UNIVERSITY OF LEICESTER

Programme Specification (Undergraduate)

Date amended: 25 Feb 2016

1. Programme Title(s) and UCAS code(s):
BSc Mathematics and Actuarial Science (N323)

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 three years.
The maximum period of registration is five years.

5. Typical entry requirements:
340 points normally including AAB at A' level with A in Mathematics. Appropriate English language skills.

6. Accreditation of Prior Learning:
APL will not be accepted for exemptions from individual modules, however may be considered for direct entry to year 2, on a case by case and subject to the general provisions of the University APL policy.

7. **Programme aims:**

The programme aims to

- foster confidence, convey knowledge and develop expertise in mathematics, including an appreciation of the usefulness of mathematics, particularly in a business/financial context;
- 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/actuarial science;
- provide an education and training in actuarial science consistent with the Faculty and Institute of Actuaries' Core Technical competencies;
- 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 in the first level, with increasing independence later;
- improve students' team-working skills;
- stimulate intellectual development and develop powers of critical analysis, problem solving, written communication skills and improve presentational skills;
- develop the ability to communicate solutions to problems and mathematical concepts in general using language appropriate to the target audience;
- develop project-management skills;
- develop competence in IT, in particular the use of mathematical software;
- enhance practical computing skills by learning software relevant to the business community;
- develop skills which will have direct applicability to employment in the financial sector, notably the actuarial profession;
- raise students' expertise and understanding to a point where they could embark upon postgraduate mathematical study;
- develop the ability to complete independent project work and foster the skill of application of

mathematical tools in a financial context.

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
- NSS Survey (2014)
- First Destination Survey
- External Examiner's Reports
- Professional organisations (Faculty and Institute of Actuaries).

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. Knowledge of key techniques and algorithms in actuarial science and finance. Knowledge of basic techniques, and model problems. Knowledge of a computing languages and software.	Lectures, specified reading, problem classes. In addition, elements of eLearning are incorporated. Computer practical classes.	Written examinations, assessed problems. Assessed practical classes. Assessed case studies and short projects. Final year project. Assessed 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. Ability to apply an algorithm for the solution of a standard problem. Ability to apply standard theorems to solve particular problems. Mathematical modeling. Application of computer algorithms for solving finance problems.	Lectures, tutorials, problem classes, marked assignments. Lectures, tutorials, problem classes, marked assignments. Computer practical classes.	Written examination, assessed problems, project report. Written examinations, assessed problems. Assessed 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 `messily defined' finance management problems. Analysis of IT problems.	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 modeling skills. Language of finance.	Lab classes, and purpose designed handbooks. Group projects. Project and lectures, eLearning.	Log books of practical sessions. Reflective blogs. Project reports. Written examinations and presentations.
(b) Transferable skills		
(i) Oral communication		
Response to questioning. Scientific communication. Project 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
(vi) Problem solving		
Analysis, breakdown, synthesis, critical examination. Mathematical modeling 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 in DL mode, including e-learning.	Covered in project supervision. eLearning-mode module.	Individual project reports. Module assessment.

(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. Careers workshops. Business based project. Guest speakers. Placements. Induction library session. Study skills handbook. Project supervision.	Examinations, assessed problems, project assessments. Meeting deadlines. Project reports. Destinations data. Successful feedback from placements.

10. Progression points:

In cases where a student has failed to meet a requirement to progress he or she will be required to withdraw from the course

11. Scheme of Assessment
The programme follows the standard scheme of award and classification set out in Senate Regulation 5.

12. Special features:
Despite both being accredited by the Institute of Actuaries, the BSc differs significantly from the MSc Actuarial Sciences. In the BSc, the understanding of the mathematics is at a lower level (commensurate with what one would expect in an undergraduate mathematics degree in a good university such as Leicester). There is also an appreciation of how the mathematics is applied in a variety of real-life situations, but these are significantly more limited in scope and complexity than those studied in the MSc. Throughout the BSc, emphasis will be placed on developing broad practical and algorithmic skills relevant to the financial/actuarial sector, while teaching the general mathematical principles common to UK mathematics undergraduate programmes.

The BSc programme will be taught using computer classes, problem classes and skills sessions in addition to appropriately-paced traditional lectures. Some elements of supported eLearning will be used to develop independent-learning skills necessary for later professional studies. Assessment will be via course work, computational exercises, projects and written exams. In contrast to the MSc's mini-projects present in each module, the BSc follows the model used by other undergraduate programmes by having a single supervisor led final-year project (although some limited use of mini projects will be made in particular BSc modules).

13. Indications of programme quality
See section 8

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 1: Programme structure see attached regulations
All programmes to formally include range of non-credit bearing attendance only activities for careers, student support etc.:
MA1903 – House hours
MA1902- Peer support

Appendix 2: Module specifications
See module specification database: http://www.le.ac.uk/sas/courses/documentation

Appendix 3: Skills matrix

BSc MATHEMATICS AND ACTUARIAL SCIENCE

FIRST YEAR MODULES

SEMESTER 1

Core Modules			**Credits**
MA1012	CALCULUS AND ANALYSIS I		10
MA1112	LINEAR ALGEBRA I		20
MA1061	PROBABILITY		10
EC1000	MICROECONOMICS I		20
		Semester Total	**60**

SEMESTER 2

Core Modules			**Credits**
MA1013	CALCULUS AND ANALYSIS II		20
MA1113	LINEAR ALGEBRA II		10
MA1202	INTRODUCTORY STATISTICS		10
EC1001	MACROECONOMICS II		20
		Semester Total	**60**

SECOND YEAR MODULES

SEMESTER 1

Core Modules			**Credits**
MA2401	CASH-FLOW ANALYSIS AND INTEREST		20
MA2404	PRINCIPLES OF FINANCIAL MODELLING		20
MA2414	MORTALITY MODELLING		10
MA2252	INTRODUCTION TO COMPUTING		10
		Semester Total	**60**

SEMESTER 2

Core Modules			**Credits**
MA2262	LINEAR STATISTICAL MODELS		10
MA2512	APPLIED ECONOMETRICS		10
MA2266	APPLIED STATISTICS		20
MA2402	FINANCE AND FINANCE REPORTING		20
		Semester Total	**60**

THIRD YEAR MODULES

SEMESTER 1

Core Modules			**Credits**
MA3071	FINANCIAL MATHEMATICS 1		20
MA3206	ACTUARIAL STATISTICS		20
MA3514	PROFESSIONAL SKILLS		10
MA3515	ACTUARIAL MATHEMATICS PROJECT		10
		Semester Total	**60**

SEMESTER 2

Core Modules			**Credits**
MA3405	ACTUARIAL PRODUCTS AND LIABILITIES		20
MA3418	FINANCIAL ENGINEERING		20
MA3515	ACTUARIAL MATHEMATICS PROJECT		20
		Semester Total	**60**