

MACQUARIE
UNIVERSITY



FACULTY OF
BUSINESS AND ECONOMICS

ACST357/862

General Insurance Pricing and
Reserving

Semester 2, year 2010

Department of Actuarial Studies

**MACQUARIE UNIVERSITY
FACULTY OF Business and Economics
UNIT OUTLINE**

Year and Semester: 2010 II

Unit convenor: A/Prof. Tak Kuen (Ken) Siu

[Prerequisites / Corequisites:] ACST356 (P) OR ACST399 (P); AND
STAT271(P) / Corequisites (None)

Credit points: 3

Students in this unit should read this unit outline carefully at the start of semester. It contains important information about the unit. If anything in it is unclear, please consult one of the teaching staff in the unit.

ABOUT THIS UNIT

- Unit description

- (a) The unit comprises three parts.

- 1. *Time Series* (tentatively weeks 1-4);
 - 2. *Generalized Linear Models* (tentatively weeks 5-9); and
 - 3. *Reserves for Outstanding Claims* (tentatively weeks 10-13):

- Unit rationale

- (a) The course will cover most of the material in the second half of the UK Institute of Actuaries' syllabus for Subject CT6 Statistical Methods [topics (vii), (viii), and (ix)].

- (b) Other units recommended for students interested in working in the financial services industry in areas related to the topics in this unit include ECON232 Econometric principles, ECON233 Econometric Analysis, ECON333 Econometric Methods, STAT278 Computer Simulation, and STAT305 Simulation and Forecasting.

TEACHING STAFF

- Convenor (contact details and [consultation hours])

- (a) Contact details:

- A/Prof. Tak Kuen (Ken) Siu, Unit Convenor, Room E4A 618

If you wish to contact Tak Kuen (Ken) Siu, please send an email to ken.siu@mq.edu.au

(b) Consultation hours: Friday 2:00 pm – 4:00 pm (Tentative and may be subject to change)

- Other staffs

(a) Contact details:

A/Prof. David Pitt, Lecturer, Room E4A 609

If you wish to contact David Pitt, please send an email to david.pitt@mq.edu.au

If you have a question about the course content, please post it on the discussion board on the Blackboard. If you are uncertain about some topics, it is likely that other students are also confused. So it may be helpful to all of your classmates if questions and answers are posted on the Blackboard.

- Teaching Assistant

Owen Tong is acting as a teaching assistant for this unit. Please address any enquiries about administration to Owen via the Private Mail facility on the unit website. If he can't answer your question he can pass the message on to the appropriate person.

- Tutors:

Tandy Xu
Xin Yin Ooi

CLASSES

- Number and length of classes:

4 hours face-to-face teaching per week

3 x 1 hour lectures

1 x 1 hour tutorial

- Timetable for Lectures and Tutorials:

Lecture 1: Thursday, 11:00 am – 1:00 pm, C5C T1, 2 hours

Lecture 2: Friday, 12:00 pm – 1:00 pm, C5C T2, 1 hour

Tutorials for ACST 357:

- Tutorial 1: Thursday, 9:00 am – 10:00 am, C5A 310, 1 hour (Tandy)
- Tutorial 2: Friday, 1:00 pm – 2:00 pm, W5A 101, 1 hour (Tandy)
- Tutorial 3: Friday, 1:00 pm – 2:00 pm, C5A 226, 1 hour (Xin Yin)
- Tutorial 4: Friday, 2:00 pm – 3:00 pm, C5A 310, 1 hour (Xin Yin)

Tutorials for ACST 862:

Tutorial 1: Friday, 1:00 pm – 2:00 pm, X5B 13, 1 hour (Ken, time series and GLMs & David, Reserves)

- A statement that: The timetable for classes can be found on the University web site at: <http://www.timetables.mq.edu.au/>
- The lectures will NOT be recorded using i-lecture and posted on the website. However we do NOT recommend you to skip lectures. Skip lectures at your own risk!

REQUIRED AND RECOMMENDED TEXTS AND/OR MATERIALS

- Prescribed unit materials:
 - (a) Time Series Part: Act Ed Study Materials for subject CT6 Statistical Methods (Chapters 12-13)
 - (b) GLMs Part: Act Ed Study Materials for subject CT6 Statistical Methods (Chapter 11)
 - (c) Lecture Notes and Tutorial Exercises: Available on the Blackboard
- Recommended texts:
 - (a) **Time Series Analysis: With Application in R** by Janathan D. Cryer and Kung-Sik Chan, (2008), (Macquarie University Library, Cal No.: QA280 .C78 2008)
 - (b) **Time Series Analysis: Forecasting and Control** by George Box and Dwilym M. Jenkins, (1976), (Macquarie University Library, Call No: QA280 .B67/1976)
 - (c) **Time Series** by M. Kendall, (1976), (Macquarie University Library, Cal No.: QA280 .K4)
 - (d) **An Introduction to Generalised Linear Models** by Annette Dobson, (2001).

UNIT WEB PAGE

- There is no web page for this unit. The lecture materials and other related materials can be found on the Blackboard.

LEARNING OBJECTIVES AND OUTCOMES

- The learning outcomes of this unit:

The discipline-based learning outcomes are as defined in the syllabus for IAA subject CT6.

In addition to the discipline-based learning objectives, all academic programs at Macquarie seek to develop students' generic skills in a range of areas. One of the aims of this unit is that students develop their skills in the following:

- (a) *Problem-solving skills;*
- (b) *Critical analysis skills;*
- (c) *Communication skills;*

TEACHING AND LEARNING STRATEGY

- The unit will be taught by a combination of lectures and tutorials. Concepts and examples will be discussed in the lectures. Problem sets will be discussed in tutorials. The web discussion page may also be used throughout the course.
- It is expected that students attend and fully participate in the lectures and tutorials. The students are expected to attempt tutorial questions before each tutorial session and to participate in the discussion of the solutions in each tutorial session. The students are encouraged to read in advance the lecture material before each lecture session.
- Week-by-week list of the topics to be covered

The following weekly topics are tentative and may be subject to change depending on the actual progress of the course.

Week	Topics covered
1	Time Series (A/Prof. Tak Kuen Siu) Introduction; Stationary Time Series; ACF and PACF
2	Time Series (A/Prof. Tak Kuen Siu) Autoregressive (AR) Models; Moving Average (MA) Models; Autoregressive Integrated Moving Average (ARIMA) Models
3	Time Series (A/Prof. Tak Kuen Siu) Box Jenkin Algorithm I: Identification and Estimation
4	Time Series (A/Prof. Tak Kuen Siu) Box Jenkin Algorithm II: Diagnostic Checking and Prediction
5	GLMs (A/Prof. Tak Kuen Siu)

	Review of Linear Regression; Introduction to GLMs
6	GLMs (A/Prof. Tak Kuen Siu) Exponential Family and Assignment 1 (Distribution)
7	GLMs (A/Prof. Tak Kuen Siu) Linear Predictor; Link Function; Estimation
BREAK	
8	GLMs (A/Prof. Tak Kuen Siu) Model comparison and Analysis of Residuals Assignment 1 (Due)
9	GLMs (A/Prof. Tak Kuen Siu) Model Comparison and Analysis of Residuals and Runoff Triangles (A/Prof. David Pitt)
10	Runoff Triangles (A/Prof. David Pitt) and Assignment 2 (Distribution)
11	Runoff Triangles (A/Prof. David Pitt)
12	Runoff Triangles (A/Prof. David Pitt)
13	Runoff Triangles (A/Prof. David Pitt) and revision Assignment 2 (Due)

RELATIONSHIP BETWEEN ASSESSMENT AND LEARNING OUTCOMES

- The modes of assessment here are in alignment with that the discipline-based learning outcomes that are as defined in the syllabus for IAA subject CT6. They consist of the following elements.

Assessment:

- Assignment 1 15% (3 - 6 hours)
- Assignment 2 15% (3 - 6 hours)
- Final Examination 70% (10 – 20 hours)

All students are required to pass the final examination AND have satisfactory performance on the assignments in order to obtain a passing grade for the unit.

If there are any changes in lecture times and assignment due dates, an announcement will be posted on the Blackboard.

Final Examination:

Exam duration: 3 hour exam plus 10 minutes reading time.

The final exam will cover all of the material in the course. Students will be allowed to use

- a calculator (one without text retrieval capability); and
- one A4 page into the exam (the A4 page may have writing on both sides).

Normal examination rules apply to the conduct of the final exam. These rules are set out under the heading "Conduct of Examinations" in the Student Information section of the Macquarie University Handbook of Undergraduate Studies (page 42).

The University Examination period in Second Half Year 2009 is from 18 November 2010 to 4 December 2010.

You are expected to present yourself for examination at the time and place designated in the University Examination Timetable. The timetable will be available in Draft form approximately eight weeks before the commencement of the examinations and in Final form approximately four weeks before the commencement of the examinations. <http://www.timetables.mq.edu.au/exam>

The only exception to not sitting an examination at the designated time is because of documented illness or unavoidable disruption. In these circumstances you may wish to consider applying for Special Consideration. Information about unavoidable disruption and the special consideration process is available at <http://www.reg.mq.edu.au/Forms/APSCon.pdf>

If a Supplementary Examination is granted as a result of the Special Consideration process the examination will be scheduled after the conclusion of the official examination period. (Individual Faculties may wish to signal when the Faculties' Supplementary Exams are normally scheduled.)

You are advised that it is Macquarie University policy not to set early examinations for individuals or groups of students. All students are expected to ensure that they are available until the end of the teaching semester, that is the final day of the official examination period.

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

Please refer to relevant Bachelor Degree rule in the Handbook of Undergraduate Studies.

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.businessandconomics.mq.edu.au/for/new_and_current_students/undergraduate/admin_central/grade_appeals.

SPECIAL CONSIDERATION

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. The policy and procedure are available at:

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

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

STUDENT SUPPORT SERVICES

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

[Individual Unit Convenors may wish to add Unit/ Faculty specific support eg BESS, Room, PAL, E4B Consultation Room.]

IT CONDITIONS OF USE

Access to all student computing facilities within the Faculty of Business and Economics is restricted to authorized coursework for approved units. Student ID cards must be displayed in the locations provided at all times.

Students are expected to act responsibly when utilizing University IT facilities. The following regulations apply to the use of computing facilities and online services:

- Accessing inappropriate web sites or downloading inappropriate material is not permitted. Material that is not related to coursework for approved unit is deemed inappropriate.
- Downloading copyright material without permission from the copyright owner is illegal, and strictly prohibited. Students detected undertaking such activities will face disciplinary action, which may result in criminal proceedings.

Non-compliance with these conditions may result in disciplinary action without further notice.

Students must use their Macquarie University email addresses to communicate with staff as it is University policy that the University issued email account is used for official University communication.

EXEMPTIONS

The unit(s) ACST 356 (ACST 861) and ACST 357 (ACST 862) together correspond to the professional subject CT6. The exemption will be recommended if and only if a SNG of at least 60 is achieved in both units and the average SNG is at least 65.

INSTITUTE OF ACTUARIES OF AUSTRALIA

The Institute of Actuaries of Australia (IAAust) has recently launched a new free offer for students to become IAAust University Subscribers. Full time undergraduates studying at an Institute accredited university who are members of a university student actuarial society are eligible. To sign up, go to

<http://www.actuaries.asn.au/Membership/MembershipoftheInstitute/Subscriber.aspx>.

The University Subscriber offer is not a membership of the IAAust but a subscription to receive information on career opportunities, invitations to selected IAAust events and online publications. You might also consider joining the IAAust – there are advantages in doing so while a full-time student. For membership information, go to

<http://www.actuaries.asn.au/Membership/MembershipoftheInstitute.aspx>

STUDENT SUPPORT SERVICES

The following can be added under the Student Support Services heading previously

BESS. Business and Economics Student Services (BESS) is located in room E4B106 and offers photocopying facilities, reading areas and reference material. Class tests will be returned to BESS. Information about facilities and services is at [http://businessand economics.mq.edu.au/for/new and current students/undergraduate/bess](http://businessand economics.mq.edu.au/for/new_and_current_students/undergraduate/bess).

Consultation room. Consultation sessions with tutors will be held in the FBE Consultation Room E4B 104 at the times outlined previously under Consultation Times.

ACSTINFO. This ACSTINFO site is used to distribute information to all students majoring in actuarial studies. The information supplied may include administrative information and job advertisements. You will retain access to this site during the vacation following the end of this semester. It is to your advantage to ensure you read information on this web site regularly. You should not assume that information posted there will also be repeated in lectures. To access the site, login at: <http://learn.mq.edu.au/> and the site should appear among your list of units. When you first login, please read the section labelled "How to use this site." This contains useful information which will help you determine when there is new information on the site which you should read.

RULES REGARDING TESTS AND EXAMINATIONS

You should ensure that your handwriting in the class tests and in the final examination is legible. Sections of work that are not legible will not be marked. For true/false questions, answers that are not clearly legible as either T or F will be assumed to be wrong and marked accordingly.

CLASS ETIQUETTE

Mobile phones should be switched off during all lectures and tutorials. If there is a reason for you to keep your phone on you should request to be allowed to do so before the start of the class. Lectures commence at 5 minutes past the hour and you are expected to be punctual. You are expected to keep talking to a minimum during classes so as not to disrupt your fellow students (and the lecturer).

ELECTRONIC COMMUNICATION AND YOUR STUDENT FILE

Every business keeps a record of its correspondence with its customers. The University is no exception and it maintains a file for every student. Staff are required to ensure that copies of all correspondence with you are added to your file. Historically, "correspondence" meant letters, but nowadays it also includes electronic communication such as email. Staffs have some discretion here and might not file copies of trivial emails, but it is difficult to define precise boundaries here, so it is safer to assume that any email you send to a staff member will be added to your file.

Some people regard email as more ephemeral than a letter and thus tend to take less care with issues such as clarity of expression, grammar and spelling. Before sending an email to a staff member, a good question to ask yourself is: "If a member of staff is reviewing my student file prior to writing a reference for me, and they see a copy of this email, would that staff member gain a favorable impression of my level of communication skills?"

In this context, email includes communications you send to staff with the mail tool in the unit's web site. It does not normally include postings you make to the discussion area. However, in those very rare cases where a student makes an inappropriate posting to the discussion area, a copy of the posting would be added to that student's file.