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ANU Campus Map (map GH32) http://tinyurl.com/9n8xgd8

Students with enquiries about program (degree) requirements should contact the College office; enquiries about courses (subjects) are normally handled by the relevant Research School.

STAT3036/8036
Credibility Theory
Semester 2, 2014

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.

<table>
<thead>
<tr>
<th>Mode of Delivery</th>
<th>On campus</th>
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</thead>
<tbody>
<tr>
<td>Prerequisites</td>
<td>STAT2001 Introductory Mathematical Statistics</td>
</tr>
<tr>
<td>Incompatible Courses</td>
<td>None</td>
</tr>
<tr>
<td>Course Convenor</td>
<td>Dr Borek Puza</td>
</tr>
<tr>
<td>Phone:</td>
<td>+61 2 612 54587</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, or by appointment made by email or in person immediately following any lecture</td>
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</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.

Proposed Assessment (Summary):

Assessment for this course will be confirmed after consultation with students at the first lecture of the semester. If there are any changes to the assessment, those changes will be publicised on Wattle.

<table>
<thead>
<tr>
<th>Assessment Task</th>
<th>Value</th>
<th>Due Date</th>
<th>Linked Learning Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Mid-Semester Examination</td>
<td>30% or 0% (redeemable in favour of the final exam; see below for more details)</td>
<td>Week 7 (probably)</td>
<td>LO1</td>
</tr>
<tr>
<td>2. Final Examination</td>
<td>70% or 100%</td>
<td>Final exam period</td>
<td>LO1, LO2, LO3, LO4</td>
</tr>
</tbody>
</table>

Research-Led Teaching

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

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

1. Verbal comments regarding the class as a whole, made publicly during lectures and on Wattle.
2. Verbal comments made privately to individuals who request them.
3. A summary of the mid-semester exam marks, made available on Wattle.
4. Individual mid-semester exam marks, accessible by students privately via the Gradebook system 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 Code of Practice for Student Academic Integrity before the commencement of their course.

Other key policies include:
- Academic Progress
- Assessment of Student Learning
- Assessment Review and Appeals
- Course Assessment: Consultation and Finalisation
- Student Feedback on Teaching and Learning
- College policies on extensions, late submissions, etc.
## Course Schedule

<table>
<thead>
<tr>
<th>Week/Session</th>
<th>Summary of Activities</th>
<th>Assessment</th>
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<tbody>
<tr>
<td>1</td>
<td>Bayesian Statistics, Lectures</td>
<td></td>
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<tr>
<td>2</td>
<td>Bayesian Statistics, Lectures, Tutorial</td>
<td></td>
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<tr>
<td>3</td>
<td>Bayesian Statistics, Lectures, Tutorial</td>
<td></td>
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<tr>
<td>4</td>
<td>Bayesian Statistics, Lectures, Tutorial</td>
<td></td>
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<tr>
<td>5</td>
<td>Time Series Analysis, Lectures, Tutorial</td>
<td></td>
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<tr>
<td>6</td>
<td>Time Series Analysis, Lectures, Tutorial</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Time Series Analysis, Lectures, Tutorial</td>
<td>Mid-semester exam</td>
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<tr>
<td></td>
<td><strong>First week of teaching break</strong></td>
<td></td>
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<tr>
<td></td>
<td><strong>Second week of teaching break</strong></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Credibility Theory, Lectures, Tutorial</td>
<td></td>
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<tr>
<td>9</td>
<td>Credibility Theory, Lectures, Tutorial</td>
<td></td>
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<tr>
<td>10</td>
<td>Credibility Theory, Lectures, Tutorial</td>
<td></td>
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<tr>
<td>11</td>
<td>Run-Off Techniques, Lectures, Tutorial</td>
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<td>12</td>
<td>Monte Carlo Simulation, Lectures, Tutorial</td>
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<tr>
<td>13</td>
<td>Revision, Lectures, Tutorial</td>
<td></td>
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<tr>
<td></td>
<td><strong>Examination period</strong></td>
<td>Final exam</td>
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## ASSESSMENT REQUIREMENTS

### Participation

Attendance and participation at lectures and tutorials is purely optional and non-assessable. However, students are strongly advised to attend as many as possible of the scheduled lectures as well as their designated tutorials every week. Each student must be officially enrolled in one tutorial group (see below for how to enrol).

### Examinations

The 30% mid-semester exam is 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 that is possible.

In the final exam (and only in the final exam), there will be one extra question for the STAT8036 students (which the STAT3036 students will not need to attempt). This extra question will be the only difference in assessment between the two courses.
Examination material or equipment

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 eventually 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.

Workloads

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

- lectures: 3 hours
- tutorials: 1 hour
- private study: 6 hours

Prescribed Texts and Reference Materials

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

Tutorial and/or Seminar signup

Enrolment in tutorials will be completed online using the CBE 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).
9. Students will have until the end of week 2 to finalise their enrolment in tutorials. After this time, students will be unable to change their tutorial enrolment.

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/

Exemptions

This course, together with STAT3035 (Risk Theory), constitutes Subject CT6 of the Actuarial Institute. To get an exemption from the Institute, you need to get an average of at least 60% for these two courses, with a minimum of 50% in both courses.