

**Division of Economic and Financial Studies
Actuarial Studies Department**



ACST859

Contingent Payments 1

FIRST SEMESTER 2008

UNIT OUTLINE

Teaching Staff Involved in the Unit

The staff involved in the teaching of this unit are

| Staff Member | Email | Telephone | Room |
|---|--------------------------------|------------------|-------------|
| Dr Jiwook Jang (Unit Co-ordinator) | jjang@efs.mq.edu.au | 9850 8575 | E4A 613 |
| Weihao Choo (Tutor) | weihao.choo@students.mq.edu.au | | E4A 622A |
| Yu-Fan (Jack) Ng (Unit Administrator) | yng@efs.mq.edu.au | | E4A 622C |

Academic queries should be directed to the Unit Co-ordinator. All non-academic queries should be addressed to the Unit Administrator. All questions should be initially posted on WebCT.

Unit Details

Unit Name: Contingent Payments 1

Credit Points: 4

Prerequisites: ACST851(P); STAT810(P); STAT272(P) or its equivalent

Please consult the Unit Co-ordinator if you do not meet any of the prerequisite requirements for the unit.

Unit Description

This unit covers the analysis of cash flows dependent on uncertain events. Single decrement survival models will be used to analyse the present value of payments under life insurance and annuity contracts. The concepts of pricing and reserving for future contingent liabilities are considered.

A comprehensive understanding of the compound interest and statistical concepts contained in the pre-requisites is assumed. You should revise these units as soon as possible if necessary.

Unit Objectives / Syllabus

The units ACST859 and ACST860 together correspond to the professional subject CT5.

Exemptions

The units ACST859 and ACST860 together correspond to the professional subject CT5. The exemption will be recommended if and only if a SNG of at least 60 is achieved in both units and the average standardised numerical grade (SNG) is at least 65.

Unit Timetable

The unit material is covered in the three hours of lectures each week. The tutorial is an opportunity for you to attempt questions for each section of work, or to ask the tutor questions. You should also use the Discussion Board to ask questions or discuss concepts covered in the unit.

| Week Number | Week Beginning | Topic Covered | Test | Lecturer |
|--------------------|----------------------|---|---------------|----------|
| 1 | 25 February | Introduction of Life Tables | | J Jang |
| 2 | 3 March | Assurance | | J Jang |
| 3 | 10 March | Assurance and Annuities | | J Jang |
| 4 | 17 March | Annuities | | J Jang |
| 5 | 24 March | Easter Monday holiday | | |
| 6 | 31 March | Net Premiums | | J Jang |
| 7 | 7 April | Net and Gross Premiums, 90-Minutes Class Test | TEST 1 | J Jang |
| STUDY BREAK | 14 April 21 April | | | |
| 8 | 28 April | Net and Gross Premiums | | J Jang |
| 9 | 5 May | Reserving and Alteration of contracts | | J Jang |

| | | | | |
|----|--------|--|--------|--------|
| 10 | 12 May | Reserving using Thiele's differential equation, 90-Minutes Class Test | TEST 2 | J Jang |
| 11 | 19 May | Reserving based on gross premium | | J Jang |
| 12 | 26 May | Reserving based on gross premium | | J Jang |
| 13 | 2 June | Revision | | J Jang |

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.

Assumed Knowledge and Skills

Students need to be able to use a computer to analyse contingency problems. You should be able to use a word processing package (such as WORD), a spreadsheet (such as EXCEL), a statistical package (such as MINITAB) and a programming language (such as Visual Basic or Matlab). **Although the unit does not aim to teach students how to use computers, as this is covered in prerequisite units, you are encouraged to make use of spreadsheets and other software packages in solving in-class exercises.** You need to have a sound grasp of probability, statistics along with a sound understanding of the mathematics of compound interest.

Lectures and Tutorials

This unit will consist of 3 hours of lectures and 2 hours tutorial per week. Lectures are held at the following times:

| Day | Time | Location |
|--------|----------------------|----------|
| Monday | 9.00 am – 12:00 noon | W6B345 |

One tutorial is held on every Thursday:

| Day | Time | Location |
|----------|-------------------|----------|
| Thursday | 4.00 pm – 6:00 pm | W5C311 |

Tutorial starts in Week 2.

Weekly tutorial exercises will be available from the unit web site at least a week before its tutorial. Solutions to the tutorial exercises will be available from the web site immediately after the tutorial.

This tutorial is an opportunity for you to work on the week's tutorial questions and to obtain help with them as needed. The more preparation you do for the tutorial, the more you will benefit from the session.

Any alterations to the tutorial hours, times, locations or enrolments will be advised in lectures and/or on the unit webpage.

ACST859 Web site

This web site uses software called WebCT. To access this web site, go to <http://online.mq.edu.au> and log on. This leads you to a page which lists all Macquarie University WebCT sites to which you have access.

If you did not understand the above, you can obtain training on how to use a web browser by contacting the Information Technology Training Unit on Level 1 of the Library. If you can't access the site due to having forgotten your password, contact the Information Technology Customer Support Desk also on Level 1 of the Library.

Before logging in to this site, you should follow the link labelled "Technical Information" and read all the information there, including the Computer and Communications Security Policy and the Computer and Communications Usage Rules. This technical information mentions a number of "plug-ins" that may be required. Of those listed, in this unit you will only need Acrobat Reader.

You can access this web site from any computer with internet access including those in the library.

The website will be used extensively for this unit so please consult the website regularly for course information. You are reminded that all initial enquiries about the course material should be posted on WebCT as this will eliminate the case where the same question is asked many times.

Learning Outcomes

The learning objectives of this unit are summarised at the start of each section of work. You should revise these after each week to ensure your understanding of the material.

In addition to the discipline-based learning objectives, all academic programs at Macquarie seek to develop students' generic skills in a range of areas. One of the aims of this unit is that students develop their skills in the following: *Critical analysis skills; Problem-solving skills.*

Textbooks

Lecture notes are mainly from the below recommended textbook:

| Title | Author | Chapters |
|-----------------------|--|-----------------------------------|
| Actuarial Mathematics | Newton L. Bowers, JR., Hans U. Geber, James C. Hickman, Donald A. Jones and Cecil J. Nesbitt | Chapters 3, 4, 5, 6, 7, 8, 15, 16 |

This textbook can only be purchased on request via special order through the Co-op bookshop. Two copies of this book will be placed in the Reserve Section of the Library.

Lecture notes can also be found from the ActEd Study Materials (subject CT5). You can purchase these notes via ASSOC at a discounted price. Information about their availability and price will be confirmed on WebCT and in the lectures.

Those who want to view a copy of the ActEd CT5 notes during the semester should contact the teaching assistant using Private Mail on the ACST859 website. Arrangements will be made for you to view them in the Department of Actuarial Studies. The notes are not available in the library. **This reference copy of the notes cannot under any circumstances be photocopied.**

Lecture notes used in the lectures will be available from the web site at least a week before each lecture. You may find it useful to use these as a skeleton to take notes during the lectures. Lectures will sometimes include some additional content and examples to illustrate key points.

A preliminary reading of the recommended textbook, *Actuarial Mathematics* and the ActEd notes before each lecture will considerably enhance the benefits you can gain from the lectures.

Tables

The *Formulae and Tables for Actuarial Examinations* book is not required for this unit, and will not be provided in the examination.

Tables needed for calculations the tutorials will be attached to tutorial sheets. Tables needed in the class tests or the examination will be provided with the test or examination papers.

Grading

Macquarie University uses the grades HD, D, Cr, P, PC and F for grading the achievements of students in units of study. The grades of achievement are defined as follows:

High Distinction (HD) denotes performance which meets all unit objectives in such an exceptional way and with such marked excellence that it deserves the highest level of recognition.

Distinction (D) denotes performance which clearly deserves a very high level of recognition as an excellent achievement in the unit.

Credit (Cr) denotes performance which is substantially better than would normally be expected of competent students in the unit.

Pass (P) denotes performance which satisfies unit objectives.

Conceded Pass (PC) denotes performance which meets unit objectives only marginally.

Fail (F) denotes performance which does not meet unit objectives.

This subject, while quantitative in nature, requires students to demonstrate substantial problem-solving skills and a clear understanding of the theory. It is not possible to achieve a Distinction grade or above by just memorising formulae or principles.

The assessment tasks in ACST859 aim to test your knowledge and understanding of the basic formulae and principles as well as your ability to apply what you have learnt in practical situations. As professionals in the future, you will often encounter business problems that are unfamiliar to you but they are in fact an extension of the theory you have already learnt. In being able to recognise the problem in that context will allow you to come up with a solution. You will encounter more of these business problems when you study Part II and Part III.

This table is a guide to the meaning of each grade in the context of ACST859:

| Grade | Level of understanding represented by that grade |
|--------------|--|
| HD | <ul style="list-style-type: none"> • Able to apply basic principles to solve unfamiliar, non-standard problems • Able to accurately perform complex numeric procedures & explain or interpret results using non-technical terms |
| D | <ul style="list-style-type: none"> • Able to apply basic principles to solve problems which differ significantly from the familiar • Able to accurately perform more demanding numeric procedures & explain or interpret results clearly and concisely |
| CR | <ul style="list-style-type: none"> • Able to apply basic principles to solve problems which differ slightly from the familiar • Able to perform numeric procedures that require some problem-solving skills & explain or interpret results on some occasions |
| P | <ul style="list-style-type: none"> • Able to apply basic principles to solve standard problems in familiar scenarios • Able to accurately perform standard numeric procedures that are more mechanical in nature, or those that require very little problem-solving skills |
| PC | <ul style="list-style-type: none"> • Marginally satisfactory achievement of P level understanding • Able to accurately perform a limited range of numeric procedures, but not able to explain them clearly |
| F | <ul style="list-style-type: none"> • No evidence of achieving P level understanding |

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. 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. In particular, note that the raw marks may be scaled in order to determine the Single Numerical Grade (SNG).

SNG's are not marks but are a ranking of students based on marks obtained from all facets of the unit assessment. The SNG's awarded in a particular unit are designed to indicate that the students in each performance band, from HD to PC, have satisfied the criteria for

inclusion in that band and ranks them by their performance within that band. Since the ranges of SNG's differ from band to band the relationship between the raw marks and the SNG's may differ from band to band even within the same unit. The relationship between raw marks and SNG's would almost always differ between units.

Assessment

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

| | | |
|---------------------|--|------|
| Mid-Semester Test 1 | Cover topics from weeks 1 to 4 inclusive | 7.5% |
| Mid-Semester Test 2 | Cover topics from weeks 1 to 8 inclusive | 7.5% |
| Final Examination | Cover all topics | 85% |

Mid-Semester Test

There will be two mid-semester tests of ninety (90) minutes duration with five (5) minutes reading time. The 1st mid-semester test **covers the topics from Weeks 1 to 4 inclusive** and the second mid-semester test **covers the topics from Weeks 1 to 8 inclusive**. The 1st test is scheduled for **Monday 7th April 2008** and will be conducted during the lecture time (10:00am – 12:00noon). The 2nd test is scheduled for **Monday 12th May 2008** and will be conducted during the lecture time (10:00am – 12:00noon). The venue for the tests will be confirmed in the lectures and posted on the discussion board on WebCT. Please note that the mid-semester tests date, time and coverage may be subject to change and that any alterations will be advised in lectures/on WebCT.

The format of the mid-semester test will be a written paper consisting of three (3) questions. You will answer in the spaces provided on the test paper, although a writing booklet will be distributed to you for scribbling (which is NOT collected or marked). All answers must be written in black or blue pen or a pencil (do NOT use a red pen).

Normal examination rules apply to the conduct of mid-semester test. These rules are set out under the heading "Conduct of Examinations" in the Student Information – Assessment section of the current Macquarie University Handbook of Undergraduate Studies. You are responsible for familiarising themselves with these rules prior to the class test. **There will not be a make-up test for those who are absent for the mid-semester test. You must provide a legitimate reason for your absence and where approved, your final grade for ACST859 will depend SOLELY on your performance in the final examination.**

When the tests are marked, you will be notified to collect them from ERIC (E4B106).

You will be allowed to take a calculator that is silent and has no text-retrieval capacity **plus** one A4 page into the test (handwritten or typed and filled in on however many sides).

Final Examination

The final examination will be a three-hour written paper with ten (10) minutes reading time. The examination will cover the whole course.

There will be a mix of calculation questions and short answer questions that require you to demonstrate a deeper understanding of the material.

You will be allowed to take a calculator that is silent and has no text-retrieval capacity **plus** one A4 page into the exam (handwritten or typed and filled in on however many sides).

Legibility of Handwriting

You should ensure that your handwriting in the class assessment tasks and in the final examination is legible. Sections of work that are not legible will not be marked. For true/false questions, answers that are not clearly legible as either T or F will be assumed to be wrong and marked accordingly.

Special Consideration

Applications for special consideration in respect of a class test or other class assessment task 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 a class test or other class assessment task, or for the 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.

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

Mobile Phones

Academic Senate has resolved that no mobile phones should be used in classrooms or be brought into examination rooms. Mobile phones must be switched off during class tests.

Calculators/Computers

Calculators will be allowed in the class tests and the final examination 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.

Reference Material

Copies of any additional readings, assignments, and other unit material will be placed in the Reserve Section of the Library.

Material for at least some sections of work is available online, along with email and chat facilities, from: <http://online.mq.edu.au/student/>

The Institute of Actuaries of Australia

Please refer to http://www.actuary.mq.edu.au/current_students/join_institute.shtml for information on the advantages of joining the Institute of Actuaries of Australia as a student.

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 "What is plagiarism?" at <http://www.student.mq.edu.au/plagiarism.html>.