ACST4033/ACST8033
Actuarial Control Cycle B

Course Description
This course covers investment and asset modeling for the purpose of liability portfolio management in the financial services industry, with a specific focus on life insurers, general insurers and superannuation funds. The course will cover development of investment strategies with regard to liability characteristics and within regulatory constraints. The use of long term stochastic actuarial models of assets and liabilities in the context of designing and monitoring investment strategies will be covered, including model characteristics and limitations.

<table>
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<th>Semester and Year</th>
<th>Semester 2, 2014</th>
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<tbody>
<tr>
<td>Mode of Delivery</td>
<td>On campus</td>
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<tr>
<td>Prerequisites</td>
<td>STAT3038/6045</td>
</tr>
<tr>
<td>Course Convener</td>
<td>Dr Garry Khemka</td>
</tr>
<tr>
<td>Office Location:</td>
<td>CBE Building 26C Rm 4.27</td>
</tr>
<tr>
<td>Phone:</td>
<td>6125 7287</td>
</tr>
<tr>
<td>Email:</td>
<td><a href="mailto:Gaurav.Khemka@anu.edu.au">Gaurav.Khemka@anu.edu.au</a></td>
</tr>
<tr>
<td>Consultation hours:</td>
<td>Wednesday, 2-4pm</td>
</tr>
<tr>
<td>Student Administrators</td>
<td>Maria Lander</td>
</tr>
<tr>
<td></td>
<td>Level 4, ANUCBE Bldg. 26C</td>
</tr>
<tr>
<td></td>
<td><a href="mailto:Maria.Lander@anu.edu.au">Maria.Lander@anu.edu.au</a></td>
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http://programsandcourses.anu.edu.au/course/ACST8033
COURSE OVERVIEW

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

1. Demonstrate an understanding of the characteristics, returns and risk factors of the different types of investment
2. Apply the methods used for the valuation of investments
3. Develop an understanding of the major economic, financial and practical theories relevant to investment
4. Describe the characteristics and limitations of the major stochastic investment models
5. Derive relevant assumptions for each of these models
6. Understand the impact of the liabilities on investment objectives and constraints
7. Demonstrate the ability to build a relevant stochastic model
8. Formulate an appropriate investment strategy for a given liability portfolio
9. Discuss the practical implementation of investment strategy

The full, detailed syllabus for this component of the Part II course is included 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.

Technology, Software, Equipment
This course requires knowledge of Microsoft Word and Excel.

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

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</table>

**Lecture times**

Lectures are held on Wednesdays from 12noon-2pm in CBE Bld LT 4; and on Fridays from 1pm-2pm in CBE Bld LT 4.

The only exception is in weeks 7, 9 and 11 where the Wednesday lectures (but not the Friday lectures) will be run as computer labs in Gould 113. These lectures are from 11am-1pm.
### COURSE ASSESSMENT

#### Assessment Summary

<table>
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<th>Item</th>
<th>Title</th>
<th>Value</th>
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<tr>
<td>1</td>
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<td>2</td>
<td>Assignment 2</td>
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<td>17th October, 12noon</td>
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<td>3</td>
<td>Final Exam</td>
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<td>Centrally Timetabled</td>
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**Assignment 1**

2500 words

Due: 5 September 2014 12:00noon

Over the 49 years ending December 2013 Warren Buffett (Berkshire Hathaway) has achieved a compound rate of return of 19.7% p.a. Such consistent, long term, outperformance might be viewed as incompatible with modern finance theory.

Discuss the Berkshire Hathaway phenomenon in the context of modern finance theory dealing with both those parts of the theory which are supported by the Berkshire Hathaway phenomenon and those which are contradicted by it.

Buffet’s response to the “global financial crisis” and other market crises is a relevant consideration.

**Assignment 2**

Will be released by the end of Week 3 of the term.

**Assignment Submission**

The ANU is using Turnitin 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.

All assignments are to be submitted electronically through Turnitin. Please keep a copy of the assignment for your records. Assignments submitted via Turnitin do not require a cover sheet.

**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%.

Applications may be made for extensions of the due date in the event of material and unforeseen events. Workload in other courses or paid employment is not an acceptable reasons for an extension!
Returning Assignments

Marked assignments 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.

Examinations

The final exam will be 3 hours long plus an additional 15 minutes as reading time. The exam will be held in a PC Lab.

For the final exam, you will be permitted to bring in a non-programmable calculator, an English dictionary (if required) and the Formulae and Tables for Actuarial Examinations textbook.

Further details relating to these exams will be provided closer to the time of each respective examination.

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 sources accompanying your work must be properly cited. Harvard referencing is most preferable (https://academicskills.anu.edu.au/resources/handouts/referencing-style-guides). Accepted academic practice can be found via the links on the Wattle sites, under the file named “ANU and College Policies, Program Information, Student Support Services and Assessment”. For a more interactive guide on what this is all about, please see http://library.acadiau.ca/tutorials/plagiarism/.

READING LISTS

Fitzherbert R., Investment Principles for Actuaries

This publication is available from the Institute of Actuaries of Australia. The textbook can be accessed at http://actuaries.asn.au/knowledge-bank/book-shop?id=32

Recommended but not required:

Mandelbrot B.B. & Hudson R.L. (2008), The (Mis) Behaviour of Markets

Taleb N.N (2004), Fooled by Randomness: The Hidden Role of Chance in Life and in the Markets

Taleb N.N (2007), The Black Swan: The Impact of the Highly Improbable

Other relevant reading material will be distributed – via Wattle - during the semester.
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

<table>
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<th>Course Code</th>
<th>Weight</th>
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<tr>
<td>ACST4031/8040</td>
<td>33.3%</td>
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<tr>
<td>ACST4032/8041</td>
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<tr>
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</tbody>
</table>

COMMUNICATION

Email
If necessary, the lecturers and tutors 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
All course materials will be available on Wattle, the University’s online learning environment. Log on to Wattle using your student number and your ISIS password. (https://wattle.anu.edu.au).

POLICIES

The University offers a number of support services for students. Information on these is available online from 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/

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
- College policies on extensions, late submissions etc.
PART IIB - Actuarial Control Cycle - Detailed Syllabus

ACST4033/ACST8033

1. Demonstrate an Understanding of the Characteristics, Returns and Risk Factors of the Different Types of Investment
   a) Explain the characteristics of each of the different types of investment
   b) Explain the returns expected of different investment types under different economic conditions
   c) Demonstrate an understanding of the risk factors, including issuer default, counterparty failure, systemic liquidity, the collapse of speculative bubbles, shocks to the system and cyclical/structural changes for each type of investment

2. Apply the Methods Used for the Valuation of Investments
   a) Describe the principles, implicit assumptions and limitations of the main methods used to value the common forms of debt, equity, property and derivative securities
   b) Determine the data required to perform a valuation of each type of investment

3. Develop an Understanding of the Major Economic, Financial and Practical Theories Relevant to Investment
   a) Develop an understanding of the application and limitations of the major economic, financial and practical theories relevant to investment
      a. the efficient market hypothesis,
      b. the capital asset pricing model,
      c. multi-factor pricing models,
      d. fundamental analysis
      e. “charting”
      f. theories from behavioural finance
      g. fractal finance
   b) Critically evaluate each of these theories and discuss the evidence for and against the validity of each one

4. Understand the Impact of the Liabilities on Investment Objectives and Constraints
   a) Describe the needs of different investors in terms of the role of liabilities, the attitude to risk, liquidity requirements and any gearing restrictions, taxation and regulatory constraints that should be taken into account in establishing an investment strategy
   b) Determine investment objectives and material constraints based on the nature of the liabilities

5. Describe the Characteristics and Limitations of the Major Stochastic Investment Models
   a) Describe the characteristics of each of the major stochastic investment models
   b) Understand the differences in structure and implicit assumptions between each of the models
   c) Critically evaluate the suitability of each model for a given context
   d) Understand the “success” of each model’s past predictions against the actual outcomes

6. Derive Relevant Parameters for each of these Models
   a) Demonstrate the ability to select the appropriate data
   b) Derive parameters from this data which is consistent with the structure, characteristics and implicit assumptions of each model

7. Demonstrate the Ability to Build a Relevant Stochastic Investment Model
   a) Select a stochastic investment model appropriate to a particular situation
b) Determine the parameters for the selected model given the particular situation

c) Build and apply the model

8. **Formulate an Appropriate Investment Strategy for a Given Liability Portfolio**
   a) Demonstrate the ability to optimise asset/liability matching to achieve the best match of durations, investment returns and volatility constraints
   b) Manage the relationship between this optimisation and the availability of capital and other constraints
   c) Formulate a strategic asset allocation, including using an asset liability model where appropriate
   d) Examine the imperfections and compromises of the model and the process

9. **Discuss the Practical Implementation of Investment Strategy**
   a) Discuss the practical implementation of investment strategy, including manager selection, the roles of major stakeholders (fund managers, custodians, etc.), performance measurement, and manager replacement in the process.
   b) Determine the relevant constraints on manager freedom