



# ACST355

## Contingent Payments 2

S2 Day 2016

*Dept of Applied Finance and Actuarial Studies*

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#### **Disclaimer**

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## General Information

Unit convenor and teaching staff

Unit convenor and lecturer

Leonie Tickle

(Please use Dialogue, not Macquarie email)

Contact via Dialogue tool on the teaching website or during consultation

E4A608

Wednesday 10-11 during teaching weeks, or other times by appointment

Tutor

Nicole Andrianopoulos

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Contact via tutorials

-

-

Credit points

3

Prerequisites

ACST358

Corequisites

Co-badged status

Unit description

This unit covers the advanced analysis of cash flows dependent on uncertain events. Multiple decrement and multiple state models are considered, and the valuation of benefits and contributions under superannuation plans is examined. Techniques for the valuation of annuity and assurance products involving two lives are developed. Expected cash flow models and profit test models are developed for life insurance products including traditional products and unbundled unit linked contracts. The concepts of pricing and reserving for future contingent liabilities, and the effect of the pricing and reserving basis on the emergence of profit, are considered. 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:

Extend the techniques learned in ACST255/859 to permit the calculation and analysis of cashflows dependent upon the death or survival of either or both of two lives, and cashflows dependent upon a fixed term as well as age.

Describe, develop, apply and analyse methods used to model cashflows contingent upon competing risks; construct and use multiple decrement service tables, and demonstrate understanding of the relationship with associated single decrement tables.

Describe, apply and analyse the technique of discounted emerging costs for use in pricing, reserving and assessing profitability, for superannuation funds and related multiple decrement tables, traditional life insurance contracts and unit linked policies.

Define, describe and illustrate the principal forms of heterogeneity within a population and the ways in which selection can occur.

Define, calculate and analyse the use of various single figure indices, explain the rationale behind the indices, and explain the advantages and disadvantages of the indices for summarising and comparing actual experience in different scenarios.

Demonstrate the ability to identify key unit concepts and to integrate them to solve and analyse novel problems.

## General Assessment Information

The following apply to the class tests and the final examination:

- You are permitted ONE A4 page of paper containing reference material printed on both sides. The material may be handwritten or typed.
- Any mortality or statistical tables that you require will be provided for you.
- Non-programmable calculators with no text storage/retrieval capacity permitted.
- Dictionaries are not permitted.
- For full marks, clear and complete working must be shown.

For all assessments:

- Assessment criteria for all assessment tasks will be provided on the unit iLearn site.
- All individual assessment results will be made available under Grades on the website. For the tests, class-level results, marking guide and feedback on common errors will also be available from the website.
- 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.

## Assessment Tasks

Name	Weighting	Due
Assessed coursework	10%	Wednesdays 11.55 pm
Class Tests	30%	12 September, 31 October
Final Examination	60%	University Examination Period

### Assessed coursework

Due: **Wednesdays 11.55 pm**

Weighting: **10%**

### Online quizzes

The four online quizzes are worth 2.5% each. Quiz 1 is on Sections 1-3, Quiz 2 is on Sections 4-6, Quiz 3 is on Sections 7-8, and Quiz 4 is on Sections 9-10. The quizzes are due Wednesday (at 11.55 pm) in weeks 4, mid-session break first week, 11 and 13, and are submitted online via the iLearn site. You should not leave the submission of quizzes until the last minute in case there are system or other problems. (In the rare case of prolonged University-wide technology problems, allowances will be made for all students).

Please ensure that you answer all quiz questions with the specified rounding, and in the required format. **Marks cannot be reinstated for rounding or formatting errors so please do not request this.**

Feedback on each quiz will be made available automatically once the quiz has been submitted and the deadline for the quiz has passed.

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 disruptions to studies is made and approved.

Please note that the quizzes aim at assisting your initial learning of concepts, before moving on to more difficult material. They are not indicative of the difficulty of questions you could expect in a test or examination.

Please use the first quiz as an indicator of whether you are progressing satisfactorily in the unit. If you are having difficulties, please see the Unit Convenor and consider withdrawing before the census date on Friday of week 4.

On successful completion you will be able to:

- Extend the techniques learned in ACST255/859 to permit the calculation and analysis of cashflows dependent upon the death or survival of either or both of two lives, and cashflows dependent upon a fixed term as well as age.
- Describe, develop, apply and analyse methods used to model cashflows contingent upon competing risks; construct and use multiple decrement service tables, and demonstrate understanding of the relationship with associated single decrement tables.
- Describe, apply and analyse the technique of discounted emerging costs for use in pricing, reserving and assessing profitability, for superannuation funds and related multiple decrement tables, traditional life insurance contracts and unit linked policies.
- Define, describe and illustrate the principal forms of heterogeneity within a population and the ways in which selection can occur.
- Define, calculate and analyse the use of various single figure indices, explain the rationale behind the indices, and explain the advantages and disadvantages of the indices for summarising and comparing actual experience in different scenarios.
- Demonstrate the ability to identify key unit concepts and to integrate them to solve and analyse novel problems.

## Class Tests

Due: **12 September, 31 October**

Weighting: **30%**

The class tests will be 75 minute written papers with no reading time, held during the lecture time. Class test 1 will cover Sections 1 to 5 inclusive and class test 2 will cover Sections 6 to 9 inclusive.

Marked test scripts will be returned via BESS. It is intended that marked papers and feedback will be returned within 10 working days of the class test date.

On successful completion you will be able to:

- Extend the techniques learned in ACST255/859 to permit the calculation and analysis of cashflows dependent upon the death or survival of either or both of two lives, and cashflows dependent upon a fixed term as well as age.
- Describe, develop, apply and analyse methods used to model cashflows contingent upon competing risks; construct and use multiple decrement service tables, and demonstrate understanding of the relationship with associated single decrement tables.
- Describe, apply and analyse the technique of discounted emerging costs for use in pricing, reserving and assessing profitability, for superannuation funds and related multiple decrement tables, traditional life insurance contracts and unit linked policies.

- Define, describe and illustrate the principal forms of heterogeneity within a population and the ways in which selection can occur.
- Demonstrate the ability to identify key unit concepts and to integrate them to solve and analyse novel problems.

## Final Examination

Due: **University Examination Period**

Weighting: **60%**

The final examination will be a three-hour written paper with ten minutes reading time, held during the University Examination period.

On successful completion you will be able to:

- Extend the techniques learned in ACST255/859 to permit the calculation and analysis of cashflows dependent upon the death or survival of either or both of two lives, and cashflows dependent upon a fixed term as well as age.
- Describe, develop, apply and analyse methods used to model cashflows contingent upon competing risks; construct and use multiple decrement service tables, and demonstrate understanding of the relationship with associated single decrement tables.
- Describe, apply and analyse the technique of discounted emerging costs for use in pricing, reserving and assessing profitability, for superannuation funds and related multiple decrement tables, traditional life insurance contracts and unit linked policies.
- Define, describe and illustrate the principal forms of heterogeneity within a population and the ways in which selection can occur.
- Define, calculate and analyse the use of various single figure indices, explain the rationale behind the indices, and explain the advantages and disadvantages of the indices for summarising and comparing actual experience in different scenarios.
- Demonstrate the ability to identify key unit concepts and to integrate them to solve and analyse novel problems.

## Delivery and Resources

### Classes

The timetables for classes can be found on the University website at:

<http://www.timetables.mq.edu.au>. Tutorials commence in week 2 of the session. All lecture classes for weeks 8, 9 and 10 will be held in the computer labs (specific locations will be advised on iLearn announcements in week 1 of session).

## Required and recommended texts and / or materials

**Optional text.** Detailed lecture materials are provided and it is not envisaged that you will require a text.

**Lecture handouts.** Lecture handouts are available for downloading from the website in advance of lecture classes. Print these (at 100% size) and bring them to the relevant lecture. It is expected that you will have these notes in all lectures.

**Tables.** The Formulae and Tables for Actuarial Examinations book is not required for this unit, and will not be provided in the examination. Instead, you will be asked to generate your own set of tables, based on up-to-date UK mortality tables. There will be Tables Tasks exercises set in the early weeks of the unit that will give you details of how to construct the tables and provide results to spot check your answers. In addition to generating results for your future use, the aim of these tasks is to help you to revise relevant results from ACST255/859. It is important that you keep up-to-date with the Tables Tasks so that you can use your tables to answer questions throughout this unit.

## Technology used and required

You will be required to use the teaching website, Excel and Word.

## Unit webpage

Course material is available on the learning management system (iLearn). To access the teaching website, go to <http://ilearn.mq.edu.au> and login using your usual login and password.

## Teaching and learning activities

**Lectures.** The unit material is covered in the three hours of lectures each week.

**Tutorials.** The tutorial is an opportunity for you to discuss the exercises available for each section of work with your tutor.

**Computer lab classes.** These will replace all of the lecture classes in weeks 8, 9 and 10.

**Material to bring to classes.** You are expected to bring to all classes the relevant lecture handout printout for the current and previous weeks, blank paper to complete exercises, a calculator, and your completed Tables Tasks.

## Unit Schedule

Week	Monday Lecture	Wednesday Lecture	Tutorials	Assessment
	Section 1: Joint life and last survivor statuses	Section 2: Simple annuities and assurances involving two lives	No tutorial	-
	Section 2 (cont)	Section 3: Contingent and reversionary benefits	Sections 1 and 2	-

Week	Monday Lecture	Wednesday Lecture	Tutorials	Assessment
	Section 3 (cont)	Section 4: Competing risks	Section 3	-
	Section 4 (cont)	Section 5: Multiple decrement tables	Section 4	Quiz 1
	Section 5 (cont)	Section 6: Superannuation funds	Section 5	-
	Section 6 (cont)	Mock test (optional)	Revision	-
	Class test	Class test review	Section 6	-
	MID-SEMESTER STUDY BREAK			Quiz 2
	MID-SEMESTER STUDY BREAK			-
	PUBLIC HOLIDAY	Section 7: Profit testing - conventional business (in labs)	No tutorials	-
	Section 7 (cont)	Section 8: Profit testing - unit-linked business (in labs)	Section 7	-
	Section 8 (cont)	Profit testing revision (in labs)	Section 8	-
	Section 9: Mortality risk factors and selection	Section 10: Mortality indices	Section 9	Quiz 3
	Class test	Section 10 (cont)	Section 10	-
	Revision and exam information	Revision	No tutorial	Quiz 4

## 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](http://mq.edu.au/policy/docs/academic_honesty/policy.html)

**New Assessment Policy in effect from Session 2 2016** [http://mq.edu.au/policy/docs/assessment/policy\\_2016.html](http://mq.edu.au/policy/docs/assessment/policy_2016.html). For more information visit [http://students.mq.edu.au/events/2016/07/19/new\\_assessment\\_policy\\_in\\_place\\_from\\_session\\_2/](http://students.mq.edu.au/events/2016/07/19/new_assessment_policy_in_place_from_session_2/)



Assessment Policy prior to Session 2 2016 <http://mq.edu.au/policy/docs/assessment/policy.html>

Grading Policy prior to Session 2 2016 <http://mq.edu.au/policy/docs/grading/policy.html>

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

Complaint Management Procedure for Students and Members of the Public [http://www.mq.edu.au/policy/docs/complaint\\_management/procedure.html](http://www.mq.edu.au/policy/docs/complaint_management/procedure.html)

Disruption to Studies Policy [http://www.mq.edu.au/policy/docs/disruption\\_studies/policy.html](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/](https://students.mq.edu.au/support/student_conduct/)

## Results

Results shown in *iLearn*, or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be made available in [eStudent](#). For more information visit [ask.mq.edu.au](http://ask.mq.edu.au).

## 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](http://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](http://ask.mq.edu.au)

## IT Help

For help with University computer systems and technology, visit [http://www.mq.edu.au/about\\_us/offices\\_and\\_units/information\\_technology/help/](http://www.mq.edu.au/about_us/offices_and_units/information_technology/help/).

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

## Supplementary Examinations

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

[http://www.businessandconomics.mq.edu.au/current\\_students/undergraduate/how\\_do\\_i/disruption\\_to\\_studies](http://www.businessandconomics.mq.edu.au/current_students/undergraduate/how_do_i/disruption_to_studies)

## 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

- Extend the techniques learned in ACST255/859 to permit the calculation and analysis of cashflows dependent upon the death or survival of either or both of two lives, and cashflows dependent upon a fixed term as well as age.
- Describe, develop, apply and analyse methods used to model cashflows contingent upon competing risks; construct and use multiple decrement service tables, and demonstrate understanding of the relationship with associated single decrement tables.
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indices for summarising and comparing actual experience in different scenarios.

## **Assessment tasks**

- Assessed coursework
- Class Tests
- 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**

- Extend the techniques learned in ACST255/859 to permit the calculation and analysis of cashflows dependent upon the death or survival of either or both of two lives, and cashflows dependent upon a fixed term as well as age.
- Describe, develop, apply and analyse methods used to model cashflows contingent upon competing risks; construct and use multiple decrement service tables, and demonstrate understanding of the relationship with associated single decrement tables.
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- Demonstrate the ability to identify key unit concepts and to integrate them to solve and analyse novel problems.

## **Assessment tasks**

- Assessed coursework
- Class Tests
- 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

- Extend the techniques learned in ACST255/859 to permit the calculation and analysis of cashflows dependent upon the death or survival of either or both of two lives, and cashflows dependent upon a fixed term as well as age.
- Describe, develop, apply and analyse methods used to model cashflows contingent upon competing risks; construct and use multiple decrement service tables, and demonstrate understanding of the relationship with associated single decrement tables.
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- Demonstrate the ability to identify key unit concepts and to integrate them to solve and analyse novel problems.

### Assessment tasks

- Assessed coursework
- Class Tests
- Final Examination

## Changes from Previous Offering

There have been minor changes to the lecture and tutorial materials. The assessment structure is new this year.

## Research and Practice

This unit uses research by Macquarie University researchers, as well as from other Australian and international researchers (references are given in the unit notes).

You are also required to source and use Australian and international research as part of the assignment in this unit.