UNIVERSITY OF LEICESTER

Programme Specification (Postgraduate)

Date created/amended: 11/03/20

1. Programme title(s):

MSc/PG Dip/PG Cert* Actuarial Science with Data Analytics

*Exit Award only

2. Awarding body or institution:

University of Leicester

3. a) Mode of study:

Full-time

b) Type of study:

On campus

4. Registration periods:

MSc Actuarial Science with Data Analytics
The normal period of registration for this programme is 24 months.
The maximum period of registration for this programme is 48 months.

PGDip Actuarial Science with Data Analytics
The normal period of registration for this programme is 9 months.
The maximum period of registration for this programme is 18 months.

5. Typical entry requirements:

At least a 2:1 in a relevant subject (Mathematics, Statistics, Sciences, Economics). Graduates from other subjects will be considered on an individual basis and students will need to demonstrate their ability in mathematics is at an appropriate level if do not have at least a B at A Level. English at IELTS 6.0 or equivalent.

6. Accreditation of Prior Learning:

APL will not be accepted for exemptions from individual modules, however the optional nature of the module structure will allow students to tailor the programme to suit their individual needs.

7. Programme aims:

The programme aims to:

- provide an education and training in actuarial science consistent with the Institute and Faculty of Actuaries' Core Principles and Core Practice competencies;
- 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;
- develop the ability to complete independent project work and foster the skill of application of mathematical tools in a financial context.
- develop students' career management and development skills.

8. Reference points used to inform the programme specification:

- https://www2.le.ac.uk/offices/sas2/quality/learnteach#discovery-led-and-discovery-enabling-learning-strategy
- University of Leicester Periodic Developmental Review Report
- External Examiners' reports (annual)
- QAA Framework for Higher Education Qualifications in England, Wales and Northern Ireland
- University Employability Strategy
- Graduate Survey (annual)
- Annual student surveys
- Professional organisations (Institute and Faculty of Actuaries)
- Employer contacts, including the employer steering board

9. Programme Outcomes:

Unless otherwise stated, programme outcomes apply to all awards specified in 1. Programme title(s).

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
(a) Discipline specific knowledge and competencies		
Knowledge		
Develop theoretical knowledge and the ability to apply theory to data. Develop knowledge of key techniques and algorithms in actuarial science and finance. Develop knowledge of computing languages and software. Develop knowledge of mathematical and statistical techniques that are of particular relevance to actuarial work and the financial sector. Develop knowledge of the principles of modelling as applied to actuarial work Develop a working knowledge of corporate finance Develop knowledge of risk management techniques and processes required by all actuaries	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 projects.
Concepts		
Show understanding of the theory underlying methods and models via novel applications of knowledge and exposition of logical structure. Demonstrate ability to generalise and specialise. Develop a general understanding of the business, commercial, social and natural environment	Lectures, tutorials, problem classes, marked assignments. Computer practical classes.	Written examination, assessed problems, project report. Assessed practical classes.

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
Techniques		
Demonstrate ability to apply theory to data through mathematical modelling. Use applications of computer algorithms for solving finance problems. Apply technical and business skills and combine them with Knowledge developed on how skills are applied to solve real world problems.	Lectures, tutorials, problem classes, marked assignments. Computer practical classes.	Written examination, assessed problems, project report. Assessed practical classes.
Critical analysis		
Critically appraise solutions. Analyse and solve `messily defined' finance and management problems. Critically evaluate financial theories. Analyse core economic principles and how these can be used in a business environment to help decision making	Project supervision. Lectures, problem classes, feedback on assessed problems.	Project reports. Written examinations, assessed problems
Presentation		
Present results (both informal and to a variety of audiences) Participate in mathematical, financial and economic discussions. Write coherent reports.	Tutorials, Group workshops, Presentation workshops, project supervision. Feedback on assessed written pieces.	Group presentations. Project presentations. Assessed reports. Assessed questions.

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
Appraisal of evidence		
Critically evaluate financial theories. Present results (both informally and to a variety of audiences) Participate in mathematical, financial and economic discussions. Write coherent reports. Conduct background research and literature surveys. Summarise content from information sources.	Resource based learning. Guest speakers. Induction library session. Project supervision.	Examinations, assessed problems, project assessments. Meeting deadlines. Project reports.
(b) Transferable skills		
Research skills		
Conduct background research and literature surveys. Summarise content from information sources. Develop ability to learn in DL mode, including elearning.	Project supervision. Readings in actuarial science tutorials .	Individual project reports. Module assessment.
Communication skills		
Critically review own written or oral communication skills Demonstrate ability to choose an appropriate format for communication Write coherent reports Present technical information to peers and tutors and communicating technical information and mathematical arguments in an appropriate form for a given audience Develop ability to communicate with other financial professionals	Tutorials, workshops. Project supervision, presentation workshops.	Presentation assessment. Assessed reports. Assessed questions.

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
Data presentation		
Demonstrate ability to choose an appropriate format for communication Write coherent reports Present technical information to peers and tutors and communicating technical information and mathematical arguments in an appropriate form for a given audience	Project supervisions. Tutorials.	Assessed reports. Assessed questions.
Information technology		
Perform statistical analyses and estimate actuarial quantities and model parameters using Excel and R. Develop the ability to work with an unfamiliar software package quickly	Induction. Laboratories. Use of specialist packages on placement Lab classes, and purpose designed handbooks. Group projects. Project and lectures, eLearning.	Marked project work. Project reports. Written examinations and presentations.
Problem solving		
Develop key problem solving skills: • Problem definition • Analysis • Synthesis • Mathematical modelling • Judgement Construct coherent analysis and solutions for `messily defined' problems in an industrial setting	Lectures, problem workshops, group work, projects.	Marked problems, group work assessment, project assessment.
Working relationships		
Participate in mathematical, financial and economic discussions. Develop project management, organizational and time management skills Work with other team members to identify, distribute and undertake tasks necessary to complete a project Communicate effectively with other team members to ensure effective operation of the team	Group problem solving. Group projects.	Group assessment.

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
Managing learning		
Develop independent learning techniques and time management. Develop information retrieval skills	Resource based learning. Study skills booklet. Induction library session. Project supervision.	Examinations, assessed problems, project assessments. Meeting deadlines. Project reports.
Career management		
Develop awareness of careers and business Develop information retrieval skills	Resource based learning. Careers workshops. Business based project. Guest speakers. Project supervision.	Examinations, assessed problems, project assessments. Meeting deadlines. Project reports. Destinations data.

10. Special features

The accreditation agreement with the Institute and Faculty of Actuaries has two routes to exemptions:

1. An overall exemption across all accredited modules (defined as all modules mapped to an actuarial subject in Appendix 1 plus MA7419 Data Science for Actuaries and MA7420 Readings in Actuarial Science (where applicable)), with a minimum of 90 accredited credits taken for the Postgraduate Diploma and 120 accredited credits for the MSc, achieved by a minimum overall mark of 60% on the accredited modules taken.
2. For those students not achieving the overall exemption requirements, subject by subject exemptions will be available based on the mappings indicated in Appendix 1, subject to a minimum mark on each actuarial subject mapping as determined by the IFoA's Independent Examiner at the Board of Examiners each year.

Despite both being accredited by the Institute and Faculty of Actuaries, the MSc differs significantly from the BSc Mathematics and Actuarial Science. 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. The MSc also offers students the opportunity to gain exemptions from the IFoA's Core Practice subjects which are at too advanced a level to be offered via a BSc programme.

The MSc programme will be taught using computer classes, problem classes, skills sessions, supervision while undertaking extensive project and dissertation work as well as lectures. Some elements of supported eLearning will be used to refresh mathematical skills as necessary. Assessment will be via course work, computational exercises, projects and written exams. In addition to the mini-projects present in each module, the MSc offers a single supervisor led summer project to gain exemptions from Core Practice subjects 2 and 3.

11. Indicators of programme quality

QAA subject review [www/qaa.org/], external examiners reports, dispensation from professional qualifications.

12. Scheme of Assessment:

As defined in Senate Regulation 6: Regulations governing taught postgraduate programmes of study.

13. Progression points

As defined in Senate Regulation 6: Regulations governing taught postgraduate programmes of study.

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.

15. External Examiners reports

The details of the External Examiners for this programme and the most recent External Examiners' reports can be found here.

16. Additional features (e.g. timetable for admissions)

Programme to formally include range of non-credit bearing attendance only activities for careers, student support etc.:
MA7903 – Personal tutor hours
MA7902 – VBA
MA7901 – SAS
MA0005 – Mathematical and Statistical Skills
MA7421 – Actuarial Professional Skills and Employability

Appendix 1: Programme structure (programme regulations)

Students choose 3 credit bearing modules (= 45cr) in semester 1 and choose 4 credit bearing modules (=60cr) in semester 2

SEMESTER ONE	SEMESTER TWO
CORE	**CORE**
MA7419 Fundamentals of Data Science (15cr)	
OPTIONS	**OPTIONS**
MA0005 Mathematical and Statistical Skills (0cr)	MA7402 (CB1) Business Finance (15cr)
MA7401 (CM1) Actuarial Modelling 1 (15cr)	MA7405 (CM1) Actuarial Modelling 2 (15cr)
MA7404 (CS2) Markov Processes (15cr)	MA7414 (CS2) Survival Models (15cr)
MA7403 (CS1) Statistical Distributions and Inference (15cr)	MA7206 (CS1) Statistical Data Analysis (15cr)
MA7071 (CM2) Financial Mathematics I (15cr)	MA7266 (CM2) Liability Modelling (15cr)
MA7411 (CB2) Business Microeconomics (15cr)	MA7412 (CB2) Business Macroeconomics (15cr)
MA7421 Actuarial Professional Skills and Employability (0cr)	MA7021 Generalised Linear Models (15cr)
MA7077 Operational Research (15cr)	MA7022 Data Mining and Neural Networks (15cr)
GY7701 Fundamentals of GIS (15cr)*	MA7072 Financial Mathematics II (15cr)
	MA7434 Actuarial Practice Workshop (0cr)
	GY7707 Geospatial Data Analytics (15cr)*

***Note** – students who choose GY7707 in semester 2 must choose GY7701 in semester 1 as GY7701 and MA7419 are pre-requisites for GY7707.

Award of Postgraduate Diploma possible at end of Semester 2 for students not progressing to summer modules, allowing exemptions from actuarial Core Principles subjects dependent on performance in line with the accreditation agreement. Award of Postgraduate Certificate is an exit award for which no exemptions are available.

Progression points:
These are in line with regulations governing postgraduate programmes of study (www.le.ac.uk/senate-regulation6) in respect of a MSc programme at the University following the 150 taught credits and a 30 credit dissertation or research project model. Some summer modules have pre-requisites dictated by the accreditation agreement with the Institute and Faculty of Actuaries which determines the requirements for exemptions from specific subjects of the actuarial qualifications. These have been indicated where relevant on the module specifications.

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Summer modules for MSc Actuarial Science

CORE
MA7423 (CP2) Actuarial Modelling Project (15cr)
MA7422 (CP3) Actuarial Communications Project (15cr)
OPTIONS – Students choose one of the following:

MA7433 (CB2) Business Economics (30cr) (distance learning)
MA7413 (CP1) Actuarial Practice 1 (30cr)
MA7910 Readings about Green Economics (30cr)

Appendix 2: Module specifications

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