UNIVERSITY OF LEICESTER

Programme Specification (Undergraduate)

For students entering in 2018/19

Date amended: Sept 2018

1. Programme Title(s) and UCAS code(s):

Pre-Masters Diploma Mathematics

2. Awarding body or institution:

University of Leicester

3. a) Mode of study:

Full time

b) Type of study:

On campus

4. Registration periods:

The normal period of registration is 12 months
The maximum period of registration is 24 months

5. Typical entry requirements:

Good second class honours BSc degree (or equivalent) in mathematical/finance related subject, e.g. Economics, Engineering, Physics, Finance, Computer Science. Each applicant will be assessed individually on their previous education and work experience by the course director for the MSc course a student wishes to pursue.

6. Accreditation of Prior Learning:

N/A

7. Programme aims:

The programme aims to

- foster confidence, convey knowledge and develop expertise in mathematics, including an appreciation of the beauty and usefulness of mathematics;
- provide an education and training in mathematics which includes fundamental concepts and gives an indication of the breadth of mathematics, and in particular to gain a solid grounding in the key applications of mathematics within finance;
- develop an appreciation of the necessity for rigorous justification of assertions and the need for logical arguments;
- develop the ability to model the world using mathematics, and to be able to produce relevant and robust solutions to real world problems;
- enable students to develop self-confidence gained through the provision of careful guidance and increasing independence;
- improve students' team-working skills;
- stimulate intellectual development and develop powers of critical analysis, problem solving, written communication skills and improve presentational skills;
- develop project management skills;
- develop competence in IT, in particular the use of mathematical software,
- enhance practical computing skills by learning a high level computer language;

- develop skills which will have direct applicability to employment in the financial sector, notably the actuarial profession, and provide the first level of training required to become a quantitative analyst;
- raise students' expertise and understanding to a point where they can embark upon postgraduate mathematical study; prepare students for a postgraduate master's programme in Mathematics, specifically Financial Mathematics through a combination of previous education/attainment and relevant modules studied as part of the programme;
- provide each student with a tailored course so as they are fully equipped to meet the demands of a masters course in Financial Mathematics; Actuarial Science.
- ensure that all students, regardless of entry qualification, are educated to the same standard so as to meet the requirements expected of all applicants onto the MSc Financial Mathematics and Computation programme or Actuarial Science, to be achieved through a tailored module selection in consultation with the relevant course director.

8. Reference points used to inform the programme specification:

- QAA Framework for Higher Education Qualifications in England, Wales and Northern Ireland
- 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	How Demonstrated?
(a) Discipline specific knowledge and competencies		
(i) Mastery of an appropriate body of knowledge		
Knowledge of basic theory, basic techniques of analysis, algebra, applied mathematics, and statistics.	Lectures, specified reading, problem classes.	Written examinations, assessed problems.
Knowledge of key mathematical techniques in finance, including actuarial notation, portfolio theory and stochastic analysis.	In addition, distance and e-learning.	On line computer assessment. Assessed practical classes. Plus prior attainment from previous degree.
Knowledge of basic techniques, and model problems.		
Knowledge of a computing language.	Computer practical classes.	
(ii) Understanding and application of key concepts and techniques		
Novel applications of basic knowledge. Exposition of logical structure. Ability to generalise and specialise.	Lectures, tutorials, problem classes, marked assignments.	Written examination, assessed problems, project report.
Proof techniques. Ability to apply an algorithm for the solution of a standard problem.	Lectures, tutorials, problem classes, marked assignments.	Written examinations, assessed problems. Assessed practical classes.
Ability to apply theorems to solve particular problems. Mathematical modelling. Application of computer algorithms for solving finance problems.	Computer practical classes.	
(iii) Critical analysis of key issues		
Analysis of problem and selection of appropriate proof or solution strategy. Critical appraisal of solutions. Analyse and solve more `messily defined' finance management	Lectures, problem classes, feedback on assessed problems, project supervision.	Written examinations, assessed problems, Project report.

(iv) Clear and concise presentation of material		
Presentation of results (both informal and to a variety of audiences), participation in scientific discussion. Ability to write coherent reports. Software presentation.	Tutorials, Group workshops, Presentation workshops, project supervision. Feedback on assessed written pieces. Guidance from project supervisor.	Group presentations. Project presentations. Assessed essays. Project presentation.
(v) Critical appraisal of evidence with appropriate insight		
Project design.	Project supervision	Project reports.
(vi) Other discipline specific competencies		
Knowledge of mathematical software such as MATLAB and MAPLE. Mathematical modelling skills. Language of finance.	Lab classes, and purpose designed handbooks. Group projects. Project and lectures, eLearning.	Log books of practical sessions. Reflective blogs. Use of MAPLE in basic skills tests. Project reports. Written examinations and presentations.
(b) Transferable skills		
(i) Oral communication		
Response to questioning Scientific communication Project and poster presentation	Tutorials, workshops. Tutorials, workshops. Project supervision, presentation workshops.	Presentation assessment.
(ii) Written communication		
Report writing. Mathematical communication	Project supervisions. Tutorials.	Assessed reports. Assessed questions.
(iii) Information technology		
Use of Windows. Use of specialist packages. Office software.	Induction. Laboratories.	Marked project work. Project reports.
(iv) Numeracy		
Use of analytical and graphical methods.	Throughout	Written examinations, project reports.
(v) Team working		
Scientific discussion. Organization, time management	Group problem solving. Group projects.	Group assessment (including peer assessment).
(vi) Problem solving		
Analysis, breakdown, synthesis, critical examination. Mathematical modelling skills.	Lectures, problem workshops, Group work, projects.	Marked problems, group work assessment, project assessment.
(vii) Information handling		
Conduct background research and literature surveys. Summarise content from information sources. Ability to learn from e-learning resources.	Project supervision. Blackboard stored e-learning resources.	Individual and group project reports. Some assessed material only provided through e-learning resources.

(viii) Skills for lifelong learning		
Study skills. Independence and time management. Careers and business awareness. Information retrieval.	Resource based learning. Study skills booklet. Structured support decreasing through years. Guest speakers. Induction library session. Study skills handbook. Project supervision.	Examinations, assessed problems, project assessments. Meeting deadlines.

10. Progression Points

The Pre-Masters course is made up of 120 credits of undergraduate level modules specifically chosen to enable a student to progress to Mathematics MSc course in the Department. It will follow the scheme of assessment for Undergraduate students in relation to marking schemes; successful completion of the course will be on the basis of 120 credits as opposed to the standard 360 for UG programmes. Students who wish to proceed to an MSc must pass the course modules with an overall average of 55%.

11. Scheme of Assessment

The Pre-Master's course will follow the scheme of assessment for Undergraduate students in relation to marking schemes; successful completion of the course will be on the basis of 120 credits as opposed to the standard 360 for UG programmes. Students who wish to proceed to an MSc must pass the course modules with an overall average of 55%.

12. Special features:

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13. Indications of programme quality

QAA subject review, external examiners reports ("the performance of the students is comparable with similar high-quality UK institutions"), QAA Benchmarking Statement Mathematics, Statistics and Operational Research (MMath) and QAA Annex to subject benchmark statement: Mathematics, statistics and operational research (2009) and dispensation from professional qualifications.

14. External Examiners

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

Appendix one (programme structure)

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

MA1903 – House hours

MA1902- Peer support

For students wishing to progress to MSc Financial Mathematics and Computation

MODULES				
SEMESTER 1				
Core Modules:				Credits
	MA1014	CALCULUS AND ANALYSIS (yearlong module)		15
	MA1114	LINEAR ALGEBRA (yearlong module)		15
	MA1061	PROBABILITY		15
Select 20 or 10 credits from:				
	MA2132	LINEAR ALGEBRA III		10
	MA2252	INTRODUCTION TO COMPUTING		10
			Semester Total	55 OR 65
SEMESTER 2				
				Credits
Core Modules:				
	MA1014	CALCULUS AND ANALYSIS (Yearlong module)		15
	MA1114	LINEAR ALGEBRA *yearlong module)		15
	MA1202	INTRODUCTORY STATISTICS		15
Select 10 or20 credits from:				
	MA2021	DIFFERENTIAL EQUATIONS AND DYNAMICS		20
	MA2022	DIFFERENTIAL EQUATIONS AND DYNAMICS		10
	MA2262	LINEAR STATISTICAL MODELS		10
	MA2261	LINEAR STATISTICAL MODELS		20
	MA2512	APPLIED ECONOMETRICS		10
			Semester Total	65 OR 55

For students wishing to progress to MSc Actuarial Sciences

MODULES				
SEMESTER 1				
Core Modules:				Credits
	MA1061	PROBABILITY		15
Select 45 credits from:				
	MA1014	CALCULUS AND ANALYSIS (yearlong module)		15
	MA1114	LINEAR ALGEBRA (yearlong module)		15
	MA2032	CALCULUS AND ANALYSIS III		20
	MA2132	LINEAR ALGEBRA III		10
	MA2252	INTRODUCTION TO COMPUTING		10
			Semester Total	60
SEMESTER 2				
				Credits
Core Modules:				
	MA1202	INTRODUCTORY STATISTICS		15
	MA2261	LINEAR STATISTICAL MODELS		20
Select 25 credits from:				
	MA1014	CALCULUS AND ANALYSIS (yearlong module)		15
	MA1114	LINEAR ALGEBRA (yearlong module)		15
	MA2022	DIFFERENTIAL EQUATIONS AND DYNAMICS		10
	MA2512	APPLIED ECONOMETRICS		10
			Semester Total	60

Pre-Masters for students wishing to progress to MSc Data Analysis for Business Intelligence

SEMESTER ONE	SEMESTER TWO
MA1061 - PROBABILITY (15CR)	MA2266 - APPLIED STATISTICS (20CR)
plus 45 credits of options	plus 40 credits of options

OPTIONS	OPTIONS
CO1102 Programming Fundamentals (15cr)	MA2261 - LINEAR STATISTICAL MODELS (20CR)
MA2252 - INTRODUCTION TO COMPUTING (10CR)	CO2002 - FINANCIAL AND BUSINESS COMPUTING (10CR)
MA2404 - PRINCIPLES OF FINANCIAL MODELLING (20CR)	CO1107 Algorithms, Data Structures & Advanced (15cr) Programming
	MA1202 - INTRODUCTORY STATISTICS (15CR)
MA1114 - LINEAR ALGEBRA (30CR) (yearlong module)	

Pre-Masters for students wishing to progress to MSc Applied Computation and Numerical Modelling

SEMESTER ONE1	SEMESTER TWO
MA2032 - CALCULUS & ANALYSIS III (10CR)	MA2021 - DIFFERENTIAL EQUATIONS AND DYNAMICS (20CR)
MA2252 - INTRODUCTION TO COMPUTING (10CR)	
Plus 40 credits of options	Plus 40 credits of options

OPTIONS	OPTIONS
MA1114 - LINEAR ALGEBRA (30CR) (yearlong module)	
MA1014 - CALCULUS & ANALYSIS (30CR) (yearlong module)	
MA2132 - LINEAR ALGEBRA III (10CR)	
	MA2261 - LINEAR STATISTICAL MODELS (20CR)
	MA2262 - LINEAR STATISTICAL MODELS (10CR)
	MA2511 - BUSINESS APPLICATIONS IN MATHEMATICS (10CR)
	MA3121 - COMPLEX ANALYSIS (20CR)

Appendix 2: Module specifications

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