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.

<table>
<thead>
<tr>
<th>Mode of Delivery</th>
<th>By lecture and tutorial on campus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prerequisites</td>
<td>STAT2001 Introductory Mathematical Statistics</td>
</tr>
<tr>
<td>Incompatible Courses</td>
<td>None</td>
</tr>
<tr>
<td>Co-taught Courses</td>
<td>STAT4036 Credibility Theory (honours) and STAT8036 Credibility Theory (graduate) Graduate and honours students attend joint classes with undergraduates but are assessed separately.</td>
</tr>
<tr>
<td>Course Convener</td>
<td>Dr Borek Puza</td>
</tr>
<tr>
<td>Phone</td>
<td>+61 2 6125 4587</td>
</tr>
<tr>
<td>Email</td>
<td><a href="mailto:borek.puza@anu.edu.au">borek.puza@anu.edu.au</a></td>
</tr>
<tr>
<td>Office hours for student consultation</td>
<td>To be advised later on Wattle, or by appointment, made in person after a lecture, or via phone or email</td>
</tr>
<tr>
<td>Research Interests</td>
<td>Bayesian statistics, MCMC methods, biased sampling and confidence estimation theory</td>
</tr>
<tr>
<td>Administrator</td>
<td>Colleen Lee</td>
</tr>
<tr>
<td>Email</td>
<td><a href="mailto:colleen.lee@anu.edu.au">colleen.lee@anu.edu.au</a></td>
</tr>
<tr>
<td>Lecturer</td>
<td>Dr Borek Puza (contact details as above)</td>
</tr>
<tr>
<td>Tutors</td>
<td>To be advised later on Wattle</td>
</tr>
</tbody>
</table>
COURSE OVERVIEW

Learning Outcomes

LO1: Explain the fundamental concepts of Bayesian statistics and use these concepts to calculate Bayesian estimators (including credibility estimators).

LO2: Define and apply the main concepts underlying the analysis of time series models.

LO3: Describe and apply techniques for analysing a delay (or run-off) triangle and projecting the ultimate position.

LO4: Explain and apply the concepts of “Monte Carlo” simulation using a series of pseudo-random numbers.

Assessment Summary

<table>
<thead>
<tr>
<th>Assessment Task</th>
<th>Value</th>
<th>Date</th>
<th>Linked Learning Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Mid-Semester Examination</td>
<td>30% (redeemable in favour of the final examination; see below for details)</td>
<td>Probably in either Week 6 or in Week 7 (to be announced later)</td>
<td>L01</td>
</tr>
<tr>
<td>2. Final Examination</td>
<td>70% (or 100%)</td>
<td>Final examination period</td>
<td>L01, L02, L03, L04</td>
</tr>
</tbody>
</table>

Research-Led Teaching

In the first section on Bayesian statistics, the lecturer may include instructive examples taken from one or more papers which he has published in this field.

Feedback

Staff Feedback

Students will be given feedback in the following forms in this course:

- verbal comments to whole class and individual students
- summary of marks for the mid-semester exam, on Wattle

Student Feedback

ANU is committed to the demonstration of educational excellence and regularly seeks feedback from students. One of the key formal ways students have to provide feedback is through Student Experience of Learning Support (SELS) surveys. The feedback given in these surveys is anonymous and provides the Colleges, University Education Committee and Academic Board with opportunities to recognise excellent teaching, and opportunities for improvement.

For more information on student surveys at ANU and reports on the feedback provided on ANU courses, go to

http://unistats.anu.edu.au/surveys/selt/students/ and
http://unistats.anu.edu.au/surveys/selt/results/learning/
Policies

ANU has educational policies, procedures and guidelines, which are designed to ensure that staff and students are aware of the University’s academic standards, and implement them. You can find the University’s education policies and an explanatory glossary at: http://policies.anu.edu.au/

Students are expected to have read the Academic Misconduct Rule before the commencement of their course.

Other key policies include:

- Student Assessment (Coursework)
- Student Surveys and Evaluations

Additional course costs
None, apart from the cost of a scientific calculator.

Examination material or equipment
See below under “Examinations”.

Recommended Resources
The course has no prescribed textbooks. Some recommended reading is as follows:


COURSE SCHEDULE (approximate)

<table>
<thead>
<tr>
<th>Week</th>
<th>Summary of Activities</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Orientation week</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Bayesian Statistics, Lectures</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Bayesian Statistics, Lectures, Tutorial</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Bayesian Statistics, Lectures, Tutorial</td>
<td></td>
</tr>
</tbody>
</table>
ASSESSMENT REQUIREMENTS

This course is assessed by way of two examinations only. There are no assignments.

Examinations

The 30% mid-semester exam is fully redeemable in favour of the final exam, 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%. There will be no special examinations for the mid-semester exam. Instead the weighting will be moved to the final exam. That is, if for any reason you are unable to sit the mid-semester exam, your final exam will definitely count 100%. Although the mid-semester exam is redeemable and optional, it is strongly advised that you do it if at all possible.

In the final exam (and only in that exam), there will be one extra question (only) for the STAT4036 and STAT8036 students, which STAT3036 students will not need to attempt. This extra question will be the only difference in assessment between the three courses.

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. Relevant information will be published at: http://timetable.anu.edu.au/exams/
Scaling

Your final mark for the course will be based on the raw marks allocated for each of your assessment items. 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.

Privacy Notice

The ANU has made a number of third party, online, databases available for students to use. Use of each online database is conditional on student end users first agreeing to the database licensor’s terms of service and/or privacy policy. Students should read these carefully.

In some cases student end users will be required to register an account with the database licensor and submit personal information, including their: first name; last name; ANU email address; and other information.

In cases where student end users are asked to submit ‘content’ to a database, such as an assignment or short answers, the database licensor may only use the student’s ‘content’ in accordance with the terms of service – including any (copyright) licence the student grants to the database licensor.

Any personal information or content a student submits may be stored by the licensor, potentially offshore, and will be used to process the database service in accordance with the licensor’s terms of service and/or privacy policy.

If any student chooses not to agree to the database licensor’s terms of service or privacy policy, the student will not be able to access and use the database. In these circumstances students should contact their lecturer to enquire about alternative arrangements that are available.

Tutorial Seminar Registration

Tutorial signup for this course will be done via the Wattle website. Detailed information about signup times will be provided on Wattle or during your first lecture. When tutorials are available for enrolment, follow these steps:

1. Log on to Wattle, and go to the course site
2. Click on the link “Tutorial enrolment”
3. On the right of the screen, click on the tab “Become Member of…..” for the tutorial class you wish to enter
4. Confirm your choice

If you need to change your enrolment, you will be able to do so by clicking on the tab “Leave group…..” and then re-enrol in another group. You will not be able to enrol in groups that have reached their maximum number. Please note that enrolment in ISIS must be finalised for you to have access to Wattle.

SUPPORT FOR STUDENTS

The University offers a number of support services for students. Information on these is available online from http://students.anu.edu.au/studentlife/