SUBJECT REVIEW

2019 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 2019 mid-year edition of the *Actuarial Students' Society Subject Review*, 4 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, we have continued 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 take one level–2 commerce elective. With this in mind, the 2019 mid-year edition of the *Actuarial Students' Society Subject Review* includes 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.

More importantly, the existing ***Part I*** program changing to the new ***Foundation Program*** is an important transition that should be carefully scrutinised by students who have started the *Bachelor of Commerce* actuarial stream in 2019 and for those who are undertaking exemption subjects in 2019. Please read the about the New Foundation Program below.

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.

New Foundation Program

Beginning in 2019, the actuarial studies curriculum is changing from its previous *Part I Program* to the new *Foundation Program*, in addition to changing its 8 Core Technical subjects (CTs) to 6 Core Principle subjects (CS, CM, CB). This change affects all new students beginning in 2019 and all students who will be undertaking actuarial exemption subjects in 2019.

For students who already have successfully completed a number of exemptions with the old *Part I Program*, these exemptions can be claimed and paid for through the Actuaries Institute website for $300 per exemption. Note that for Foundation exemptions CM1 and CS2, which have two applicable subjects in Part I (CT1 & CT5 and CT4 & CT6, respectively), students need to have obtained both *Part I* exemptions to obtain the *Foundation Program* exemption. For example, if you have obtained CT1 Financial Mathematics by the end of 2018, but not CT5 Contingencies, do not apply and pay for the CT1 exemption as this will not contribute towards CM1. This notion is expanded upon at https://www.actuaries.asn.au/studying-with-the-institute/foundation/exemptions.

For the purpose of this subject review, the exemption status indicated for each subject follows the curriculum the subject reviewer is/was undertaking.

The mapping of the old Part 1 exemptions to the new Foundation Program exemptions is outlined in the following table:

Table 1: Transition to Foundation Program

Foundation subject	Part I subject
Foundation	***Part I***
CS1 Actuarial Statistics 1	CT3 Probability and Mathematical Statistics
CS2 Risk Modelling and Survival Analysis	CT4 Models CT6 Statistical Methods
CM1 Actuarial Mathematics 1	CT1 Financial Mathematics CT5 Contingencies
CM2 Financial Engineering and Loss Reserving	CT8 Financial Economics
CB1 Business Finance	CT2 Finance and Financial Reporting
CB2 Business Finance	CT7 Business Economics

Feel free to contact the Actuarial Students' Society for more information or clarification.

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. To do this, we host an array of events throughout the year that all members of the society are welcome to attend. We provide valuable exposure to the industry at our premier event of the year, Contact Night, as well as augmenting members' professional skill sets in our popular workshops and information sessions. On the other hand, 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 more relaxed and informal manner.

Our sponsors are industry leaders who are 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 we 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

The Actuarial Students' Society would like to extend its sincere gratitude to the following people for their kind contributions to the 2019 mid-year edition of the *Actuarial Students' Society Subject Review*. Note that some contributors have asked to remain anonymous:

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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.

While the Actuarial Students' Society has made every effort to ensure the reliability and validity of any information presented herein, the Actuarial Students' Society does not guarantee accuracy, relevance, or completeness of any information provided. The Actuarial Students' Society and the University of Melbourne do not assume legal responsibility for any decisions made or actions taken as a result of information available in this guide.

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* (CB1 *Business Finance* subject).
Lecturer(s)	Mr Noel Boys Dr Phil Cobbin
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.
Lecture capture	Full (both audio and video).
Year and semester reviewed	2019 Semester 1

Comments

Going into this accounting subject, 3 things become abundantly clear:

1. Noel is a great lecturer that adds a necessary flair to a sometimes mundane subject.
2. The conceptual framework becomes the backbone of almost every question you will encounter.
3. People that have studied accounting before (i.e. in VCE) will appear to know everything and not hesitate to ensure you are aware of that fact.

Noel is a great lecturer as he makes sure to move beyond the slides. He will engage you with both his humour and spontaneous analogies; a personal favourite is the time he somehow linked the balance sheet to eating goldfish. Accordingly, it was a devastating blow in week 6 when he announced that he would be leaving on long service leave. One thing you notice with Noel gone is the solid pace with which he works through the lecture slides: His replacement Phil made a valiant effort however his first lecture finished 5 lengthy slides short, while his second finished 15 mins early after skipping 4 slides that I would argue contained important notes. Accordingly, whether you choose to attend lectures or not, it is imperative to go through the completed lecture slides (released every week on Friday) in depth and ensure you understand any worked examples conducted or notes added in red. Many of these are derived from the conceptual framework and going through this process can make initially daunting problems appear much more simple. Finally, when working through initial transaction analysis, those that have done accounting in the past will know how to classify transactions almost immediately. This was personally a bit daunting initially as I had never done any accounting before and felt a bit out of my depth having to work through each of these at a slow pace. Make sure this doesn't discourage you as it is imperative to understand the intricacies and reasons of every classification to succeed in this subject.

Subject content

- Week 1: Regulatory Framework / Conceptual Framework
- Week 2: Transaction Analysis & Financial Statements
- Week 3: The Balance Sheet — Assets
- Week 4: The Balance Sheet — Liabilities & Equity
- Week 5: The Statement of Comprehensive Income & Statement of Changes in Equity
- Week 6: The Cash Flow Statement
- Week 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

Textbook

Personally, I purchased a physical textbook second-hand however I would definitely not label it as necessary. Every lecture begins by outlining which learning outcomes from the textbook will be covered, however the slides themselves contain more than enough information, case studies and explanations of main concepts. In addition, Noel does upload a document with textbook question numbers targeted at what the lecture covered. This is useful as it allows you to only cover relevant material and he also provides solutions to these, whereas the textbook itself does not have these attached. Doing these questions did help when clarifying certain topics, however I would not mark these as essential, and they could easily be replicated by grabbing them off an online copy. Overall, a physical textbook is not a necessity and having a textbook at all is really up to personal taste. As it is a foundation accounting subject, many of the concepts are broad and consistent with many online resources/covered in the slides.

Tutorials

I had a very good tutor who converted almost every numerical question into some form of table. I found this to be extremely useful as it allowed visualisation of the process being taken, enabling an understanding of content outside of definitions. It also allowed us to comprehend how concepts fit together. The tutorial really assisted in narrowing down the lengthy lecture slides into only relevant knowledge. At times, lectures can seem like a ceaseless cascade of information with no particular progression, while the tutorials allow a sense of completeness for the new concepts.

Assignments

The first assignment involves everyone receiving a list of transactions and having to place these into a transaction analysis sheet on excel. After completion, this will be uploaded where you will receive the corrected version. This will then release part 2, where you will get an array of classifications and have to create both a balance sheet and statement of profit/loss. One thing to be wary of is formatting/presentation. Whilst they limit marks you can lose off these, evidently it would be optimal not to lose any at all. This includes bolding/underscoring the right cells. Overall a relatively simple task that helps your understanding of the subject. If you're struggling with your specific sheet, I highly recommend looking at the transaction analysis Noel spends a lecture on and trying to identify patterns or similar situations.

Assignment 2 is a group project consisting of 2 parts. Part A (3%) requires the group to complete a set of financial analysis tasks on Excel. I would recommend each member of the group completing the entire spreadsheet individually and then comparing them together as it does not take an excessive amount of time, and doing so ensures you understand each of the

analysis techniques. Ultimately however, I would encourage you to at least complete the ratio part as understanding each of these are essential for Part B and sometimes in the exam. Part B (7%) involves evaluating the financial performance of an entity in the format of a memorandum. The lead up to this is a bit vague, particularly the formatting so I would definitely recommend searching up some professional ones to nail these easy marks. As for the actual analysis, try and break it into sections such as profitability, efficiency and liquidity and attempt to create a cohesive flow between these, even the simple inclusions of linking words can go a long way into creating a sense of continuity.

Online Tests

You get 4 online test consisting of around 12-15 questions, each worth 1%. They are usually quite straight forward and shouldn't take too long. Doing the practice tutorial online questions on the LMS will prepare you perfectly for these.

End of Semester Exam

Exam Structure Breakdown

- Question 1 (35 marks): Income Statement and Balance Sheet
- Question 2 (20 marks): Cash flow statement and transaction analysis sheet
- Question 3 (25 marks): Short answer questions from a variety of topics
- Question 4 (10 marks): Budgeting
- Question 5 (10 marks): Cash Volume Profit analysis

In the lead-up, you will get access to a lot of 'exam style questions'. These are very useful for covering content and ensuring you understand it, however they can become a bit frivolous eventually as they don't really mimic the style of the exam. As you can see above, there is a huge weighting on Income statement and Balance Sheet and Cash flow statement and transaction analysis sheet so it is imperative to understand how to complete these, something not really covered in the practice materials. I would highly recommend referring to Assignment 1 to observe the formatting and required sections. Finally, look out for any conditions that could change classifications. These could affect factors such as the time horizon of an event, quantity or even whether it can be classified (once again, it all comes back to the conceptual framework!).

ACCT10002 Introductory Financial Accounting [SM2]

Exemption status	CT2 *Finance and Financial Reporting*, in conjunction with FNCE10002 *Principles of Finance* or FNCE20001 *Business Finance*. An average of 73 across this subject and one of • FNCE10002 *Principles of Finance* • FNCE20001 *Business 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%
Online quiz	2 × 3%
Practice set assignment Part 1	5%
Practice set assignment Part 2A	7%
Practice set assignment Part 1	8%
3-hour end-of-semester exam (hurdle)	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. 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. I have never had to use it as the lectures and tutorial work were detailed enough.
Lecture capture	Full (both audio and video).
Year and semester reviewed	2018 Semester 2

Comments

Subject content

One week per dot point:

- Introduction, Conceptual Framework, External Reporting
- Double Entry Recording
- Accrual Accounting, Adjustments
- Inventories
- Receivables
- Non-Current Assets
- Liabilities
- Equities
- Share Issue/Change in Equity
- Statement of Cash Flows
- Accounting for GST

This review was previously published in the 2018 end-of-year edition of the *Actuarial Students' Society Subject Review*.

- Revision/Course Review

ACCT10002, also known as Introductory Financial Accounting, or IFA for short, can be thought of as an extension from *Accounting Reports and Analysis*, with more emphasis on financial accounting, as the name suggests. This may be the subject where your VCE Accounting background comes in handy, as there is a heavy focus on double entry (debit/credit) accounting processes behind preparing a set of financial statements. However, not having prior knowledge on this concept is not an issue, as it is thoroughly taught during the first week or two, and even if you don't fully grasp it then, the countless exposure to the process throughout the semester will ensure that you are comfortable with the idea.

Lectures

Lecture slides are uploaded on LMS the week before and unlike most other lecturers, Warren uploads the fully completed slides from the beginning, so if you really cannot be bothered to go to a lecture or watch it, purely reading the slides will still provide you with the same information. He also uploads the completed versions of any worksheets that are covered during the lecture, which can be accessed through LMS at the end of the week. However, note that not watching the lectures may hinder your understanding of the new concepts, especially if you're unfamiliar with the double entry system, so I would definitely recommend watching them. Warren usually finishes his lectures almost half an hour early, and he speaks very slowly so if you lecture capture at $\times 1.5$ or even $\times 1.75$ speed, it takes only an hour or so to finish the lecture. I think it's worth the investment.

Tutorials

Tutorial participation and attendance is an easy way to guarantee 6 % of your total mark. It is a bit less than your usual 10% tutorial mark, but hey 6% is still something. Your tutor will assess your participation and attendance, which results in a final mark out of 6. Honestly speaking, as long as you make an effort to contribute during class and attend them, they are easy marks. Asking questions is a simple way to demonstrate to the tutor that you are attentively participating.

Whilst there was pre-tutorial work which was "required" to be completed each week, my tutor never checked it, and I rarely did it (yet still managed a 6/6), so the prior work is not essential as far as your tutorial marks are concerned . However, your tutor will most likely go through these questions or request the class to complete certain tasks as a group, so having done these questions prior to the tutorial will help with your understanding and assist you to contribute more for that 6/6 tutorial mark.

Answers for the questions are uploaded on LMS at the end of each week. Your tutor will not go through every single question, so it is crucial that after doing the questions, you check your answers.

Assignments and Assessments

Assignment Part 1 was an exercise that comprised of reading and comprehending a set of information, given in the form of invoices, and preparing a statement of financial position and financial performance. This had to be done manually through Excel, which was new to some people, and there were several hidden twists and tricks , so it was crucial that you did not rush this assignment. This was worth 5% of the total mark.

Assignment Part $2A$ was an extension from Part 1, with the difference being that it was done through Xero, which I thought was much quicker and easier than using Excel. A few of my friends said it was harder because they were not familiar with Xero, but I believe that in addition to Google, there were plenty of resources. This was worth 8%.

Assignment Part $2B$ was a short written assessment in which you had to discuss the cost method of a given business. Personally, it was the hardest one, not because it was difficult to do, but because it was hard to see what was expected.

However, they give you a chance to submit a draft to receive concise feedback, so I strongly recommend that you do this in order to get an idea of what you're supposed to write.

Other Resources

I completed the subject without the textbook, and I can confidently say that it is not necessary. As previously mentioned, it can be a good reference. Unfortunately, IFA does not provide the privilege of having online tutors but emailing Warren himself is also a good way to have your questions answered. There were pit-stops to assist you with each assignment, and I would recommend you utilise this opportunity as much as you can, especially if you are unsure about what you're doing.

End-of-Semester Exam

The final exam was a 200-mark paper that ran for 3 hours, with 15 minutes of additional reading time. This was the first semester that an IFA final exam did not include a multiple-choice section. The seemingly large number of marks was purely due to the fact that Warren did not want to give half marks. Hence, we were told to just think of it as a 100-mark paper that was doubled in mark size. There was a hurdle of 50% to pass the subject. Past papers were provided on LMS with extra information to discern any irrelevant questions. The exam consisted of 100 marks on "practical" questions and 100 marks on "theory" questions, so I suggest you familiarise yourself with answering both types of questions.

There were three semesters' worth of past exams and answers provided. I found these exams to be quite poorly written, with marks not always proportionate to effort required. Several questions were ambiguous, with answers failing to provide much clarification. For instance, we were informed that we did not need to remember any of the AASB numbers, however, these showed up occasionally in exams questions and sample answers.

Concluding Remarks

Generally speaking, you can think of this subject as the financial accounting aspect of ARA, with the double entry system added on top. If you have established a sound understanding of what financial accounting is and how it functions in ARA, IFA will be a breeze, as it does reiterate a great amount of content covered in ARA. With that being said, if you struggled in ARA, you're likely to struggle in IFA.

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 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.
Lecture capture	Full (both audio and video).
Year and semester reviewed	2018 Semester 2

Comments

Subject content

One week per dot point:

- Introduction, Simple interest and discount
- Compound interest, nominal and effective, force of interest
- Annuities
- Bonds and loans
- Demography, crude rates and population
- Mortality, life tables, stationary population
- Mortality experience, expectation of life, fertility, population projection
- Contingent payments
- Life insurance: Premium calculation
- Life insurance: Pricing and reserving parameter variability
- General insurance, reinsurance
- Superannuation and revision

If you've completed *Principles of Finance* before this subject (which most of you should have), you will soon realise that the first few weeks of ACTL10001 are very VERY similar to PoF, and will most likely think, "Why the heck are we spending a whole week on simple interest and simple discount? Wait we're spending another week just on compound interest? This subject is going to be so easy!" Yes, that was me. And yes, most of the questions in the earlier weeks of the subject can be solved using the knowledge and skills from PoF. However, you will also soon learn that there is no formula sheet in ACTL10001, and that the subject does not just teach Financial Mathematics and that there are probably around 20 million actuarial-specific notations that you will need to get your head around. If you don't do this early in the semester, you will most likely suffer during both the mid-semester and end-of-semester exam .

This review was previously published in the 2018 end-of-year edition of the *Actuarial Students' Society Subject Review*.

Lectures

There were 2 lectures, each being 1 hour. Everything during each lecture is fully recorded on lecture capture, though Shuanming's camera skills are questionable at times. To be honest, I must say that Shuanming's lectures are not for everyone, and I for instance found them quite difficult to follow. Nonetheless, he is knowledgeable and skilled in what he does. However, I really enjoyed how he would upload a summary/expectation of each week's content at the end of the week. Reviewing this can be a powerful tool for you to refine your understanding and can also assist you with your revision prior to exams. Everything covered in the lectures were usually already in the slides, so in my opinion, purely reading the slides in your own time is enough to comprehend the week's content, especially if it is a theory-heavy week. The solutions and steps for questions in the lecture slides are also included in the slides.

Tutorials

Unlike most of your other commerce subjects, Introduction to Actuarial Studies does not have any tutorial requirements. There are no required questions to attempt. You don't even have to attend any tutorials as attendance does not go towards your final mark. However, if you're lazy like me and don't review the weeks content in your own time, going to a tutorial is a great way to review and solidify your understanding of the knowledge and skills from each week.

Assessments and Assignments

There are two group assignments, each worth 10% of your final grade. Both assignments were done on Excel, so it would save you a great amount of time if you are familiar with different tools that you can utilise within Excel (make sure you attend Actuarial Students' Society's Excel workshop). The first assignment is quite short and straight forward and was based on the financial mathematics from weeks 1-4. The second assignment was a little trickier but was not impossible to do. I strongly suggest that you first attempt these assignments individually, then gather as a group and check for differences. This way, you can ensure that you make the least amount of errors as a group.

The mid-semester test was difficult, and the cohort average was $18/30$. Time constraint was the biggest issue for most students, so it is very important that you familiarise yourself with your $FX-82$ calculator before you head into the exam. Being able to use the memory function on your calculator saves an exorbitant amount of time.

End-of-Semester Exam

The end of semester exam was a 2-hour exam with 15 minutes of reading time. It was comprised of mostly application/practical questions, with a few marks on theory. The actual exam was much easier compared to the practice exams that were provided through LMS. I was told that actuarial exams are hard because you're pretty much doing 3 hours' worth of questions in the span of 2 hours. I guess this year was an exception. Many students found the final exam very doable. Again, make sure you know how your calculator works; it saves time and saves marks.

Final Remarks

Overall, this subject is a great way to see what the actuarial course is going to be like. It gives you a taste of the contents you'll be studying further down the line and is a good way to check if actuarial studies is really your thing.

ECON10003 Introductory Macroeconomics [SM2]

Exemption status
Not an exemption subject, but is a prerequisite for ECON20001 *Intermediate Macroeconomics* (CT7 *Business Economics* subject).

Lecturer(s)
Dr Lawrence Uren
Nahid Khan

Weekly contact hours
2 × 1-hour lectures
1 × 1-hour tutorial

Assessments

Tutorial attendance and participation	10%
Macroeconomics feedback assessment Task 1	5%
Assignment 1 - Group	10%
Assignment 2 - Group	10%
Macroeconomics feedback assessment Task 2	5%
2-hour end-of-semester exam	60% (Hurdle)

As part of your tutorial preparation, pre-tutorial questions are to be completed prior to your tutorial. You will be assessed on your attempt on completing the questions irrespective of whether the answers are correct or not.

Textbook recommendation
Bernanke, B., Olekalns, N., & Frank, R. H. (2014). *Principles of Macroeconomics* (4th ed.). North Ryde, AU: McGraw-Hill.

✗ No. Personally, I did not find reading the textbook mandatory to my learning. However, it was useful in clarifying concepts and provided examples of variables that may affect the economy. I would suggest borrowing the textbook from the library, rather than purchasing it, since there are many copies available for students.

Lecture capture
Full (both audio and video).

Year and semester reviewed
2018 Semester 2

Comments

Lecture schedule

Lectures

If you are like me, someone who is often discouraged by lectures that contain heavy text-slides and seemingly never-ending number of slides, then I highly recommend listening to Lawrence's lectures. His lectures are structured in a way that is straightforward and clear, with particular emphasis on concepts that are important for exam preparation. He generally annotates a lot on his lecture slides and explains each point listed in depth. He also makes the completed version available after the lectures, so do not worry about copying exactly what he annotated. Just make sure you really understand the models introduced in the lectures and how different variables can affect the model and the economy.

This review was previously published in the 2018 end-of-year edition of the *Actuarial Students' Society Subject Review*.

Week	Topic
1	Introduction & Measuring Output: GDP
2	Inflation and interest rates & Saving, wealth and investment
3	The Labour Market & Short-term Economic Fluctuations
4	Keynesian Model of the Economy
5	Keynesian Model of the Economy & Fiscal Policy
6	Monetary policy, inflation and financial markets
7	Aggregate Demand and Supply model
8	Introduction to Growth & Solow-Swan Model
9	Solow-Swan Model
10	International Trade
11	Exchange Rates
12	Balance of Payments

Tutorials

Preparation and attendance for tutorials, worth 10%, are the easiest marks you can obtain, so do not put yourself in the position of losing them! Tutorials commenced in the second week of the semester and were conducted under a collaborative learning format. Rather than the tutor re-introducing concepts explained in prior lectures, you are to work in small groups within your tutorial to answer a number of questions that test your understanding. These tutorials help to reinforce what you have learnt as well as teaching you to apply that knowledge to applicable exam questions.

Tutorial marks are allocated by providing evidence of your preparation of the tutorial (completing pre-tutorial questions), and the extent of your participation in class by demonstrating active listening and contribution to discussion.

Solutions to pre-tutorial questions will be provided on the LMS after all the tutorials have taken place. However, solutions to in-tutorial tasks will not be posted, so make sure to take notes while working through the questions and to really consolidate your understanding.

Including exam preparation, tutorials were tremendously helpful in completing the assignments. The in-tutorial questions and concepts explored were very similar to the assignment questions, so be sure to take note of the examples discussed in the tutorials especially those that were applied to the key macroeconomic models .

Assessments

Macroeconomics Feedback Assessment Tasks

Macroeconomics Feedback Assessment Task 1 and 2, worth 5% each, are multiple choice quizzes administered online through the LMS. We were given a short time frame, between 9am Thursday to 4pm Friday, to complete the 30-minute quiz. You will be asked to complete fifteen questions that were randomised from a supply of available questions. There were practice sample quizzes given that were similar to the types of questions you would get in the test.

Assignments

Assignments 1 and 2, worth 10% each, consisted of a number of short-answer style of questions. You are to complete the assignment in groups of three or less that are within your tutorial. Although it is listed as a group assignment, you have the choice of completing it by yourself. Just make sure to register yourself as a group even if you are working alone. I often have a hard time working in groups as it can become such a burden to chase people up to do their part or for them to

complete it to the same standard as you would. Therefore, I chose to do the assignments by myself and I had no problems in doing so. In fact, I felt like it was much easier, so that option is there for you if you prefer working alone.

The assignment questions generally give an example of an occurrence (such as an increase in government spending or productivity) and requires you to explain how it causes a change in the model, and how the change affects the economy in the short or long term. The lecturer does go into depth with these examples in the lectures, so make sure you keep an eye out for them. The in-tutorial questions and textbook readings were also designed to help you as well.

The answers to the assignment questions will be released following the submission date. This is also a great tool to use for exam revision.

End-of-Semester Exam

The exam is a hurdle! I repeat, a hurdle! It was a 2 hour and 15 minute exam including 15 minutes of reading time. It was divided into two parts - multiple choice and a short answer section. The approved calculator for the exam is the Casio $FX-82$ (any suffix). Past exam papers are available on the library website, however, answers to only two papers were provided on the LMS.

In regard to preparation for the exam, tutor and lecturer consultations are available throughout the semester. If you prefer to remain anonymous, you can access the Online Tutor tool via the LMS which also allows you to directly ask questions to your tutor or lecturer. They will attempt to answer your question within 24 hours and on weekdays only.

The exam is entirely about your depth of understanding and how you can apply changes to exogenous and endogenous variables to the macroeconomic models. If you can really concentrate and understand why these changes are brought about, you will definitely do well. Enjoy and good luck!

ECON10004 Introductory Microeconomics [SM1]

Exemption status
CB2 *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)
Professor Tom Wilkening
Professor Phillip McCalman

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.

In Tom's lectures, certain diagrams were retrieved from the first textbook mentioned above. Referring to the textbook could be helpful in clarifying certain concepts from the lectures. Even though it's not required, it could be useful.

Lecture capture
Full (both audio and video).

Year and semester reviewed
2019 Semester 1

Comments

Subject content

- Week 1: Introduction to Economics and its key concepts
- Weeks 2–3: Perfectly Competitive Markets
- Weeks 4–5: Welfare and Market Failures
- Weeks 6–7: The Firm and Managerial Economics
- Weeks 8–9: Imperfect Competition and Price Discrimination
- Weeks 10–11: Game Theory
- Week 12: Exam Review

ECON10004 Introductory Microeconomics is an engaging subject which introduces us to many key and fundamental economic concepts. Even though it was my first time learning economics, I found the content covered in the first five weeks fairly easy to understand since they mainly revolved around the supply and demand of a market.

However, starting from week 6, the concepts taught in the topics will become a lot more confusing as you start to see different variations of graphs that go beyond the simple supply and demand curves. It'll be a lot easier to grasp the mathematics involved to solve questions from the topics if you have a solid understanding of the concepts and the related

graphs. My advice is to really understand the components of the graphs and how to sketch them out as graphs contribute a fair amount of marks in the assignments and final exam.

Personally, I did not read the textbook since the lecture slides already contained most of the subject content. I only referred to it when I found the graphs on the lecture slides confusing. Even so, I did rely on the internet a lot when stuck on a concept. Do check out the Online Tutor regularly (something I wish I did), as chances are other students will struggle with the same concepts that you find confusing. So make full use of the Online Tutor!

Lectures

There are four lecture streams, two in the morning and two in the afternoon. Lecture slides were uploaded on the LMS over the weekends most of the time. It would be helpful to have a copy of the lecture slides with you. As I attended Tom's lectures, he always drew extra graphs and elaborated on the equations on a separate piece of paper (they were recorded and would appear on the Lecture Capture).

To be frank, Tom's lectures were pretty fast-paced at the beginning of the semester. If you find yourself falling behind, do rewatch his lectures on the Lecture Capture to fully understand the concepts. With that being said, you will soon find yourself accustomed to the pace as the semester goes on. A new system, TopHat was also introduced in this semester's lectures for interactive activities. Tom displayed the lecture slides from TopHat throughout the semester. All in all, Tom is a great and extremely knowledgeable lecturer who explains the concepts well.

Tutorials

Tutorial attendance and participation contribute 10% to your final mark in this subject. If you are unable to attend a tutorial, you can go for a replacement tutorial and ask the tutor to sign on a piece of paper. This way you will still be marked present by your actual tutor.

Every week an in-tutorial worksheet is given out and students are expected to work through the questions in class before the tutor starts giving out the solutions. The tutorial questions cover topics taught in the week before. It gives students a great opportunity to seek clarification on confusing concepts from their tutors.

There is also a pre-tutorial exercise every week on TopHat. Students can gain free access to the website as long as they are in the specific school zones. I recommend you to purchase the 1-semester plan as instructed by Tom as it will be a lot more convenient for you.

Assignments and Assessments

In the fourth week of the semester, a multiple-choice exam was conducted through the LMS subject webpage. Students were given 25 minutes to complete 8 questions. Some of the questions were tricky so do read through the questions and choices of answers carefully.

Assignment 1 mainly covered topics from the first four weeks of the semester and had a word limit of 750 words, whereas the second assignment covered topics from week 5 to week 9 and was allowed a maximum of 1250 words. Both assignments require a heavy use of diagrams to assist in answering the extended response questions. You could use any online graphing tools, like Desmos, to plot the graphs. I also used Microsoft Powerpoint to edit and label them afterwards. You will also be asked to show your full workings for some questions. Typing your workings out as equations on the word document can substantially reduce the word count as well. As I worked through both assignments, I gained a better understanding of the concepts taught in the topics as I had to apply them to solve the questions. They can serve as good revision for the final exam.

End-of-Semester Exam

The final exam lasts two hours and includes a mixture of multiple-choice, short answer and extended response type questions. It was out of 120 marks with a hurdle of 50% to pass the subject. Time constraint was the main issue and a piece of advice from a tutor was to answer the multiple-choice questions last so that you could spend more time on the questions which required longer answers.

Four past papers were released on the LMS subject webpage along with their answer keys so plenty of revision materials were available to help us prepare ourselves for the final exam. Again, make full use of the Online Tutor as they are there to help.

Concluding Remarks

It is important to fully understand the concepts first as the mathematical and calculation sides of the subject will almost come naturally once you understand the intuition behind the concepts. Lastly, remember to make full use of the resources available (pit stops, Online Tutor) throughout the semester (don't wait until the last minute)!

FNCE10002 Principles of Finance [SM1]

Exemption status	CB1 *Business Finance*, 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	1 × 2-hour lectures 1 × 1-hour tutorial
Assessments	Tutorial participation 10% Online Assignment due in Week 5 10% 1-hour mid-semester test in Week 6 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. Textbook readings are assigned to students before each week's lecture. Although not absolutely necessary for success, the textbook provides a solid conceptual foundation before each lecture and acts as another point of contact when the lecture notes don't quite hit the mark. ✓ I would recommend buying this textbook.
Lecture capture	Full (both audio and video).
Year and semester reviewed	2019 Semester 1

Comments

FNCE10002 Principles of Finance is one of four compulsory subjects for the Bachelor of Commerce and additionally provides exemption for CB1 *Business Finance*. Principles of Finance introduces students to the key concepts of finance, new to most high-school students. Topics range from calculating compound interest and valuing bonds to the capital asset pricing model and leverage.

Performing well comes down to having good mathematical skills in addition to strong conceptual understandings of the underlying financial models and theories. The nature of the subject shifts dramatically after the mid-semester break, transitioning from mostly formula work to analysing complex financial models and theories. For the end-of-semester exam in particular, having a deep knowledge of the intricacies involved in various financial theories is pivotal in scoring highly.

Subject content

- Week 1: Introduction to Principles of Finance and Financial Mathematics I
- Week 2: Introduction to Financial Mathematics II
- Week 3: Valuation of Debt Securities
- Week 4: Valuation of Equity Securities
- Week 5: Modern Portfolio Theory and Asset Pricing I
- Week 6: Mid-semester test
- Week 7: Modern Portfolio Theory and Asset Pricing II
- Week 8: Capital Budgeting I

- Week 9: Capital Budgeting II
- Week 10: Capital Structure and Payout Policy I
- Week 11: Capital Structure and Payout Policy II
- Week 12: An Introduction to Options

The first few weeks of content, up to Week 5, are very straightforward. Topics covered in weeks 1-4 consisted primarily of substituting values into various formulas and the only difficulty (if you can even call it that) is figuring out which formula to use. There is little theory involved in these weeks of content and when there is, it is often intuitive and not very complicated. However, this quickly changes after the mid-semester break as Asjeet unloads a number of financial models with deep theoretical underpinnings. Problems move towards questioning about assumptions and the specifics around the financial models and theories.

Lectures

There were four lecture streams, each being two hours long. For the most part, Asjeet's lectures were informative and comprehensive. At the start of every lecture, he would remind students of the assigned readings for the week but personally I felt that the lecture notes combined with his explanations were sufficient. Lecture notes were reasonably detailed, but it was expected that you added to these notes yourself. In particular, Asjeet would have questions in red text on the slides which he would answer during the lectures. I found that the answers to these questions very valuable in providing additional insight to the topic at hand, so it was always worth noting these down. Every single lecture was recorded and uploaded onto Lecture Capture in timely fashion. For PoF, I actually preferred watching lectures online to attending them in person, since they were identical in almost every way, but Lecture Capture had the advantage of being able to move at your own pace. This was ideal when topics became increasingly complex and you needed to additional time to think through and understand each slide before moving forward.

Tutorials

Every week, there is a 1-hour tutorial reviewing content from the previous week's lecture content. In preparation for each week's tutorial class, students are required to complete the first section (Part A) of the week's tutorial sheet. Note that this is graded as either satisfactory or unsatisfactory, and that only a genuine attempt is sufficient for marks. Even if you cannot do the problem, attempt it anyways, as it is not really homework but rather a way for the tutor to check that you have prepared for the tutorial. The remaining part of the tutorial sheet is gone through during the tutorial and students are encouraged to discuss and attempt the problems before the tutor provides solutions. While these are not necessary to have been completed prior to the tutorial, it was useful to at least read through the problems and have a think about them before the tutor went through them during the class.

Online Assignment and Mid-Semester Test

Both the online assignment and mid-semester test covered similar content (week 1 to week 4), but the online assignment was substantially easily and was worth less as a result. The assignment consisted of 14 multiple choice questions, worth 10%, and was online. The questions were handed out a week earlier and answers would be entered on the LMS once you had worked out the problems. In solving the problems, lecture notes should be referred to whenever necessary as this assignment is a great opportunity to score highly and improve your grade.

The mid-semester test, on the other hand, was held in week 6 and was worth 20%. Other than that, the format of the mid-semester did not differ vastly from the online assignment, besides the fact that it was to be completed in exam conditions in under an hour. Questions were also slightly more difficult. The time limit was generous to say the least, with many students finishing well before the one-hour mark. It is therefore ideal to take your time and read through each question carefully,

paying attention to the wording in particular. Two practice mid-semester exams were provided for preparation and study purposes. Another good source of revision would be to look over the formula sheet and to familiarise yourself with the relevant formulae.

End of Semester Exam

The end-of-semester exam was 2-hours and worth 100 marks as it was in previous years. The exam was split into a multiple-choice section worth 40 marks, and a short answer section worth the remaining 60 marks. As usual, some questions from the multiple-choice section had subtle word choices which made them confusing and difficult to answer. The exam consistently focused on the content covered after the mid-semester exam and as a result it was a lot more theoretical in terms of question style. That said, there were nonetheless formula-based problems in the latter section of the exam which favour the mathematically inclined. The main take-away from the exam is to concentrate study on fully understanding the concepts and assumptions which underpin the various models and theories covered in lectures.

Concluding Remarks

Overall, I found Principles of Finance to be an interesting and enjoyable subject. It teaches the basic workings of financial markets and provides a holistic overview of finance as an area of study. Do not be intimidated by the fail rates (which Asjeet will promptly inform you of in the very first lecture) as it is a very manageable subject if you consistently put in a few hours of study per week.

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 Chenyan Wu Dr Binzhou Xia Associate Professor Diarmuid Crowley Professor Christian Haesemeyer
Weekly contact hours	3 × 1-hour lectures 1 × 1-hour tutorial
Assessments	9 individual assignments (6 written, 3 webwork) total 20% 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	2019 Semester 1

Comments

The material explored in Calculus 2 is often relatively simple to understand if you follow through consistently and complete the relevant questions/tutorial work, however the wide array and pace with which lecturers move can be a bit difficult to deal with at times. The most important factor in succeeding in this subject is to keep up with the content. It is understandable if you have to sacrifice completing all of the questions at certain times during the semester, however ensure you at least have some understanding of the previous notes when attending lectures otherwise it will be hard to keep track.

Subject content

- Limits, Continuity, Sequences and Series
- Hyperbolic functions
- Complex Numbers
- Integral Calculus
- First Order Ordinary Differential Equations
- Second Order Ordinary Differential Equations
- Functions of Two Variables

Other Comments

As hinted at above, I highly recommend purchasing the printed notes from the co-op book store; these are essential as the lecturers work off these directly. Through the 3 lectures each week, they cover a lot of content and having these notes handy and collated in one place allows you to keep track of all the topics and quickly identify anything you may have missed. Additionally, each lecture begins with a review and having blank sides in the booklet gives you a perfect place to record these.

It is imperative to find a process that works for you. I started off by attending lectures, writing a few notes here and there on a notepad and then going home and re-watching it before filling it in on the booklet. I soon reverted to completing the notes during lectures as I felt - whilst the first method might have helped me grasp content better - it was extremely time consuming and meant I could not devote as much time on questions which I felt were integral to a greater extent to truly grasp the content. The provided question booklet is a great resource and I would highly recommend printing it out and working through it in a consistent manner, as there are a lot of questions similar to those you might encounter in exams. Work through these constantly and definitely review the tougher ones come SWOTVAC.

Tutorials

The tutorials involved the formation of little groups who worked off a provided tutorial sheet. I found that I enjoyed being in similar groups each week as we soon learnt each other's strengths and fall into a bit of a routine. For example, our group went through each question together, one person writing on the white board at a time whilst the others observed. I preferred this to working through the questions individually and then trying to compare with other group members as everyone works at a different pace and it leads to a lot of cramped whiteboards. It is a good idea to hold onto these sheets and review them before the final exam as they cover a lot of exam style questions.

Assignments

The weekly assignments came in two forms, namely written assignments and webwork.

The weekly assignments were generally quite straight forward. They do try to pick up on tiny details to stump students, but a week is more than enough time to go through it thoroughly. Talking to my tutor, he said most people's assignment marks generally increase over time as the first few weeks regarding limits and continuity rely more so on 'mathematical intuition' as opposed to working through problems sequentially, something that is often very different to high school mathematics. That said, it is not hard to do well on every assignment, doing so may just might require some deep thought or discussion with others. As with all maths questions, ensure to be careful with little details such as justifications, domains and presentation to prevent giving tutors an excuse to take any marks off.

With webwork, be cautious about the mark allocation. There were a couple of times where people would be tripped up by one part of a question, and this would cost them the whole question as opposed to just a single mark. You do get 3 attempts per question, so definitely use all of these and if you get something wrong, try not to rush into submitting something else you think could be right (particularly with multiple choice questions where you can select more than one option) as before you know it, you will have exhausted all your attempts.

Final Exam

Students do get access to quite a few practice papers. I felt the 2019 Semester 1 exam was relatively more difficult than the ones before as there was more focus on the finer details of first order differential equations, something barely explored in previous exams. Overall though, there are questions on every topic and you can generally predict the main techniques they will test you on. Ensure to know how to use the formula booklet to avoid unnecessary memorisation. You will however have to memorise certain concepts such as the conditions for various convergence/divergence tests, as these aren't provided and are essential for coming to a valid conclusion. Fortunately there aren't too many of these and some of them make intuitive sense.

Finally, it is important to remember that there are multiple lecture streams which you may attend, so if one topic doesn't sink in with one lecturer, then you are encouraged to try another. I used this technique for some of the more abstract concepts such as the Comparison test.

MAST10007 Linear Algebra [SM1]

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)	Dr Christine Mangelsdorf Dr Anthony Morphett
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	Fitzherbert, R., & Pitt, D. (2012). *Compound Interest and its applications*. Melbourne, AU: University of Melbourne Custom Book Centre. Anton, H., & Rorres, C. (2013). *Elementary Linear Algebra*, (11th ed.), Applications Version, Wiley. Textbook was not referenced throughout the entire semester. The lecture notes available on the LMS are sufficient, so ✗ it is not recommended.
Lecture capture	Full (both audio and video).
Year and semester reviewed	2019 Semester 1

Comments

Subject content

The first few weeks of Linear Algebra pretty much cover the basic "building blocks" of the subject. If you took Specialist Mathematics in high school, these concepts would be familiar to you. However, do not let your guard down as once the vector space topic is introduced, you will notice a lot of brand new topics and content that require rigorous thinking and the ability to find the connections between the topics. Generally, lectures and tutorials were paced nicely and Christine's lectures were easy to follow.

1. Linear equations

   In this topic, you'll be introduced to systems of linear equations, matrices and how to solve the system by performing row operations on the matrix. As you'll be required to apply this technique to most of the future topics in this subject, you'll want to know it like the back of your hand (you can practise by answering questions from the homework problem sheets in the course guide). Be sure to double or triple check your matrices in row or reduced row echelon forms as careless mistakes can easily be made as we're not allowed to use calculators.

2. Matrices and determinants

   This topic covers the general properties of matrices and how to find matrix inverses. In addition to that, you'll learn how to perform row operations to find the rank and determinant of matrices. You'll also be taught to use cofactor expansion to calculate the determinant.

3. Euclidean vector spaces

   This topic introduces students to vector geometry, lines and planes along with dot and cross products. Students will be taught how to calculate area and volume using cross product, form vector equations of a line and a plane and how to convert between parametric and Cartesian forms.

4. General vector spaces

   In this topic, you'll be introduced to new terminology and concepts related to vectors such as spaces, spans, bases and so on. Knowing the axioms that determine spaces and subspaces is crucial as it would assist you in answering questions that will be tested from this topic. I personally found 3Blue1Brown's (a YouTube channel) Linear Algebra series very helpful when it comes to understanding the intuition behind the concepts taught in this topic.

5. Linear transformations

   This topic involves transforming vectors and vector spaces by mapping one space to the other. You'll be required to prove if the mappings are linear transformations. Besides that, the idea of nullity, image and kernel of a transformation matrix will be introduced. A solid grasp on the concepts from topic 4 will help you understand the concepts in this topic tremendously.

6. Eigenvalues and eigenvectors

   This topic covers the basic properties of eigenvalues, eigenvectors and how to find them by calculating determinants and performing row operations again. Although the lecture slides do not really explain what they are used for, 3Blue1Brown's video on this topic helps with the visualisation and covers the intuition pretty well.

7. Inner product spaces

   This topic generalises key properties of the dot product (introduced in Topic 3) to allow it to be performed on general vector spaces (introduced in Topic 4), where different rules according to the vector space are applied on the inner product between vectors. Students will also be taught to use inner product in the Gram-Schmidt procedure.

Lectures

Since the lecture notes were rewritten, blank lecture slides were released throughout the semester on the Linear Algebra LMS subject webpage. Students are expected to print them out and bring to the lectures.

There are two lecturers teaching this subject, each taking charge of one lecture stream. I attended Christine's lectures at the beginning of the semester. Christine always shows clear steps required to solve the examples and she stresses a lot on the importance of getting the notation right when answering questions in this subject.

Lectures from both lecture streams are recorded and will be available after the lectures on Lecture Capture. I personally relied on the lecture captures instead of physically attending them towards the latter half of the semester and still found the subject manageable. However, the catch is to consistently review the lecture captures every week and not fall behind. Once it piles up, you will find it hard to catch up with the content since there are three lectures per week.

Tutorials

In every week's tutorial, a worksheet will be handed out to the students and you'll be required to work in groups and solve the questions on the whiteboard. The solution sheet is then given out, only to those who have attended, at the end of the tutorial. Although marks are not given for tutorial participation and attendance, attending tutorials is one of the most helpful ways in solidifying and strengthening understanding of the concepts taught from the previous week.

In addition, there will be a computer lab session right after the tutorial. Students then work through exercises from the computer lab booklet on MATLAB. These exercises are meant to help students visualise the application of certain topics in linear algebra. Personally, I found it enjoyable but frustrating at times when I could not answer certain questions (no answers are given for MATLAB exercises and sometimes not even the tutor knows the solution).

Assignments

There are 3 online and 6 written assignments in total. Online assignments are conducted through WebWork (a website), whereas written assignments are to be handwritten and placed into the appropriate assignment box in the Peter Hall building.

Questions asked are generally straightforward and closely resemble the examples from the lecture notes. You can refer to your notes as you answer the questions but try not to rely too much on them. (Answering based on your understanding first before double-checking with reference to the notes can serve as a great revision tool.) As mentioned before, Christine is very particular when it comes to getting the notation right. So do double check before submitting your written assignments as you may get penalised heavily for getting it wrong.

MATLAB

A sample test will be released on the LMS approximately one week before the test. Do attempt the test as many times as you can as the actual MATLAB test would be very similar to the samples. As long as you work through all computer lab exercises and understand how to apply the specific MATLAB commands to solve questions, the actual test should be fairly easy to score highly in.

End-of-Semester Exam

The 3-hour time limit is sufficient to complete the paper and double/triple check your workings. It's important to check through all the row operations and calculations a few times to avoid careless mistakes. If you are stuck on a question, leave some space, skip it first and come back later. A good tip that my tutor shared is to list down the properties and axioms that you think are related to the question you are stuck on. This can provide clues to help you work through the question.

Generally, the format of the final exam is very similar to the past years' papers that were released on the LMS. Almost all topics and subtopics were covered and questions were arranged in the sequence of the topics being taught. For revision, attempt the past years' papers and the homework from the course guide to familiarise yourself with the style of questions being asked, and be sure to go through all the subtopics during your revision.

Concluding Remarks

Linear Algebra is an enjoyable subject which exposes you to the more abstract side of mathematics. Take some time to visualise and understand the intuition behind the concepts and you will start to notice the wonderful links between the topics (they are all interconnected!). Consistently attempt the homework questions from the course guide instead of piling them all up and only starting when it's close to SWOTVAC as there simply won't be sufficient time for you to attempt all of them.

MAST10008 Accelerated Mathematics 1

Exemption status	None. 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* in order to meet the prerequisites for ACTL20001 *Financial Mathematics I*.
Lecturer(s)	Dr Alexandru Ghitza
Weekly contact hours	4 × 1-hour lectures 1 × 1-hour tutorial 1 × 1-hour MATLAB tutorial
Assessments	3 individual online tests in weeks 3, 4, & 10 — 3 × 2% 3 individual assignments due in weeks 5, 7 & 11 — 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. Textbook was not once referred to throughout the semester and it was very uncommon to see students actively using it. The provided lecture notes are more than sufficient to perform well in this subject. ✗ I do not recommend this textbook.
Lecture capture	Full (both audio and video).
Year and semester reviewed	2019 Semester 1

Comments

MAST10008 Accelerated Mathematics 1 (AM1), combined with MAST10009 *Accelerated Mathematics 2*, is designed to cover prerequisites for three mathematics subjects: MAST10005 *Linear Algebra*, MAST10006 *Calculus 2* and MAST20026 *Real Analysis*. Accelerated Mathematics 1 introduces students to topics and methods in linear algebra, an area of mathematics new for many recent high-school graduates. Towards the end of the semester, the subject also covers differentiation and integration of multivariable functions in preparation for *Accelerated Mathematics 2*.

Performing well in this subject comes down to having a thorough and refined understanding of each topic and the interrelationship between these topics. Theorems and formulae are thrown around left, right and centre, so it is critical that you are comfortable with their application in solving exam and assignment problems. Personally, I felt that having an intuitive view of concepts in linear algebra was almost as important as understanding the rigorous mathematics involved in proofs and derivations. As previously recommended, the YouTube series 'Essence of Linear Algebra' by 3Blue1Brown is fantastic at helping you visualise the content in this course, which then further builds mathematical intuition.

Subject content

- **Topic 1 - Matrices and linear equations:** This topic introduces students to matrix arithmetic and properties of matrices. Key concepts include row echelon form and determinants, ideas of which should be understood in great detail come exam time. When doing practice problems around elementary row operations, take the time to carefully perform the calculations (as tedious as it is) since you will be punished quite harshly in exams for arithmetic errors.

Vectors and solid geometry are also covered in the topic and should be fairly accessible to most students. Main skills include converting between parametric and Cartesian forms of a line, in addition to making use of the various formulae for orthogonality and distance.

- **Topic 2 - Introduction to rigorous mathematics:** This topic takes a break from matrices and vector geometry, and instead explores the theoretical underpinnings of mathematics. It covers various methods of proof as well as sets and functions. Proof by induction is perhaps the most important concept from this topic, so ensure that you are competent in solving an extensive range of induction questions.
- **Topic 3 - Vector spaces and linear transformations:** This topic contains the bulk of linear algebra covered in this course and is consequently questioned extensively on exams. Vector spaces can seem initially abstract and almost nonsensical but be assured that many others are thinking exactly the same and it is only a matter of time before everything clicks. Linear transformations can also be confusing especially with the notion of different bases. Again, visualisations from YouTube animations are invaluable in facilitating your understanding. Commonly asked questions on this topic include proving whether a certain set is a vector space or not, so it is vital that you know the subspace theorem and are comfortable with it. Similarly, questions about whether a transformation is linear or not also come up frequently, so again ensure you know what the conditions for linearity are.
- **Topic 4 - Inner products:** This topic introduces inner products, taught as generalisations of the dot product similar to how vector spaces are generalisations of the Euclidean plane. Inner products are not particularly difficult, as all the formulas used in topic 1 reappear albeit slightly differently. Eigenvalues and eigenvectors are covered in this topic as well. Typical exam questions ask about calculating eigenvalues and diagonalization, which become routine with some practice.
- **Topic 5 - Introduction to multivariable calculus:** This topic marks the end of linear algebra and covers surfaces in three-dimensional space, partial derivatives and optimisation in addition to complex numbers. Multivariable calculus follows intuitively from calculus in one variable, so students should find this topic manageable. There are a number of conditions and formulae which do need to be memorised, however. Complex number questions are fairly limited to examples covered in lectures and in the problem booklet, so these should be easy marks if you are familiarised with them.

Lectures

Lectures in this course are informative and insightful, although they progress quickly and rather dense in content. There are lectures on all days of the week other than Wednesday, so falling behind is especially undesirable. I found that it was extremely helpful to quickly review all concepts covered after every lecture to strengthen my understanding, since each lecture built upon the content from the previous one. All lectures are recorded onto Lecture Capture and are equally as informative online as they are in person. Note that Alex sometimes uses two DocCams when working through lecture notes, but only one camera is recorded onto Lecture Capture. For the most part, he did a fantastic job of ensuring that everything was recorded by the primary camera but there were rare occasions where he would forget to move his working over, and you would be left staring at a blank page for a few minutes. Of course, this was very uncommon and won't be a problem if you intend on attending all the lectures anyway. Overall, he was a great lecturer, very intelligent and explained all concepts comprehensively in an easy to understand manner. His witty sense of humour provides some much-needed comedic relief throughout the semester.

Tutorials

Tutorials are a great chance to apply concepts learnt in lectures to exam-style questions. Tutorials typically consisted of small groups of students attempting problems from a question sheet, while the tutor would roam the class providing assistance. It was a good opportunity to also ask any burning questions you had or to clarify any misconceptions. At the end of the tutorial, detailed answers to the question sheet were handed out.

Laboratory classes are almost identical in nature to tutorial classes, where each student would work through a MATLAB handout on their individual computers. In all honesty, these classes were pretty useless and only helps with the end of semester MATLAB test. That said, if you are interested in the many applications of linear algebra, you may find these classes enjoyable and worthwhile.

Written and Online Assessments

The written assignments in this course are tedious to say the least. They are often time-consuming and require a high degree of justification disproportionate to the number of marks awarded. The questions are nearly always more difficult than final exam questions and are designed as such to provoke deeper and more nuanced mathematical thinking.

The online assignments, on the other hand, were far more accessible and considerably shorter. Questions were also very generic and test basic knowledge and understanding. Students should be able to score full marks on these assignments.

MATLAB Test

The MATLAB test is out of 25 marks and acts almost as a check-up as to whether you know your stuff before the final exam. The content in the test is very similar to that of the final exam, just with 'ugly' numbers so that you are forced to use MATLAB. Personally, I found that the laboratory classes (other than the very first one) did not prepare you very much for the test, and that revising lecture notes and tutorial sheets was far more effective. The MATLAB commands necessary are printed on the cover sheet so it comes down to a matter of knowing what each of them do, most of which are fairly self-explanatory. There is also a 5-mark programming question at the end which can prove challenging if you have no prior background in computing.

End of Semester Exam

The final exam was out of 95 marks instead of the typical 100 seen in previous years. Each major topic and sub-topic made an appearance on the final, with most of the exam focusing on Topics 3 and 4 as expected. The three-hour time limit is fair given that you are working at a reasonable pace. Sub-questions are often unrelated to each and are additionally worth little marks, usually 2-3, so do not feel afraid to skip ahead if you are stuck on one. The worst thing to do is to linger on a 2-mark question for 10 minutes when there is an easy 8 marker a few questions ahead. As always with this subject, take extreme caution with arithmetic calculations. In regard to revision, past exams provide good indication of the difficulty and style of questions.

Concluding Remarks

Out of all the typical first-year first-semester subjects, AM1 will definitely be the most difficult, even if you are mathematically skilled. The fast pace and relatively long contact hours combined with tricky questions will ensure that you devote most of your attention onto this subject come exam time. Regularly do practice questions from tutorials and problem booklet, clarify misunderstandings and review lecture notes frequently in order to perform as well as possible in a challenging but intellectually rewarding course.

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	The yellow MAST10009 Accelerated Mathematics 2 book is the designated textbook. While this book is extremely dense, it is written by Barry specifically for this course. You will need to purchase the book and consult it regularly; it will become your bible. It includes the entire collection of lecture notes, as well as practice problems for each lecture. I cannot stress just how important this textbook is.
Lecture capture	Full (both audio and video).
Year and semester reviewed	2018 Semester 2

Comments

MAST10009 Accelerated Mathematics 2 AM2 introduces students to the mathematical rigour of real analysis and trains students in generic first-year university calculus. While this subject has a reputation for being the most challenging subject in first-year actuarial studies, students generally do well at the end of the semester. What most students (myself included) struggled with at first was the rigour expected by Barry and his tutors in terms of succinct mathematical presentation, clarity of arguments, as well as logical thinking. As redundant as it may seem, Barry essentially wanted to test whether you understood the content that he taught, and I will suggest ways for which you can achieve this for each topic in the Subject Content section. To succeed in this course, you will need to regularly review the lectures and stay up-to-date with the lecture content. Not only this, but you also need to ensure that you can mimic the proofs that he presents and, most importantly, understand the definitions and theories he teaches. Whilst not recommended by some intelligent lasses, I found that visualising the theories Barry presented through the Cartesian plane and analysing an example function or sequence solidified my understanding of the theory. Don't be phased when it takes one or two hours just to fully visualise and grasp one concept, for it is worth it in the scope of this subject. Contrary to popular (and Barry's) opinion, I do not think you need to do all the questions in the Problem Booklet to achieve a good mark in this course, since the questions in the problem booklet don't reflect the difficulty of the exam very well, as most questions are a lot harder than exam questions. In fact, I didn't do any problems after the mid-semester exam, and did a lot better in the end-of-semester exam than the mid-semester exam.

This review was previously published in the 2018 end-of-year edition of the *Actuarial Students' Society Subject Review*.

Subject content

1. **Sequences**

   This topic reintroduces students to the high-school concept of limits, but in a more mathematically rigorous manner. Continuing on from this, Barry introduces the concepts of convergence and divergence, limit theorems, as well as special genres of sequences. While Barry doesn't dedicate much time to Landau Symbols, or the concept of asymptotic equivalence, I found that many questions in the mid-semester and end-of-semester exam required them. So, I highly recommend that you familiarise yourself with them and approach questions equipped with the notion of asymptotic equivalence at the front of your mind to simplify the task.

   While the concepts in this topic are not explicitly examined other than in the mid-semester exam, these ideas form the foundation of some topics to come, so it is absolutely vital that you grasp these ideas quickly. What worked for me was visualising these ideas on a Cartesian plane with a random sequence and specific values for the variables (ϵ, N etc.), and then generalising it to arbitrary variables upon understanding the specific cases.

2. **Functions, Limits and Continuity**

   Extending upon the ideas of limits and behaviours of sequences, this topic covers the limits and behaviours of functions and reconstructs the idea of continuity. Though you will notice a significant leap in the number of definitions that you must now memorise, ensure that you are still dedicating your brain space to them instead of something else, like beer. Definitions also start becoming very finicky from here on out, with very exact intervals or inequalities that must be written.

   Again, the concepts in this topic are not explicitly examined in the end-of-semester exam, but is, nevertheless, important in the grand scheme of things. If you discovered an effective way to understand concepts in Topic 1, apply it to this topic as well, for the ideas are quite similar in nature.

3. **Differential Calculus**

   This topic re-examines high school differential calculus in greater detail and introduces students to vital theories like Rolle's Theorem and Mean Value Theorem. For some reason, Barry very much enjoys examining these topics and often asks students to recite the definitions or theorems in this topic. Barry also introduces the hyperbolic trigonometric functions here and also loves to incorporate these into exam questions, so make sure you are familiar with the properties of these functions.

   Fundamentally, the ideas in this topic were quite visual and rather simple to grasp. However, there were specific applications of these theorems and proofs using these theorems that you must familiarise yourself with.

4. **Integral Calculus**

   Whilst only covering four lectures, the idea of Riemann integrability and partial sums is vital for Improper Integrals in the future. Again, Barry revolutionises how you should think about integration, but hopefully you familiarised yourself to Barry's unusual style of teaching by this time.

   Barry likes to examine definitions for this topic, so make sure you carve these definitions into memory more than ever. I found that thinking about a model function, drawing upper and lower partial sums and refining them helped me grasp Darboux integrals and Riemann integration rather quickly.

5. **Differential Equations**

   For what's meant to be the point where the subject becomes relatively easier since you enter Calculus 2 territory, I found this topic to be quite challenging at first and taught rather messily. To give you a clearer rundown than Barry,

you are introduced to a number of different types of differential equations (both first order and second order) and taught very specific ways to solve them. Make sure you can identify the type of differential equation on first glance and memorise the method to solve them.

Barry also studies some applications of differential equations, which are mostly always examined. I recommend remembering the way that Barry approaches each problem, instead of just remembering the solution equations. In saying this, do not discount the importance of knowing the solution equations, for these will often simplify the problem at hand, especially when complex numbers come into play.

6. **Improper Integrals**

   This topic is rather short covering just three lectures, but nevertheless, vital for the end-of-semester exam. Exam questions encompass verifying whether a function is an improper integrable or not. Make sure you are familiar with the conditions for improper and Riemann integrability. A technique that is often used is splitting up functions into separate intervals and looking at the integrability of each interval. You will often need to use ideas of limits, continuity and Landau symbols in conjunction to verify the integrability of specific intervals.

7. **Infinite Series**

   Although this is the last topic in the semester, it is one of the easiest to understand and constitutes the largest proportion of all end-of-semester exams. Dedicate time to memorising the conditions for using each test, for Barry will often ask you to recite these in the exam. The only complication with this topic is knowing which test to use for each function, you will need to notice these patterns.

Lectures

Lectures proceed at a very fast pace, so give yourself time to absorb and understand the content. While Barry advised that you do not miss a single lecture, I felt like it was perfectly fine to skip some and catch up on them later. Even though he wrote the worked examples on the board, he talks through every line he writes up, so you can essentially transcribe him or get the examples from a friend. The lectures were well-structured, where most of the content led on from each other, creating a logical flow from lecture to lecture. What I found worst about Barry was the fact he had to skip so many steps in his explanation due to the amount of content he had to get through for this subject. This meant that you needed to review each lecture very thoroughly and fill in the gaps yourself (or go to a consultation).

Tutorials

The tutorials were not necessary to attend, as they just went through questions in the Problem Booklet. The tutor did not provide more insight than was covered in the lecture. While the tutor helped us through questions when we didn't know how to do them, this could be achieved through attending a consultation. In saying this, I did feel like I understood the content a lot better after attending the tutorials.

Individual Assignments

Barry's assignments were both very complicated and difficult to get a high mark on. I do not recommend doing his assignments right before the deadline, as they require a lot of thought. His assignment questions always required you to think about many different things, especially since most of his questions deal with variables instead of numbers. This meant that you had to consider the cases for different values of the variables, for instance.

Mid-semester test

The mid-semester exam was out of 40 marks, with a time limit of 45 minutes. The biggest problem with this exam was the time limit – most students felt very pressed for time. Make sure that you know your definitions and theorems very well, as this constituted more than one-fifth of the exam. They were very harsh with the level of detail expected in answers, taking marks away for missing justification. For instance, you would lose a mark if you didn't explicitly state that you used a limit law when used.

End-of-semester exam

The 2018 end-of-semester exam was out of 125 marks. Content-wise, the exam was very similar to past exams, so the best preparation for it would be to do the past exams Barry provides. What was a little different to the past exams were the functions used in questions. I found that the functions Barry used in the 2018 end-of-semester exam was a lot more complicated than previous years, making it quite scary at first sight. However, once you got past the initial fear, the questions were quite doable, if you were able to break down them down to little segments. Overall, the exam was quite straightforward with little tricks and turns. Again, make sure you know your definitions and theories and are able to think on your feet. Good luck!

Second-Year Subjects

Contents

ACTL20001 Financial Mathematics I (1)

Exemption status	CM1 *Actuarial Mathematics I*, 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	2019 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) consists of four chapters of content based on the first four chapters of the accompanying textbook. From a glance, FM1 shares much of the same content as ACTL10001 *Introduction to Actuarial Studies*reintroducing actuarial notation, valuing cash flows and loan contracts. However, this subject builds on prior concepts, expands on their applications and delves deeper into their definitions and proofs touching on methods of proof from MAST10009 *Accelerated Mathematics 2* helping to build intuition on why these concepts work and when to apply them. There is also new content introduced such as increasing and decreasing annuities and types of institutional investments.

Lectures

Due to the limited number of actuarial students, there is only one lecture stream for FM1. It may help to build your timetable about these lectures though they tend to be at accessible times (Wednesday and Thursday afternoon for Sem 1, 2019). Lecture slides were broken into individual chapters and released well in advance of the lectures, and were accompanied by supplementary notes released on the LMS when required.

Lectures consisted of Ping briefly reviewing concepts from the previous lecture before introducing a new concept with help from the lecture slides. Although the lecture slides give sufficient information to introduce a topic and what it means, some additional details and proofs will be provided by Ping via annotation. Concepts involving calculations are often

accompanied by introductory examples which will be explained in the lecture slides, however, more nuanced applications of concepts such as those appearing in assessments and tutorial questions may require more time to digest.

Tutorials

Tutorials for FM1 begin on the first week of the semester, with tutors reviewing the pre-tutorial questions for each week released at the start of the semester. Tutorial attendance is not assessed and solutions to these questions are released every Friday. These factors combined lead to low tutorial turnout, which can result in a very personalised tutorial experience.

Tutorial questions for each week consisted of 3-7 questions of varying difficulty. Though some questions involved straightforward concepts from lectures in the previous week, other questions hinted at topics in future subjects or proving certain equalities. It was clear that these questions were not examinable.

Overall, I believe that tutorial attendance for the subject is not necessary. Completing the tutorial questions, then cross-checking them with the solutions should be sufficient to grasp the course material. That being said, tutorials provide a good opportunity to ask questions and solidify understanding of concepts.

Assignments

There were two group assignments for FM1 consisting of 3-5 people. Groups could be formed with anyone completing the subject regardless of tutorial time. Assignment questions were released about 3 weeks before they were due. Both assignments were out of 20 marks.

Unlike previous years, the assignments for FM1 this year were application based, requiring a combination of research and calculations to reach a conclusion. Due to this, it is not a good idea to leave the assignment to the last minute as the assumptions made when answering questions may need to be discussed as a group. Overall, both assignments were quite accessible, and many groups tended to score close to full marks.

Mid-Semester Exam

The mid-semester exam was in week 7 and was a 45-minute exam with 5 minutes of reading time. The exam covered content from Chapter 1 and half of Chapter 2. Like most actuarial exams, no formula sheet is provided so formulae must be memorised. Prior to the exam, two practice papers were released with the actual exam format following it closely.

The paper itself was of quite fair, all the questions were accessible so long as revision was done beforehand, with time pressure preventing most from achieving higher scores. It may be prudent to learn how to store equations or numbers as variables on the FX82 calculator to avoid having to retype equations, thus saving time. Solutions were released after the exam with papers available for review during the following tutorial.

End-of-Semester Exam

The final exam ran for 2 hours with 15 minutes of reading time making up 70% of the subject mark and is the only assessment contributing to the CM1 *Actuarial Mathematics I* exemption. The exam is out of 70 marks, making 1 mark equal to 1% of the subject. Like all FBE subjects, there is a 50% exam hurdle. It was mandatory to have a calculator (Casio FX-82 any suffix) and no formula sheet was provided. Two past exams with solutions were made available on the LMS (with more available on the Library website).

The structure of the exam was identical to the past papers released and the difficulty was definitely a step up. The exam itself consisted of 11 questions and is application based with many calculations (timelines will be your best friend) accompanied

by 1-2 questions of proofs and theory (from Chapter 4). Formulae learnt throughout the semester will need to be internalised with their applications understood, knowing the formulae alone will not be enough the solve some of the more complicated questions. For example, instead of constant loan repayments, increasing and decreasing annuities could be applied to loan amortisations instead.

Necessary Resources

The recommended textbook for FM1 is Compound Interest and its applications by Fitzherbert. R. & Pitt. D. The textbook is available for purchase at the University Co-op Bookshop for $33. While I recommend purchasing the textbook, it is mostly a denser version of the subject's lecture slides, with better explained definitions, proofs and other nuances. It also provides practice questions with worked solutions for each chapter that are useful for exam preparation. However, if you prefer learning through Ping's explanations, the textbook may not be necessary.

This textbook is also used for ACTL20002 *Financial Mathematics II*.

Concluding Remarks

Financial Mathematics I provides a comprehensive introduction to the basic tools used by actuaries. During the semester it's not too difficult as long as you keep up with the content. Much of the difficulty of this subject can be attributed to the exams, as, come exam time (mid-semester and final) a strong understanding of cash flows, discounting and the relationships between notation will be required. In my opinion, the best way to approach this subject will be to build and develop intuition through consistent practice so that applying concepts to different scenarios will become a reflex.

ACTL20001 Financial Mathematics I (2)

Exemption status	CM1 *Actuarial Mathematics I*, 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. ✗ Not necessary unless you want to utilise the exercises. Lecture covers all the content needed.
Lecture capture	Full (both audio and video).
Year and semester reviewed	2019 Semester 1

Comments

Subject content

- Week 1: Present Value and Interest/Discount rates
- Week 2: Nominal and Effective Interest/Discount rates
- Week 3: Force of Interest and Applications
- Week 4: Present Value with varying and constant rates
- Week 5: Valuing Cash Flows
- Week 6: Continuous Cash Flows and Applications
- Week 7: Payments with Linear Variations
- Week 8: Equation of Value
- Week 9: Loan Contracts and Repayment
- Week 10: Evaluation of Projects
- Week 11: Characteristics of Major Asset Types
- Week 12: Characteristics of Major Asset Types/ Revision

This will be your first, proper actuarial subject, where the completion is compulsory and counts towards your exemptions. Many find this as a repeated subject from *Introduction to Actuarial Studies* ACTL10001 from your first year, and whilst this may be true for the first few weeks of the course, you will soon learn that ACTL20001 goes much more in depth with regards to the financial mathematics. That being said, if life tables were not your forte, this may be your time to shine.

The subject starts off relatively easy, leading to some students slacking off and often results in unnecessary shocks when the content becomes more difficult. As there are many new actuarial notations introduced in this subject (and yes, that means more formulas), it is important not to underestimate the difficulty of the subject. Understanding of mathematical concepts such as Taylor series are assumed, hence if you have not taken MAST10009 *Accelerated Mathematics 2*, take

some time to learn, or at least have a brief idea of these concepts.

Lectures

There are 2 lectures per week, both fully recorded with slides uploaded on the LMS prior to the lectures. When Ping writes anything outside of the slides, which she does occasionally, she will scan and upload this on the LMS as well, which I found handy for revision. The pace of the lecture is quite slow from what I have experienced, as I was able to follow through the lecture even on 2-times speed using lecture capture. There was a complaint made to Ping about this, and she explained that she must cater to all students, including those who have not completed ACTL10001. While the slides are pretty much self-explanatory, I would still recommend going through the lectures to understand the different examples.

Tutorials

Unlike your other commerce subjects, ACTL20001 does not consider attendance and participation as part of your assessment criteria. Tutorial questions are provided on the LMS, and whilst the answers for these are uploaded at the end of every week, the explanation/working-out provided in these answer sheets tend to be very brief and sometimes even insufficient. I would strongly recommend you to go to these tutorials to hear the full explanation and be able to ask questions when you do not understand something. The format of most tutorials will see the tutor go through each question and explain the solutions.

Assessments and Assignments

The assignments, both 1 and 2 were very practical tasks, where students, in groups of five, were required to conduct their own research to find and utilise real life data, such as the cash rate or the stamp duty level. They both contributed 10% to your final mark. Being able to use Excel proficiently is a very handy advantage, as it is not possible to do the assignment purely with pen and paper. I strongly suggest that you first attempt these assignments individually, then gather as a group and check for differences. This way, you can ensure that you make the least amount of errors as a group. The mid-semester exams, like any other actuarial exam, was difficult mostly because of the short time frame. Familiarise yourself with the FX-82 calculator to avoid wasting time during the exam.

End-of-Semester Exam

A big tip for studying for the final exam is to go through the tutorial questions. Whilst the exercises from the textbook may help, I think the tutorial questions are much more relevant. Ping also tends to ask questions that students did not do so well in during the mid-semester exam, so make sure you read the mid-semester exam review. Memorising your formulae may seem daunting initially, but you will soon realise that there is a pattern to them. Again, the time constraint will be an issue, so familiarise yourself with the calculator and the sorts of questions asked. You will be able to do this using the past exams that the lecturer provides. Many found this year's exam to be quite difficult as the questions sometimes required you to think outside the box, but otherwise it was a fair exam that reflected the study material provided throughout the semester.

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)	Jason Davis
Weekly contact hours	2 × 1-hour lectures 1 × 1-hour tutorial
Assessments	Assignment 1 due Week 6 — 10% 45-minute mid-semester test in Week 8 — 10% Assignment 2 due Week 6 — 10% 2-hour final exam — 70%
Textbook recommendation	None
Lecture capture	Full (both audio and video).
Year and semester reviewed	2018 Semester 2

Comments

Subject Content

- Weeks 1–2: Securities and Bonds
- Week 3: Measuring Investment Performance
- Week 4: Interest Rates and Immunisation
- Week 5: Interest Rates, Arbitrage and Replication
- Week 6: Arbitrage and Forward Contracts, and Default
- Week 7–8: IID Returns
- Week 9–10: Life Assurance Applications and Lognormal Distribution
- Week 11–12: Time Series Models and Simulation

Enjoy the sense of achievement upon successfully completing ACTL20001 *Financial Mathematics I* (FM1) before you're thrown into Financial Mathematics II (FM2). The subject started off gently with familiar securities and bonds, and relatively simple methods of measuring investment performance. Although calculating different types of rates was tedious and boring, the real-life applicability of immunisation was interesting. The ideas of arbitrage and how options and forwards contracts work were easy to take in, but using them to replicate portfolios was tricky and required a deeper understanding of the cash flows involved. Default was quite an intuitive topic which made it a nice break from the difficult subject. Then, from Week 7, FM2 became extremely difficult with IID returns, the lognormal distribution and time series models. These topics were heavily maths-based and were hard to digest. The applications in life assurance were a bit tricky but quite interesting. Overall, the FM2 subject content was a step up from that of FM1.

This review was previously published in the 2018 end-of-year edition of the *Actuarial Students' Society Subject Review*.

Lectures

Lecture slides were split into Weeks 1–6 and Weeks 7–12 and uploaded well in advance. Every lecture started with the learning objectives, alternated between theory and examples and concluded with a summary. Although theory could be learnt by reading the slides, the examples were crucial to understanding how things worked and could be applied.

Jason often engaged students by asking questions throughout his lectures, whether it was to check understanding of theory or to calculate a part of a problem. He also frequently showed Excel spreadsheets or pulled up other relevant information on the screen, and as these were generally hard to see, it was a good idea to sit close to the front.

Whether to attend the lectures or watch them online is personal choice, but since the lectures were at decent times, I thought I might as well attend in person. Due to the difficulty of the subject, I don't think watching the lectures online would have saved time; you probably wouldn't have understood much at 2× speed anyway.

Tutorials

People tend to get lazy when tutorial attendance is not compulsory. To be honest, I didn't attend many of my FM1 tutorials and realised during SWOTVAC (when I was going through the problem sets) that it would've been much more effective to go regularly and review at the end of the semester. So, to reduce my end-of-semester stress levels, I ended up going to all 12 of my FM2 tutorials. Since my tutorial was on a Monday morning, I sometimes struggled to find time to complete all the questions on the problem sheet in time for the tutorial, but I always read through them and at least considered how to approach them.

My tutorials were split into two sections – a review of the previous week's content and then going through the problems. The time spent on each depended on how many problems there were and how difficult they were. My tutor did not necessarily expect us to have completed all the problems but would ask us to contribute to solving the problems at times, which was a good way for us to learn from each other. Solutions to the problem sets were uploaded to the LMS at the end of the week, but I didn't refer to them until my review during SWOTVAC since I had already learnt the solution during my tutorials.

Assignments

There were two individual assignments, worth 10% each, that both involved building a model in Excel. The assignment tasks had storylines to reflect the real-life application of the financial models created, which made them interesting.

For both assignments, I had to think through the theory and how it could be turned into a spreadsheet, before being able to do anything in Excel, and I assume this is also because I had no previous experience in building Excel models. It was important to consider all possible scenarios when creating the models. Although the tasks had emphasised that the models should work for any inputs, it was easy to only think of the obvious cases.

For both assignments, after the results were released, Jason released the test cases and then kindly allowed resubmissions from students who received less than 8 out of 10 for a maximum mark of 8. Having the test cases meant that students could guarantee that their resubmission could receive an 8.

Mid-Semester Test

The mid-semester exam was a 45-minute closed-book exam with no reading time and with the usual calculator. The exam covered content up to Lecture 11 (inclusive). The exam papers and their solutions from 2014 to 2017 were provided for preparation. The solutions were very bare, often presented in tables without explanations, and questions that were bookwork did not have solutions, so it was unclear how much it would be necessary to write for theory questions.

This semester's paper was more confusing than difficult; superfluous information was provided to and a question on index-linked bonds was complicated in its definition. Consequently, many students did not do as well as they expected, which served as a lesson in how tricky FM2 could be and prepared us for the final exam.

Final Exam

The final exam was a 2-hour paper with 15 minutes of reading time and required a calculator. Like with the mid-semester exam, the 2014-2017 papers and their solutions were provided, and these solutions provided more support. Although there was some pattern to the structure of the paper, it was clear that the problems themselves could be wildly different to questions already seen, and so the final exam appeared to be a test of problem-solving ability, given the content taught.

The final exam this semester appeared approachable enough during reading time but was extremely tedious. Jason set questions that required line-after-line of working out and calculator input, which, personally, I was not expecting. Furthermore, the style of questions was slightly different to what was expected after doing past papers. Finally, many students struggled to finish the paper, with several barely reaching the last question, so maybe it would be important to also improve speed, on top of problem-solving ability when preparing for the final exam.

Concluding remarks

FM2 is significantly more challenging than FM1, but also more interesting and applicable to the actuarial field. I know people are tired of hearing about the correlation between lecture/tutorial attendance and good scores, but seriously, attending my tutorials and participating when I could provided me with the basic technical skills and the confidence I needed to tackle the harder problems in the exams. The subject required much more higher-order thinking and definitely has improved my problem-solving ability.

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 participation (incl Online Tutorial) 10% Online multiple-choice test, set in Week 6 5% 2 × group assignment 12.5% 2-hour end-of-semester exam 60%
Textbook recommendation	Blanchard, O. (2017). *Macroeconomics Australasian Edition*. Frenchs Forest, AU: Pearson Education Australia.
Lecture capture	Full (both audio and video)
Year and semester reviewed	2018 Semester 2

Comments

Subject content

There are 5 main topics covered in this subject:

1. Short-run macroeconomics (IS/LM models)
2. Labour markets and unemployment
3. Macroeconomics adjustments (AD/AS and DAD/DAS models)
4. Long-run macroeconomics (Solow model, endogenous growth model and productivity)
5. Open-economy macroeconomics (Interest rate and exchange rate regimes)

Lectures

The lecture slides of this subject are quite detailed when combined with Mei's explanation. Occasional, the slides lack a structure as Mei focuses too much on the detail of a specific concept without explaining the main points. The algebra and mathematical proofs shouldn't be difficult for actuarial students and I recommend that students should really take advantage of this through learning the proofs in detail and understanding every step.

There is usually a question attached to the end of every second lecture. This question covers the concepts that were taught, and students should understand them fully as they are quite straightforward. Answers are provided online after class.

This review was previously published in the 2018 end-of-year edition of the *Actuarial Students' Society Subject Review*.

Tutorials

Attendance to tutorials contribute to the student's final grade, therefore, students should go to every tutorial. Students are provided with problems on a blue, pre-tutorial sheet to complete at home. These questions are often very simple, therefore, tutors usually don't go over them in class. During tutorials, students are given pink sheet problems, and these are quite challenging in comparison to the blue sheets. The workings-out of the pink sheet problems are not provided. Therefore, it is highly recommended for students to attend replacement tutorials where they can obtain detailed solutions of the problems as pink sheet problems are very important during revision time.

Online test

This is an online test similar to the one in *Introductory Macroeconomics* and is conducted on LMS with 15 questions. Students are provided with sample questions beforehand along with answers. The online test was on the topics of labour market and short-run macroeconomic models.

Assignments

There are 2 assignments during the semester. Students have the option to do the assignments individually, or in groups of 2 or 3. Personally, I completed the assignment individually and I recommend this because it really helps to consolidate the concepts that students have learnt.

The first assignment is on the IS/LM model and the dynamic AD/AS model. Students are also required to use Excel to do calculations and plot time-paths and output graphs. This assignment should be quite straightforward.

The second assignment is on the Solow-Swan Model and its variations. This assignment is comparatively more difficult as it requires students to manipulate formulae and provide interpretation. Again, students are required to utilise Excel to plot graphs and calculate other parameters.

It is highly recommended for students to write more for the assignments. The mark allocations can be very misleading and writing more for each question will increase your chances of getting a higher mark.

End-of-semester exam

This is a 2-hour exam with 15 minutes reading time. There are 3 equally weighted sections (A, B and C), which are worth 20 marks each.

- Section A: Multiple Choice
- Section B & C: Short Answer

For section A, the multiple choice questions often contain many traps, so it is imperative to read and interpret the questions carefully. For sections B and C, students are required to answer 2 out of the 3 questions provided. It is best for students to identify the "best" questions to answer during reading time as this is often the key to obtaining a high score.

Despite Mei explicitly stating that we do not need memorise the formulae, students should not only memorise the formulae but also understand the derivation for each formula. Often, the formulae provided in the exam are insufficient to answer the question. There are also instances where students are asked to derive a specific formula, which was one of our questions in part C.

Conclusion

This is my favourite subject this year as I considered it as a break from the tedious concepts in *Statistics* and *Financial Mathematics II*. I highly recommend actuarial students to take advantage of your mathematical advantage and understand every single element within the derivations as this will allow you to understand the concepts a lot better.

ECON20002 Intermediate Microeconomics [SUM]

Exemption status	None.
Lecturer(s)	Ms Svetlana Danilkina
Weekly contact hours	2 × 2-hour lectures 1 × 1-hour tutorial
Assessments	Tutorial attendance and participation 10% Online multiple-choice test 10% 2 individual assignments 2 × 10% 2-hour end-of-semester exam 60%
Textbook recommendation	Pindyck, R. S., & Rubinfeld, D. L. (2013). *Microeconomics*. (8th ed.). Pearson Education. ✗ This textbook was never explicitly used, so I do not recommend purchasing it.
Lecture capture	Full (both audio and video).
Year and semester reviewed	2019 Summer Term

Comments

ECON20002 Intermediate Microeconomics can be completed over the Summer or in Semester 1, with differing focus and styles of examination in these two study periods. In the Summer, the exam was very theory-heavy, so there was a lot of writing (with basically no calculations). In Semester 1, the exam was much more mathematics-heavy, so there was a lot of calculations (with basically no written work).

Subject Content

1. Consumer Theory
2. Producer Theory
3. Markets
4. General Equilibrium
5. Game Theory
6. Oligopoly
7. Choice under Uncertainty
8. Economics of Information (not examined)

Lectures

Svetlana's lectures were very dense, with numerous concepts being covered in one lecture. And her content-heavy slides only made each lecture more overwhelming. However, I would advise you to focus on the story that Svetlana tells, as her verbal explanations are extremely logical, with each sentence flowing onto the next. After disregarding much of her lecture slides, I found the content a lot easier to follow. She is not a lecturer that reads off the slide, in fact, she probably says

about 10% of what is on the slide, but she does so to ensure a very crisp narrative is told with the concept she teaches. This is what makes her such a great lecturer and one of the best lecturers I have had.

Because each concept typically builds onto the next, I found that as soon as I did not understand something, the rest of the lecture became a total waste of time. As such, I only ended up attending one lecture in person and would highly recommend watching lectures online. Personally, I found the content to be quite straightforward once I understood the narrative she was telling.

Tutorials

The tutorials were very well structured, composing of a pre-tutorial component and problems to work on in the tutorial. The pre-tutorials were quite easy to complete, and the tutor will check your work during randomly selected tutorials, which will form a part of your tutorial participation mark. What I found misguiding was the style of questions in the tutorials as compared to the end-of-semester exam. Most – if not all – questions in the tutorials were mathematical and required calculations, but the end-of-semester exam lacked this aspect. Therefore, I found that tutorials were not a good reflection of the final exam but was good practice to ensure you understood the content.

Multiple Choice Quiz

As with other Economics subjects, the multiple-choice quiz was not there to trick you. In this subject, the quiz only covered Consumer Theory. Questions were extremely similar to the tutorial questions, so I would recommend preparing for the quiz by attempting these questions again. Svetlana also provided us with a practice quiz, which was of similar difficulty. The average mark was $8/10$.

Assignments

Assignment 1 covered Consumer Theory and Producer Theory and was very calculation-heavy. Assignment 2 covered Markets and General Equilibrium and was a lot more theory-heavy. Nevertheless, neither assignment was tricky, in that answers could be found in either similar tutorial questions or were explicitly stated by Svetlana in a lecture. Students should generally do extremely well on these assignments.

End of semester exam

Svetlana made it clear that the exam will be similar to tutorials and assignments, and some questions were indeed nearly identical. Therefore, such questions should generally be done to a very high standard and can be prepared for by completing all tutorial questions again. What was unexpected was the sheer amount of writing that needed to be done in the exam. As tutorials were very calculation and mathematics-heavy, I was under the impression that the final exam would also be of a similar style. However, there was only one big question that focused on calculations, with most other questions requiring a written explanation of a concept. This means that it is not enough to understand how to do tutorial questions, but the logic and development of all models should be crystal clear. The past exams provided were 5 to 10 years old and are good indicators for the Summer exam's difficulty.

Looking back, the exam was extremely fair, perhaps almost too fair for a second-year subject. My only advice would be to focus on understanding the narrative Svetlana tells (and being able to retell this story) and be comfortable with both writing and calculation style questions. Calculation questions can be prepared for through the tutorial questions, while writing questions can be prepared for by talking through the story to yourself for every concept in the semester.

MAST20004 Probability

Exemption status	CS1 *Actuarial Statistics I*, 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 MATLAB session
Assessments	4 × individual assignments 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. ✗ This textbook was never explicitly used, so I do not recommend purchasing it. A bound copy of the lecture slides and the prescribed problem sets can be purchased from the Co-op store. Although these were also available in PDF format on the LMS, ✓ I highly recommend purchasing this book and annotating it as you go through the semester.
Lecture capture	Full (both audio and video).
Year and semester reviewed	2019 Semester 1

Comments

MAST20004 Probability formalises basic probability theory taught in high school and introduces students to various ways of working with probability distributions. Compared to MAST10009 *Accelerated Mathematics 2*, this subject is a lot less dense and so a lot easier to follow. At first glance, Probability seems like an application-driven subject, so it is easy to fall into the trap of grinding problem sets. However, I believe the course was structured in a manner that emphasises the concepts a lot more than students think. Therefore, I cannot stress the importance of investing time into understanding core ideas enough, and I have outlined what I did to help me grasp each topic in the **Subject Content** section below.

Subject Content

1. **Introduction to Probability**: This topic reintroduces students to high school concepts of probability – such as independence – and formalises it with definitions and axioms. Much of this topic should be a review of previous knowledge, and the concepts are generally easy to understand. I found understanding the Law of Total Probability key to some future topics, so make sure you understand its graphical and tree diagram representation.

   Judging from past exams over the last decade, the first question of the end-of-semester exam is always about probability axioms and proving probability properties. I found that these proofs almost always utilise Axiom 3, so make sure you can comfortably construct disjoint events.

2. **Univariate Distributions**: Extending upon random variables taught in high school, this topic is the foundation of the more complicated bivariate distributions topic. Pmfs, pdfs, cdfs, expectation and variance were first introduced quite generally, then these concepts were applied to a variety of discrete and continuous distributions. Although the derivation of each distribution function, expectation and variance was shown, I have never seen this explicitly tested

on an exam. In saying this, it is expected of you to have all of this information readily available on your cheat sheet.

Most of this topic is straightforward. I would take the time to understand how each distribution function is derived as a means of understanding the difference between each distribution. Furthermore, understanding the relationship between areas under distribution functions and probabilities is vital for understanding the next topic.

3. **Bivariate Distributions**: Whilst students were generally comfortable dealing with pmfs, pdfs, expectations and variances of univariate distributions, a second variable proved to be a significant leap in difficulty. Understanding double integration and its three-dimensional representation was key in helping me learn this topic.

   Every past paper had a question about bivariate distributions, and the tricky thing was knowing what bounds to use when integrating the distribution function. Shading the domain of the bivariate function on an x-y plane helped me see which sections I needed to integrate and proved to be a great method to answer this style of questions.

4. **Generating Functions**: I found this topic the most conceptually-difficult and confusing, as there was no way to visualise generating functions. Be open with your thinking when learning this topic and be familiar with manipulating one generating function to another.

   Students struggle most with the exam question on generating functions, as most students neglect this topic when studying. Again, be comfortable manipulating one generating function to another and make sure you can easily derive generating functions for a given probability distribution. I recommend putting the pgfs and mgfs of all probability distributions onto your cheat sheet.

5. **Stochastic Processes**: In contrast to the previous topic, stochastic processes is arguably the easiest and shortest in this course. Brush up on your knowledge of eigenvalues and eigenvectors and familiarise yourself with matrices. Besides that, this topic is very logical and easy to comprehend.

   Markov chains are set to be on your end-of-semester exam, but the questions are straightforward and asked in a very similar style to previous years. Practise these types of questions and these should be easy marks in the final exam.

Lectures

Mark and Aihua have varying styles of teaching: Aihua goes into a lot more depth with each concept and often goes on tangents, whereas Mark tends to provide just enough information for you to understand the concept. Because Mark was a lot more succinct, I preferred Mark's lecture stream. However, Mark glossed over complicated concepts near the end of the semester, so I complemented Mark's lectures with Aihua's detailed explanations. Overall, I would recommend watching Mark's lectures throughout the semester and referring to Aihua's when required.

Contrary to popular belief, I found that watching lectures online was extremely effective (perhaps more effective than attending in-person). This is because I could pause and rewind the lecture as I annotated the slides throughout the semester. Maintaining this type of note-taking gave me a very logical set of notes to read in SWOTVAC.

Tutorials

Tutorials consisted of attempting prescribed questions in small groups. I did not find it necessary to attend tutorials regularly, as I could just attempt the questions in my own time. If you are having trouble understanding the content, I would recommend going to a consultation (especially Aihua's) as his explanations are extremely clear. I had Aihua as my tutor, so I only attended tutorials when I had trouble with a particular concept.

The purpose of each MATLAB session was to visualise or simulate concepts learned in the previous week. If you think this would enhance your understanding of concepts, then I would attend. If not, the MATLAB session does not add much value. End-of-semester exams typically have a couple marks dedicated to MATLAB, and the questions are of similar style every year. Attempting past exams would be sufficient preparation for MATLAB questions.

Assignments

Written assignments consist of four or five questions, of which two questions will be randomly chosen and marked. Questions require some thinking but are generally doable. The assignments do take quite some time to write everything out, so I would recommend starting early.

These assignments were marked out of 10 (as compared to 100 in MAST10009 *Accelerated Mathematics 2*). Therefore, scoring full marks was a lot more common in MAST20004 Probability, as the rigour expected from students was lower than in *Accelerated Mathematics 2*.

End of Semester Exam

The 2019 end-of-semester exam was out of 110 marks. Aihua wrote this exam, and it was extremely similar to 2018's exam (which he wrote as well). I followed the style of most past exams, so the best preparation would be to do the past exams provided. Every question was broken up into sub-parts of which each one was worth around 2-3 marks, which together spanned the entire syllabus. It is therefore vital that you are familiar with the question-types over the entire course.

MAST20005 Statistics (1)

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 Dr Allan Motyer
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. I personally did not use the textbook as the lectures notes provide sufficient information. Specific problems from the textbook are listed in LMS for those who want extra practice. Copies are available in the ERC High Use.
Lecture capture	Full (both audio and video).
Year and semester reviewed	2018 Semester 2

Comments

Subject content

Module 1: Introduction and revision of probability

Module 2: Point estimation

Module 3: Interval estimation: Part 1

Module 4: Interval estimation: Part 2

Module 5: Regression

Module 6: Hypothesis testing

Module 7: Distribution-free methods

Module 8: Analysis of Variance

Module 9: Order statistics, quantiles & resampling

Module 10: Bayesian methods

Module 11: Asymptotics & optimality

This review was previously published in the 2018 end-of-year edition of the *Actuarial Students' Society Subject Review*.

Module 12: Revision of 2017 past exam paper

Lectures

You can enroll in either Allan's (morning stream) or Damjan's (afternoon stream) lectures. You don't necessarily have to go to the lectures as all the handwritten notes will be uploaded to LMS at the end of the day. At least half of the students took this subject as an online course according to the lecture attendance rate. Damjan sometimes spoke very softly in lectures but his explanations were overall clear. You may prefer to listen to his recording. I personally went to Allan's morning lectures to push me out of my bed.

One of the most challenging parts of the subject is that each lecture contains lots of information, and sometimes the concepts can be too abstract to absorb in one hour. I wish more worked examples could be given in the lectures to help solidify the content understanding.

Tutorials

Similar to other math subjects, tutorials are conducted in a group setting which encourages students to work together. Attendance is not compulsory and tutorial problems and solutions are released online. Don't panic if you find the lectures a bit confusing at the end of the week since the tutorial questions serve as a good opportunity to enhance your understanding of the subject. I usually did some of the tutorial questions beforehand so I could leave the rest for the tutorial and finish all of them on time. If I had time left over, I would ask for more clarifications on the lecture notes as I didn't bother to go to the consultations.

Computer labs

There is one one-hour lab per week immediately following the tutorial. Lab notes, exercise and solutions will be on LMS. Most students found one hour inadequate to complete all the questions. I would recommend everyone to read through the lab notes before every class, this will let you get the most from that class with your tutors present.

Piazza discussion forum

You can easily get help from your classmates and teaching staff in Piazza. Generally, you will get a reply from the instructors within one day. Any questions and clarifications about the assignments can also be posted. Everyone benefits from the discussions and it saves you effort from going to the consultations.

Erata

The Errata page is to update corrections to errors in the lecture notes and other learning materials. It may not include every error so do ask if unsure.

Assignments

There are three individual assignments and each is given two weeks to finish. Assignment questions are slightly more difficult than tutorial questions, which allow deeper understanding of the content covered. I personally found the assignments quite useful in helping me catch up with my R study. As R knowledge is essential for some assignment questions, I felt I had a better command of it every time I completed my assignment.

Laboratory test

The 45-min lab test is held in week 12. A computer lab test was made available early in the semester to give us a sense of what a typical lab test looks like. One or two questions in the lab test were basically the same as the sample questions. I recommend everyone print out the learning materials during the semester as you may bring any of them (lecture slides/notes, tutorial problems and solutions, lab notes and solutions) to the lab test.

Final exam

You will get the most out of 2017 Past Exam Paper as it was designed by Damjan. There is one question in the 2017 exam which was quite similar to the 2018 exam. Past exams from previous years are also good practice resources but the solutions are not given so you have to rely on group discussions, consultations or the discussion forum to check answers. From what I've heard, most people found the 2018 statistics final exam relatively easier than the 2018 probability final exam, and the results have also shown this.

Other comments

According to the mid semester subject survey, roughly half of the students found the pace of the subject fast and difficult. The average hours of work outside classes were 5 hours.

It is a challenging subject but you will do well if you make use of the available learning materials and get as much practice and feedback as possible.

MAST20005 Statistics (2)

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	2018 Semester 2

Comments

Lectures

Personally, I didn't actually go to the lectures. For the few lecture capture videos that I watched, I found that the usefulness of watching them varied greatly depending on the topic. Listening to the explanation of how to interpret Bayesian inference was very helpful, as it gave me an intuitive perspective on a different inference method to our usual frequentist's inference. This topic, in addition to topics regarding confidence intervals, hypothesis testing and different pivots (like the standard normal distribution) were among the more beneficial topics to watch on lecture capture. Otherwise, the lecture slides were sufficient for learning content. Being a maths subject, and specifically since this is statistics, I found lectures less useful to watch because practising and gaining experience applying concepts was much more important than memorising content.

Tutorials

Statistics, like most other maths subject actuarial students take, has one 1-hour in-class tutorial and one 1-hour computer lab class for R, the programming language. Statistics tutorials in particular are extremely important to attend, as getting experience with different questions will benefit you greatly. Make sure you place these tutorials at a time that you're sure you can be awake for. This subject provides good lecture slides for learning the content, which don't take too long to sift through, so I would highly suggest printing the notes out and reading them on your way to the tutorial, or even during the tutorial.

Statistics is the first time actuarial students learn to use the programming language R. R is not unlike MatLab that we encountered prior to R, but it has many more useful statistical analysis functions, like hypothesis testing and ANOVA

This review was previously published in the 2018 end-of-year edition of the *Actuarial Students' Society Subject Review*.

testing, which provide information about the likelihood of a test statistic. The lab classes were, as always, not interactive at all, but tutors are present to provide you with assistance when needed. I would recommend completing the lab sheets at home, and going to the lab only if you have questions.

Assignments

As all the assignments feature R components, Statistics assignments, as opposed to previous maths assignments, take even more time to complete. The assignment questions are nevertheless basic when compared to the likes of *Accelerated Maths 2*. The method for the questions can generally be taken directly from either a lecture slide or a lab sheet- use this to your advantage! Don't be too focused on making your R code pretty; it just has to be presentable and functional. Allocate at least two nights to each assignment.

Exam

Statistics allows a double-sided A4 handwritten cheat sheet that you can bring into the exam. This should contain information about a few common probability distributions, similar to *Probability*, as well as the different statistics and their confidence intervals. As with all applied maths subjects, the guide to cramming success is not reading or watching lectures; it is doing all the past exams. The past exams span the range of different questions that they are likely to ask you, and provide a good indicator of your knowledge and ability. Whilst we only received solutions to the previous year's exam, we were given the questions for the past 5 years' exams. Statistics favours repetition and preparation, so make sure to oil the statistical gears before attempting the final exam.

MGMT20001 Organisational Behaviour [SUM]

Exemption status	None.
Lecturer(s)	Ms Lily James
Weekly contact hours	2 × 1-hour lecture 2 × 1-hour tutorial 2 × online tutorials
Assessments	Tutorial attendance and participation 10% Individual assignment, due in Week 2 10% Group assignment, due in Week 5 30% 2-hour end-of-semester exam 50%
Textbook recommendation	McShane et al. (2016). *Organisational Behaviour: Emerging Knowledge. Global Insights*. Australia: McGraw-Hill. ✓ I would recommend having one as it assists in understanding the different theories which can get a little confusing.
Lecture capture	Full (both audio and video).
Year and semester reviewed	2019 Summer Term

Comments

For most actuarial students, if not all, this will be the first reading-heavy, content-heavy and writing-heavy subject that they encounter. Unlike your other subjects, there is absolutely no mathematics in this course, and many of you may find yourself out of your comfort zone. The subject and content itself however, whilst notorious for its group assignment worth 30%, is quite fascinating to study, and the research that you will be asked to do will assist you in the future if you decide to pursue a life in academia. Doing this subject during the summer term means that the time period given to you for every assignment is halved, so it is important that you manage your time, especially with your group. More on this later.

Subject Content

- Week 1 (1): Introduction & Contrasting Management Approaches
- Week 1 (2): Teams & Leadership
- Week 2 (1): Perception, Attribution and Decision Making
- Week 2 (2): Values, Attitudes and Behaviour
- Week 3 (1): Motivation
- Week 3 (2): Conflict & Negotiation
- Week 4 (1): Organisational Change
- Week 4 (2): Organisational Communication
- Week 5 (1): Organisational Culture
- Week 5 (2): Power & Influence
- Week 6 (1): Organisational Strategy and Structure
- Week 6 (2): Ethics

Lectures

The lecturer invites students to participate during the lecture significantly more than in other subjects you will take in this course. Whilst the lecture slides include most of the content you need, I would still recommend attending the lectures or at least watching them, as this will help immensely with your understanding of the myriad different concepts and theories taught. Although I would not say that readings are essential, doing it will assist you in following the lecture.

Tutorials

Participation marks in this subject are very subjective and is heavily dependent on who your tutor is. As there is not a specific measure of participation, it may simply be a comparison with others in your tutorial. Other than that, tutorials are mostly used to go over the content from the previous lecture, and this is done is different ways. Usually they are done in a form of group task, which help students to fully understand the theories and content. Online tutorials are done as a sign of participation as well, representing your pre-tutorial preparation. Whilst they tend to be quite tedious, it is good to have a shot so you have something to discuss during the tutorial.

Assignments

Your first assignment is due in the second week, noting that this is following a summer semester timeline. It is a written case study analysis, and as most actuarial students will not have done such assignments during their first year, this may come as a shock for some students. Use the first individual assignment as a learning opportunity. At the end of the day, it is only worth 10%, so utilise this as a chance to figure out what is expected for this subject. Draw upon the feedback and use this to build the foundation for your next 30% group assignment. Groups are decided by the teaching team and were based on your personality/abilities. As mentioned earlier, because of the short time frame, it is crucial that you and your team cooperate to maximise the productivity of your meetings. My team always ended up getting distracted during the meeting, and hence our first few meetings were not utilised well. We fixed this issue by creating a plan for the meeting and setting a strict time limit to each of them.

End-of-Semester Exam

The final exam is 2-hours long and is separated into two parts. The first half is based on a micro-topic, and you must use examples from the interactions within your group assignment team in conjunction with the theories taught in lectures. This part is worth 25% of the final exam. To prepare for this, regularly take note of the interactions that occur within your team and try to make links to the topics you have studied. The second half of the exam will be on a random selection of a macro-topic, together with a case study. I studied by highlighting and making notes of each relevant macro-topic in the selection of case studies given. Be concise and clear with your answers as you may run out of time otherwise. Plan your answers before you start writing in order to maximise your efficiency and minimise mistakes!

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 8 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 all required material is provided in the slides. I personally did not use the textbook.
Lecture capture	Online lecture is recorded with video. However, workshops are not recorded.
Year and semester reviewed	2019 Semester 1

Comments

When the lecturer emails- "a large number of you applied for special consideration" in one of the smallest cohorts, you know you're in for a good time. If you thought that the step-up in difficulty from first-year to second-year was rough, be prepared for the worst. Actuarial Modelling I is a subject rife with arduous proofs and leftover gifts from second-year abominations, *Statistics* and *Financial Maths II*. Yet, beneath the tough mathematical derivations, lies a juxtaposing simplistic and familiar essence of *Introduction to Actuarial Studies*. Actuarial Modelling I is not for the faint-hearted. For those of you who think you may not be suited for actuarial studies, this is where you will be caught in the filter that is the alternative actl/eco/finance split major.

Subject Content

1. Modelling Mortality; future lifetime as a random variable, life tables, expectation of life, laws of mortality and fractional age assumptions. This section works with probability functions.
2. Non-parametric methods; Kaplan-Meier estimation, Nelson-Aalen estimation and Proportional Hazards model.
3. Estimating Mortality rates; Two-state Markov model, The Binomial Model, The Poisson Model as well as the comparison of these models.
4. Multiple State Models; Looks at using models with more than two states, for example, healthy-ill-dead, to estimate the probability of transition from one state to the other. This process involves solving linear ordinary differential equations.
5. The Poisson Process; Looks at the mathematical properties of the Poisson process and its application.
6. Simulation; Looks at the theory of simulating values using random numbers as well as application of simulation under discrete and continuous distributions.

Lectures

I did not attend lectures, which may well be the worst decision of my uni career so far. Not because the LMS material for this subject is suboptimal, but instead because it is vital that you do not fall behind - I had crammed every previous maths subject in four days thus far, but not even two straight weeks of only AM1 was enough for this subject.

Regardless, the lecture slides for this subject were clear and concise, with only one or two blank areas that needed to be filled out. They were beautifully succinct to such an extent that often, I would stop on one page for half an hour at a time to comprehend the derivation.

The lecture recordings were uploaded to Vimeo in videos that were each about 3 minutes long, alluding to only a few pages at a time. Consequently, it was easy to find the exact recording for the section I was looking for, but difficult to be absorbed into the process of lecture-watching, as I would have to load a new webpage every few minutes. You can find a code to allow you to change the viewing speed of Vimeo videos by simply Googling, which I personally recommend, as I believe that Dickson's pace is well suited to 2x speed.

Tutorials/Workshops

Having only attended two, I do not have the best idea of how these are run. However, the exam, to someone who had minimal exposure to the possible questions they could ask of you, felt completely different from the practise exams and the material that was available on LMS. Following this notion, I would highly recommend that you attend tutorials to maximise exposure to practising and working through various questions, as tutorial questions will not be posted onto the LMS.

My deepest regret is walking out of the exam, feeling lost, only to have friends say, "this was derived in the tutes/workshops".

Group Assignment

For the assignment, I was automatically placed into a group of four. Luckily, my group was very productive and willing to work together. The assignment had some conditions that had to be fulfilled that made it difficult; many students struggled to fit all of their responses to questions into an A4 MS Word document. For this reason, I recommend completing the assignment and using LaTeX to present the final document (go to our annual LaTeX workshop if you can't!) Additionally, we were required to submit the document with a photograph of all of the group members together, likely to create some real-life interaction between peers. This was an interesting concept, and I'm thankful for it, because I would not know what my group members look like otherwise.

Mid-Semester Test

The mid-semester exam is similar to the specimen and therefore deceptively easy. The average mark for my year was 7.36/10, which was followed by the remark from Dickson, "If you scored 8 or above you are on track for exemption standard in this subject. If you scored below 6.5 you should be concerned about whether you will pass the final exam, which is a hurdle requirement for the subject."

End-of-Semester Exam

As I have previously mentioned, this exam was quite unlike the specimen exam, of which we were only given one. This made practising exam technique and exam-styled questions quite difficult, as the only reference was not ideal. Except for the previously derived Kolmogorov proofs and other proofs, the only similar questions between the specimen and actual exam were the rare computation questions in this subject. The exam mostly consisted of questions that you could either do entirely or not at all. Given how difficult you now know this subject is, be sure not to underestimate it!

Concluding Remarks

It's no wonder that the dropout rate at the end of first semester of third-year is historically disproportionately high. Good luck my fellow budding actuaries, and, as I like to say, see you next year!

ACTL30002 Actuarial Modelling II (1)

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	Workbook for Actuarial Modelling 2 (AMII), prepared by Dr Xueyuan Wu is available for purchase from the Co-op store. ✓ I highly recommend this workbook as it includes all the lecture materials, tutorial questions, progress check questions and a specimen exam.
Lecture capture	Full (both audio and video).
Year and semester reviewed	2019 Semester 1

Comments

Subject content

- **Unit 1: Exposed-to-risk**. During the first three weeks the subject will cover the estimation of mortality from crude data. Most students found it challenging to understand the scenario of adjusting census data to match the same age definition as crude data. Practice is essential to enhance your understanding in this unit. There are hand-written illustrations for some key concepts which will be shared via the OneDrive notebook.
- **Unit 2: Hypothesis testing**. You will find it takes less effort to grasp the idea in unit 2 than unit 1 as most of the statistical tests such as chi-squared and sign tests have been taught in MAST20005 *Statistics*. This unit has more focus on the application of hypothesis tests in life insurance, which is to decide whether insurers' own internally derived mortality rates adhere sufficiently closely to the mortality rates in a published life table.
- **Unit 3: Methods of graduation**. The main purpose of graduation is to smooth the data. Although some of the graduation methods have to be fully delivered via Excel, which means they are hard to be tested in the exam, it is important to understand intuitively how each graduation technique works and be able to perform them under simple conditions.
- **Unit 4: Markov chains**. Unit 4 is not related to mortality rate modelling but properties of discrete time Markov Chains. Some of the materials have been covered in MAST20004 *Probability* while others will be discussed in greater depth. Again, being able to apply the methods such as first step analysis in various backgrounds of the questions is highly valued and especially useful in final exam.

Lectures

The attendance rate for the lectures was quite poor and Shane almost decided to turn off the recordings when it approached the end of the semester. I personally prefer to attend the lectures as it helps me to fully concentrate on the vast amount of content. Having a rough pre-study before lectures and recapping what has been covered afterwards is a good way to stay on top of the subject's content.

Tutorials

While there are no marks that contribute to your final result based on your attendance, tutorials are generally useful. Full solutions will be given at the end of the week in case you miss anything in the tutorials. Similar to other subjects, tutors offered more detailed explanations regarding the thinking process and sometimes may give a different perspective which enhances your understanding.

Mid-Semester Examination

The exam consists of 4 multiple choice questions and 2 short answer questions. Students usually performed well (the average mark was 75%) if they have read through all the tutorial questions and additional exercises Shane provided. There was nothing to trip you up as long as you have followed all the materials provided.

Group Assignment

Students are allowed to form their own group of 4 for the group assignment. Unit 1-3 will be tested and you will be working with real data in Excel format. The questions about calculating central or initial ETR and conducting hypothesis tests and graduation are straightforward and standard. Be careful about the assumptions involved in each method as you may lose marks on them if they are not stated clearly.

Final Exam

The final exam was quite challenging given the short amount of time. Not only did it require you to be able to respond to each question quickly but it also tested the depth of your understanding as the questions were slightly varied from the textbook questions we were comfortable with. The revision lecture in week 12 was really helpful in terms of the key concepts likely to be covered in the final exam.

Concluding Remarks

It is difficult to cram for the exam so keeping up with the study pace will save you lots of energy during SWOTVAC. Understanding each concept intuitively and being able to apply them in different scenarios is required, so be prepared to work hard.

ACTL30002 Actuarial Modelling II (2)

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% 1000 word group assignment 10% 2-hour end-of-semester exam 80%
Textbook recommendation	The printed lecture notes for Actuarial Modelling 2 (AMII) can be purchased from the Co-op store. ✓ This is essential as all the tutorial questions, progress check questions and practice exam are located within this book.
Lecture capture	Full (both audio and video).
Year and semester reviewed	2019 Semester 1

Comments

This subject is not very content heavy in comparison to other third-year, semester 1 Actuarial Subjects. There is a lot of overlapping content with *Actuarial Modelling I*, which focuses more on the proofs and derivations of the theory. AMII is not a subject that you can cram last minute as it requires a lot of time and effort to fully understand the content thoroughly.

Subject content

- **Unit 1:** Exposed to Risk Calculation
- **Unit 2:** Goodness of Fit Tests
- **Unit 3:** Methods of graduation
- **Unit 4:** Markov chains

Unit 1 starts off relatively easy, but the level of difficulty increases exponentially. It requires students to fully understand the theory behind the content and be able to manipulate it accordingly. This should be the most difficult section in the whole course. Students often develop their own way of calculating the solutions, and should work together to master this method of calculation. Due to the lack of practice questions, it is highly recommended for students to fully understand all the concepts of unit 1 prior to the mid-semester exam and practise it regularly. It is extremely unlikely to be able to cram this unit.

Units 2 and 3 are related to each other. Unit 2 shares similar concepts with *Statistics* (MAST20005). Unit 2 focuses on various 'goodness of fit tests', which are designed to test how well a crude data-set fits against a theoretical set of data. Students are required to know the strengths and weaknesses of each test.

Unit 3 covers methods of graduation. The focus of unit 3 is to take a given set of observed, crude data points and graduate them to remove any bias. Students will learn about the relationship and trade-off between data smoothness and data

adherence.

Unit 4 is not related to Unit 1/2/3. It focuses on probability and Markov Chains. It focuses on a method called, "first step analysis" and students are recommended to sharpen up their matrices skills as there will be a lot of matrix calculations. Unit 4 accounts for the highest proportion of marks in the end of semester exam.

Lectures

All lectures are recorded. It is recommended to attend the lectures rather than using Lecture Capture as it allows students to ask questions, which can be quite helpful, especially in understanding Unit 1 of the course.

Shane puts in a lot of effort to break down the concepts covered in Unit 1 of the course. You are not required to follow Shane's derivations exactly in Unit 1 and it is recommended for students to derive their own method of thinking in this section. The content requires a lot of time to breakdown, understand and apply.

Tutorials

Tutorials are not compulsory for AMII, however, it is recommended for students to attend. It provides an opportunity to ask questions especially for Unit 1. Tutors will go through the tutorial questions in the textbook and provide a detailed explanation of the solution.

Group Assignment

Students are allowed to pick their own group for the group assignment. It is an Excel task where students are required to perform statistical tests on a set of graduated rates against crude rates.

It is recommended for students to cross-check with other groups prior to submitting a final group copy.

It is also recommended that assignments are completed using LaTeX.

Mid-Semester Examination

This will only cover the content from Unit 1 and 2.

Again, you should spend as much time as possible to fully understand Unit 1 content. The Unit 1 multiple choice questions can be quite different and complex. It is highly recommended for students to go through the practice exam thoroughly. For the unit 2 content which is also covered, students should remember all the goodness of fit tests and learn how to apply them prior to the exam.

Final Exam

The final exam is a 2-hour paper with 15 minutes reading time.

Students are only provided with 1 practice exam (within the textbook) therefore there is clear lack of revision material. It is advised for students to focus on the questions that they are most familiar with first, and then tackle the harder questions.

It is highly unlikely for the exam questions to be similar to questions that students have seen in the past, especially for Unit 4 and Unit 1. Unit 4 covers the most proportion of marks followed by unit 3, unit 1 and unit 2. You should also find out what formulae will be provided in the exam. For example, in the 2019 exam, the "Cubic Spline formula" was provided. Do not focus on reciting the formulae, but instead understand how they can be applied and derived.

ACTL30003 Contingencies

Exemption status	CT5 *Contingencies*. Satisfactory performance in this subject's end-of-semester exam is needed.
Lecturer(s)	Dr Rui Zhou
Weekly contact hours	4 × 1-hour lectures 2 × 1-hour tutorials There are 2 extra 1-hour 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 the materials are available online as well, so it's a matter of preference.
Lecture capture	Full (both audio and video).
Year and semester reviewed	2018 Semester 2

Comments

Contingencies is a subject which isn't exactly too difficult with mathematical concepts, but rather its broadness and copious amounts of computation, whether it be numbers or algebra. Keeping in mind Contingencies is a double subject, it spans a plethora of topics, and in fair detail as well, making it a very challenging third year subject. It has many similarities to that of ACTL30001 *Actuarial Modelling I*, with both focusing heavily on life insurance. Concepts can be similar, but notation is different.

Perhaps one of the standout things about this subject is how many of the topics, although seemingly different at first, tie together. A concept in an earlier topic can often be explained more thoroughly in a later topic, as the concept re-appears. There is a nice link between most of the topics, and that means holistic understanding is required.

Subject content

Life insurance

This topic makes up the first half of the entire semester's content and is hence the main focus of this subject. It revolves around the idea that although we can find present values of annuity or life insurance payouts, we need to know the expectation of these present values. It covers areas including:

- Finding expectation of annuity or life insurance payouts
- Premium calculations
- Reserving (finding out how much a company needs to set aside to meet benefit payments)
- Differential equations

Joint life

This review was previously published in the 2018 end-of-year edition of the *Actuarial Students' Society Subject Review*.

An extension of life insurance, it looks at expectation of benefit payouts given the relationship between two lives. This includes the use of joint distributions; hence adequate calculus skills are required. It is potentially the most difficult of the topics during the semester, but it heavily uses concepts from life insurance- hence, being strong in the first topic is very necessary.

Multi-decrement models

Somewhat similar to the topic covered in Actuarial Modelling I, decrements other than death are looked at. No matrices are used, unlike Actuarial Modelling I. Questions in this area tend to revolve around filling out a table of lives given different types of decrements and mortality experiences.

Pension funds

This topic is potentially the least computation heavy, as it relies more on your intuitive understanding of formulas. It discusses how a pension fund might calculate how much is needed to set aside to ensure it is able to meet pension payments of a worker currently working or a death insurance payment, for example.

Demography

The topic which set itself out very differently to all the other topics, with not too much link to life insurance and expectation calculations. It looks at different types of death rates and birth rates of populations. The smallest topic of the semester.

Discount emerging cost technique

This topic allows a nice tie between life insurance, multi-decrement models and pension funds, as it asks you to look at how much money an insurance company makes or loses year on year on a particular policy. A tedious topic with plenty of calculations, but minimal mathematical concepts. It requires attention to detail and a strong understanding of reserving and how reserving applies.

Lectures and tutorials

Lecture slides are very well written, and Rui covers the topics extremely well, by regularly explaining the same concepts in the slides using a different method. This allows us to better understand a concept by using multiple methods. Pacing is excellent, and it is pivotal to attend lectures or listen to the recordings. Although there are four hours of lectures a week with plenty of content, keep in mind it is a double subject, and hence a single week of missed lectures can put you plenty behind.

Tutorials are very standard, with the completion of questions in class. It is advisable to complete the tutorials before the actual class so you're able to contribute, otherwise it can be very difficult to follow since the questions take a long time to complete. Many questions are provided, but only a handful are selected for tutorial work. The rest is very advisable to complete in preparation for the exam.

Assessment

The assignment was a group work task, and it stepped aside from the content we had learnt in class. It involved research of group self-annuitisation and its benefits. Strong ability to work in Excel, VBA or R is recommended, and a presentation is given in the end. It is a very large assignment considering it is 30% of a double subject. Rui provided plenty of help during the assignment, so we were able to gauge whether or not our research was going in the right direction. It gave us a strong understanding of another aspect of annuities, and it was extremely engaging to work on.

The actual exam is the key for the exemption, as a low exam mark coupled with a strong assignment or even subject score is not sufficient to pass the exemption. It was a very lengthy exam, but given the depth of the course, it did not cover all

the concepts taught, which made it difficult as everything could have been tested.

Tips for Success

Do not leave this subject behind, as it is nearly impossible to catch up on due to the sheer size of the content. Spend time on each tutorial question, even the ones not listed for classwork, and understand the concepts intuitively. Concepts are not difficult, but attention to detail is where many students fall short.

ACTL30004 Actuarial Statistics

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, with additional lectures in weeks 1, 11 and 12 1 × 1-hour tutorial
Assessments	50-minute mid-semester exam in week 7 10% Group assignment due on last day of week 12 10% 2-hour end-of-semester exam 80%
Textbook recommendation	ACTL30004 Actuarial Statistics workbook can be purchased from Co-op. The PDF version of the workbook (excluding the appendix containing checklists and statistical tables) are available on the LMS. ✓ The workbook is essential, as 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	2018 Semester 2

Comments

This subject is one of the more applicable and interesting third-year actuarial subjects. It covers a variety of statistical techniques that are tailored to an actuarial context.

Course Content

- Unit One: Introduction to R (3 lectures) — covers storing data in vectors and matrices, associated operations, probability distribution commands, writing simple functions, root-finding and maximum likelihood estimation commands.
- Unit 2: Likelihood Theory (5 lectures) — maximum likelihood estimation and asymptotic properties, likelihood ratio test and Fisher-Scoring algorithm.
- Unit 3: Generalised Linear Models (6 lectures) — exponential family of probability distributions, parameter estimation for GLM and their properties, and measures of model selection.
- Unit 4: Simulation (4 lectures) — Inverse Transform, Acceptance-Rejection, Box-Muller and Marsaglia's polar methods of simulations, required number of simulations.
- Unit 5: Outstanding Claims Provisions (2.5 lectures) — Run-off triangles, Basic Chain Ladder Method, Average Cost per Claim method, Bornhütter-Ferguson Method and variations incorporating inflation and incurred costs.
- Unit 6: Experience Rating Systems (1.5 lectures) — application of Discrete Time Markov Chains to examine the effectiveness and fairness of No Claims Discount systems.
- Unit 7: Time Series Analysis (5 lectures) — Linear Time Series, ARMA(p,q) processes, ARIMA(p,d,q) processes, and forecasting time series with the best linear predictor.

This review was previously published in the 2018 end-of-year edition of the *Actuarial Students' Society Subject Review*.

Lectures

Enrique is an experienced lecturer who certainly knows the subject content in and out. In his lectures, he generally annotates a printed version of the slides and expands on the content. While his handwriting is by no means messy, at times it is hard to discern between several characters he writes, namely "n", "m" and "π". Thus, it is recommended that you pay attention before you mistakenly write down the wrong letter.

Like ACTL30002 *Actuarial Modelling II*, the workbook contains partial lecture slides which are to be completed. At times, Enrique's pace is too fast, but thankfully he generally uploads the relevant slides after each lecture.

Do not be alarmed when SWS shows 3 lectures a week for the subject. Most weeks only have two lectures, but Enrique sometimes adds extra lectures (which are all scheduled at the same time) to catch up on content or make up for the mid-semester test.

Lecture attendance is recommended for this subject. Sometimes the desk microphone — Enrique doesn't use the LAV microphone — doesn't pick up everything Enrique says; especially if he turns his back. Thus, context is often useful in capturing the main point.

Tutorials

Tutorials begin in week two and cover material from the previous week. At times, tutorial questions assumed that we knew how to do things before we had covered it (i.e. using the likelihood ratio to construct confidence intervals). Other times, the lectures ran behind schedule and thus, we couldn't complete certain tutorial problems. The main remedy for this during semester was Enrique instructing tutors to ignore certain questions for which he would provide the solutions during lectures.

Tutorials were well-run with a lecture summary at the beginning. My tutor used a Surface Book as a whiteboard which saved time and allowed us to get through material a lot faster than on a traditional whiteboard. My tutor also gave us useful tips for integration among other things.

Assessments

The mid-semester test covered Units 1, 2 and half of Unit 3. We were provided with the previous year's test as practice, which had a similar format. Generally, questions were weighted towards the latter units, with only a few marks devoted towards Unit 1. The best preparation is to complete all previous tutorial problems, the specimen test and be familiar with expressing distributions in exponential family form.

The assignment was released in Week 9 and was quite lengthy. It had two equally-weighted questions; covering Units 2 and 3, and Unit 4 respectively. The assignment was useful for applying all the skills we learnt during the semester. It required judgement, which was not covered during the semester. The crux of this assignment was constructing a Fisher-Scoring algorithm from scratch. This proved to be quite a daunting task for many people with limited coding experience, but it turned out to be a very rewarding experience for those who persevered. The assignment contained several questions that contained concepts not covered in classes. Thankfully, they were carefully chosen so that we could complete them with some additional research.

End-of-Semester Exam

The end-of-semester exam was a two-hour closed book exam. The majority of the course was examinable, except specific sections that Enrique explicitly stated would not be assessed. Thus, be sure to listen out to what he says is examinable and not.

Preparatory material supplied by Enrique included the specimen exam and the 2017 exam. These, along with the workbook exercises and tutorials and the mid-semester test formed most of my revision material.

The good thing about Enrique's exams is he often gives intermediate results, coupled with "show that"-type questions. This means a couple of things. First, since sometimes working-out for different distributions can be quite messy, so it is easy to check results. Second, even if you do not get the first part of the question, the latter part may still be possible to answer with the information provided in the question.

Concluding Remarks

ACTL30004 Actuarial Statistics is a content-heavy but practical subject. Overall, it is useful to practice and understand the derivations (these can be tested) behind formulae rather than blindly remembering them.

ACTL30005 Models for Insurance and Finance

Exemption status	Not an exemption subject, but is a prerequisite for ACTL40004 *Advanced Financial Mathematics I* (CT8 *Financial Economics* subject).
Lecturer(s)	Xiang Cheng
Weekly contact hours	3 × 1-hour lectures Tutorials are held in the place of lectures scattered throughout the semester (5 in total).
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	2018 Semester 2

Comments

Models for Insurance and Finance was at times frustrating and challenging throughout the semester but upon reaching the final weeks you could begin to see the thoroughness of the content which gave a well-rounded application of many stochastic processes. MIF is quite different to other third year actuarial subjects in that it more closely follows the structure of a difficult mathematics subject. Expect to rely on various knowledge from *Calculus 2*, *Probability* and *Statistics* when moving through the lecture and coursework as these subjects are all assumed knowledge by this stage of the course.

Initially, the subject appeared dry with no real-world application as you move through defining a random variable in terms of a measure, which in turn means defining a measure and so on. To compensate for the level of depth and difficulty in content, the mid-semester and final exam questions purely relied on understanding the key conditions under which a theory stands (think memorising definitions of various concepts).

This was the first semester that Xiang lectured MIF. He began timidly and at times was confusing, however, he gained confidence, progressing as a great lecturer. Note that the lecture slides contained little when compared with Xiang's additional notes he makes in lectures. Annoyingly, these annotated notes weren't uploaded until the completion of Week 12 but they did contain detailed worked solutions to tutorials, alternate explanations to theorems and plenty of additional examples.

Although, Xiang does provide you with a past student's, Ben Locke's, complete summary notes- however, they do not contain all of the current coursework unfortunately missing out on the final section. These were a helpful additional resource which assisted greatly at the beginning of the subject if you were struggling to understand the lectures.

Lectures

The course was split into three parts. The First "Advanced Probability" extends on knowledge from MAST20004 *Probability*, but begins by introducing key notation and terms. This topic took up roughly half the semester and contained content tested on the mid-semester exam. Secondly, we moved into Discrete Time Stochastic Processes which extended the first topic's

This review was previously published in the 2018 end-of-year edition of the *Actuarial Students' Society Subject Review*.

foundations into applications involving martingales. A martingale is, in its simplest form, 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. Lastly, we moved into continuous time stochastic processes. This led to the introduction of Brownian Motion, the continuous analogue of the random walk.

Tutorials

Tutorials were run in lecture time roughly every fortnight. Xiang posted questions around a week before the tutorial and expected students to have attempted the questions before he worked through all questions. Note that only basic solutions are uploaded to LMS and you will have to take down key notes from the tutorial if you wish for a worked solution. (Xiang did post his full worked solutions, sometimes with multiple methods, in the final annotated notes).

In terms of the difficulty of tutorial questions, they ranged from very easy to extremely difficult. You probably won't be able to complete them before the tutorial. However in saying that, you can sometimes view these questions as extensions of the lecture examples.

Mid-semester test

The mid-semester test was relatively straightforward. You must recognise which theorems are important to know definitions for, as some appeared in every specimen and our actual test. Further, the level of difficulty was not extreme and many questions replicated those of lecture examples. Overall, I believe the cohort did relatively well on this mid-sem.

Assignment

Our assignment was a series of 8 questions with many different parts to each question. It was a relatively long assignment, which was expected as it is the only assignment for this subject, however, in a team of 4, the assignment was very manageable. Xiang released the assignment questions around Week 9 and it was due on the last day of Week 12. However, don't be fooled into taking a relaxed approach as the amount of work will catch up to you. I would recommend attempting all the questions that you will be able to work through given your progress in lectures. You will not be able to do it all at the beginning. The questions again were extensions from lecture examples with a few different twists here and there. It is imperative to consolidate your work with group members to avoid any mistakes.

End-of-Semester Exam

It is astounding the level of complexity that some of the topics studied delved into, however, many questions testing said difficult topics were tested at an easier level. In saying that, the 2-hour exam is of reasonable length, but it is important to stay focussed otherwise you will not finish. Many of the questions replicated those of problem sets or tutorial questions. Yet, there were a few challenging extension questions that required a complete understanding of certain topics; namely Ito's Integral.

Concluding remarks

Overall, this subject is very different from other third year actuarial subjects. If you have a strong passion for theoretical maths you will love this subject. If you are the type of person, like myself, who loves maths (hence actuarial) but struggles to wrap their head around maths without many applications and/or isn't intending to complete the Actuarial Honours program (this subject is a pre-requisite for *Advanced Financial Mathematics I*), then I would seriously consider all of your options.

Although this subject was at times very challenging, hard to follow and theoretical, it is a great opportunity to test your mathematical skills built up over your previous years of study. MIF is not an easy subject, but with the right amount of dedication and hard work, (cramming/diligent study) you can achieve a great mark. Good Luck!

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
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. However, I would look around for a soft copy if you're cost conscious.
Lecture capture	Full (both audio and video).
Year and semester reviewed	2019 Semester 1

Comments

Financial Mathematics III (FM3) explores the role of an actuary working in the fields of investments and asset management. Some topics including the Capital Asset Pricing Model (CAPM) and the Arbitrage Pricing Theory (APT) may seem familiar from previous subjects such as FNCE10002 *Principles of Finance* and ACTL20002 *Financial Mathematics II*. However, FM3 not only provides more detail but also introduces a range of new topics surrounding portfolio theory. Overall, this subject is quite content-heavy and formula-based, therefore it is ideal that you work consistently throughout the semester to keep up.

Subject Content

- Mean-variance analysis: Assuming investors only care about mean and variance of returns, we learn to construct an efficient portfolio consisting of different assets that will allow them to achieve ideal returns while minimising risks. Knowledge of linear algebra, specifically Gaussian elimination, is applicable here when computing the weights of assets in the portfolio via the covariance matrix. We also use single or multi-factor models when calculating the expected return, variance and covariance of each individual asset. The Gram-Schmidt algorithm is used to remove correlation between indexes to allow for less tedious computations.
- Utility theory: In this section, we explore investors' risk preferences by their utility function to determine their investment behaviour. Types of utility include exponential utility, power utility and log utility. This topic also looks at first order and second order stochastic dominance as well as geometric means.
- Capital Asset Pricing Model (CAPM): One of the most popular equations in finance which computes the return of an asset considering its exposure and correlation to the market. Two-factor CAPM is introduced where the risk-free rate in the original CAPM equation is replaced by the expected return of a zero-beta portfolio.

- Arbitrage Pricing Theory (APT): A slight throwback to *FM2* from the previous semester, we learn to calculate the expected return on a general portfolio using the principle of no arbitrage.
- Market efficiency and rationality: Short topic classifying market efficiency as strong, semi-strong and weak. It is not possible to make money by exploiting mispricings as stocks are accurately priced by the market taking into account risk adjustments.
- Risk measures: The concept Value-at-Risk (VaR) is introduced as the how much or more can be lost with a given probability. You will also learn to calculate shortfall probability and expected shortfall.
- Stock price models across time: The lognormal distribution from *FM2* is revisited here when calculating the mean, variance and VaR. Time series models, both the ARCH and GARCH processes as well as the Wilkie model are touched upon.

Lectures

Zhuo goes through the subject content strictly adhering to the lecture slides and explains the topics very well with the aid of his additional notes which he writes throughout the course of each lecture. As lecture recordings fully capture what he writes, viewing lectures online provides a similar experience to attending lectures in person. With that said, being such a content heavy subject, it is worth stressing the importance of not falling behind and going through the concepts by the end of each week to consolidate them. Personally, I chose to attend the lectures not only because I found it easier to focus and engage in class but also due to convenience as it was the first of three back-to-back-to-back sessions that I had (followed by *AMII* lecture and *AMI* workshop).

Tutorials

Tutorial questions are set from the prescribed textbook. Solutions are provided at the end of the textbook which serve as decent checks after you have completed your tutorial work.

My tutor would start each tutorial with a recap of the formulas we learned the previous week before going through each question together as a group. Although attendance is not compulsory, I still attended all my tutorials not only to fully test my understanding of the topics but also to check that the textbook solutions were accurate as they can sometimes be slightly flawed or difficult to comprehend.

Assignment

The individual assignment was completed on Excel and makes up 10% of the final score for the subject. The task involved building a model which computes the weights of assets, expected return as well as the standard deviation of the portfolio given different risk-free rates, individual asset returns and covariance matrix. The assignment was fairly easy and with enough checks you should be able to get full marks.

Mid-Semester Exam

The mid-semester test was one hour long and makes up 10% of the final score of the subject. It covers the first four weeks of content such as finding the tangent and minimal variance portfolio, their expected return and variance as well as the factor models. The test was extremely straightforward and similar to the practice test provided. Completing the assignment and practice test should prepare you well enough to do the test. As always, speed and accuracy are key to excel in any mid-semester exam and this one is no exception!

End-of-Semester Exam

The final exam is worth 80% of the final score for the subject. Before the exam, we were provided a specimen exam that was simple and easy to do. However, the difficulty of the actual exam turned out to be drastically higher and as a result, caught a lot of students by surprise. The exam consisted of a single definition question with the remaining ones being calculation based that were not only tedious but required a deeper understanding of the content to complete. Personally, I found the exam to be a huge step up in terms of rigour in comparison to tutorial questions that we worked on throughout the semester. Therefore, make sure you are comfortable doing variations of questions under each topic.

Concluding Remarks

Personally, I found the topics and theories covered in this subject intriguing. It was unique in the sense it gave insights about the work behind asset management rather than insurance that we were more familiar with. If you aspire to be an investment actuary or fund manager, you will definitely enjoy this subject.

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

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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.

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

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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) Project 2 (Semester 1 Week 9–Semester 2 Week 8) Project 3 (Semester 2 — Weeks 5–12)	25% 35% 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.

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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;

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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 [SM2]

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, 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 (audio and visual).
Year and semester reviewed	2018 Semester 2

Comments

Actuarial Practice and Control II is the continuation of the previous course, APC I. APC forms a bridge between the specific technical skills taught in Part I subjects and their applications in a business and commercial context. Therefore, judgement and experience play an important role in decision-making. However, APC II is still the most technical one among all APC subjects.

Subject content

Aim 9 – Model: Select an appropriate model to solve client problems. Part of this has been mentioned in APC I, however, more details are provided here.

Aim 10 — Capital: Recognise the importance of capital, which is defined as the "excess of assets over liabilities". We mainly discuss the purpose of capital, how capital is acquired and how different levels of capital affect different stakeholders.

Aim 11 — Liabilities: Apply relevant approaches and techniques to the valuation of liabilities. There are a lot of uncertainties facing insurance companies, and it could be very complicated in terms of estimating the value of liabilities – it's basically an "uncertain measurement of an uncertain process". Therefore, the valuation of liabilities and how the ultimate figure is determined needs to be based on economic and financial assumptions, which will be covered in much detail.

Aim 12 — Pricing: Apply relevant techniques to the pricing of products and contracts. How much should an insurance company charge for insurance coverage? What risks can arise? Does the premium take all these risks into account?

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Aim 13 — Solvency: Measure, report and manage solvency. Insolvency is always a risk for insurance companies; the issue arising if they cannot pay the obligations as they fall due. It remains a big task for insurance companies to seek to stay profitable and solvent.

Aim 14 — Profit: Measure and report emerging profits and/or costs. Accounting principle indicates that revenue is only recognised when services are conducted. In terms of insurance companies, the premium is paid in advance, and with each policy different from another, it's critical that the organisation takes the uncertain nature of liabilities into consideration.

Aim 15 — Monitoring & Aim 16 — Managing: Monitor and assess experience; Manage the business and respond to the experience. These two aims make the control cycle a real "cycle". It's important that an actuary monitors the impact of the decision, as either favourable or unfavourable outcomes may be generated; and the actuary needs to respond to these outcomes quickly and properly.

In the midst of this, two lectures about health insurance are covered, focusing mainly on Community Rating, Risk Equalisation and Demutualisation.

It should be noted that knowledge from APC I may still be examinable for APC II exam as they are highly correlated. Therefore, it's highly recommended that you are familiar with concepts in APC I and bring your APC I notes in the exam as well.

Lectures

Lectures are held at 5:15pm on Tuesdays and Thursdays (and I don't see this changing in the future). All lectures are delivered by actuaries who work in a wide range of businesses- therefore, the content is up-to date. APC II lecturers are very distinct in style and characteristics, therefore, their lectures are very enjoyable, even though they are scheduled after-hours. David Heath incorporates current events into his lectures; Andrew Brown covers much about the prospect of the actuarial profession; Donald Campbell delivers many of his own past experiences in superannuation industry and Andrew Gale, the guest lecturer, covers Health Insurance, with interactive games designed to inspire students to create the most profitable model. Lecturers would bring up questions to maintain good communication between students and lecturers, and students are encouraged to ask questions as well. It's a course that's definitely worth staying back till 7 for.

Assignments

The assignment works in a very similar way to the assignment in APC I, where a draft report, then a final report needs to be submitted. You can always make changes to your report after receiving feedback on the draft report. You will be assigned into a group by the coordinator. APC II assignment does require some technical skills, as it requires you to perform a valuation of the long service leave liabilities.

Again, the assignment is not considered for Part II exemptions, but it will affect your subject score at the end of the semester.

End-of-semester exam

This is an open-book exam — you can bring all your annotated lecture slides, the textbook, and your own summary notes. The exam has 15 minutes reading time followed by 3 hours of writing.

Even though APC is a qualitative subject, it is recommended that you write in dot points. It is also very critical that you answer the questions with clear and concise responses for all questions. This will make sure that you won't be in a rush, which many students found themselves in. Exam questions will provide you with some background information and the question itself in 1–2 paragraphs. Overall understanding of all the issues learned in the semester is required to be expressed effectively in the exam. Also, remember to put everything in your bound reference.

Tips for success

APC is a qualitative subject, and it is recommended to be done in a group, with regular discussion of lecture content and other content. It is the most effective way to study this course. Through group discussion, you can all strengthen your understanding even if you don't have a firm understanding of the content. It is also important to incorporate the knowledge from APC I – they are not isolated courses, but related. Think about the interconnection between the Aims (across both APC I and APC II), because the Control Cycle is a whole, organic unit rather than isolated units. In order to better facilitate the knowledge, it is recommended that you form a "map", to locate the items you've learned. Ask a lot of questions, you will be well received.

Best luck for your study.

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 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

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

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.

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

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

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

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.

ACTL90005 Life Contingencies [SM2]

Exemption status	CT5 *Contingencies*. Satisfactory performance in this subject's mid-semester and end-of-semester exam is needed.
Lecturer(s)	A/Professor Shuanming Li
Weekly contact hours	2 × 1-hour lectures Additional lecture slots were blocked out in case content was not covered 1 × 1-hour tutorial during the two one-hour lectures, however, Shuanming did not use these with us.
Assessments	1-hour mid-semester test in Week 8 20% Individual assignment due in Week 12 10% 2-hour end-of-semester exam 70%
Textbook recommendation	None.
Lecture capture	Full (both audio and video).
Year and semester reviewed	2018 Semester 2

Comments

I really enjoyed ACTL90005 Life Contingencies. The subject really builds on ideas first introduced in ACTL90001 *Mathematics of Finance I* but rather than finding the present value of payments, we found the expected present values instead.

The subject was very content-heavy. The undergraduate version of this subject (ACTL30003 *Contingencies*) is 25 points, so they had double the lectures and double the tutorials for the same content.

Subject content

- Unit 1: Select life table and ultimate life table
  This unit is very short and gives a definition of a select life.
- Unit 2: Valuations of Insurance Benefits
  This unit introduces different insurance products that will be dealt with in future units, including whole life insurance, term insurance and endowment insurance amongst others.
- Unit 3: Valuations of Life Annuities
  This unit introduces different annuity products such as whole life annuity due, term annuity due, and continuously payable annuities. It also presents different approximations between continuous and discrete annuities.
- Unit 4: Future Loss and premium calculations
  This unit covers the equivalence principle and how to calculate the premiums of different insurance and annuity products.
- Unit 5: Policy Values
  This unit extends on Unit 4 and teaches calculations of the future value of a product under both discrete and continuous models.

This review was previously published in the 2018 end-of-year edition of the *Actuarial Students' Society Subject Review*.

- Unit 6: Multiple state Markov mortality models
  This unit builds on the previous two units and looks at premium calculations and policy values when there are multiple states rather than the simple Alive-Dead model.
- Unit 7: Joint Life Theory
  This unit looks at how insurance and annuity benefits are affected when there are two lives involved rather than one.
- Unit 8: Multiple Decrements and Applications
  This unit teaches us how to build multiple decrement tables, so for example, a table that shows how many lives will die, retire or be injured each year. It also covers calculating future salary and benefits related to salary.
- Unit 9: Emerging costs
  This unit is very spreadsheet-heavy and looks at measuring the profit of different policies from an insurer's point of view.

Lectures

Our lectures moved very fast, so it was essential to attend them. Shuanming also provided additional handouts almost every week so it was doubly important to attend the lectures. The lectures elaborated on the content of the slides and really helped me to understand and give context to each unit. I tried to read through ahead of each lecture to stay on top of this massive subject, but I found the content too difficult to understand by myself without the explanations and timelines that Shuanming drew to explain things.

Tutorials

The tutorials were a great help towards my learning in this subject and I feel that attendance was essential to doing well. The tutorial solutions presented in class were sometimes different from the ones provided online afterwards and it was helpful to see different ways to solve the same problem.

Assignments

Our assignment was individual and mostly done in Excel. The questions were extensions of the examples covered in class. I found the assignment helpful in my revision for the exam as it was due in Week 12 and covered all units.

Mid-semester test

Our mid-semester test was one hour. It was difficult and I believe most people ran out of time. It covered units 1 to 5 and the questions were extensions of the content we had covered. All questions required a deeper understanding of the content and it was not enough to just memorise formulae and rote-learn the units. In particular, I'd hoped the questions covering the first two chapters on insurance and annuities would be straightforward application of formulae to find expected present values, however in reality, we were given questions that required going back to first principles to find slightly adjusted formulae.

Shuanming also wrote a few True/False questions that required us to find different forms of a formula. There was also a surprise question at the end that required knowledge from ACTL90006 *Life Insurance Models I*.

Personally, I found that the lecture examples, tutorial questions and problem sets provided more than enough material to use for revision for this test.

End-of-semester exam

Our exam was 2 hours and covered the whole semester. I found it was important to go to lectures and tutorials. In our last tutorial, Shuanming gave us a breakdown of the exam and expectations we could have for the structure of the final exam. During the lectures, he would also comment on formulae we were required to memorise and ones we did not, as there was no formula sheet provided.

Overall, I found the exam fair. There were many questions that were similar to ones we'd seen in either tutorials or as examples in lectures as well as some more difficult questions that required a deeper understanding of the content. The exam was long and had nine questions, but I found I had some extra time at the end to check over work and properly attempt questions I had skipped. We were provided with one specimen exam that I found more difficult and in a different style to the one we sat.

Concluding remarks

Overall, I really enjoyed this subject, especially the maths involved and the challenge of deriving variations on established formulae.

ACTL90006 Life Insurance Models 1

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 lectures (adding up to roughly 1 hour) 1 × 1-hour workshop 1 × 1-hour tutorial
Assessments	Group Assignment 1, due in Week 5 — 10% Mid-semester test, in Week 8 — 20% Group Assignment 2, due in Week 11 — 10% End-of-semester exam — 60%
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	Full (both audio and video) for online lectures. None for workshops.
Year and semester reviewed	2019 Semester 1

Comments

Overall this subject was well taught and the content can be very interesting and intuitive. Assessments were challenging but fair with a wealth of questions to consolidate your understanding.

Subject content

- 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 important to know the intuitive interpretation and the derivation of the equations.
- 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.
- 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. A good way to consolidate your understanding is to derive the Method of Moments Estimate and the Maximum Likelihood Estimate under different assumptions (Constant Force of Mortality, Baldduci, Uniform Distribution).
- Multiple state models — This section requires you to be comfortable with the previous sections as it is in a sense a generalisation of the dead or alive model taught in section 1. The differential equations may at first seem difficult but once you repeat the derivation across multiple questions you will see that the techniques are very routine. It is important to focus on the general techniques for solving and deriving these equations.
- 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. The numerical part of this section requires concepts learnt in Probability such as conditional probability, independence and equivalent events.

- 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. They are clearer than live lectures as David has the luxury of multiple takes. The lectures lasted about an hour in total per week, but I found myself spending two to three hours with pauses to attempt to reconstruct the proofs.

Assignment

The assignment was an individual assignment in Excel. The numerical computations were straight forward but a significant proportion of marks were given for presentation of the excel workbook and the written submission. It takes more time to obtain full marks for presentation than to obtain full marks for the correct answer. Attempting to copy the format and language used in David's textbooks is a good idea.

Workshops

Instead of lectures, David runs weekly workshops. 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.

Tutorials

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. In both workshops and tutorials David would give us key points in the question to look out for to highlight the important parts explained in lectures.

Midsemester test

The mid-semester exam was composed of standard questions across sections 1 and 2 with one challenge question. Doing textbook questions can give you an advantage as some of the question pool stems from the textbook but all questions were doable with the provided material.

Exam

The final exam was slightly more difficult than the mid-term exam purely due to the fact that sections 3 to 6 were more difficult than sections 1 to 2. The paper covered the whole semester's content and not just the second half. This exam was slightly more lenient with computation speed and accuracy as the other actuarial exams. David meant it when he said to not gamble by being an expert in certain areas/types of questions and neglect others. The exam extracted material quite evenly between lectures, workshops, tutorials and problem sets.

ACTL90007 Life Insurance Models 2 [SM2]

Exemption status	CT4 *Models*, in conjunction with ACTL90006 *Life Insurance Models I*. Satisfactory performance in both subjects' mid-semester and end-of-semester exams is needed.
Lecturer(s)	Dr. Kevin Fergusson
Weekly contact hours	2 × 1-hour lectures 1 × 1-hour tutorial
Assessments	50-minute mid-semester test in Week 8 20% Individual assignment due in Week 12 10% 2-hour end-of-semester exam 70%
Textbook recommendation	ACTL90007 Life Insurance Models 2. Available from the bookstore. ✓ Yes,I recommend getting this textbook although all problems, tutorials and lecture material is also provided online as a PDF.
Lecture capture	Full (audio and visual).
Year and semester reviewed	2018 Semester 2

Comments

I thought ACTL90007 Life Insurance Models 2 was going to be an extension of ACTL90006 *Life Insurance Models I*, but it was completely different. In my opinion, Life Insurance Models 2 uses more statistics and has more theory and less mathematics. The content covered was more in line with what I imagine actuarial modelling is like.

Subject content

Unit 1: Rate Intervals

This unit introduces rate intervals and age labels. It covers life year, calendar year and policy year rate intervals. In my opinion, this unit was the most difficult as some of the calculations of exposed to risk under each type of rate interval was difficult to conceptualise. Wrapping my head around the start of the interval and how that related to a life was, at times, frustrating.

Unit 2: Hypothesis Testing

This unit introduces six hypothesis tests to test the validity of the data: the Chi-Squared Test, the Individual Standardised Deviations Test, the Cumulative Deviations Test, the Runs Test, the Signs Test and the Serial Correlations Test. Advantages and limitations of each test are also covered.

Unit 3: Graduation

This unit covers 4 different graduation methods including the Whittaker-Henderson method, the graphical method, graduation by mathematical formula, graduation with respect to a standard table and graduation using cubic splines. It also covers the advantages and disadvantages of each method.

This review was previously published in the 2018 end-year edition of the *Actuarial Students' Society Subject Review*.

Unit 4: Stochastic processes This unit is not related to mortality rate modelling and felt disjoint from the rest of the subject. Markov chains are studied in depth and there is a brief introduction into new stochastic processes such as the Compound Poisson Model and White Noise.

Lectures

I found the lecture content sparse. We were able to comfortably fit all content in the 50-minute lectures with time to spare. As a result, Kevin got to know us very well during lectures and vice versa. He knew all of our names which was also a nice personal touch. The lecture content followed the textbook content closely.

Tutorials

In our tutorials, Kevin went through all the solutions on the board and we had the opportunity to input our own opinions on alternative solutions. The tutorial questions were a great opportunity in seeing different applications of the content taught.

Assignment

For our assignment this year, we were required to graduate mortality rates under different models including the Whittaker-Henderson model. Most people used Excel, but we were allowed to use any program we preferred, and some tried their hand at the assignment with R. After graduating our rates, we were then required to perform different hypothesis tests to see if they fit the model well. The assignment was well-designed and gave us a chance for additional practice on hypothesis testing.

Mid-semester test

The mid-semester exam was 50 minutes and covered units 1 and 2. Overall, the exam was doable in the time given. We were required to perform all hypothesis tests from unit 2, including the serial correlations test, which does not have an example in the textbook.

Exam

This 2-hour exam covered all content in units 1 to 4. We had one past exam provided which I found extremely difficult and different from our actual final exam. Our exam had a mixture of theory questions and application questions. I think the professional exams were a good resource for additional questions as we were only provided with tutorial questions and textbook examples. I also found that the theory questions in the exam were similar to the ones from the professional exam. It helped me see which theories were more important and emphasised for this subject. Unit 4 in particular covered loosely-connected ideas and I found the professional exams helped connect and consolidate the required knowledge.

ACTL90008 Statistical Techniques in Insurance

Exemption status	CT6 *Statistical Methods*, in conjunction with ACTL90004 *Risk Theory I*. Satisfactory performance in this subject's end-of-semester exam and a satisfactory final grade in ACTL90004 *Risk Theory I* are required.
Lecturer(s)	Dr Enrique Calderin
Weekly contact hours	1 × 2-hour lectures 1 × 1-hour tutorial
Assessments	50-minute mid-semester exam in week 7 — 10% Individual assignment due on last day of week 12 — 10% 2-hour end-of-semester exam — 80%
Textbook recommendation	ACTL30004 *Actuarial Statistics* workbook can be purchased from Co-op. ✓ The workbook is essential, as all tutorials are in this book and not provided elsewhere.
Lecture capture	Full (both audio and video)
Year and semester reviewed	2018 Semester 2

Comments

Statistical Techniques in Insurance is a content heavy subject. Although the first chapters fit together nicely, I found some disjointedness in the content overall. The subject covered a lot of ground and I really enjoyed the topics.

Subject content

Unit 1: Introduction to R

This unit covers all the basics in R – from downloading the software to addition in R, to simulating values from probability distributions. Properly understanding this unit is essential to this subject because the assignment requires R coding.

Unit 2: Likelihood Theory

Much of this unit was taught in MAST20005, *Statistics*. It covers maximum likelihood estimation, the likelihood ratio test and the Fisher-Scoring algorithm.

Unit 3: Generalised Linear Models

This unit is an extension of Unit 2 and is especially applicable to actuaries. It covers parameter estimation for generalised linear models and techniques used to assess the statistical significance of the estimated parameter values.

Unit 4: Simulation

This unit covers different techniques in simulating random numbers from a variety of distributions. Some methods covered have been taught in previous actuarial subjects, such as the inverse transformation method, and other new methods are taught, such as the acceptance-rejection method.

Unit 5: Outstanding Claims Provision

This review was previously published in the 2018 end-of-year edition of the *Actuarial Students' Society Subject Review*.

This unit covers four different methods used by general insurers to calculate the liabilities.

Unit 6: Experience Rating Systems

This unit is the shortest section in the whole subject. It introduces the no claims discount system and explains applicable areas of insurance for the model.

Unit 7: Time Series Analysis

This unit introduces times series, which are variables that change over time. I found this unit the most difficult and the most maths heavy. We are introduced to new processes such as moving average processes and ARMA processes.

Lectures

Our lectures this year were during a two-hour time slot on a Monday evening. Fortunately, we were usually given a short 10-minute break in the middle. I attended all the lectures and I feel it was essential and helpful to do so, however, many of my class did not attend or only attended the first half. Although lecture capture records everything on screen, I felt that by attending classes, I was able to pick up hints for exams and assessable material more easily.

Tutorials

Tutorials were essential to attend as the solutions were handed out during class and were not provided online. Furthermore, Enrique often wrote additional notes or fleshed out solutions during tutorials.

Assignment

The assignment was an individual assignment which was done in R. Some of the stuff, such as glm calculations, was covered during lectures but the majority was not and required extra research. A coding background was extremely advantageous in this assignment as we were required to do "if" statements and "for" loops for some questions.

We were given the assignment after our midsemester break and although there was enough time, I found if I had not started on the assignment straight away, I probably would not have been able to finish it. The same assignment was given to the third-year undergraduate cohort but they worked on it in groups.

Overall, I found the assignment enjoyable, albeit at times frustrating, and found it helpful in my learning.

Midsemester test

We were provided with one past mid-semester paper as a guide. The test covered Chapters 1, 2, and half of chapter 3 and included practical questions as well as theory/proof questions. During lectures, Enrique told us which proofs were examinable and highlighted a select few, one of which was in our mid-semester test. There were also a few marks allocated to R code which he also informed us about during lectures. The exam was a reasonable length but as is usual with actuarial papers; I personally did not have time to check over answers at the end.

Exam

Enrique provided the 2017 exam as a specimen paper. I thought it was a good indication of the difficulty of the exam we sat. As usual with all actuarial exams, we were pressed for time. It covered all topics and had a good variety of questions. I believe the material we were given, tutorials and the 2 practise exams, was sufficient revision. During lectures, Enrique

also covered tips on what we should memorise for the exam which turned out to be helpful, so definitely attend lectures and make a note when he says something needs to be memorised.

A couple topics I wish I had looked over again before the exam were the lognormal distribution and other common distributions. Although Enrique was fair and provided the probability density functions for more obscure distributions, seeing the lognormal distribution in a No Claims Discount system initially threw me in the exam. Another tip that came up during discussions after the exam was to make sure your calculator is in radians and not degrees.

During our 2018 exam, we were not required to reproduce any proofs of theorems taught throughout the course. Some things examined were not explicitly covered during semester and were assumed knowledge such as finding the quantile function from a cumulative distribution function.

Concluding Remarks

Overall, the exam was fair and felt like a reasonable test of our understanding of the course. The questions were a challenging extension of what we were taught.

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

This review was previously published in the 2018 mid-year edition of the *Actuarial Students' Society Subject Review*.

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.

ECON90047 Macroeconomics 2

Exemption status	CT7 *Business Economics* 73 average across this subject and ECON90015 Managerial Economics and ECON90032 Macroeconomics for Managers
Lecturer(s)	Professor Efrem Castelnuovo
Weekly contact hours	1 × 2-hour lecture 1 × 1-hour tutorial
Assessments	4 × Assignments, due every 3 weeks 20% 2-hour Mid-semester test, due in Week 6 30% 2-hour End-of-semester exam 50%
Textbook recommendation	None.
Lecture capture	None.
Year and semester reviewed	2019 Semester 1

Comments

This subject was amazing. It honestly almost made me want to change my major from actuarial studies to econometrics. The content was interesting and the lecturer was engaging. Each topic was a further development on the previous and it was an extremely well structured and well explained subject.

Overall, the subject was more mathematical than Macroeconomics for Managers. There were more graphs and equations but the level of mathematics was manageable, especially with an actuarial background.

- 1: Basic Keynesian Model
- 2: IS-LM Model
- 3: Classical Model
- 4: Keynesian Labour Market
- 5: Open Economy
- 6: Barro-Gordan Model
- 7: New Keynesian Model

The subject revolves around modelling the economy and examining key factors that lead to output. It also touches on controls the government and central bank have that can affect the economy.

Lectures

The lecture slides were supplied on LMS before the lectures. They were adequate but not excessive and complemented the lectures sufficiently. Efrem wrote a lot on the whiteboard and the whiteboard notes did not follow the slides exactly, but rather built on the content in the PDF slides. Many of the models had complicated graphs associated with them and Efrem explained them thoroughly during the lectures on the whiteboard. I highly recommend attending lectures since they were not recorded, so skipping one meant missing over half the topic. Many of the graphs were also easier to understand after the explanations on the whiteboard. Not only was Efrem engaging during lectures, the lecture content was also interesting and gave more insight into each model.

Furthermore, Efrem outlined the exam structures in these unrecorded lectures, so it was even more essential to attend to know what to expect for the exams.

Tutorials

The tutorials followed the lectures, with some of the questions coming from the lecture slides. Occasionally, additional questions were provided in class, but they were written on the whiteboard with no paper trail. Some topics didn't even have any tutorial questions at the end of the lecture notes and the only exercises on the topic were written on the whiteboard during the unrecorded tutorial, making it even more essential to attend the classes.

At first, I thought that there were not enough practise questions provided, but combined with the four assignments, there was sufficient material for exam revision in the end.

Assignments

There were four evenly spaced assignments throughout the semester. I found them really helpful towards my learning and understanding of each topic as the content was constantly reviewed and examined in the form of low pressure assignments. For each assignment we received two to three weeks to work on it. They were usually provided before all the content had been taught. Efrem encouraged us to work in groups of up to four people, but we were also allowed to submit individual assignments. Each assignment was similar to undergraduate maths assignments where we had a few exercises to complete. The assignments got more difficult towards the end of the semester and reflected the difficulty of the topics covered.

Some students provided assignments written in LaTeX, but Efrem did not require this and accepted handwritten assignments too.

End of Semester Exam

The final exam covered content over the whole semester. The structure of the end-of-semester exam was similar to the mid-semester exam where it was split into two parts. The first part of the exam was on topics five to seven where we had one exercise to solve in each of the Open Economy, Barro-Gordan and New Keynesian model. This half was worth the bulk of the marks. The second part of the exam was on content from the whole semester and we were again asked to analyse three out of six statements on their truthfulness.

I found I had more time during the final exam than in the mid-semester exam. The questions were fair and Efrem gave us tips during the semester on how to do well in the exam and what we could expect.

Concluding Remarks

Macroeconomics 2 was an incredible subject. The mathematics was enjoyable and a nice break from the many proofs from the core actuarial subjects. I understood the graphs more than the previous economics subject and Efrem was a great lecturer who was clearly passionate about the subject matter.

FNCE90060 Financial Management

Exemption status	CT2 *Finance and Financial Reporting* 73 average across this subject and ACCT90004 Accounting for Decision Making and FNCE90018 Financial Management
Lecturer(s)	Dr Ali Akyol Dr Maurice McCourt
Weekly contact hours	1 × 3-hour lecture
Assessments	Group Assignment 1, due in Week 5 10% Mid-semester test, in Week 8 20% Group Assignment 2, due in Week 11 10% End-of-semester exam 60%
Textbook recommendation	Berk, J. B., & DeMarzo, P. M. (2007). *Corporate finance*. Pearson Education. ✗ This textbook is not required. There are a number of copies in the library as well as PDF copies online that can be used but there is sufficient material on LMS to use.
Lecture capture	Full (both audio and video).
Year and semester reviewed	2019 Semester 1

Comments

This subject was a simpler version of *Mathematics of Finance 1* with more focus on theory than formulas. There was some additional content that was not covered in *MoF1*, such as Capital Structure and Debt and Taxes, but most of the content from this subject was revision. Since I had already completed *MoF1*, *MoF2* and *MoF3*, Financial Management(FM) was overall relatively relaxed.

- 1: Present Value and Arbitrage
- 2: Time Value and Interest Rates
- 3: Investment Decision Rules
- 4: Capital Budgeting
- 5: Bonds
- 6: Stocks
- 7: Payout Policy
- 8: Risk
- 9: Asset Pricing Models
- 10: Capital Structure
- 11: Debt and Taxes

Lectures and Workshops

Dr Akyol took the first half of the semester before the mid-semester test and Dr McCourt took the last half of the subject. Both lecturers spent the first hour going over the previous week's workshop questions and then the following two hours on the new content. I attended over half the workshops and lectures but started watching them online towards the end of the semester when the weather got cold.

The workshop questions were taken from the textbook and solutions were supplied at the end of the week after the last

lecture stream had concluded. Sometimes, the questions required knowledge from the assigned readings and were not in the lecture slides, but for the most part, the questions were able to be completed after the content had been taught in lectures. They took about an hour or two to complete if you wanted to do them before class, but plenty of students just copied down answers as the lecturer went through them in the workshop.

The lectures were fully recorded and the lecturers rarely used the whiteboard so all the writing this semester was captured in the recordings. Although I went to most of the classes, I believe that solely watching the lectures online would not be detrimental to your studies in this subject. However, I would recommend attending the lectures to meet other students so you can form a study group for the assignment.

Textbook

I used the textbook in my revision for the exams. It followed the lecture notes extremely closely and the corresponding textbook chapters were outlined at the beginning of each set of lecture slides. There was more explanation in the textbook and I referred to it for definitions that were sometimes lacking in the lecture notes.

Assignments

We were given two assignments during the semester and were given the option of working in groups of up to four students or solo if we preferred. Each assignment was given weeks in advance of its due date, so there was plenty of time to complete them. I found the assignments more difficult than I expected for this subject as they were longer analysis pieces and not the typical complete ten exercises using formulas taught in class. There was a lot of discussion required when trying to state and understand the underlying assumptions. I also found the marking for the assignments very harsh. Each assignment was only out of 10 marks and consequential marks did not seem to be given freely. Sometimes four or five answers were worth one mark or an explanation was worth one mark and it was hard to see how much we were required to do. I feel like if the assignment had more marks per question, then it would be more fairly evaluated.

Mid-semester Exam

The mid-semester exam was 20 multiple choice questions in one-hour. We were given additional practice questions from the textbook prior to the exam and one practice exam. The mid-semester exam was reasonably short and there was plenty of time to write and leisurely check over the answers. I thought it was slightly harder than the practise exam provided, but overall still easy. There were also more theory questions in the mid-semester exam than in the practise exam. We were provided with a formula sheet so for exam prep, if you feel confident applying the formulas, I would recommend concentrating more on definitions and theorems. The average across the cohort was 75% which the lecturers were happy about.

End of Semester Exam

The final exam covered all topics across the whole semester and the lecturers mentioned that there was going to be more focus on the latter half of the semester that hadn't yet been examined. The exam had ten multiple choice questions and numerous short answer questions. Again, there was enough time given to complete the exam and I even got the opportunity to leave early which was a nice change to the usual struggle.

For revision, we were provided with one final practise exam as well as additional practise questions on the latter half of the semester. Overall, I felt that we were supplied with more than enough exercises to revise for the exam. During my revision, I also used the textbook to clarify some key concepts in the final two topics, Capital Structures and Debt and Taxes, and found it helpful in clearing up some definitions that I was unclear on.

Concluding Remarks

This was a relatively relaxed subject and was a nice change from the intense actuarial subjects. The exams weren't rushed and the subject was a nice way to revise content from *MoF1*.

Breadths and Electives

Contents

BLAW10001 Principles of Business Law [SM2]

Exemption status	None.
Lecturer(s)	Dr Rosemary Langford
Weekly contact hours	1 × 2-hour lectures 1 × 1-hour workshop in Weeks 3, 8 and 12 (optional)
Assessments	1-hour online multiple-choice test in Week 4 10% 1-hour online multiple-choice test in Week 9 10% 1.5-hour multiple-choice end-of-semester exam 80%
Textbook recommendation	Lambiris and Griffin. (2017). *First Principles of Business Law*. New copies of the textbook come with a unique code which provides access to an e-tutorial. Unless you prefer the convenience of doing this at home and on your personal laptop, you do not have to buy the book as the e-tutorial can also be done on the computer labs in the law school. Try to get a second-hand if you don't mind missing out on the e-tutorial.
Lecture capture	Yes.
Year and semester reviewed	2018 Semester 2

Comments

Need a relief from *Probability* and *Statistics* or looking for a WAM booster? You're in for a treat! Not only is BLAW10001 Principles of Business Law (PBL) an all multiple-choice subject, there are also no assignments involved which gives you more time to focus on your other subjects during the semester.

As a level 1 breadth subject, PBL provides an introduction to different topics in law, including contract law, agency law, consumer law and tort law. Who knows? You might even consider pursuing a JD after your degree if you really enjoy this subject.

Subject content

Weeks 1–2 provide a general introduction to the origin, purpose and nature of law as well as the Australian parliamentary system. You also learn the legislative procedure of making a new law and how the court interprets a piece of legislation.

Week 3 is spent on the role of courts in law-making (case law) and the structure of the Australian legal system.

Weeks 4–8 cover contract law. This makes up a substantial portion of the subject as it goes through, quite comprehensively, various aspects of contract law – from how parties come together to form a legally binding contract, agreeing on terms of a contract, what happens when there is a breach and the consequent remedies that are available to finally vitiating factors that make a contract voidable.

Week 9 looks at the Australian Consumer Law which is the most practical and applicable in our everyday lives as consumers. You gain insights into and understanding of basic consumer rights and protection and unfair business practices (e.g. false and misleading statements, bait advertising, unsolicited goods etc) that are prohibited under regulation.

This review was previously published in the 2018 end-of-year edition of the *Actuarial Students' Society Subject Review*.

Week 10 turns to a different area of law which is called tort law. Focusing specifically on negligence, this topic concerns the liability of the wrongful conduct by one person that causes foreseeable harm to another who is under his/her duty of care.

Week 11 covers both the law of agency and basics of property law. The law of agency explores the relationship between three parties: principal, agent and third party, authority and duties of an agent as well as liabilities in the event an agent commits a mistake. Property law was not examinable this semester.

Week 12 is revision and exam preparation where the lecturer basically runs through the entire course and summarises the different topics.

Throughout Weeks 3–11, you will also learn cases in which the different rules of law that are being taught each week have been applied to help the court decide the outcome of the case. You are examined on these cases.

Lectures

Rosemary was particularly strict on not talking during her lecture. Nonetheless, she encouraged everyone to stop her at any point to ask clarifying questions. At the end of each lecture, there is a mini case study to help reinforce the ideas and rules of law covered in that lecture. These case studies are pretty straightforward and Rosemary goes through them fairly quickly but that shouldn't trouble anyone especially when the concepts are still fresh in your head.

I personally only attended a few lectures during the semester as I found it more helpful to pause on lecture capture to write notes and properly read the cases on the lecture slides. I can say that you don't miss out on much by not attending as Rosemary often reiterates the questions that other students asked during the lecture and you will be able to hear them clearly through lecture capture. This probably explains the rather empty lecture hall most of, if not all, the time I was there.

Overall, Rosemary delivers her lecturers well despite her frequent, overused example of her trying to sell her iPhone.

Workshop

Workshops run for one hour in Weeks 3, 8 and 12. They are for you to get feedback and ask questions about the practice tests before each assessment. If you struggled with the practice tests, you should attend these. However, if you think you've done well and understand your mistakes from the solutions provided, the workshops can be skipped.

Assessments

There are two online multiple-choice assessments consisting 40 questions that are be completed in an hour under one sitting. Each assessment will make up 10% of your final grade.

The first assessment in Week 4 was easy and requires minimal revision. You can quite quickly look up the answers in the lecture slides and complete the test comfortably within the time limit.

I carried on this perception going into the second assessment in Week 9 and I was terribly wrong as it was a lot more difficult. You really have to have a solid understanding of the content taught in the few weeks prior in order to excel. Be sure to make notes on the individual cases to avoid wasting time flipping through lecture slides.

End-of-semester exam

You will have 15 minutes reading time and 90 minutes to finish 60 multiple-choice questions.

The end-of-semester exam usually falls on the very last day of the exam period. This can be a good or a bad thing. Good: gives you more time to prepare. Bad: you are the last one to finish amongst your other peers not doing this subject.

A good cheat sheet is key to doing well in the final exam. Investing effort in preparing your cheat sheet will not only give you the opportunity to thoroughly revise the course but more importantly be familiar with the material you're bringing into the exam. Of course, if you are lazy, don't have the luxury of time or prefer cramming, there are plenty of resources online including cheat sheets prepared by past students. But this shouldn't imply you can completely neglect studying for the exam. Do as many practice tests and e-tutorial questions as you can using the cheat sheet you intend to bring in to make sure you have covered all the possible topics you will be tested on. The last thing you want is a cheat sheet that you don't even understand yourself. Otherwise, the end-of-semester exam isn't too challenging and you can definitely breeze through it easily given adequate revision.

Concluding remarks

There is no excuse to do poorly in PBL. I personally really enjoyed the subject. Not only was the workload significantly less than that of my other second-year subjects, I was able to get a taste of what it's like to study law and how it applies to real life scenarios.

Highly recommend doing this subject if you still have room for a level 1 breadth.

COMP10001 Foundations of Computing [SM1]

Exemption status	None.	
Lecturer(s)	Professor Tim Baldwin Dr Nic Geard Ms Marion Zalk Ms Farah Khan Guest lecturers	
Weekly contact hours	3 × 1-hour lectures 1 × 1-hour tutorial 1 × 1-hour workshop	
Assessments	Online Grok worksheets	10%
	45-minute Mid-semester test in Week 5	10%
	Individual project, due in Week 7	10%
	Individual project, due in Week 9	10%
	Individual project, due in Week 12	10%
	2-hour End-of-semester exam	50%
Textbook recommendation	None.	
Lecture capture	Full (both audio and video).	
Year and semester reviewed	2019 Semester 1	

Comments

Faced with the limited capacity to undertake breadth subjects given the constraints of the actuarial course structure, many students will opt to undertake COMP10001 Foundations of Computing, a great introductory subject that focuses primarily on programming with Python v3.6.

For those who have had limited exposure to coding before, Foundations of Computing may be initially quite intimidating, especially when surrounded by peers who have years of programming experience under their belt already. Fear not, as many of these students with strong computational backgrounds will sit a proficiency test within the first fortnight, allowing them to gain an exemption from the subject.

That being said, the content is challenging, and consistent work throughout the semester is crucial if you hope to succeed. Fortunately, I found the study-support within the subject to be immensely helpful when encountering challenging concepts or ideas.

A significant portion of this subject is delivered through the online programming platform, Grok Learning. On this site, you will be able to implement and test any Python code you generate. This immediate feedback loop, made possible by the automated verification process built into the platform, helped me quickly identify and correct any misconceptions that I held.

Subject content

- Weeks 1-8: Python Fundamentals
- Week 9: The Internet and HTML
- Week 10: Algorithm Families/ Character Encoding
- Week 11: Digital Representation, Fairness and Ethics
- Week 12: Exam revision

Lectures

Lectures for Foundations of Computing were split into two streams, with the majority of lectures presented by Professor Tim Baldwin and Dr Nic Geard, both of whom were extremely passionate about the field of computing.

While the first four weeks of content could be grasped quite easily individually through Grok, I still attended all the lectures as they helped to reinforce the content for the fast-approaching mid-semester test (Week 5). Within the lectures, Tim and Nic would initially introduce the topic, before delving into some more complicated examples. I would strongly recommend that you attempt to follow along and re-create these as I found it extremely helpful in learning how to apply these new concepts.

Following the mid-semester exam, lecture content shifted away from the simple building blocks and syntax of Python, to a more holistic, combination of all the individual 'tools', applied onto larger scale problems requiring more complex functions. It is at this stage where it is imperative to keep up with lectures lest you become overwhelmed by these increasingly difficult topics.

By the end of week 8, lecture content shifts away from Python to an amalgam of various topics ranging from HTML to the Ethics of Computing. Although seemingly small, these topics are all examinable, meaning it would be remiss of you to ignore them when revising.

Interspersed throughout the semester are three guest lectures delivered by industry professionals. For this semester, we were exposed to topics relating to Cognitive Science, Quantum Computing and Verifiable e-Voting. All three of these were extremely enjoyable, as the guest lecturers' passion was enrapturing, while also illustrating some different pathways computing can take you. These guest lectures are also examinable, however, the extent is often limited to the higher-level concepts rather than the low-level ideas such as the technicalities behind Shor's Algorithm.

Tutorials/ Workshops

Tutorials were segmented into two parts, a one-hour traditional classroom tutorial, and another one-hour computer lab workshop. I personally found the classroom tutorials to be beneficial in consolidating the coursework covered in lectures while also providing an opportunity to practise writing code by hand in a style similar to mid/end-of- semester exams.

On the other hand, the computer lab workshops were of minimal use unless you had specific queries in relation to Grok worksheets or projects. This was primarily due to the style of the workshop where there was little guided work to complete, and demonstrators were there to help with individual problems rather than teaching/revising concepts from lectures. That being said, I still attended all of these workshops to ensure I allocated an additional hour each week to computing.

Projects/ Grok Worksheets

Throughout the semester, there were three individual projects, each contributing 10% to the final grade, and 16 Grok worksheets worth a combined 10%. Altogether, students need to achieve a minimum of 20/40 to satisfy the hurdle in this section.

The three projects across the semester each consisted of 4 smaller sub-problems and an additional bonus question. With 2-3 weeks to complete each project, you may be tempted to put them off until closer to the due date, but I would warn against such a decision. As many students discovered belatedly, although purely writing code can be quite fast, the process of generating an efficient, accurate solution to the problem will take a considerable period of contemplation.

Another point to keep in mind is that code stylistics/ readability and commenting were worth a sizable portion of each project and represent easily attainable marks that all students should strive to gain. To do so, ensure that all code is PEP8 compliant, and that the naming of variables in addition to commenting will mean someone with minimal programming background will still be able to deduce the purpose of your program.

The 16 Grok worksheets, which were periodically released in sets, each of which were due roughly fortnightly, served as a great way to practise the lecture content. In addition, should you ever get stuck when attempting these worksheets, the 'forum' and 'tutoring' available within the Grok website can provide detailed responses in regard to any concerns you may have. Without any limit on the number of submission attempts, completing all 16 worksheets perfectly was quite common.

Mid-semester test

The mid-semester test was a 45-minute, 40 mark closed-book paper examining content covered in the first four weeks of semester. Whereas previous semesters' tests were later in the teaching period, thus covering more complicated programming content, our test was relatively straight-forward. To prepare, I would recommend attempting to re-do all assessable Grok worksheets and the released past mid-semester tests by hand, as coding on paper is significantly more challenging than on a computer.

End-of-semester exam

As was the case in previous years, the end-of-semester exam was out of 120 marks, and consisted of three components, namely the Code Interpretation, Generating Code and Conceptual Questions sections. Out of these sections, the Generating Code portion was the most technically challenging as students were required to write Python code with minimal framework to start from. Fortunately, our lecturer informed us that the level of difficulty in this portion had been toned done to balance the effort/marks proportion for this area. Instead, the theoretical questions for our exam became trickier and required a rather in-depth understanding of different character encodings (a sub-topic many students had disregarded when studying).

While there is considerable work required throughout the semester to perform well on the projects, if you have consistently invested time into grinding through the Grok worksheets, you will find that you already possess much of the necessarily skillset to tackle the first two sections of the exam. For me, revision for this subject during SWOTVAC just consisted of familiarising myself with the theoretical components covered in the latter weeks of semester, saving me time to study for the more challenging, core actuarial subjects.

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

This review was previously published in the 2018 mid-year edition of the *Actuarial Students' Society Subject Review*.

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! :) */
```

FNCE20002 Management of Financial Institutions [SM2]

Exemption status	None.
Lecturer(s)	Dr Zhen Shi
Weekly contact hours	1 × 2-hour lectures 1 × 1-hour tutorial
Assessments	1-hour mid-semester test in week 6 — 15% Group Case Report and Presentation in week 10–12 — 15% 2-hour final exam — 70%
Textbook recommendation	Lange, H., Saunder, A., & Millon Cornett M. (2015). *Financial Institutions Management*, 4th edition.
Lecture capture	Partially recorded for the first three weeks, whereby the lecturer recorded the first hour and conducted the second hour without recording to encourage in-class discussion. However, this approach was unpopular as many students fell behind on lecture content, so for the rest of the semester lectures were fully recorded.
Year and semester reviewed	2018 Semester 2

Comments

This Commerce elective is an interesting expansion of *Principles of Finance* and *Corporate Financial Decision Making*, focusing heavily on financial institutions' roles in the financial system. Techniques on pricing financial instruments and managing risk in the market economy are covered in this course.

Subject content

Lectures and tutorials

In Lectures 1–3 the lecturer only recorded the first half of the lecture and engaged in discussions for the second half of the lecture, which was supposedly 50% examinable. However, due to student complaints of difficulty with keeping up with the lecture materials, full recordings became available thereafter. In Weeks 1 and 2, the material focused on refreshing basic topics such as pricing bonds, option contracts and theoretical content like the purpose of financial intermediaries. From Week 3 onwards, the following topics were covered: tools financial intermediaries use to mitigate risk such as the repricing gap; hedging; derivative pricing; interest rate swaps and securitisation . These topics were thoroughly covered and quite interesting to learn. Interest rate swaps and securitisation, covered in Week 6 and 7, were definitely the most challenging topics, but plenty of tutorial questions made it easier to master . The lecturer's explanations were often adequate, but could be convoluted and difficult to follow at times. Only after I had attempted the tutorial questions for that week that did the lecture material begin to make sense.

Tutorial attendance was not recorded and thus week by week, tutorial attendance began to drop dramatically. By the last few tutorials I was often the only student attending the tutorial. The tutor's explanations were helpful, especially in explaining questions I couldn't complete myself, and more thorough than the tutorial answers provided at the end of each week. Although it was possible to just work from the tutorial questions and answers provided, the extra explanation was

This review was previously published in the 2018 end-of-year edition of the *Actuarial Students' Society Subject Review*.

Week 1	I. Introduction to banking II. Overview of the financial system
Week 2	The basics of bond pricing
Week 3	Managing interest rate risk using repricing and duration gap analyses
Week 4	The basics of derivatives pricing
Week 5	Managing interest rate risk using derivatives - Bond option
Week 6	Mid-semester exam
Week 7	Managing interest rate risk using derivatives - Swaps
Week 8	Managing interest rate risk and liquidity risk using securitisation
Week 9	Managing credit risk, market risk and liquidity risk
Week 10	I. Non-banking financial institutions (1) II. Guest speakers
Week 11	Group presentations
Week 12	I. Group presentations (2) II. Non-banking financial institutions (2)

helpful for more difficult concepts, such as interest rate swaps and securitisation techniques.

Assessment

A 1-hour multiple choice mid semester test was conducted in Week 6, covering the first five weeks of content. A practice mid-semester test was provided with answers which turned out to be very similar to the actual test. It was found to be relatively easy by most students.

The group case report and presentation required groups of ten to choose one case out of four provided and then write a 10-page report based on the questions given. I found that working with a group of ten people became difficult at times as team members' work could overlap, making some of it redundant. However, it made completing the report a relatively easy task as so many people were working on it. Presentations were held during lectures and focused on summarizing the report and explaining it to the rest of the cohort and lecturer. Half of the marks were allocated towards answering questions from the audience about our presentation and asking questions to other students' presentations .

The final exam was a 2-hour closed book exam, with an emphasis on Lectures 5-10. It consisted of two sections where Part A consisted of "fill in the blank"-type questions and accounted for 40% of marks, while Part B consisted of calculation/explanation questions and accounted for 60% of marks. While Part A was a breeze, Part B was a little more difficult than expected and required more steps than learnt in tutorial questions or the practice exam provided. There was some overlap again from the practice exam questions and the actual exam, but some Part B questions such as hedging or derivative questions were more extended and challenging.

Concluding remarks

Overall, it was an interesting subject to learn about calculations and techniques used by banks to maximize their role in the financial market and how risk could be managed. I would recommend it to those who are interested in working in the banking sector or want to gleam an insight into the workings of financial intermediaries.

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 7 20% Tutorial Participation 10% 3-hour end-of-semester examination 70%
Textbook recommendation	Peirson, G., Brown, R., Easton, S., Howard, P., & Pinder, S. (2015). *Business Finance* (12th ed.). North Ryde, AU: McGraw-Hill. ✗ I do not believe the textbook is necessary. See Textbook Section below for more comments.
Lecture capture	Full (both audio and video).
Year and semester reviewed	2019 Semester 1

Comments

For students pursuing an Actuarial/Finance double major, Corporate Financial Decision Making (CFDM) is a core subject that leads to the required 3rd year Finance subjects.

This subject has a very clear structure. The topics for each week are outlined at the very beginning of every lecture which helps you see the big picture of corporate finance and finding links between different topics. The content covered each week is consistent and the order of the topics also flow logically.

Subject content

- Week 1: Options
- Week 2: Payout Policy
- Week 3: WACC and Capital Structure Policy
- Week 4: Raising Capital: Equity
- Week 5: Raising Capital: Debt & Lease + Guest Lecture
- Week 6: Advanced topics in Capital Budgeting Sensitivity, Breakeven and Decision Tree Analysis
- Week 7: Mid-semester Test
- Week 8: Advanced topics in capital budgeting: Real options
- Week 9: Takeovers I
- Week 10: Takeover II
- Week 11: Corporate Restructuring and Guest Lecture 2
- Week 12: Risk Management

Lectures

The lecture slides for this subject contain almost all the details you need to know for the exam. During the 2-hour lecture every week, Chander explains the concepts and examples in detail and provides a lot of intuition behind the theory. So, it is beneficial to go to the lectures or watch the recordings online as they help a lot with understanding and memorising.

In addition, it is recommended to use the questions in the "After Today's Class" section of each lecture as a self-check at the end of each lecture to make sure you keep up with the requirements.

Tutorials

There is a 10% participation mark credited for the attendance of tutorials, which are essentially free points to earn. Each week, you need to hand in Part B of the tutorial questions and tutors will mark attendance based on these. As long as you have shown a good attempt at the questions, you will receive full marks. The thing to be noted is that you can only attend the class you enrolled in to earn the participation mark, which may be uncommon for students used to attending make-up tutorials.

The tutorial questions are relatively straightforward. It provides you motivation to keep updated on lectures, however, in isolation, they will not be sufficient for exam preparation.

Textbook

While the textbook does explain the lecture material well, it includes a lot of additional material which may not directly help with exam preparation, thus meaning it is not crucial for this subject. However, if you are hoping for an extension on the topics covered in this subject, this will be an excellent resource for additional learning.

Mid-Semester Exam

The mid-semester exam consisted of 20 multiple choice questions and was worth 20% of the final result. Although the concepts were relatively straightforward, tricky questions provided options like:

d) More than one of the above
e) None of the above

Another tricky style is to ask you to choose the closest answer to the numerical solution. In these, the exact answer will not be included in the options provided. This means that when you have arrived at an answer, you will not have any confirmation of its accuracy. For these, while carefully checking your answers is important, make sure not to overthink your solution.

End-of-Semester Exam

The final exam was very much like the practice exam and past exams from previous semesters taught by Chander. The only difference in this semester is that section B and C were combined into one section and short response questions replaced the true or false questions. This in fact made it less tricky since you no longer need to struggle with the wording of the statements, with the only requirement being to put down whatever you know about the theory in a straightforward manner.

Half of the questions are theory based, thus requiring you to memorise basically all the details and understand the intuition behind them. This section will be rather time consuming.

The other half are calculations. These questions are much easier for Actuarial students especially as the formula sheet is provided. For preparation, it is helpful to go through all the examples in lectures and tutorials. Do them at least once with your books closed. There are some tricks in these problems, so read the questions carefully and as long as you have fully understood the process, you will be fine with the exam.

Final Comments

The total time commitment for CFDM is much less than the actuarial subjects. Besides, it provides you an overview on how different policies impact corporation's financial decision making. I would suggest choosing it as an elective even if you are not looking for an Actuarial/Finance double major. It will give you a broader idea of real-world performance of companies, while honing the many technical skills you have learned in actuarial subjects. Most importantly, this is a good opportunity to boost your WAM.

IBUS20007 International Business Experience [SUM]

Exemption status	None.
Lecturer(s)	Dr. Lauren Johnston
Contact hours	1 × Information session 1 × Pre-departure briefing 2 weeks travel time overseas Note: It is also compulsory for students to attend the information session and the pre-departure briefing.
Assessments	Reflective Journal (1000 Words for Undergraduate, 1500 for Postgraduate Students) 30% Research Essay (2000 Words for Undergraduate, 2500 for Postgraduate Students) 50% Group Presentation (10 min) 20%
Textbook recommendation	None.
Lecture capture	None.
Location	National Chengchi University, Taipei, Taiwan (Subject to change every winter/summer holiday)
Quota	20-25 people (minimum 70% WAM required, subject to change)
Year and semester reviewed	2018 Summer Term

Comments

This is an overseas commerce subject that aims to provide an opportunity for students to gain a better understanding into how business is conducted in the Asia region. The basic idea is for students to spending 2 weeks in a specific Asian country where they will attend classes at a partnering university and visit various local businesses.

Application process

Students who applied for the subject were required to submit their resume and a short 100 word questionnaire. The published WAM requirement is 70% but there were students with a lower WAM on my trip.

Scholarship and costs

Students are required to pay an additional fee on top of their subject fee. It is approximately $2300, which covers the accommodation, university travel insurance and sightseeing expenses. Students will have to pay for their flight tickets separately and food is also not included. For domestic students, the New Columbo Plan (NCP) of around $2700 is available, which will leave students with an additional $500 after paying for the program expenses. For international students, the NCP option is not available. The Melbourne Global Scholars Award of $1000 is also available but students cannot receive both the NCP and the award.

This review was previously published in the 2018 end-of-year edition of the *Actuarial Students' Society Subject Review*.

Subject content

Information session

An FBE staff member will go through a brief outline of the program including the administration tasks such as your visa, flight tickets and hotel room allocations, and program-related content such as the itinerary. This is a compulsory session and allows you to meet the other students who you will be travelling with. This should go for approximately one hour.

Pre-Departure Briefing

A full pre-departure briefing workshop where students will meet the FBE staff member who will be supervising the trip. They will be travelling with you and may also be marking your assessments. Lunch and snacks were provided.

During the briefing, the details of the trip will be explained to the students. During my pre-departure briefing, there was also a segment to explain the basic local language and culture, which was useful especially for the students who had no prior exposure to the location that the program took place at.

In-country period

The subject will occur over 2 weeks at the selected destination. It aims to expose students to the local business environment as suggested by the name. There are mainly 3 components to the trip; lectures, company visits and travelling.

The FBE will be partnering with a local university. There will be a staff member from the local university who will act as the main contact and organiser for the entire trip. During my trip to Taiwan, Jean, who was a very lovely lady, was in charge of organising the trip and looking after us. There are approximately 2 lectures scheduled every day and they aim to provide students with an introduction to the local business environment, culture and even technical skills. The lectures will be given in English. We had lectures that introduced us to the local industries, businesses, culture and we analysed a historical M&A case.

Company visits are also an important component of the subject as it provides insights into the local businesses and industries. There should be around 2-3 visits per week and a smart casual/business casual dress code is required. Please ensure that you have a set of outfits for company visits (Consult the FBE staff member during the pre-departure workshop). The companies that we visited ranged from a local business that developed hi-tech kitchenware, an innovative NFP recycling plant, a National Museum and a few local businesses. Take as many photos and note down any information as this will also be very valuable during your reflection journal and in deciding the research topic. There will also be tours of local destinations.

Assessment

Reflective Journal: This is a 1000-word personal reflection journal/diary that allows you to reflect on your experiences during the trip. This is suggested to be a diary/personal journal. There is no specific prompt or topics provided. It is recommended to include pictures or diagrams that will assist in your reflection. It is also recommended to write a brief summary at the end of each day as you may forget about some details after the trip.

Research Essay: This is a 2000-word research essay that allows you to research a topic of your choice. The chosen topics needs to be relevant to the business or economy of the country that students travelled to. It is strongly recommended and vital for you to consult with the relevant staff member marking your work to ensure that the topic is approved prior to commencing. As it was still a relatively new subject when I undertook it, there was a lack of structure or restrictions on the

research essay, which equates to greater degree of freedom. It is best to start this essay as early as possible especially for those students who have no previous exposure to the chosen topic. Referencing is also very important so do it well.

Group Presentation: Students are required to form groups of 3-4 students. The topic of the presentation should be able a topic that students have learnt about as part of the trip. The topic of the presentation cannot be the same one that any of the group members have completed their essay on. Plan ahead and ensure tasks are allocated according to the strengths of each group member. Communicate with the professor/staff member who will be marking your work to ensure that you are in the right direction. Rehearse well prior to the presentation and make sure the *presentation is distributed equally amongst group members.*

Concluding remarks

Through the trip, we were able to learn about the business environment of Taiwan. More importantly, we were exposed to the general business etiquettes that are adopted by the locals. These are valuable experiences that students can apply to their future career.

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 review was previously published in the 2018 mid-year edition of the *Actuarial Students' Society Subject Review*.

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.

MUSI20149 Music Psychology

Exemption status	None.
Lecturer(s)	Professor Katrina McFerran and various guest lecturers
Weekly contact hours	1 × 2-hour lecture (non-compulsory)
Assessments	10 × weekly quizzes 10 × 4% 2000 word written assignment 60%
Textbook recommendation	Rickard, N. & McFerran, K. (2011). *Lifelong Engagement with Music: Benefits for Mental Health and Well-Being*. Melbourne: Nova Publishers. ✗ I do not believe the textbook is necessary. See 'Necessary Resources' in the body of the review for more information.
Lecture capture	Full (audio and visual).
Year and semester reviewed	2019 Semester 1

Comments

Subject content

- Week 1: Overview and Introduction to the Field of Music Psychology
- Week 2: Music in the Prenatal and Postnatal Phases
- Week 3: Music in Schools
- Week 4: Music and Adolescents
- Week 5: Music and Older People & Introduction to Assignment
- Week 6: Music and the Brain
- Week 7: Performance Science
- Week 8: An Overview of Music and Pain
- Week 9: Music and Emotions
- Week 10: Multi-Sensory Perception
- Week 11: Music Performance Anxiety
- Week 12: From Psychology to Evolutionary Theory: Multiple Perspectives on Music and Wellbeing

Music Psychology is a breadth subject that explores research involving the influence of music on the brain and the body across the lifespan. Weeks 2-5 constitute the "lifespan series", considering each stage of the human life, whilst the later weeks look at the specific impacts of music. I found the subject content very interesting and easy to learn. Since all assessment tasks are open-book, there was no pressure to memorise studies or results, which made the subject relatively relaxed.

Lectures

The class registration offered a 9am 2-hour lecture or an "online lecture" – this actually meant that attendance at the on-campus lecture was not compulsory, providing students with the flexibility to watch the lecture whenever convenient. All of the lectures had full audio and video lecture capture recordings, so watching at home covered all the content. Some of the lectures had audience participation activities, such as Poll Everywhere or even singing, so attending the lecture in person could also be quite fun.

At the start of the semester, it was announced that lecture slides would only be released at the discretion of the lecturer, but they would still be captured on lecture capture if not provided. Luckily, all PowerPoint presentations were made available to us. Since the subject is taken by many lecturers, the slides varied in length, amount of detail and amount of literature discussed.

Professor Katrina McFerran, the subject coordinator, took 3 lectures and the rest were taught by guest lecturers (1 guest lecturer for each of the remaining 9 weeks). Katrina was an extremely passionate and engaging lecturer – I could feel her enthusiasm even through the lecture capture. All of the guest lecturers were leading researchers in their respective fields and had interesting research to share, but I can't say they were all as engaging as Katrina was. I found Dr Tan-Chyuan Chin's lecture on 'Music and Emotions' particularly captivating as it explored different models of how music impacts our emotions.

Weekly Quizzes

There were 10 multiple-choice quizzes that tested content from Week 2 to Week 11. The quizzes had 4 questions each, with each question worth 1% of the final grade. They were open for a week for a single attempt and answers would be released shortly after they closed.

The quizzes mostly tested content from the lectures – initially it was often possible to Ctrl+F in the lecture slides but in the second half of the semester the questions became slightly harder and required watching of the lectures. The questions were generally quite straightforward. However, during this semester, there were 2 questions that were somewhat ambiguous. After the answers were released and students pointed this out, they removed the questions and re-weighted the remaining questions. Overall, the quizzes are an easy way to guarantee 40% (or nearly 40%) of the total marks for the subject.

Written assignment

The final assessment was a 2000-word written assignment worth 60%. It was introduced in Week 5 and due during SWOT-VAC (and later extended to the first day of the exam period as university policy does not allow for due dates during SWOT-VAC). The assignment topic was the impact of personal music use on cognition and emotion, and required both personal reflection and analysis of relevant literature.

Only content from Weeks 3, 4, 6, and 9 were directly relevant for the assignment, so there was no need to wait until after the semester finished to begin working on it, which meant there was sufficient time to complete the assignment. Additionally, the assignment was split into 4 parts, with a recommended word count for each section, so although I hadn't written any long essays since high school, I found it easy to reach 2000 words. It was not required to source academic literature outside of what had been provided through lectures and required readings, but I still found my own sources to ensure that my evidence was relevant and current.

In order to provide students with an idea of what was expected, we were provided with the marking rubric, FAQs, extracts of sample answers and an optional on-campus tutorial. I found the sample answers really useful as they indicated the required balance between personal reflection and research literature.

Necessary Resources

The required textbook was Rickard, N. & McFerran, K. (2011). Lifelong Engagement with Music: Benefits for Mental Health and Well-Being. Melbourne: Nova Publishers, which was available as an e-book from the university library website. It could also be purchased hardcopy for those who prefer physical books. Other essential or additional readings were articles that were available either through the university library or shared as PDFs on the LMS.

For the first few weeks, I completed the readings before watching the lectures and completing the weekly quiz. I found that the reading often overlapped with the lecture content so it was unnecessary. Thus, I don't believe it was necessary to complete the readings to do well in the subject, but the resources were free and easily accessible so they could provide extra support.

Concluding Remarks

Music Psychology was a really interesting subject that allowed me to take a break from the challenges of Actuarial Studies. I believe it will also help to boost my WAM since I have already guaranteed myself a lot of marks through doing well in the weekly quizzes. I highly recommend it as a breadth subject for anyone who enjoys listening to music, playing music or is just interested in the psychology of music.

MUSI20150 Music and Health [SM2]

Exemption status	None.
Lecturer(s)	Dr. Lucy Bolger Dr. Jennifer Bibb Prof. Katrina Skewes McFerran Various (Different lecturer for each week)
Weekly contact hours	1 × 2-hour lectures (non-compulsory)
Assessments	10 × weekly quizzes 10 × 5% Final assignment 50%
Textbook recommendation	None.
Lecture capture	Full (audio and visual).
Year and semester reviewed	2018 Semester 2

Comments

Music and Health is a good second-year bludge subject, especially if you enjoyed *Organisational Behaviour*. It has no attendance requirements and can be completely purely online. The only marks come from the weekly quizzes and a final 2000-word essay due at the end of the semester. With decent accountability and willingness to put up with music as a subject, MUSI20150 is the go-to second-year bludge subject with an easy H1. Expect to spend about 30 minutes a week on quizzes and 3-4 hours at the end of the semester for the final assignment.

Lectures

Lectures for MUSI20150 are redundant to such an extent that when you register for the classes, it says something along the lines of: "if you don't get a lecture time, don't worry, it doesn't matter, just watch lecture capture." The only times I did watch the lectures was for the weekly quizzes, where the lecturer would indirectly give the answer to each question. The problem with this is that the lecture slides often don't give sufficient information for the quizzes, so you will have to sift through the lecture capture. Just watch the lectures online if you feel the need to. Don't attend unless you're willing to sing and participate in some "musicking", as MUSI20150 coins.

Quizzes

The weekly quizzes have 5 questions each, for 10 weeks, where each question is worth 1% of your final grade. This makes each incorrect question quite costly, so I would highly recommend taking this subject with a group of friends. My Music and Health subject score was lower than it should've been because I missed two quizzes, and hence lost 10% stupidly. You generally won't find any answers by googling online, so I would highly recommended that you skip selectively through the lecture capture until you find the phrase spoken by the lecturer that leads you to the right answer, or just watch the lecture.

This review was previously published in the 2018 end-of-year edition of the *Actuarial Students' Society Subject Review*.

Final assignment

There is a 50% essay due at the start of SWOTVAC, which has a word limit of 2000 words. This essay requires you to create a playlist of ten songs or pieces from any mix of genres, rearranged in a certain order that enhances your physical or mental health, whilst alluding to music theories and concepts taught during the semester. You will need at least six scholarly references throughout. The essay itself isn't hard and you should expect to take around 2-4 hours towards the end of the semester to complete it.

MUSI20163 Samba Band [SM1]

Exemption status	None.
Lecturer(s)	Mr Alex Pertout Mr Salvador Persico Mr Ryan Menezes
Weekly contact hours	1 × 2-hour practical
Assessments	500 word research on a percussion instrument 15% Final group performance 35% Classroom participation 50%
Textbook recommendation	None.
Lecture capture	None. A video is filmed after every practical for you to practice at home.
Year and semester reviewed	2019 Semester 1

Comments

Subject content

- Week 1 Introduction: styles, techniques, pulse, counting, hand to hand
- Week 2 Ensemble: Rhythmic Styles I
- Week 3 Ensemble repertoire rehearsals / basic development of the various parts
- Week 4 Continuation of ensemble development - Discussion on Individual Test in week 6
- Week 5 Ensemble: Rhythmic Styles II - Discussion on Individual Test in week 6
- Week 6 Individual Test - All parts and instruments covered weeks 1-5 (no mark is assigned)
- Week 7 Continuation of ensemble development
- Week 8 Ensemble: Rhythmic Styles III
- Week 9 Ensemble repertoire rehearsals / basic development of the various parts
- Week 10 Continuation of ensemble development
- Week 11 Rehearsal and preparation for formal performance assessment or studio recording
- Week 12 Final rehearsal and preparation for formal performance assessment or studio recording

Samba Band is a breadth subject that provides participants an opportunity for an in-depth practical study of percussion techniques and repertoire. The material is based on African derived drumming which over the centuries has continued to develop and flourish on the American continent. Classes will cover techniques on a variety of percussion instruments, the role of the various instruments in the ensemble, background and selected improvisation styles. The ensemble will prepare and rehearse both conducted and unconducted material that is suitable for public performance or recording. In general, this subject is very relaxing and chilled.

Practicals

I had Salvador Persico as my tutor. He engages the class very well and made the learning experience very enjoyable. You will learn about two ensembles in this subject and there is a brief introduction given during the first week. On that,

you will learn how to read music notes that are needed in this subject, which means having a musical background is not a prerequisite. However, a basic background in music and rhythmic awareness will help you to ace this subject.

There will be an individual test in week 6 at your normal practical covering some of the instruments that you learned in the first 5 weeks. No marks are assigned to this test but it does give your tutor an idea on your performing ability, which may affect your marks on weekly participation. The second ensemble is relatively harder. The best advice I can give you is to print the music sheet out before the practical. It would be much easier to follow when you have a hard copy.

The classroom participation is 50% of the assessment and is marked based on your weekly performance and discussion. 5 students will be selected or volunteer to be recorded at the end of the practical for the class to practice at home. If you are one of those top 5 students in every video, you are certainly doing very well in this subject. There is also a hurdle requirement of at least 80% attendance to these classes.

Final group performance

The final group performance occurs in the last practical in week 12 which forms 35% of your final mark. Your tutor will record the performance and watch the video many times to assess you as an individual. It will be hard to play every note correctly so some practice will be needed for the final performance. However, don't worry too much if you make mistakes as most students will.

Unfortunately, you do not get to take any instruments home, but a good way to practise is by listening to the video recording after class and practise the pattern on your lap, mimicking how you would perform your percussion instrument.

500 word research paper

The research paper should incorporate historical research on a particular percussion instrument, a description of its playing techniques, broad use in traditional and popular settings and include information on particular recordings the participant has analysed that incorporate and/or feature this particular instrument. The paper will be submitted in hard copy at the last class of the semester, week 12. As is the case with all academic essays, it should incorporate a sizeable bibliography and footnotes outlining the research material gathered. I would say this paper was quite easy to complete as it's not marked as strictly as in other subjects.

Concluding Remarks

The total time commitment of Samba Band is 96 hours while it is 170 hours for an ordinary actuarial subject as suggested in the handbook. From my personal experience, I spent 2 hours on the essay and maybe 6 hours in total on practice across the semester. So, if you do the math, I only spent approximately 32 hours (including practicals and time spent practising) on this subject for the whole semester. This gave me more time to focus on my actuarial subjects. In terms of whether it is a WAM booster or not, I would say it is quite a subjective subject as your final mark is highly dependent on what your tutor thinks about your performance. To conclude, considering the amount of work that is required for actuarial subjects, I would highly recommend this subject to all actuarial students as it makes you feel like you are under loading. It was also the most enjoyable subject I've ever taken.

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 2: Core Subjects

Subject Code	2015 Start	2016 Start	Mid	End	2017 Mid	End	2018 Mid	End	2019 Mid
ACCT10001		1	1	1	1	1	1	1	1
ACCT10002	2	2	2	2	2	2	2	2	2
ACTL10001	2	2	2	2	2	2	2	2	2
ECON10003		2	2	2	2	2	2	2	2
ECON10004	1	1	1	1	1	1	1	1	1
FNCE10002					1	1	1	1	1
MAST10006		1	1			1	2	2	1
MAST10007			S	S		2	2	2	1
MAST10008	1	1	1	1	1	1	1	1	1
MAST10009	2	2	2	2	2	2	2	2	2
ACTL20001	1	1	1	1	1	1	1	1	1
ACTL20002	2	2	2	2	2	2	2	2	2
ECON20001	2	2	2	2	2	2	2	2	2
MAST20004	1	1	1	1	1	1	1	1	1
MAST20005	2	2	2	2	2	2	2	2	2
MGMT20001		2	S	S	1	1	1	2	S
ACTL30001	1	1	1	1	1	1	1	1	1
ACTL30002	1	1	1	1	1	1	1	1	1
ACTL30003	2	2	2	2	2	2	2	2	2
ACTL30004	2	2	2	2	2	2	2	2	2
ACTL30005	2	2	2	2	2	2	2	2	2
ACTL30006	1	1	1	1	1	1	1	1	1
ACTL40002		1	1	1	1	1	1	1	1
ACTL40003				2	2	2	2	2	
ACTL40004		1	1	1	1	1	1	1	1
ACTL40005				A	A	A	A	A	A
ACTL40006		1	1	1	1	1	1	1	1
ACTL40007						2	2	2	2
ACTL40008		2	2	2	2	2	2	2	
ACTL40009				2	1	2	1	2	2
ACTL90001						1	1	1	1
ACTL90002						2	2	2	2
ACTL90005								2	2
ACTL90006							1	1	1
ACTL90007								2	1
ACTL90008								2	2
ACTL90018							1	1	1
ECON90047									1
FNCE90060									1

Table 3: Breadths and Electives

Subject Code	2016 Start	Mid	End	2017 Mid	End	2018 Mid	End	2019 Mid
AGRI20030			J					
BLAW10001	1	1					2	2
BLAW20001	1	1						
CHIN20026				2	2			
COMP10001		1	1			1	1	1
COMP20005	2	2		1	1	1	1	1
COMP90038							2	
ECOM30004							2	
ECON20002	1	1	S	S		1	1	S
ECON20005			2	2				
FNCE10001		1						
FNCE20001	2	2	2	1				
FNCE20002							2	2
FNCE20005						1	1	1
FNCE30007	2	2		1	1			
GERM10008	1	1						
IBUS20007							2	2
JAPN10001		1	1			1	1	
MAST20022			2	2	2			
MAST30020		1	1					
MAST90082				1	1	1	1	1
MGMT30006			2					
MGMT30017			W	W	J	J		
MUSI20149								1
MUSI20150							2	2
MUSI20163								1
MUSI20168			1	1				
SCIE20001					2	2		
STDY00002							2	
D-MATHSC		O						

Table 4: Legend

1	Semester 1
2	Semester 2
S	Summer Term
W	Winter Term
J	July Intensive
A	All Year
O	Other

List of CT Exemptions

Table 5: 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

Foundation Program Subjects

Table 6: Actuaries Institute Core Principle subjects and corresponding university subjects

Institute Subject	University Subjects
Part I	
CM1 Actuarial Mathematics 1	ACTL20001 Financial Mathematics I ACTL30003 Contingencies
CM2 Financial Engineering and Loss Reserving	ACTL2000X Topics in Actuarial Studies ACTL30006 Intermediate Financial Mathematics ACTL40004 Advanced Financial Mathematics
CS1 Actuarial Statistics 1	MAST20004 Probability MAST20005 Statistics ACTL30004 Actuarial Statistics
CS2 Risk Modelling and Survival Analysis	ACTL30001 Actuarial Modelling I ACTL30002 Actuarial Modelling II ACTL3000X Actuarial Modelling III
CB1 Business Finance	FNCE10002 Principles of Finance ACCT10002 Introductory Financial Accounting
CB2 Business Economics	ECON10004 Introductory Microeconomics ECON20001 Intermediate Macroeconomics
Part II	
Core Actuarial Management	ACTL40006 Actuarial Practice and Control I ACTL40007 Actuarial Practice and Control II
Core Data and Statistical Analysis	ACTL4000X Actuarial Analytics and Data 2

Source: Centre for Actuarial Studies
Current as of 5th July 2019.

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 7. Others will just contribute to the same exemption subject as their undergraduate counterparts (and hence have common content), as in Table 8.

Table 7: 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 8: 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