ACST862
General Insurance Pricing and Reserving

Department of Applied Finance and Actuarial Studies
Faculty of Business and Economics

Unit Guide
D2 Day; Offered in Session 2, North Ryde 2012
# Table of Contents

Table of Contents ........................................................................................................ 2  
General Information ................................................................................................. 3  
Convenor and teaching staff ..................................................................................... 3  
Credit Points .................................................................................................................. 3  
Prerequisites .................................................................................................................. 3  
Corequisites ................................................................................................................... 3  
Co-badged status ......................................................................................................... 3  
Unit Description ............................................................................................................ 3  
Learning Outcomes ...................................................................................................... 4  
Graduate Capabilities ................................................................................................ 5  
Problem Solving and Research Capability .................................................................. 5  
Discipline Specific Knowledge and Skills ...................................................................... 5  
Critical, Analytical and Integrative Thinking ............................................................... 5  
Assessment Tasks ........................................................................................................ 6  
Group Assignment ....................................................................................................... 6  
Final Examination ........................................................................................................ 6  
Class Test ....................................................................................................................... 6  
Unit Schedule ................................................................................................................ 7  
Delivery and Resources .............................................................................................. 8  
Required and Recommended Texts and/or Materials .................................................. 8  
Technology Used and Required ................................................................................... 8  
Teaching and Learning Strategy .................................................................................... 8  
Research and Practice .................................................................................................. 9  
Policies and Procedures .............................................................................................. 9  
Academic Honesty ....................................................................................................... 9  
Grades ............................................................................................................................ 9  
Grading Appeals and Final Examination Script Viewing .............................................. 10  
Special Consideration Policy ...................................................................................... 10  
Student Support .......................................................................................................... 10  
Student Enquiry Service ............................................................................................. 10  
Equity Support ............................................................................................................ 10  
IT Help .......................................................................................................................... 11
General Information

Convenor and teaching staff

Unit Convenor: David Pitt
Email: david.pitt@mq.edu.au
Office: E4A609
Consultation Hours: Wed 10-12

Credit Points
3

Prerequisites
ACST356(P) and STAT271(P)

Corequisites
N/A

Co-badged status
Co-taught with ACST357

Unit Description
This unit examines the use of statistical models in general insurance. The models include those used in time series analysis, generalised linear statistical modelling and runoff triangle models. Time series models are considered for both single and multiple time series. These models are often used for forecasting and inferring the behaviour of times series. Generalised linear models are used in the pricing of insurance such as automobile or home owner insurance. Runoff triangle models are used to predict outstanding insurance liabilities. A good knowledge of the material covered in STAT271 Statistics I is essential. Students should understand regression analysis, and the nature and use of a statistical model. Students gaining a grade of credit or higher in both ACST356 and ACST357 are eligible for exemption from subject CT6 of the professional exams of the Institute of Actuaries of Australia.
Learning Outcomes

At the end of this unit students will have developed the following skills:

1. Use the R statistical software package to conduct statistical analyses of the types covered in this unit.
2. Understand and perform calculations using simple no claim discount systems.
3. Understand and apply the method of maximum likelihood estimation.
4. Understand and apply generalised linear models.
5. Understand simple stationary univariate time series models for description and forecasting. Define the basic multivariate time series models.
6. Understand and apply deterministic and basic stochastic methods for the calculation of outstanding claims provisions in general insurance.
7. Apply knowledge and understanding to a complex problem.
Graduate Capabilities
This unit provides opportunities to develop in the graduate capabilities in the following ways:

Problem Solving and Research Capability
Our graduates should be capable of researching; of analysing, and interpreting and assessing data and information in various forms; of drawing connections across fields of knowledge; and they should be able to relate their knowledge to complex situations at work or in the world, in order to diagnose and solve problems. We want them to have the confidence to take the initiative in doing so, within an awareness of their own limitations.

This graduate capability is supported by:
- Assessment Task Assignment
- Assessment Task Final Examination
- Assessment Task Class Test

Discipline Specific Knowledge and Skills
Our graduates will take with them the intellectual development, depth and breadth of knowledge, scholarly understanding, and specific subject content in their chosen fields to make them competent and confident in their subject or profession. They will be able to demonstrate, where relevant, professional technical competence and meet professional standards. They will be able to articulate the structure of knowledge of their discipline, be able to adapt discipline-specific knowledge to novel situations, and be able to contribute from their discipline to inter-disciplinary solutions to problems.

This graduate capability is supported by:
- Assessment Task Assignment
- Assessment Task Final Examination
- Assessment Task Class Test

Critical, Analytical and Integrative Thinking
We want our graduates to be capable of reasoning, questioning and analysing, and to integrate and synthesise learning and knowledge from a range of sources and environments; to be able to critique constraints, assumptions and limitations; to be able to think independently and systemically in relation to scholarly activity, in the workplace, and in the world. We want them to have a level of scientific and information technology literacy.

This graduate capability is supported by:
- Assessment Task Assignment
- Assessment Task Final Examination
- Assessment Task Class Test
## Assessment Tasks

<table>
<thead>
<tr>
<th>Task</th>
<th>Weight</th>
<th>Due Date</th>
<th>Linked Learning Outcomes</th>
<th>Linked Graduate Capabilities</th>
<th>Brief Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group Assignment</td>
<td>20%</td>
<td>Friday 2 November 4pm</td>
<td>1,2,3,4,5,6,7</td>
<td>1,2,3</td>
<td>Questions involving analysis and written response</td>
</tr>
<tr>
<td>Final Examination</td>
<td>70%</td>
<td>University Examination Period</td>
<td>1,2,3,4,5,6</td>
<td>1,2,3</td>
<td>Three hour final exam covering the entire unit</td>
</tr>
<tr>
<td>Class Test</td>
<td>10%</td>
<td>Wednesday 10 October 8am</td>
<td>1,2,3,4</td>
<td>1,2,3</td>
<td>Test covering up to and including Section 5</td>
</tr>
</tbody>
</table>

**Group Assignment**

Due Date: Friday 2 November 4pm  
Weight: 20%  
Assessment  
Assessed on a pass/fail basis.  
Extension  
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, expect for cases in which an application for special consideration is made and approved.

**Final Examination**

Due Date: University Examination Period  
Weight: 70%  
Examination conditions  
Closed book examination. Formulae sheet will be provided. Students may NOT bring any notes to the examination. Non-programmable calculators with no text-retrieval capacity are allowed.

**Class Test**

Due Date: Wednesday 10 October 8am  
Weight: 10%  
Rules  
Closed book test. Formulae sheet will be provided. Students may NOT bring any notes to the test. Non-programmable calculators with no text-retrieval capacity are allowed.  
Extension  
No subsequent test will be provided for students who do not take the class test.
<table>
<thead>
<tr>
<th>Week</th>
<th>Lecture Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Section 1: Intro to R</td>
</tr>
<tr>
<td>2</td>
<td>Section 2: NCD Systems; Section 3: MLE (Tutorial covers Section 1 Exercises)</td>
</tr>
<tr>
<td>3</td>
<td>Section 3: MLE (Cont) (Tutorial covers Section 2 Exercises)</td>
</tr>
<tr>
<td>4</td>
<td>Section 4: GLM I (Tutorial covers Section 3 Exercises)</td>
</tr>
<tr>
<td>5</td>
<td>Section 5: GLM II (Tutorial covers Section 4 Exercises)</td>
</tr>
<tr>
<td>6</td>
<td>Section 6: Time Series I (Tutorial covers Section 5 Exercises)</td>
</tr>
<tr>
<td>7</td>
<td>Section 7: Time Series II; Mock Test (Tutorial covers non-assessable test (different to mock test) solutions)</td>
</tr>
<tr>
<td>Semester Break</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Section 7: Time Series II (Cont); Section 8: Time Series III (Tutorial covers Section 6 Exercises)</td>
</tr>
<tr>
<td>9</td>
<td>CLASS TEST; Section 8: Time Series III (Cont); (Tutorial covers Section 7 Exercises)</td>
</tr>
<tr>
<td>10</td>
<td>Section 9: Time Series IV; Section 10: Outstanding Claims Provisions: Deterministic (Tutorial covers Section 8 Exercises)</td>
</tr>
<tr>
<td>11</td>
<td>Section 10: Outstanding Claims Provisions: Deterministic (Cont) (Tutorial covers Section 9 Exercises)</td>
</tr>
<tr>
<td>12</td>
<td>Section 11: Outstanding Claims Provisions: Stochastic (Tutorial covers Section 10 Exercises)</td>
</tr>
<tr>
<td>13</td>
<td>Section 11: Outstanding Claims Provisions: Stochastic (Cont); Revision (Tutorial covers Section 11 Exercises)</td>
</tr>
</tbody>
</table>
Delivery and Resources

Classes

The timetable for classes can be found on the University web site at

www.timetables.mq.edu.au.

Required and Recommended Texts and/or Materials

Required texts

Lecture Handouts (i.e. notes with gaps) are available for downloading from the ACST357/862 teaching website.

Optional ActEd material
The ActEd CT6 are not set as required or recommended reading for this unit, since the unit notes are comprehensive and detailed.

Other useful references

Technology Used and Required

MS Excel and MS Word will be used throughout the unit.
The R statistical software package will be used throughout the unit.
Students will be required to use a non-programmable calculator in the final examination and during the in-class test.

Unit Web Page
To access the website, go to http://ilearn.mq.edu.au and login using your usual login and password.

Teaching and Learning Strategy
The unit is taught using three hours of lectures and a weekly tutorial. Tutorials commence in Week 2.
You are expected to read lecture materials in advance of the lectures and to participate actively in the tutorial classes.
Research and Practice

The unit will include some links to research through the use of a group assignment. Professional practice in the area of general insurance will also be discussed during the unit.

Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central. You may find of particular interest those which can be found in the Learning and Teaching category.

Academic Honesty

The nature of scholarly endeavour, dependent as it is on the work of others, binds all members of the University community to abide by the principles of academic honesty. Its fundamental principle is that all staff and students act with integrity in the creation, development, application and use of ideas and information. This means that:

all academic work claimed as original is the work of the author making the claim
all academic collaborations are acknowledged
academic work is not falsified in any way when the ideas of others are used, these ideas are acknowledged appropriately.

Further information on the academic honesty can be found in the Macquarie University Academic Honesty Policy at

http://www.mq.edu.au/policy/docs/academic_honesty/policy.html

Grades

Macquarie University uses the following grades in coursework units of study:

HD - High Distinction
D - Distinction
CR - Credit
P - Pass
F - Fail

Grade descriptors and other information concerning grading are contained in the Macquarie University Grading Policy which is available at:

Grading Appeals and Final Examination Script Viewing

If, at the conclusion of the unit, you have performed below expectations, and are considering lodging an appeal of grade and/or viewing your final exam script please refer to the following website which provides information about these processes and the cut off dates in the first instance. Please read the instructions provided concerning what constitutes a valid grounds for appeal before appealing your grade.

http://www.businessandeconomics.mq.edu.au/
new_and_current_students/undergraduate_current_students/how_do_i/grade_appeals/

Special Consideration Policy

The University is committed to equity and fairness in all aspects of its learning and teaching. In stating this commitment, the University recognises that there may be circumstances where a student is prevented by unavoidable disruption from performing in accordance with their ability. A special consideration policy exists to support students who experience serious and unavoidable disruption such that they do not reach their usual demonstrated performance level. Students should be aware that supplementary examinations that are offered are more difficult than the main round exam. This recognises the fact that students taking supplementary examinations have additional time to prepare.

The SNG recommended based on the performance on a supplementary examination can override the SNG that would have been awarded based on an attempt at the main round examination. The policy is available at:

http://www.mq.edu.au/policy/docs/special_consideration/policy.html

Student Support

Macquarie University provides a range of Academic Student Support Services. Details of these services can be accessed at: http://www.mq.edu.au/currentstudents/.

Student Enquiry Service

Details of these services can be accessed at http://www.student.mq.edu.au/ses/.

Equity Support

Students with a disability are encouraged to contact the Disability Support Unit who can provide appropriate help with any issues that arise during their studies.
IT Help
If you wish to receive IT help, we would be glad to assist you at


When using the university's IT, you must adhere to the Acceptable Use Policy. The policy applies to all who connect to the MQ network including students and it outlines what can be done.