Australian National University

STAT8003
Biostatistics

Course Description

This course introduces survival models and discusses their estimation and their application to mortality. Topics covered will include: an introduction to the life table; survival models; estimation procedures for lifetime distributions; statistical models of transfers between multiple states; maximum likelihood estimation of transition intensities for such models; binomial model of mortality including estimation and comparison with multiple state models; exposed to risk and methods for smoothing crude mortality rate data.

Mode of Delivery	On campus
Prerequisites	STAT 2001 (compulsory) and STAT 2008 (recommended)
Co-taught Courses	STAT4072/STAT7042/STAT3032
Course Convener	Le Chang
Office Location:	Room 3.07, ANUCBE Bldg. 26C
Phone:	02 6125 5116
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Consultation hours:	Please check wattle site for the latest information
Bio and research interests	Le is an Associate Lecturer in RSFAS, Associate of the Institute of Actuaries of Australia. His research interests are in the field of Model Selection, Robust Statistics and Spatial Statistics. He has recently graduated with a PhD degree in Statistics from RSFAS.
Tutor	TBA
Student Administrators	TBA

SEMESTER 1
2018

http://programsandcourses.anu.edu.au/course/STAT8003

COURSE OVERVIEW

Course Learning Outcomes

To achieve an understanding of and facility in:

1. Explain the concept of survival models.
2. Describe estimation procedures for lifetime distributions.
3. Describe statistical models of transfer between multiple states, including processes with single or multiple decrements, and derive relationships between probabilities of transfer and transition intensities.
4. Derive maximum likelihood estimators for the transition intensities in models of transfers between states with piecewise constant transition intensities.
5. Describe how to estimate transition intensities depending on age, exactly or using the census approximation.
6. Describe how to test crude estimates for consistency with a standard table or a set of graduated estimates, and describe the process of graduation.

Research-Led Teaching

This course involves intermediate level of programming with R. In the lectures and tutorials, we will use real-life datasets to demonstrate the applications of Survival Models in R. Apart from that, additional research articles including journal publications will be provided. Those articles are good examples of how to use appropriate techniques of Survival Models to analyse and solve research questions step-by-step.

Technology, Software, Equipment

This course involves intermediate level of programming with R, which is a powerful and free statistical package widely used by industrial professionals and academics.

Co-teaching

This course will be taught alongside STAT4072/STAT7042/STAT3032. There will be some material in this course which may not be relevant to STAT8003. This will be clearly identified during the lecture and/or tutorial.

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

COURSE SCHEDULE

Week	Summary of Activities	Assessment
0	Access to Wattle site for all enrolled students	
1	Introduction to Survival Models, Week 1 Notes	
2	Introduction to Survival Models, Week 2 Notes/ Tute 2	
3	Estimation Methods, Week 3 Notes/ Tute 3	
4	Kaplan-Meier Estimation, Week 4 Notes/ Tute 4	
5	Kaplan-Meier/ Nelson Aalen Estimation, Week 5 Notes/ Tute 5	
6	Cox Regression, Week 6 Notes/ Tute 6	Mid Semester Exam
7	Two State Models, Week 7 Notes/ Tute 7	
8	Multi State Models, Week 8 Notes/ Tute 8	
9	Graduation and Smoothing, Week 9 Notes/ Tute 9	
10	Graduation and Smoothing, Week 10 Notes/ Tute 10	
11	Methods for Graduating and Smoothing, Week 11 Notes/ Tute 11	
12	Introduction to Census Method. Mortality, Selection and Standardisation, Week 12 Notes/ Tute 12	

COURSE ASSESSMENT

Assessment Summary

Item	Title	Value	Due Date
1	Mid Semester Exam	20% (or 0%)	Week 6
2	Final Exam	80% (or 100%)	Exam Period

Assessment Task 1: Mid Semester Exam (redeemable)
Details of task:
Close-book exam will cover the week sessions 1 to 6.

Mid-semester exams are redeemable and optional for this course. No deferred mid-semester examinations will be offered, instead the weighting will be moved to the final exam.

Assessment Task 2: Final Exam
Details of task:
Three-hour close-book exam will cover the entire course.

Examinations

The mid semester examination will be 1.5 hour long with 15 minutes reading time. The final examination will be 3 hours long with a 15 minutes reading time. One A4-size paper with notes on both sizes and paper-based dictionary (no approval needed but all notes must be removed) are allowed for both examinations.

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 or equal the scaled mark of that student), and may be either up or down.

READING LISTS

Lecture notes and other course materials will be updated weekly with the progress of this course on Wattle.

TUTORIAL AND/OR 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.

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 licensors 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.

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/

POLICIES

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

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 Student Academic Integrity Policy before the commencement of their course.

Other key policies include:

- Student Assessment (Coursework)
- Student Surveys and Evaluations