ACST819

Actuarial Modelling

S2 Day 2019

Department of Actuarial Studies and Business Analytics

Contents

Disclaimer

Macquarie University has taken all reasonable measures to ensure the information in this publication is accurate and up-to-date. However, the information may change or become out-dated as a result of change in University policies, procedures or rules. The University reserves the right to make changes to any information in this publication without notice. Users of this publication are advised to check the website version of this publication [or the relevant faculty or department] before acting on any information in this publication.

General Information

Unit convenor and teaching staff
Unit convenor and teaching staff
Jackie Li
jackie.li@mq.edu.au
Contact via Email
E4A 610
Mondays 4pm-5pm during teaching weeks

Teaching staff
Bruce Edwards
bruce.edwards@mq.edu.au
Contact via Email
-
Refer to iLearn

Credit points
4

Prerequisites
STAT806 or STAT810

Corequisites

Co-badged status

Unit description
Survival models will be used to estimate decrement rates from actual experience, compare these with standard rates, and prepare new tables. In constructing new tables, consideration will be given to risk factors; selection; data collection; graduation; and testing the graduation. The concept of actuarial modelling will be discussed. The 'actuarial control cycle', a conceptual framework of the processes for developing and managing financial enterprises and products, will be introduced. Students gaining a grade of credit or higher in this unit and ACST818 may apply for exemption from subject CT4 of the professional exams of the Institute of Actuaries of Australia.

Important Academic Dates

Information about important academic dates including deadlines for withdrawing from units are available at https://www.mq.edu.au/study/calendar-of-dates

Learning Outcomes

On successful completion of this unit, you will be able to:

Describe the principles of actuarial modelling and apply them to common actuarial problems both individually and in a team environment.

Identify the most significant risks for various types of financial institutions and compare ways of managing these risks.

Discuss the concept of the Actuarial Control Cycle and apply it to a variety of straightforward practical commercial situations. Identify ethical and professional issues in actuarial and insurance practice.

Describe how to test crude estimates for consistency with a standard table or a set of graduated estimates and describe the process of graduation. Develop research skills associated with this learning outcome.

Use the binomial and Poisson models for mortality. Derive the maximum likelihood estimator for the model parameter. Describe how to estimate transition intensities depending on age, exactly or using the census approximation. Develop research skills associated with this learning outcome.

General Assessment Information

It is the responsibility of students to view their marks for each within session assessment on iLearn within 20 working days of posting. If there are any discrepancies, students must contact the unit convenor immediately. Failure to do so will mean that queries received after the release of final results regarding assessment marks (not including the final exam mark) will not be addressed.

Assessment Tasks

Name	Weighting	Hurdle	Due
Class Test	20%	No	Week 7
Group Project	20%	No	Week 3 and Weeks 8 to 13
Final Examination	60%	No	Examination Period

Class Test

Due: **Week 7**
Weighting: **20%**

Test will cover Weeks 1 to 5 materials. You will have 1 hour and 15 minutes to complete the test. It will be conducted in a lecture.

No extensions will be granted. Students who do not attend the test will be awarded a mark of 0, unless an application for special consideration is made and approved.

Assessment criteria will be provided on iLearn.

On successful completion you will be able to:

- Describe how to test crude estimates for consistency with a standard table or a set of graduated estimates and describe the process of graduation. Develop research skills associated with this learning outcome.
- Use the binomial and Poisson models for mortality. Derive the maximum likelihood estimator for the model parameter. Describe how to estimate transition intensities depending on age, exactly or using the census approximation. Develop research skills associated with this learning outcome.

Group Project

Due: **Week 3 and Weeks 8 to 13**
Weighting: **20%**

A project requiring data analysis, investigation, and professional judgement along with a detailed written report and presentation will be required. Note that 50% of the marks will be allocated to individual performance.

No extensions will be granted. There will be a deduction of 10% of the total available marks made from the total awarded mark for each 24 hour period or part thereof that the submission is late (for example, 25 hours late in submission – 20% penalty). This penalty does not apply for cases in which an application for special consideration is made and approved. No submission will be accepted after solutions are posted.

Assessment criteria will be provided on iLearn.

Project submission is via iLearn.

On successful completion you will be able to:

- Describe the principles of actuarial modelling and apply them to common actuarial problems both individually and in a team environment.
- Identify the most significant risks for various types of financial institutions and compare ways of managing these risks.
- Discuss the concept of the Actuarial Control Cycle and apply it to a variety of straightforward practical commercial situations. Identify ethical and professional issues in actuarial and insurance practice.

Final Examination

Due: **Examination Period**
Weighting: **60%**

A three-hour written exam will be held during the normal university examination period. Questions will cover the entire unit.

You are permitted ONE A4 page of paper containing reference material printed on both sides. The material may be handwritten or typed. The page will not be returned to you at the end of the final examination.

You are given ten minutes reading time.

On successful completion you will be able to:

- Describe the principles of actuarial modelling and apply them to common actuarial problems both individually and in a team environment.
- Identify the most significant risks for various types of financial institutions and compare ways of managing these risks.
- Discuss the concept of the Actuarial Control Cycle and apply it to a variety of straightforward practical commercial situations. Identify ethical and professional issues in actuarial and insurance practice.
- Describe how to test crude estimates for consistency with a standard table or a set of graduated estimates and describe the process of graduation. Develop research skills associated with this learning outcome.
- Use the binomial and Poisson models for mortality. Derive the maximum likelihood estimator for the model parameter. Describe how to estimate transition intensities depending on age, exactly or using the census approximation. Develop research skills associated with this learning outcome.

Delivery and Resources

The timetables for classes can be found on the University website at:

https://timetables.mq.edu.au/2019/

Tutorials will commence in Week 2 of the session.

Lecture handouts are available for download from the website in advance of lecture classes. It is expected that you will print these notes and bring them to the relevant lectures.

You will be required to use the teaching website, Word, PDF, R, and Excel.

Course materials are available on iLearn. To access the website, go to http://ilearn.mq.edu.au and log in using your usual login and password.

Unit Schedule

Week   Topic

1   Exposed to Risk

2   Exposed to Risk

3   Exposed to Risk

4   Exposed to Risk

5   Statistical Tests

6   Graduation

7   Class Test

8   Control Cycle

9   Control Cycle

10   Control Cycle

11   Control Cycle

12   Control Cycle

13   Revision

Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central (https://staff.m
q.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-centr
al). Students should be aware of the following policies in particular with regard to Learning and
Teaching:

- Academic Appeals Policy
- Academic Integrity Policy
- Academic Progression Policy
- Assessment Policy
- Fitness to Practice Procedure
- Grade Appeal Policy
- Complaint Management Procedure for Students and Members of the Public
- Special Consideration Policy *(**Note:** The Special Consideration Policy is effective from 4 December 2017 and replaces the Disruption to Studies Policy.)*

Undergraduate students seeking more policy resources can visit the Student Policy Gateway (htt
ps://students.mq.edu.au/support/study/student-policy-gateway). It is your one-stop-shop for the
key policies you need to know about throughout your undergraduate student journey.

If you would like to see all the policies relevant to Learning and Teaching visit Policy Central (https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central).

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: https://students.mq.edu.au/study/getting-started/student-conduct

Results

Results published on platform other than eStudent, (eg. iLearn, Coursera etc.) or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be made available in eStudent. For more information visit ask.mq.edu.au or if you are a Global MBA student contact globalmba.support@mq.edu.au

Supplementary exams

Information regarding supplementary exams, including dates, is available at: http://www.businessandeconomics.mq.edu.au/current_students/undergraduate/how_do_i/disruption_to_studies

Student Support

Macquarie University provides a range of support services for students. For details, visit http://students.mq.edu.au/support/

Learning Skills

Learning Skills (mq.edu.au/learningskills) provides academic writing resources and study strategies to improve your marks and take control of your study.

- Workshops
- StudyWise
- Academic Integrity Module for Students
- Ask a Learning Adviser

Student Services and Support

Students with a disability are encouraged to contact the Disability Service who can provide appropriate help with any issues that arise during their studies.

Student Enquiries

For all student enquiries, visit Student Connect at ask.mq.edu.au

If you are a Global MBA student contact globalmba.support@mq.edu.au

IT Help

For help with University computer systems and technology, visit http://www.mq.edu.au/about_us/

offices_and_units/information_technology/help/.

When using the University's IT, you must adhere to the Acceptable Use of IT Resources Policy. The policy applies to all who connect to the MQ network including students.

Graduate Capabilities

PG - Discipline Knowledge and Skills

Our postgraduates will be able to demonstrate a significantly enhanced depth and breadth of knowledge, scholarly understanding, and specific subject content knowledge in their chosen fields.

This graduate capability is supported by:

Learning outcomes

- Describe the principles of actuarial modelling and apply them to common actuarial problems both individually and in a team environment.
- Identify the most significant risks for various types of financial institutions and compare ways of managing these risks.
- Discuss the concept of the Actuarial Control Cycle and apply it to a variety of straightforward practical commercial situations. Identify ethical and professional issues in actuarial and insurance practice.
- Describe how to test crude estimates for consistency with a standard table or a set of graduated estimates and describe the process of graduation. Develop research skills associated with this learning outcome.
- Use the binomial and Poisson models for mortality. Derive the maximum likelihood estimator for the model parameter. Describe how to estimate transition intensities depending on age, exactly or using the census approximation. Develop research skills associated with this learning outcome.

Assessment tasks

- Class Test
- Group Project
- Final Examination

PG - Critical, Analytical and Integrative Thinking

Our postgraduates will be capable of utilising and reflecting on prior knowledge and experience, of applying higher level critical thinking skills, and of integrating and synthesising learning and knowledge from a range of sources and environments. A characteristic of this form of thinking is the generation of new, professionally oriented knowledge through personal or group-based critique of practice and theory.

This graduate capability is supported by:

Learning outcomes

- Describe the principles of actuarial modelling and apply them to common actuarial problems both individually and in a team environment.
- Identify the most significant risks for various types of financial institutions and compare ways of managing these risks.
- Discuss the concept of the Actuarial Control Cycle and apply it to a variety of straightforward practical commercial situations. Identify ethical and professional issues in actuarial and insurance practice.
- Describe how to test crude estimates for consistency with a standard table or a set of graduated estimates and describe the process of graduation. Develop research skills associated with this learning outcome.
- Use the binomial and Poisson models for mortality. Derive the maximum likelihood estimator for the model parameter. Describe how to estimate transition intensities depending on age, exactly or using the census approximation. Develop research skills associated with this learning outcome.

Assessment tasks

- Class Test
- Group Project
- Final Examination

PG - Effective Communication

Our postgraduates will be able to communicate effectively and convey their views to different social, cultural, and professional audiences. They will be able to use a variety of technologically supported media to communicate with empathy using a range of written, spoken or visual formats.

This graduate capability is supported by:

Learning outcomes

- Describe the principles of actuarial modelling and apply them to common actuarial problems both individually and in a team environment.
- Identify the most significant risks for various types of financial institutions and compare ways of managing these risks.
- Discuss the concept of the Actuarial Control Cycle and apply it to a variety of straightforward practical commercial situations. Identify ethical and professional issues in actuarial and insurance practice.

Assessment tasks

- Group Project
- Final Examination