Programme Specification (Postgraduate)

FOR ENTRY YEAR: 2022/23

Date created: 23/04/2021 **Last amended:** 23/04/2021 **Version no.** 1

1. Programme title(s) and code(s)

MSc/PGDip*/PGCert* Actuarial Science with Data Analytics
* Exit award only

HECOS Code

HECOS Code	%

2. Awarding body or institution

University of Leicester

3. a) Mode of study

Full-time

b) Type of study

Campus-based

4. Registration periods

MSc Actuarial Science with Data Analytics
The normal period of registration is 24 months

The maximum period of registration is 48 months

PGDip Actuarial Science with Data Analytics

The normal period of registration is 9 months

The maximum period of registration 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

- QAA Benchmarking Statement
- Framework for Higher Education Qualifications (FHEQ)
- UK Quality Code for Higher Education
- University Learning Strategy
- University Assessment Strategy
- University of Leicester Periodic Developmental Review Report
- External Examiners' reports (annual)
- United Nations Education for Sustainable Development Goals
- Student Destinations Data
- 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).

a) Discipline specific knowledge and competencies

i) Knowledge

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
Develop theoretical knowledge and the ability to apply theory to data.	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.
Develop knowledge of key techniques and algorithms in actuarial science and finance.	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
Develop knowledge of 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 projects.

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
Develop knowledge of mathematical and statistical techniques that are of particular relevance to actuarial work and the financial sector.	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.
Develop knowledge of the principles of modelling as applied to actuarial work	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.
Develop a working knowledge of corporate finance	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.
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.

ii) Concepts

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
Show understanding of the theory underlying methods and models via novel applications of knowledge and exposition of logical structure.	Lectures, tutorials, problem classes, marked assignments. Computer practical classes.	Written examination, assessed problems, project report. Assessed practical classes.
Demonstrate ability to generalise and specialise.	Lectures, tutorials, problem classes, marked assignments. Computer practical classes.	Written examination, assessed problems, project report. Assessed practical classes.
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.

iii) Techniques

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
Demonstrate ability to apply theory to data through mathematical modelling.	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?
Use applications of computer algorithms for solving finance problems.	Lectures, tutorials, problem classes, marked assignments. Computer practical classes	Written examination, assessed problems, project report. Assessed practical classes.
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.

iv) Critical analysis

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
Critically appraise solutions.	Project supervision. Lectures, problem classes, feedback on assessed problems.	Project reports. Written examinations, assessed problems
Analyse and solve `messily defined' finance and management problems.	Project supervision. Lectures, problem classes, feedback on assessed problems.	Project reports. Written examinations, assessed problems
Critically evaluate financial theories.	Project supervision. Lectures, problem classes, feedback on assessed problems.	Project reports. Written examinations, assessed problems
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

v) Presentation

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
Present results (both informal and to a variety of audiences)	Tutorials, Group workshops, Presentation workshops, project supervision. Feedback on assessed written pieces.	Group presentations. Project presentations.
Participate in mathematical, financial and economic discussions.	Tutorials, Group workshops, Presentation workshops, project supervision. Feedback on assessed written pieces.	Assessed questions
Write coherent reports.	Tutorials, Group workshops, Presentation workshops, project supervision. Feedback on assessed written pieces.	Assessed reports.

vi) Appraisal of evidence

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
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

i) Research skills

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
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.

ii) Communication skills

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
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.

iii) Data presentation

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
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.

iv) Information technology

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
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.

v) Problem solving

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
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.

vi) Working relationships

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
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.

vii) Managing learning

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
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.

viii) Career management

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
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 (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. Criteria for award and classification

This programme follows the standard scheme of taught postgraduate award and classification set out in Senate Regulations – see the version of *Senate Regulation 6 governing taught postgraduate programmes of study* relevant to year of entry.

13. Progression points

As defined in Senate Regulations - refer to the version of *Senate Regulation 6 governing taught postgraduate programmes of study* relevant to year of entry.

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/exit award where appropriate.

14. Rules relating to re-sits or re-submissions

As defined in Senate Regulations - refer to the version of *Senate Regulation 6 governing taught postgraduate programmes of study* relevant to year of entry.

15. External Examiners reports

The details of the External Examiner(s) for this programme and the most recent External Examiners' reports for this programme can be found at exampapers@Leicester [log-in required]

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.:
MA0005 – Mathematical and Statistical Skills
MA7421 – Actuarial Professional Skills and Employability

UNIVERSITY OF LEICESTER

Programme Specification (Postgraduate) FOR ENTRY YEAR: 2021/22

Date created: 21/04/2021 **Last amended:** 21/04/2021 **Version no.** 3

Appendix 1: Programme structure (programme regulations)

The University regularly reviews its programmes and modules to ensure that they reflect the current status of the discipline and offer the best learning experience to students. On occasion, it may be necessary to alter particular aspects of a course or module.

Credit breakdown

Status	Year long	Semester 1	Semester 2	Other delivery period
Core taught	n/a	15 credits	n/a	n/a
Optional	n/a	45 credits	60 credits	n/a
Dissertation/project	n/a	n/a	n/a	60 credits

180 credits in total

Level 7/Year 1 2022/23

Core modules

Delivery period	Code	Title	Credits
Semester 1	MA7419	Fundamentals of Data Science	15 credits
Summer	MA7422	(CP3) Actuarial Communications Project	30 Credits
Choose one of the following:			
Summer	MA7433	(CB2) Business Economics (30cr) (distance learning)	30 Credits
Summer	MA7413	(CP1) Actuarial Practice 1 (30cr)	30 Credits
Summer	MA7910	Readings about Green Economics	30 Credits

Notes
n/a

Option modules

Delivery period	Code	Title	Credits
Semester 1	MA0005	Mathematical and Statistical Skills	n/a
Semester 1	MA7401	(CM1) Actuarial Modelling 1	15 credits
Semester 1	MA7404	(CS2) Markov Processes	15 credits
Semester 1	MA7403	(CS1) Statistical Distributions and Inference	15 credits
Semester 1	MA7471	Financial Engineering for Actuaries	15 credits
Semester 1	MA7411	(CB2) Business Microeconomics	15 credits
Semester 1	MA7421	Actuarial Professional Skills and Employability	15 credits
Semester 1	MA7077	Operational Research	15 credits
Semester 1	GY7701	Fundamentals of GIS*	15 credits
Semester 2	MA7402	(CB1) Business Finance	n/a
Semester 2	MA7405	(CM1) Actuarial Modelling 2	15 credits
Semester 2	MA7414	(CS2) Survival Models	15 credits
Semester 2	MA7206	(CS1) Statistical Data Analysis	15 credits
Semester 2	MA7266	(CM2) Liability Modelling	15 credits
Semester 2	MA7412	(CB2) Business Macroeconomics	15 credits
Semester 2	MA7021	Generalised Linear Models	15 credits
Semester 2	MA7022	Data Mining and Neural Networks	15 credits
Semester 2	MA7434	Actuarial Practice Workshop	15 credits
Semester 2	GY7707	Geospatial Data Analytics*	15 credits

Notes
This is an indicative list of option modules and not definitive of what will be available. Option module choice is also subject to availability, timetabling, student number restrictions and, where appropriate, students having taken appropriate pre-requisite modules.

* 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.

Updates to the programme

Academic year affected	Module Code(s)	Update

Appendix 2: Module specifications

See taught postgraduate module specification database (Note - modules are organized by year of delivery).