

**ACST354 SURVIVAL MODELS**  
**FIRST SEMESTER 2006**  
**UNIT OUTLINE**

**Unit Description**

This unit looks at some types of models which are commonly used in actuarial work.

We start with a general overview of the process of modelling.

Then we consider particular types of model, how to use data to estimate the parameters of a model, and how to use the models.

This unit is called “Survival Models”, because we focus primarily on models of mortality, or similar situations, where someone or something “survives” for a random period of time before ceasing to survive. A survival model represents a very simple situation: there are two “states”, ie surviving or not surviving, and movements can only occur in one direction, from the state of surviving to the state of not surviving. In this unit we also consider more complex models, with multiple states, where movements can occur in both directions, ie to and from each state.

**How to Contact the Staff Involved in the Unit**

The staff involved in the teaching of this unit are Clare Bellis, Brian Chu, and Glen Barnett. Clare Bellis is the Unit Coordinator. Questions or comments relating to the unit content should be directed to the lecturer for that section of work via the relevant topic in the Discussion facility on the ACST354 website. Questions relating to the administration of the unit should be directed to the Unit Coordinator via the “Main” topic in the Discussion facility. This way, all students benefit from seeing the questions and answers. Students are also encouraged to answer questions posted by other students. The staff will check the Discussion board frequently, but will generally leave time for questions to be answered first by other students as this is a good way for you to check your understanding of the material.

You may post Discussion messages anonymously if you prefer.

Please use the Private Mail facility on the website only to conduct private discussions with your fellow students (if you wish) and to consult the Unit Coordinator about personal administrative matters.

**Unit Details**

Unit Name: Survival Models      Credit Points: 4      Prerequisites: ACST243 or  
ACST255(P); ACST210(P) or ACST211(P); STAT271(P)

Please consult with the unit coordinator if you have queries about the prerequisite requirement for the unit. If you do not satisfy the prerequisite and have not had the prerequisite waived then you will be automatically withdrawn from the unit, possibly after the HECS census date.

## Lectures

Lectures are held at the following times:

Day	Time	Location
Tuesday	11-1	E7B T5
Wednesday	9-11	E7B T3

Any alterations to the lecture times or locations will be advised in lectures and via the website.

## Tutorials

There is a one hour tutorial session each Thursday at 3-4 pm in E7B T5. Attendance is OPTIONAL. This time is intended as an opportunity for you to ask questions about the material covered that week. All tutorials will be conducted by Brian Chu.

Any alterations to the tutorial times or locations will be advised in lectures and via the website.

## Unit Timetable

Week Number	Week Beginning	Topic Covered	Test	Lecturer
1	27 Feb	Principles of modelling		C Bellis
2	6 March	Stochastic processes		C Bellis
3	13 March	Markov chains		C Bellis
4	20 March	Markov jump processes: introduction		B Chu
5	27 March	General Multi State models		B Chu
6	3 April	Two state models; estimation of transition intensities		B Chu
7	10 April	Modelling mortality: concepts		C Bellis
<b>STUDY BREAK</b>	17 April 24 April			
8	1 May	Practical issues, experimental design, and estimation	Test	C Bellis
9	8 May	Using models to draw inferences		C Bellis
10	15 May	Estimation from census data		G Barnett
11	22 May	Graduation and testing: introduction		G Barnett
12	29 May	Graduation and testing: continued		G Barnett
13	5 June	No classes		

This is only a preliminary outline, and may be adapted as the semester proceeds. Any alterations will be advised in lectures and via the website.

## Textbook

We will be using the CT4 notes published by ActEd Australia. Details of how to obtain these notes will be posted on the Discussion board of the website.

## The ACST354 Web Site

To access this website, go to <http://online.mq.edu.au/>. If you did not understand this instruction, you can obtain training on how to use a web browser by contacting the Information Technology Training Unit on Level 1 of the Library.

Before logging on, you should follow the link labelled Using WebCT – Technical Information – IT Rules, and read the linked documents there. You can now logon. If you can't access the site because you have forgotten your password, contact the Information Technology Customer Support Desk also on Level 1 of the Library. If your home computer does not have internet access, you can access this website from computers in the library.

The website will be used as an integral part of this unit. The main components of the website are as follows.



### Unit Outline

You can download this unit outline from here.



### Class Discussion

Unit announcements will be made through this facility. You should use the Discussions facility, along with the tutorial time, as your main resource for asking questions about the unit. You are encouraged to post answers to other students' questions. You are able to post messages anonymously if you wish, although we prefer that you reveal your identity. You should consult the Discussions frequently, at least once a week.



### Private Mail

You should use the Mail facility to contact the Unit coordinator about private administrative matters only. It will also be used to contact you individually, if necessary. You can also use this facility to contact your fellow students. Check your mailbox regularly for messages.



### Download Unit Material

Supplements to the ActEd notes and tuition exercises will be posted here.



### Download Exams and Tests

Previous examinations and tests for ACST344, ACST397 and ACST231 (all units now discontinued) are available here. We will provide guidance on examination content in ACST354 here, as the semester progresses.



### Assignment

All material to do with the group assignment, including the assignment itself, data, the cover sheet etc. will be available here.



### Software

Any software which will be used in the course will be available here.



### Mortality Tables

Any mortality tables required for this unit will be available here.

Additional pages may be made available throughout the semester.

## Assessment

The following table gives an indication of the relative weighting of the assessment components:

Class Test	10%
Group Assignment	10%
Final Examination	80%

### Class Test

There is one class test scheduled for Tuesday 2 May at 11 am. The test will cover weeks 1 to 7 inclusive. Please note that the class test date, time and coverage may be subject to change, and that any alterations will be advised in lectures and via the website.

Normal examination rules apply to the conduct of the class test. These rules are set out under the heading “Rules governing student’s conduct in examinations” in the Student Information – Assessment section of the current Macquarie University Handbook. Students are responsible for familiarising themselves with these rules prior to the class test.

The test will include multiple choice questions. You should ensure that you bring several 2B pencils and an eraser to the test.

### Group Assignment

The group assignment will involve a series of activities to be completed throughout the semester. You will be expected to work together with your group and submit group reports or other assessment tasks approximately every two weeks. You should form a group as early as possible in the semester – see the website for details.

Full details of the assignment will be posted on the website.

Late submission of any assignment tasks will be penalised except in exceptional circumstances and by **prior** arrangement with the Unit Coordinator. The penalty will be 10% of the total mark per day (or part day).

Please take careful note of the policy of the Department of Actuarial Studies regarding the use of computers for coursework, which is set out later in this outline. Please also take careful note of the section of this unit outline titled Cheating and Plagiarism in relation to your assignment. You will be issued with an assignment cover sheet; please ensure that you sign and submit the cover sheet with your assignment, after reading the notes on plagiarism.

### Final Examination

The final examination will be a three-hour written paper with ten minutes reading time. The examination will cover the whole course, so it may include questions on material already tested in the class test.

The final examination may include multiple choice questions. You should ensure that you bring several 2B pencils and an eraser to the examination.

### **Reference Material in Examination and Test**

You may take into the class test and the final examination one A4 sheet of paper containing any notes you wish on both sides. It can be handwritten, typed or photo-reduced.

### **Legibility of Handwriting**

You should ensure that your handwriting in the class test and in the final examination is legible. Sections of work that are not legible will not be marked.

### **Grading**

Macquarie University uses the grades HD, D, Cr, P, PC and F for grading the achievements of students in units of study. The meaning of each symbol is explained in section of the Bachelor Degree Rules of the current Macquarie University Handbook of Undergraduate Studies.

The numerical marks resulting from assessment of your work in this unit will be used as an initial indicator of the quality of your learning and understanding. The use of these numerical marks is, however, only a starting point in determining the appropriate grade. In particular, note that the mark ranges mentioned in the Handbook of Undergraduate Studies are not the raw marks. To obtain a grade you must satisfy the qualitative definition of that grade. Once your grade has been determined, you are allocated a standardised mark indicating your approximate position amongst students assigned that grade.

### **Special Consideration**

Applications for special consideration in respect of the class test or the group assignment must be made on the “Advice of Absence or other Circumstances” form. These are available from and should be submitted to the Student Enquiry Service on Level 1 of the Lincoln Building.

Applications in respect of the final exam must be made on the “Request for Special Consideration” form. These forms are available from and should be submitted to the Academic Program Section on Level 4 of the Lincoln Building.

Applications based on medical grounds (whether for the class test, group assignment, or final examination) **must** be accompanied by the Professional Authority Form. Applications omitting this form (such as those which only supply a doctor’s certificate) will be ignored.

The application forms are also online at <http://www.registrar.mq.edu.au/academic-index.html>.

### **Exemptions**

The unit ACST354 corresponds to the professional subject CT4. You require a HD, D or Credit grade in this unit to receive the exemption.

## **Mobile Phones**

Academic Senate has resolved that mobile phones should not be used in classrooms or be brought into examination rooms. Communication devices, including but not restricted to mobile phones, text message receivers, pagers and wireless-equipped calculators, may not be brought into the class tests or exam. If a student is found to have brought such a device into the examination room, the argument that the device was turned off will NOT be regarded as an acceptable excuse.

## **ACSTINFO Web site**

To access the site, go to: <http://online.mq.edu.au/pub/ACSTINFO/> (the address is case-sensitive.) This site is used to distribute information to all students majoring in actuarial studies. The information supplied may include administrative information and job advertisements. You will retain access to this site during the vacation following the end of this semester.

It is to your advantage to ensure you read information on this web site regularly. You should not assume that information posted there will also be repeated in lectures.

When you login to this site, please read the section labelled "How to use this site." This contains useful information which will help you determine when there is new information on the site which you should read.

## **EFS Resource and Information Centre (ERIC)**

The EFS Resource and Information Centre is located in room E4B 106 and offers photocopying facilities, reading areas and reference material.

## **Calculators/Computers**

Calculators will be allowed in the class test and the final examination provided they are portable, silent and battery operated, but a clear indication of the steps involved in every calculation must be shown. Any machines that have a text-retrieval capacity, whether or not they have a full alphabet on the keyboard, are not allowed.

Calculators may be checked at the commencement of the class tests and final exam, and the make/model may be recorded.

## **Use of Computers for Coursework**

Please take careful note of the policy of the Department of Actuarial Studies regarding the use of computers, which follows.

### **DEPARTMENT OF ACTUARIAL STUDIES**

#### **NOTICE TO STUDENTS RE USE OF COMPUTERS FOR COURSEWORK**

1. Computers do occasionally break down. This is a normal part of working life. When completing assignments, you should not leave computer work until the last moment, assuming the system will be available when you need it.
2. You are the person responsible for keeping backup copies of any data or files you create on a computer. If you fail to keep backup copies, loss of data or files, for whatever reason, is not an acceptable excuse for failing to complete an assignment on time.
3. You should have at least two backups. If you have only one backup disk, then a computer malfunction while you are updating your backups may simultaneously corrupt both the original version (on the hard disk or network) and your backup disk. Do not store your two backups together. Spread your risks.
4. If you are planning to write a document on one computer (eg. your home computer) and print it from a different computer, you should test well ahead of the due date that the second computer can print your document. This particularly applies if your documents incorporate graphs, tables, unusual fonts or special formatting.

## **Cheating and Plagiarism**

To cheat in the context of university assignments, tests and examinations is to attempt to gain an unfair advantage by violating the principles of intellectual and scholarly integrity. Cheating also encompasses plagiarism, which is the appropriation or imitation of another person's ideas and manner of expressing them.

You are responsible for familiarising yourself with the document entitled "The dangers of cheating and plagiarism and how to avoid them" at <http://www.student.mq.edu.au/plagiarism/>.