Year and Semester: 2009 II

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

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

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 and credit points

  (a) The unit comprises three parts. Each part will be taught by an individual lecturer.

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

  (b) It is a 3 credit point unit.

• 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@efs.mq.edu.au

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

- Other Staffs

  (a) Contact details:

  Dr. Glen Barnett, Lecturer, Room E4A 620

  If you wish to contact Glen Barnett, please send an email to gbarnett@efs.mq.edu.au

  (b) Consultation hours:

  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

  Werner Fortmann is acting as a teaching assistant for this unit. Please address any enquiries about administration to Werner 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.

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, E7B T2, 2 hours
  Lecture 2: Friday, 12:00 pm – 1:00 pm, W5A T1, 1 hour
Tutorials:

Tutorial 1: Friday, 1:00 pm – 2:00 pm, W5A T1, 1 hour, ACST 357
Tutorial 2: Friday, 1:00 pm – 2:00 pm, X5B 136, 1 hour, ACST 862

- A statement that: The timetable for classes can be found on the University web site at: [http://www.timetables.mq.edu.au/](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: 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**

The web page for this unit can be found at: [http://learn.mq.edu.au](http://learn.mq.edu.au)

The website will be used extensively for this unit so please consult the web page frequently. You will find administrative updates, lecture notes, tutorials and assignments posted there. Materials posted on the website may be updated from time to time.

It is your responsibility to check the website regularly to make sure that you are up-to-date with the information for the unit.
LEARNING OBJECTIVES AND OUTCOMES

• The learning outcomes of this unit:

The discipline-based learning outcomes are as defined in the syllabus for IA 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 (including computing examples in R using real datasets in finance and insurance) 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 fully 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.

<table>
<thead>
<tr>
<th>Week</th>
<th>Topics covered</th>
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| 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)  
<pre><code>  | Linear Predictor; Link Function; Estimation |
</code></pre>
<table>
<thead>
<tr>
<th>BREAK</th>
<th>GLMs (A/Prof. Tak Kuen Siu) Model comparison and Analysis of Residuals Assignment 1 (Due)</th>
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<tbody>
<tr>
<td>8</td>
<td>GLMs (A/Prof. Tak Kuen Siu) Model comparison and Analysis of Residuals and Runoff Triangles (Dr. Glen Barnett)</td>
</tr>
<tr>
<td>9</td>
<td>Runoff Triangles (P Cooper) and Assignment 2 (Distribution)</td>
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<tr>
<td>10</td>
<td>Runoff Triangles (Dr. Glen Barnett)</td>
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<td>11</td>
<td>Runoff Triangles (Dr. Glen Barnett)</td>
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<td>12</td>
<td>Runoff Triangles (Dr. Glen Barnett)</td>
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<tr>
<td>13</td>
<td>Runoff Triangles (Dr. Glen Barnett) and revision Assignment 2 (Due)</td>
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</tbody>
</table>

**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 IA subject CT6. They consist of the following elements.

Assessment:
- Assignment 1  15%
- Assignment 2  15%
- Final Examination  70%

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.

Assignment 1 will be due on October 6, 2009 at 4:30 pm.

Assignment 2 will be due on (TBA by Glen)

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 2009 to 4 December 2009.
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.

**Plagiarism**

The University defines plagiarism in its rules: "Plagiarism involves using the work of another person and presenting it as one's own." Plagiarism is a serious breach of the University's rules and carries significant penalties. You must read the University's practices and procedures on plagiarism. These can be found in the Handbook of Undergraduate Studies or on the web at: http://www.student.mq.edu.au/plagiarism/

The policies and procedures explain what plagiarism is, how to avoid it, the procedures that will be taken in cases of suspected plagiarism, and the penalties if you are found guilty. Penalties may include a deduction of marks, failure in the unit, and/or referral to the University Discipline Committee.

**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 ERIC Room, PAL, TEPIT Centre, ELS Student Support Officers.]