

MACQUARIE
UNIVERSITY



FACULTY OF
BUSINESS AND ECONOMICS

ACST359/819
Actuarial Modelling

Semester 2, 2011

*Department of Applied Finance and Actuarial
Studies*

**MACQUARIE UNIVERSITY
FACULTY OF BUSINESS AND ECONOMICS
UNIT GUIDE**

Year and Semester:	Semester 2, 2011
Unit convenor:	Jim Farmer
ACST359 Prerequisite ACST819 Prerequisite	ACST354 (P) or ACST358 (P) ACST851 and STAT810

Students in this unit should read this unit guide carefully at the start of semester. It contains important information about the unit. If anything in it is unclear, please consult the unit convenor.

ABOUT THIS UNIT

Students will use survival models to estimate decrement rates from actual experience, compare these with the rates in standard tables, and prepare new standard tables. As part of the construction of new tables, consideration will be given to risk factors and the effects of selection; design of data collection; statistical analysis and graduation of the observed rates; and testing of the graduation. The unit concludes with a review of the principles of actuarial modelling and an introduction to the "actuarial control cycle", a conceptual framework of the processes for developing and managing financial enterprises and products.

TEACHING STAFF

Jim Farmer is the unit convenor. Lectures will be taken by Jim Farmer, David Pitt, Leonie Tickle and Glen Barnett. Bronwen Harrison will provide two classes on presentation skills.

Celeste Chai is the teaching administrator for this unit. Administrative questions that are not covered in this unit outline should be directed to her via the private Mail facility of the website. If the questions are of interest to everyone, the question and the reply will be posted to the website, so you should specifically request if you want your message to remain private.

Questions about unit content should be sent to the Discussion Board of the website or raised during tutorials or lectures.

CONSULTATION TIMES

In general, questions about the unit content should be sent to the Discussion Board, so that everyone gets to see the question and answer. However, David Pitt will be available for consultation on his topics at Monday 2pm to 5pm during teaching weeks 3 to 8.

Students experiencing significant difficulties with any topic in the unit are encouraged to seek assistance immediately.

CLASSES

The timetable for classes can be found on the University web site at www.timetables.mq.edu.au.

Lectures are held Tuesday 1 – 3 in W5A Price Theatre and Thursday 9 – 10 in C5C Forum, (formerly known as C5C T2). The unit material is covered in the three hours of lectures each week.

Tutorials are held Tuesday 9 – 10 and 5 – 6. **There are no tutorials in Week 1.** The tutorial will cover material from the previous week's lectures. The only tutorial you may attend is the one you are enrolled in. The tutorial is an opportunity for you to attempt the exercises given for each section of work, and to discuss problems with the tutor.

CLASS ETIQUETTE

Mobile phones should be switched off during all lectures and tutorials. If there is a reason for you to keep your phone on you should request to be allowed to do so before the start of the class. Lectures commence at 5 minutes past the hour and you are expected to be punctual. You are expected to keep talking to a minimum during classes so as not to disrupt your fellow students (and the lecturer!).

REQUIRED AND RECOMMENDED TEXTS AND/OR MATERIALS

Required texts

There are no required texts.

Lecture notes and/or copies of lecture overheads and/or solutions to lecture exercises will be available for downloading from the ACST359/819 teaching website. The nature of the material provided may differ from topic to topic, depending on who teaches that topic and the nature of the material taught. For most sections, there will be material on the web site which you will need to print in advance and bring to the relevant class. Other material such as solutions to exercises, will only become available after the relevant class.

Optional recommended text

The ActEd CT4 Notes are not set as required or recommended reading for this unit. However, if you have already purchased the notes for ACST358/818, you may find them useful as an additional source.

TECHNOLOGY USED AND REQUIRED

- Notes are provided in pdf format.
- Some data will be provided to students in the older Excel format denoted by the .xls extension. This can be read by most spreadsheet packages. The student labs provide access to Excel.
- For the class presentations, students may wish to use Powerpoint which is available in the Student Labs.
- Students will require a calculator for the final examination and the in-class test. Calculators which are programmable or which can store text are not allowed.

UNIT WEB PAGE

To access the website, go to <http://learn.mq.edu.au>.

Before logging in, you should follow the link labelled “Technical Information” and read all the information there, including the Information Technology Security Policy and Rules and the Information Technology Usage Rules. This technical information also mentions a number of “plugins” that may be required. Of those listed, in this unit you will only need Acrobat Reader and Java. (Technically, you only need software capable of displaying pdf files, and there are alternatives to Acrobat Reader.) Java was probably installed with your operating system and/or your browser, but Blackboard seems to be finicky about the version, and we have found we needed to upgrade the Java version on some older PCs. The “Browser tune-up” link should alert you if there are any difficulties.

If you have any trouble logging in (e.g. you have forgotten your password), please contact the Student IT Helpdesk.

When you login you will have access to the websites for all the units in which you are enrolled.

Remember to logout and close your browser when you have finished using the site. If you don't, another person can use the still running browser to access the website with your account.

The web site will be used as an integral part of this unit. It is used to distribute lecture and tutorial material and information about assessment tasks.

Discussions. You should use the web site's Discussion facility, along with the tutorial time, as your resource for asking questions about the content of the unit. Please address your questions to your fellow students – if there is no response or an incorrect response from the class the teaching staff will post a response. You are encouraged to post answers to other students' questions – this is one of the most effective ways to clarify your own understanding of the material. You should consult the Discussions frequently, to contribute to questions and see answers to queries.

LEARNING OUTCOMES

On completion of this unit you should be able to do the following.

1. Describe the principles of actuarial modelling.
2. Describe the Binomial and Poisson models of mortality, and derive maximum likelihood estimates where appropriate.
3. Develop and apply methods for estimating transition intensities depending on age, exactly or using the census approximation.
4. Test, using statistical methods, crude estimates for consistency with a standard table or set of graduated estimates, and interpret the results of the tests.
5. Apply, describe and analyse statistical methods of graduation of crude estimates.

6. Discuss the concept of the Actuarial Control Cycle, and apply it to a variety of straightforward practical commercial situations.

GRADUATE CAPABILITIES

In addition to the discipline-based learning objectives, all academic programs at Macquarie seek to develop the capabilities the University's graduates will need to develop to address the challenges, and to be effective, engaged participants in their world. This unit contributes to this by developing the following discipline specific knowledge and graduate capabilities:

1. Discipline Specific Knowledge and Skills:
 - (a) Have skills in fitting and assessing the reliability of statistical models, particularly in the context of financial applications.
 - (b) Have the ability to develop methods for measuring and manipulating the range of decrement rates relevant to actuarial problems.
2. Critical, Analytical and Integrative Thinking
3. Problem Solving and Research Capability
4. Effective Communication
5. Creative and Innovative
6. Capable of professional and personal and judgement and initiative

TEACHING AND LEARNING STRATEGY

- The unit is taught using three hours of lecture class times and one hour of tutorials each week.
- In many weeks, the lecture time will not be run in the traditional lecture format, but will involve class participation and group discussion. You are expected to actively participate in the these classes and in tutorials.

RELATIONSHIP BETWEEN ASSESSMENT AND LEARNING OUTCOMES

This unit is assessed using a class test, an assignment, a presentation, and a final examination. An assessment schedule is given in the following pages and any changes to the assessment or assessment due dates will be advised in classes.

In addition to tasks that count for assessment, you will be provided with exercises to attempt during the tutorials and / or in your own time. These exercises are aimed at helping you to understand the fundamental concepts before moving on to more difficult material. **They are not necessarily indicative of the difficulty of questions you could expect in the class test and on the final exam** (i.e. they are mostly easier, to assist your initial learning).

	Assignment	Presentation	Test	Exam
Description	Written report	Presentation on a paper recently presented to the Australian actuarial profession	In-class test covering sections 1 to 6	2 hour final examination
Due date	10 October – Noon	Weeks beginning 24 Oct and 31 Oct	4 Oct 1:05 pm	To be determined.
% Weighting	10%	10%	10%	70%
Grading method	Marked against a marking template.	Marked according to criteria given in the presentation task.	Marked against a marking template. Allowance for follow through errors will be given.	Marked against a marking template. Allowance for follow through errors will be given.
Submission method	Submit to assignment boxes at BESS	N/A	Handed in at conclusion of test	Handed in at conclusion of exam
Feedback	Marked assignments will be returned to students.	Feedback provided via BlackBoard	Marked papers returned to students. Solutions will highlight common problems.	-
Estimated student workload (hours)	19	15	20	35
Learning outcomes assessed	3 - 5	-	2 - 5	1 - 6
Graduate capabilities assessed	1	2 - 6	1 - 2	1 - 2

Week	Week Beginning	Lecturer	Tuesday 1-3 class	Thursday 9-10 class	Tutorial
1	1 Aug	JF	Lecture: Section 1 <i>Binomial and Poisson Models</i>	Lecture: Section 1 (cont)	(no tutorial)
2	8 Aug	DP	Lecture: Section 2 <i>Exposed to Risk I</i>	Lecture: Section 2 (cont)	Section 1 Exercises
3	15 Aug	DP	Lecture: Section 3 <i>Exposed to Risk II</i>	Lecture: Section 4 <i>Tests of Actual versus Expected</i>	Section 2 Exercises
4	22 Aug	DP	Lecture: Section 4 (cont)	Lecture: Section 4 (cont)	Section 3 Exercises
5	29 Aug	DP	Lecture: Section 5 <i>Graduation I</i>	Lecture: Section 5 (cont)	Section 4 Exercises / Discussion of early diagnostic task.
6	5 Sept	DP	Lecture: Section 6 <i>Graduation II</i>	Lecture: Section 6 (cont)	Section 5 Exercises
7	12 Sept	DP/LT	Lecture: Section 7 <i>Graduation III</i>	Introduction to Research	Section 6 Exercises
STUDY BREAK	19 Sept 26 Sept				
8	3 Oct	DP/BH	Test	Introduction to Presenting I	Solutions to test
9	10 Oct	GB	Lecture: Section 8 <i>Actuarial Modelling</i>	Lecture: Section 8 (cont)	Section 7 Exercises
10	17 Oct	LT/BH	Lecture: Section 9 <i>Introduction to the Actuarial Control Cycle</i>	Introduction to Presenting II	Section 8 Exercises
11	24 Oct		Class presentations	Class presentations	Section 9 Exercises
12	31 Oct		Class presentations	Class presentations	Exam question revision
13	7 Nov	JF	Unit surveys, exam information	-	-

Early Diagnostic Task

As an early diagnostic task, a non-assessable quiz will be distributed via the web site. Solutions will be discussed in the Week 5 tutorial.

Assignment

The assignment contributes 10% of the assessment weight. Assignments must be submitted to the appropriate assignment box at BESS by noon on Monday 10 October. This is a group assignment, where individual contributions are not individually assessed. Hence, in accordance with university policy, it will only be assessed on a pass/fail basis. Late submissions will only be accepted if every single member of the group is able to submit a valid special consideration request. (That is, don't rely on a single member of your group to accomplish the submission. We will not accept the excuse that the member of your group who was supposed to submit the assignment was delayed by sickness or traffic. You need a back-up plan to deal with this possibility.)

Class test

The class test will occur in the class on 4 October. It contributes 10% to the total assessment. It covers Sections 1 to 6.

An announcement will be made on the web site when assignments are ready for collection from BESS. If the marking is completed at a suitable time, we may return them at tutorials, with uncollected tests then being placed at BESS.

Presentation

The presentation contributes 10% of the assessment weight. While you will work in a group to develop your presentation, you will be marked on your individual performance.

Exam

The final examination is worth 70% of the final assessment for the unit. It will be a two-hour written paper with ten minutes reading time held during the University Examination period.

The University Examination period in Second Half Year 2011 is from 14 November to 2 December, including weekends. You are expected to present yourself for examination at the time and place designated in the University Examination Timetable. The timetable will be available in Draft form approximately eight weeks before the commencement of the examinations and in Final form approximately four weeks before the commencement of the examinations from <http://www.exams.mq.edu.au/>.

You are advised that it is Macquarie University policy not to set early examinations for individuals or groups of students. All students are expected to ensure that they are available until the end of the teaching semester, that is, the final day of the official examination period.

RULES REGARDING TESTS AND EXAMINATIONS

Normal examination rules apply to the conduct of the class test and the final examination. These rules are available at <http://www.exams.mq.edu.au/>. Students are responsible for familiarising themselves with these rules prior to the class test and final examination.

Calculators will be allowed in the class test and the final examination but a clear indication of the steps involved in every calculation must be shown. Calculators that are programmable, or which 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 test and final exam, and the make/model may be recorded.

Dictionaries will not be permitted in the class tests or the final examination.

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 test 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.

EXEMPTIONS

The units ACST358/818 and ACST359/819 together correspond to the professional subject CT4. The exemption will be recommended if and only if a SNG of at least 60 is achieved in both units and the average SNG is at least 65.

ACADEMIC HONESTY

The nature of scholarly endeavour, dependent as it is on the work of others, binds all members of the University community to abide by the principles of academic honesty. Its fundamental principle is that all staff and students act with integrity in the creation, development, application and use of ideas and information. This means that:

- all academic work claimed as original is the work of the author making the claim
- all academic collaborations are acknowledged
- academic work is not falsified in any way
- when the ideas of others are used, these ideas are acknowledged appropriately.

Further information on the academic honesty can be found in the Macquarie University Academic Honesty Policy at http://www.mq.edu.au/policy/docs/academic_honesty/policy.html

GRADES

Macquarie University uses the following grades in coursework units of study:

HD - High Distinction
D - Distinction
CR - Credit
P - Pass

F - Fail

Grade descriptors and other information concerning grading are contained in the Macquarie University Grading Policy which is available at:

<http://www.mq.edu.au/policy/docs/grading/policy.html>

GRADING APPEALS AND FINAL EXAMINATION SCRIPT VIEWING

If, at the conclusion of the unit, you have performed below expectations, and are considering lodging an appeal of grade and/or viewing your final exam script please refer to the following website which provides information about these processes and the cut off dates in the first instance. Please read the instructions provided concerning what constitutes a valid grounds for appeal before appealing your grade.

http://www.businessandconomics.mq.edu.au/new_and_current_students/undergraduate_current_students/how_do_i/grade_appeals

SPECIAL CONSIDERATION

The University is committed to equity and fairness in all aspects of its learning and teaching. In stating this commitment, the University recognises that there may be circumstances where a student is prevented by unavoidable disruption from performing in accordance with their ability. A special consideration policy exists to support students who experience serious and unavoidable disruption such that they do not reach their usual demonstrated performance level. The policy is available at:

http://www.mq.edu.au/policy/docs/special_consideration/policy.html

STUDENT SUPPORT SERVICES

Macquarie University provides a range of Academic Student Support Services. Details of these services can be accessed at <http://www.student.mq.edu.au>.

IT CONDITIONS OF USE

Access to all student computing facilities within the Faculty of Business and Economics is restricted to authorised coursework for approved units. Student ID cards must be displayed in the locations provided at all times.

Students are expected to act responsibly when utilising University IT facilities. The following regulations apply to the use of computing facilities and online services:

- Accessing inappropriate web sites or downloading inappropriate material is not permitted. Material that is not related to coursework for approved unit is deemed inappropriate.
- Downloading copyright material without permission from the copyright owner is illegal, and strictly prohibited. Students detected undertaking such activities will face disciplinary action, which may result in criminal proceedings.

Non-compliance with these conditions may result in disciplinary action without further notice.

Students must use their Macquarie University email addresses to communicate with staff as it is University policy that the University issued email account is used for official University communication.

INSTITUTE OF ACTUARIES OF AUSTRALIA

The Institute of Actuaries of Australia (IAAust) has recently launched a new free offer for students to become IAAust University Subscribers. Full time undergraduates studying at an Institute accredited university who are members of a university student actuarial society are eligible. To sign up, go to

<http://www.actuaries.asn.au/Membership/MembershipoftheInstitute/Subscriber.aspx>.

The University Subscriber offer is not a membership of the IAAust but a subscription to receive information on career opportunities, invitations to selected IAAust events and online publications. You might also consider joining the IAAust – there are advantages in doing so while a full-time student. For membership information, go to

<http://www.actuaries.asn.au/Membership/MembershipoftheInstitute.aspx>