



ACST859

Contingent Payments 1

S1 Day 2014

Applied Finance and Actuarial Studies

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General Information

Unit convenor and teaching staff

Unit Convenor

Xian Zhou

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E4A 607

Refer to the unit's web site

Credit points

4

Prerequisites

Corequisites

ACST851 and (STAT806 or STAT810 or (ACST601 and ACST604))

Co-badged status

Unit description

This unit covers the analysis of cash flows dependent on uncertain events of mortality. Single decrement survival models will be used to evaluate the expected present values of payments under life insurance and annuity contracts, and calculate the premiums of such contracts. The concepts of pricing and reserving for future contingent liabilities are considered, and the methods of calculating required reserves will be discussed.

Important Academic Dates

Information about important academic dates including deadlines for withdrawing from units are available at <https://www.mq.edu.au/study/calendar-of-dates>

Learning Outcomes

On successful completion of this unit, you will be able to:

Understand simple survival models and related properties

Master the skills to calculate the expected present values and the variances of benefits in standard life assurance and annuity contracts

Understand the concepts of select and ultimate mortalities and their applications

Familiar with the calculations of net premiums and reserves under various life insurance contracts

Able to calculate prospective and retrospective policy values under variable benefits and

with-profit life insurance policies

Understand the costs and profits of life insurance business and be able to calculate gross premiums and reserves

Assessment Tasks

Name	Weighting	Due
Assignment 1	10%	Thursday, 27 March 2014
Assignment 2	20%	Thursday, 8 May 2014
Final Examination	70%	University Examination Period

Assignment 1

Due: **Thursday, 27 March 2014**

Weighting: **10%**

Type of questions: Multiple-choice

Submission: By answer sheet

Extension: No extensions will be granted. Students who have not submitted the task prior to the deadline will be awarded a mark of 0 for the task, except for cases in which an application for special consideration is made and approved.

Penalties: Not applicable

What is required to complete the unit satisfactorily: Not Applicable

Weight: 10% upon passing the final examination

On successful completion you will be able to:

- Understand simple survival models and related properties
- Master the skills to calculate the expected present values and the variances of benefits in standard life assurance and annuity contracts
- Understand the concepts of select and ultimate mortalities and their applications

Assignment 2

Due: **Thursday, 8 May 2014**

Weighting: **20%**

Type of questions: Detailed solutions required

Submission: By answer sheets

Extension: No extensions will be granted. Students who have not submitted the task prior to the

deadline will be awarded a mark of 0 for the task, except for cases in which an application for special consideration is made and approved.

Penalties: Not applicable

What is required to complete the unit satisfactorily: 60 marks out of 100 are required for satisfactory coursework

Weight: 20% upon passing the final examination

On successful completion you will be able to:

- Understand simple survival models and related properties
- Master the skills to calculate the expected present values and the variances of benefits in standard life assurance and annuity contracts
- Understand the concepts of select and ultimate mortalities and their applications
- Familiar with the calculations of net premiums and reserves under various life insurance contracts
- Able to calculate prospective and retrospective policy values under variable benefits and with-profit life insurance policies

Final Examination

Due: **University Examination Period**

Weighting: **70%**

Examination conditions: Open-book, any materials on paper allowed

Type of questions: A combination of multiple-choice and questions requiring detailed solutions

What is required to complete the unit satisfactorily: Passing the final examination is required to pass this unit.

On successful completion you will be able to:

- Understand simple survival models and related properties
- Master the skills to calculate the expected present values and the variances of benefits in standard life assurance and annuity contracts
- Understand the concepts of select and ultimate mortalities and their applications
- Familiar with the calculations of net premiums and reserves under various life insurance contracts
- Able to calculate prospective and retrospective policy values under variable benefits and with-profit life insurance policies
- Understand the costs and profits of life insurance business and be able to calculate gross premiums and reserves

Delivery and Resources

Classes

This unit is taught through 3 hours of lectures and 2 hours of tutorials per week.

Tutorials start in Week 1.

The timetable for classes can be found on the University web site at: <http://www.timetables.mq.edu.au/>

Required and Recommended Texts and/or Materials

Lecture Notes are the required materials and will be posted on the website before the lectures.

The main additional reading materials are the ActEd CT5 notes Chapters 1 to 7 inclusive. This will also be used as background reading for ACST860.

Technology Used and Required

You will need access to the internet to obtain course information and download teaching materials from the unit website.

It is your responsibility to check the unit website regularly to make sure that you are up-to-date with the information for the unit.

Unit Web Page

Course materials are available on the learning management system (iLearn).

The web page for this unit can be found at: <http://ilearn.mq.edu.au>

Teaching and Learning Activities

The unit is taught through 3 hours of lectures and 2 hours of tutorial per week. Lectures cover the topics and materials in accordance with the syllabus of Subject CT5 of Institute of Actuaries (IA). Tutorials will discuss exercise questions covered by the lectures.

Students are expected to listen carefully to all lectures and tutorials; participate in discussions during tutorials, read relevant materials in advance; review the knowledge learnt in classes; and complete all assignments independently.

The planned week-by-week list of the topics is provided in Unit Schedule. Note that this is a tentative schedule, and small departures are expected on the basis of week to week progress.

Changes Since the Last Offering of This Unit

Teaching materials are updated.

Unit Schedule

Week	Topics covered
1	Review of probability; Expected present value; Introduction to survival models
2	Life assurance contracts
3	Life annuity contracts
4	The Life table; Select mortality
5	Evaluation of life insurance contracts
6	Net premiums and reserves
BREAK	
7	Prospective and retrospective policy values
8	Policies with variable benefits
9	With-profit policies
10	Gross premiums
11	Gross premiums and reserves; Profit and loss in life insurance
12	Profit and loss in life insurance
13	Revision

Note: This is only a tentative schedule. Small departures are expected on the basis of week to week progress.

Learning and Teaching Activities

Teaching

The unit is taught through 3 hours of lectures and 2 hours of tutorial per week. Lectures will cover the topics and materials in accordance with the syllabus of Subject CT5 of Institute of Actuaries (IA). Tutorials will discuss exercise questions covered by the lectures.

Learning

Students are expected to listen carefully to all lectures and tutorials; participate in discussions during tutorials, read relevant materials in advance; review the knowledge learnt in classes; and complete all Assessment and Practice Tasks independently.

Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central](#). Students should be aware of the following policies in particular with regard to Learning and Teaching:

Academic Honesty Policy http://mq.edu.au/policy/docs/academic_honesty/policy.html

Assessment Policy <http://mq.edu.au/policy/docs/assessment/policy.html>

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

Grade Appeal Policy <http://mq.edu.au/policy/docs/gradeappeal/policy.html>

Grievance Management Policy http://mq.edu.au/policy/docs/grievance_management/policy.html

Disruption to Studies Policy http://www.mq.edu.au/policy/docs/disruption_studies/policy.html *The Disruption to Studies Policy is effective from March 3 2014 and replaces the Special Consideration Policy.*

In addition, a number of other policies can be found in the [Learning and Teaching Category](#) of Policy Central.

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: https://students.mq.edu.au/support/student_conduct/

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.businessandeconomics.mq.edu.au/new_and_current_students/undergraduate_current_students/how_do_i/grade_appeals/

Special Consideration Policy

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

Supplementary Examination Dates

Further information regarding supplementary exams, including dates, is available here

http://www.businessandeconomics.mq.edu.au/current_students/undergraduate/how_do_i/special_consideration

[eration](#)

Student Support

Macquarie University provides a range of support services for students. For details, visit <http://students.mq.edu.au/support/>

Learning Skills

Learning Skills (mq.edu.au/learningskills) provides academic writing resources and study strategies to improve your marks and take control of your study.

- [Workshops](#)
- [StudyWise](#)
- [Academic Integrity Module for Students](#)
- [Ask a Learning Adviser](#)

Student Services and Support

Students with a disability are encouraged to contact the [Disability Service](#) who can provide appropriate help with any issues that arise during their studies.

Student Enquiries

For all student enquiries, visit Student Connect at ask.mq.edu.au

IT Help

For help with University computer systems and technology, visit <http://informatics.mq.edu.au/help/>.

When using the University's IT, you must adhere to the [Acceptable Use Policy](#). The policy applies to all who connect to the MQ network including students.

Graduate Capabilities

PG - Discipline Knowledge and Skills

Our postgraduates will be able to demonstrate a significantly enhanced depth and breadth of knowledge, scholarly understanding, and specific subject content knowledge in their chosen fields.

This graduate capability is supported by:

Learning outcomes

- Understand simple survival models and related properties
- Master the skills to calculate the expected present values and the variances of benefits in standard life assurance and annuity contracts
- Understand the concepts of select and ultimate mortalities and their applications

- Familiar with the calculations of net premiums and reserves under various life insurance contracts
- Able to calculate prospective and retrospective policy values under variable benefits and with-profit life insurance policies
- Understand the costs and profits of life insurance business and be able to calculate gross premiums and reserves

Assessment tasks

- Assignment 1
- Assignment 2
- Final Examination

PG - Critical, Analytical and Integrative Thinking

Our postgraduates will be capable of utilising and reflecting on prior knowledge and experience, of applying higher level critical thinking skills, and of integrating and synthesising learning and knowledge from a range of sources and environments. A characteristic of this form of thinking is the generation of new, professionally oriented knowledge through personal or group-based critique of practice and theory.

This graduate capability is supported by:

Learning outcomes

- Master the skills to calculate the expected present values and the variances of benefits in standard life assurance and annuity contracts
- Understand the concepts of select and ultimate mortalities and their applications
- Familiar with the calculations of net premiums and reserves under various life insurance contracts
- Able to calculate prospective and retrospective policy values under variable benefits and with-profit life insurance policies
- Understand the costs and profits of life insurance business and be able to calculate gross premiums and reserves

Assessment tasks

- Assignment 1
- Assignment 2
- Final Examination

PG - Research and Problem Solving Capability

Our postgraduates will be capable of systematic enquiry; able to use research skills to create new knowledge that can be applied to real world issues, or contribute to a field of study or

practice to enhance society. They will be capable of creative questioning, problem finding and problem solving.

This graduate capability is supported by:

Learning outcomes

- Master the skills to calculate the expected present values and the variances of benefits in standard life assurance and annuity contracts
- Understand the concepts of select and ultimate mortalities and their applications
- Familiar with the calculations of net premiums and reserves under various life insurance contracts
- Able to calculate prospective and retrospective policy values under variable benefits and with-profit life insurance policies
- Understand the costs and profits of life insurance business and be able to calculate gross premiums and reserves

Assessment tasks

- Assignment 2
- Final Examination

Research and Practice

- This unit uses research from external sources

Research underlying the topic of “life contingencies” goes back to original attempts to construct life tables (see Gaunt J (1646): Natural and Political Observations made upon the Bills of Mortality)

First attempts to price life insurance contracts were mainly done in England. For a discussion of the same and pertinent references see the introduction to eg De Jong, P and Ferris, S (2006) Adverse selection spirals. *Astin Bulletin*, 36(2):589.

- This unit gives you practice in applying research findings in your assignments