SUBJECT REVIEW

2018 MID-YEAR EDITION

Contents

Preface

By now, you have probably ascertained that you may want to be an actuary. But what must one learn to become an actuary? A quick Google search for "actuarial science" will bring up this Wikipedia definition:

> Actuarial science is the discipline that applies mathematical and statistical methods to assess risk in insurance, finance and other industries and professions.

Perhaps this suggests a predominant study of mathematics, statistics, and finance. Nevertheless, this gives no headway as to what exactly an actuarial student may encounter in their university studies. As it turns out, the path to becoming an actuary is arduously complex, and the Actuarial Students' Society has recognised this.

This publication is the product of the society's efforts to create greater transparency regarding the subjects studied as part of an Actuarial Studies major under the *Bachelor of Commerce* degree. Through this, we hope that students hoping to graduate from the major may gain not only greater insight into the content studied in these subjects, but also general tips and advice that past students have provided based on their own experience. With authors coming from a range of different backgrounds, we hope to highlight the obstacles and challenges in each subject so that students may prepare themselves better for their studies.

In the 2018 mid-year edition of the *Actuarial Students' Society Subject Review*, 3 new subjects were reviewed, in addition to updating reviews for each of the core subjects of the Actuarial Studies major. The *Actuarial Students' Society Subject Review* contains up-to-date reviews for all subjects that contribute to the accreditation process. In addition to subjects relevant to the *Masters of Commerce (Actuarial Science)* course, an effort is being made to include subjects relevant to the *Masters of Actuarial Science* course.

Due to the change to the *Bachelor of Commerce* structure in 2017, actuarial students must now take a level–2 commerce electives. With this in mind, a focus for the 2018 mid-year edition of the *Actuarial Students' Society Subject Review* was to include more of these electives to assist actuarial students in deciding the right elective for them, whether they wanted a subject to broaden their study options, to learn concepts to complement their developing actuarial skillset, or to have a "bludge" subject. With the upcoming shake-up of the actuarial qualification process by the Actuaries' Institute, even more changes will be occurring to the *Bachelor of Commerce* degree, and the *Actuarial Students' Society Subject Review* will undeniably be a great resource to help future students during the transition.

Invariably, each review will be an expression of opinion — we urge readers to be conscious of this fact, as the subject experience may differ from individual to individual.

Please take note of the year and semester of each subject review. Subject content, structure, and personnel undergo continuous change, and it is important to recognise whether the reviewed curriculum has since been superseded. Such reviews will, however, still serve as a reliable reference for the general direction of the subject.

If you are interested in submitting a subject review for the next edition of this guide, please contact the Actuarial Students' Society at contact@melbourneactuary.com.

About the Actuarial Students' Society

The Actuarial Students' Society is the representative body for all Actuarial students at the University of Melbourne. Since being founded by Actuarial students in the mid-90s, the society has been an important link between students, the university, and employers. Our aim is to enhance the social and professional lives of our members. We help prospective actuaries build bridges and make connections with other students, mentors, and potential employers.

We host an array of events throughout the year and all students are welcome to attend. We provide valuable exposure to the industry at our premier event of the year, Contact Night, as well as career luncheons and workshops. Events such as Trivia Night, Poker Night, and Pool Night are great ways to make friends and have fun with fellow students and qualified actuaries in a relaxed, informal manner.

Our sponsors are industry leaders and always on the lookout for the best and brightest. We provide our members with information regarding internship and employment opportunities directly from our sponsors, along with many events where you can brush shoulders with practising actuaries.

For more information, including how to become a member, please visit our website or Facebook page:

www.melbourneactuary.com

www.facebook.com/actuarialstudentssociety

Acknowledgements

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Disclaimer

All opinions and observations expressed herein remain the views of the individual author and do not necessarily reflect the views of the Actuarial Students' Society or the University of Melbourne.

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First-Year Subjects

Contents

ACCT10001 Accounting Reports and Analysis [SM1]

Exemption status	Not an exemption subject, but is a prerequisite for ACCT10002 *Introductory Financial Accounting* (CT2 *Finance and Financial Reporting* subject).
Lecturer(s)	Mr Noel Boys
Weekly contact hours	1 × 2-hour lecture 1 × 1-hour tutorial
Assessments	Tutorial preparation and participation 6% Assessable online tests 4% Individual Assignment, due in Week 5 10% Group Assignment, due in Weeks 11 10% 3-hour end-of-semester exam 70% As part of your tutorial preparation, there are weekly quizzes to be completed prior to the tutorial. The overall result of the quiz is not assessable but completion of it is necessary.
Textbook recommendation	Birt, J., Chalmers, K., Maloney, S., Byrne, S., Brooks, A., & Oliver, J. (2017). *Accounting: Business Reporting for Decision Making* (6th ed.). New York, US: John Wiley & Sons. All students enrolled in the subject have **free access** to the e-text through the LMS for the entire semester.
Lecture capture	Full (both audio and video).
Year and semester reviewed	2018 Semester 1

Comments

Lectures

- Week 1: Regulatory Framework / Conceptual Framework;
- Week 2: Transaction Analysis & Financial Statements;
- Week 3: The Balance Sheet — Assets;
- Week 4: The Balance Sheet — Liabilities;
- Week 5: The Statement of Comprehensive Income & Statement of Changes in Equity
- Week 6: The Cash Flow Statement
- Weeks 7 & 8: Financial Statement Analysis
- Week 9: Budgeting;
- Week 10: Cost-Volume-Profit Analysis;
- Week 11: Sustainability — Contemporary Issue in Accounting (Guest Lecturer);
- Week 12: Course Review / SWOTVAC and Exam Details

If you have never done accounting before, do not be afraid! It is safe to say that you are definitely not the only one. As a matter of fact, the lecturer does take a moment in the introductory lecture to highlight that completion of VCE accounting prior to this subject will not provide you with any advantage whatsoever. In turn, it is the students that did VCE accounting

who generally struggle, as the concepts and presentation format of the financial statements differ to what was being taught in VCE.

The first lecture provided an introduction to accounting and the main purpose it provides to users. As an introductory lecture it was quite dry and text heavy which made the subject my least favourite to look forward to at that point in time. However, do not fret, I can guarantee you that it does gradually become more interesting! In my personal opinion, I would highly advise students to understand the Conceptual Framework; how it provides accountants with choices, estimates and judgements and how those choices, estimates and judgements impact the resulting financial statements relayed to users. You will definitely see a recurring importance of this concept through-out the subject.

The second lecture illustrates how to analyse and record individual business transactions and events, and how that information is translated into other financial statements explored in weeks 3 – 6. In the following weeks, Noel explores the key elements of accounting and the definition and recognition criteria of each as defined by the Conceptual Framework. Lectures 7 and 8 is where the information recorded in financial statements will be transformed into ratios used for interpretation of an entity's financial position and performance. You are highly recommended to understand these ratios as they play a significant importance in analysing an entity's financial statements in Assignment Two. Noel emphasises that you are not examined on your memory of citing the definitions but your understanding (which I can highly attest to). This includes learning how to observe, interpret and even illustrate any of the financial statements in the exam.

Lectures 9 and 10 focuses solely on management accounting which do require a number of calculations that are predominantly straightforward. The subject concludes with a guest lecturer in week 11 who introduces the topic of sustainability — how that has been significantly adopted by many organisations and how that has impacted and translated into their financial statements.

There are instances where the lecturer does turn off the lecture recording, especially near the end-of-semester, to provide the students with tips on the exam. Therefore, to ensure that you do not miss out, make sure you make the effort to at least attend the last few lectures.

Overall, the subject is definitely heavy content and more often boring than stimulating, to say the least. Nonetheless, Noel Boys will guarantee to make you rethink even for a split second during the lecture that the subject is tolerable with his great and witty sense of humour.

Textbook

The textbook was personally very useful in clarifying the material in more detail as it provided numerous examples with every concept. It does provide further insight into areas that are beyond the scope of the learning objectives thus, do highly refer to the nominated prescribed readings given for each lecture. Although it is expected that the readings are completed prior to the lectures, I did not find this mandatory to my learning. However, I do highly recommend reading the textbook as it was mentioned that there are concepts within the reading that are examinable.

Tutorials

Preparation and attendance of tutorials are the easiest marks you would ever obtain from this subject, so it is highly recommended to do so. From my experience, I have discovered that the presentation and structure of the tutorials do differ according to the tutor. If you have found that your tutor's explanations do not align with your own learning, do not be afraid to branch out to other tutorials. Just make sure you do so before it is too late!

As for my own tutor, she would start off the tutorial with a recap of the concepts that were introduced during the lecture. From there, we would move onto tasks that were completed as a group of 3–4 followed by a class discussion. The discussion was extremely useful in providing examples of how we would answer potential questions relating to the concepts learnt. Depending on the tutor, you are also assessed for your participation within the tutorial so be sure to speak up!

Assignments

Assignment one is an individual assignment divided into two parts accumulating to 10% of your grade. Part A focuses on the preparation of a transaction worksheet on an Excel spreadsheet (demonstrated in week 2) given by a list of business transactions and events conducted by an entity. The template is provided thus, only insertion of the values into each cell is required. Every student is presented with a different set of information to ensure that no collusion is conducted. Following submission of Part A, a **corrected** worksheet is given for you to prepare a Balance Sheet and Statement of Income. Although the assignment is relatively straightforward, I put emphasis on triple-checking the values you have inserted into each cell as well as the presentation of the statements (as your marks are greatly deducted for this criteria).

Assignment two is a group assignment divided into two parts accumulating to 10% of your grade. Part A requires students to work in groups of 3–4 where a set of financial statements on Excel is provided for you to calculate a set of ratios and conduct trend analysis (refer to lectures 7 and 8). I recommend every student to complete this task individually and, in the end, use your solutions as a comparison to your other team members. Not only does this help to check the answers, it also highlights any gaps within your knowledge. After submission, you are to complete a quiz of 12 questions as a group regarding the Excel spreadsheet you have completed. Some of the questions involved figures directly from the worksheet whilst others required interpretation and understanding of the ratios. In terms of Part B, you are given a set of financial statements of an illustrated entity, and you are to evaluate their financial performance and position by highlighting three main concerns in an internal memorandum.

Online Tests

As part of your tutorial preparation, there are online quizzes that need to be completed prior to each tutorial. Although the marks of the quiz are non-assessable, completion of the quiz provides an indication of your preparation of the tutorial. Throughout the semester, there are 4 assessable quizzes worth 1% each that are generally open to students on Friday 4pm till Sunday 4pm for the according week. Majority of the questions are sourced from the textbook so be sure to attempt those first!

End of Semester Exam

Overall, there is definitely a mixture of arithmetic and theory-based questions. However, as noted above, the exam is entirely about your depth of understanding rather than your reliance on memory. In my experience of the exam, I found that there is quite an emphasis on the preparation of financial statements — Balance Sheet, Income Statement and Cash Flow Statement. Other than that, you are given a number of scenarios where you are required to apply your knowledge of the accounting elements to answer them. If you are wondering, Noel did mention that you do not have to remember the formulas of the ratios as relevant ones are provided to you in the exam.

Concluding Remarks

Although this subject was far from my favourite, I have learnt to appreciate the concepts being taught as I have found that it is applicable to understanding the terms that I come across on a daily basis. It might not be your favourite either but at least we can all come together and agree how much of a gem Noel has been!

ACCT10002 Introductory Financial Accounting [SM2] (1)

Exemption status	CT2 *Finance and Financial Reporting*, in conjunction with FNCE10002 *Principles of Finance*. An average of 73 across this subject and FNCE10002 *Principles of Finance* is needed, with no fails.
Lecturer(s)	Mr Warren McKeown
Weekly contact hours	1 × 2-hour lecture 1 × 1-hour tutorial
Assessments	Tutorial attendance and participation 4% 2 × Tutorial assignments 2 × 3% Practice set assignment 14% Online assignment 6% 3-hour end-of-semester exam 70%
Textbook recommendation	Carlon, S., Mitrione, L., Kirk, N., Palm, C., Wong, L., & McAlpine-Mladenovic, R. (2016) *Financial Accounting – Reporting, Analysis and Decision Making* (5th ed.). Milton, Au: John Wiley & Sons Australia. ✓ I recommend the textbook. See 'Necessary Resources' in the body of the review for more information.
Lecture capture	Full (both audio and video).
Year and semester reviewed	2017 Semester 2

Comments

Subject content

Concepts covered included (one lecture per dot point):

1. Conceptual framework
2. Double Entry Recording
3. Accrual accounting
4. Inventory
5. Receivables
6. Non-current assets
7. Liabilities
8. Equity
9. Statement of Cash Flows
10. Annual Reports, Performance, Measurement, Disclosure, Debt/Equity Decisions
11. GST

IFA is quite an easy subject, considering ACCT10001 *Accounting Reports and Analysis* is a prerequisite. Many concepts are the same, but IFA reteaches them in the context of the double-entry system. Most of the content is straightforward and

This review was previously published in the 2017 end-of-year edition of the *Actuarial Students' Society Subject Review*.

easy to understand, and knowing how to apply concepts is a matter of practice. I predominantly used the textbook to learn and checked lecture slides to ensure I did not miss anything.

Lectures

There were three lecture streams throughout the week. Lecture slides were usually uploaded well in advance and often contained about 60 slides. The slides contained a mix of theory, examples and screenshots from the textbook. Some lectures also had lecture illustrations, which were examples done during the lecture. These helped to show how to do certain types of questions. Warren explained concepts quite well, but spoke quietly and could have been more engaging. He always gave a short break during the lecture to ensure students did not become too bored.

Tutorials

Tutorial work involved a worksheet that was supposed to be completed before the tutorial. I was one of the few in my tutorial who did them beforehand, but my tutor did not penalise those who didn't. As our tutorials were run in a class discussion style, this meant that it took longer for us to get through all the questions if students were attempting questions when picked on. Occasionally, with longer questions, we would compare answers in small groups and write our answers up on the whiteboards around the room, for the tutor to check and explain to the class. I found doing the worksheets useful, as they were a good way to practice new concepts and check whether there were things I needed to ask questions about.

Tutorial attendance and tutorial participation were 2% each. If you couldn't attend your usual tutorial, you could go to any other tutorial (tutorial times are available on the LMS) and have the tutor write a slip to verify your attendance. However, the subject guide states that participation marks are only awarded for participation at your official tutorial.

Assignments and Assessments

There were two tutorial assignments worth 3% each. These were short tasks that took no longer than an hour each.

The Practice Set assignment was split into two parts, with each part being 7%. The first part required preparing general journal entries, ledger entries, a trial balance and financial statements. Excel templates were provided, but students were given the choice to print them out and do the assignment by hand. This assignment was quite time-consuming, particularly for students who were unfamiliar with the double-entry system. The second part entailed using MYOB accounting software to record transactions and prepare a trial balance and financial statements. The computers in the FBE computer labs on Bouverie Street have MYOB installed and are available for use, but I chose to download the free trial on my own laptop. Students were expected to learn how to use MYOB by themselves — I found that the modified tutorial uploaded on the LMS was sufficient. The hardest part of part two of the practice set was learning how to use MYOB; once you were familiar with inputting transactions, it became easy.

The 6% online assignment was a 90–minute quiz at the end of the semester. The 10 questions were very similar in style to tutorial worksheet questions. Since I completed the tutorial worksheets throughout the semester, I found the quiz quite easy.

Final Exam

The final exam was a 3–hour paper, with 15 minutes reading time, that had 100 marks. There is a hurdle of 50% to pass the subject. The 2016 Semester 1 paper was uploaded to the LMS and solutions were provided a little later. This paper was very similar to the final exam in style, so even though it was the only paper available, it was very useful.

The exam had 20 multiple-choice questions and 10 multi-part questions. Overall, it was slightly more difficult than work done during the semester.

Necessary Resources

The textbook required is *Financial Accounting — Reporting, Analysis and Decision Making*. The hard copy textbook is $144.95, the e-text with access to online quizzes is $85 and the e-text by itself is $60. I only had the PDF and did not feel like not having access to all the online resources impacted me. I found the textbook useful as it explains concepts clearly and has examples to demonstrate how to record transactions in different circumstances. However, very occasionally, the textbook uses slightly different account names to what is taught in lectures. This only affected my tutorial work as it did not come up in assessments or the final exam.

Supplementary Resources

The study guide suggests 5 books that may be used as references or wider reading, but I don't know anyone who went out of their way to purchase them, as the required textbook and lecture slides are sufficient.

Some WileyPLUS practice questions are available on the LMS for students who do not purchase access. I only looked at them before the online quiz, but realised that they are all multiple-choice questions and very easy. If you really need to practice simple concepts, maybe they could be useful, but I don't think they are worth the time.

Consultations are available, but I don't think a timetable was ever uploaded to the LMS (I only knew when and where my tutor was available as he told us in the first tutorial). A special SWOT-VAC consultation schedule was made available though; consultations were held every day up to the day before the final exam.

Concluding Remarks

IFA was much more enjoyable and easier than ARA. I found it easy to stay on top of learning the content and doing tutorial work, and liked that the course was structured clearly and closely aligned with the textbook.

ACCT10002 Introductory Financial Accounting [SM2] (2)

Exemption status	CT2 *Finance and Financial Reporting*, in conjunction with FNCE10002 *Principles of Finance*. An average of 73 across this subject and FNCE10002 *Principles of Finance* is needed, with no fails.
Lecturer(s)	Mr Warren McKeown
Weekly contact hours	1 × 2-hour lecture 1 × 1-hour tutorial
Assessments	Tutorial attendance and participation 4% 2 × Tutorial assignments 2 × 3% Practice set assignment 14% Online assignment 6% 3-hour end-of-semester exam 70%
Textbook recommendation	Carlon, S., Mitrione, L., Kirk, N., Palm, C., Wong, L., & McAlpine-Mladenovic, R. (2016) *Financial Accounting – Reporting, Analysis and Decision Making* (5th ed.). Milton, Au: John Wiley & Sons Australia. ✓ HIGHLY RECOMMENDED, as the textbook goes through the content in detail
Lecture capture	Full (both audio and video).
Year and semester reviewed	2017 Semester 2

Comments

Subject content

Week:

1. Introduction Conceptual Framework, External Reporting
2. Double Entry Recording
3. Accrual Accounting
4. Inventories
5. Receivables
6. Non-current Assets
7. Liabilities
8. Equities
9. Share Issues/Change in Equity
10. Statement of Cash Flows
11. Accounting for GST
12. Revision

This review was previously published in the 2017 end-of-year edition of the *Actuarial Students' Society Subject Review*.

Lectures

The lectures were quite engaging. Warren's explanations were very easy to understand and the lectures were very important especially for people who have no prior knowledge of accounting. I used the textbook more as it covers the content in depth compared to the lecture slides, which were usually 50-60 slides long for us. It is best to use both the textbook and the lecture slides together as the lecture slides provide a brief understanding whilst the text explains it in detail. Many examples were given in the lecture slides so it was very useful. Everything was recorded for us including lectures and the annotations. "Double Entry Accounting" forms the basis of the subject, something that is vital in order to pass the subject, so please master this skill early on or you will have a tough time in later weeks. The hardest weeks for me were Non-Current Assets, Liabilities and Equities.

For those who have learnt accounting before, please don't assume that this is an easy subject even though the first 3 weeks were basically a summary of VCE Accounting and ARA. Do ALL the tutorial work and make sure you understand all of it.

Tutorials

I attended every tutorial, or replacement tutorial if I missed one. Tutors basically go through most of the pre-tutorial questions in class so if you don't understand them, you really should be there listening or asking questions. ATTEMPT the questions before you show up at the tutorial if you want to make the most out of it. If you have not completed the pre-tute questions (or content for that week if you are behind), then you should still go as I realised I learned more in an hour of tutorial than spending hours studying at home. My tutor was Graham and he has been one of the nicest tutors I have had (He memorised all our names in the first week). If you miss it, just attend a replacement and ask for a slip to hand it to your usual tutor next week.

Assignments

Practice Set Assignment: consists of 2 parts — Part 1 involved providing many pages of source documents such as receipts and invoices for students to enter into Excel, creating accounting journals and reports. Don't cram this, as it is very time consuming but it is easier if it is done with 2 screens; one displaying the source docs and the other displaying the excel sheet. Alternatively, you can print out the source documents.

Part 2 is more entry work but you have to use MYOB accounting software. Please start early IF you have never used MYOB before and DO go to the assignment consultations. Students have to know how to enter transactions on MYOB correctly and not simply using the General Journal (you will understand what I mean when you do the assignment) as marks were deducted for not using the correct tools to enter EVEN IF YOUR REPORTS ARE CORRECT AT THE END as your journals will be checked as well. Some people did it at home by downloading the MYOB trial software but I don't recommend this as you have to convert the file so you might as well go to the university computer lab (go early as it will get packed) to reduce the likelihood of an error.

Online Assignment: (1.5-hour time limit) This is "easy" but hard if you want full marks. It is an hour and a half and there are a few traps and several trick questions so MAKE SURE you READ THE QUESTIONS carefully and don't rush to conclusions without thinking it through. Use reliable internet and not WIFI, preferably LAN connection as you cannot log back on if you are disconnected.

Tutorial Assignments: they are pretty simple. Many people have completed them in less than 1 hour, or even 20 minutes if they were familiar with the content.

End-of-Semester Exam

This semester's examination was pretty tough as it was very long and content heavy. Do all the practice and past papers and go through the tutorial questions well in advance so you know what you need to re-learn or make improvements on. There is a hurdle requirement of 50% on final examination. There were quite a lot of written responses and questions requiring explanations. We were given the formula sheet to basic formulas but we were required to interpret the formulas and not just to simply calculate the ratios. Don't expect that there are simple questions such as "given the data and calculate this ratio". Ledger Reconstructions have been on the past exams for many years so MASTER this before going into the exam as it will account for a significant portion if it does appear on the exam.

ACTL10001 Introduction to Actuarial Studies

Exemption status	Not an exemption subject, but a great introduction subject which covers the basics of financial mathematics.
Lecturer(s)	Associate Professor Shuanming Li
Weekly contact hours	2 × 1-hour lectures 1 × 1-hour tutorial
Assessments	2 Microsoft Excel group assignments 2 × 10% 45-minute mid-semester test in Week 7 10% 2-hour end-of-semester exam 70%
Textbook recommendation	Dickson, D. C. M., & Atkinson, M. E. (2011). *An Introduction to Actuarial Studies* (2nd ed.). Cheltenham, UK: Edward Elgar Publishing. Not mandatory but does provide extra detail and examples
Lecture capture	Full (both audio and video).
Year and semester reviewed	2017 Semester 2

Comments

Overall, a great introduction subject into the world of actuarial mathematics. Whilst it does not go into much depth, the content covered in the subject definitely provides enough material for you to appreciate the way in which actuaries' approach and solve problems, and hopefully get a taste of the actuarial profession.

Subject content

The subject is divided into 3 topics.

Financial mathematics (Weeks 1 to 4) — You learn about different interest rates that are used in valuing different financial instruments, such as simple interest, simple discount and compound interest. After that the course moves onto annuities, and their application in bonds and housing loans. This part of the course is somewhat similar to *Principles of Finance* in semester 1, but new actuarial notation and formulas are introduced.

Demography (Weeks 5 to 7) — This part of the course looks at studying human population models, including population pyramids, mortality rates and life tables which briefly delve into the probability aspect of the actuarial field.

Actuarial practice and Contingent payments (Weeks 8 to 12) — This is by far the most challenging part of the course as by this point, the actuarial notation begins to build up, and every symbol will start looking the same to you. Content covered in these weeks include valuing financial transactions in which payments aren't certain to occur. This is mainly explored with application in life insurance, where an insurance agency seeks to set the correct level of premium for its various customers, who each have different probabilities of survival. Finally, the last two weeks is just theory about actuarial practices in different fields such as life and general insurance.

This review was previously published in the 2017 end-of-year edition of the *Actuarial Students' Society Subject Review*.

Lectures

Lectures are timetabled in the afternoon and personally, I didn't attend too many in person. I found watching the recording more beneficial as I could pause and try the questions myself. In terms of the delivery, the lecturer goes through lecture slides that are available in advance and students are expected to fill in the blanks with worked examples throughout the lecture. However, the lecturer was sometimes hard to understand due to his accent, and hence another reason to watch the recordings at home. This was also his first year of teaching the subject so some of the content had to be skipped due to time constraints. Nonetheless, he was definitely very knowledgeable about the subject and answered any queries in detail. He also provided a weekly expectation sheet which was a good summary of the week's content, including key ideas and formulae.

Tutorials

Weekly tutorials include going through problem sheets, which started off as being interactive and participative early in the semester to a point where the tutor simply went through the solutions on the board. Worked solutions are also provided on the LMS at the end of the week, so attendance isn't vital. However, my tutor was kind enough to make her own summary sheets every week which were very detailed and summarised the week's content in a very neat and organised manner. These definitely came in very handy during exam revision.

Group Assignments

Groups could be formed with 4-5 people, and the assignments were fairly straightforward. Ample time was provided for these and median scores were very high (Almost 100% for assignment 1, and 85% for assignment 2). There were two of them and they required presenting answers through a spreadsheet in Microsoft Excel. As for technical Excel skills, there is not much required, and basic knowledge of simple formulas (with addition, subtraction, multiplication, division) as well as knowing how to format and lock reference cells and copying a formula to a range of cells will definitely suffice.

Mid Semester Exam

Speed and accuracy was required as 45 minutes with no reading time meant you didn't have much time to check answers, making this exam more difficult than the final exam. I personally was guilty of making many silly errors and not reading the question carefully. Make sure to highlight key words and subtleties of the question if you have to before attempting the question.

End-of-Semester Exam

The final exam was much easier than the mid-sem and previous years. There were a lot of theory based questions, definitely more than previous years. Ultimately, if you learn and understand all content and formulae, doing well on the final exam is very possible. However, again keep in mind to read all questions very carefully to avoid silly errors.

So enjoy the first "real" actuarial subject in first year as this is just the tip of the iceberg!

ECON10003 Introductory Macroeconomics [SM2]

Exemption status	Not an exemption subject, but is a prerequisite for ECON20001 *Intermediate Macroeconomics* (CT7 *Business Economics* subject).
Lecturer(s)	Professor Lawrence Uren
Weekly contact hours	2 × 1-hour lectures 1 × 1-hour tutorial
Assessments	Tutorial attendance and participation 10% 2 online multiple-choice tests 10% 2 assignments 2 × 10% 2-hour end-of-semester exam 60%
Textbook recommendation	Bernanke, B., Olekalns, N., & Frank, R. H. (2014). *Principles of Macroeconomics* (4th ed.). North Ryde, AU: McGraw-Hill. Not absolutely necessary but can have a more detailed and faster explanation than Lawrence's. As stated in previous years, there are a few copies available at Giblin Euson.
Lecture capture	Full (both audio and video).
Year and semester reviewed	2017 Semester 2

Comments

Subject Content

This subject covers the following topics:

- **GDP** — What it is and ways to measure
- **CPI and Inflation** — Inflation targeting
- **Unemployment** — Okun's law and measuring unemployment
- **Labour market and Cobb Douglas** — Learning the production function and how it works
- **Keynesian model** — Graphs
- **Fiscal policy**
- **Money and banking** — Types of money
- **Aggregate demand and supply** — Graphs
- **Solow-Swan model** — Economic growth analysis
- **International trade**
- **Exchange rates** — More graphs
- **Balance of payments**

This subject isn't the hardest subject you'll take, but there is some challenge in its simplicity and straight-forwardness. Take the persona of a rational thinker, and consider every facet of each model you'll study. Most importantly, make sure to

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scrutinise every assumption involved with the models: what assumptions are made, why the assumptions are made and what would happen without them.

Lectures

Lectures run twice a week for this subject. Towards the start of the semester especially, I would recommend getting to the lecture theatres as early as possible, as they will be very full for sure. Bring some friends to keep you awake, but be attentive to everything the lecturer says, as many of this subjects intricacies are explained orally, and not conveyed so well on paper. Lawrence records the lecture screen with audio, and uploads all the annotated lecture slides, so use them in conjunction with the textbook to review the concepts that you don't understand.

Tutorials

Attendance is recorded and counts towards your final mark. Pre-tutorials are marked and should always be completed ahead of tutorials. Note however, that they're not easy to do unless you've attended the lectures and have some idea of the concepts taught (so attend lectures!!). Try to be in the same tutorials as your trusted friends, as there will be group assignments specific to tutorial groups.

Assignments

There are two group assignments that you can do in groups of two or three with people in your tutorial group. These assignments are not difficult with decent knowledge of the subject, and should be worked through in depth. Try not to over-write unnecessarily; otherwise, full-marking the assignments is easily achievable.

Multiple-Choice Questions

These online quizzes are a lot harder than you may think. Googling for answers rarely gives anything to work with, so make sure you prepare for them properly and don't do them last minute.

End-of-Semester Exam

I would recommend reviewing each lecture prior to the exam, and focus on the Cobb–Douglas and Solow–Swan, as there are usually extended response question based on those models. There are several past papers, but no solutions. Nevertheless, try to look through them before attempting the real exam, as always. Good luck!

ECON10004 Introductory Microeconomics [SM1]

Exemption status	CT7 *Business Economics*, in conjunction with ECON20001 *Intermediate Macroeconomics*. An average of 73 across this subject and ECON20001 *Intermediate Macroeconomics* is needed, with no fails.
Lecturer(s)	Dr Eik Swee Associate Professor Tom Wilkening
Weekly contact hours	2 × 1-hour lectures 1 × 1-hour tutorial
Assessments	Tutorial attendance and participation 10% 45-minute online multiple-choice test in Week 4 5% Written Assignment 1 due in Week 7 10% Written Assignment 2 due in Week 10 15% 2-hour end-of-semester exam 60%
Textbook recommendation	Gans, J., King, S., Byford, M., & Mankiw, N. G. (2014). *Principles of Microeconomics: Australia and New Zealand Edition* (6th ed.). South Melbourne, AU: Cengage Learning Australia. Borland, J. (2016). *Microeconomics: Case Studies and Applications* (3rd ed.). South Melbourne, AU: Cengage Learning Australia.
Lecture capture	Full (both audio and video).
Year and semester reviewed	2018 Semester 1

Comments

Subject content

- Week 1: Introduction to Economics and its basic concepts
- Weeks 2–3: Perfectly Competitive Markets and its Mechanisms
- Weeks 4–5: Welfare and Market Failures
- Weeks 6–7: Firm and Managerial Economics
- Weeks 8–9: Profit Maximisation and Pricing
- Weeks 10–11: Game Theory
- Week 12: Exam Revision

If you're someone who studied Economics in VCE or equivalent, you can consider yourself to be in an advantage, at least for the first few weeks. The content will be quite similar to your high school Economics during these weeks, with just some extra details that are still intuitive and relatively easy to understand. If not, do not worry. The subject covers the basic economic concepts and ideas anyways, so no prior knowledge is required.

The subject does get more confusing in the later weeks, (the firm and managerial economics), so a tip would be to really get those foundational economic concepts in your head, as this will help you understand the harder content.

Whilst there is a fair bit of mathematics involved, understanding the theory is what will make you go from a 7/10 to an 8 or

a 9. So, if you are a maths person (like me), do not fall into the trap of neglecting the theory and solely focusing on the maths. Whilst this works for some parts, it is not going to get you through to the end.

Readings, and hence textbooks, are not necessary in my opinion, although they can be a good reference if you are struggling to understand a concept.

Lectures

There are four lecture streams, two with each lecturer. Lecture slides are uploaded on LMS the week before and whilst the two lecturers use the same slides, their styles are quite different. I attended Eik's lectures.

Eik's lectures tend to be a bit fast-paced, and you may find yourself sitting there very confused from time to time. He started the semester using pen and paper to work through the examples (which were not recorded) so I would say it was necessary to attend the lectures to fully grasp the content. He later changed to using his touchpad to write and draw directly on the slides (due to the doc-cam being dodgy), so his workings were fully recorded in lecture capture since. Eik ran the two lecture streams in the morning.

Tutorials

Tutorial participation and attendance is an easy way to guarantee 10% of your total mark. Tutors assign a mark out of 10 for tutorial participation and one mark is deducted for each tutorial you miss after missing 4 tutorials. Asking questions is a simple way to appeal to the tutor that you are attentively participating.

There are pre-tutorial and in-tutorial sheets. As the name suggests, the pre-tutorial sheet is to be done prior to the tutorial, and whilst some tutors check these and use this as a basis for marking the 10%, some do not. Nevertheless, it is encouraged to attempt this as it will help consolidate the content from the lecture in the previous week.

The in-tutorial questions are of similar nature to that of the pre-tutorial, however at a slightly more challenging manner. Whilst answers for the pre-tute sheet are uploaded on LMS at the end of the week, in-tutorial sheet answers are only discussed by your tutor during the tutorial to incentivise you to attend. Do not procrastinate asking questions if you don't understand something. Chances are you're going to forget until exams come up.

Assignments and Assessments

The first assessment was a 25 minute online multiple-choice test to be done independently, with 10 questions to answer and worth 5% of the total mark. Appropriate revision material was provided, including practice exams and revision sessions ran by the lecturers. The slides that were used were later uploaded onto LMS, so attendance was not necessary. Whilst the content was not difficult, the wording of the questions was confusing so it is recommended that you take your time and read the questions thoroughly.

The two assignments that followed had a maximum of 750 and 1250 words respectively. However, this was only a maximum, and no minimum was set. Assignment 1 consisted of long extended questions, which students were encouraged to use diagrams and tables to answer, with some sentences explaining them. Assignment 2 was of similar nature, however it required a deeper understanding of the concepts learnt, as you had to create a case study of a real-life example through a topic chosen by the student (within the scope of the assignment). For both assignments, I would recommend relying

heavily on diagrams and tables, since it is near impossible to meet the word cap by answering all the questions fully in words. Diagrams with succinct explanation earned the highest marks.

Other Resources

I completed the subject without the textbook, and I can confidently say that they are not necessary. As previously mentioned they can be a good reference, however, google and youtube videos provide enough assistance to help you get through the subject. Online tutors and pit-stop tutorials are of great help, so utilise them throughout the semester, not just before the exams and assessments.

End-of-Semester Exam

The final exam was a 120-mark paper that ran for 2 hours, with 15 minutes reading time. There is a hurdle of 50% to pass the subject. The past papers could be accessed in the university library, with no answers available. However, there has been quite a few changes in the content of the subject, so some questions were ineffective. As no answers were provided, students relied on comparing answers with each other, going to pit-stop tutorials that were held everyday during SWOTVAC, and Online Tutors. Whilst pit-stop tutors were the most helpful, they were usually very crowded.

The exam consisted of three sections: multiple-choice, short-answer and long-answer application questions. The exam was fair and straight forward, though time constraints were many students' concern. Again, using well-labelled diagrams was a method to save time and earn the marks.

Concluding Remarks

Whilst the subject is intuitive and hence relatively easy for some students, this can also be a drawback for some students that do not understand these intuitive economic understanding as the whole subject holds it as a basis. Online Tutors are highly recommended, even if it is just reading the answer to another student's question, as it is likely you are going to be troubled by the same problem .

FNCE10002 Principles of Finance [SM1]

Exemption status	CT2 *Finance and Financial Reporting*, in conjunction with ACCT10002 *Introductory Financial Accounting*. An average of 73 across this subject and ACCT10002 *Introductory Financial Accounting* is needed, with no fails.
Lecturer(s)	Associate Professor Asjeet S. Lamba
Weekly contact hours	2 × 1-hour lectures 1 × 1-hour tutorial
Assessments	Tutorial participation 10% Online Assignment due in Week 6 10% 1-hour mid-semester exam in Week 7 20% 2-hour end-of-semester exam 60%
Textbook recommendation	Graham, J. R., Smart, S.B., Adam, C. & Gunasingham, B. (2017), *Introduction to Corporate Finance*, (2nd ed.), AsiaPacific Edition, Cengage Learning. Berk, J. & DeMarzo, P. (2017), *Corporate Finance: The Core* (4th ed.), Pearson Global Edition Brealey, R., Myers, S. & Allen, F. (2017), *Principles of Corporate Finance* (12th ed.), North Ryde, AU: McGraw-Hill.
Lecture capture	Full (both audio and video).
Year and semester reviewed	2018 Semester 1

Comments

Subject content

- Weeks 1-2: Overview and Introduction to Financial Mathematics
- Weeks 3-4: Applications in Financial Mathematics
- Weeks 5-6: Modern Portfolio Theory and Asset Pricing
- Week 7: Mid-semester exam
- Weeks 8-9: Capital Budgeting
- Weeks 10-11: Capital Structure and Payout Policy
- Week 12: Introduction to Options

The first few weeks of the subject are pretty much just maths, something you would do in Further Mathematics in VCE. I found that Principles of Finance, (especially in the first few weeks) is a little bit like the Physics equivalent of Commerce; you learn the theory in lectures, but when doing the questions, it's the formulae that are going to give you the answer. However, this whole mathematics-based approach ends after the mid semester exam, so it is encouraged that you try to understand the theory of the early weeks as these will be required to understand the latter half of the semester. No prior knowledge is required other than some basic mathematical skills that you would already be familiar with from previous years. Whilst Asjeet constantly repeats "I am doing the lecture assuming you've all done your readings", I don't think they are essential, as I didn't even own a textbook myself and still found the subject doable. However, like any other subject,

reading it may help your understanding of the theory of the subject.

Lectures

There were three lecture streams, each being two hours long. Asjeet recorded and uploaded every single one of them onto Lecture Capture. Sometimes he explains the same content in different ways for different lectures, so if what he says in the lecture you're watching doesn't make sense to you, try watching another stream of the same week. Whilst I prefer to attend the lecture than use lecture capture, I felt that it was better to use lecture capture for Finance, as the content can be quite hard to follow in the speed that Asjeet goes through. And because there always is a flow within the lecture, if you don't understand one part of the lecture early on, it is very likely that you are not going to comprehend the subsequent slides resulting in a waste of two hours as you will have to go through it again. Hence, being able to pause and understand each slide was helpful and was only possible using lecture capture. Asjeet lecture slides are also very self-explanatory, so there was no trouble in understanding them through the recording.

Tutorials

Every week you are given a tutorial sheet to complete. Part A of this sheet are to be done prior to your tutorial and handed in at the beginning of it. Tutors use this as a way to mark your attendance and hence this accounts for 10% of your total grade. Even if you do not understand the question, attempt them anyways, as it is not really homework that your tutor marks, but rather a way for the tutor to check that you have prepared for the tutorial. As long as there is visible evidence that you have had a go , your tutor will accept it regardless of whether the answer is correct or not. The remaining parts of the sheet are gone through during the tutorial by the tutor. They usually give some time for the students to collaborate and discuss the answers, and then go through them afterwards. Whilst these other parts of the tutorial sheet are not required to be completed prior to the tutorial, it is encouraged that you still attempt or have a read at least, as this will assist with the tutorial hour to be more effective.

Assignments and Assessments

The assignment, which accounted for 10% of the total grading, was just a simple 14 multiple choice quiz which was given out prior to the submission of the answers. It is open book as they are to be done at individual times, and you are given a few days to answer the 14 multiple choice questions. Honestly, I didn't even understand why this was worth 10%. Anyways, once you have worked out your answers, you had to input these answers onto the LMS. Instructions were clear, and the questions were fair and straightforward.

The mid-semester exam, which accounted for 20% of the total grading was pretty much the same as the previous assignment, the only difference being the time restriction (1 hour) and the fact that it was a closed book test. Again, 14 questions, fair and straightforward, a quick and easy way to earn 20%. I managed to finish the exam in 30 minutes. One tip for the mid-semester exam would be to familiarise yourself with the formula sheet. Just going through the formula sheet itself can be a great revision tool, and knowing when, where and how to use them will give you a great advantage in the mid-semester exam. Two practice materials were provided which were very similar to the exam itself.

End of Semester Exam

End of semester exam was a 2-hour exam with 15-minutes reading time, more focused on the content learnt after the mid-semester exam. It was a shocker for me, as I expected them to be mostly maths and formula based like the mid-semester exam; if I had read the ASS subject review for the previous year, I would have known that the end of semester exam focuses heavily on the theory side of finance . It included labelling a graph, recognising and explaining errors and such. Two practice papers were provided on LMS however these were not in a similar format to the actual exam. Nonetheless they were a great revision material. Expect a fair deal of theory in the end of semester exam, but with that being said, mathematical applications are still required.

Concluding remarks

Finance is a subject for those of you who enjoy the maths side of commerce in particular. However, it is essential to keep the balance between application and theory, especially in the latter weeks of the semester as not understanding the concepts will hinder your ability to effectively apply the skills.

MAST10006 Calculus 2 [SM1]

Exemption status	Not an exemption subject; however, you will need either • an average of at least 75 across this subject and MAST10007 *Linear Algebra* or • a total of at least 135 across this subject and MAST10008 *Accelerated Mathematics 1* to continue the major and enrol in ACTL20001 *Financial Mathematics I*.
Lecturer(s)	Dr Iwan Jensen
Weekly contact hours	3 × 1-hour lectures 1 × 1-hour tutorial
Assessments	4 individual assignments 4 × 5% 3-hour end-of-semester exam 80%
Textbook recommendation	✓ Make sure to get the green lecture book and exercise book on your first day of class from the Co-Op store.
Lecture capture	Full (both audio and video).
Year and semester reviewed	2017 Semester 1

Comments

Given you obtain above the prerequisite mark for Specialist Mathematics in high school, this subject should not cause a problem. Calculus 2 overall felt like an extension of Specialist undertaken in high school. The assignments were quite challenging but were helpful in aiding with exam preparation at the end of the semester, as well as the tutorial sheets. With 3 lectures a week, you do not want to fall behind in this subject otherwise it may be difficult to catch up.

Subject content

This subject covers limits, continuity, sequences and series, hyperbolic trigonometry, integral calculus, first and second order differential equations, and functions of two variables.

Other Comments

The material is quite straightforward and the lecture recording proved to be enough for studying the content. I found that jotting down everything on the partial lecture notes from the lecture capture and then revising back to understand the steps was sufficient to learn the required topics, and then going back and listening again to the lecturer's explanation for information I had trouble understanding.

I recommend keeping up with the exercise booklet questions, as it contained a wide variety of problems to tackle and solidify your understanding of topics. It is not something you want to fall behind in and leave all up to in SWOTVAC.

This review was previously published in the 2017 end-of-year edition of the *Actuarial Students' Society Subject Review*.

The assignments were almost always more challenging than the problems encountered in class, but with the aid of classmates and research they prepared you maybe a little too well for the exam, as the exam was nowhere near as difficult as some of the questions in the assignments. There were 4 worth 5% each, with a week given to complete and submit them.

The resources given to prepare for the 3-hour exam was more than adequate, with a number of past exams and answers provided to practice as well as consultation hours to ask tutors/lecturers difficult problems. Routinely completing these exams prepared us well with the format and the types of questions encountered in the exam. Overall, I found that the exam was very similar to the past exams, hence nothing struck out as surprising and the questions were relatively straightforward.

In conclusion, this subject gives you an introductory insight into the Mathematics in this major and it is not impossible to meet the 75% requirement as long as you work persistently in this subject.

MAST10007 Linear Algebra [SM2]

Exemption status	Not an exemption subject; however, you will need either • an average of at least 75 across this subject and MAST10006 *Calculus 2* or • a total of at least 135 across this subject and MAST10009 *Accelerated Mathematics 2* to continue the major and enrol in ACTL20001 *Financial Mathematics I*.
Lecturer(s)	Paul Norbury, David Ridout, Jesse Gell-Redman
Weekly contact hours	3 × 1-hour lectures 1 × 1-hour tutorial 1 × 1-hour computer lab session
Assessments	10 × individual weekly assignments 10% 45-minute written computer laboratory test in week 12 10% 3-hour end-of-semester exam 80%
Textbook recommendation	There isn't a prescribed textbook, although the lecturer suggests any textbook on linear algebra in the ERC as additional material. ✓ Make sure to get the orange lecture book and exercise book on your first day of class from the Co-Op store.
Lecture capture	Full (both audio and video).
Year and semester reviewed	2017 Semester 2

Comments

Subject content

You can imagine the Linear Algebra course to be set up with many "tools" or bits of theory (i.e. Gauss-Jordan elimination, triple cross product) that you'll be using in conjunction to understand more complex and abstract theory (i.e. General vector spaces, eigenvectors) taught later in the course.

1. Linear equations

   At the start of the semester you learn about systems of equations and how to do row operations to solve the system. It's important to really understand this theory because it is the foundation for the rest of the course.

2. Matrices and determinants

   You'll review matrix operations then learn a lot of terminology regarding matrices. Elementary row operations will be brought up again and related to the rank and determinant of matrices.

3. Euclidean vector spaces

   Here the lectures leave the matrices and move into vectors and operations with vectors such as the dot product and cross product.

This review was previously published in the 2017 end-of-year edition of the *Actuarial Students' Society Subject Review*.

In the first 3 topics, you'll basically learn 'tools' that are specific operations that you'll be applying and building on for the rest of the course. The tools will feel unrelated but it is essential to memorize to be able to focus on grasping the more abstract, complex theory later on.

4. General vector spaces

   This is very theoretical part of the course and an extension of Topic 3, but also a foundation you'll need to understand completely to build upon. You will learn about vector spaces that are to Cartesian planes like vectors are to functions. In addition, you'll be introduced to spanning sets and bases as well as linear independence.

5. Linear transformations

   This topic will build upon what you've learnt in Topic 2 and 4. You will combine matrix operations and general vectors (by defining the vector space in terms of matrix vectors) to learn about a way to transform vectors and vector spaces.

6. Inner product spaces

   This topic is basically an alternate, more abstract version of Topic 4, where the definition of the "tool" dot product you learnt in Topic 1 is altered.

7. Eigenvalues and eigenvectors

   This topic is a more sophisticated extension of Topic 3 and 4, where you learn to manipulate vector spaces with matrix operations such as multiplication and row operations to simplify linear transformations that you learn in Topic 5.

So as you can hopefully see, the theory taught in Linear Algebra is very linked to each other and you should make sure you keep up with the theory, otherwise it is easy to get confused by the twists and next-level theory that's introduced. To cement your understanding, the exercise book is an excellent help. Understanding the foundations and the intuition behind the operations you apply, and not just memorizing how to apply the operations, will make grasping the next-level theory later easier as well.

The actual maths and algebra involved in Linear Algebra is not that complex; it's mainly addition and multiplication, so you just need to be careful with negative signs and not making silly mistakes. However, remembering all the theorems (for vector spaces, matrix operations, determining determinants, finding eigenvectors, etc.) is difficult.

Tutorials

In addition to the exercise book being a great help in cementing theory, the tutorials where you'll be able to ask your tutor questions about the theory and intuition are incredibly useful. Like most other maths subjects, you'll get extra questions to work on in addition to the exercise book and the questions are set up chronologically to deepen your understanding the theory.

Assignments

Unfortunately, you will be getting 10 weekly assignments for Linear Algebra. It was very tedious to do them but they are pretty short. Usually you write the assignment but sometimes it is done online (or both). Not all the questions are marked.

It is excellent to go to the tutorials because questions in the assignment are often similar to the tutorial questions and by getting feedback on the answers and method to solve the questions, you can avoid many mistakes in the assignments.

MATLAB

Beside the theory you'll be learning, you'll also be learning how to use MATLAB to do Linear Algebra. The language to use MATLAB also requires memorization so it is good to go to the lab classes after every tutorial (the Tutorial 2 you'll see on your timetable), because systematic repetition to memorize is very true with MATLAB. The MATLAB test in Week 12 is pretty straightforward so just make sure you know how to do questions unique to MATLAB that can't be done on paper, as you'll be primarily tested on those. You'll also be tested on more tedious questions that can be handwritten (for example changing parametric equations to Cartesian equations).

End-of-Semester Exam

There are not many twists and turns in the examination, but due to the variety of questions to be asked with the range of theories to be tested on, you really need to understand all the bits and bobs of theory. The theory in Linear Algebra is mainly to do with methodology so by just remembering the methods to solve, you can apply it mechanically and if you don't make silly mistakes you'll get the right answer.

Key takeaway is: Linear Algebra is simple if you can conquer the numerous theorems and methods to solve. And to really ingrain all that into your mind, it is effective to understand the theory and its intuition and (depending on how you like to learn) to practice, practice, practice!

MAST10008 Accelerated Mathematics 1

Exemption status	Not an exemption subject; however, you will need either • an average of at least 60 across this subject and MAST10009 *Accelerated Mathematics 2* or • a total of at least 135 across this subject and MAST10006 *Calculus 2* to continue the major and enrol in ACTL20001 *Financial Mathematics I*.
Lecturer(s)	Dr Alexandru Ghitza
Weekly contact hours	1 × 2-hour lecture 2 × 1-hour lectures 1 × 1-hour tutorial 1 × 1-hour MATLAB tutorial
Assessments	3 individual online tests in weeks 4, 5, & 12 — 3 × 2% 3 individual assignments due in weeks 7, 8 & 12 — 3 × 3% 1-hour MATLAB test in week 11 — 5% 3-hour end-of-semester exam — 80%
Textbook recommendation	Anton, H., & Rorres, C. (2010). *Elementary Linear Algebra: Applications Version* (10th ed.). New York, US: John Wiley & Sons. A PDF-version of the textbook was uploaded onto the LMS before the semester. Overall, this textbook is overly complicated in its explanation of content and utterly unappealing to the eye, making the reading experience an absolute chore. The lecture notes coupled with a number of YouTube channels, such as **Khan Academy** and **3Blue1Brown**, are more than sufficient for success. ✗ I do not recommend this textbook at all.
Lecture capture	Full (both audio and video).
Year and semester reviewed	2018 Semester 1

Comments

MAST10008 Accelerated Mathematics 1 (AM1) is a course about linear algebra, which is uncharted territory for those who are fresh out of high school. This course challenges conventional high school mathematics, reshaping students' understanding of vectors and introducing them to higher-dimensional spaces. While the content is definitely dense, it is doable if you spend the time understanding the purpose of each of these topics in the grand scheme of things.

To succeed in this subject, you should possess both a mathematical and visual understanding of the content. Following the lecture notes, watching videos from 'Khan Academy' and doing the problem booklet will polish up your mathematical computations. I found that the linear algebra series created by '3Blue1Brown' is exceptional at teaching you how to visualise the content in this course, so I highly recommend watching the videos.

Subject content

1. Linear Equations and Matrices

This topic introduces students to matrix arithmetic and some properties of matrices. While much of this topic is not explicitly examined on the end-of-semester exam, this knowledge is fundamental for all subsequent topics in this course. Although I never learned matrices in high school, I found that doing questions from the problem booklet helped concrete my understanding.

On top of learning how to row reduce quickly and accurately, you need to know how to compute inverses and determinants of matrices. I recommend understanding the relationship between determinants and areas, as this will aid your learning of linear transformations.

2. Vectors and Solid Geometry

   This topic covers lines, planes and simple vector geometry, which should merely be revision for students. While formulae can be applied to calculate distances between lines and planes, many of these computations can be performed if you visualise the position of lines and planes. Few marks are dedicated to this topic in the end-of-semester exam.

   The fundamental skills you should know are simple vector arithmetic and converting between the parametric and Cartesian form of lines and planes. These skills will then be applied to compute angles and distances between lines and planes in three-dimensional space.

3. Mathematical Induction, Proofs and Numbers

   This topic introduces students to the different fields, as well as different forms of proof. While you should be familiar with proofs by contradiction, focus your attention on proofs by induction; looking at the past end-of-semester exams, there has always been one proof by induction question.

   You should be so familiar with induction questions that it becomes second nature – this will save you lots of time in the end-of-semester exam. Ensure that you know how to prove both equalities and inequalities by induction.

4. Complex Numbers

   This topic covers simple complex numbers arithmetic, which should also be revision for students. End-of-semester exam questions about complex numbers are very similar to the questions on the problem booklet, so familiarising yourself with them would prove helpful.

   Exam questions often focus on the use of De Moivre's Theorem. Make sure you also know how to apply complex arithmetic to differentiation and integrals, as these are examiner favourites.

5. Vector Spaces

   This topic marks a turning point for AM1 students, for it is where students' preconceptions of vectors and spaces are challenged. Do not fixate yourself on past knowledge — begin the topic with an open-mind and simply absorb what the lecturer is saying. Watching videos about visualising vector spaces would definitely help you cope with the abstract nature of this content. Personally, I was completely blur about what vector spaces represented until I could visualise them. For me, it was helpful to think about vector spaces as an umbrella term, with the Cartesian plane — something we are all familiar with – being one specific example of a vector space.

   It is vital that you know the axioms for subspaces, as typical exam questions ask you to determine whether a certain set is a subspace. Knowing how to rigorously identify subspaces is therefore also extremely important. Make sure you know the difference between spans and bases, as well as linear dependence and independence. You should also be comfortable working in vector spaces such as functions, polynomials and matrices.

6. Inner Product Spaces

This topic covers norms and angles, as well as orthogonality and orthonormality. End-of-semester exams often ask about inner product axioms and the Gram-Schmidt process. Instead of memorising the Gram-Schmidt formula, understanding its derivation by visualising the vectors will ensure accuracy. For me, it was helpful to think about inner product spaces as an umbrella term, with the dot product being one specific example of an inner product.

7. Linear Transformations

   Arguably the hardest topic in the course, linear transformations unfortunately also constitute the largest proportion of end-of-semester exams. Again, learning the axioms of linear transformations is vital, as typical exam questions ask to prove whether a transformation is linear. You should also be able to readily convert a linear transformation into matrix form. While the lectures tackle this problem rather formulaically, videos on YouTube do a fantastic job at explaining its derivation.

8. Eigenvalues and Eigenvectors

   Eigenvalues and eigenvectors, the last topic about linear algebra, is the easiest to grasp. Typical exam questions ask about diagonalization and identifying eigenvalues. Visualising where eigenvalues and eigenvectors are in a linear transformation will definitely help you answer questions, and the videos created by '3Blue1Brown' demonstrate this perfectly.

9. Functions of Two Variables

   This topic covers surfaces in three-dimensional space, gradients, tangents, as well as partial derivatives and double integrals. While it is the last topic in AM1, there are quite a few formulae that you must know, such as the conditions for local minima, maxima and saddle points. End-of-semester exam questions are very similar to those in the problem booklet, so I found it very helpful to attempt all the questions in this topic.

Lectures

Lectures proceed at a very fast pace, so give yourself time to absorb and understand the content. Make sure you are keeping up with the problem booklet questions instead of cramming them at the end of the semester — you are definitely not going to finish the entire booklet in a couple of days. Although I attended most lectures throughout the semester, I believe watching them on Lecture Capture is actually better. Since each lecture is structured such that the content in the latter half of the lecture builds upon the content in the first half, it would be helpful to pause and think through each step before moving on.

Overall, Dr Alexandru Ghitza was a great lecturer. Extremely knowledgeable yet easy-to-understand, Alex (as we call him) gave us a wonderful taste of what university mathematics looks like. He often applied the concepts we learned to real-life situations, allowing us to build genuine interest for linear algebra. Every lecture, Alex would work through the lecture notes on the DocCam and students would simply copy down what he wrote.

Tutorials

The way I look at it is — you have paid to attend university, so why not attend the classes you have paid for? AM1 tutorials generally encompass attempting questions in small groups with a tutor walking around helping each group. The questions are a very good reflection of the difficulty of the end-of-semester exam, so knowing how to do these questions will hold you in good stead. The tutors are smart blokes and blokettes, so pick at their brains and ask them tons of questions. Personally,

I found that talking to my tutor solidified my understanding of the content because they explained the interrelationship between each topic and so explained how each topic fits together.

The laboratory sessions are similar in nature to the tutorials in that a tutor roams the computer lab while you attempt a lab sheet individually. Most of the content covered in the lab is extension and pretty useless for the end-of-semester exam, but nevertheless, it typically helped deepen my understanding of that topic. Look over all the lab sheets before the MATLAB exam to familiarise yourself with all the commands that you have learned to use.

Online and Written Assessments

The online tests are generally very short and simple – you should be looking to achieve full marks on them. Questions are very generic and test you on basic knowledge and understanding. A pro-tip is to check your answers with a calculator or MATLAB!

The written assignments, on the other hand, are tedious and long – tutors can basically take away marks for any reason, so give it your best crack and hope for the best. Questions typically encompass tedious calculations with 'ugly' numbers or proofs. Tutors look for very specific details in regard to layout, so make sure you are following the exact format seen in lectures.

MATLAB Test

The MATLAB test is out of 25 marks and serves as a great entrée for the end-of-semester exam, for it reflects its difficulty and covers the entire course. One-fifth of the test requires you to write a program in MATLAB which was barely mentioned in class. So, unless you already know how to program, these five marks are not worth your time to learn programming. The other 20 marks are relatively simple, only requiring you to write simple commands in MATLAB to answer the questions, all of which you have covered in the laboratory sessions. But, of course, you must know what commands to even write, so understanding the content comes first.

End of Semester Exam

The 2018 end-of-semester exam was out of 96 marks but was out of 100 marks in prior years. Most marks were concentrated on Topics 5-9, and while the exam was definitely tough, it is doable in the three-hour timeframe. Questions are very similar to worked examples in the lecture notes and some questions in the problem booklet. You are not allowed to use a calculator in the exam, so be sure to do a lot of mental arithmetic accurately and quickly. Note that each question and sub-question don't carry very many marks – generally two to four marks. So, if you get the answer wrong due to an arithmetic error, you will be quite harshly penalised. My advice is to be very meticulous and mindful of all the arithmetic you are performing, ideally checking them as you go.

Practice exams are available on the University's library website, but answers are not available. Nevertheless, past exams are still a satisfactory indication of difficulty and style of questions, so give them a crack.

Concluding Remarks

All in all, AM1 is definitely going to be one of the hardest subjects in your first semester, for the content is dense and exam questions are often demanding. In saying that, it was my favourite subject given the abstract nature of the concepts, which garnered much of my interest.

My biggest piece of advice for those who choose AM1 is to **visualise, visualise and visualise**. Space and vectors are, quite sensibly, visual notions, and it is no different when considering the concepts in AM1. The linear algebra series created by '3Blue1Brown' was frankly life-changing; it taught me how to visualise all the concepts taught in AM1, which genuinely helped me solve the questions on the exam. It is without any hesitation that I recommend the linear algebra series created by '3Blue1Brown'.

MAST10009 Accelerated Mathematics 2

Exemption status	Not an exemption subject; however, you will need either • an average of at least 60 across this subject and MAST10008 *Accelerated Mathematics 1* or • a total of at least 135 across this subject and MAST10007 *Linear Algebra* to continue the major and enrol in ACTL20001 *Financial Mathematics I*.
Lecturer(s)	Professor Barry Hughes
Weekly contact hours	4 × 1-hour lectures 1 × 1-hour tutorial
Assessments	2 individual assignments 2 × 5% 45-minute mid-semester test 10% 3-hour end-of-semester exam 80%
Textbook recommendation	MAST10009 Accelerated Mathematics 2 — Textbook (yellow one that matches the lectures). It is your life from now onwards — consult it regularly for success.
Lecture capture	Full (both audio and video).
Year and semester reviewed	2017 Semester 2

Comments

Subject content

This subject covers the following topics:

- **Sequences** — convergence, divergence, Landau symbols, limit theorems, Cauchy and contractive sequences (6 lectures)
- **Functions, Limits and Continuity** (8 lectures)
- **Differential Calculus** — mean value theorem, l'Hôpital's rule, iterative solutions, Taylor polynomials, hyperbolic functions, inverse hyperbolic functions (9 lectures)
- **Mid-Semester Test** (1 lecture)
- **Integral Calculus** — Riemann integrals, integration techniques (4 lectures)
- **Differential Equations** — first-order and second order linear ODEs; applications to: population models, mixing, motion with drag, electric circuits (8 lectures)
- **Improper Integrals** — applications: probability density functions, Fourier transforms (3 lectures)
- **Infinite Series** — convergence, power series, complex series, Fourier series (7 lectures)
- **Revision of past exams** (2 lectures)

As you probably would have already heard about this subject, it's intensive and fast paced, and certainly not something to be taken lightly. This subject is a blast if you really enjoy maths, but probably not what you want to take if you don't. Either way, you won't ever have nothing to do in your spare time. Aside from staying up to date on lectures on a week to week basis, it's important to pinpoint the proofs, concepts and definitions that are game changing, if not all of them.

This review was previously published in the 2017 end-of-year edition of the *Actuarial Students' Society Subject Review*.

Lectures

There's truly nothing more therapeutic than waking up super early to make it on time to Barry's 9am lectures. With four of them a week, it further stresses the point of enjoying this subject and maths in general — don't take it if you won't! The lecture attendance is essential for several reasons. Whilst the accompanying slides are recorded with the audio, all of the important worked examples and demonstrations are presented on the blackboards, which you won't see if you don't attend his lectures. The yellow textbook is amazing — however, whilst it encompasses everything you need to know in the course, many of the examples do not have worked solutions (some are at the back of the book). To maximise success in this subject, note down every example, and vehemently peruse the concepts in your spare time. It's worth even spending a few minutes on public transport every day flipping through the textbook and your notes.

Tutorials

Attendance is strongly encouraged, but does not contribute towards your final score. In tutorials, you'll be attempting several questions from the textbook on whiteboards, so make sure that you're always on top of things from week to week. Take the tutorials as seriously as you can — when writing out solutions, give the full working, stating all of the necessary theorems adopted in your working. This way, when your tutor walks over to yours, he can scrutinise the small details or mistakes that you missed, especially in the presentation of your solution. If it's not too late already, try to make your tutorial early in the week rather than late, so that the topics covered in the previous week are still relatively fresh to you, and you don't have to learn another week's worth of material before covering the previous week's.

Assignments

Here is where you will need impenetrable presentation of your solutions. Marks can literally be taken off for whatever your tutor wants, so make sure you're familiar with what your tutor looks out for before you write each assignment. The marking is tough; if you forget to mention a theorem or misrepresent the exact wording, you will lose marks. The assignments do take a bit of time, so don't leave them to last minute.

Mid-semester test

This exam will come sooner than you expect. For the mid-sem especially, make sure your definitions are well understood and learnt, proofs included. If the proof is not impossibly difficult, then you will need to know it. Try to get your hands on a past mid-semester exam if possible.

End-of-semester exam

No matter what happens, make sure you look through all of the past papers before you take the actual exam. They are worthwhile and well structured, and give a solid demonstration of what to expect. There are two lectures towards the end of the semester where Barry will go through two papers with worked solutions for each. Make sure to attempt these before the lectures so you truly understand what's going on, and what to expect henceforth. Otherwise, clench as hard as you can, and good luck!

Second-Year Subjects

Contents

ACTL20001 Financial Mathematics I

Exemption status	CT1 *Financial Mathematics*, in conjunction with ACTL20002 *Financial Mathematics II*. Satisfactory performance in both subjects' end-of-semester exams is needed.
Lecturer(s)	Dr Ping Chen
Weekly contact hours	2 × 1-hour lectures 1 × 1-hour tutorial
Assessments	Group assignment, due in Week 7 — 10% 45-minute mid-semester test in Week 7 — 10% Group assignment, due in Week 12 — 10% 2-hour end-of-semester exam — 70%
Textbook recommendation	Fitzherbert, R., & Pitt, D. (2012). *Compound Interest and its applications*. Melbourne, AU: University of Melbourne Custom Book Centre. ✓ I recommend buying Compound Interest and its applications. See 'Necessary Resources' in the body of the review for more information.
Lecture capture	Full (both audio and video).
Year and semester reviewed	2018 Semester 1

Comments

Subject content

- Weeks 1-3: Chapter 1 — Fundamental concepts;
- Weeks 4-8: Chapter 2 — Valuing cash flow;
- Weeks 9-10: Chapter 3 — Financial analysis of loan contracts and business projects;
- Weeks 11-12: Chapter 4 — Background to institutional investments.

Financial Mathematics I (FM1) is split into 4 sections, based on the first 4 chapters of Compound Interest and its applications. Quite a lot of the content will be familiar because it builds upon material taught in ACTL10001 *Introduction to Actuarial Studies* and, to some extent, FNCE10002 *Principles of Finance*. However, this subject requires a deeper understanding of those ideas and the ability to apply them in more nuanced problems. Obviously, new content is taught as well — this mostly occurs after the mid-semester break. Although the subject is heavily dependent on the use of formulae, a substantial amount of theory about major asset types is taught in Chapter 4. This is a bit dry but can easily be rote-learned for the exam.

The lecture slides are the dot-points version of the corresponding chapter in the textbook and thus the content can be completely learnt from either source.

Lectures

There is only one lecture stream since there aren't that many actuarial students. This may mean having to build your timetable around FM1 lectures. Lecture slides for each chapter were uploaded altogether at the beginning of the semester (even though the subject guide says "available prior to the lectures, hopefully the week before").

Ping tends to explain the concept and then follow up with examples. Most examples tend to be clear about what they are asking and make good references for when you attempt harder questions. Although most lecture slides can be understood without listening to Ping, I would particularly recommend paying attention when she explains proofs – not just because we often think a proof makes sense but then fail to reproduce it, but it also helps with understanding why a formula can be applied (and, consequently, recognising when to use it).

Tutorials

Tutorial attendance rates for FM1 is low since there are no attendance/participation marks. This meant that for those who make the effort to attempt tutorial questions and go to tutorials, they get a very personalised experience. I was not one of those lucky few. Although I was able to attempt tutorial questions by myself and check against solutions, it would have been worth at least attending the tutorials for which I struggled with the tutorial sheet.

Tutorial questions tend to be a mix of practising simple concepts, applying concepts to more complex problems and proofs. Solutions are uploaded to the LMS (usually on Friday afternoon) and explain the working out clearly. Like the lecture slides, solutions can be read and understood on your own, but it's beneficial to listen to someone explain the approach.

Assignments

There are two group assignments that contribute 10% each. They are supposed to be completed in groups of 3-5, but you can request to work individually or in a pair. A common method for groups was to do all the questions individually and then compare answers with group members. I recommend doing this as it gives you an opportunity to understand how others approach questions and you may learn new techniques and shortcuts.

Assignment questions were released about 3 weeks before they were due. This was more than sufficient time, as both assignments were quite easy. Both assignments were out of 20 marks. Assignment 1 had 5 questions that tested knowledge of the content from weeks 1-6 (Chapter 1 and most of Chapter 2). Assignment 2 had 6 questions that focused on content from weeks 7-10 (the rest of Chapter 2 and Chapter 3).

Mid-Semester Exam

The mid-semester exam in week 7 was a 45-minute exam with 5 minutes of reading time. The exam had 5 questions that covered content from the first half of the semester. There is no formula sheet, so formulae must be committed to memory and a calculator is required. The previous year's paper was made available with solutions and was a good representation of what to expect in terms of structure and question types.

The paper for this semester was somewhat challenging, but it was mainly the pressure of time that stressed people out and may have prevented them from achieving higher scores. The paper and its solutions were uploaded to the LMS two weeks after the exam. Feedback was also provided on the performance of the cohort and common mistakes were identified. It

was possible to review your exam in your enrolled tutorial the following week if you wanted to see check your marks or see what you got wrong. I think that having access to the solutions and then reviewing your paper is useful for recognising areas that you need to practise.

End-of-Semester Exam

The final exam was a 70-mark paper that ran for 2 hours with 15 minutes of reading time. There is a hurdle of 50% in the exam to pass the subject. Like the mid-semester exam, it was necessary to have a calculator and no formula sheet was provided. Exams from the past three years were uploaded to the LMS in week 12.

The final exam was quite similar in structure to the past papers. As the questions were not in order of difficulty, I chose to do the questions I was sure about first to guarantee as many marks as possible, in case I wasted too much time trying to unpack a complex question. Although there is a lot of formulae, if you practise consistently throughout the semester, it's not difficult to memorise them all for the final exam. Otherwise, you could just rote learn them. However, exam questions tend to be complicated and just knowing all the formulae is useless if you can't figure out what information the question gives you. Additionally, make sure you revise everything, including those seemingly unimportant rules of thumb and simple tests – they just might come up on the final exam.

Necessary Resources

The required textbook for FM1 is Compound Interest and its applications. It is also used for ACTL20002 *Financial Mathematics II*. The book is available from The Co-op for $33. A PDF of notes on the textbook was uploaded to the LMS at the beginning of the semester with some edits and exclusions. The textbook is a lot denser than the lecture slides and, as mentioned before, reading it may not be necessary. However, you may prefer it if you learn better by reading. The textbook also has practice questions with solutions. I recommend doing the relevant exercises each week to consolidate your understanding as they can help you become familiar with different question styles and practise applying important concepts.

Concluding Remarks

Financial Mathematics I is not too difficult during the semester. As long as you don't forget everything you learnt in *Introduction to Actuarial Studies*, most of the content should be easy to digest. The difficulty of this subject can be attributed to the final exam which tests your ability to apply what you know to complicated situations. In my opinion, the best way to prepare is to practise consistently and learn different approaches (from tutorials or friends). Also, if you tend to become stressed when you are faced with complex problems, it is important to learn how to manipulate them into problems you can solve.

ACTL20002 Financial Mathematics II

Exemption status	CT1 *Financial Mathematics*, in conjunction with ACTL20001 *Financial Mathematics I*. Satisfactory performance in both subjects' end-of-semester exams is needed.
Lecturer(s)	Professor Mark Joshi *Professor David Dickson took the last 4 lectures due to Mark's passing*
Weekly contact hours	2 × 1-hour lectures 1 × 1-hour tutorial
Assessments	Microsoft Excel individual assignments 2 × 10% 45-minute mid-semester test 10% 2-hour end-of-semester exam 70%
Textbook recommendation	Fitzherbert, R., & Pitt, D. (2012). *Compound Interest and its applications*. Melbourne, AU: University of Melbourne Custom Book Centre. The textbook is a good source for different explanations of lecture material as well as extra questions for practice. However, these questions are not always relevant to examinable material/ tutorial questions.
Lecture capture	Full (both audio and video).
Year and semester reviewed	2017 Semester 2

Comments

Many students consider ACTL20002 Financial Mathematics II to be the hardest subject of second year, and with good reason. Although the subject starts with content related to ACTL20001 *Financial Mathematics I*, it goes much more in depth on familiar topics as well as introducing new abstract concepts that may be difficult to grasp. In addition, we quickly discover that memorising formulae to substitute into questions does not work, as each question is uniquely tailored such that critical thinking and manipulations are required for the correct answer, unlike many other rote learning subjects before it. Due to this, cramming for this subject is especially undesirable as an adequate understanding of each topic and its various applications are required to be able to solve any sort of problem at all.

Subject Content

- Discount Securities & Coupon Bonds (Price and Yield Calculations) — Weeks 1–2
- Measures of Investment Performance — Week 3
- Interest Rate Risk, Bond Market Structure — Weeks 4–5
- Derivative Securities (No Arbitrage Pricing, Put-Call Parity) — Week 6
- Valuing with Default — Week 7
- Non-Deterministic Interest Rates, Valuation w/ Stochastic Rate of Return, Moments — Week 8
- Life Insurance Applications, The Lognormal — Weeks 9–10
- Simulation, Time Series Models — Weeks 11–12

This review was previously published in the 2017 end-of-year edition of the *Actuarial Students' Society Subject Review*.

Personally, I found a massive gap in difficulty between weeks 1-7 and 8-12, with the first half being quite manageable with appropriate time allocation and practice. Topics such as valuing bonds, floating rate notes, after tax yields etc in the first 2 weeks are built upon the basics of FM1. These topics, although straight-forward in theory, are easy to mess up in practice as questions often throw curveballs, requiring extra thought instead of just substituting numbers into annuity formulae. Weeks 3-6 are also fairly easy to digest, where understanding where to use which formula as well as how to derive their variables are enough to get you through. Concepts like selling a put or buying a call etc can become confusing especially when adding in the factor of time along with the different rates of interest, so take make sure your understanding of this finance component is sound.

Week 7 arrives at this point along with the mid semester test, and it takes the place of one of the lectures, leaving only 1 lecture about valuing defaults this week. Starting from week 8, the content ramps up exponentially in difficulty, with many people being completely lost in the vast amount of formulae and variables that come with confusing explanations. This section of the subject is quite application based, with the concept explained at the beginning and many differing examples that follow in the lectures, making it more up to the students themselves to fully understand the nuances of different variables in different situations. Luckily, the exam questions based around this are usually of similar nature to the lecture slides, so a solid understanding of lecture material should score you a decent mark.

Mid-Semester Test

The mid semester test is a 45 minute test with no reading time, scientific calculator allowed. Although the topics covered are not very difficult comparatively, scoring well is not guaranteed as the difficulty and content varies, so past mid semester tests will not be a completely accurate representation of your year's test. Definitions, proofs, problem solving and application are all part of the scope of the mid semester test.

Tutorials

I highly recommend attending tutorials even though this subject does not have attendance marks. The tutorial questions can become quite tricky and are often extensions of the lecture material, meaning you have no clear way of getting an accurate answer without the tutor's explanations. Although answers do go up at the end of each week, they are sometimes unclear and skip steps in working out. In addition, tutorials are a good place to consolidate your knowledge and ask tutors about textbook questions as well.

Assignments

Both assignments are to be completed in Excel by creating a model through manipulating formulae to fit given sets of data points. I imagine this would be similar to what people actually do as actuaries, so it was a good and interesting experience. It is emphasised that the models submitted in the assignments should work different inputs, so your model must actually have adaptive formulae and accurate components to still be correct after changes to inputs.

End-of-Semester Exam

The final exam usually has 8-10 questions, and has a time limit of 2 hours. These questions are mostly problem solving, with a rare definition or proof questions as well, which could be difficult if there is no solid understanding of the topic since

there are no cheat sheets available.

Overall, this subject definitely tackles difficult concepts and arithmetic, however, with appropriate preparation one shouldn't struggle too much. Due to the unfortunate passing of Mark, the subject content and tests may be subject to a change in style in future years, but I believe it will remain the subject most reflective of an actuary's job in second year.

ECON20001 Intermediate Macroeconomics

Exemption status	CT7 *Business Economics*, in conjunction with ECON10004 *Introductory Microeconomics*. An average of 73 across this subject and ECON10004 *Introductory Microeconomics* is needed, with no fails.
Lecturer(s)	Dr Mei Dong
Weekly contact hours	2 × 1-hour lectures 1 × 1-hour tutorial
Assessments	Tutorial attendance and participation 10% Online multiple-choice test, set in Week 6 5% Group assignment, due in Week 8 12.5% Group assignment, due in Week 10 12.5% 2-hour end-of-semester exam 60%
Textbook recommendation	Blanchard, O., & Sheen, J. R. (2013). *Macroeconomics Australasian Edition*. Frenchs Forest, AU: Pearson Education Australia.
Lecture capture	Full (both audio and video)
Year and semester reviewed	2017 Semester 2

Comments

Lectures

There were five main topics covered throughout the course:

1. Short-run macroeconomics (the IS/LM model) — 3 weeks
2. Labour markets and unemployment — 1 week
3. Macroeconomic adjustment (the AD/AS and DAD/DAS models) — 3 weeks
4. Long-run macroeconomics (the Solow model, endogenous growth model and productivity) — 3 weeks
5. Open-economy macroeconomics (interest rate and exchange rate regimes) — 2 weeks

The lecture slides for this subject were relatively sparse in detail, but sufficient to grasp the main concepts. Many diagrams were accompanied by an insufficient explanation in the captions. Thankfully, Mei often annotated these diagrams and provided a more detailed verbal explanation. At times, the algebra on slides skipped multiple steps, but once again Mei added in annotations as necessary. However, the slides occasionally contained typos or broken English which was a slight annoyance.

Mei explains concepts very clearly but at times speaks quickly when she gets into a rhythm. This generally occurred when she explained concepts multiple times (i.e. movement in the IS/LM model in different scenarios). By that point, we were familiar enough with the topic to follow what she was saying.

This review was previously published in the 2017 end-of-year edition of the *Actuarial Students' Society Subject Review*.

Lectures often had an example question tagged onto the end of every second lecture. These covered concepts covered in that week's lectures. Mei worked off slides with solutions which were distributed after the lecture. Mei often forgot or ran out of time to go through these, but this was not an issue as they were generally straightforward and solutions were provided.

Tutorials

Like other economics subjects, tutorials used the blue and pink sheet system. Blue sheets were often too easy. Several tutors didn't bother checking them and thus some students didn't bother doing them. They were sufficient for light revision of some topics, but were not stimulating. On the other hand, the pink sheets were much more challenging. Especially in the later weeks, where they required some tedious algebra. Whilst the algebra is important, I feel that some tutors spent too much time focusing on the algebra rather than the intuitive explanations for results in questions.

Textbook

The Blanchard and Sheen book covered most of the concepts we studied, apart from labour markets (topic 2) and the dynamic AD/AS model (part of topic 3). We were provided with supplementary material for the DAD/DAS model from Mankiw's textbook, but our only material for labour markets was in the lecture slides.

Online Text

The online test (held in week 6) was conducted on the LMS and consisted of 12 pooled questions. A set of sample questions and answers were provided. The questions were relatively straightforward and covered the first two topics.

Assignments

There were two assignments throughout the semester, due in weeks 8 and 10. We had the option of working individually or groups of up to 3 people from the same tutorial.

The first assignment covered the IS/LM model and the dynamic AS-AD model. The IS/LM questions were relatively straightforward as they merely required us to look up numbers in a report and complete brief calculations. The dynamic AS-AD question was more challenging and required the use of excel to plot time-paths for inflation and output.

The second assignment covered the Solow growth model and other variations. Much like the dynamic AS-AD question from assignment 1, most of it was based on using excel to plot time-paths of various parameters. Many students found this assignment confusing as there was a wide scope for interpretation.

The mark allocation for assignments was at times unbalanced which led to confusion amongst students about how much detail was required in responses.

End-of-Semester Exam

The end-of-semester examination ran for two hours and consisted of 60 marks. The paper had three equally-weighted sections. Section A consisted of 12 multiple choice questions which were relatively similar in style but more difficult than

those in the online multiple choice test. Sections B and C had three multi-part short-answer questions each, of which students were required to answer two from each section. This brought in a new dynamic to exams as choosing the "right" question also became a deciding factor in the exam. Section B questions were more mechanical, whilst section C questions were slightly trickier.

Mei explicitly stated that we did not need to memorise formulae as they would be provided in each question. However, the formulae given in the question were sometimes inadequate and required derivation to get an answer. Therefore, it is important that students memorise and understand how to derive the formulae in the course.

I found Intermediate Macroeconomics to be an enjoyable extension of concepts covered in *Introductory Macroeconomics*. Despite the occasionally annoying focus on algebraic proof at the expense of intuitive explanation, the subject was well-taught and not too difficult. Good luck!

MAST20004 Probability

Exemption status	CT3 *Probability and Mathematical Statistics*, in conjunction with MAST20005 *Statistics*. An average of 73 across this subject and MAST20005 *Statistics* is needed, with no fails.
Lecturer(s)	Dr Aihua Xia Dr Mark Fackrell
Weekly contact hours	3 × 1-hour lectures 1 × 1-hour tutorial 1 × 1-hour computer lab session
Assessments	4 individual assignments, due in Weeks 3, 6, 10 and 12 4 × 5% 3-hour end-of-semester exam 80%
Textbook recommendation	Ghahramani, S. (2005). *Fundamentals of Probability, with Stochastic Processes* (3rd ed.). Upper Saddle River, US: Pearson Education. An orange book of printed lecture slides can also be purchased along with a workbook with exercises from Co-op. The staples are sharp, watch out.
Lecture capture	Full (both audio and video).
Year and semester reviewed	2018 Semester 1

Comments

Subject Content

An important aspect to note as you start this subject is that you can bring one double-sided, handwritten A4 page of notes into the exam. The earlier you start preparing them with useful formulae and notes on theorems, the better. I wrote these with something akin to size 7 font.

An introduction to probability and its axioms — Somewhat a review of the basic probability content covered in secondary school. The subject rigorously covers the fundamentals of probability, defining the axioms of probability. Your cheat sheet should include the axioms of probability.

Probability distribution functions and random variables — You know how in high school, you learn about binomial, and normal distributions? This subject encompasses these distributions, but there are more of them (gamma, negative binomial, etc.)!

This is where the subject starts becoming difficult. The topics of random variables, distribution functions and density/mass functions are explored in depth. It is worth noting down the essential properties which define these functions, as well as the expected values and variances for each unique probability distribution you learn about.

You may find yourself unsure of why you are learning about a certain probability distribution during the semester. At times like these, the innumerable resources supplied by this subject can come in very handy. I found that the easiest way to understand topics was to apply the maths and practice potential exam questions, as Probability is a very application-based subject when compared to *Accelerated Mathematics 2*.

Bivariate random variables and correlation — Like the previous section, but with two variables instead of one. Learning the transformations of the random variables can be difficult, so be attentive at these times (week 6). There are several formulae which should be on your cheat sheet.

Generating functions, limiting distributions, branching and stochastic processes — These are arguably the most convoluted areas of the subject, with regards to comprehending them. Thus, it is essential to work through the workbook and consult the recommended textbook as you work through these topics. At the time these topics are taught, the resources for exam preparation should be up. Take advantage of this and see what type of questions they can ask.

Lectures

This year, we were given a choice of two streams, with Mark Fackrell and Aihua Xia as the two lecturers. I had Aihua as my lecturer, and his lectures were funny, insightful and akin to a beacon in the stormy night that is Probability. The pacing of the lectures is manageable for the average maths student, let alone an elite actuarial student such as yourself. Aihua's lectures were my favourite, but I've heard Mark's lectures are more succinct, which might be more suitable for crammers.

As always, maths lectures are worth going to as it is a lot harder to catch up on Probability than your other commerce subjects.

Tutorials

Probability tutorials are like all other tutorials from the mathematics and statistics department, whereby you are given a question sheet to work on as a small group on whiteboards around the classroom for an hour. Then, you have an hour of MATLAB class, where you learn about coding applications for the mathematical models taught in lectures. Whilst these tutorials are not marked, it is highly recommended that you attend as they teach you how to apply the maths. The MATLAB tutorials may seem monotonous at first, but they do teach valuable skills that you'll need for your assignments, and based on past years, some exams.

Assignments

The four individual assignments are spread evenly throughout the semester, in increasing difficulty. The first assignment can be completed with high school knowledge, but don't let that give you a false sense of security. Thenceforth, the assignments become more difficult and require more time to complete. It is therefore highly recommended that you rigorously discuss the themes that appear on the assignment. The assignments are marked differently from other subjects, whereby only two of five questions will be marked, and the other three questions are only checked to see if they have been attempted.

These assignments can include MATLAB based questions that ask you to write a code, so make sure you attend the MATLAB sessions.

End of Semester Exam

The end of semester exam is weighted 80% of your final mark, but it is not a hurdled. To get your actuarial CTs however, you'll want above 73 in Probability.

Luckily, Probability is a subject rife with fantastic resources, including roughly 10 of each: past exams, assignments, tutorial questions, etc. These are released a few weeks before the exam, so stay on top of things and begin doing the exams as soon as possible. This is especially applicable with this subject, as it is an application-based subject and you should be able to see patterns between the past exams; they all have similar questions that reappear every year. As an example, the exams always have one question on probability axioms, one question on bivariate random variables and one question on generating functions. Thus, studying the past exams extensively is your best route to success.

As previously mentioned, you are allowed one double-sided A4 handwritten sheet of notes. Try to squeeze as much information in as possible. Writing the cheat sheet throughout the semester is ideal, however, writing the cheat sheet serves as a good way to consolidate content.

Anyhow, your success in this subject will mostly depend on your preparation for the final exam. Your recipe for success should entail several practice exams, and an in-depth understanding of the possible variants of questions. Good luck!

MAST20005 Statistics

Exemption status	CT3 *Probability and Mathematical Statistics*, in conjunction with MAST20004 *Probability*. An average of 73 across this subject and MAST20004 *Probability* is needed, with no fails.
Lecturer(s)	Dr Damjan Vukcevic
Weekly contact hours	3 × 1-hour lectures 1 × 1-hour tutorial 1 × 1-hour computer lab session
Assessments	3 individual assignments 20% 45-minute computer laboratory test 10% 3-hour end-of-semester exam 70%
Textbook recommendation	Hogg, R. V., Tanis, E. A., & Zimmerman, D. (2015). *Probability and Statistical Inference* (9th ed.). Boston, US: Pearson Education. This subject is based on Chapters 6–9. The lecture notes are quite standalone and covered everything. I didn't need to consult the textbook, however I would recommend it if you want additional questions and more in-depth proofs. Copies are available in the ERC High Use.
Lecture capture	Full (both audio and video).
Year and semester reviewed	2017 Semester 2

Comments

MAST20005 Statistics was an enjoyable subject. It served as a good introduction to the basics of statistical modelling, data analysis and various statistical computations.

Let's cut to the chase. Stats is not a difficult subject; as usual, if you work hard, you will do well. Unfortunately, there are a lot of black boxes in this subject, we were merely taught how to take certain inputs and produce some outputs. Personally, this made the subject less satisfying, but easy to grasp. The subject itself is crammable (although would not recommend) — don't stress too much if you fall behind.

The Good: Supportive teaching staff. Despite this is Damjan's first time lecturing, he looked after us in every way possible. Damjan was very active on the subject discussion forum, answering students' questions on various topics. He also took time in lectures to clarify assignment questions and spent the last week of lectures doing revision.

Subject discussion forum. The maths faculty is trialling a new platform for students to work collaboratively and get help from the teaching staff more easily. Most of the class discussion was conducted on Ed, which is pretty much the Online Tutor but done better; tutors actually gave meaningful responses and fellow students can also answer questions and start a discussion. I enjoyed using Ed. It was fast and easy to use, I can access it from any device, plus you can also type nicely formatted maths equations :)

The Bad: Errors! Nothing sucks more than finding out that complicated formula from the lecture slide is wrong. In this subject, we rarely derived any formulas or proved theorems. Most of the time, you are told to trust the lecture slides and accept what is given. It is problematic and frustrating when there are typos/errors in almost any given lecture. This

This review was previously published in the 2017 end-of-year edition of the *Actuarial Students' Society Subject Review*.

isn't entirely Damjan's fault, but the legacy of the last lecturer for this subject, as Damjan has been reusing the previous lecturer's slides to keep the subject content consistent. I just wished Damjan could have been more active in correcting these typos and notifying the students of them. This means, unfortunately, you have might to keep your skeptical hat on; don't immediately trust the lecture slides, solutions etc. If in doubt, ask.

The Ugly: Many thought the exam was a curveball, it was vastly different in style compared to previous exams that we were given. However, this is to be expected as Damjan is a new lecturer and did not write the past papers. As such, if you happen to get a new lecturer for a subject, don't fall into the trap of revising from past exam papers, try to focus on assessments written by the current lecturer, such as tutorial questions.

Falling behind. I am atrocious when it comes to staying up to date with content. I fell behind with Stats (and all my other subjects) not long into the semester, and struggled to catch up. Disclaimer, this is not saying that you are likely to fall behind. Most of us will be taking Stats in our penultimate year, and that means we will also be spending a lot of time and energy outside of studying looking to secure a summer internship! During this stressful time of writing online applications and preparing for interviews, if you ever find yourself far behind in a subject, this is not when you give up and say I will catch up during mid-sem break!

Try to keep track of all your deadlines, make sure you know when things are due and focus on your important tasks. Things that are urgent but not important can wait. Additionally, make use of every bit of free time you have to finish assignments and study for tests; for me this meant doing the stats assignment at the airport the night before it was due. Okay, that probably wasn't a good example, but the point is: don't stress if you fall behind, prioritise.

Subject Content

- Module 1: Review of probability
- Module 2: Descriptive statistics
- Module 3: Point estimation
- Module 4: Interval estimation
- Module 5: Linear Regression
- Module 6: Hypothesis testing (including distribution-free methods)
- Module 7: Order statistics, quantiles & resampling
- Module 8: Bayesian methods
- Module 9: Asymptotic distributions, sufficient statistics & optimal tests

Lectures

People like to ask if lectures are worth going to. For me, the answer is, it depends. I won't be recommending that you attend or not attend these lectures. I pretty much took Statistics as an online course, part of the reason is that I found myself unable to absorb much information during the lecture. As a slow learner, I prefer to have the option to pause, write down notes and google any details Damjan might have rushed over. From personal experience, lecture recordings were sufficient.

Tutorial

Statistics tutorials are what you would expect of standard maths tutorials. A set of tutorial questions will be released each week for you to work on during the tutorial. During the tutorial, we broke into groups of 3-4 students and worked together to solve the set of questions on whiteboards.

Computer Labs

Following the one-hour tutorial each week, there is another hour of computer lab on R. These labs are important as you will be tested on your ability to use R. Each week, you will be given new a lab sheet to work on, the content will be related to the previous week's lectures. On surface, you will be doing a lot of copying the R commands from the lab sheets and pasting them into your R console. But please try to understand the logic behind all these R commands, experiment with different parameters, don't just regurgitate what's printed on the lab sheets.

Assignments

Assignments were not too difficult, had a good balance of theoretical and application questions. You are encouraged to use R for the assignments, which can make tedious computations much faster.

Lab Test

A practise lab test was given. The content of the test is very similar what you have done in the labs. You are allowed to bring in all of the lab sheets and annotate them to whatever degree you so desire. The test was not difficult. Just go through all the lab sheets beforehand.

Good luck!

MGMT20001 Organisational Behaviour [SM1]

Exemption status	None.
Lecturer(s)	Dr Victoria Roberts (Head tutor) Professor Bill Harley
Weekly contact hours	1 × 1-hour lecture 1 × 1-hour tutorial
Assessments	Tutorial attendance & participation and completion of online tutorial 10% Individual assignment, due in Week 4 10% Group assignment, due in Week 9 30% 2-hour end-of-semester exam 50%
Textbook recommendation	McShane et al. (2016). *Organisational Behaviour: Emerging Knowledge. Global Insights*. Australia: McGraw-Hill. The textbook was useful in drawing references for both the individual and team assignment, and also to provide additional depth into topic content. Although textbook readings were recommended weekly, lectures proved sufficient enough.
Lecture capture	Full (both audio and video).
Year and semester reviewed	2018 Semester 1

Comments

Welcome to your first taste of a management subject! Because of its reputation of being a reading-focused subject, most students had mixed opinions about this subject. You may find this subject quite different compared to the other core subjects undertaken in Commerce, as this subject heavily focuses on reading and writing - requiring you to be able to absorb a considerable amount of information and effectively be able to condense it into essay writing. Being a core subject, the advantages were the abundant access to resources and being able to collaboratively learn with others due to a large cohort undertaking this subject, as well as the addition of many past students' resources.

Subject Content

- Week 1: Introduction & Contrasting Management Approaches
- Week 2: Teams & Leadership
- Week 3: Perception, Attribution and Decision Making
- Week 4: Values, Attitudes and Behaviour
- Week 5: Motivation
- Week 6: Conflict & Negotiation
- Week 7: Organisational Change
- Week 8: Organisational Communication
- Week 9: Organisational Culture
- Week 10: Power & Influence

- Week 11: Organisational Strategy and Structure
- Week 12: Ethics

Lectures

Lectures were 1 hour per week , with Weeks 1-6 focusing on the 'micro' topics and Weeks 7-12 focusing on the 'macro' topics of the subject. I found that watching the lectures online on double speed was sufficient enough to understand the content, and I referred to the textbook if certain lecture slides weren't expanded on enough, such as the types of bias in Week 3, which Vicky told us would be expanded more in the textbook. In Weeks 2, 8 and 9 lectures were presented in an 'online lecture' format which were prerecorded clips uploaded on Vimeo. Although the aim of this was for students to be able to draw from interactive examples and apply the content's material into 'real world' examples, occasionally it felt like an overload of unnecessary information to tediously follow. It felt as if the slides had not been updated in a long time which further made it harder to pay attention.

Apart from the online lectures, Vicky was an excellent lecturer who clearly explained and expanded on each lecture slide succinctly which made understanding the content much easier. I recommend either to attend/watch Vicky's lectures, as she explains the content straight to the point and her interactive approach in occasionally asking questions to students made lectures more enjoyable and easier to retain information.

Tutorials

Tutorials were conducted as a combination of a weekly online tutorials and 1 hour in-class tutorials. The online tutorials essentially acted as a learning tool that converted the concepts and content in lectures into a quiz format . They were in the format of a survey/questionnaire where answers had to be typed into the given boxes below each question. No time limit was given to do this, however the same browser and web activity had to be active in order to go back and save your answers. They took roughly one hour to complete if answered sufficiently. It was to be completed prior to your tutorial each week so it is recommended you do not put your tutorial too early in the week as our lectures were every Friday, and online lectures only opened on the Monday at the beginning of each week. However, if you are incredibly responsible and on top of all your work, feel free to not heed this advice. Completing the online tutorials each week helped to better follow class discussions in the in-class tutorials as the questions discussed in the in-class tutorials were from the online tutorials.

Participation marks were obtained from mainly 2 sources - completing the online tutorial each week and participating in class discussions in the in-class tutorial. Although it may seem tedious and even dull at times completing the online tutorials, writing all your answers down beforehand made it much easier to contribute in the class discussions since you could simply just draw on the points you wrote down beforehand. It was also interesting hearing the tutor and other student's perspectives on certain questions/topics, providing you with a greater insight into the varied perspectives on the topic.

Assignments

An individual assignment was due in Week 4 worth 10%, expecting you to recall the past 3 weeks of content to apply to the questions asked in the assignment. A case study was given to us and 3 questions referring to this case were to be answered with a 1000 word limit, drawing on concepts learnt in lectures and readings. The required readings given to us to complete the assignment was the longest process, in terms of reading through and analysing. The research component of assignments will inevitably take longer than writing the actual essay itself, so my advice is not to worry if you feel as if you are behind, as writing the actual essay will take the shortest amount of time (given you plan out and do sufficient

research prior). An abundance of resources were given by the department regarding how to format and write your essay, as this was most student's first taste of academic essay writing during their time in Commerce. Although optional, utilise these resources - I found them to be the most helpful, as tips were specifically given into how to approach and target key points in the questions to effectively shape your answer.

The team assignment, although being known for being extremely rigorous was not too difficult as the support of the department and your team mates guided you to be able to adequately complete the assignment. This was due in Week 9 and was worth 30%, so it is recommended you spend considerable time and commitment for this assignment to the best of your efforts. With the OB department providing you a guideline on how to approach to the team assignment, and the tutor's feedback, it was a relatively smooth experience. The 5000 word limit and the length of the case study may be daunting at first, but sharing the workload with your team mates made it reasonable to work on. Given you effectively plan out the completion of each process in the assignment, it was a fine experience. Pay attention to your experience with the team, as this will be asked to be drawn upon in the final exam.

End-of-Semester Exam

This year's exam threw a curveball at us, by asking the micro question about discipline which most people skipped over in the lectures and knew nothing about. Advice: READ EVERY SINGLE SLIDE, no matter how mundane and far fetched they are. Learn from our experience, you could still be asked on it. The macro question was straightforward- requiring us to draw upon on the 3 dimensions of power to the Sanrizz case which was suspiciously very similar to the previous past exam questions on power. In my experience in studying for the exam, you could only memorise so much, thus learning off the lectures was adequate by itself. I found that especially for the macro cases, analysing each case with each examinable macro topic (16 combinations in total) was useful and made memorising the macro content come more naturally.

Concluding Remarks

Overall OB is very well-structured subject and as long as you put in reasonable amount of effort you will be fine. Be very careful for the final exam and read everything in detail and attentively .

Third-Year Subjects

Contents

ACTL30001 Actuarial Modelling I

Exemption status	CT4 *Models*, in conjunction with ACTL30002 *Actuarial Modelling II*. Satisfactory performance in both subjects' end-of-semester exams is needed.
Lecturer(s)	Professor David Dickson
Weekly contact hours	1 × Set of online videos (adding up to roughly 1 hour) 1 × 1-hour workshop 1 × 1-hour tutorial
Assessments	50 minute mid-semester test, held in Week 7 10% Group assignment, due in Week 10 10% 2-hour end-of-semester exam 80%
Textbook recommendation	Dickson, D. C. M., Hardy, M. R., & Waters, H. R. (2013). *Actuarial Mathematics for Life Contingent Risks* (2nd ed.). Cambridge, UK: Cambridge University Press. The textbook is ✗ not necessary, as the notes provided are sufficient for study. The textbook may provide more questions to practice on, however there are already plenty of questions provided in the tutorials and workshops to work on.
Lecture capture	Online lectures are uploaded well in advance. Workshops are not recorded.
Year and semester reviewed	2018 Semester 1

Comments

Subject content

ACTL30001 Actuarial Modelling I returns to some of the content taught back in ACTL10001 *Introduction to Actuarial Studies*, focusing on techniques relating to life insurance and modelling mortality rates. The subject is split into the following six sections:

- **Modelling Mortality** — This lays the foundation for the rest of the subject, defining a lot of the notation and concepts used in later topics, and it draws upon things from two years ago, so it may seem familiar. Some areas may seem like it isn't important, but be very careful: unless explicitly stated, all topics are in the realm of being tested or examined.
- **Non-Parametric Methods (Estimation)** — A more calculation-focused topic, looking at estimates of mortality rates using different methods of estimation. Potentially one of the easier topics and ability to earn some decent calculation marks, but derivations and proofs could be difficult.
- **Estimating Mortality Rates** — Another very large unit in the subject along with Modelling Mortality. Draws upon some knowledge in Modelling Mortality, and some knowledge of distributions in MAST20004 *Probability*, including the Binomial Distribution, Poisson Distribution and general ability to deal with distributions. A more difficult unit that focuses more on derivation and proofs rather than computation.
- **Multiple State Models** — This topic explores more states other than just being Alive and Dead, and my personal favourite topic. Many answers can be derived intuitively. It is quite algebra heavy with use of up to second order differential equations, but a strong understanding of the reasons behind the algebra will make this topic much simpler.

- **The Poisson Process** — Touched upon in *Probability* , but delved deeper in this subject. A shorter topic, and uses some knowledge of MGFs and PGFs.
- **Simulation** — The shortest topic of the subject, spanning only a week or so. Revisits techniques used in ACTL20002 *Financial Mathematics II*, but applied in a life insurance setting.

Lectures

Lectures are pre-recorded online and uploaded to Vimeo by Professor David Dickson. They come in bite-sized chunks of about 10 videos per week, with each video covering one or two pages, with lengths of 2 to 6 minutes, depending on the section being covered. A unique method of providing information, but I quite enjoyed it. Being uploaded in small chunks allows you to keep focus, and very quickly refer to a specific video if you are having difficulty with a page.

The lecture notes are provided; they are very structured and thorough, and you'll be nearly solely relying on this for the subject. Analyse everything in close detail, especially the proofs and derivations.

The benefit of having lectures online is the ability to fit in a workshop to the schedule, which is extremely beneficial to attend. Going through exam-styled questions in class and explaining them aids the learning process. Some questions are done through polls, and are quite engaging. Although not mandatory, these are also not recorded, so doing well in this subject requires attendance of these workshops. These questions, however, are posted on the LMS along with solutions, albeit with some delay to encourage attendance.

Tutorials

Tutorials are not mandatory, but are still pivotal to attend. There is plenty of practice available each week, and it includes problem sheets (to be done and corrected in your own time), and tutorial questions (completed in class and feedback provided by tutors). The tutorial questions are not uploaded online.

In class, students will work in groups on specific questions and present them to the class, and each group is typically allocated a single question. Given this fact, it is important to work on these questions in your own time as well. I found it helpful to listen to others for the other questions to get some sort of an idea of what to do, and work on it in detail after the tutorial.

The practice you receive each week cover a large amount of content. If you're able to complete tutorial questions, problem sheets and workshop questions well, then you would be quite well prepared for the final exam. Many proofs and derivations are not asked in the questions in the tutorials or problem sheets, so ensure you get practice of proofs and derivations as well.

Assignment

The subject only has one assignment worth 10% of your final mark. It is an Excel-based group assignment split into two questions. The first of which was to draw a graph for survival estimation (used in one of the topics), and the second was to estimate a mortality rate using MLEs.

Given it is a group assignment, many groups just complete it individually, then come together to check solutions, and often, only one person's Excel is picked. A write up is also required, so there is some level of task allocation involved, but even so, it is recommended to do the write up individually so that everyone is able to get some practice.

The Excel component is not only marked by a correct solution, but also presentation of the spreadsheet and whether it is easy to understand or not. This means that students should generally try to find a solution first, then find ways to either make it more efficient, improve the method used to getting the solution and generally make the spreadsheet presentable.

Mid-Semester Test

The MST is worth 10% of your final mark, and covers the first two topics in the subject (Modelling Mortality and Non-Parametric Methods). In our semester, there were many surprise questions on the MST (as mentioned in Subject Content above, all areas could be assessed, so be careful!).

The MST was situated in week 7, somewhat later than most MSTs, despite only covering the first two topics, which is testament to the depth required on the earlier topics.

The reality was that the MST wasn't extremely difficult, however, answers were completed poorly in general by the cohort, which lead to an average of about 10 out of 25 (based on tutor's remarks). It reflected poor understanding of the underlying content up to the MST, and I think was a big wakeup call for the rest of the subject; the understanding "why" is just as important, if not more, than simply understanding "how".

End-of-Semester Exam

The final exam is worth 80% of the final mark. It is 2 hours and contains 60 marks. The final exam is also a hurdle requirement for the subject.

Only one specimen exam is provided, so it is advisable to do this as late as possible, while focusing on tutorial questions, problem sheets and workshop questions first. A very important point of practice for the final exam are the proofs and derivations which may not show up in the questions and practice – it is key to understand and write-down the proofs or derivations so you're able to get some practice in for the final exam. It cannot be stressed enough the importance of understanding how concepts are derived, or where they come from. It is simply not enough to understand how to calculate things, since you'll find that they don't make up many marks on the final exam.

Good advice for the final exam is to skip questions at a whim. If at any point in the exam you find you'll struggle at a question, skip it and do the questions you can do easily which are worth many marks (i.e. high mark value questions). This may involve calculation questions or bookwork questions asking you to state assumptions, for example. You may find the exam tight on time if you dwell on key components too long.

Further practice for both this subject and ACTL30002 *Actuarial Modelling II* can be obtained from doing CT4 *Models* past exams which are available on the institute's website.

Concluding Remarks

ACTL30001 Actuarial Modelling I contain a good mixture between application and theory, and will often cross-over with ACTL30002 *Actuarial Modelling II*. Overall, it is regarded as a difficult subject, where ROTE learning is not recommended – derivations and conceptual understanding is highly required in the subject. Those who enjoyed probability and statistics last year would enjoy this subject.

It is a challenging subject, but one which is very enjoyable, as it pulls together knowledge from various subjects in the past. For aspiring actuaries and those looking to work in the life insurance sector, this subject should pique your interest.

ACTL30002 Actuarial Modelling II

Exemption status	CT4 *Models*, in conjunction with ACTL30001 *Actuarial Modelling I*. Satisfactory performance in both subjects' end-of-semester exams is needed.
Lecturer(s)	Dr Xueyuan (Shane) Wu
Weekly contact hours	2 × 1-hour lectures 1 × 1-hour tutorial
Assessments	50-minute Mid-semester exam 10% Group assignment 10% 2-hour end-of-semester exam 80%
Textbook recommendation	Lecture Notes for Actuarial Modelling 2 (AMII), prepared by Xueyuan Wu. Purchasable from the Co-op store. This book contains lecture notes, tutorial questions, progress-check questions and a specimen examination. Some of the material are uploaded to the LMS following the completion of each topic, so it is ✓ recommended to buy the course reader.
Lecture capture	Full (both audio and video).
Year and semester reviewed	2018 Semester 1

Comments

In comparison to ACTL30001 *Actuarial Modelling I*, this subject took a more practical approach to models that would predominantly be used by insurance companies. There were four major units:

- **Unit 1: Exposed-to-risk (weeks 1-3)**. This explored how mortality rates can be derived from crude data. The crux of this unit was manipulating death and census data using the principle of correspondence and counting days.
- **Unit 2: Hypothesis testing (weeks 4-5)**. This unit consisted of statistical tests to check for adherence of mortality rates (such as those derived in Unit 3) with standard tables. Most of these tests were revision from MAST20005 *Statistics*, with new additions being the exact chi-square, runs, and serial correlations test.
- **Unit 3: Methods of graduation (weeks 6-8)**. Techniques for smoothing crude mortality rates (from Unit 1). The five techniques covered were: Whittaker-Henderson, graphical, mathematical formula, standard table and cubic splines.
- **Unit 4: Markov chains (weeks 9-12)**. This unit began with general revision of Markov chains with the addition of first step analysis and new definitions of communication classes and states. The unit also covered applications to no-claims-discount systems for insurers.

After learning how to count days in ACTL20001 *Financial Mathematics I* and ACTL20002 *Financial Mathematics II*, you may think it is trivial. However, this line of thinking would be disastrous. Here you not only need to count days; but also convert between age definitions and rate intervals and state assumptions as necessary. Timelines are your friend here.

The main things to note from Unit 2 are to remember to differentiate between decisions and conclusions; and memorise the formulae of the statistical tests and whether they are one-sided or two-sided. For instance, the formula for the mean and variance of the runs test is not particularly intuitive.

Unit 3 covers a lot of excel work. Whittaker-Henderson and Graduation by Cubic Splines are generally conducted by a pre-built spreadsheet model. Clearly most of the content in this unit cannot be rigorously examined, but it is still important to memorise the formulae and proofs, as well as the pros and cons of each technique.

The main technique in Unit 4 is first-step-analysis, which is used for a wide range of applications. Another key technique is converting random variables to satisfy the Markov property.

Lectures

Shane delivered the lectures with slides which were for the most part identical to the course reader. He frequently used the document camera, so the only risk of missing out information on lecture capture was in the case where there was no recording. This happened on several occasions this year—usually due to scheduling changes.

Generally, his pace was reasonable and easy to follow. However, sometimes he stuck too rigorously to his schedule so he would rush through a lecture in the final 10 minutes if he has covered other material to begin the lecture.

Tutorials

Even though attendance was not compulsory, tutorials were useful and relevant. Tutorials generally covered relatively easy (but sometimes tedious) questions. In Units 2 and 3, some tutorial questions were Excel based, which were useful practice for the assignment. Full solutions to tutorials and relevant excel files were uploaded at the end of each week, but sometimes these did not contain all the steps. For instance, solutions for Unit 1 would not contain timelines and would rely on confusing worded answers at times.

I personally found tutorials useful for the explanations and reviews of lectures. As with many Actuarial subjects, studious students who do not attend tutorials are not significantly disadvantaged—after all, the solutions are provided each week. However, tutors sometimes impart their experience or shortcuts that may save time on the exam.

Mid-Semester Examination

This exam had two short-answer questions and four multiple-choice questions, covering Units 1 and 2. It is advisable to prepare more for Unit 1 given it is more difficult. The exam format was similar to previous exams, which may have resulted in a median of around 14—unusually high for a subject taken by Shane.

Group Assignment

The group assignment covered Unit 3—Graduation. Students could self-enrol in groups of up to four people on the LMS. The assignment consisted of several short-answer questions on a mortality investigation. Students were required to use Microsoft Excel to calculate crude rates and graduated rates and perform hypothesis testing on these. The assignment was relatively straightforward, but many students lost marks for not explicitly stating certain key assumptions.

Final Exam

This exam was relatively fair. It is important to pay close attention to the final review lecture—several concepts/topics Shane alluded to such as memorisation of graduation formula in Unit 3 and conversion of random variables in Unit 4 came up on the exam.

Solving matrices should be done last as it is very time consuming and prone to errors. It is not necessary in my experience to work with exact answers—using decimals will suffice. Generally, solving by substitution is preferred to Gaussian elimination, but there are times when Gaussian elimination is (unfortunately) necessary. Time should be spent determining which method to use as the wrong decision can be a disaster.

Other Resources

The course reader was quite disappointing. It contained numerous typos, most notably the misspelling of "Exercise" throughout the book. Hopefully next year it will be restructured to make for a better learning tool. The appendix (including the specimen exam) was very difficult to read as it was printed on orange paper. This issue was compounded by fuzzy text in the statistical tables.

Shane created a Microsoft OneDrive notebook which he shared with the cohort. It contained handwritten elaborations on certain lecture slides or tutorial content. It was useful in some cases, but sometimes not so relevant to the course.

Concluding Remarks

This subject was not as rewarding in terms of delving into derivations as ACTL30001 *Actuarial Modelling I*, but still contained many useful and practical skills. It is not taught the best but with enough practice students should find it easier than AMI.

ACTL30003 Contingencies (1)

Exemption status	CT5 *Contingencies*. Satisfactory performance in this subject's end-of-semester exam is needed.
Lecturer(s)	Dr Ping Chen
Weekly contact hours	2 × 2-hour lectures 2 × 1-hour tutorials There are 2 extra hours of lectures in the first week.
Assessments	Group assignment 30% 3-hour end-of-semester exam 70%
Textbook recommendation	*ACTL30003 Contingencies* workbook ✓ The workbook is essential. All lecture notes, tutorials problems and specimen exam are available in the workbook.
Lecture capture	Full (both audio and video).
Year and semester reviewed	2017 Semester 2

Comments

Finally, the big double subject you have waited for has arrived! As Ping states in her first lecture, this subject is essentially a combination of probability theory and compound interest. Contingencies brings together the knowledge and skills gained from studying subjects such as ACTL20001 *Financial Mathematics I* and ACTL30001 *Actuarial Modelling I*.

Contingencies is one of the most challenging subjects in the entire degree. Nevertheless, if you invest enough time understanding concepts and derivations, you will quickly see the rather repetitive nature of this subject — with more time invested into Contingencies, the large number of formulas will hopefully become second nature. Consequently, this subject may become less daunting than what it initially seems.

Subject Content

Contingencies considers the present value of cash flows and the probability of whether such cash flows will take place. Using this idea, this subject looks at pricing different insurance products. The subject is broken into several sections:

- **Life Insurance Mathematics (4 weeks)** — This section explores various types of life insurance products such as annuities and death benefits. Different formulae are derived for the sum assured, premium and provisions held for these products.
- **Joint Life Theory (2 weeks)** — Here, the focus is on insurance contracts which are dependent on two lives. This is arguably the most challenging section of the course. Whilst the first four weeks is rather tedious and formulaic, this section of the course requires more thinking and can be conceptually difficult.

This review was previously published in the 2017 end-of-year edition of the *Actuarial Students' Society Subject Review*.

- **Multiple Decrement Models (1 week)** — Initially, we looked at how benefits are payable on death, which was the single decrement. In reality, a benefit may be payable due to a number of different decrements. Here, we look at how single decrement models relate to multiple decrement models and how conversions can take place between the two models.
- **Pension Funds (1 week)** — This is an application of life insurance mathematics and multiple decrement models. We observe different cases under a superannuation scheme to derive expected present values of benefits payable. The summations for these expected present values are quite long, so it is crucial to understand the purpose of each term within the summation.
- **Demography (1 week)** — Very similar to the content in the demography section of ACTL10001 *Introduction to Actuarial Studies*, this is one of the more straight forward sections of this subject. In addition, various types of selection that are used to create homogenous groups are also looked at in detail.
- **Discounted Emerging Cost Techniques (1 week)** — This topic looks at the way in which insurance companies calculate the expected present value of their insurance products and how this affects their profit. This section draws upon basic accounting skills and requires understanding of which cash flow goes where. Additionally, the concept of profit testing is delved into, as well as various summary measures of profit.

In regards to all the units studied in this course, it is important to understand the derivations of the formulas to see relationships and reoccurring ideas between formulas. Additionally, adopting techniques such as drawing timelines to see when deaths could take place during various time intervals is very useful in approaching questions, especially in the joint life section.

Lectures

This year, Dr Ping Chen took all the lectures for the subject. I thoroughly enjoyed Ping's lectures, as she went into great depth when concepts were more difficult or abstract. The slower pace of Ping's lectures allowed students to follow the material relatively comfortably without feeling rushed.

Ping's use of diagrams and summaries throughout the course were vital to seeing the intuition and links between formulas. I strongly recommend attending lectures. I did find it quite tough in the first few weeks to pay attention for two hours straight, especially when the content can be dry and difficult to follow. Nevertheless, Ping is aware of this and gives students a small break to regather momentum.

Lectures are recorded with full audio and video. However, I would not recommend watching lectures online as a habit. Being a double subject, the sheer amount of content to understand is a challenge itself. But falling behind and trying to catch up on several two hour lectures is asking for trouble.

Note that there are no content lectures in week 11 and week 12. In week 11, Ping kindly arranged past students who were working in different industries to share their experiences as young actuaries. In week 12, students were to present their findings from the group assignment — more on this later.

Tutorials

Each week there are two one-hour tutorials. At the start of the semester, Ping provided a sheet on the LMS outlining the tutorial questions that should be completed prior to the particular tute. These were a few questions selected from a vast number of exercises located within the workbook. I strongly recommend doing the set tutorial problems as a **minimum**.

The ideal situation would be to complete the set tutorial problems as well as the other relevant exercises in the workbook each week. However, this is easier said than done with the workload from other subjects.

During each tutorial, the tutor will go through the methodology for the set tutorial problems for that tute. Whilst there aren't many set questions each week, these questions are deceivingly long and can take quite a while to complete.

Tutors may summarise each week's lecture content, providing tips and tricks on how to understand certain ideas. At the end of each class, tutors provided a set of worked solutions. Ping also provides a set of solutions to the relevant exercises at the end of each week, placed on the LMS. Nevertheless, these solutions are not as comprehensive as the worked solutions provided in class.

Tutorials commence in week 2 and finish in week 11. In week 12 there is no traditional tutorial but is instead a consultation time with the tutor.

Group Assignment

In 2017, the assignment was directly linked to superannuation. We were to provide the preliminary costings of converting a number of members of a defined benefit (DB) fund to defined contribution (DC) arrangements. The project is quite heavily weighted, with the report being worth 25% and the presentation being worth 5%. Much like other third year actuarial subjects, the groups were allocated by Ping, based on students' prior performance and capabilities.

The assignment was comprised of three parts. The first part was a relatively straight forward research component. The second part involved building the actual model to determine employer contribution rates when converting from DB to DC. In the final part, groups had to use the results of part two, to provide recommendations on whether members should be converted on a voluntary or compulsory basis and the ease/cost of doing so. Finally, each group had to provide their findings in a report and then present their recommendations in a 10 minute presentation to Ping in week 12.

The project definitely felt realistic and is similar to some of the work in the superannuation industry. However, it was quite stressful to complete in the latter weeks of semester, as the assignment took up quite a substantial amount of time. Even with what I thought was effective time management, some of my group members and I did have a few sleepless nights in completing the project.

Hence, I cannot stress the importance of starting early. There is an information session held, which you should attend to ask any questions, because there aren't many opportunities to ask following this session. Whilst I found the project very interesting, I felt it did not really assist me in studying for the subject other than having some crossover with the Pension Funds section of the course.

End-of-Semester Exam

The end of semester exam was a 3 hour exam worth 80 marks. The exam is weighted at 70%.

We faced our worst nightmare when our exam timetables showed that the Contingencies exam was to be held on the very first day of the exam period. This was quite tough as we were completing the project right up until the end of semester.

Nevertheless, Ping was understanding of this and decided to remove any excel related questions, and reduced the number of questions and marks on the exam, from what would usually be 90 marks, to 80 marks. Ping also said our exam would be relatively easier than last year's exam, which was notoriously difficult. However, don't expect this to be the same each year.

Our exam was not as difficult as what it could have been, nor was it easy. The difficulty of our exam was similar to that of the more tedious exercises in the workbook. I felt that the one specimen exam we were provided was not indicative of the difficulty of the real exam, as the specimen exam was relatively easier than the actual exam. However, the specimen is a good indicator for the nature of questions you can expect.

Based on my experience and speaking to a number of people, during reading time, the exam looked quite doable. However, as I started the exam, I observed a few particular details in each question, making the exam deceivingly tedious and longer to complete than initially thought.

Concluding Remarks

From all the subjects I have completed, I found that Contingencies had the most amount of information to digest, when attempting a majority of the questions. To top this off, each question takes a considerable amount of time to complete, only adding to the frustration in an already tedious subject. A common and foolish mistake I made was using "ultimate mortality" when the question clearly stated to use "select mortality". There is no excuse for such mistakes. Don't make the subject any harder than it needs to be; pay attention to detail. Underline key words, draw timelines, diagrams or whatever it is that helps you; it will definitely help in saving time.

In terms of preparation, if you manage to finish all the provided questions with time to spare (if you do, hats off to you!) there are past CT5 exams that can be found online and can be completed as extra practice. Ping did not really recommend this but extra practice does not hurt. Nevertheless, if you understand the lecture content and are able to complete the lecture exercises and tutorial problems without much difficulty, the exam should be manageable.

I wish you all the very best in completing Contingencies!

ACTL30003 Contingencies (2)

Exemption status	CT5 *Contingencies*. Satisfactory performance in this subject's end-of-semester exam is needed.
Lecturer(s)	Dr Ping Chen
Weekly contact hours	2 × 2-hour lectures 2 × 1-hour tutorials There are 2 extra hours of lectures in the first week.
Assessments	Group assignment 30% 3-hour end-of-semester exam 70%
Textbook recommendation	Workbook purchased from Coop. This contains lecture notes, tutorials and one specimen exam.
Lecture capture	Full (both audio and video).
Year and semester reviewed	2017 Semester 2

Comments

Put simply contingencies is the combination ACTL20001 *Financial Mathematics 1* and ACTL30001 *Actuarial Modelling I* . This subject teaches you how price and value insurance policies using probabilities and the time value of money. Conceptually this subject is very similar to ACTL10001 *Introduction to Actuarial Studies* where you also learnt how to price simple insurance policies.

Compared to other third year subjects, this subject is very procedural and not conceptually challenging. However, this subject is very tedious and requires you to consider a lot of intricate details.

You can do well by solely doing a lot of questions and getting used to the nuances of this subject, such as the actuarial notation, the recursive relationship between insurance/annuity types and shortcuts to derive certain equations from others.

Subject content

Life Insurance / Superannuation mathematics — The first 4 weeks of this course considers the pricing, reserving and profit reporting of term, endowment and whole life insurance products. Pricing refers to the calculation of a premium for an insurance contract using the principle of equivalence (same concept from ACTL10001), reserving considers the study of provisions the insurer needs to hold for policy holders and profit reporting concerns the incremental profit to the insurer if a policy holder is to die or suffer a decrement (mortality profit).

As an extension of the discrete case for premium and benefit payments: continuous, increasing, decreasing cash flows are considered along with reversionary (with bonus) contracts and adjusted mortality rates which consider selection. There are nuances in the calculations and techniques to approach each question regarding different assumptions and insurance types. The best way to get used to it is just to repeat exercises until it becomes intuitive.

This review was previously published in the 2017 end-of-year edition of the *Actuarial Students' Society Subject Review*.

Joint life theory — The next 2 weeks studies insurance policies applied to 2 or more lives where benefits are paid out on either a first-to-die or a second-to-die basis. The pricing of a joint life contract is similar to a normal contract. The main consideration in this topic is when premiums/benefits may come in and out and how to show it via standardised actuarial notation. Questions about this topic are very ad hoc and require some judgement. Exam questions about joint life are conceptually harder than the first topic in this subject but are a bit less tedious in nature.

Multi-decrement models — This topic considers the combination of decrements such as withdrawals, injuries and death. This topic is very similar to the multi-state model topic from ACTL30001. You will learn how to derive multi-decrement models from single decrement models and vice versa. The considerations of independent and dependent decrements are also studied.

Pension funds — Pension funds are in nature very similar to life insurance. The formulas from this topic would be similar to the first four weeks of this course.

Demography — This topic is basically exactly the same as the demography section from ACTL10001. It is by far the easiest topic in this course and just requires knowing a few formulas/concepts in relation to birth, fertility and selection.

Discounted emerging cost techniques — This topic considers the profit signature of an insurance policy, the flow of profits throughout the life of an insurance contract. Multiple variables are considered such as unit linked policies and provisions to ensure that the profit signature is never negative.

Lectures and Tutorials

In general, lectures follow the content in the workbook very closely. The pace of Ping's lectures is very manageable and not too fast. The main benefit of going to lectures is that Ping tries to cover intuitive derivations of the formulas presented. As a lot of memorisation is involved, intuition will make it easier to relate the formulas to a specific context. Most of the time, you will have to review lecture notes afterwards due to the sheer amount of formulas presented.

As this is a double subject, there are two tutorials a week. There are pre-set tutorial questions from the workbook that the tutor would go through. It is recommended that you do the questions beforehand as there is no point going to the classes for answers. Most of the tutorial questions involve many steps and require a lot of patience and a focus on details to complete. The best tip is to treat each step of a question as a separate question instead of tackling the whole thing at once.

Assessment

In 2017, the assignment involved a conversion from a defined benefit to an accumulation superannuation plan. This assignment was a very good insight in terms of real actuarial work and Ping's effort to make the assignment realistic is appreciated. There was a lecture dedicated to asking assignment questions run by a working actuary which helped a lot.

In terms of doing the assignment, Excel and VBA skills are required. It is recommended to take some time to learn how to write macros before doing the assignment. This would most likely apply to future assignments as well.

Tips for Success

My main tip for success for this subject is to practice continuously and be patient when you are given a problem which is extremely tedious and time consuming. Compared to other actuarial subjects, Contingencies is the hardest to study when

you have fallen behind due to the sheer amount of work. Put it first on the priority list.

ACTL30004 Actuarial Statistics (1)

Exemption status	CT6 *Statistical Methods*, in conjunction with ACTL40002 *Risk Theory I*. Satisfactory performance in this subject's end-of-semester exam and a satisfactory final grade in ACTL40002 *Risk Theory I* are required.
Lecturer(s)	Dr Enrique Calderin
Weekly contact hours	2 × 1-hour lectures 1 × 1-hour tutorial
Assessments	50-minute mid-semester exam in week 7 10% Group assignment due in week 12 10% 2-hour end-of-semester exam 80%
Textbook recommendation	ACTL30004 Actuarial Statistics workbook can be purchased from Co-op. It is also available on the LMS if you choose to print it. ✓ Getting the workbook is essential. All lecture notes, tutorial problems and the specimen exam are contained within this book.
Lecture capture	Full (both audio and video)
Year and semester reviewed	2017 Semester 2

Comments

This subject is one of the most practical subjects in your degree and discusses R and GLMs, both being crucial tools not only as an actuary but also in a variety of other careers.

Subject Content

This subject introduces a number of statistical models and actuarial tools. Its content is divided into seven units which are outlined below.

- Unit One — Introduction to R

  Most of the content in this unit will be familiar from MAST20005 *Statistics*. Some things are covered in slightly more detail such as writing a function, finding roots and maximum likelihood estimation. It is important to have a good understanding as questions do appear in exams and assignments that may ask you to write code.

- Unit Two — Likelihood Theory

  Again, should be familiar from MAST20005 *Statistics*. A number of important theorems are proved and then the new concept of Fisher Scoring is introduced.

- Unit Three — Generalised Linear Models (GLMs)

  The most lengthy and important chapter in the course. You will learn the definitions of a GLM then methods to parameter estimation. Additionally, being able to use R to model using a GLM is covered. The unit concludes with

This review was previously published in the 2017 end-of-year edition of the *Actuarial Students' Society Subject Review*.

tests to compare and assess models. It is a very interesting chapter but I would recommend exploring different families and link functions then plotting your GLMs in R as I got quite lost to what was actually going on in the mountains of algebra.

- Unit Four — Simulation

  Parts of this unit will have been covered at the end of ACTL30001 *Actuarial Modelling I* such as simulation using the inverse transform method for discrete and continuous distributions. However, for those distributions without an inverse function, the acceptance-rejection method is introduced. The unit then introduces some ways to simulate from a normal distribution.

- Unit Five — Outstanding Claims Provisions

  A number of methods are introduced to measure how claims will develop into the future. A method useful in General Insurance.

- Unit Six — Experience Rating Systems

  An application of Markov Chains which would have been covered multiple times in your prior study. Should be relatively straightforward unit.

- Unit Seven — Time Series Analysis

  As the name suggestions, a time series models a variable over time. Concepts like autocovariance and autocorrelation functions are covered. The ARMA(p,q) process and the application of causality and invertibility are covered. I found the slides of this chapter to be a poorly organised with the main idea being lost in the mountains of algebra, as such I would recommend looking through the textbook.

Lectures

Lectures in this subject are quite standard. Enrique delivers them well and most of them are quite clear to follow. It is up to you whether to attend in person or watch online. If you find his accent too strong, it may be good to watch online at a slower speed.

Tutorials

The tutorials for this subject are standard but I found them useful. I switched between different tutorials and both classes had excellent tutors. A brief recap of topics studied was provided before going into tutorial questions. The quality of tutorials will depend heavily on tutors.

Mid-Semester Test

I found the MST very painful. It covered the first two units and the beginning of the third unit. Questions were very algebraic and lengthy. As we were the first cohort to have a MST, there was no specimen provided. Particularly frustrating was the question relating to finding the exponential form of a distribution. It was not in the style of a 'show that' question, as such, pretty much all marks would be lost further in the question if you were unable to find the form. Especially when there is no fixed method to find the exponential form, these questions can sometimes feel like complete luck and I felt were a poor assessment of a student's knowledge.

Assignment

The assignment groups were allocated based on MST marks. It is released towards the end of semester and due in the final week. It is crucial to be able to use R well. Although possible to do the questions in Excel, it will take much longer. As assignments for all third year second semester actuarial subjects are towards the end of the semester, getting started early, working well as a team and managing your time well is crucial.

End-of-Semester Exam

The exam was challenging but a fair exam. We received the 2016 exam and along with the specimen exam, both are good indications of the standard of the exam. If you've made it this far in the degree, you will have hopefully established your own study methods which work for you so I won't repeat the advice of redoing tutorial questions and being precise.

Concluding Remarks

This subject had some fascinating areas and introduced some useful topics which will be important in your careers not only if you become an actuary but in other areas too. The content was not overly complicated but assessment was quite challenging. As with most actuarial subjects, I would have liked more practical application of the content. Especially with GLMs, there was so much algebra which I found to be mind-numbingly boring. This made me focus on formulas and derivations rather than the exciting applications of the method which I would have liked to see more of. Overall, the subject was well delivered, with Enrique being a knowledgeable lecturer.

ACTL30004 Actuarial Statistics (2)

Exemption status	CT6 *Statistical Methods*, in conjunction with ACTL40002 *Risk Theory I*. Satisfactory performance in this subject's end-of-semester exam and a satisfactory final grade in ACTL40002 *Risk Theory I* are required.
Lecturer(s)	Dr Enrique Calderin
Weekly contact hours	2 × 1-hour lectures 1 × 1-hour tutorial
Assessments	50-minute mid-semester exam in week 7 10% Group assignment due in week 12 10% 2-hour end-of-semester exam 80%
Textbook recommendation	ACTL30004 Actuarial Statistics workbook can be purchased from Co-op. It is also available on the LMS if you choose to print it. ✓ Getting the workbook is essential. All lecture notes, tutorial problems and the specimen exam are contained within this book.
Lecture capture	Full (both audio and video)
Year and semester reviewed	2017 Semester 2

Comments

This subject is generally an extension of content covered in MAST20005 *Statistics* and ACTL30002 *Actuarial Modelling II*, but also introduces a number of new interesting actuarial techniques that are mainly applied in a general insurance context. This is a very practical subject, providing you a great opportunity to learn lots of useful skills for any quantitative work. It covers content that are applicable in many other fields rather than just actuarial industry.

Subject Content

This subject introduces a number of statistical models and actuarial tools. Its content is divided into seven units which are outlined below.

- Unit One — Introduction to R

  In this course, R has been chosen as a statistical software for effectively studying the following units. This unit gives a brief introduction for the programming language of R.

- Unit Two — Likelihood Theory

  Likelihood theory is commonly used for estimating unknown parameters associated with a random variable. This extends upon knowledge learnt from MAST20005 *Statistics* However, there will be something new with the Fisher Scoring algorithm.

- Unit Three — Generalised Linear Models (GLMs)

This review was previously published in the 2017 end-of-year edition of the *Actuarial Students' Society Subject Review*.

Generalised Linear Model is an extension of the linear model covered in MAST20005 *Statistics*. This is often used in a general insurance context for premium determination. We know some response variables are not normally distributed. This is when we need GLMs, which model the mean of non-normally distributed response variables as a linear function of covariates.

- Unit Four — Simulation

  For those more complicated models that are unable to be examined theoretically, the method of simulation is needed. It is usually undertaken to determine the value of some quantity θ associated with a particular stochastic model. Questions we consider are normally how many simulations are needed and what the confidence interval is for a certain level of significance.

- Unit Five — Outstanding Claims Provisions

  This is a very practical methodology commonly used in general insurance contexts. Run-off triangles are introduced for calculating the amount of money to be held for future claim payments. There are several methods available dependent on the information given.

- Unit Six — Experience Rating Systems

  This is a very short unit that only takes one week to finish. It applies Markov Chains to "No Claim Discount (NCD)" systems, where good insurance risks are rewarded by offering a lower premium price.

- Unit Seven — Time Series Analysis

  A random variable measured over time in sequential order is considered instead of at a single time point. This unit explores the pattern followed by the variable observed over time, where a number of stochastic processes are discussed. Particularly, autoregressive and moving average processes from ACTL20002 *Financial Mathematics II* are further developed and, at the same time, a new process — ARMA(p,q) is introduced.

Lectures

As a lecturer, Dr Enrique is quite experienced in ACTL30004 *Actuarial Statistics*. This is not an extremely hard subject but still a challenging one. Enrique's way of delivering lectures aims to make it easier for us to understand the statistical concepts.

Students are expected to follow along with Enrique in their workbooks. Unfortunately, there is normally not enough time to copy down detailed solutions for all in-lecture exercises. However, lecture slides are normally available on the LMS after finishing each unit. While the textbook covers most of the content, slides do provide additional information, in particular, the solution for lecture exercises.

Even though lectures are recorded with full audio and video available, I do recommend that you attend lectures in person. Enrique regularly asked questions to keep us focused and help us better understand the concepts. You will lose the opportunity to interact with the lecturer if you just watch the recording. Also once you are behind, it becomes harder and harder to catch up.

Tutorials

Each week there is a one-hour tutorial, which generally consisted of two parts — revision of content from last week's lectures and solutions for tutorial problems. If you find it difficult to understand material from lectures, then the tutorial is a

great opportunity for you to catch up. My tutor actually gave a very clear summary each week at the start of the tutorial. Although tutorial attendance is not monitored, it is strongly recommended to attend. Since no solution will be posted on the LMS, you need to go to tutorials to get a hard copy.

Occasionally, there are times when tutorial questions require content that have not been covered in lectures yet. Do not worry. As tutors are generally aware of this issue, they normally just save these for the following week.

Your tutorial experience will ultimately depend on your tutor. Tutorials start in week 2.

Assessments

This is the first year we had a mid-semester exam for this subject. It is a 50-minute exam worth 10% of the final result. It took place in week 7 and covered material from week 1 to week 5; that is Unit 1 to the first half of Unit 3. As we were the first year to have a mid-semester test, we were not given any past exams or practice exams. So for preparation, lecture slides, tutorial questions and the workbook are the main resources. The time was a bit tight for the exam and the level of difficulty was higher than expected. But overall it was doable.

Similar to first semester actuarial modelling subjects, students are placed into groups of four (or three for leftover students, which is what happened to me) for the group assignment. The assignment is released near the end of semester, normally around week 9 to week 10 and due by the end of week 12. It generally covered content from Unit 3 and Unit 4. Tasks included calculating the maximum likelihood estimates, applying the Fisher-Scoring algorithm, and using simulation to perform a statistical test. It will be a huge struggle to get through the assignment without using R. However, it is possible to finish the assignment just by using Excel. Just be aware this normally takes longer. In addition, since assignments for all three subjects in the last semester are generally due on similar dates, the importance of getting started early has to be emphasised. It is essential for you to manage your time wisely and plan ahead.

End-of-Semester Exam

The end-of-semester exam was a 3-hour exam being weighted at 80% of your final result.

For revision, the workbook is your first source. It contains all the content from lectures, tutorial problems as well as the specimen exam, which provides a good indication of the difficulty of the questions in the exam. It should be noted that there is a checklist at the end of the workbook, listing the expectations related to each unit. This will help you find out the emphasis of the exam. In addition to the specimen exam, one past exam from 2016 was provided to us, which also assisted preparation for the final exam.

It is highly recommended to redo all tutorial questions at least once and repeat questions that you got wrong the first time if you have more time. Moreover, speed is very important in the exam. Silly mistakes are much easier to occur when you do questions fast. Practicing more will not only help you increase your speed, but also reduces the possibility to make mistakes.

One strategy essential in the exam is making good use of the reading time, during which you should consider the order of answering questions. You are strongly recommended to attempt easy questions first then hard ones if you have more time. Do not assume you cannot do part b without doing part a.

Concluding Remarks

Overall this is a relatively practical but challenging subject. Simply memorising formulae is far from enough. To achieve a satisfactory performance in this subject, you need to understand the derivation of formulae as well as the idea behind it. A bit of background knowledge in programming will definitely help a lot with assignments and some tutorial problems. So take your time in first week and try to learn as much as you can for R. As said before, silly mistakes do appear in the exam, especially when in a rush. Therefore, more practice is always encouraged.

CT6 exams are definitely another good resource. However, as it covers both ACTL30004 *Actuarial Statistics* and ACTL40002 *Risk Theory I*, not all questions are helpful for preparation for this subject.

I wish you all the best in completing Actuarial Statistics!

ACTL30005 Models for Insurance and Finance (1)

Exemption status	Not an exemption subject, but is a prerequisite for ACTL40004 *Advanced Financial Mathematics I* (CT8 *Financial Economics* subject).
Lecturer(s)	Mr Jackson Kwok
Weekly contact hours	3 × 1-hour lectures Every other week, one of the lectures was replaced with a tutorial instead.
Assessments	50-minute mid-semester test in Week 7 10% Group Assignment due in Week 12 10% 2-hour end-of-semester exam 80%
Textbook recommendation	None.
Lecture capture	Full (both audio and video).
Year and semester reviewed	2017 Semester 2

Comments

Despite what the name might suggest, Models for Insurance and Finance (MIF) has surprisingly little to do with Insurance and Finance. Its content is far closer to that of a mathematics subject. From other actuarial subjects, you are probably used to having to apply lecture concepts to real world problems; MIF is quite different in this regard. Given the difficulty, questions don't tend to extend beyond the simplest of the real-world cases; it more comes down to memorizing coursework and applying various theorems and concepts.

You might have heard the stigma attached to MIF as being the hardest subject in the degree, however, this should not be a major concern going into the course. For our cohort (and from my knowledge of past cohorts) lecturers have an understanding of the difficulty of the subject. This means that they (1) set relatively easy assessments and (2) tend to mark leniently. To paraphrase Jackson, students should not be, and are not, penalised for taking a more difficult subject.

The key takeaway of this is that you should not be afraid of MIF. Do, however, be prepared to work hard to get a good mark. Unlike many other subjects, you are not expected fully understand the course content. You can still do well with a surface level understanding of the course (i.e. cramming). The key to success is repetition, especially of tutorial and problem set questions.

When doing questions, your focus should not so much be about the final answer, but about being rigorous in your working. The latter is the far more important of the two and is where you will get your marks in assessments.

Subject Content

MIF is divided into four key sections:

This review was previously published in the 2017 end-of-year edition of the *Actuarial Students' Society Subject Review*.

1. The first half of the semester formalises some of the aspects of probability theory that have been taken for granted in the past. It better defines concepts such as sets, probability measures, inverses, random variables, expectations and conditioning. It is without doubt the hardest unit of the course.

   You will find the first two weeks to be a breeze – a simple refresher of your work in MAST20004 *Probability*. By about week 4 you are looking at far more complex material than what you have ever seen in the past. New concepts including measurable spaces and the Lebesgue Integral allow us to consider probability in a new light and give us the tools to solve more complex problems.

   This unit is very important. The content itself is seemingly random, however, it is highly relevant moving into Units 3 and 4. Thus it is vital that you build solid foundations. Additionally, this is the basis of content for the mid-semester test, so make sure you understand this section.

2. The second section is a short look at some of the more complicated probabilistic concepts and theorems that you have used (possibly without proof) in previous years. It discusses and proves famous results such as convergence of random variables, the Law of Large Numbers and the Central Limit Theorem.

3. The third section considers martingales, their definition and you will discuss their applications to the real world. It is the first of the two major topics around which MIF revolves. A martingale, in its simplest form, is a stochastic process whose expected value is given by its most recently known value. The main application of this unit is to be able to show that, given a fair game, no playing strategy can achieve abnormal returns in the long run.

4. The last part of the course introduces Brownian Motion, the continuous analogue of the random walk. You begin looking at simple problems which then progress into its applications (e.g. modelling stock prices over time). You are then briefly introduced to a highly abstract mathematical concept called Itô's integral, a tool used to solve stochastic differential equations which incorporate Brownian motion. Despite this, you will have no idea what the integral actually means, merely a basic understanding of its use (and I think this is well reflected in my explanation).

Lectures

This was Jackson's first year lecturing and I think that I speak on behalf of the whole cohort when I say that he did a brilliant job of teaching the subject. He was highly knowledgeable and incredibly patient, especially given the difficulty of the work.

Primarily he used a separate notepad to run through examples whilst following the pre-set lecture content that he had released in advance. For me, examples were key to understanding the subject. Often definitions were confusing or very similar to one another. I effectively copied word-for-word his hand-written notes and this gave me a sufficiently good understanding of the subject to succeed.

A former student named Ben Locke produced a highly in depth set of MIF notes which closely follows the course content. Jackson provided this to us at the beginning of the course. During the first half of the semester I made the mistake of using this as a sole reference for this subject. I then proceeded to fail the mid-sem. Honestly, I wouldn't bother with this document as it goes into far more detail than is necessary and can end up being more confusing than helpful. Maybe use it if there is a specific topic you are struggling with. Otherwise, as a whole document, I did not find it to be a very helpful resource.

Lastly, during the semester, Jackson took two lectures to teach us some simple R coding. Although not originally part of the course, it was an excellent addition to the content. He showed us how we could use R code to simulate stock prices and portfolio values. This was incorporated into the martingale section. It also came up on the assignment.

Tutorials

Tutorials are very different to what you have experienced in the past. They run once every two weeks in place of one of the lectures. Jackson released the questions in advance and went through the solutions in class. These tended to be very challenging, especially since he went through them at Jackson-pace after having already completed them 3+ times in advance.

It is important to attend/watch these tutorials. You will find that most questions have an easy way and a hard way. Given the importance of time in the final exam, you want to expose yourself to as many problem-solving methods as you can. You will learn tricks and shortcuts that are relevant to solving other MIF problems as well.

When you attempt these questions beforehand, there is a good chance that you will get nowhere. Don't sweat it too much if you can't crack them on the first try. If you attempt them again a few days after the tutorial you'll find them far more doable and it will consolidate the methods used to solve them.

Problem Sets

A set of questions will be released each week with solutions. Nothing special about this. Just make sure you attempt them as they will go a long way to helping you with assessments.

Mid-semester Test

For us, this covered the whole of Unit 1. It was worth 10% of the final mark. It was very reasonable and was effectively the same as the work done during lectures and tutorials. No reason you shouldn't get a decent mark in this. Questions are very much like those in tutorials, problem sets and lecture examples. Follow these closely when preparing for this assessment.

Assignment

This was a group assignment due in week 12 worth 10%. We were able to choose the groups ourselves. Unsurprisingly the assignment was the most difficult assessment throughout the semester.

The assignment comprised of a few difficult proofs which used methods from the first unit, as well as some martingale and Brownian motion theory from the latter half of the course. Lastly there was a coding question which was (intentionally) almost a line for line copy of the code Jackson had covered in class.

Pro tip: If you are struggling with proofs in this assignment, try the internet.

End-of-Semester Exam

The exam makes up 80% of your final grade. As with the mid-semester test, questions are very similar to that of tutorials, problem sets and lecture examples. Personally, the best way to study was to attempt and reattempt the given questions. Often, whilst the exam questions won't be exactly the same, they use similar tricks and steps to solve the problem. More practice will make it far easier to complete.

We were provided with a single practice paper. Past papers were not relevant as Jackson had changed the course significantly from previous years. Solutions were released a few days before the exam. Despite this, you don't really need solutions. The good thing about this subject is that you'll tend to know whether you've gotten a question right or not.

The exam was of reasonable length and difficulty and focused mostly on questions we had seen before rather than challenging new ones.

Conclusion

Don't be fooled, MIF is not an easy subject. But with a sufficient amount of work (either persistent study or cramming) you can certainly achieve a decent mark. All the best!

ACTL30005 Models for Insurance and Finance (2)

Exemption status	Not an exemption subject, but is a prerequisite for ACTL40004 *Advanced Financial Mathematics I* (CT8 *Financial Economics* subject).
Lecturer(s)	Mr Jackson Kwok
Weekly contact hours	3 × 1-hour lectures Every other week, one of the lectures was replaced with a tutorial instead.
Assessments	50-minute mid-semester test in Week 7 10% Group Assignment due in Week 12 10% 2-hour end-of-semester exam 80%
Textbook recommendation	None. Lecture notes and a detailed subject summary are provided on the LMS.
Lecture capture	Full (both audio and video).
Year and semester reviewed	2017 Semester 2

Comments

This subject is quite theory-based, as there's a lot of definitions and properties to remember. Being able to use the theory to approach a question and justify your steps makes for a key part of the subject; it's important to be thorough and diligent in your approach. Hence, it's helpful to go through all the lecture examples, tutorials and problem set questions to understand when to apply certain concepts to what sort of problems, and hopefully improve your comprehension of the material in the process.

Study groups are insanely useful for this subject, and strongly encouraged. Talking through your understanding of the content can fill in any gaps in your knowledge while bringing up a lot of new points or questions you hadn't previously thought of. Often the same parts of the subject would be difficult to understand for everyone, so consultations were quite popular and you could learn a lot from other students' questions.

The amount of actual content in this subject is quite moderate, but it's difficult to understand conceptually. You often need time to stew over certain concepts and actually understand what you're meant to be doing. Therefore, it's important to keep up with the lectures, even if you're not fully comprehending the material.

Subject Content

1. Counting and Limits

   This was a very short topic with relatively simple concepts, which made it a good introduction to the style of the subject. The main content is expanding what we know about counting and limits to infinite sets, and introducing the peculiarities of infinite sets.

2. Probability spaces (sample spaces, σ-algebra, probability measures)

This review was previously published in the 2017 end-of-year edition of the *Actuarial Students' Society Subject Review*.

We've worked with probability before, but this subject explores the theoretical aspects in detail and puts a completely new perspective on what we've learnt before. Sample spaces will be familiar from previous studies, but this topic introduces the 2 other components of a probability space: σ-algebra, and probability measures. You also get introduced to the concept of 'measurable functions', which is another way of looking at random variables. Initially, it just sounds like a lot of jargon and it's difficult to make sense of the big picture, but it slowly starts to come together and you realise the point of learning it (hopefully). This topic contains several key definitions and properties to remember, which form the basis of much of the later material.

3. Integration, expectation, conditional expectation

   This topic is a continuation of the previous one, in which you learn how to integrate measurable functions, and hence apply expectation and conditional expectation to them. It can be quite confusing to get your head around the specifics of the approaches, but going through the lecture examples is very helpful in understanding how it works.

4. Selected topics in classical probability theory

   This topic is relatively short and quite theory-based, and looks at key results relating to convergence and limits. Familiar theorems are covered, such as the Law of Large Numbers and Central Limit Theorem, with the addition of proofs and extensions.

5. Martingales

   In this topic, you're introduced martingales, which are stochastic processes that represent a 'fair game'. You cover the definitions, properties and various examples of martingales, and learn how to determine if a process is a martingale. You also learn important concepts such as 'stopping time' and key theorems which you use to solve many of the problems posed for this topic. Like with most of the subject, the theory by itself can seem endless and overwhelming, but working through examples helps you in figuring out when to apply a concept/theorem, and what you should be doing in general.

6. Brownian Motion

   Brownian motions are the continuous extension of random walks. Through this topic, you learn several types of Brownian motions and their properties, including some proofs relating to first and second variation. This topic was more straightforward to understand, and mainly involved applying results to solve various problems.

7. Ito Calculus

   This topic introduces many concepts owned by Ito: Ito integrals, Ito processes, and Ito's lemma. By this point in the subject, you have generally accepted that there will be complicated concepts with practical applications you do not comprehend. This topic is one of them, and mainly involves applying formulae, so lack of actual understanding won't impede your ability to solve problems.

8. Stochastic Differential Equations

   In this topic, you learn the approach to solving SDEs of various forms and finding their distributions. There was more to the topic that we didn't have time to cover, so overall it was a short and relatively simple end to the subject.

Lectures

Jackson was a very engaging lecturer, which really helped make the subject enjoyable. He didn't stay strictly to the lecture notes, and often covered some additional extensions or examples. There is a fair amount of note-taking involved during the lectures, so it's helpful to have additional paper/notebooks.

The tutorials took place during a lecture every fortnight. Although some of the questions were difficult to approach/solve, I would still recommend attempting them before the tutorial.

Mid-Semester Test

The mid-semester test covered the topics up until conditional expectation. It was quite straightforward, and several of the questions were quite similar to lecture examples or tutorial questions; hence it was a good indicator of how you were keeping up with the subject and the material.

We didn't get any example tests to complete beforehand, however there was a 'playground' app with questions related to the material that we could try.

Assignment

The assignment was given in Week 10 and due at the end of Week 12. Unlike most other third year actuarial subjects, we formed our own groups of 3-5 people. Most of it was pretty straightforward, with questions based on the lecture content.

The more time-consuming aspect was creating a model of a particular stock strategy, and coming up with further extensions to add to the model. Jackson ran through an R coding workshop during a couple of lectures, which you could base your model on.

End-of-Semester Exam

The exam was difficult, but fair; the exam-checker allegedly removed the toughest parts of the exam. We were given a specimen exam which helped in understanding what sort of questions may be asked. Jackson was also super helpful in specifying the relevant tutorial and problem set questions for the exam, which helped narrow down the content to study for.

Concluding Remarks

You don't have to be a professional swimmer to tread water and stay afloat; a similar philosophy applies to this subject.

ACTL30006 Financial Mathematics III

Exemption status	CT8 *Financial Economics*, in conjunction with ACTL40004 *Advanced Financial Mathematics I*. Satisfactory performance in the end-of-semester exam of this subject and satisfactory performance in the mid-semester test and end-of-semester exam of ACTL40004 *Advanced Financial Mathematics I* are required.
Lecturer(s)	Dr Zhuo Jin
Weekly contact hours	2 × 1-hour lectures 1 × 1-hour tutorial Additionally, there is possibly an additional lecture, depending on content progress/public holidays.
Assessments	Mid semester exam in Week 7 — 10% Individual assignment, due in Week 7 — 10% 2-hour end-of-semester exam (hurdle requirement) — 80%
Textbook recommendation	Joshi, M. S., & Paterson, J. M. (2013). *Introduction to Mathematical Portfolio Theory*. Cambridge, UK: Cambridge University Press. ✓ Essential for this subject, as all tutorial questions are set from this textbook. Content is also explained in a slightly different way, so it may help further understanding.
Lecture capture	Full (both audio and video).
Year and semester reviewed	2018 Semester 1

Comments

On the surface, almost half of this subject has been covered somewhere in previous years, such as in *Business Finance*, *Accelerated Mathematics*, or *Financial Mathematics II*. However, Financial Mathematics III goes much more in depth about every topic, along with copious amounts of calculations and formulae. This subject has arguably the most content out of your first semester third year subjects, so it is crucial to not fall behind.

Subject Content

This subject focuses on several theories and models that can be used to evaluate the effectiveness and desirability of different investments/portfolios.

- Mean–Variance Analysis: Finding the optimal trade-off between mean and variance. This concept should be familiar from last year's FNCE20001 *Business Finance*, but with much more maths due to more factors that need to be considered. Gaussian elimination and Gram-Schmidt calculations also reappear from MAST10008 *Accelerated Mathematics 1* in this topic when computing covariance matrices.
- **Utility**: Finding the best portfolio to suit individual preferences for risk. An investor's behaviour is represented as a function relating their happiness (utility) to the amount of money they have. Similar to utility in ECON20002 *Intermediate Microeconomics*. This topic also includes geometric means, long term growth, and log-utility.

- **CAPM**: A short topic similar to that of FNCE20001 *Business Finance*, where the expected return on an asset is reliant on its covariance with the market. A new two-factor CAPM is introduced where there is no risk free rate.
- **APT**: Another short topic about the theory of no arbitrage, and how to price assets based of Arbitrage Pricing Theory. Similar to concepts learnt in ACTL20002 *Financial Mathematics II*.
- **Market Efficiency and Rationality**: A theory heavy section explaining different forms and market efficiency with examples.
- **Risk measures**: Previously, risk has always been expressed in terms of variance, but it is not always the best method. The last few lectures introduce a new risk measures – VAR (Value at risk) and expected shortfall.
- **Stock price models across time**: Using log-normally distributed assets to compute the mean, VAR, and variance of a model. ARCH and GARCH processes.

Lectures

Keeping up to date with lectures is highly recommended, either by attending or at least watching the recordings promptly. Zhuo does write extra notes and solve questions on paper in the lectures which help consolidate knowledge, so it is important to take note of those. Overall, he is clear and delivers most of the content off the slides efficiently, though symbols used to represent various variables change throughout the semester, which may cause confusion. In addition, there is a lot of content every lecture, so don't expect to understand and remember everything straight away, and take the time to read and reread your notes to fully grasp all the concepts.

Tutorials

Tutorial questions are set from the textbook, so it is very important to purchase it. The questions are mostly to consolidate knowledge and provide opportunity to become familiar with the basic calculations necessary for each topic. Most of the questions present are easier than exam standards, but there are a few tricky ones that will help you prepare for less known knowledge points.

I personally did not attend the tutorials, which subsequently also meant I fell behind on the course work. Compared to my friends who did go to the tutorials, I was much slower at solving most questions and didn't know shortcuts or the proper method of approach despite many of the questions being fairly formulaic. I regret not going as it definitely impacted my exam results negatively, and cramming is not as effective in this subject compared to those in the previous years due to the large amount of content and depth of knowledge required.

Mid-Semester Exam

This is a standard 10%, 50 minute test given around week 7. 2018's mid semester exam only had 3 questions, testing the first 5 weeks of knowledge, i.e. mean variance efficiency, single and multi-factor models, tangent portfolios, and basic theory about MPT and utility theory. In general the cohort did fairly well, averaging 70-80%. In addition, the questions were all straightforward given proper preparation was done from the textbook, as all the questions were just modifications of existing ones.

Assignment

This is another fairly standard Excel assignment, where the goal is to produce a model to compute minimal variance portfolios, expected returns, standard deviations etc. It is similar to other Excel assignments done in previous subjects. Most groups lost a maximum of 3-4 marks out of 20, as the models aren't too difficult in theory, but needed many formulae and steps to complete.

End-of-Semester Exam

The 2 hour end of semester exam is predominantly calculation based, with only 1-2 questions about theory. However, most of the calculations can only be done correctly given your understanding of the topic, as any detail changed in a question may lead to a different method of computation. From the 7-10 questions, every topic will be covered in some way, so exam preparation should be thorough. Zhuo gave 2 practice exams and answers for revision, and it was mostly a good reflection of the actual difficulty. There is a lot of calculation required during the exam, such as finding inverse matrices, integrals, variances etc., so in addition to sufficient understanding, speed and accuracy is key to finishing on time.

Concluding Remarks

Financial Mathematics III has the most content out of the first semester third year subjects, and it is very important to not fall behind as it's hard to catch back up. This subject was enjoyable in that it brings back a few knowledge points from previous years, so it felt fulfilling to reuse pre-acquired knowledge. Although challenging, I still found Financial Mathematics III to be the most enjoyable out of the third year subjects so far due to its interesting theories that model human behaviour.

Honours and Masters Subjects

Contents

ACTL40002 / ACTL90004 Risk Theory I

Exemption status	Completion of this subject and ACTL30004 *Actuarial Statistics* with satisfactory performance across both will lead to exemption from professional exam CT6 *Statistical Methods*.
Lecturer(s)	Dr Xueyuan (Shane) Wu
Weekly contact hours	3 × 1-hour lectures
Assessments	1-hour mid-semester exam in Week 7 20% Individual assignment, due Week 12 10% 2-hour end-of-semester exam 70%
Textbook recommendation	Dickson, D. C. M. (2005). *Insurance Risk and Ruin*. Cambridge, UK: Cambridge University Press. ✗ Not necessary to purchase. A few questions in problem sheets will be from this text but there are so few it will be more worthwhile to use the copies in the library. This book will be used in Risk Theory II but again, it will probably be cheaper to go to the library.
Lecture capture	Full (both audio and video)
Year and semester reviewed	2018 Semester 1

Comments

Risk Theory I provides an introduction to a number of models to estimate claim amounts for insurers and reinsurers. With this, it will introduce various probability distributions, classes of distributions and calculation methods to aid the use of these models.

This subject was one of the most enjoyable personally for the semester and possibly out of all ACTL##### subjects. An understanding of concepts such as the various distributions, conditioning and moments, MGFs and PGFs taught in MAST20004 *Probability* in addition to MLE, Bayesian Estimation from MAST20005 *Statistics* will be very useful.

Although not computationally and conceptually difficult, a large part of this subject will involve being able to apply the methods used in the many proofs within the subject. Indeed, it is less important to memorise every step of a proof but much more important to be able to understand the techniques being used in each step, as exam questions will rarely ask you to straight up regurgitate a result seen in the slides but rather prove a similar result but with a small variation. Furthermore, to do well in the subject it is important you are familiar with the formula sheet and also know some of the tricks that can be used to solve some otherwise very lengthy expectation calculations.

Subject Content

The subject is well structured and split into 5 sections

1. **Distributions in Non-life Insurance** — This section begins as revision for some basic results of some important distributions within the subject. Most techniques will be familiar from prior studies, however there are some new and simple results that are important to know, such as the CDF of a gamma distribution for integer shape (α) parameter. Later on, we will see how we can find expected payoffs for the insurer and reinsurer under excess of loss and

proportional reinsurance agreements. A very crucial lemma for the multiplication of summations is introduced. This result will be used repeatedly in the subject for almost every recursion proof. Finally, the concepts of parameter estimation techniques and the goodness of fit test will be reviewed.

2. **The Collective Risk Model** — This is the crux of the subject and the most crucial section. The collective risk model is introduced as a way to model aggregate claim amounts. Calculation techniques for expected values under reinsurance will be taught. Remembering results for the Compound Poisson will be useful. Different classes of distributions and corresponding recursion formulae to find the distribution for each will play a crucial part in this as well. I cannot emphasise how important it is to understand the techniques being used in the proofs, in particular, for Panjer's Recursion. At first it will definitely seem daunting as the proof will almost be a page in length. However, many of the proofs will use similar techniques to it so it is important you understand it. Furthermore, it may be useful to understand how to find the probability of x claim amount by first principles as occasionally it may be faster/easier than using recursion. For example, having 0 aggregate claim amount is the same as having 0 claims or having x claims and each being 0 in value. Finally, the chapter ends with some approximation techniques by matching the moments of the collective risk model to the normal and gamma distributions.
3. **Individual Risk Model** — The IRM is similar to the CRM in the previous chapter but with some different assumptions. This chapter has numerous proofs and results. De Pril's Recursion was incredibly lengthy, but the techniques within it are definitely still examinable. Finally, some estimation techniques using Compound Poisson caps out this section. This chapter I found to be the least interesting and thankfully it was quite short.
4. **Introduction to Ruin Theory** — Ruin theory in our context is saying that if an insurer's capital follows a certain process, how long will it take for us go bankrupt. In this subject, only a brief introduction is made for this concept and much more detail will be involved in RT2. The main concept that is taught is finding upper bounds for this ruin probability. I found this section quite interesting.
5. **Credibility Theory** — Credibility theory is about being able to estimate a future using data for a group as well as individual claim experience. Using Bayesian techniques, we are able to do this under some distribution assumptions. However, it will be quickly apparent they do not always work so we introduce a non-parametric technique known as the Empirical Bayes Credibility Theory (EBCT) Models 1 and 2. The proofs within this section can seem quite lengthy and there is a lot of notation to go with it. At first, the results will seem a bit all over the place but once you get a grasp of the bigger picture and the meaning of each formula, it is apparent they are more intuitive than possibly first thought. For EBCT1, it is not too bad as many results are similar to sample variance, sample mean etc. However for EBCT2, the relaxing of certain assumptions make this model more complex. Shane was nice to recognise this as well and reassured us that any exam questions would give us the relevant formula for these questions. It is also important you know the different assumptions between Bayesian, EBCT1 and EBCT2.

Lectures & Tutorials

As this is an honours/masters level subject, this subject involves 3 lectures a week. There are 6 'tutorials' throughout the semester which take the place of a lecture where Shane will go through questions on the tutorial sheet. I believe the course was previously taught by Professor Dickson and the clarity of the lecture slides are evident.

I was impressed by Shane's teaching style for this subject. He was quite clear and taught at a good speed. For many proofs and questions, Shane would write handwritten notes for how he would do it and I found these to be very useful. These would then be uploaded onto a OneNote file which he shared at the start of the semester and would be accessible whenever one pleases. It was clear the work and dedication he had put into teaching this subject and I am immensely thankful for it. Shane would also often respond very quickly to any emails sent to him.

Finally, doing and understanding all questions on problem sheets and tutorial sheets will be crucial to your success in this subject. Tutorial sheets are probably the best practice for the exam.

Assignment

The assignment was given in week 10 and due in week 12. It was relatively straightforward but nonetheless, care still needed to be taken. In the feedback given to us, it was clear having a well written report is crucial. It is important you are clear and concise with how you came to results and indeed what the actual result is! Students got marked down for saying things like 'refer to R code'. Finally, there are a couple of marks reserved for presentation; these should be easy marks so please be neat. Handwritten, typed in Word or LaTeX are all fine.

Mid Semester Exam

The MST was held 2 weeks after the break (mostly because Easter was quite early in 2018). You had one hour. We were given 2 practice papers beforehand to practice as well. The MST had 2 questions and was accessible to students. There was one particular question that required a proof that proved to be trickier. The formula sheet is provided. Unlike in undergraduate subjects, the MST also counts towards exemption.

Final Exam

The exam is 2 hours, with 15 minutes reading time. The exam in 2018 was a good standard. It was well written, with a good range/length of questions and with sufficient revision, should all be doable. One practice paper was given. This practice paper was quite frankly very very difficult and worried me for the exam itself. Fortunately, the actual exam was much fairer. Again, the formula sheet is provided.

Closing Remarks

I found this subject very interesting and well taught. It applies concepts learnt in introductory probability and statistics subjects from earlier years to an insurance context. Shane taught the subject with clarity and dedication. Lectures were well organised and the plentiful amount of practice questions greatly aided learning. This was a subject I very much enjoyed.

ACTL40003 / ACTL90014 Insurance Risk Models II

Exemption status N/A; this subject does not constitute any exemption requirement but is instead an elective upon satisfactory completion of ACTL90004 *Insurance Risk Models* (which comprises part of the exemption requirement for CT6 *Statistical Methods*).

Lecturer(s) Dr Enrique Calderin

Contact hours 3 × 1-hour lectures

Assessments

	Honours	Masters
Mid-Semester Exam (Week 8)	20%	20%
Individual Assignment due in Week 12	—	10%
2-hour Final Exam	80%	70%

Textbook recommendation Dickson, D. C. M. (2005). *Insurance Risk and Ruin*. Cambridge, UK: Cambridge University Press.

The textbook is not essential. However, the textbook is extremely good at explaining some of the more complex concepts should you refer to it throughout the semester.

Lecture capture None

Year and semester reviewed 2017 Semester 2

Comments

Between the two optional postgraduate Actuarial subjects, this is far and away the more popular choice, as conceptually *Risk Theory* is a lot easier to digest than the crazy martingale stuff of *Financial Mathematics*. That does not mean this subject is easy by any means — welcome to what is likely to be the last numerical actuarial subject of your long arduous journey.

Subject content

The precursor to this subject (ACTL90004 *Insurance Risk Models*) deals with models for a general insurance company, taking into account the random nature of both the claim size and the claim numbers. Rather than modelling the claims paid by an insurance company, the majority of Insurance Risk Models II is concerned with the decisions made by the Insurer in a variety of contexts. The subject content is split into 4 distinct units:

Unit 1 — Utility Theory makes its return from ACTL30006 *Financial Mathematics III*. In a nutshell, Utility Theory assumes that entities make decisions based on a function of the amount of wealth they will have (you can think of it as some sort of "satisfaction level"). Calculations on the minimum and/or maximum premium amount that should be charged for a given risk and utility function are the focus of this unit.

This review was previously published in the 2017 end-of-year edition of the *Actuarial Students' Society Subject Review*.

Unit 2 — Premium Principles — Utility theory is just one way to calculate an appropriate premium for a given risk. Additionally, you have already dealt with calculating a *Fair Premium* (from ACTL30003 *Contingencies*). This unit explores a wide range of methods to calculate premiums, taking into account various features of the distribution of the risk (e.g. its variance, or distribution function).

Unit 3 — Optimal Reinsurance Arrangements is where the subject starts to get a bit hairy. Suppose an insurer is thinking about reinsuring its business; what type of reinsurance arrangement should it take (e.g. Excess of Loss, Proportional)? Depending on the goals of the insurer, the optimal reinsurance arrangement is different. Here you will cover an onslaught of theorems to **rigorously** prove the optimality of these arrangements. This is arguably the hardest part of the course.

Unit 4 — Ruin Theory — in my opinion the most interesting part of the subject. Insurers are always at risk of becoming ruined (i.e. having no more money). Assuming that claims paid follow a compound counting process, we are interested in the probability that this actually occurs over both finite and infinite time intervals. Interestingly, the answer is not always 1 in the infinite time case. Lundberg's inequality for the probability of ruin (which you may remember from IRM) is derived, as well as finding analytic solutions for the ruin probability (assuming certain distributions) using various calculus techniques, and deriving approximations to the ruin probability.

Despite being a "sequel" to IRM, I didn't feel like there was much connection between the two subjects. From memory, the only bit of overlap was ruin theory and knowing how to calculate the moments of a compound distribution.

Lectures

Much like in IRM, slides are released in units with the exception of Unit 4, which was released on a rolling basis. However, the style of slides were very different (not that it affected much).

Enrique would go through each slide, filling in any blank space with proofs and examples as they appeared. Being Enrique's first time, sometimes the proofs were a bit hard to follow or had errors which students were quick to point out. However, I imagine most of these would be rectified in the next iteration of the subject.

Occasionally, a tutorial would be held in place of a lecture in which Enrique would work through a problem. Tutorial sheets would often contain up to 10 questions. However, only around 4 or 5 were covered in the lecture, with the remaining questions left as an exercise for the student.

Mid-Semester Exam

As is standard in Actuarial subjects, a mid-semester exam is held in Week 7. Plenty of past mid-semester papers were provided as practice. In 2017, due to timing issues, the only units that were examinable were Units 1 and 2, though parts of Unit 3 were examinable in the past.

Questions on the paper ranged from theoretical questions ("Give the mathematical definition of ...") to computational questions ("Calculate the premium under such and such principle") and even proof questions ("Prove that ABC satisfies XYZ").

Nothing in the mid-semester exam was too difficult to answer, considering the strong set of mathematical tools that the undergraduate course should have equipped you with. In fact, all you really needed were skills in probability and integration. Much like in every integration question, your biggest downfall will be silly mistakes (or missing a minus sign... whoops :S). Answers had to be extremely thorough to get full marks, with the highest mark being 37.5/40.

Assignment

The assignment is only given to Masters students, presumably to give Honours students a bit more time to spend on their research project/essay.

Questions on the assignment primarily related to Unit 3, with one (unassessed) question on Unit 4. It was a very long assignment, with 8 lengthy questions. None of the questions were too difficult, though the use of numerical approximation techniques were required.

Many students did not keep up with the subject, and the assignment did an extremely good job at forcing them to finish studying the course by the time SWOTVAC came around.

End-of-Semester Exam

Enrique was kind enough to provide 3 past exams. You will quickly notice that these exams each have a fairly common style and format. The 2017 paper had a very similar style, but the difficulty of the questions was much harder. Solutions were not provided for these papers — deal with that however you need to (e.g. forming study groups or doing research).

Much like all actuarial exams, questions focused more on conceptual understanding than grinding out the correct method for specific questions. For example, while the majority of questions about utility theory throughout the semester will be in an insurance context, a question on the exam asked about one in a gambling context instead.

There were 7 questions on the end-of-semester exam, with more of a focus on Units 3 and 4. Many of the questions were quite accessible. Questions ranged from "Calculate how much an individual would be willing to pay to make a decision under utility theory", "Prove that a reinsurance arrangement is optimal" and "Explain intuitively what this mathematical expression means". One of the trickier questions involved proving an inequality was true for all values of a parameter M.

Tips for Success

IRM2 will not be as conceptually challenging as many of the subjects you will have taken in the past (e.g. the *Financial Mathematics* pentalogy is conceptually much harder), so many of your mistakes will be silly mistakes.

You will want to brush up on your proof skills if you want to excel in this subject. The questions that differentiate between those that do okay and those that do amazing are likely to be the ones that require you to prove something. There is usually a long way and a short way of answering all of the proof questions — it should be obvious which one you will want to use in an exam setting.

While there might appear to be a lot of tedious memorisation that is required, taking a step back from the slides and just thinking about what the big idea is will really reduce the burden of memorisation. For example, one of the approximations to the ruin probability involves solving a system of linear equations for which an ugly analytic solution is provided. In essence, you are really just approximating a random variable using a zero-inflated gamma distribution and matching moments.

Honestly, if you have made it this far into your degree, it should not be too hard to do decently well in this subject — you should focus more on your exemption subjects *Actuarial Practice and Control II* (and *III* if you are an Honours student). Best of luck!

ACTL40004 / ACTL90003 Advanced Financial Mathematics I

Exemption status	CT8 *Financial Economics*, in conjunction with ACTL30006 *Financial Mathematics III*. Satisfactory performance in the mid-semester test and end-of-semester exam of this subject and satisfactory performance in the end-of-semester exam of ACTL30006 *Financial Mathematics III* are required.
Lecturer(s)	Dr Zhuo Jin
Weekly contact hours	3 × 1-hour lectures
Assessments	Individual assignment, due around Week 8 10% 1-hour mid-semester test in Week 8 20% 2-hour end-of-semester exam 70%
Textbook recommendation	Joshi, M. S. (2008). *The Concepts and Practice of Mathematical Finance* (2nd ed.). Cambridge, UK: Cambridge University Press. ✗ It is not necessary.
Lecture capture	Full (both audio and video)
Year and semester reviewed	2018 Semester 1

Comments

This subject is one of the most difficult subjects in the degree. There will be a lot of confusion and frustration. Many results will need to be taken as fact without proof as they are far beyond scope. However, in all the conceptual difficulty, there are several results that are quite remarkable in the way they are used to price various contracts.

Subject Content

The subject is quite lengthy with the course being over 550 slides. This is to be expected as from any of the FM subjects.

Introduction/Binomial Trees — The first couple weeks act as an important background. It begins with revision of previously seen topics like the payoffs for Puts/Calls as well as Put Call Parity which is one of the most important results in the subject. Later on, binomial trees will be introduced, which is effectively a simplified world where stocks can only move 2 states per step.

Martingales/Brownian Motion/SDE — This section acts as an introduction for stochastic processes and their differential equations. Most techniques will be familiar from ACTL30005 *Models for Insurance and Finance*. Fortunately, they will all be reviewed as not all students in the cohort will have taken MIF. The definition of a martingale, the definition and properties of Brownian motion will be important knowledge. Finally, solving SDEs and associated techniques such as Ito's Formula, integration by parts, product rule, integrating factors will all be introduced in the SDE context. I found the integrating factors slides to be a bit unclear. Indeed, the technique is effectively the same as with ODEs. Additionally, the result of Ito's Isometry is very important for later proofs in the subject. All the techniques taught in this section of the course will be incredibly crucial for later on.

Black Scholes and the Greeks —I'm sure many of you will have heard of the famed Black Scholes equation, this will most likely be the first time you will go into much depth about it. These chapters begin with proving the result through hedging and martingale approaches. It is important you understand how these proofs work as well as the assumptions of the BS model. Later on, criticisms of the BS Model will be discussed. Then the Greeks are introduced which are just the derivatives (in the calculus sense) of derivative values. These give us an indication of how the value of a product changes according to various factors. Finally, the BS model is modified to allow stocks with dividends and how these can be related to foreign exchange. I found the forex content in the course to be extremely confusing.

Interest Rate Derivatives — Rather than depending on stocks, some derivatives depend on future interest rates. The main difference between this is that you cannot actively trade interest rates like you do with stocks. Furthermore, interest rates exist for a range of maturities rather than one stock price. Some products like forward rate agreements, swaps, caps and floors are introduced as well as the Black Formula. This is a very important formula for the subject. However, it is a bit unclear in the slide exactly what it is as it is introduced in the context of pricing a cap but can be used in a variety of contexts. Later, numerous exotic interest rate derivatives are introduced. I found this section to be both frustrating and uninteresting. It is effectively a long list of products which come exam time would just surmount to meaningless rote learning to be forgotten right after. I hope this section will either be removed or made non-examinable in future iterations of the course. Finally, a number of term structure models are introduced to model the instantaneous short rate as well as simulating future interest rates with them and how they can be applied to a binomial tree.

Credit Derivatives — The final chapter is covered in the very final week and covers credit default swaps and credit risk concepts. This includes the recovery rate if a company bankrupts as well as how firm values are modelled. An understanding of the Merton Model is crucial and thankfully Zhuo provided a summary of it at the end of week 12 as the slides are quite bare.

Lectures & Tutorials

Each week there are 3 lectures. There were few if any tutorial sessions, however Zhuo would often cover some difficult questions at the end of the final lecture each week. Lectures were generally at a good pace and Zhuo tries his best to explain quite difficult concepts in the best way possible. However, many concepts will make little sense the first time. This is mainly due to the abstract nature rather than his lecturing style. Personally, I also found the lecture slides a bit convoluted at times. In the tutorial aspect of the course, Zhuo will also type up summaries of more complex or important areas which I found really useful. Each week's lecture slides also include a series of practice questions increasing in difficulty. I found many of these very challenging at first try, however, as the course progressed, later concepts could be applied to questions from earlier making them easier to understand.

For some reason, lecture capture quality was quite poor at times with the picture extremely washed out. This made some of the things he wrote on the slides extremely difficult to read and I had to resort to bothering my friends to clarify what was written. Additionally, the audio would at times peak, making the recording literally painful to listen to. Zhuo also writes on the board especially when he is doing a recap of topics. As someone who on many occasions was unable to attend lectures in person, it was incredibly triggering to listen to him writing on the board and having no idea what was there. I hope for future cohorts Zhuo will write on the back of slides/loose paper under the document camera as writing on the board hinders learning of the concepts for no good reason.

Assignment

The assignment involved pricing various vanilla and barrier options using binomial trees. What made this trickier was the fact that the number of steps would be variable. As such, VBA macros were allowed to be used in the calculation. Doing some online research on how to write VBA code will be important if you're unfamiliar with it. Zhuo allowed some other programming languages if you consult with him beforehand.

Mid Semester Exam

The mid semester exam was a fair standard, was accessible and also tested concepts well. It covered everything up to the Black Scholes derivation. There were no practice papers. It is important you do the questions at the end of each week's slides as these are a good indication of the standard of questions.

The average in our cohort was 13.5. Zhuo provides a breakdown of every questions' average which was useful to see which were harder/easier. The MST also counts towards exemption.

Exam

The exam was good length. There were a number of trickier questions as well as simpler ones that had come virtually straight from previous papers. As such, it is very important you attempt both practice papers and have a firm understanding of all questions in them as the actual exam will be of a similar standard.

Overall, the exam is quite challenging but still fair. Compared to the CT8 exams from the Actuaries Institute however, they are vastly more difficult. All 7 questions were worth 10 marks even though some were vastly more time consuming than others. The exam will have a couple questions on theory such as explaining assumptions or what a certain derivative is. To do well in exams it is also crucial to understand the extra explanatory sheets that Zhuo will go through in lectures to explain more difficult questions. Exam questions will often draw from these – especially the one given in week 12.

Closing Remarks

This subject was very challenging. The amount of content is not as immense but the fact that some concepts get very abstract make this subject conceptually very difficult. For such a conceptually difficult course, Zhuo generally lectured well but I sincerely hope he makes some simple changes to vastly improve the quality of lecture recordings for future years.

ACTL40005 / ACTL90013 Actuarial Studies Projects

Exemption status	None.	
Lecturer(s)	Xueyuan (Shane) Wu Shuanming Li Mark Joshi	
Contact hours	3 × 1-hour consultations per project	
Assessments	Project 1 (Semester 1 — Weeks 1–8)	25%
	Project 2 (Semester 1 Week 9–Semester 2 Week 8)	35%
	Project 3 (Semester 2 — Weeks 5–12)	40%
Year and semester reviewed	2017 All Year	

Comments

Mark Joshi: What did you think of your previous projects?
Student: I was surprised we had to do so much research!
Mark Joshi: [laughs] You know, this subject is called *research* projects for a reason.

Welcome to the world of research, and be prepared to have your limits (and stress levels) stretched to new highs by this subject. So far in our actuarial journey, we have rarely had to research too much on our own, or use too much judgement. Following instructions generally ensured a good outcome. However, this subject really pushes you to think, decide, and execute on your own as significantly less guidance is provided.

At the beginning of each project, the project supervisor delivers the project, outlining expectations and tasks. For every project, you will get three consultations with the project supervisor. Questions regarding the projects will only be answered in these three sessions, and will not be answered via email at other times. Each project goes for 8 weeks (with the second project stretching over the winter break), and requires an academic paper style report and usually the code or spreadsheets used in performing the required tasks. All projects require some degree of coding, so this subject is also very valuable in the sense that your programming skills are put to practice.

Project 1

The first project was delivered by Shane, and focused on investigating two aggregate claims models for insurance with dependence. The project consisted of two main tasks: deriving theoretical results for two models such as the mean, variance and covariance, and then using monte–carlo simulation to further compare and contrast the two models.

Looking back at the projects, this project was perfect at easing our way into the subject, and tied in well with our *Risk Theory I* studies since some techniques learnt in *Risk Theory I* needed to be applied. This project was more structured in that the tasks required were clearly outlined, but there was enough room to use our judgement and initiative such as choosing which probability distributions to use, and what sorts of tests to perform when comparing the two models.

This review was previously published in the 2017 end-of-year edition of the *Actuarial Students' Society Subject Review*.

Project 2

This project was delivered by Shuanming, and similar to Project 1, had an overall *Risk Theory* focus. Nonetheless, immediately from the outset of the project, it was apparent that a lot more research would be required for this project. The focus of the entire project was on copulas (a method to model dependent random variables), and none of us had ever heard of these before! Hence, before we were able to even start the tasks, extensive research went into understanding what they were. The remaining parts of the project focused on fitting various data to bivariate distributions using common distributions and copulas, ultimately leading to a comparison of the methods and fit.

Project 3

The final project was delivered by Mark Joshi. Very much like his financial mathematics assignments, the project started with a similar background story where we were an analyst and our boss required us to complete a task. For our project, the task was to create two models (one basic and one enhanced) that would calculate the price of an exotic basket option called the *South Guarantee* (a product which prevents your investment from going south) and compute the Greeks. Six test cases were provided, and we were expected to perform our own tests as well. Sound straightforward? The catch was that our bonus (i.e our project mark) would depend on how quickly our enhanced model could run compared to our basic model. Mark warned us that he would be very unimpressed if we purposely made our basic model exceptionally inefficient.

Compared to the other projects, this project was the most open ended, and really challenged us to develop some programming skills and think about how we could make the model more efficient. At the same time, we were expected to be able to understand and explain how the techniques used to accelerate our code worked, so the project had a good balance between theory and application.

Tips for Success

Looking back over the year, the biggest factor that determines how successful you are, and how well you manage your stress is how early you start the projects. Often, many students would not start them until three or four weeks into the project which would lead to cram sessions in the final week that the project was due. Often such cramming led to sky–high stress levels and the need to skip other lectures, which is not recommended.

When writing up the report, the look and way the report is written also carries more weight than what you might first expect. Hence, time should be taken to proof-read and think about how the report will be structured. LaTeX is preferred, and it is rumoured that a mark is deducted for every two typos. Finally, a reminder that initiative will be rewarded and the more you put into the projects, the more you will get back — both in the form of being more work ready, and your subject mark.

Whilst the projects are tedious to complete throughout semester, there is no doubt that we will look back later and realise that the projects have taught us many skills that are transferrable when we enter the workforce. Good luck, and start the projects early!

ACTL40006 / ACTL90010 Actuarial Practice and Control I

Exemption status	Part IIA *The Actuarial Control Cycle* and Part IIB *Investment and Asset Modelling*, in conjunction with ACTL40007 *Actuarial Practice and Control II* and ACTL40009 *Actuarial Practice and Control III*. Satisfactory performance in all three subjects' end-of-semester exams will lead to exemption from both Part IIA and Part IIB.
Lecturer(s)	Mr David Heath — Subject coordinator; General Insurance Mr Andrew Brown — Life Insurance Mr Donald Campbell — Superannuation Mr Richard Cooney — Investments
Weekly contact hours	2 × 2-hour lectures
Assessments	Group assignment, due in Week 10 — 30% 3-hour open-book end-of-semester exam — 70%
Textbook recommendation	Bellis, C., Lyon, R., Klugman, S., & Shepherd, J. (Eds.). (2010). *Understanding Actuarial Management: the actuarial control cycle* (2nd ed.). Sydney, AU: The Institute of Actuaries of Australia. ✗ The textbook is not essential.
Lecture capture	Full (both audio and video).
Year and semester reviewed	2018 Semester 1

Comments

This subject is more qualitative than many of the actuarial subjects you would have taken previously, and hence requires a different skillset. In particular, the ability to judge what is relevant and material to a problem, and then be able to succinctly communicate that, is what differentiates the better students.

However, it can also be quite hard to judge your grasp of the material and how well you are actually performing throughout the semester. The best way would probably be to discuss the content and work through the example problems with other classmates. That way, you can compare your approach and way of thinking with theirs, and identify any areas that you're missing or need improvement on.

Subject Content

The subject content is taught following 9 aims:

1. Actuarial Control Cycle;
2. Professionalism;
3. Environment;
4. Regulation;
5. Product features and risks;
6. Enterprise Risk Management;
7. Risk assessment frameworks;

8. Product design;
9. Models *(may or may not be examinable, depending on time constraints)*.

More specific aims such as those relating to environmental context, products and risks are taught in-depth from the General Insurance, Life Insurance, Superannuation and Investment perspectives. The majority of the content follows the first three perspectives, with 2 lectures having an Investments focus.

In addition to what is taught in lectures, you're also expected to have background knowledge and understanding of the four industries. To help give you a starting point, documents containing knowledge 'fundamentals' are provided on the LMS at the start of semester.

Lectures

The lecturers are working actuaries with experience in their respective fields, hence they are knowledgeable in both the subject content and the way to approach problems in a real-world setting. In particular, they impart a lot of context to the subject material via their personal experiences and anecdotes, which can be quite interesting to listen to even if it's not always the most relevant.

The lecturers take turns, and often continue off from their previous lecture, so I'd recommend you to look over the previous lecture they took before each class.

Student participation in lectures is expected, with class time given for discussions on lecture content or even relevant events occurring in real-life, e.g. the royal commission. Participation was decent throughout the semester, and it's a good way to test if you're really understanding the material. (Note that the lecture recordings generally don't pick up student voices.)

A couple of the lectures were tutorials, and most of the lectures in the last 3 weeks were revision, which gives you an opportunity to work through some exam-style questions. However, the first tutorial was only in Week 4, so there may be an extended period of time where you feel like you're learning things but still not sure how the subject actually works.

Assignment

For the group assignment, we acted as consultants to a client, where the final objective was to deliver a report that provides solutions to the client's problem. The assignment had 3 components with successive due dates: an initial scope letter, a draft report, and the final report.

The assignment was designed to imitate the stages of an actual work project. Writing the scope letter ensures you're taking the report in the right direction, however it mainly involves paraphrasing the assignment questions. On the other hand, the feedback given after the draft report is very useful, and should definitely be incorporated into the final report.

One aspect that groups tended to struggle with was the page limit, hence it was important to identify the essential aspects of the problem to elaborate on, and keep other sections brief. In particular, groups should examine the situation from the client's point of view, and consider their objectives, what risks they may be exposed to etc. and hence recommend a suitable solution.

Overall, the assignment could be easily completed within the given time frames, as long as your group was efficient at dividing up tasks and staying on track.

End-of-Semester Exam

The exam is open-book, so you don't need to memorise definitions, legislations etc., which is quite useful. Of course, a good understanding of the content and how to approach questions is still essential. Industry background knowledge is particularly important, as there are questions involving areas that are not always covered in depth in lectures.

A specimen exam was provided, which is very helpful to go through. The actual exam questions followed a similar level of difficulty and structure. Most of the questions on the exam were challenging, but not unfairly so. I personally found that the investments question was worded rather confusingly, however that may have been because we didn't have many examples to go off.

In addition to worded answer questions, the exam also includes multiple choice questions, where you choose all, some or none of the options for each question. Hence, there feels like an element of chance regarding whether or not you get the mark for the question (e.g. choosing 2 of the 3 right options still gives you no marks).

Although 3 hours sounds like a long time, it was definitely necessary and packed with writing.

Concluding Remarks

Overall, APC1 is quite an interesting subject as it finally provides some context towards all the maths you've been learning. You gain much more of an idea of the types of situations and problems that actuaries actually encounter and solve in the workplace.

ACTL40007 / ACTL90011 Actuarial Practice and Control II

Exemption status	Part IIA *The Actuarial Control Cycle* and Part IIB *Investment and Asset Modelling*, in conjunction with ACTL90010 *Actuarial Practice and Control I* and ACTL90009 *Actuarial Practice and Control III*. Satisfactory performance in all three subjects' end-of-semester exams will lead to exemption from both Part IIA and Part IIB.
Lecturer(s)	Mr David Heath — Subject coordinator; General Insurance Mr Andrew Brown — Life Insurance Mr Donald Campbell — Superannuation Mr Andrew Gale — Health Insurance
Weekly contact hours	2 × 2-hour lectures
Assessments	Group assignment 30% 3-hour open-book end-of-semester exam 70%
Textbook recommendation	Bellis, C., Lyon, R., Klugman, S., & Shepherd, J. (Eds.). (2010). *Understanding Actuarial Management: the actuarial control cycle* (2nd ed.). Sydney, AU: The Institute of Actuaries of Australia. ✗ The textbook is not essential.
Lecture capture	Full (both audio and video).
Year and semester reviewed	2017 Semester 2

Comments

ACTL90011 Actuarial Practice and Control II continues on from where APC1 left off. APC focuses more on the qualitative side of being an Actuary, where judgment and context is absolutely key to a wide range of decisions that must be made. APC2 is ever so slightly more technical than its sibling.

Subject content

APC1 and APC2 both cover 16 aims laid out by the Actuaries Institute. APC1 covers the first 9 aims, and APC2 covers the rest. The remaining aims are:

Aim 10 — Capital: defined as the "excess of assets over liabilities" (at least in an insurance context). The purpose of capital, how capital is acquired and how different levels of capital affect different stakeholders is discussed.

Aim 11 — Liabilities: insurance companies are in the business of uncertainty, and valuing liabilities is not always the most straightforward thing; it is an "uncertain measurement of an uncertain process". The economic assumptions and financial assumptions that are incorporated into liability valuation, and how they affect the ultimate figure are discussed in great detail.

Aim 12 — Pricing: how much should an insurance company charge for insurance coverage? What risks can arise? Does the premium take into account all of these risks?

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Aim 13 — Solvency: an insurance company is always at risk of becoming insolvent (i.e. unable to pay their obligations as they fall due). How can an insurance company help maximise the probability of remaining solvent?

Aim 14 — Profit: not much is covered for this aim. The matching principle from accounting says that revenue should only be recognised as services are performed. In the context of an insurance company, where premiums are paid in advance, this is very important, especially considering the uncertain nature of the liabilities that are paid out for each policy.

Aim 15 — Monitoring & Aim 16 — Managing: the final two aims are what makes the control cycle a "cycle". After a decision is made, the impact of that decision must be monitored so that the actuary can respond to any favourable and unfavourable outcomes in a timely and appropriate manner.

In the midst of this, a couple of lectures about Health Insurance are covered, focusing mainly on Community Rating (i.e. everyone is charged the same premium regardless of individual characteristics), Risk Equalisation and Demutualisation.

You will want to retain as much knowledge from APC1 as possible (I sincerely hope this was obvious to you).

Lectures

Much like its sibling, lectures are held late afternoon on Tuesdays and Thursdays (and I don't see this changing in the future). 2017's cohort was (un)lucky enough to have Tuesday lectures start at 5:15pm instead of the usual 4:15pm. I hope for your sake you don't have to go through the same thing (though apparently it's better for the lecturers).

Lectures were very engaging, as they were delivered by current working actuaries in a wide range of industries. Each lecturer from APC1 (apart from the Investments lecturer) returns with their distinct style which made attending lectures enjoyable despite the incredibly late timing — David Heath would often bring up recent events affecting General Insurers, Andrew Brown would often talk about the future of the actuarial profession, and Donald Campbell would often bring up amusing stories from his time as a superannuation actuary. Andrew Gale was the "guest lecturer" of the semester, taking two lectures focusing on Health Insurance, with the majority of the second lecture being an interactive Health Fund game, where groups competed to create the most profit across several rounds.

Very often, lecturers would ask questions to keep us on our toes, and students were encouraged to ask questions throughout the lecture. However, the microphone did not do a very good job at picking up what students say, and while the lecturers tried their best to remember to repeat what students say, they often wouldnt. For this reason I would recommend attending lectures, even if it means staying back at university until 7 at night; grab a coffee and do whatever you need to do to stay awake.

Assignment

Much like in APC1, the assignment placed you in the shoes of an actuarial consulting firm, and required you to do some "client work". A draft report and a final report was to be submitted; there was no scope letter that needed to be submitted (which was the case in APC1).

In APC2, the assignment was more technical in nature, requiring groups to perform a valuation. Just over a week after the draft report was submitted, feedback was provided for you to incorporate into your final report.

The assignment is not considered for Part II exemptions, so don't stress too much about it and take it more as a learning experience. The assignment will only determine your subject score at the end of the semester.

End-of-Semester Exam

Luckily, this is an open-book exam — you can bring anything that is not prohibited (...David's words, not mine). You can bring all your annotated lecture slides, the textbook, your own bound reference, and even a magazine to read if you finish early (a joke from David).

The exam had 15 minutes reading time followed by 3 hours of writing. Despite being a qualitative subject, you were encouraged to write in dot points. Clear and concise responses are essential to making sure you answer all the questions, as many students found themselves rushed for time.

Exam questions would usually provide a paragraph or two, providing some context before asking a question. Questions ranged from "Explain the concept of ...", "What should be considered for ...", and "What impact will this have on ...". Evidently, a holistic view on all of the issues discussed throughout semester is required to perform successfully in this subject.

Each of the lecturers would stress the intent of why things are done, and if you understand these intentions and are able to explain it clearly and concisely, the exam should come naturally to you. Alternatively you can chuck everything into a 100 page bound reference and use that in the exam.

Tips for Success

Forming study groups is the most effective way to study for the APC trio. Being a qualitative subject, discussion is very important, and talking through lecture content, even if no one really has a firm understanding of the content, will ultimately benefit everyone involved.

Retaining as much knowledge from APC1 is essential — don't treat the two subjects as isolated cases. Think about how each Aim links to each other (across both APC1 and APC2), as ultimately the Control Cycle should be thought of as a whole unit rather than a collection of disjoint sub-units. For example, when coming up with a premium for insurance products, you should consider the regulations that govern your line of business, and what your competitors are doing (plus a myriad of other things); focusing solely on making a profit will not always work out. Mindmaps are invaluable here.

Also don't be afraid to answer some of the questions in lectures.

ACTL40008 / ACTL90015 Mathematics of Finance IV

Exemption status N/A; this subject does not constitute any exemption requirement but is instead an elective upon satisfactory completion of ACTL40004 *Advanced Financial Mathematics I* (which comprises part of the exemption requirement for CT8 *Financial Economics*).

Lecturer(s) Professor Mark Joshi

Dr Dan Zhu (Mark's former PhD student) took the last 3 lectures due to Mark's passing

Weekly contact hours 2 × 1.5-hour lectures

Assessments

	Honours	Masters
Mid-Semester Exam (Week 7)	20%	20%
Group Assignment due in Week 7	—	10%
2-hour Final Exam	80%	70%

Textbook recommendation Joshi, M. S. (2008). *The Concepts and Practice of Mathematical Finance* (2nd ed.). Cambridge, UK: Cambridge University Press.

✓ The textbook is essential, as exercises are taken from there.

Lecture capture Full (both audio and video).

Year and semester reviewed 2017 Semester 2

Comments

***Disclaimer**: Note that all the comments in this review pertain to the subject when it was delivered by Professor Mark Joshi, who has unfortunately passed away.*

Mathematics of Finance IV is the pinnacle of financial mathematics subjects offered by the University of Melbourne. While the *Financial Mathematics* pentalogy has been relatively theoretical, MoF4 also gets into how each of the concepts are actually applied in practice. Get ready for the most rewarding subject that the Actuarial Department has to offer.

Subject content

MoF4 extends on the content covered in MoF3. There is no official breakdown of overarching topics, but the content can be loosely categorised as follows:

No Arbitrage and Binomial Trees — The principle of no arbitrage is introduced once again, as well as a slew of other theorems that follow as a consequence. An in-depth discussion of trees follows, talking about different types of trees (including one where the stock is used as numeraire), and a number of techniques that are used to "accelerate" computations using trees.

Continuous Time Martingale Pricing — All the content from *Models for Insurance and Finance* and MoF3 is very briefly revised. We learn how to price options through stochastic differential equations when the stock is used as the numeraire

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instead of the bond, before learning the analytic formula for the price of a barrier option — an option that only pays off if the stock reaches (or does not reach) a certain value before the option's expiry. In MoF3, you would have learnt that you can change the drift of a Brownian motion when passing through another measure. Here you learn exactly how that is achieved through the use of the Radon-Nikodym derivative.

Multiple Sources of Risk — up until now, the only source of randomness included in a model was a single Brownian motion (or a single random variable per step in the discrete case). Here, a model which incorporates a multidimensional Brownian motion is introduced, allowing us to price more complicated options (such as one that allows us to trade two stocks at some future point in time). *Linear Algebra* starts to become a huge part of the course from this point moving forward, so brush up on your first year mathematics notes.

Interest Rate Derivatives and Market Models is an extremely large topic of the subject, consisting of 7 of the 22 "content" lectures. Some derivatives depend on a set of interest rates in the future. This topic focuses on how we can use Monte-Carlo to price these derivatives. Among other things, the drifts of the forward rates in a variety of martingale measures is derived, before a very lengthy discussion on how the implement a market model.

Jump Diffusion Models — In history, there have been a number of crashes in the market, causing jumps in the prices of stocks. All models studied up to this point have assumed that such jumps don't occur. Jump Diffusion Models attempt to model these jumps through the use of a (compound) Poisson process. What impact does including this possibility have on the price of an option?

While it initially starts off as a theoretical maths-y subject, the Market Models lectures starts blurring the lines between a maths subject and a computing subject, where *computational complexity* (i.e. how the length of time it takes for a program to run something scales in relation to the number of inputs) becomes a heavy focus. Any programming experience would be a huge boon for this subject.

Lectures

Slides are released in quarterly chunks, and lectures are delivered as two 1.5-hour lectures in a week. One of the lectures is replaced with a mid-semester test (held in week 7), and there is only 1 lecture in the final week (or at least that was what was initially planned).

Lectures would usually consist of going through slides, and proving any results that were in slides on the whiteboard. This meant that listening to lecture recordings was not very helpful at all, as most of the stuff not on slides was not recorded. Mark expected lecture participation from students, and even went out of his way to include students who didn't usually contribute in lectures.

On the second lecture of each week, the final 30 or so minutes was dedicated to working through problems that students wanted to go through.

Mid-semester exam

As is standard in Actuarial Subjects, a mid-semester exam is held in week 7. Only one past mid-semester test was provided.

2017's mid-semester test was a lot more computational than I had expected to come from Mark. In hindsight, none of the questions were too hard. However, time was a huge issue due to the computational nature of some of the questions asked.

A common pitfall students made was trying to be overly clever and "simplifying an expression" before applying a certain technique, which actually made it more complicated instead, and failing to divide the payoff of the derivative by the numeraire.

Assignment

A group assignment was released at about Week 5. It involved simulating a hedging strategy on a stock, varying the hedging strategy as well as the model volatility of the stock. Students were required to make observations on how the trading strategy in relation to the model volatility affected the profit (or loss) made by the trader.

It goes without saying that programming was essential to the assignment. The "answers" (i.e. which scenarios resulted in profits and losses) was made apparent in lectures, so it was simply a matter of making your code produce results that match the results shown in lectures. One interesting thing to note is that the write-up required concepts that were taught in MoF3 rather than MoF4.

I believe all groups scored full marks for the assignment.

End-of-semester exam

Two past exams were provided with solutions. The format of the past exams were very similar: 6 questions each worth 10 marks regardless of difficulty/time required. There was always an essay question.

Our exam changed the formula up a bit, and was consequently a lot harder that previous exams. 7 questions were on the exam, each worth 10 marks. Instead of a single question dedicated to essay writing, there were about 3 sub-questions spread throughout the exam that required students to write either a proof for a result shown in lectures, or an explanation of how to implement or accelerate a certain algorithm.

No question on the exam was a "free mark", as is typically the case in every other exam. In hindsight, the most important thing to know for the exam was the **black formula**, and how exactly to use it to answer questions.

The exam was heavily scaled upwards.

Tips for Success

A lot of what is taught in MoF3 is very computational, so the best way to learn about the content is to actually implement them in a programming language. Most students are familiar with R, but you can use whatever language you want, as long as you are implementing what is taught in lectures. This topic is especially true for the Market Models topic — even if you don't implement it correctly, being able to see the general structure of how it would be coded will help immensely.

Closing Remarks

Unfortunately, due to the passing of Mark, I'm not entirely sure if this subject will even be offered in 2018, which is a huge shame. However, I sincerely hope that it continues to be taught. The lecturer that takes it will have huge shoes to fill, and if they are even half as good as Mark was, then I am confident that it will be taught well.

Rest in Peace Mark — you will be missed...

ACTL40009 / ACTL90009 Actuarial Practice and Control III [SM2]

Exemption status	Part IIA *The Actuarial Control Cycle* and Part IIB *Investment and Asset Modelling*, in conjunction with ACTL40006 *Actuarial Practice and Control I* and ACTL40007 *Actuarial Practice and Control II*. Satisfactory performance in all three subjects' end-of-semester exams will lead to exemption from both Part IIA and Part IIB.
Lecturer(s)	Dr Kevin Fergusson
Contact hours	1 × 1-hour workshop 1 × 2-hour lecture discussion
Assessments	Individual Assignment due in Week 11 20% 3-hour end-of-semester exam 80%
Textbook recommendation	Investment Bridging Course Notes, Course Texts & Extracts, and Student Course Notes Investment Bridging Course Notes is uploaded onto the LMS. This reading is not absolutely necessary, but provides good background knowledge for any unfamiliar topics. The other two readings are available at Co-op, and ✓ are recommended.
Lecture capture	N/A
Year and semester reviewed	2017 Semester 2

Comments

This subject is very different to any subject we have done so far! Sounds familiar doesn't it? However, APC3 is yet again different to even APC1 and 2. It might take a few lectures, or weeks, or possibly even until very late into the semester before you realise what the subject is trying to convey. Rest assured that this is not your problem, and just the way the course material is designed and delivered. The climax of the subject is the last two lectures where everything should come together.

Unlike APC1 and 2 where the course content is based on aims, APC3's content seems very scattered at first, much like individual siloed topics. Broadly speaking, the course can be broken down in the following way:

- Introduction which challenges the way we think about investments, models, and asset return estimation. Essentially, is what we often use/think up until now actually justified?
- Toolkit where the characteristics of various asset classes (debt, property, equity) are discussed. Models and their arguments for and against are further discussed.
- Climax where we think of ourselves as senior actuaries estimating the long-term asset returns

Lectures

Overall, Kevin's lectures varied in clarity. Some lectures were very easy to understand; however, key concepts were often difficult to identify in many lectures. He also seemed to assume that we had more knowledge than we did. Certainly, many of us will have learnt about basic investment ratios in ARA, however, it is unlikely that many of us really retained much

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of that knowledge. It also did not help that lecture slides were very bare, often being heavily abbreviated. The first few lectures were especially difficult to follow due to the amount of investment jargon used. As a result, many students found it useful in these first few lectures to refer to readings as a way of identifying key points before then revising the lecture notes again. Some also found that the first few lectures only really made sense after the entire semester's material was taught and revised. Having said so, Kevin is very receptive to students' feedback, and is very willing to take onboard feedback throughout semester, and this was much appreciated.

For our semester, Kevin included specimen exam questions at the end of each lecture to give us an idea of the type of questions that could be asked in the exam. Sometimes these questions were attempted in class, and Kevin gave us feedback for our answers.

Workshops

Every week, there is also a workshop (unlike other honours/masters subjects). The workshop questions are contained in one of the reading packs, and answers were uploaded onto the LMS following the workshop. Overall, many of the workshop problems are very fluffy and open ended. Consequently, the answers were often also wishy washy and could be whatever you wanted it to be as long as you could justify your reasoning. Attempting the workshop problems is highly recommended as it gives you practise at forming your own opinions and justifying your reasoning. Having said that, since many of the lectures were very confusing, some students found the workshop problems hard to access at first, so try to give it your best shot!

Assignment

The assignment was an individual assignment where we were required to provide a buy/sell/hold recommendation for an allocated stock and other peer stocks after researching the company's financial position and performing fundamental analysis. This assignment is only compulsory for honours and masters students, and is optional for distance education students. Having said that, this assignment provided excellent practice for calculating the key yardsticks learnt in earlier lectures, and really helps one familiarise themselves with commonly used investment jargon. Since we were required to consider financial reports, we were also challenged to see all the possible areas where judgement was required, and how fundamental analysis is itself also an art, and not exact science. The assignment also allowed us to appreciate some of the points made in the first few lectures.

In terms of timing, the assignment was due towards the end of semester, which coincided with the deadline for the APC2 assignment (and IRM2 assignment for masters students). The assignment was uploaded before the mid semester break, so using your mid sem break wisely is a promising idea.

End-of-Semester Exam

The exam is 3 hours, with 15 minutes reading time. It is a closed book exam, unlike the other APC subjects. Since it is closed book, it is recommended (and expected) that you have a basic idea of market rates such as the overnight cash rate, 10–year bond rates, swap rates etc. During SWOTVAC, there is one specimen exam provided, and the rates you are expected to know is also provided.

Overall, the specimen is similar in format to the final exam, however, the length of the specimen was relatively shorter. To our surprise, the specimen was a compilation of the specimen exam questions provided at the end of each lecture and

some workshop problems. In terms of the final exam, it was very long (14 questions with sub questions as well), and most students did not finish. In preparation for the exam, re-attempting tutorial questions and specimen exam questions seems promising. The exam was a similar difficulty and style to these questions. Be prepared to justify your answer as there was often no one correct answer.

Tips for Success

Students should walk into this subject with an open mind, and not expect to rote learn the subject. Understanding what investments there are, and how the investment markets work is helpful, so it may be worthwhile taking time at the start of semester to consider these fundamentals.

If you ever feel lost as the semester progresses, referring to the readings may provide some direction. Forming a study group to discuss concepts, or taking down your own notes throughout semester could also be an efficient way to study for the subject. Nonetheless, regardless of how you choose to study for this subject, it is imperative to practise communicating and justifying ideas. It is important to realise that this subject is one where there is no right answer. Also remember that investment assumptions will depend on the objective and timeframe. Good luck!

ACTL90001 Mathematics of Finance I

Exemption status	CT1 *Financial Mathematics*. Satisfactory performance in the mid-semester test and end-of-semester exam of this subject required.
Lecturer(s)	Dr Zhuo Jin
Weekly contact hours	2 × 1-hour lectures 1 × 1-hour tutorial
Assessments	Group Excel assignment, due in Week 11 — 10% 1-hour mid-semester test (topics 1-3) in Week 10 — 20% 2-hour end-of-semester exam — 70%
Textbook recommendation	Fitzherbert, R., & Pitt, D. (2012). *Compound Interest and its applications*. Melbourne, AU: University of Melbourne Custom Book Centre. ✓ I highly recommend buying this textbook.
Lecture capture	Full (both audio and video)
Year and semester reviewed	2017 Semester 1

Comments

I loved this subject. This was my first subject from the actuarial studies department and it was the perfect introduction. Although there were many formulas to memorise, the applications later in the semester was interesting. In addition, many of the mathematical proofs were elegant and satisfying to see.

Subject Content

The content from this subject is equivalent to the undergraduate subjects ACTL20001 *Financial Mathematics I* and ACTL20002 *Financial Mathematics II*.

The first topic was an introduction to interest. We covered all the various types of interest such as simple interest, compound interest, nominal and effective rates of interest, the force of interest and varying interest rates.

The second chapter was on valuing cash flows. We looked at discrete and continuous annuities, increasing and decreasing payments and briefly covered solving equations of value.

The third chapter was on different loan types and their repayment schedules. We also covered financial evaluation of projects and focused on the five evaluation criteria; the net present value, the internal rate of return, the payback period, the discounted payback period and the accumulated profit of the project. This chapter also touched on allowing for inflation.

The fourth chapter was an overview on different investment classes such as shares, discount securities, fixed coupon securities, indexed bonds and derivatives. This section was very theory heavy compared to the other chapters that were more problem solving. We spent most of our time on futures, options and understanding long and short positions.

This review was previously published in the 2017 end-of-year edition of the *Actuarial Students' Society Subject Review*.

The fifth chapter was applying the formulae learnt in the first two chapters in asset markets. We looked at measuring investment performance by calculating the money weighted rate of return, time weighted rate of return, linked internal rate of return and Hardy's approximation. In this section, we also forayed into some more actuary specific content such as the idea of immunisation.

The final chapter was taking the content from previous chapters and applying probability theory. We looked at how to calculate expected present values and how to solve problems where the interest rate was a random variable. This chapter also introduced independent and dependent lognormal models.

Lectures

The lectures were all recorded with full audio and video. Zhuo provided notes on the LMS and during our lectures he used the document projector, often writing notes on the slides. He drew a number of diagrams to explain the different of annuity formulas. I found his lecture style extremely engaging and enjoyed his way of teaching. Zhou was also very receptive to students asking questions after class and always had time to go over concepts with individual students when needed.

Group Excel Assignment

For our spreadsheet assignment, we were required to evaluate four projects according to the five criteria introduced in chapter three. Not only did we have to provide our spreadsheet, but we also needed to write a summary explaining how our spreadsheet was set up and answer some short questions on which projects we would recommend.

This was a good introduction to Excel and to learning some graphing and linear interpolation techniques.

Mid-Semester Exam

The mid semester exam was an in class exam that covered chapters one to three. The questions were of a similar style to the ones from the textbook and the tutorials. There was nothing surprising or overly difficult on the MST.

For most of the cohort, the main problem was time management as the exam was long and everyone was writing until the last minute. There was basically no time to check over work or even to stop and think about the problem. The best way to do well in the exam was to do the questions from the tutorials and the textbook over and over again until the formulae were imprinted in your memory and the steps to follow for different types of questions was second nature. Before the mid semester exam, I had done all the questions from the book three times and so while I found the exam challenging, it was definitely doable and there were no surprises.

In our exam, there were no proof questions or deriving formulas from first principles. We were also provided with a small formula sheet with a limited number of formulae but I recommend memorising them rather than relying on the sheet.

End-of-Semester Exam

The end of year exam was a two hour exam in the last week of the exam period. The exam was incredibly long and covered everything from chapters one to six. There were a small number of theory questions but no proof or derivation questions. The questions in the exam were of a similar style to questions from the book as well as the few sample exams Zhuo provided.

Similar to the mid semester exam, there were no surprising questions, just a high volume of questions. While studying for the exam, it was tempting to look over the complex annuity questions that had increasing or decreasing payments and different interest rates and just say you know how to do it, but it was super important to actually sit down and do those long questions over and over again until the steps are engrained.

For the final exam, no cheat sheet was provided and it was important to keep all the formulas from the start of the semester in chapters one and two fresh in your mind.

Textbook

I highly recommend buying the textbook. It is relatively cheap and you can probably buy the textbook from a third year student. It covers the content in more depth than the lecture notes and has some background reading options as well.

Additional Study

For more practise questions, you can look at the past exams for CT1 from the Institute. A few students did that this semester for additional practise.

End-of-Semester Exam

This subject was the perfect introduction to actuarial studies. The mathematics was elegant and there were plenty of problems to practise. Neither exams had any surprises but they were both extremely long. The content was interesting and well taught.

ACTL90002 Mathematics of Finance II

Exemption status	CT8 *Financial Economics*, in conjunction with ACTL90003 *Mathematics of Finance III*. Satisfactory performance in the end-of-semester exam of this subject and satisfactory performance in the mid-semester test and end-of-semester exam of ACTL90003 *Mathematics of Finance III* are required.
Lecturer(s)	Dr Jane Joshi
Weekly contact hours	2 × 1-hour lectures 1 × 1-hour tutorial
Assessments	Individual assignment, due in Week 11 — 10% 1-hour mid-semester test (topics 1-6) in Week 10 — 20% 2-hour end-of-semester exam — 70%
Textbook recommendation	Joshi, M. S., & Paterson, J. M. (2013). *Introduction to Mathematical Portfolio Theory*. Cambridge, UK: Cambridge University Press. This is a required textbook, however there are a number of copies in the library available for short term loans.
Lecture capture	Full (both audio and video)
Year and semester reviewed	2017 Semester 2

Comments

Overall Mathematics of Finance II was well taught and the content was interesting. The spreadsheet assignment was fun. The mid semester exam had nothing unexpected. The end of year exam was hell.

Subject Content

- Definition of risk and return
- Efficient Portfolios
- Portfolios with a risk-free asset
- Finding the efficient frontier
- Single-factor models
- Multi-factor models
- Introducing Utility
- Utility and risk aversion
- Foundations of utility theory
- Maximising long term growth
- Stochastic dominance
- Risk measures
- The Capital Asset Pricing Model

This review was previously published in the 2017 end-of-year edition of the *Actuarial Students' Society Subject Review*.

- The arbitrage pricing model
- Market efficiency and rationality
- Brownian motion and stock price models across time

Lectures

The lectures were all recorded with full audio and video. In the notes printed off the LMS, some sections were left blank for us to fill out during the lectures. Personally, I found the lecture pace slow but the content was well taught and explained clearly.

The first half of the semester concentrated on mean variance investors and we covered a lot of theory and content in depth. It's extremely important to be able to solve matrices quickly using row reduction techniques learnt in MAST10006 *Linear Algebra* (or MAST10008 *Accelerated Mathematics 1*).

Tutorials

Tutorial attendance is, of course, highly recommended. It is a great chance to ask Jane questions and clarify subject material. There are not many worked solutions in the lectures so the tutorials are a great way to do more problem solving. Jane assigned select questions from each chapter to do before the tutorial and they took an hour or so to do each week, so not very long at all. During the tutorials, we usually did not go over the solutions to the set problems from the book unless there were particularly difficult ones. Instead, we worked through the additional exam style questions she provided at the beginning of the week.

Assessments

I really enjoyed the spreadsheet assignment. I have no experience at all with spreadsheets and it was a great introduction to excel. We were required to create an active workbook that found the weights of five assets to form an efficient portfolio. The question was based on a multi-factor model with two indices and Jane varied the parameters and the lending & borrowing rates to check our outputs. Using the same model, we also had to find the weights for a given mean and another for a given standard deviation. Jane marked the assignments in a way that if we scored less than 8, she allowed us to resubmit the assignment to get a new mark out of 8 if we wished.

The mid semester exam covered topics 1 to 6. We had 3 questions for our exam and the longest one worth the most marks was using Gaussian elimination to find the minimum variance portfolio, and the composition of two efficient portfolios; one for a given mean and another for a given standard deviation. The questions were reasonable and not unexpected. We were given enough time to complete the paper provided we worked consistently. All questions were problem solving rather than theory based although Jane hinted throughout our lectures that we should know our definitions well. Doing the questions at the end of each chapter as well as learning all the formulae in the lectures was enough to do well in the exam.

The end of semester exam was challenging. Jane had provided a number of past exams and sample exams that were a reasonable indication of the length but not of the difficulty. The exam consisted of a mix of theory questions, such as defining Brownian motion, as well as practical questions and proof questions. In the exam, there were a few practical questions in a style that we had not encountered at all during the semester. It was important to understand the differences between APT and CAPM and when to apply each. To do well in the exam, it was crucial to understand all the theories and concepts rather than just rote learning how to solve the questions in the book and the sample exams. To study for

the exam, a few of us also memorised some of the proofs of the various theorems covered during the semester. Time management was another issue in the exam and I found that the time spent on solving matrices to find an efficient portfolio did not correspond to the number of points the question was worth. You may consider starting with the shorter questions first before going onto the easy but longer questions

Textbook

Although I bought the textbook, I feel it was not necessary. The lecture slides that you can print from LMS were practically identical to the textbook. The only material you need from the textbook are the questions at the end of each chapter and there were a number of copies in the library you can borrow before a tutorial to see the questions.

Closing Remarks

In summary, MoF2 was a challenging but rewarding subject. The content is manageable and interesting. The most important thing is to understand the content thoroughly and not rely too heavily on the questions in the book or the sample exam questions when studying for the final exam.

ACTL90006 Life Insurance Models I

Exemption status	CT4 *Models*, in conjunction with ACTL90007 *Life Insurance Models 2*. Satisfactory performance in both subjects' end-of-semester exams is needed.
Lecturer(s)	Professor David Dickson
Weekly contact hours	1 × Set of online videos (adding up to roughly 1 hour) 1 × 1-hour workshop 1 × 1-hour tutorial
Assessments	1-hour minute mid-semester test, held in Week 7 — 20% Individual assignment, due in Week 7 — 10% 2-hour end-of-semester exam — 80%
Textbook recommendation	Dickson, D. C. M., Hardy, M. R., & Waters, H. R. (2013). *Actuarial Mathematics for Life Contingent Risks* (2nd ed.). Cambridge, UK: Cambridge University Press. ✗ It is not necessary to buy this textbook. There are several copies in the high use section of the Giblin Eunson library. I would recommend consulting this textbook for additional problems should the problem sheets, tutorial problems and workshop questions not be enough.
Lecture capture	Online lectures are uploaded well in advance. Workshops are not recorded.
Year and semester reviewed	2018 Semester 1

Comments

Overall this subject was a really interesting introduction to life insurance. The content was quite challenging and there are a lot of formulae to memorise. The prerequisites for this subject are *Probability* and *Statistics*, and it is super important to have learnt and understood both of these subjects to do well in Life Insurance I.

Subject content

Life Insurance I is all about modelling mortality. This will be the first subject in the Master of Actuarial Science course that focuses more specifically on actuarial science rather than finance or general statistics.

This subject is broken into six sections.

1. **Modelling mortality** — This section introduces lifetimes and how to model these lifetimes. New concepts such as lifetime distribution, survival function and force of mortality, which underpin the remainder of this subject, are introduced. It is a relatively long section with several formulae to memorise. It is very important to understand the proofs and derivations to these formulae as they are assessable.
2. **Non-parametric methods** — This section looked at applying data to model the lifetime distribution introduced in section 1. We start with an introduction to different types of censoring (when data is incomplete) and how to work with censored data then look at two different techniques to model a lifetime distribution.

3. **Estimating Mortality Rates** — This section looks at modelling the mortality rate rather than the lifetime distribution. We examine three techniques; the Two-State Markov model, the Binomial model and the Poisson model.
4. **Multiple state models** — This section really requires techniques taught in some of your previous subjects , such as solving differential equations. We extend on the concepts taught in the previous section on the Two-State model of mortality to multiple states. The techniques for solving the differential equations are fairly standard and although they look extremely difficult and fiddly at first, the steps to solve each differential equation in this section are very similar, so understanding the basic ones really help you solve the equations for the more complex models.
5. **The Poisson Process** — This section is very proof heavy and focuses on different theorems associated with the Poisson Process. By the end of this section, you should be very familiar with the probability functions of the Exponential, Gamma and Poisson distributions as well as their Moment Generating functions. It is definitely worth memorising the probability density functions and cumulative functions of these distributions as there is no formula sheet provided in the exam.
6. **Simulation** — This is the shortest section in the course and was covered in the last week of lectures. This topic covers simulating random variables from a discrete or continuous distribution using random drawings from a uniform distribution.

Lectures

The lectures for this subject were delivered purely online in bite sized chunks of three to four minutes. They were uploaded weekly and we were expected to keep up with them in our own time. The lectures lasted about an hour in total per week, but I found myself spending an hour and a half to two hours on them each week. Although the content in the lectures follows the lecture notes extremely closely, sometimes David will briefly cover ideas not in the notes, so I highly recommend watching the videos. This was especially true in the last section on simulation where he drew a graph to help explain concepts that was not in the lecture notes.

Workshops

Instead of lectures, David runs weekly workshops. This semester, at the beginning of each workshop, he trialled a new mini quiz. It was an online multiple-choice quiz containing three to four questions. You can log into the website on your phone or laptop and submit the answers anonymously. I really enjoyed these short questions as they gave me a gauge of what was expected of me at that point in the semester and how far behind everyone else I was. Unfortunately, these quiz questions were not uploaded onto the LMS, so if you get stuck on any of the questions or do not understand the solutions, copy them down for your own reference. After the quiz, we then went through one or two workshop questions as a class. These questions were uploaded to the LMS along with the solutions at the end of each week.

Tutorials

The tutorials were fantastic. We all got a tutorial sheet, worked on a question in smaller groups, and then took turns presenting our solutions to the class. It was a great way to learn new techniques to solve problems as on more than one occasion, the solutions presented in class were different to the solutions uploaded to the LMS. Furthermore, sometimes our tutor also gave us a third way to look at the problem and solve it. This was especially nice with the proof questions where some proofs or derivations for the same problem were easier to understand than others.

Assignment

The assignment was an individual assignment in Excel. The first part to the assignment was plotting the Kaplan-Meier Estimate and the second part was finding the mortality rate in the binomial model of mortality. This assignment was not marked purely on finding the correct answer, points were also given for presentation of the excel workbook and the written submission. I highly recommend using LaTeX for this assignment . I had never used LaTeX before this semester and picked it up easily for this assignment. If you do choose to use Word, make sure your subscripts are subscripts and superscripts are superscripts. In our feedback for the assignment, David focused on attention to detail.

Midsemester Exam

The midsemester exam was held in week 7 and covered Section 1 and all of Section 2 except proportional hazards. There was a mix of computational and theory questions.

Personally, I found the exam extremely unexpected although looking back now, most of the questions were standard. Many questions were just slightly different to what we had previously come across, and I, along with many classmates I talked to, thought it was much harder than the 2017 mid-term exam which was provided as practise. Fortunately, we were given enough time (60 minutes) to do the exam but there was no difference since I didn't know where to start for far too many of the questions. The mid-term really emphasised how important it was to understand the concepts deeply rather than to just know how to blindly apply formulae.

A good reference for additional questions is the recommended textbook. One of the questions in the mid-term exam which we had not previously seen in any problem sheet, tutorial sheet or workshop question was an exercise in one of the chapters from the textbook.

At the end of each chapter in the lecture notes, David outlines his expectations which should also be carefully reviewed during the revision for the mid-term exam.

End-of-Semester Exam

I found the end of semester exam much better than the mid-term exam. There were fewer surprising or unexpected questions. The paper covered the whole semester's content and not just the second half. Overall, I think the time given and paper length was well balanced, although you had to work consistently without stopping to recall formulae to finish in time. This exam was not as long as some other actuarial exams I've sat but it was definitely not cruisy either.

In your revision for the exam, problem sheets, tutorial sheets and workshop questions are your best friend. I found many of the questions in the exam were written in a similar style to these questions. Unfortunately, these sheets do not cover the many proofs taught throughout the subject, so I would recommend looking over these in the lead up to your exam since almost all proofs are examinable. One piece of advice given to us by David was to write down the proofs rather than just reading over them and that really helped me, especially the section on the Poisson Process. The proof and derivation questions required in the exam were ones that I had scrawled probably ten or so times in the weeks before the exam and if I had not done that, I reckon I would not have had enough time to finish the exam.

Concluding remarks

Overall, I really enjoyed Life Insurance Models I. The subject was extremely challenging and covered a lot of ground, but the concepts were interesting, and the mathematics was fun.

ACTL90009 Actuarial Practice and Control III [SM1]

Exemption status	Part IIA *The Actuarial Control Cycle* and Part IIB *Investment and Asset Modelling*, in conjunction with ACTL90010 *Actuarial Practice and Control I* and ACTL90011 *Actuarial Practice and Control II*. Satisfactory performance in all three subjects' end-of-semester exams will lead to exemption from both Part IIA and Part IIB.
Lecturer(s)	Dr Kevin Fergusson
Contact hours	1 × 2-hour lecture 1 × 1-hour workshop
Assessments	Individual Assignment due in Week 11 20% 3-hour end-of-semester exam 80%
Textbook recommendation	Investment Bridging Course Notes Course Texts and Extracts Student Course Notes The Course Texts and Extracts and the Student Course Notes are provided on the LMS, and were made available at Co-op roughly 3 to 4 weeks into the semester. ✓ I recommend them.
Lecture capture	Full (both audio and video). Caters for both university and distance education students.
Year and semester reviewed	2018 Semester 1

Comments

Actuarial Practice and Control III (APC3), as it is currently delivered, is unlike any subject delivered by the actuarial department. In your previous finance subjects, you took the assumptions and methods used in various models (such as the CAPM) as a fact. This is the subject where we question those very models.

Now, where does this all fit in with the actuarial profession? Unfortunately, it isn't very clear at all until the last 2 weeks of semester.

Subject Content

APC3 takes a higher level view of financial markets, focusing more on how financial markets work rather than coming up with a single number for the return of an asset.

This subject is perhaps the only subject in the course with **critical thinking** as a key focus. For example, you may have learnt that a stock has a higher return than a bond because is *riskier* (e.g. Mean-Variance Analysis). However, the issue goes a lot deeper than that; what do we mean when we talk about the riskiness of an asset? In *Financial Mathematics III*, we use risk to refer to the volatility of the return. But we shouldn't we also consider counter-party risk, liquidity risk, or many of the other types of risk that come with purchasing an asset? Why is it that a riskier asset produces a higher (average) return? Is it purely because of investor behaviour, or is there some other factor that remains unidentified?

With that introductory example out of the way, let's move onto the course structure. The first week opens by setting the overall mood of the subject. The expectation for students to be able to analyse and discuss different ideas critically is

displayed before showing a brief justification of the use of history to inform our decisions. Afterwards, two key ideas in the actuarial profession are brought up and questioned:

1. share prices will keep pace with inflation; and
2. total return from investing in shares will exceed the total return from investing in bonds by a material margin.

Following this is 7 weeks of discussing different types of assets. Weeks 2 and 4 deal with fundamental analysis, a technique used to place a value on a company's shares through careful scrutiny of publicly available information (e.g. company reports, announcements, financial news). At the end of week 4 there is a discussion on the impact of inflation on company reports, and how inflation may distort a company's financial position as displayed through their balance sheet. Sandwiched in the middle of these two weeks is a discussion on speculative bubbles; are they able to be detected before they burst, and what are the characteristics of a speculative bubble?

Week 5 deals with debt markets, and how debt securities work, along with a discussion on immunisation and the yield curve, which you may remember from ACTL20002 *Financial Mathematics II*. Week 6 discusses the property asset class; in particular, the characteristics and issues with direct property investment. Following this is a discussion on securitisation (essentially the formation of a trust which invests in some type of underlying asset, with units issued to potential unitholders.).

Any income you earn as an investor will be taxed. Week 7 deals with taxation from the point of view of an institution, with a focus on superannuation companies in pension and accumulation mode, and insurance companies. Here, topics such as franking credits may be familiar territory from *Business Finance* (but not in *Principles of Finance*), while other topics such as the Double Tax Treaty (i.e. how tax is handled on foreign income) may be completely new to you. Week 8 deals with derivatives, their characteristics and the risks they introduce, despite being assets with the purpose of mitigating risk.

Week 9 discusses the rationale behind splitting assets into asset classes, before discussing which asset classes would be best to keep up with (hyper-)inflation. Week 10 revisits the efficient market hypothesis, CAPM and the equity risk premium, which you may remember from *Financial Mathematics III*.

So why are we learning about all this as aspiring actuaries? Typically, the companies we end up working for will need to hold some combination of assets to support the liabilities that are held, whether they are pension payments for pension funds or claim payments for insurance companies. How do we estimate the return of our asset portfolio? Coming up with this return will require a strong understanding of how the underlying assets work, as ultimately, actuaries should be able to justify any of the assumptions they have made. That is what the remaining weeks of the semester deals with. How we should allocate our assets to meet different goals and estimating the long-term return of our asset mix are discussed here.

Overall, the content of the subject is incredibly interesting, and the focus on critical thinking is a huge plus. However, throughout the semester, the looming question of "why am I learning this?" was very prevalent, and unfortunately it wasn't until the last 2 weeks where everything made sense. I guess the key takeaway here is throughout the semester, have the following at the back of your mind:

As an actuary, I need to know about this so I can justify assumptions for investment returns.

Lectures

The 2-hour lecture is split into two halves, each half dealing with a different (sub-)topic. Slides are uploaded the weekend before the lecture starts, leaving you plenty time to print them out before the lecture starts.

Kevin is incredibly knowledgeable in the finance industry, and was incredibly receptive to feedback throughout the semester. However, it was not very easy to pick up on the things taught in lectures, which I think was a combination of both the difficulty

in learning things about the finance market without actively taking part in it and the way lectures were delivered. It might be worth forming study groups with other students to discuss content in depth after the lecture is over.

Workshops

These are essentially a 1-hour lecture focused more on answering questions rather than teaching subject content. Questions for the workshop were released at around the same time as the lecture slides.

These questions are essential to help consolidate your understanding of the subject. Try your best to attempt them before the workshop to train your thinking. The questions are very open-ended, and the solutions may appear to be a bit wishy-washy, but this reflects how work is in the real world – things are ambiguous and uncertain all the time.

Solutions are discussed in the workshop, as well as uploaded to the LMS as the week ends.

Optional Mid-semester Exam

An optional mid-semester exam was also made available in the middle of the semester. Scripts were expected to be done in 2 hours of your own time, but obviously there was no way for this to be verified. Scripts were to be handed to the lecturer roughly a week after the mid-semester paper was made available. This gave you the opportunity to get your answers marked and valuable feedback to be provided. However, most of the feedback was minimal, mainly consisting of ticks or crosses. Moreover, the paper was a compilation of some of the workshop and lecture exercises, for which solutions were provided, meaning that if you kept up with the subject content, it didn't force you to apply knowledge into new situations.

Based on the mark I got and the marks everyone else got, people did extremely well for the optional paper, which may have instilled a false sense of confidence in us for the subject. More on this in the **End-of-Semester Exam** section.

Individual Assignment

The assignment was an individual assignment due in week 11 of the semester. We had about 6 weeks to finish it. The submissions were to include a written report and the Excel spreadsheet used for calculations.

The assignment put us in the shoes of an actuary who was asked to provide a buy/sell/hold recommendation on a portfolio of 15 different stocks. To do so, fundamental analysis had to be applied, which required the analysis of company reports for each of the 15 different companies.

As tedious as the assignment was, I personally thought it was the most well-constructed assignment in the course, forcing students to deal with data limitations and some of the ambiguity that is present in the real world. Not only that, it helped me learn about fundamental analysis through the actual act of performing it rather than reading about it. However, it is a very challenging and time-consuming assignment, so your mileage may vary. From what I could tell, most students did incredibly well, with marks ranging from 18 to 20 out of 20. We were not given any feedback on our assignment however.

End-of-Semester Exam

Much like the other APC subjects, the exam was 3-hours, and examined everything in the course. However, unlike the other APC subjects it was closed-book. Students were expected to have a decent idea of some of the more pertinent rates

in the market, such as the cash rate, the 10-year bond rate, the cap rate, etc. Kevin was kind enough to provide a summary sheet that showed what these rates were in October 2017, but it may be worth looking up the rates yourself to get the most up-to-date rates.

A specimen exam was provided, which was a compilation of some of the exercises from workshops and lectures (as well as the questions that were on the optional mid-semester paper). The style of the actual exam was very similar to the specimen. In terms of study preparation, make sure you have a good understanding of the workshop solutions; in particular, how they justify certain statements, as you will be expected to justify any assumptions you make in the final exam.

I suspect that the end-of-semester exam was marked much harsher than the practice mid-semester exam and the assignment. Hence, don't be lulled into a false sense of security if you score well in either of those two.

Concluding Remarks

Overall, APC3 was an interesting experience. Though the subject content was extremely interesting, its purpose was incredibly unclear until the final 2 weeks of the semester, which is unfortunately a shame. Forming study groups, and consistent discussion will be the key to success in this subject. Best of luck in what is likely your final exemption subject for accreditation.

ACTL90018 General Insurance Practice

Exemption status	N/A; this subject does not constitute any exemption requirement but is intended to prepare students for their Part 3A and Part 3B exams.
Lecturer(s)	David Heath Lynda Young Cameron Lucas
Weekly contact hours	2 × 1.5-hour lectures
Assessments	Group assignment, draft due in Week 9, final due in Week 12 30% 3-hour end-of-semester exam 70%
Textbook recommendation	Hart, D., Buchanan, B., Howe, B. (2007). Actuarial Practice of General Insurance (7th Ed). Sydney, AU: The Institute of Actuaries of Australia. The textbook is mentioned a few times during the semester, but the slides are more than sufficient for the subject.
Lecture capture	Full (both audio and video).
Year and semester reviewed	2018 Semester 1

Comments

One of the main draws for doing the Masters of Commerce instead of Honours is the opportunity to study General Insurance Practice (GIP) to prepare for your Part III exams if you choose to specialise in general insurance. Taken by working actuaries, this is one of the most practical subjects you will study, and will give you a great taste for what is to come.

Subject Content

The subject aims to be a watered down version of the 3A and 3B General Insurance modules with the Actuaries Institute. Obviously, it would be impossible to fit everything in these modules in this subject, but nonetheless, this subject is still an excellent introduction into the main aspects of general insurance (GI). The topics are categorised as follows:

General Insurance Products (4 lectures) – Before studying what actuaries actually do in GI, we require a strong understanding behind the general insurance products out there, and how they work. Different insurance products will have very different characteristics. For instance, workers' compensation insurance claims might take years to resolve, but something like a comprehensive motor insurance claim may only take a couple of weeks. The impact that these differences have in an actuary's work will become clear as the semester progresses.

Liability Valuation (3 lectures) – Now that we know about GI products, we get to some numbers. Some claims might take years to resolve. Of the claims that have come through the door, how might we estimate the amount of money that we expect to pay out for these claims? Actuaries use development triangles (which was briefly touched upon in ACTL30004 *Actuarial Statistics* under the name Run-Off Triangles) to do just that. Different models such as the PPCI, PPCF, PPAC models and more are touched on here, each of which relies on a different aspect of the claim handling process, and an explanation as to when one may be more appropriate to use than another.

Reserving (4 lectures) – Balance sheets for an insurer are quite interesting. Recall that an asset/liability is an expected cash inflow/outflow from an entity arising from events that have occurred in the past. For an insurer, reserves are created for claims that have been made in the past, but these amounts are unknown: we don't know if an injured person will need $1,000 to pay for medical fees in the future or $100,000! Touching upon the accounting principles of revenue recognition, matching expenses to revenue and conservatism, the ideas of unearned premium reserve, outstanding claims reserve, premium liability reserve, and unexpired risk provision are explored. Among other topics, accounting for the uncertainty in these reserves is covered as well, before finishing off with reconciliation, which helps actuaries understand the movements in the outstanding claims provision from period to period.

Pricing (5 lectures) – How exactly do we determine an appropriate premium to charge customers for coverage? A premium should cover what we expect to pay out and any expenses we may incur, as well as a profit margin. However, there may be some instances where premiums charged are much higher or lower. Why would that be? Things to consider while pricing are covered here, as well as modern techniques for pricing premiums, which touches on some machine learning ideas (such as overfitting and cross-validation), machine learning models (such as gradient boosted machines, and random forests) as well as the Generalised Linear Model (which you should be very familiar with from *Actuarial Statistics*).

Capital (2 lectures) – i.e. the excess of assets over liabilities. Recall that insurance is about bearing the risk of policyholders. If the money we have set aside for claims is not enough, then the insurer goes bust. To account for this, APRA (the regulator for insurance) requires insurers to hold a minimum amount of capital. How exactly is this minimum amount determined? Two insurers with the same number of policies may have vastly different capital requirements, simply due to the nature of the types of insurance products they provide.

Following these broad topics, a series of single topic lectures are delivered. The first dedicated to Government Injury and Disability schemes, giving some background behind insurance schemes that have government involvement such as Worksafe and the TAC. Accounting statements and profits are covered as well, showing how our reserving assumptions may affect how profit emerges for an insurer. Lastly, the role of the appointed actuary is covered, outlining what the requirements of the appointed actuary are, as well as the reports they are responsible for. The last few lectures are dedicated to revision.

The subject is still in its infancy (only being the second time the subject was delivered) and there are no strict curriculum requirements set by the Actuaries Institute, so the content is quite malleable. Lecturers are always open to feedback to see how the subject could be improved as well. Because of this, don't be surprised if the way the subject is delivered is vastly different to what is in this review. Overall, like the APC subjects you would have studied beforehand, the subject is quite qualitative.

Lectures

Just like in APC, the subject is delivered by a number of working actuaries. David Heath makes a return from APC as the subject coordinator, alongside Lynda Young (who delivered the reserving module) and Cameron Lucas (for the pricing module). Each of the lecturers were extremely clear in explaining specific ideas and encouraged students to ask questions that they had during the lecture. As such, lectures were very engaging, despite starting at 5:15pm.

The cohort of 2017 left an extremely good impression for the lecturers, as there was active discussion from not only the lecturers, but also the very small cohort. I think David was hoping to reproduce that experience in 2018, where unfortunately, the cohort was very quiet. I strongly encourage you to answer questions that are asked by the lecturers, as they not only force you to think a bit more, but they might also help to correct some of the misunderstandings you may have about certain concepts. You don't have to be correct all the time!

Discussion Forum

Just like in APC, the discussion forum is available for students to ask questions they had about the subject content. Apparently this was used heaps in 2017, but it was not used at all in 2018 (and I imagine David will point this out when he teaches the subject in 2019). Unlike the Online Tutor, the discussion forum is not anonymous.

Students can provide answers for questions others have posted, as well as lecturers. With the right cohort, this would be an extremely powerful tool to help consolidate understanding, as you would be able to (attempt to) answer another student's question with what you think the answer is, and the lecturer would be able to not only answer the original question, but also comment on the response that you provided (either confirming that you were right or providing amendments to your answer). Try your best to use it if you don't understand something in the subject. There is nothing wrong with being incorrect!

Group Assignment

The group assignment involved looking at the annual reports of two very different insurers, looking at a number of figures from the balance sheet and income statement, and commenting on them. Students were then asked to compare the difference of the figures between the two insurers by considering the characteristics of the two insurers. Like in APC1 and APC2, a report was meant to be submitted in two parts: a draft, and a final after feedback was provided on the draft report.

Overall, students performed fairly poorly. I personally felt like it was a bit unclear as to what David was exactly looking for, and David spent a bit of time in lectures clarifying what exactly he was looking for before the deadline for the final report. Despite that, the assignment was designed to help students understand some of the reasons behind the figures in the annual reports, and in that regard, it was extremely helpful.

End-of-Semester Exam

Much like the APCs, the end-of-semester exam is a three hour exam. However, unlike the APCs, it is a closed-book exam, meaning we could not bring in our 300-page binder of notes. A specimen exam is provided, which is a good indication of the types of questions you will encounter in the exam. However, I thought the actual exam was ever-so-slightly harder than the specimen.

Everything on the course was examined, from liability valuation, to reserving and pricing. I found the exam to be quite a bit more computational than the APC subjects before it, so some comfort can be derived from that. Depending on the question, you may also be able to use the numbers provided in the question as a check for your calculations. If you have studied machine learning in the past, then that will also help you heaps for the pricing section. I found the trickiest part of the exam to be the reconciliation section.

Overall, I felt the exam was very fair.

Concluding Remarks

Thinking back on it, I should have taken advantage of the fact that it was delivered by working actuaries to ask more questions, as ultimately, this is what I am likely to end up doing for a huge chunk of my career. GIP was an incredibly interesting subject, and I strongly recommend taking it.

Breadths and Electives

Contents

COMP10001 Foundations of Computing [SM1]

Exemption status	None.	
Lecturer(s)	Professor Tim Baldwin Nic Geard Marion Zalk Guest lecturers	
Weekly contact hours	3 × 1-hour lectures 1 × 1-hour tutorial 1 × 1-hour workshop	
Assessments	Online worksheets on Grok due throughout the semester 45-minute mid-semester test in Week 6 Individual project, due in Week 7 Individual project, due in Week 9 Individual project, due in Week 12 2-hour end-of-semester exam	10% 10% 10% 10% 10% 50%
Textbook recommendation	None.	
Lecture capture	Full (both audio and video).	
Year and semester reviewed	2018 Semester 1	

Comments

Subject content

- Weeks 1-9: Python
- Week 10: HTML and the Internet
- Week 11: Algorithms
- Week 12: Exam revision

Foundations of Computing assumes no prior coding experience. This semester used Python 3.6 but use of Python 3.0 was acceptable for assessments. The subject used worksheets on an online platform, Grok Learning, to aid with the teaching of Python content. I found that the Grok worksheets were better for learning than lectures as they explained concepts in interesting ways and the questions tested your ability to apply what you may have just learnt. As more ideas were introduced, many of the problems required knowledge of previously taught concepts. The consistent practice meant that I had used the concepts so much that they became second nature. I found the theory taught on HTML and the internet and algorithms quite interesting. Guest lectures were also very interesting, but the technical concepts were often hard to understand.

Lectures

There were two lecture streams for the three 1-hour lectures. Lecture slides were usually uploaded a few days before the lecture. They tended to be quite short with basic definitions and explanations, and some sample code. During the lecture, the lecturers often demonstrated the sample code or wrote more code in a browser. This was usually captured by lecture capture, so students don't miss out by not attending in person. Lectures which taught Python are not too important since the content can be learnt from Grok, but lectures for the rest of the semester are worth attending or watching.

From week 3, one lecture every second week was a guest lecture. Guest lecture slides were uploaded after they had presented since the content was also examinable. I recommend attending them since the guest lecturers are passionate about their respective areas, which makes it easier to remember the content. Every other week had a revision lecture and an advanced lecture running at the same time. The revision lectures were more like consultations while the advanced lectures taught extension work that was not examinable. There's no need to attend these lectures if you're comfortable with the content and not interested in advanced computing concepts.

Tutorials

Tutorials consist of two parts – a one-hour traditional tutorial and a one-hour computer lab workshop. There are no attendance or participation marks, but my tutor had us sign an attendance sheet anyway. He implied that if someone just missed the hurdle for the projects and worksheets component, frequent attendance might get them that extra mark or two.

During the first hour, a tutorial sheet is handed out and students are given some time to attempt the questions before they are discussed and explained. My tutor tried to encourage us to talk to each other and solve problems together, but the effect was limited. The tutorial sheets provided practice for coding on paper and the questions were often similar in style to questions on the mid-semester and final exams. Occasionally, there would also be harder problems or extension problems at the end and I found these hard to complete in the limited time available. Solutions to the tutorial sheets were uploaded to the LMS within the next week.

The second hour is a computer lab workshop in which students can work on Grok worksheets or the relevant project. The tutor and a demonstrator are available to help if you are struggling or want to discuss harder concepts. Although I never asked for help, I went along anyway to allocate a specific hour to Grok and being surrounded by students working on the same thing helped me stay focused.

Assignments and assessments

There are three individual projects that contribute 10% each and 16 Grok worksheets that are worth 10% altogether. There is a hurdle of 50% in the projects and worksheets; that is, you must score at least 20/40 to pass the subject.

The projects consisted of 4-5 individual questions and were marked out of 10 for the code itself, adherence to style and usefulness of comments. Projects were released 2-3 weeks before the due date to provide enough time to complete them. It's important to make use of this time as it takes time to think through why you're stuck or to find and solve any bugs that arise. A practice project was available on Grok so that students could know what to expect but it wasn't marked.

In this semester, Project 1 required two simple functions and the remaining three questions were components of a system that analyses a document and determines the author; Project 2 involved 3 functions to validate plays for a board game and the final question asked for test cases for the functions; and Project 3 entailed validating plays for a card game and writing a program that could play the game, which competed against other students' programs in a tournament. Project 1 was

quite easy and marking on the style and comments was lenient, so 10/10 was common. Project 2 and 3 were significantly harder. It took a while to understand the rules of the games and then figure out how to turn them into code. Project 2 offered a bonus mark to students whose test cases could accurately detect incorrect submissions in a previous question. Project 3 also offered bonus marks through writing a program that could make a play for a modified version of the game. Overall, the projects can be quite time-consuming. I didn't put effort into finding another solution that could make my code more elegant or attempt the bonus question in Project 3; I felt that the time required to possibly gain an extra mark or two was better used elsewhere.

The worksheets were fairly easy and provided good practice. Two or three worksheets were due each week to correspond with the content taught in that week. Doing all 16 worksheets on time is an easy way to guarantee 10%. A 17th worksheet was made available in week 11 for bonus marks (completing all of the worksheet 17 questions would have led to an extra 0.75 marks). It focused on data science and the content was not examinable.

Mid-semester test

The mid-semester test in week 6 was a 45-minute closed-book paper examining content up to the end of week 5. There were 5 questions in the paper, for a total of 45 marks. A sample test and a past test was uploaded to the LMS. The sample test was explained during a lecture and solutions to the past test were available on the LMS. The structure of the paper was consistent with the resources made available. However, the paper in this semester seemed harder. It wasn't hard to pass, but it wasn't easy to do particularly well in either.

Final exam

The final exam was a 120-mark paper that ran for 2 hours with 15 minutes of reading time. There is a hurdle of 50% in the mid-semester test and final exam. Numerous past papers were available on the LMS but I only did those from the past 3 years since older exams were based on older versions of Python. A sample paper with only 60 marks was also uploaded and used as an example for the revision lectures in week 12.

The final exam was very similar in structure to the past papers and the difficulty was similar. Like the mid-semester test, the final exam tests coding on paper, but it also tests theory. The theoretical questions can be tricky as the scope is not just weeks 10-11 and guest lectures – we were asked very basic concepts about Python that were mentioned in the first couple of weeks.

The best preparation for the final exam is consistent practice throughout the semester, by completing Grok worksheets and tutorial worksheets. This will help with understanding unfamiliar code quickly and writing code for new problems more easily. The small amount of theory can easily be memorised.

Suitability as a breadth

Foundations of Computing is a popular breadth for actuarial students. The subject helps to develop problem-solving skills and a methodical approach to breaking down complex problems. I highly recommend this subject if you have little or no experience with coding and enjoy being challenged by logic problems. I would say that it's easier than your average commerce subject and, if you find the content interesting, the work for this subject can be used to procrastinate what you need to do for your other subjects.

Concluding remarks

Hard work pays off in Foundations of Computing. Consistency during the semester is particularly important to doing well overall. The subject content is interesting and makes for a great breadth choice.

COMP20005 Engineering Computation [SM1]

Exemption status	None.
Lecturer(s)	Professor Alistair Moffat <3
Weekly contact hours	3 × 1-hour lectures 1 × 2-hour workshop
Assessments	Mid-semester test 10% Individual assignment 1 due in Week 9 10% Individual assignment 2 due in Week 12 20% 3-hour end-of-semester exam 60%
Textbook recommendation	Moffat, A. (2012). *Programming, Problem Solving and Abstraction with C* (2nd ed.). Frenchs Forest, AU: Pearson Education Australia. ✓ A MUST as it follows the subject closely, and has many examples and exercises for you to peruse.
Lecture capture	Full (both audio and video).
Year and semester reviewed	2018 Semester 1

Comments

Have you ever gotten frustrated at how a subject was structured? The lecture pace was too slow, the content was mainly memorization, and the lecturer was distant and impassive?

Well, Engineering Computation restores hope with the super passionate sassy lecturer, Alistair Moffat (who is probably chaotic neutral), the content saturated lectures, and a holy textbook.

Later in the review, I'll be comparing this subject to the more friendly, but plain and less exciting *Foundations of Computing* with nearly double the cohort of EngComp, but less than half the interest.

Subject content

Following the clear structure of the textbook, Alistair begins the subject with simple background information on computers, programming, types of variables in programming and simple operations you can perform. You then solidify this knowledge through beginning to code simple programs, with plenty of examples being covered in lectures and offered in the textbook exercises.

Alistair then adds to your toolkit of just operations and simple functions in the basic C library by introducing conditional and iterative looping statements (`IF`, `WHILE`, `FOR` statements). This is where the importance of the ability to visualise and apply logic starts revealing itself. And you practice again with plenty of exercises provided in the textbook. The beauty with programming is also that you get to imagine problems to be solved and actually attempt them and implement what you've learnt in creative ways.

The next jump in difficulty (the following chapter in the book) is creating functions of your own. Practice more. And then your world expands again as you learn about arrays, and the genius of data structure hits you. The first assignment tests you on arrays. But it is structures that make you realize the true beauty of programming. And this is when the combination of everything you've learnt, arrays of structures in functions, the complexity of pointers to structures with arrays, reaches a peak. Cue the second assignment.

And now that you've learnt the technical skills and the ins and outs of C, the subject content takes a turn to application of those technical skills.

You learn about the most efficient ways to solve problems to reduce time spent computing (this is covered more extensively in COMP10002 *Foundations of Algorithms*, which you are not allowed to take with EngComp, that also uses the same textbook as EngComp and is taught by Alistair in Semester 2). You also learn about the binary, hexadecimal and what different numbers look like as bits in the computer – this part requires ability to pick up patterns and apply conversion rules.

And that is the story of Engineering Computation.

Lectures

Although it is alright to just watch the lectures online, the lectures are truly engaging as Alistair often demonstrates with his hands and stacks of paper to help you visualize how C works, so I, like everyone else, highly recommend attending lectures.

Though I personally enjoyed the online experience of lecture capture and Alistair's voice at 1.7x speed throughout the semester, in reflection of my entire experience, my verdict is that skipping EngComp lectures and not keeping up with the kar-disiplines is not for the average or just above average student and it's better to play it safe with this difficult subject and doubtfully nice lecturer.

Also, there are plenty of jokes and puns made by Alistair.

Textbook

Prior to the lectures and workshops, it is helpful to have a read through the textbook (an easy read.

The textbook is set up effectively (as expected of a programmer for the writer), each chapter following the other logically and filled with explanations, demonstrations with sample programs and output, and excellent exercises. There are no sample solutions in the book, but Alistair will either provide them on the LMS and/or explain them in lectures, or you can ask your tutor as well.

Workshops

Although attendance is not compulsory, if you need help with doing exercises, have questions about the assignment or just need a time to be disciplined and actually do work, workshops are great. You can also attend other workshops as long as they are not full so be sure to utilize this resource.

(Since I skipped often) *Apparently* the workshops were usually 1 hour of discussion and demonstrations with the class and then 1 hour of coding on your own with an additional tutor. During the period of programming for the assignment

however, the tutors were willing to assist a bit with your program bugs and it was great just working on your assignment then.

Mid-Semester Exam

A 30-minute challenge to look for mistakes in a sample code and write a function by hand. The semester I took it, the mid-semester exam was quite hard, but Alistair compensated by making the rest of the assessments not quite as hard.

Assignments

Both of the assignments this semester were based on sample data, and you wrote a variety of functions to manipulate the data to generate output in different stages.

Key points were to be pedantic about details in the output and the efficiency and logic behind your code. Both assignments punish late starters heavily, so do not leave it till later and you'll be a happy camper.

End of Semester Exam

A 2-hour version of the mid-semester exam, with lines of code to fix and more functions to write out, but it also tests the methods to solve problems taught later in the lectures as well as short answer questions on number representations and pointers.

This semester, there were 3 sample exams supplied so you get ample practice in addition to studying the sample code Alistair provides in lectures and from the exercises.

Comparison to Foundations of Computing

The greatest difference between *Foundations of Computing* and EngComp would be the method of coding.

In EngComp, you are required to use a program called JEdit to write out your code, then compile and run it on a separate program. Even submitting the assignment is much more tedious than just uploading a file (though you learn about connecting servers just through submitting).

However in *Foundations of Computing*, you are guided through a series of online exercises on Grok that tell you what's wrong, allows you to communicate with your tutor, and is much more user friendly.

But do not be daunted by the unfriendly JEdit program or the angry error messages you will receive through Terminal (on the Mac), as in the end coding is simply about what you write and the output generated, and you will get past the unfriendly interface in EngComp. At first glance, *Foundations of Computing* seems easier but it is just as easy to grasp JEdit so this is not something to be taken in consideration when weighing the two subjects.

Additionally, *Foundations of Computing* utilizes Python, a much more beginner friendly language, and C is much more unforgiving in terms of syntax, but like the comparison between Grok and JEdit, the structural difference is secondary to the actual programming done. In addition, learning a harder language to start and building a keen attention to detail and syntax also helps with all future coding endeavours, even if you're just writing code in Matlab.

Ultimately, EngComp is a carefully designed subject that is more than just a subject to add to your list to show that you have done computing, but a subject to show you how fun programming can be. If you know you love a bit of a challenge and learning, EngComp might suit you better.

Final Comments

A really well structured subject that sets you up for certain success if you practice enough and are able to grasp the abstraction and higher level thinking behind coding but to hit the top scores, it still requires a certain penchant and mind for programming.

The quote by Abraham Lincoln – "If I had more time, I would have written a shorter letter" – is truly exemplified in programming.

```
/* Programming is Fun! :) */
```

ECON20002 Intermediate Microeconomics [SM1]

Exemption status	None.
Lecturer(s)	Dr Reshad Ahsan
Weekly contact hours	2 × 1-hour lectures 1 × 1-hour tutorial
Assessments	Tutorial attendance and participation 10% Online multiple-choice test held in Week 6 10% 2 group assignments due in Weeks 5 and 9 2 × 10% 2-hour end-of-semester exam 60%
Textbook recommendation	None needed. The lecture slides are ample study material.
Lecture capture	Full (both audio and video).
Year and semester reviewed	2018 Semester 1

Comments

Intermediate Microeconomics is more or less a bludge subject for actuarial students. Therefore, it is a good option to take as a Commerce elective for those set on the path of actuarial studies. Compared to your other second year subjects, this one will feel somewhat like a breeze, and you will likely feel like you're not learning anything new from week to week. If you think you would enjoy a more calculus/maths focused version of *Intro Micro*, then this subject is for you.

Subject Content

Supply and demand (Lectures 1 and 2) — A review of *Introductory Microeconomics*, which covers basic theories taught in first year.

Consumer preference (Lecture 3 to 6) — An in-depth look at optimal baskets of utility through indifference curves and budget constraint.

Individual demand (Lecture 7) — Income and substitution effects; the impact on the optimal basket if income changes.

Consumer preference over time (Lecture 8) — Consumer choice while factoring in inflation over time.

General equilibrium (Lecture 9 and 10) — What happens when two firms' prices of two goods affect one another? A look into Pareto efficiency and Edgeworth boxes.

Uncertainty (Lectures 11 and 12) — Consumers' preferences based on expected values of risk-taking baskets.

Production functions (Lectures 13 to 18) — A deeper look at firm profits, revenues and costs taught in Introductory Microeconomics.

Monopoly and oligopoly firms (Lectures 19 to 22) — Price setting and social costs with monopoly and oligopoly markets.

Review (Lectures 23 and 24) — A review of selected lectures in the semester.

Lectures

Whilst I attended a sparse number of lectures, Reshad made it very clear from the outset that he would make the lecture slides as self-sufficient as possible. This ended up being the case, as the lecture slides themselves were enough to teach me the whole course, with added examples.

The concepts taught in this subject are in general simple enough to understand without having to attend every lecture, however, it is still best that you attend. That being said, I did resort to the lecture capture whenever there were more confusing elements of the subject, wherein the slides themselves weren't sufficient, but this scenario was rare. Whilst I did not attend many lectures, it did not affect my progress, as lecture slides were sufficient when it came to learning content.

Tutorials

Similar to first year *Introductory Microeconomics*, the tutorials are marked for both attendance and participation, including pink and blue sheets for your revision. My tutor was charismatic and a clear explainer of the economic concepts and kept me on top of things throughout the semester. At the beginning of your 1-hour long tutorial, you'll receive a pink sheet of a few questions to attempt with your peers, for in-class reviewing before the end of the hour. These questions serve as a good indicator of your success in the subject, so, participate and complete all the worksheets, as they are valuable resources at your disposal. My pre-tutorial work was not marked, but that might not be the case for all tutorials.

Assignments

The two assignments were distributed with ample time to complete them. They both had only one or two questions; extended questions, however, with multiple parts to each. These assignments weren't exceptionally difficult, and with solid calculus skills, you should be fine. Give yourself a few days to attempt them, as they can be monotonous and filled with "reading comprehension". As previously stated, the assignments are both group assignments, with a maximum of four people per group, and only with people from your tutorial class. Therefore, I would highly advise that you sign up for this subject with good (smart) friends in the same tutorial group.

Mid-semester test

The mid-semester test, or as they like to call it, the "within-semester test", is a simple ten-question online multiple-choice test that should take about 20 minutes to complete. The questions are each simplistic, and honestly, without any second-year knowledge, you should be able to figure the answers out. The questions of your online test will be slightly different from other people's, but don't ask me how I know. With sufficient preparation, this online test should be a pebble on the side of the road.

End of semester exam

The two-hour exam at the end of the semester may be daunting at first, but you'll be missing this subject's exam as soon as *Probability* rolls around. Just like in first year, the final exam is split into three sections: sections A, B and C. Section A is a ten-question multiple choice section, where each question is worth two marks each. Sections B and C are both worth 40 marks each, and each contain two extended response questions. The exam was very similar to the past exams, in that

for sections B and C, the number of unique questions they could ask is pretty much equal to the number of questions they actually ask. That is to say, with good revision and attempts at the past exams, you'll find this exam a breeze. For my exam, even just between sections B and C, the questions were repetitive.

Exam preparation should entail completing the two past exams they give you and checking solutions afterwards. If that's not enough, then complete all the tutorial questions. With an adaptable intellect, this subject is conquerable. Best of luck!

FNCE20005 Corporate Financial Decision Making [SM1]

Exemption status	None.
Lecturer(s)	Professor Chander Shekhar
Weekly contact hours	1 × 2-hour lectures 2 × 1-hour tutorial
Assessments	Mid-Semester Exam in Week 8 20% Tutorial Participation 10% 3-hour end-of-semester examination 70%
Textbook recommendation	Peirson, G., Brown, R., Easton, S., Howard, P., & Pinder, S. (2014). *Business Finance* (12th ed.). North Ryde, AU: McGraw-Hill. See Textbook Section below for more comments.
Lecture capture	Full (both audio and video).
Year and semester reviewed	2018 Semester 1

Comments

This subject is a core subject that leads 3rd year Finance subjects and ultimately a Finance major, though you will not be able to achieve all the actuarial exemptions if you pursue that major.

Subject content

The pace and structure of the subject is very similar to *Principles of Finance* and *Accounting Reports and Analysis* (ARA), which you would have already taken in first year.

It has a very clean structure as each week you will cover different topics, with some major topics such as Advanced Capital Budgeting broken down into further sub-topics, so that the content covered each week is consistent and the order of the topics also flows logically. In addition, as you would have covered many of the topics in *Principles of Finance*, ARA, *Introductory Financial Accounting* (IFA) and *Introduction to Actuarial Studies*, it makes learning the subject quite easy.

Lecture Breakdown

1. Payout policy
   - Dividends vs. share buybacks
   - M-M irrelevance Theorem
   - Covered in *Principles of Finance*
2. WACC and capital structure policy
   - How to calculate WACC
   - How capital structure affects WACC
   - Covered in ARA
3. Adv. Capital Budgeting: Assessing projects NPV
   - How to do annuities and compare NPV

    - Covered in *Principles of Finance*, *Financial Mathematics I*
    - As an actuarial student, this should be the easiest part.
4. Adv. Capital Budgeting: Sensitivity, Breakeven, Decision Tree Analyses
    - Covered in IFA
5. Raising capital: Equity
    - How companies increase equity
    - Basics covered in ARA
6. Raising Capital: Debt and Leases + non assessable Guest Lecture
    - How companies increase debt
    - Basics covered in ARA
7. Mid-Semester Exam
    - Details below
8. Adv. Capital Budgeting: Real options
    - This was an interesting topic, as they altered the very mathematical call and put options in Principles of Finance and applied the concept of an "option in the future" to a management point of view regarding integrated future options within projects that may change NPV.
    - Based on topics covered in *Principles of Finance*
9. Analysis of Takeover I
    - Around week 9 is when you start learning new things, such as how a takeover can affect capital structure, efficiency and accounting ratios of a company as well as the NPV considerations behind a takeover
10. Analysis of Takeover II
11. Corporate Restructuring + non assessable Guest Lecture
    - Based on the subsidiary topic covered in ARA
12. Risk Management
    - How to reduce risk in projects, to increase project NPVs and firm value

As seen in the lecture breakdown, there are very few foreign topics covered in Corporate Financial Decision Making. The subject elaborates further on topics you have already seen, sometimes by showing a new mathematical technique (e.g. to compare mutually exclusive projects with unequal lives), or applying it to an intuitive managerial approach.

Chander frequently emphasizes the human side of management (like Noel does in ARA for accounting) but this intuitive material comes with quite a bit of memorization of how shares' initial public offerings are executed, how the PE ratio of a merged company is calculated, etc. Therefore, if you didn't enjoy the memorization and dry overload of information that happened in ARA, you may not enjoy that aspect of Corporate Financial Decision Making.

Lectures

Essentially the same as the ARA lectures, lasting for 2 hours in Copland Theatre (at least in this semester), but without the Noel's humour. However, Chander often tries to end his lectures early and when there are the non-assessable guest lectures, you know what option you have ;).

In addition, watching the lectures online is also an equally viable option, with no particular negative sides except for needing the discipline to keep up with lectures.

Mid-Semester Exam

Although the topics covered in the multiple choice mid semester exam were relatively straightforward, there were a few points to note:

They took the "none of the above" answers another step further and had options such as:

d) More than one of the above
e) None of the above

d) a) and c) are true
e) a), b), and c) are true

In addition, there were 20 questions on the exam, and it's worth 20% so 1 question = 1 subject mark :)

If you study enough to be sure of yourself, you will not be daunted by the structure of the mid-semester exam, as the theory tested is straightforward and familiar.

Tutorials

There is a participation mark for tutorials, and although you may groan, it is quite simple to earn those marks. There are pre-tutorial questions that you need to try, and once you have proved that you have tried and handed in the sheet, you have already earned the mark and how you utilize the tutorial time is up to you ;)

The pre-tutorial questions are quite straightforward and force you to keep updated on lectures (or learn to glean the minimum for lectures to barely prove you have tried).

Textbook

Some of the questions will be based from the textbook, which is the only time the textbook was truly required.

The textbook does explain the lecture material clearly, however is not directly aligned with the lectures and has a lot of additional material, which is excellent for additional learning (like the guest lectures).

End-of-Semester Exam

Very reminiscent of the ARA exam, with the pedantic accounting calculations replaced with straightforward calculations from formulas (that you do not need to memorize since there is a formula sheet provided...) and annuity calculations (yay actuarial students' favourite).

The multiple-choice section is in the same, tricky, wordy style of the mid-semester exam.

Final Comments

Though it wasn't the most interesting subject to study, it was well-structured, encouraged participation, and good marks as well. If you enjoyed the straightforwardness of ARA or *Principles of Finance*, you will also enjoy Corporate Financial Decision Making.

JAPN10001 Japanese 1

Exemption status	None.
Lecturer(s)	Ms Masako Nagayama
Weekly contact hours	2 × 2-hour seminars
Assessments	5 Fortnightly Quizzes 5 × 3% Oral Assessment in Week 6 and Week 11/12 20% Cultural Discovery Project, due in Week 12 15% 2-hour end-of-semester examination 50%
Textbook recommendation	Banno, E. (2011). *Genki 1 Workbook: An Integrated Course in Elementary Japanese*. Tokyo, JP: Japan Times. ✓ The textbook was necessary to follow along with content in seminars, and to also study in preparation for all assessments.
Lecture capture	None
Year and semester reviewed	2018 Semester 1

Comments

This subject is intended for students undertaking Japanese for their first time. Although the pace of this subject is fast, it is reasonable to keep up, as long as persistent effort is put in throughout the semester. This subject is a great breadth as it gives a good foundational insight for students interested in learning Japanese and learning aspects of Japan culture.

Subject content

- Week 1-2: Lesson 1 - Self-introduction, Time & numbers, Hiragana
- Week 3-4: Lesson 2 - Shopping, Dining, Katakana
- Week 5-6: Lesson 3 - Daily Routines, Invitations, Kanji
- Week 7-8: Lesson 4 - Locations, Talking about past events and habits
- Week 9-10: Lesson 5 -Travel, Interests, Likes & Dislikes
- Week 11-12: Lesson 6 - Requests, Permissions, Rules, Directions

Seminars

Seminars consisted of two 2-hour classes each week. A chapter of the Genki textbook was covered every 2 weeks, meaning chapters 1-6 of the textbook were covered for this subject in the semester. At the end of every 2 weeks, a quiz worth 3% was held in class covering the chapter learnt. The teachers covered weekly seminar slides in conjunction with the relevant chapter in the textbook. I found that the speed was well-paced, and although it seemed fast at times, it was sufficient if you had reasonably prepared and studied after the class each week. There was around 20-30 students in a seminar which made learning with the teacher more personable and interactive. There were also many pair work activities

involved to practice communicating and get a better grasp of language nuances and appreciate the intricacies and cultural aspects of the language. Because the classes were of smaller size, this made classes more enjoyable by getting to know your teacher and other students better, allowing better personalised feedback on your performance in quizzes and progress in verbal communication.

Assessments

The fortnightly 3% quizzes were emphasized not to be a big deal if you did not do well since they were worth very little by the teachers. However adding up to 15% altogether made it worth a significant amount over time. They each consisted of a listening component, where sentences read out had to be recited into Japanese, and writing/grammar components, where sentence structures, grammar and character recollection were tested. Again, these tests were not very difficult as long as you adequately revised the chapter for that week.

There were also 2 oral assessments worth 10% each which comprised of a script having to be written and memorised by you and a partner. These were performed in front of your class with your teacher marking your ability to hold a fluent conversation with your partner. At the end of the second oral assessment, a cultural discovery project had to be completed where you and your partner analysed the content of your script in reference to Japanese culture and in comparison against other foreign cultures. Both of these assessments were not that difficult to complete as the Japanese department gave well-written guidelines on how to complete the tasks.

End-of-Semester Examination

The exam was a 2-hour reading and writing exam which was worth 50% of your total grade. Prior to the exam, a document was given detailing the type of format that may be encountered for each question in the exam, which was very useful in thinking about how to approach your revision. However, I expected the exam to be very similar to the weekly quizzes done in class, and therefore found that the exam was much more difficult than my initial expectations. Although the exam was still doable, it involved a heavy amount of reading short passages and answering questions to them, which was not covered nor practiced much in class. The textbook briefly covers this in the Kanji practice sections which is well-worth revising over. Apart from this, the time limit was very reasonable to give each question an adequate amount of time to answer.

Concluding Remarks

Overall, Japanese 1 gives you a wonderful introduction to the foundations of the language, and to learn about the cultural and social aspects of every day Japanese conversation . I found it to be an enjoyable breadth as the lessons/assessment requirements were very well-structured and detailed.

MAST90082 Mathematical Statistics

Exemption status	None.
Lecturer(s)	Liuhua Peng
Weekly contact hours	3 × 1-hour lectures
Assessments	2 individual assignments 2 × 10% 3-hour end-of-semester exam 80%
Textbook recommendation	Casella, G., & Berger, R. L. (1990). *Statistical Inference* (2nd ed.). Belmont, CA: Duxbury Press. Hogg, R.V., McKean, J., & Craig, A.T. (2013). *Introduction to Mathematical Statistics* (7th ed.). Upper Saddle River, US: Pearson Education. Lecture notes are sufficient for this subject, but the lecturer regularly refers to the Casella and Berger textbook. You may want access to the textbook to explore concepts deeper.
Lecture capture	None
Year and semester reviewed	2018 Semester 1

Comments

Mathematical Statistics is one of the more common electives for students who are doing the Master of Commerce degree majoring in Actuarial Science. Also it is a pre-requisite for some other electives listed in the study plan. It extends on topics covered in MAST20005 *Statistics*, but it goes deeper, and some topics are not easy to understand.

Subject content

Statistics is about using data available and fitting it to a probabilistic model. Doing this course, students should gain a deeper understanding of the principles of mathematical statistics and some of its important applications. Its content is divided into three chapters:

- **Chapter one – point estimation**

  This chapter introduces the idea of point estimation, including Method of Moment Estimators (MME), Maximum Likelihood Estimation (MLE), Uniform Minimum Variance Unbiased Estimators (UMVUE), Bayes Estimator, etc. Some of them you will have been exposed to before, however, this subject will go more in depth – introducing and applying properties of those point estimations.

- **Chapter two – hypothesis testing**

  Hypothesis testing has been used a lot in MAST20005 *Statistics*. In this chapter, we will understand the fundamental idea of hypothesis testing. The main tests we apply here are the Most Powerful Test (MPT), Uniformly Most Powerful (UMP) test, Likelihood Ratio Test (LRT), and Bayes tests. In addition, various theorems and lemmas are introduced to find the required tests.

- **Chapter three – interval estimation**

This is the last topic, which is based on chapter two – hypothesis testing. After a brief introduction to interval estimation, we will learn four main approaches – namely inverting a test, pivoting the CDF, pivotal quantities and Bayes intervals. The course ends up with evaluating interval estimators.

Based on the course structure, it may seem that there is not much content in this course. However, the workload is indeed quite heavy. You will be required to do lots of proofs, so a good understanding of theorems and lemmas is very essential.

Lectures

This is the first year that Liuhua Peng taught this subject. As a result, the whole course was delivered in quite a different way from previous years – for example, a relatively large change in its structure. Moreover, there was no recording for this subject before, while now you have full access to both audio and video recordings.

Liuhua wrote all of his notes on his tablet and students are expected to print out the lecture notes beforehand and follow him in the lecture. Although the lecture is recorded and annotated lecture notes will be uploaded onto the LMS after each lecture, attendance is recommended as it is a great opportunity to interact with lecturer.

There is no tutorial or workshop for this subject. Also, no exercises will be given throughout the semester, except the pre-requisite questions at the start of the semester and revision questions at the end of the semester. However, the lecture notes do contain some examples and exercises and if you want more questions to practice, the textbook is a good resource.

Liuhua has a three-hour consultation every week so you have enough time to discuss with him if you have any problems with the lecture material.

Assignments

There are two assignments due roughly in week 7 and week 12 of the semester, each worth 10% of the overall mark. The first assignment covers content from chapter one mainly and the second assignment covers the rest.

These assignments were incredibly long, with 15-20 questions, including some optional questions. Some questions are pretty challenging and time-consuming. Unlike most other maths subjects, all questions in each assignment will be marked including optional ones. Marks for optional questions will be added on as a bonus mark but the total mark is restricted to 10. Overall, students did pretty well in assignments – quite a lot of students achieved full marks for both assignments.

Given that no additional tutorial questions were provided, the assignment is really good practice – in fact it was the only source of exercises. It sometimes gave tips for final exam.

End of Semester Exam

The exam is a standard three-hour exam that you would expect from the mathematics department. Students are allowed to take in two double-sided handwritten or printed A4 cheat sheets. However, calculators are not permitted. Putting in every single definition, theorem and proof in as small of a font as possible is not recommended. The cheat sheet should just cover main theorems, results and lemmas to make it easier for you to find what you need in the exam.

Because this was the first time Liuhua taught this subject, and the course structure has been changed quite a bit, past exams may not be a good indicator for the exam. You may see some past exam questions testing on material that are

not covered in this subject. Therefore, assignments are the best resource for your revision. Liuhua provided a revision question set by the end of the semester to assist your revision – some questions are very challenging though.

Liuhua runs regular consultations every week during the whole revision period, so you should have enough opportunities to ask as many questions as you like.

Overall, the level of difficulty for the final exam was reasonable. You only have three to four questions to do in three hours (I had three questions in my exam) and they are all standard questions. Personally speaking, the final exam is relatively easier than the assignment questions. Students generally did well.

Tips for Success

Lecture material is generally delivered clearly through demonstration of examples and proofs. While watching at the lecturer do the questions and understanding the methods may seem quite easy, it is strongly recommended that you go through proofs by yourself. Once you start to work on questions by yourself, you may find it harder than expected. If you simply look at the course structure – only three chapters, you may think the contents are not much. But in fact, the workload is quite heavy – too many theorems and proofs. A reasonable amount of time should be spent on this subject and this will make the content eventually manageable.

The cheat sheet does take a long time to prepare, however, it is worth the time you spend as a good summary will help you a lot in the final exam. Silly mistakes do occur, so do not rush in the exam – the time given should be enough.

MGMT30017 Global Managment Consulting [JUL] — Berlin

Exemption status	None.	
Coordinator(s)	Dr. Tine Koehler (Subject co-ordinator and person in charge for the Berlin program)	
Weekly contact hours	1 full day pre-departure seminar in week 12, and variable working hours during the in-country period depending on your host company	
Assessments	Team presentation & 1000-word report (Due end of 2 week in-country period) 5000-word full team report (Due 1 month after in-country period) 2000-word reflective individual essay (Due 1 month after in-country period) Peer review assessment (Due 1 month after in-country period)	40% 30% 20% 10%
Textbook recommendation	None. Some resources will be uploaded to the LMS.	
Lecture capture	N/A	
Year and semester reviewed	2017 July Term	

Comments

Global Management Consulting (GMC) is a commerce capstone subject. The basic idea is that instead of going to lectures and sitting exams, you go overseas and work with a real client on a real project for two weeks with a team of other highly-capable students, and you have to deliver an end-product. You will be assessed on the quality of your deliverables and your ability to work with others in a team.

Application Process

In my year, the application consisted of an academic transcript, a resume and a questionnaire, which includes a personal statement. Every city has a quota of 20 students, and they selected 50% above the quota of students to progress to the interview stage. In my year this meant the top 120 students by WAM were selected to progress to the interview stage. The cut off was 73.067 (yes, this was verified with the admin), and if you don't meet this they won't even bother looking at the rest of your application. That being said, my WAM was just below this cut off, as was another student who was ultimately selected for the program. Let's just say we were a bit proactive in our approach. It is in part because of students like us that I think they have modified the selection process for next year (2018). Check the GMC Handbook link and website for exact details as they are subject to change, but I believe they have lowered the cut off to 65.

Scholarships and costs

You will have to pay the usual subject fee and an additional "GMC subject cost" of around $1500, which covers accommodation, travel insurance and some basic sightseeing tours. You will have to pay for your own food and travel.

This review was previously published in the 2017 end-of-year edition of the *Actuarial Students' Society Subject Review*.

You may be eligible for the Global Scholars Award of $1000. Application outcomes are generally lenient and are based on your WAM. You are automatically selected if you had an ATAR of over 98.

The FBE also selects 1 candidate per city to receive the FBE travel grant of $1500. This will be based on how well you perform in the application process. All applicants are automatically considered and you do not need to apply.

You can find more information here: Scholarship Link

Pre-country period

You will be required to attend a full day pre-departure seminar in week 12. There will also be some information sessions regarding travel and accommodation arrangements. These sessions are optional but highly recommended. You are free to travel before and after the designated in-country period as you wish, as long as your subject co-ordinator is aware of your travel plans. Unfortunately I had an exam scheduled to the last days of the exam period so I could only squeeze in 4 days of travel, but had a blast in Italy and the Vatican.

In-country period

I only found out about my team and client 3 days before the designated in-country period of 2 weeks, but you should normally expect to receive this information sooner. I was in a team with a high school colleague heading into investment banking, an accounting student with an active interest in aerospace engineering, and a second accounting student. We were allocated MTU Maintenance, an aircraft engine maintenance company. They were a relatively smaller player in the world of aircraft engine maintenance, repair and overhaul (MRO), and they gave us a real project they wanted to work on for a long time but never had the time to. Due to our non-disclosure agreement, I can only tell you in basic words that we were tasked with curating a database and providing insights and recommendations based on the data. Given that my background was in data analytics, this got me very excited. I won't go through too much about the work process, but what I can reminisce on is that we had a relatively chill time compared to the other teams. We encountered daily technical roadblocks and sometimes we just left early because there was nothing we could do until it was resolved the next day. I spent many evenings sightseeing and socialising with other students from other teams with no worry about not finishing our task in time. Not saying our task was easy, but it was highly technical and very specific. The teams that had to work overtime usually had very broad time-consuming tasks, which is challenging in a different way.

It is important to use the skills of every single member of the team. While I was good with the whole excel and database building business, I needed the skills of the investment banker to recommend technical workarounds when some roadblocks were unsolvable, and to make sure everything looked pretty and presentable. The Chinese students were also excellent at market research. The insights they pulled out went so far beyond the data and it honestly blew my mind. This project cannot be done by yourself. You cannot carry the team even if you want to. Be open to ideas from everyone and resolve conflicts quickly if there are any.

Post-country period

The presentation and immediate deliverables (slides and supplementary materials) were completed in the country, but the final full report, self-reflective piece and peer review assessment are due around 1 month after you leave the country. It may sound like a lot of time, but usually the team energy drops after the team disperses. Two of my teammates went on exchange and the third went travelling, so we all took a step back and really came back together pretty late on Google

Docs to complete the report. It was really hard to keep the energy up if you're all so far away from each other, so please be considerate with your travel plans. Don't be that guy who goes to Nepal for a spiritual escape and becomes unreachable until 4 days before the report is due. There is still substantial work to be done.

Final Comments

This was by far the best subject I have done at the University of Melbourne. I learnt from this subject that I was far better at working than studying. If you enjoy practical hands-on work, you will love this subject. Travel geeks out there will also love how this subject gives you the opportunity to travel. Tips for doing well in this subject:

- Be open to new ideas. Students selected for the GMC program are generally very remarkable. They're usually very unique individuals with thoughts and ideas that are very different to yours. Be open to trying new things even when they challenge your own technical specialty. It has the potential to absolutely revolutionise your deliverables.
- Socialise. You will be working in the same team for 2 weeks and you must hit the 'performing' stage as a team if you want to do well. Socialising is the basis for you to find that connection and get that energy rolling. Also socialise with those outside your team. It might sound weird but spending time with other very driven high-energy individuals allows some of that energy to rub off on you as well.
- Ask. You only have 2 weeks to finish this project. If you have a question, ask. You don't have all the time in the world to figure out everything. You might not even have enough time to figure out all of the important bits. Find out what you don't know, find out what you need, then find ways to get them. That is all I can say.

MGMT30017 Global Managment Consulting [JUL] — Shanghai

Exemption status	None.	
Coordinator(s)	Jill Lei (person in charge for the Shanghai program)	
Weekly contact hours	1 full day pre-departure seminar in week 12 Full-day attendance for 10 days at the host company internationally (70 hours) 2-hour de-briefing session after returning	
Assessments	Team presentation & 1000-word report (Due end of 2 week in-country period) 5000-word full team report (Due 1 month after in-country period) 2000-word reflective individual essay (Due 1 month after in-country period) Peer review assessment (Due 1 month after in-country period)	40% 30% 20% 10%
Textbook recommendation	None — there's no textbook for a work-experience project.	
Lecture capture	N/A	
Year and semester reviewed	2017 July Term	

Comments

Disclaimer: To enrol in this subject, you must have completed

- MGMT20001 *Organisational Behaviour*; and
- a minimum of 175 total accumulated subject credit points at commencement of the subject.

You must also receive permission from the Subject Coordinator via selection process.

Late night drinks, Maccas at 2am in the morning and a lot of networking. No other university subject offers anything close to this experience — an intense, two week course where you bond quickly with your teammates, enjoy Shanghainese night life and create a 5,000 word report + PowerPoint Presentation.

It is also one of the best ways to get a taste of management consulting, given that your advice and feedback will be actively considered by the firm you are working with. I should note early that this is the **most intense** subject I have personally encountered during university as well — if you are not someone who deals with stress or late nights well, you may need to reconsider selecting this subject.

It was not only a rewarding experience, where I was able to work in another country as a 'real' consultant, but also one of my most memorable times at university. Whether it was the late nights working with my team on finishing up our deliverables, or the 2am mornings drinking and staying up late with the rest of the students, this is something that will stay with me for a long time.

The friends I made on this journey I still talk to, as we bonded over good food, great drinks and just a good time in Shanghai, in my opinion, a symbol of Chinese economic might and prosperity. The subject coordinator, in our case Jill, acts as the advisor who mediates and provides ongoing feedback. In my opinion, the Shanghai experience was significantly enhanced

This review was previously published in the 2017 end-of-year edition of the *Actuarial Students' Society Subject Review*.

due to Jill's efforts with each team. She was honest in her advice, experienced in her approach and always available for a chat, even at 2am in the morning if situation was dire.

I would recommend anyone who has space in their undergraduate degree to seriously consider this subject, because it honestly reshaped my perception of working life and what areas/industries I may work for.

Subject Content

When enrolling in this subject, you can choose to go to Berlin, Seoul, Shanghai and Singapore. Depending on the time of year, there are different quotas — January and November have quotas of 40 students, while July has a quota of 80 students.

Rather than writing a TripAdvisor review on why Shanghai is such a great place to be (not biased at all), some opening thoughts on what makes Shanghai such an interesting place to experience the Global Management Consulting subject, while giving some tips on how to get the most out of your time in Shanghai.

The majority of individuals in Shanghai do not use cash as their preferred method of payment. Substitutes that are widely used are WeChat Pay, Alipay or the consolidated company Royal Pay. Due to changes in China's regulatory system, a Chinese bank account is now required to open an Alipay or WeChat Pay account.

As of 1st July 2017, it is very difficult for foreigners to open a bank account in China with one of the Big Four Chinese Banks, being Industrial and Commercial Bank of China, China Construction Bank, Bank of China and Agricultural Bank of China. Instead, smaller banks include China Merchant's Bank, which is (as at December 2017) still open to foreigners who seek to open a bank account in China.

China's public transportation system is quite congested, with the Shanghai Metro (subway system) being the predominant method of travelling. It is significantly faster and more punctual than Melbourne's Metro, with trains arriving almost every minute.

The Chinese equivalent of Uber, known as DiDi Chuxing is quite easy and flexible to use, but is not as reliable as Uber in Australia, as demand for taxis usually outstrips supply. Taxi prices were generally around 1/4 the price of Uber's in Australia.

Download the University of Melbourne VPN on your phone and laptops. This is imperative, or you will not have access to Google, Snapchat, Facebook, Instagram, Whatsapp at all during your time in Shanghai.

Team

The quota of 20 students per country roughly translates to 4 people per team, with 5 teams in each country.

Teams are assigned based on previous experience and degree majors, to ensure there is a mix of skills and backgrounds.

Industries

The Shanghai experience included a diverse range of businesses that ranged from industries in Real estate and property development, health and well-being, marketing, supply chain and logistics.

Our team worked in the real estate and property development industry, which was both insightful and open in terms of our learning and experience, given none of us had any experience in real estate prior to the project.

Management Consulting

As part of the subject, you will spend 10 days embedded within the firm you are consulting for. Your team will need to create a project scoping document, project plan and timeline to map out what the final deliverable to be provided to the client would be. Naturally, the subject coordinators will be there to help, and are extremely helpful, but you will be relying on your team to develop and provide most of the documents.

Believe me, you will quickly realise whether or not there is anything you dislike or find irritating about team members — I would highly recommend trying to reconcile differences or issues, rather than letting them fester early on, because they can significantly affect the output of your team.

Consulting itself is quite broad, so you may find a variety of different tasks depending on which team and client you are working for. For example, our team's project was more on the cost-side, with a creative design component and plenty of financial modelling (it was my first time using a Chinese-language financial model!). For other groups, some needed to conduct surveys to draw recommendations from while others had to look for supply chain optimisations.

Team Presentation

The team presentation is the culmination of the 10 days you spend in Shanghai, as your team will need to present in front of clients your key findings and recommendations in a short 10 minute presentation, with 5 minutes allocated afterwards for Q&A.

This is easily one of the most stressful parts of the entire course — it is basically a crash course case competition except that you are presenting to actual clients who understand their business, and can easily tell if you have no idea what you are talking about. Believe me, some clients will call you out if you overstep your boundaries in terms of understanding or awareness, so it is always a good idea to check with Jill, the subject coordinator of your ideas.

Generally, teams were well-balanced to have at least one or two individuals who were proficient in PowerPoint.

Reflective Essay

I would highly recommend keeping a journal of what your experience in Shanghai on a daily, or twice-weekly basis, so you don't forget everything when you come back to write the reflective essay.

Peer Review

Make sure you worked out all the disagreements with your teammates, this part can easily turn ugly when things don't work as well as expected.

Team Essay

The 5,000 word essay may seem challenging, however remember that you have already created a detailed PowerPoint and have hopefully kept all of the information you used to research your recommendations during Shanghai. This makes writing the team essay more of a process of refining the research and recommendations, rather than creating an entirely new document from scratch.

Concluding Statements

Global Management Consulting is one of the most challenging experiences in university. This should not deter anyone from applying for it — the application process is a group interview, where you may asked difficult or thought-provoking behavioural questions. As it is one of the only times during university where you will be able to experience practical learning in a commercial environment, I would highly recommend at least checking out this subject.

SCIE20001 Thinking Scientifically

Exemption status	None.	
Lecturer(s)	Professor Andrew Drinnan	Professor Ian Gordon
	Dr Sue Finch	Dr Jenny Martin
	Dr Heather Gaunt	Dr Charles Robin
Weekly contact hours	2 × 1-hour online lecture(s)	
Assessments	3 × Online quizzes	16.7%
	4 × Module assessment tasks	4 × 16.7%
	Take-home exam	16.7%
Textbook recommendation	None — there are various website links throughout the semester that are recommended readings, and I found them interesting and helpful for the assignments.	
Year and semester reviewed	2017 Semester 2	

Comments

Originally, I picked this subject because it was heralded as a great 'wam booster'. However, the more lectures and assignments I did, the more genuine interest I had developed about this subject and its content. The 4 different topics covered in the subject are not hard, but still offer an interesting take on how various topics are explored in the scientific community.

Subject Content

Introduction

The first 2 weeks cover the basic idea of what science can be defined as, and how it fits into the subject. Ideas such as the scientific method, critical thinking, and several approaches are introduced, and extra reading in the form of blogs and videos are given as an optional enhancement. Though the extra resources given do not directly help you achieve a better score, they are often times still interesting, and will enhance your knowledge, so it is worth the time.

Science communication

This topic was about conveying scientific research and jargon to the general public effectively. Certain aspects regarding the assessment in this subject is somewhat difficult, but I enjoyed the creative element of writing a blog, rather than an essay, as the final assignment. It allowed me to explore a broader range of media in my research, or cast my net more widely, so to speak. Having the freedom to use sources that would be unavailable (or more restricted) in other forms of assessment was deeply beneficial to my own study.

Observation

In this topic, we learned about making unbiased and impartial decisions in the world of science. To be honest, I enjoyed this topic the most. The concept of bias in science and media is something that has always interested me, and is especially relevant in this current political climate. Nowadays (and perhaps in the past as well), it has become increasingly difficult

This review was previously published in the 2017 end-of-year edition of the *Actuarial Students' Society Subject Review*.

to discern truth from fiction. Given the rise of "alternative facts", I believe the general community should always be vigilant when consuming media, and always attempt to find the truth in the information they receive. In this regard, science may be the last bastion in the pursuit of neutral and unprejudiced knowledge. In our assignment for this topic, we were given the classic painting 'Shearing the Rams', by renowned Australian artist Tom Roberts. We had to make unbiased observations of the painting, from which an individual could replicate the image without seeing it, or having any prior knowledge of it. This was trickier than it seemed; the assessment demonstrated to me that our everyday observations are intrinsically biased. Describing the painting in an impartial (or scientific) manner was difficult – it revealed to me the nature of observation, and the lens in which we perceive things through.

Thinking with data

Relative to the other areas of study, I found this topic to be the most confusing. The topic was divided into several subsections, including statistics, graphing, sampling, p-tests and tables. The lectures cover all the topics to a conceptual extent, but the assignment in this module has more difficult questions that stretch the scope of the topic, and, in my opinion, is the hardest test in this subject. The 3 online quizzes are focused on this one topic, with each quiz testing a different aspect of thinking with data. In addition, there is an assignment to make a PowerPoint explaining and outlining the effectiveness of Lamarckian theory etc. which requires graphing making, logical reasoning and comparisons. I am unsure whether the topic for PowerPoint remains constant, but pre-reading on these topics will help you understand and draw better conclusions in this module.

Science in the media

This was the last topic of study, and it was also what the exam is mainly based upon. Science in the media discusses how to think critically about Science as it is presented in the general media. For example, common critiques such as factual errors, incorrect statistical interpretation, or over-simplification are explained and then tasked to us to find in some sample articles. This topic exposes the biases within the scientific community caused by biased funding or just ignorant journalism. The assignment for this module involved reading 10 different online science articles and identifying whether they are rigorously written. Afterwards, we were to pick one biased article, and write our own objective article based off the original study. It was harder than expected to remain completely objective in the writing process, as there are many subtle mistakes that could have been made, such as incorrect connotations and careless interpretation of facts.

Exam

The take-home exam was due to be submitted online about a week in to the exam period, plenty of time to write the 1000 word response required. There were no past exams on the lms for reference, but I assume the format is consistent: you are given a recent scientific event/discovery/topic and a series of articles discussing it. After reading all the different viewpoints regarding the topic, 2 questions, 500 words each, are given regarding the legitimacy or controversy of the topic. This is really a test about reading comprehension, critical thinking about sorting through large blocks of information, but was not very hard.

Overall, I enjoyed this subject's interesting content, and the topics are not time consuming nor overly confusing. I would recommend this subject for anyone looking to try something new and low stress.

Subject Review Index

This section serves as an index for each subject review across all the different editions of the *Actuarial Students' Society Subject Review*. Blue numbers indicate a new review for that edition.

Table 1: Core Subjects

Subject Code	2015 Start	2016 Start	Mid	End	2017 Mid	End	2018 Mid
ACCT10001		1	1	1	1	1	1
ACCT10002	2	2	2	2	2	2	2
ACTL10001	2	2	2	2	2	2	2
ECON10003		2	2	2	2	2	2
ECON10004	1	1	1	1	1	1	1
FNCE10002					1	1	1
MAST10006		1	1			1	2
MAST10007			S	S		2	2
MAST10008	1	1	1	1	1	1	1
MAST10009	2	2	2	2	2	2	2
ACTL20001	1	1	1	1	1	1	1
ACTL20002	2	2	2	2	2	2	2
ECON20001	2	2	2	2	2	2	2
MAST20004	1	1	1	1	1	1	1
MAST20005	2	2	2	2	2	2	2
MGMT20001		2	2S	2S	1	1	1
ACTL30001	1	1	1	1	1	1	1
ACTL30002	1	1	1	1	1	1	1
ACTL30003	2	2	2	2	2	2	2
ACTL30004	2	2	2	2	2	2	2
ACTL30005	2	2	2	2	2	2	2
ACTL30006	1	1	1	1	1	1	1
ACTL40002		1	1	1	1	1	1
ACTL40003				2	2	2	2
ACTL40004		1	1	1	1	1	1
ACTL40005				A	A	A	A
ACTL40006		1	1	1	1	1	1
ACTL40007						2	2
ACTL40008		2	2	2	2	2	2
ACTL40009				2	1	12	1
ACTL90001						1	1
ACTL90002						2	2
ACTL90006							1
ACTL90018							1

Table 2: Breadths and Electives

Subject Code	2016 Start	Mid	End	2017 Mid	End	2018 Mid
AGRI20030			J			
BLAW10001	1	1				
BLAW20001	1	1				
CHIN20026				2	2	
COMP10001		1	1			1
COMP20005	2	2		1	1	1
ECON20002	1	1	S	S		1
ECON20005			2	2		
FNCE10001		1				
FNCE20001	2	2	2	1		
FNCE20005						1
FNCE30007	2	2		1	1	
GERM10008	1	1				
JAPN10001		1	1			1
MAST20022			2	2	2	
MAST30020		1	1			
MAST90082				1	1	1
MGMT30006			2			
MGMT30017			W	W	J	J
MUSI20168			1	1		
SCIE20001					2	2
D-MATHSC		O				

Table 3: Legend

1	Semester 1
2	Semester 2
S	Summer Term
W	Winter Term
J	July Intensive
A	All Year
O	Other

List of Exemptions

Table 4: Actuaries Institute exemption subjects and corresponding university subjects

Exemption subject	University subject
Part I	
CT1 Financial Mathematics	ACTL20001 Financial Mathematics I ACTL20002 Financial Mathematics II
CT2 Finance and Financial Reporting	ACCT10002 Introductory Financial Accounting FNCE10002 Principles of Finance[1]
CT3 Probability and Mathematical Statistics	MAST20004 Probability MAST20005 Statistics
CT4 Models	ACTL30001 Actuarial Modelling I ACTL30002 Actuarial Modelling II
CT5 Contingencies	ACTL30003 Contingencies
CT6 Statistical Methods	ACTL30004 Actuarial Statistics ACTL40002 Risk Theory I
CT7 Business Economics	ECON10004 Introductory Microeconomics ECON20001 Intermediate Macroeconomics
CT8 Financial Economics	ACTL30006 Financial Mathematics III ACTL40004 Advanced Financial Mathematics I
Part II	
Part IIA The Actuarial Control Cycle	ACTL40006 Actuarial Practice and Control I ACTL40007 Actuarial Practice and Control II
Part IIB Investment and Asset Modelling	ACTL40009 Actuarial Practice and Control III

Source: Centre for Actuarial Studies
Current as of 19th January 2017.

[0]Students are also eligible for the exemption if they complete FNCE20001 Business Finance

Equivalent Graduate Subjects

Subjects offered as part of the 2-year MC-ACTSCI *Master of Actuarial Science* or 1.5-year MC-COMACSC *Master of Commerce (Actuarial Science)* degrees allow graduate students to gain professional actuarial exemptions from the Actuaries Institute. Due to the overlap in content between these subjects and actuarial subjects offered as part of the B-COM *Bachelor of Commerce* and the BH-COM Honours program, we have listed graduate actuarial subjects with their undergraduate counterparts below. The reviews for undergraduate subjects included in the *Actuarial Students' Society Subject Review* will serve as an accurate reference of the content in the corresponding graduate subjects.

Some of these graduate actuarial subjects will share the same lectures as their undergraduate counterparts, as in Table 5. Others will just contribute to the same exemption subject as their undergraduate counterparts (and hence have common content), as in Table 6.

Table 5: Graduate and undergraduate actuarial subjects with common lectures

Graduate subject	Undergraduate subject
ACTL90003 Mathematics of Finance III	ACTL40004 Advanced Financial Mathematics I
ACTL90004 Insurance Risk Models	ACTL40002 Risk Theory I
ACTL90009 Actuarial Practice and Control III	ACTL40009 Actuarial Practice and Control III
ACTL90010 Actuarial Practice And Control I	ACTL40006 Actuarial Practice and Control I
ACTL90011 Actuarial Practice and Control II	ACTL40007 Actuarial Practice and Control II
ACTL90014 Insurance Risk Models II	ACTL40003 Risk Theory II
ACTL90015 Mathematics of Finance IV	ACTL40008 Advanced Financial Mathematics II

Table 6: Graduate and undergraduate actuarial subjects with common exemption subjects

	Graduate subject	Undergraduate subject
CT1	ACTL90001 Mathematics of Finance I	ACTL20001 Financial Mathematics I ACTL20002 Financial Mathematics II
CT4	ACTL90006 Life Insurance Models I ACTL90007 Life Insurance Models 2	ACTL30001 Actuarial Modelling I ACTL30002 Actuarial Modelling II
CT5	ACTL90005 Life Contingencies	ACTL30003 Contingencies
CT6	ACTL90008 Statistical Techniques in Insurance ACTL90004 Insurance Risk Models	ACTL30004 Actuarial Statistics ACTL40002 Risk Theory I
CT8	ACTL90002 Mathematics of Finance II ACTL90003 Mathematics of Finance III	ACTL30006 Financial Mathematics III ACTL40004 Advanced Financial Mathematics I
Part IIA	ACTL90010 Actuarial Practice And Control I ACTL90011 Actuarial Practice and Control II	ACTL40006 Actuarial Practice and Control I ACTL40007 Actuarial Practice and Control II
Part IIB	ACTL90009 Actuarial Practice and Control III	ACTL40009 Actuarial Practice and Control III