ACST4032 / ACST8041  
Actuarial Control Cycle A2

**Course Description**  
The aim of the Actuarial Control Cycle is to provide students with an understanding of underlying actuarial principles that may be applied to a range of problems and issues in commercial and business environments. Students are expected to develop a holistic approach to practical problem solving, and develop a level of judgement and professional skills required to successfully apply actuarial principles. The syllabus relates to actuarial practice both in the financial services and in other industries. Examples will be drawn from traditional and non-traditional areas to illustrate and establish the underlying actuarial principles in a problem based learning approach, using case studies and business-based examples.

This subject, in conjunction with ACST4031/8040 and ACST4033/8033, provides the opportunity for exemption from the Part II academic requirements of the Actuaries Institute. Such exemption depends on the grades attained over all three subjects.

<table>
<thead>
<tr>
<th>Semester and Year</th>
<th>Semester 2 2014</th>
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</table>
| Course URL        | http://programsandcourses.anu.edu.au/course/ACST4032  
                    http://programsandcourses.anu.edu.au/course/ACST8041 |
| Mode of Delivery  | On campus       |
| Prerequisites     | STAT3038 or STAT6045 |
| Incompatible Courses | Nil          |
| Course Convener  | Ms Bridget Browne |
| Office Location:  | Rm 3.58 CBE Building 26C |
| Phone:            | 6125 7373       |
| Email:            | bridget.browne@anu.edu.au |
| Consultation hours| TBA In Week 1   |

**Bio and research interests**  
Bridget joined ANU in 2011 after serving as Life Chief Pricing Actuary at Partner Reinsurance Europe Ltd where she was responsible for all aspects of pricing of Partner Re’s Life portfolio worldwide, including the full range of traditional and alternative mortality and longevity transactions. Prior to her work with Partner Re, Bridget worked in a variety of actuarial roles with Zurich Financial Services in Australia and Canada and Hazell Carr in the UK. Bridget is a Fellow of the Institute of Actuaries of Australia and the Institute and Faculty of Actuaries of the UK. She is an affiliate member of the Institut des Actuaires of France and a Chartered Enterprise Risk Actuary.

**Student Administrators**  
Ms Anna Pickering  
RSFAS School Office, 4th Floor CBE Building 26C
COURSE OVERVIEW

Course Learning Outcomes

Upon successful completion of the requirements for this course, students will be able to:

1. Monitor and assess experience
2. Determine an appropriate assumption set
3. Apply relevant approaches and techniques to the valuation of liabilities
4. Measure, report and manage solvency
5. Understand the methods and implications of various approaches to profit measurement
6. Understand the calculation of appraisal values
7. Apply appropriate techniques to the pricing of products and contracts; and
8. Manage the business and respond to the experience

The detailed syllabus is set out at the end of this document.

Research-Led Teaching

This course covers the relevant parts of the Actuaries Institute Part II syllabus. It will be informed by practical examples and case studies of relevance to professional and research issues currently faced by the profession.

There will also be several guest speakers throughout the course. These speakers have many years of experience and professional practice and their presentations will address key aspects of Part II learning outcomes.

Continuous Improvement

We use feedback from students, professional bodies and staff to make regular improvements to the course. In response to this feedback, design improvements from the previous version of the course include:

- Incorporation of guest lecturers
- Increased usage of the discussion forums in Wattle

Technology, Software, Equipment

Students should be familiar with the Microsoft Office software or equivalent ie Word, Excel and PowerPoint.

Students are strongly encouraged to bring a laptop or tablet to class for Case Studies and Computer based exercises. Working in pairs or three’s is encouraged, so students may share laptops with others.

Requisites

STAT3038 or STAT6045 is a pre-requisite.

It is highly recommended that students complete ACST4031 / ACST8040 Actuarial Control Cycle A1 before undertaking this course.

Co-teaching

This Course Outline applies to both ACST4032 and ACST8041 Actuarial Control Cycle A2. All teaching and assessment for these courses is identical.
Student Feedback
All CBE courses are evaluated using Student Experience of Learning and Teaching (SELT) surveys, administered by Planning and Statistical Services at the ANU. These surveys are offered online, and students will be notified via email to their ANU address when surveys are available in each course. Feedback is used for course development so please take the time to respond thoughtfully. Course feedback is anonymous and provides the Colleges, University Education Committee and Academic Board with opportunities to recognise excellent teaching and to improve courses across the university. For more information on student surveys at ANU and reports on feedback provided on ANU courses, visit
http://unistats.anu.edu.au/surveys/selt/students/ and
http://unistats.anu.edu.au/surveys/selt/results/learning/

COURSE SCHEDULE

<table>
<thead>
<tr>
<th>Week</th>
<th>Summary of Topics</th>
<th>Activities and Readings</th>
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<tr>
<td>0</td>
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<td>UAM means the Course Text</td>
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<tr>
<td>1</td>
<td>Experience Analysis</td>
<td>UAM Ch 17</td>
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<td>2</td>
<td>Experience Analysis</td>
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<tr>
<td>3</td>
<td>Experience Analysis</td>
<td>Computer based exercise</td>
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<td>Assumption Setting</td>
<td>UAM Ch 10</td>
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<tr>
<td>4</td>
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<td>Case Study</td>
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<td>Assumption Setting</td>
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<td>5</td>
<td>Assumption Setting</td>
<td>Computer based exercise</td>
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<tr>
<td>6</td>
<td>Assumption Setting</td>
<td>Case Study</td>
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<td>Liabilities</td>
<td>UAM Ch 12</td>
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<tr>
<td>7</td>
<td>Liabilities</td>
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<td>Mid Semester Break</td>
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<td>8</td>
<td>Solvency</td>
<td>UAM Ch 15</td>
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<tr>
<td></td>
<td>Profit</td>
<td>UAM Ch 16</td>
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<tr>
<td>9</td>
<td>Solvency</td>
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<td></td>
<td>Profit</td>
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<td>10</td>
<td>Appraisal Values</td>
<td>UAM Ch 13</td>
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<td>Pricing</td>
<td>Computer based exercise</td>
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<td>Manage the Business</td>
<td>UAM Ch 18</td>
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<td>12</td>
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<td>Case Study</td>
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<td>Review</td>
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<td>13</td>
<td>Manage the Business</td>
<td>Case Study</td>
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<td></td>
<td>Review</td>
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There will be several external guest lecturers during semester. The dates of these visits will be confirmed in class and on the Wattle site.

Lecture times
Lectures are held on Tuesdays from 12 noon to 2pm in CBE Bldg LT 4; and on Thursdays from 12 noon to 1pm in CBE Bldg LT 3.
COURSE ASSESSMENT

Assessment Summary

<table>
<thead>
<tr>
<th>Item</th>
<th>Title</th>
<th>Value</th>
<th>Due Date</th>
<th>Linked Learning Outcomes</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Assignment 1</td>
<td>15%</td>
<td>29/8</td>
<td>LO1-2</td>
</tr>
<tr>
<td>2</td>
<td>Assignment 2</td>
<td>15%</td>
<td>10/10</td>
<td>LO3-6</td>
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<tr>
<td>3</td>
<td>Final exam</td>
<td>70%</td>
<td>TBA</td>
<td>LO1-8</td>
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Assessment Task 1: Assignment 1
Details of task:

Word limit: 3 000 words
Due date: Friday 29 August 5:00pm (Week 6)

Details to be provided on Wattle site.

Assessment Task 2: Assignment 2
Details of task:

Word limit: 3 000 words
Due date: Monday 13 October 9:00 am (Week 11)

Details to be provided on Wattle site.

Assessment Task 3: Final Exam
Details of task:
The final exam will be 3 hours long plus an additional 15 minutes as reading time.

For the exam, you will be permitted to bring in a calculator, an English dictionary if required, the Course Textbook, plus 2 A4 sheets of paper with your own notes written on them.

Further details regarding the exam will be provided closer to the scheduled date.

Assignment Submission
Assignments are submitted using the course Wattle site. Submitted assignments must include the cover sheet provided on Wattle. Please keep a copy of the assignment for your records.

The ANU is using Turnitin where possible to enhance student citation and referencing techniques, and to assess assignment submissions as a component of the University's approach to managing Academic Integrity. For additional information regarding Turnitin please visit ANU Online.

Extensions and Penalties
All work must be submitted by the due date and time. Anything that is submitted after the relevant date and time will receive a mark of 0%.
**Returning Assignments**
Marked assessments will be returned as soon as they are marked, at the next available lecture time, or you will be able to collect them from the course convenor.

**Scaling**
Your final mark for the course will be based on the raw marks allocated for each assignment or examination. However, your final mark may not be the same number as produced by that formula, as marks may be scaled. Any scaling applied will preserve the rank order of raw marks (i.e. if your raw mark exceeds that of another student, then your scaled mark will exceed or equal the scaled mark of that student), and may be either up or down.

**Referencing Requirements**
All material used should be referenced in your assignments. References in the body of the report should conform to the styles:

Jones (2008) models the ....

(see, Jones, 2008; Smith, 2005; and Foster, 1997).

For multiple authors of a reference state the first authors name and use *et al.* (short for the latin expression *et alii* which means ‘and others’), e.g., (Roberts *et al.*, 2007)

Include at the end of your required reports a bibliography that lists only those references that have been cited in the body of your report. The bibliography does not count towards the 3000 word limit. References in the bibliography should conform to the following styles:


Websites can be referenced as follows (note that the date that you accessed the website should be included as the contents of websites can change):


**READING LISTS**


Other reading and reference material will be made available on Wattle throughout the semester.
COMMUNICATION

Email
If necessary, the lecturer for this course will contact students on their official ANU student email address. Information about your enrolment and fees from the Registrar and Student Services’ office will also be sent to this email address.

Announcements
Students are expected to check the Wattle site for announcements about this course, e.g. changes to timetables or notifications of cancellations. Notifications of emergency cancellations of lectures or tutorials will be posted on the door of the relevant room.

Course URLs
More information about this course may be found on:

• Programs and Courses (http://programsandcourses.anu.edu.au/2014/Catalogue )
• the College of Business and Economics website (http://cbe.anu.edu/courses) and
• Wattle (https://wattle.anu.edu.au), the University's online learning environment. Log on to Wattle using your student number and your ISIS password.

University subscription to the Institute of Actuaries
The Institute of Actuaries of Australia (IAAust) allows students to become IAAust University Subscribers free of charge. 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.

General information for actuarial students
A generic Wattle site has been created for actuarial students called “Actuarial Students’ News and Information”. The purpose of this page is to provide actuarial students with up to date news on the actuarial profession, requirements for qualification, job opportunities and any other relevant information. To access it, login to Wattle and in the “Search Courses” box at the top of the page search for “Actuarial”. Then find the link to the “Actuarial Students’ News and Information” page and click on it, selecting “Yes” to enrol in the course. You will remain enrolled in the site for the remainder of your degree at ANU.
**Exemption Standard**

The standard for exemptions from the Institute Part II is achievement of a weighted Distinction grade average (70% or better) over the combination of each of the three units ACST4031/8040, ACST4032/8041 and ACST4032/8033, with a minimum requirement of 60% in each unit.

The weights will be

- ACST4031/8040 33.3%
- ACST4032/8041 33.3%
- ACST4033/8033 33.3%

**POLICIES**

The University offers a number of support services for students. Information on these is available online from [http://students.anu.edu.au/studentlife/](http://students.anu.edu.au/studentlife/).

ANU has educational policies, procedures and guidelines, which are designed to ensure that staff and students are aware of the University’s academic standards, and implement them. You can find the University’s education policies and an explanatory glossary at: [http://policies.anu.edu.au/](http://policies.anu.edu.au/)

Students are expected to have read the **Student Academic Integrity** Policy before the commencement of their course.

Other key policies include:

- Student Assessment (Coursework)
- Student Surveys and Evaluations
ACST4032/ACST8041 Detailed Syllabus

10. Monitor and Assess Experience
   a) Identify the need for experience to be monitored, and the critical elements of experience relevant to particular products or entities
   b) Identify appropriate measures of experience
   c) Undertake an experience analysis
   d) Examine the practical issues involved, including data difficulties
   e) Explain the need for analysis of the financial impact of experience and its place in the Control Cycle
   f) Identify the items of such analysis relevant to particular products or entities
   g) Undertake an analysis of the financial impact of experience in a simplified situation
   h) Examine the practical issues involved, including the use of approximations
   i) Explain how returns on asset portfolios should be monitored and assessed, including the appropriate usage of the different methods of calculating returns, performance attribution to asset classes and security selection, and analysis of risk
   j) Demonstrate how to monitor the ongoing validity of the strategic asset allocation adopted in light of experience
   k) Discuss and apply criteria by which the success of the investment decision can be assessed over time, and identify how the asset liability monitoring process can be used to benefit the investment decision process

11. Determine an Appropriate Assumption Set
   a) For each assumption used in the modelling process, specify the information required, explain its relevance, examine problems that may arise in obtaining the required information, including difficulties with data, and explain how these issues may be addressed in determining the appropriate assumption
   b) Recognise the issues arising when assumptions are determined on a regular cycle rather than at a single point
   c) Demonstrate an understanding of the need for internal consistency between the individual assumptions in an assumption set
   d) Determine an appropriate assumption set in a variety of practical situations

12. Apply Relevant Approaches and Techniques to the Valuation of Liabilities
   a) Compare and contrast the different purposes for which a valuation of liabilities may be needed
   b) Relate data requirements, specification, verification, correction and materiality to the purpose of the valuation of liabilities
   c) Discuss and apply the major criteria in the selection of discount factors
   d) Explain the need for assessing sensitivities and reasonableness of the valuations, identifying the major drivers of change, both at a point in time and over time, and how these may be communicated
   e) Examine the issues in spreading the cost for commitments, such as defined benefit superannuation, where costs are being met over a period, and describe, in broad terms, the techniques used
   f) Explain how guarantees and other options for long-term products can be incorporated in the valuation of liabilities
   g) Apply the valuation of liabilities in a variety of practical situations
13. Measure, Report and Manage Solvency
   a) Compare and contrast the different purposes for which a comprehensive valuation of liabilities and assets may be needed, including the various purposes for which these values might be reported
   b) Recognise alternative measures of solvency with reference to assets and liabilities
   c) Describe the different approaches to dealing with uncertainty in measuring liabilities and assets, including the difficulties of placing a value on risk
   d) Understand the approaches adopted by APRA in respect to solvency of the institutions whom they regulate
   e) Discuss the interaction between solvency, best estimates of liabilities, prudential margins and release of profit
   f) Discuss how consumers can be protected from the effects of insolvency, including the role of regulators, professions and guarantee schemes
   g) Identify the issues involved in dealing with insolvency/“winding-up”
   h) Communicate valuation methodology and results to stakeholders

14. Understand the Methods and Implications of Various Approaches to Profit Measurement
   a) Discuss the different approaches which are used to measure profit
   b) Relate the interaction between the valuation process and the timing of release of profit
   c) Describe, in broad terms, techniques used to manage the release of profit on ongoing contracts
   d) Communicate the results to stakeholders

15. Understand the Calculation of Appraisal Values
   a) Calculate embedded value and appraisal values
   b) Discuss the uses of these measures of profitability and value

16. Apply Appropriate Techniques to the Pricing of Products and Contracts
   a) Discuss the general objectives of pricing for each stakeholder, and examine the interrelationship of their particular needs and requirements
   b) Describe and apply processes for setting margins (either implicit or explicit) which may be used in the pricing process
   c) Describe the role of profit testing and its relationship with the desired return on capital invested
   d) Apply the pricing process in a variety of practical situations

17. Manage the Business and Respond to the Experience
   a) Discuss how changes in experience impact on the management of businesses
      a) Outline ways of responding to the experience, other than distribution of surplus
      b) Explain the issues of distribution of surplus, including equity, solvency and practicality
      c) Apply methodologies for allocating investment return to individual accounts, for both unitised and non-unitised products, and discuss the issues which arise in practice
      d) Discuss appropriate ways of allocating profit for an insurer and achieving equity between different groups of policyholders and shareholders
      e) Examine the methods available to handle surpluses or deficits within superannuation plans and achieving equity between groups of members
      f) Discuss management processes such as claims control, expenses control, financial control systems and audit controls