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[\(map GH32, reference G3\)](#)

Course Outline

STAT3036/8036 Credibility Theory

Semester 2, 2011

STUDENTS: Course details change from semester to semester. Please check that you are reading the Course Outline for the correct semester.

Course Description

This course covers the fundamental concepts of: Bayesian statistics, including estimation, prediction, hypothesis testing, and decision theory; time series analysis, including estimation and prediction based on ARIMA models; credibility theory, including limited fluctuation credibility theory and the Buhlmann-Straub model; several run-off techniques for estimating an outstanding claims reserve; and Monte Carlo techniques, including the inverse transformation method, the polar method, and Monte Carlo integration.

Graduate Studies Select Classification

Advanced and Specialist

Contacts

Role	Office address	Email	Telephone	Consultation Times
Course Convenor and Lecturer (Course Authority) Dr Borek Puza	Rm 4.29 CBE Bldg 26C	borek.puza@anu.edu.au	6125 4587	Drop in or by appointment.
Tutor/s Abhinav Mehta Mo Yang	TBA	TBA	TBA	TBA
School Student Administrators Tracy Skinner	Rm 4.48 CBE Bldg 26C	tracy.skinner@anu.edu.au	6125 0487	NA

Communication

Email

If necessary, the lecturers and tutors for this course will contact students on their official ANU student email address. Information about your enrolment and fees from the Registrar and Student Services' office will also be sent to this email address.

Announcements

Students are expected to check the Wattle site for announcements about this course, e.g. changes to timetables or notifications of cancellations. Notifications of emergency cancellations of lectures or tutorials will be posted on the door of the relevant room.

Course URLs

More information about this course may be found on:

- [Study @ ANU](#),
- the [College of Business and Economics website](#), and
- [Wattle](#), the University's online learning environment. Log on to Wattle using your student number and your ISIS password.

Course Information

Learning Outcomes

Upon successful completion of the requirements for this course, students will be able to:

- Explain the fundamental concepts of Bayesian statistics and use these concepts to calculate Bayesian estimators (including credibility estimators).
- Define and apply the main concepts underlying the analysis of time series models.
- Describe and apply techniques for analysing a delay (or run-off) triangle and projecting the ultimate position.
- Explain and apply the concepts of "Monte Carlo" simulation using a series of pseudo-random numbers.

Workload

Students taking this course are expected to commit at least 10 hours a week to completing the work.

This will include:

- 3 hours a week: lectures
- 1 hour a week: tutorials
- 6 hours a week: reading, and exam/tutorial preparation

Course Delivery


Lectures and tutorials.

Attendance Requirements

None.

Tutorial Registration

Enrolment in tutorials will be completed online using the Electronic Teaching Assistant (ETA). To enrol, follow these instructions:

1. Go to <http://eta.fec.anu.edu.au>.
2. You will see the Student Login page. To log into the system, enter your University ID (your student number) and password (your ISIS password) in the appropriate fields and hit the **Login** button.
3. Read any news items or announcements.
4. Select "Sign Up!" from the left-hand navigation bar.
5. Select your courses from the list. To select multiple courses, hold down the control key. On PCs, this is the **Ctrl** key; on Macs, it is the  key. Hold this key down while selecting courses with the mouse. Once courses are selected, hit the **SUBMIT** button.
6. A confirmation of class enrolments will be displayed. In addition, an email confirmation of class enrolments will be sent to your student account.
7. For security purposes, please ensure that you click the **LOGOUT** link on the confirmation page, or close the browser window when you have finished your selections.
8. If you experience any difficulties, please contact the School Office (see page 1 for contact details).

Study Schedule

Week beginning	Theme / Topic / Module	Activity	Required student preparation	Deadlines
25/7/2011 (Week 1)	Bayesian Statistics	Lectures		
1/8/2011 (Week 2)	Bayesian Statistics	Lectures, Tutorial		
8/8/2011 (Week 3)	Bayesian Statistics	Lectures, Tutorial		
15/8.2011 (Week 4)	Bayesian Statistics	Lectures, Tutorial		
22/8/2011 (Week 5)	Time Series Analysis	Lectures, Tutorial		
29/8/2011 (Week 6)	Time Series Analysis	Lectures, Tutorial		
5/9/2011 (Week 7)	Time Series Analysis	Lectures, Tutorial		
12/9/2011	Mid-Semester Teaching Break			
19/9/2011	Mid-Semester Teaching Break			
26/9/2011 (Week 8)	Credibility Theory	Lectures, Tutorial		
3/10/2011 (Week 9)	Credibility Theory	Lectures, Tutorial		
10/10/2011 (Week 10)	Credibility Theory	Lectures, Tutorial		
17/10/2011 (Week 11)	Run-Off Techniques	Lectures, Tutorial		
24/10/2011 (Week 12)	Monte Carlo Simulation	Lectures, Tutorial		
31/10/2011 (Week 13)	Revision	Lectures, Tutorial		

Assessment

Proposed Assessment Schedule

Details about assessment may change during the first two weeks of semester. Please ensure that you check with your lecturer or tutor about any changes. Changes to the assessment schedule will be posted to the Wattle site.

Assessment item	Description and detail of assignment	Specific requirements	Due Date	Weighting (%)
Mid-Semester Examination	Redeemable exam on Bayesian Statistics	See below.	Probably week 7 or 8	30%
Final Examination	Exam on all course materials.	See below.	Final exam period.	70%

Learning Outcomes-Assessment

How well have you achieved the learning outcomes for this course? Your lecturer makes this judgement based on your assignments and examination papers. This table illustrates how each assessment item provides evidence about your achievements against each learning outcome.

Course Learning Outcomes	Mid-Semester Exam	Final Exam
Upon successful completion of the requirements for this course, students will be able to:		
Describe and apply the fundamental concepts of Bayesian statistics in a number of simple settings.	✓	✓
Describe and apply the main concepts involved in the analysis of time series using ARIMA modelling.		✓
Describe and apply techniques for analysing a run-off triangle and projecting the outstanding claims reserve.		✓
Describe and apply the basic concepts of Monte Carlo techniques using a series of pseudo-random numbers.		✓

Assignment Details

This course has no assignments.

Scaling

Your final mark for the course will be based on the **raw** marks allocated for each assignment or examination. However, your final mark may not be the same number as produced by that formula, as marks may be **scaled**. Any scaling applied will preserve the rank order of raw marks (i.e. if your raw mark exceeds that of another student, then your scaled mark will exceed the scaled mark of that student), and may be either up or down.

Extensions

Not relevant.

Penalties

Not relevant.

Examinations

Both exams will be closed book, with the only permitted materials being a non-programmable calculator. A formula sheet will be attached to each exam paper to assist students. Students may view the formula sheets in advance on the class Wattle site. Alterations to this scheme may be discussed in class and any changes will be announced on the Wattle site.

The mid-semester exam is redeemable, meaning that you will get the better of the two breakdowns 30+70 and 0+100. That is, if you do better in the final exam than in the mid-semester exam, your mid-semester exam will not count and your final exam will count 100%.

If you choose not to sit the mid-semester exam, your final exam will definitely count 100%.

Although the mid-semester exam is optional, it is strongly advised that all students do it.

Texts and Other Reading

Prescribed Texts

None.

Technology, Software, Equipment

No computing is required for this course. However, you will need a scientific calculator.

Recommended Reading

- Bolstad, W.M. (2004). *Introduction to Bayesian Statistics*. Wiley-Interscience, New Jersey.
- Chatfield, C (2004). *The Analysis of Time Series: An Introduction*, 6th Edition. CRC Press, Florida.
- Hart, D.G., Buchanan, R.A. and Howe, B.A. (1996). *Actuarial Practice of General Insurance*. Institute of Actuaries of Australia, Sydney.
- Lee, P. M. (1989). *Bayesian Statistics: An Introduction*. Oxford University Press, New York.
- Shumway, R.H. and Stoffer, D.S. (2006). *Time Series Analysis and Its Applications with R Examples* (2nd Ed.). Springer, New York.

Course-related Matters

Requisites

Completion of Introductory Mathematical Statistics (STAT2001).

Co-teaching

Not relevant.

Other information

This course, together with STAT3035 (Risk Theory), constitutes Subject CT6 of the Institute of Actuaries of Australia. To get an exemption from the Institute, you need to get an average of at least 60% for these two courses.