



ACST840

Quantitative Research Methods II

S2 Day 2018

Archive (Pre-2019) - Dept of Applied Finance and Actuarial Studies

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General Information

Unit convenor and teaching staff

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Lecturer

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Credit points

4

Prerequisites

(Admission to MActPrac or (admission to MCom in Actuarial Studies and 16cp)) and (STAT810 or STAT806)

Corequisites

Co-badged status

Unit description

This unit focuses on statistical approaches for research in Business and Economics and related disciplines. Topics include a range of probability and statistical models, their theoretical basis, the assessment and evaluation of the models, and methods of statistical inference for data analysis. The unit will also consider applications of the above models and techniques to the actuarial practice discipline.

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:

Understand the theoretical basis of a range of statistical models used in actuarial research and the practice of modelling and inference using statistical models.

Critique, replicate and extend basic actuarial research using statistical models.

Ask questions and communicate problems relating to statistical models, and to explain and discuss ideas relating to implementation of statistical models.

Understand how a variety of statistical models are used in actuarial research and how empirical results are communicated in practice.

Using statistical software R to solve actuarial problems

General Assessment Information

Assessment Marks

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 Criteria

Assessment criteria for all assessment tasks will be provided on the unit iLearn site.

Final Examination

This unit does not have a final examination.

Assessment Tasks

Name	Weighting	Hurdle	Due
Assignment 1	10%	No	20 Aug 2018
Project 1	40%	No	24 Sep 2018
Assignment 2	25%	No	25 Oct 2018
Assignment 3	25%	No	14 Nov 2017

Assignment 1

Due: **20 Aug 2018**

Weighting: **10%**

Assignment 1 consists of conceptual and problem-solving questions

Submit the answers in PDF file via Turnitin on iLearn by 5pm on Monday 20 August 2018.

No extensions will be granted. Students who have not submitted the task prior to the deadline will be awarded a mark of 0 for the task, except for cases in which an application for special consideration is made and approved.

On successful completion you will be able to:

- Understand the theoretical basis of a range of statistical models used in actuarial research and the practice of modelling and inference using statistical models.
- Critique, replicate and extend basic actuarial research using statistical models.

Project 1

Due: **24 Sep 2018**

Weighting: **40%**

Project 1 consists of two parts:

Part 1: Problem solving questions

Part 2: A project report

Submit the project in PDF file via Turnitin on iLearn by 5pm on Monday 24 September 2018.

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 have been posted.

On successful completion you will be able to:

- Understand the theoretical basis of a range of statistical models used in actuarial research and the practice of modelling and inference using statistical models.
- Critique, replicate and extend basic actuarial research using statistical models.
- Ask questions and communicate problems relating to statistical models, and to explain and discuss ideas relating to implementation of statistical models.
- Understand how a variety of statistical models are used in actuarial research and how empirical results are communicated in practice.

Assignment 2

Due: **25 Oct 2018**

Weighting: **25%**

Assignment 2 consists of conceptual and problem-solving questions

Submit the answers in PDF file via Turnitin on iLearn by 5pm, 25 October 2018.

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 have been posted.

On successful completion you will be able to:

- Understand the theoretical basis of a range of statistical models used in actuarial research and the practice of modelling and inference using statistical models.
- Critique, replicate and extend basic actuarial research using statistical models.
- Ask questions and communicate problems relating to statistical models, and to explain and discuss ideas relating to implementation of statistical models.
- Understand how a variety of statistical models are used in actuarial research and how empirical results are communicated in practice.
- Using statistical software R to solve actuarial problems

Assignment 3

Due: **14 Nov 2017**

Weighting: **25%**

Assignment 3 consists of conceptual and problem-solving questions

Submit the answers in PDF file via Turnitin on iLearn by 5pm, 14 November 2018.

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 have been posted.

On successful completion you will be able to:

- Understand the theoretical basis of a range of statistical models used in actuarial research and the practice of modelling and inference using statistical models.
- Critique, replicate and extend basic actuarial research using statistical models.
- Ask questions and communicate problems relating to statistical models, and to explain and discuss ideas relating to implementation of statistical models.
- Understand how a variety of statistical models are used in actuarial research and how empirical results are communicated in practice.
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Delivery and Resources

Classes

- This unit is taught through 3 hours of lectures per week.
- The timetable for classes can be found on the University web site at: <http://www.timetables.mq.edu.au/2018/>

Unit Web Page

- The web page for this unit can be found at: <http://ilearn.mq.edu.au>

Technology Used and required

- You will need access to the internet to obtain course information and download teaching materials from the unit website.
- It is your responsibility to check the unit website regularly to make sure that you are up-to-date with the information for the unit.

Required and Recommended Texts and/or Materials

For weeks 1-7:

- Lecture Notes are required materials and will be posted on the website before the lectures.
- The references listed in Lecture Notes are recommended materials. Some of them will be posted on the website and others are available via the library.

For weeks 8-13:

- Lecture Notes/Slides are required materials and will be posted on the website before the lectures.
- The references listed in Lecture Notes are recommended materials. Some of them will be posted on the website and others are available via the library.
- Statistical software R with R-studio will be used for demonstration and numerical examples

Unit Schedule

The following is a tentative schedule only. It will be adjusted from time to time.

Week 1: Survival models and estimation of survival distribution with long-term survivors

Week 2: Asymptotic theory; testing for the presence of long-term survivors

Week 3: Nonparametric statistical methods; one-sample location problem

Week 4: Two-sample location and dispersion problems

Week 5: Two-sample dispersion problem; bootstrap estimation

Week 6: Part 1 of Project 1

Week 7: Part 2 of Project 1

Week 8: Bayesian methods - model estimation

Week 9: Bayesian methods - combining different data sources

Week 10: Dependence modelling

Week 11: Machine learning methods - Clustering

Week 12: Machine learning methods - Poisson Regression Trees

Week 13: Machine learning methods - Poisson Regression Trees

Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central \(https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central\)](https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central). 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 \(https://students.mq.edu.au/support/study/student-policy-gateway\)](https://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 \(https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central\)](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 shown in *iLearn*, 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](#).

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

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

- Understand the theoretical basis of a range of statistical models used in actuarial research and the practice of modelling and inference using statistical models.
- Critique, replicate and extend basic actuarial research using statistical models.

- Ask questions and communicate problems relating to statistical models, and to explain and discuss ideas relating to implementation of statistical models.
- Understand how a variety of statistical models are used in actuarial research and how empirical results are communicated in practice.
- Using statistical software R to solve actuarial problems

Assessment tasks

- Assignment 1
- Project 1
- Assignment 2
- Assignment 3

PG - Research and Problem Solving Capability

Our postgraduates will be capable of systematic enquiry; able to use research skills to create new knowledge that can be applied to real world issues, or contribute to a field of study or practice to enhance society. They will be capable of creative questioning, problem finding and problem solving.

This graduate capability is supported by:

Learning outcomes

- Understand the theoretical basis of a range of statistical models used in actuarial research and the practice of modelling and inference using statistical models.
- Critique, replicate and extend basic actuarial research using statistical models.
- Ask questions and communicate problems relating to statistical models, and to explain and discuss ideas relating to implementation of statistical models.
- Understand how a variety of statistical models are used in actuarial research and how empirical results are communicated in practice.
- Using statistical software R to solve actuarial problems

Assessment tasks

- Assignment 1
- Project 1
- Assignment 2
- Assignment 3

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

- Understand the theoretical basis of a range of statistical models used in actuarial research and the practice of modelling and inference using statistical models.
- Critique, replicate and extend basic actuarial research using statistical models.
- Ask questions and communicate problems relating to statistical models, and to explain and discuss ideas relating to implementation of statistical models.
- Understand how a variety of statistical models are used in actuarial research and how empirical results are communicated in practice.
- Using statistical software R to solve actuarial problems

Assessment tasks

- Project 1
- Assignment 2
- Assignment 3