONS AND INFERENCE	15
MA7023	BUSINESS STATISTICS	15
MN7022	FOUNDATIONS OF FINANCIAL ANALYSIS AND INVESTMENT	15
	Semester Total	**60**

SEMESTER 2

Core Modules		**Credits**
MA7072	FINANCIAL MATHEMATICS II	15
MA7011	COMPUTATIONAL PARTIAL DIFFERENTIAL EQUATIONS WITH APPLICATIONS	15
MA7073	FINANCIAL RISK	15

Optional Modules

One selected from:

MA7022	DATA MINING AND NEURAL NETWORKS	15
	15	
MA7206	STATISTICAL DATA ANALYSIS	15
MA7021	GENERALIZED LINEAR MODELS	15
MA7414	SURVIVAL MODELS	15
EC7075	INTERNATIONAL MONEY AND FINANCE	15
EC7104	FINANCIAL MARKET MICROSTRUCTURE & TRADING	15
EC7097	FINANCIAL RISK MANAGEMENT	15
	Semester Total	**60**

SUMMER

Core Modules		**Credits**
MA7002	INDIVIDUAL PROJECT	60
	Total Credits	**180**