ACST255

Contingent Payments 1

S2 Day 2014

Applied Finance and Actuarial Studies

Contents

General Information

Unit convenor and teaching staff
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Credit points
3

Prerequisites
Admission to BActStud and ACST152(P) and ACST202(P) and STAT272(P) and GPA of 2.5

Corequisites

Co-badged status

Unit description
This unit covers the analysis of cash flows dependent on uncertain events due to mortality and other factors. It introduces the concept of the expected present value of payments under various life insurance contracts, including whole life, term and endowment assurances; immediate and temporary annuities; and deferred assurances and annuities. The standard international actuarial notation in life insurance is used extensively. Probability models and life tables are used to calculate the expected present values accurately based on ultimate or select mortality. Furthermore, important concepts of pricing and reserving for future contingent liabilities are discussed. Equations of value are established to calculate net premiums. Prospective and retrospective net premium reserves required to meet future liabilities are determined and compared. The concepts and methods are then extended to gross premiums and reserves that make allowance for profits and expenses. Students gaining a grade of credit or higher in both ACST255 and ACST355 are eligible for exemption from subject CT5 of the professional exams of the Institute of Actuaries of Australia.

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

General Assessment Information

- **To be eligible to pass this unit, a pass is required in the final examination**
- C**riteria and standards for grading**
  - **N**umerically correct answers based on correct reasoning
- **Submission methods**
  - Assignments are submitted via iLearn
  - Midterm is in class on the indicated date
- **Late assessments, extensions, penalties, resubmissions**
  - 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.
- **Midterm and Final examination conditions.**
  - You are permitted ONE A4 page of paper containing reference material printed on both sides. The material may be handwritten or typed. The page will not be returned at the end of the midterm or final examination.
  - It is the responsibility of students to view their marks for each within session assessment on iLearn within 20 working days of posting. If there are any

discrepancies, students must contact the unit convenor immediately. Failure to do so will mean that queries received after the release of final results regarding assessment marks (not including the final exam mark) will not be addressed.

- **Standardised Numerical Grade (SNG)** will be awarded based on your overall performance. An SNG gives you an indication of how you have performed within the band for your descriptive grade. The SNG is not a mark, and you may not be able to work it out based on your raw examination and other assessment marks. Nor are you able to determine you are "one mark away" from a different grade.
- **Supplementary Exams.** Further information regarding supplementary exams, including dates, is available here *http://www.businessandeconomics.mq.edu.au/current_students/undergraduate/how_do_i/special_consideration*

Assessment Tasks

Name	Weighting	Due
Assignment 1	10%	29/08/2014
Class Test	10%	Tuesday 7/10/2014
Assignment 2	10%	14/11/2014
Final Examination	70%	Exam period

Assignment 1

Due: **29/08/2014**
Weighting: **10%**

Perform various calculations to do with life insurance contract valuation

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

Class Test

Due: **Tuesday 7/10/2014**
Weighting: **10%**

One hour in class test

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: **14/11/2014**
Weighting: **10%**

Reserving calculations

On successful completion you will be able to:

- 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

Final Examination

Due: **Exam period**
Weighting: **70%**

3 hour exam scheduled as per final examination schedule

On successful completion you will be able to:

- 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

- **Technology used and required:**
  - Calculator (non programmable only are allowed in Midterm/Final
  - You will need access to the internet to obtain course information and download teaching materials.
  - For some exercises it may be helpful and/or useful to use a spreadsheet program.
- **Required unit materials**
  - Course notes available through iLearn
  - Lecture Notes will be posted on the website before the lectures.
- **Recommended readings**
  - The main additional reading materials are the ActEd CT5 Notes (2011or later edition).
  - Reading of the ActEd CT5 Notes (Chapters 1 – 7) will considerably enhance the benefits you can gain from the lectures.
  - The ActEd notes can be purchased through ASSOC. More information about ASSOC can be found at its website http://www.mqassoc.org
  - Additional reference texts are
    - Life Contingencies -- JordanURL
    - Life Contingencies -- Neill
- **What is required to complete the unit satisfactorily**
  - Must pass final exam
- **Link to the Timetables portal:**
  - http://timetables.mq.edu.au

Unit Schedule

We will follow Lecture Notes 1-11 in order at a pace consistent with class understanding.

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/

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

Discipline Specific Knowledge and Skills

Our graduates will take with them the intellectual development, depth and breadth of knowledge, scholarly understanding, and specific subject content in their chosen fields to make them competent and confident in their subject or profession. They will be able to demonstrate, where relevant, professional technical competence and meet professional standards. They will be able to articulate the structure of knowledge of their discipline, be able to adapt discipline-specific knowledge to novel situations, and be able to contribute from their discipline to inter-disciplinary solutions to problems.

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
- Class Test
- Assignment 2
- Final Examination

Critical, Analytical and Integrative Thinking

We want our graduates to be capable of reasoning, questioning and analysing, and to integrate and synthesise learning and knowledge from a range of sources and environments; to be able to critique constraints, assumptions and limitations; to be able to think independently and systemically in relation to scholarly activity, in the workplace, and in the world. We want them to have a level of scientific and information technology literacy.

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
- Class Test
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- Final Examination

Problem Solving and Research Capability

Our graduates should be capable of researching; of analysing, and interpreting and assessing data and information in various forms; of drawing connections across fields of knowledge; and they should be able to relate their knowledge to complex situations at work or in the world, in order to diagnose and solve problems. We want them to have the confidence to take the initiative in doing so, within an awareness of their own limitations.

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
- Class Test
- Assignment 2
- Final Examination

Creative and Innovative

Our graduates will also be capable of creative thinking and of creating knowledge. They will be imaginative and open to experience and capable of innovation at work and in the community. We want them to be engaged in applying their critical, creative thinking.

This graduate capability is supported by:

Learning outcomes

- 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

Changes from Previous Offering

This year there are two assignments. Previous years only had 1.

Research and Practice

This unit teaches the principles and mechanics of "Expected Present Value" pricing where the uncertainty is based on mortality. Much research is presently undertaken on "longevity risk" and its interaction with "interest rate" and "market" risk. Also superannuation and the potential shortfalls therein are also the object of much research. The tools and techniques taught in this course are instrumental in coming to grips, understanding, and addressing these issues.

Changes since First Published

Date	Description
07/09/2014	Changed midterm date

Date	Description
14/01/2014	The Prerequisites was updated.