



SUBJECT REVIEW
2022 EDITION

Acknowledgements

The Actuarial Students' Society would like to extend its sincere gratitude to the following people for their kind contributions to the 2022 edition of the *Actuarial Students' Society Subject Review*.

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Disclaimers

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The impact of COVID-19 on the Actuarial Students' Society Subject Review

In light of the persisting COVID-19 situation, the Actuarial Students' Society have endeavoured to bring value to our members throughout 2022 with our adapted workshops, information sessions and the *Actuarial Students' Society Subject Review*.

Please note that some of the subjects reviewed in 2022 reflect the individual author's educational experiences in an online environment. Whilst the authors have kept this in mind as they composed their reviews, undoubtedly the aspects of some reviews — including assessment details and specific advice given — hold only for the online delivery of these subjects. We hope that the 2022 edition of the *Actuarial Students' Society Subject Review* can continue to provide valuable information for our members hereafter.

Contents

<i>Preface</i>	6
<i>Important Information on the 2022 Subject Review</i>	7
<i>About the Actuarial Students' Society</i>	8
<i>Subject Reviews: First-Year Subjects</i>	9
ACCT10001 Accounting Reports and Analysis [SM1]	10
ACCT10001 Accounting Reports and Analysis [SM1]	13
ACCT10002 Introductory Financial Accounting [SM2]	15
ACTL10001 Introduction to Actuarial Studies [SM2]	17
CMCE10001 Sustainable Commerce [SM1]	20
ECON10003 Introductory Macroeconomics [SM2]	21
ECON10004 Introductory Microeconomics [SM1]	23
ECON10004 Introductory Microeconomics [SM1]	25
FNCE10002 Principles of Finance [SM1]	27
FNCE10002 Principles of Finance [SM1]	29
MAST10005 Calculus 1 [SM1]	31
MAST10006 Calculus 2 [SM2]	33
MAST10006 Calculus 2 [SM2]	35
MAST10007 Linear Algebra [SM1]	37
MAST10008 Accelerated Mathematics 1 [SM1]	39
MAST10008 Accelerated Mathematics 1 [SM1]	41
MAST10009 Accelerated Mathematics 2 [SM2]	43
<i>Subject Reviews: Second-Year Subjects</i>	45
ACTL20001 Introductory Financial Mathematics [SM1]	46
ACTL20001 Introductory Financial Mathematics [SM1]	48
ACTL20003 Stochastic Techniques in Insurance [SM2]	50
ACTL20004 Topics in Actuarial Studies [SM2]	52
ECON20001 Intermediate Macroeconomics [SM2]	54
MAST20004 Probability [SM1]	56
MAST20004 Probability [SM1]	58

MAST20005 Statistics [SM2]	60
MAST20026 Real Analysis [SM2].....	62
MGMT20001 Organisational Behaviour [SUM]	64
Subject Reviews: Third-Year Subjects.....	66
ACTL30001 Actuarial Modelling I [SM1]	67
ACTL30001 Actuarial Modelling I [SM1]	69
ACTL30002 Actuarial Modelling II [SM1]	71
ACTL30003 Contingencies [SM2]	73
ACTL30004 Actuarial Statistics [SM2]	76
ACTL30006 Intermediate Financial Mathematics [SM2]	78
ACTL30007 Actuarial Modelling III [SM1]	80
ACTL30007 Actuarial Modelling III [SM1]	82
ACTL30008 Actuarial Analytics and Data I [SM1].....	84
ACTL30008 Actuarial Analytics and Data I [SM1].....	86
Subject Reviews: Graduate Subjects.....	88
Equivalent Graduate Subjects	89
ACTL90001 Mathematics of Finance I [SM1]	90
ACTL90002 Mathematics of Finance II [SM2]	92
ACTL90003 Mathematics of Finance III [SM1]	94
ACTL90004 Insurance Risk Models [SM1]	96
ACTL90004 Insurance Risk Models [SM1]	98
ACTL90005 Life Contingencies [SM2].....	101
ACTL90006 Life Insurance Models I [SM1].....	103
ACTL90007 Life Insurance Models II [SM2]	105
ACTL90008 Statistical Techniques in Insurance [SM2]	107
ACTL90010 Actuarial Practice and Control I [SM1]	109
ACTL90010 Actuarial Practice and Control I [SM1]	111
ACTL90011 Actuarial Practice and Control II [SM2]	113
ACTL90013 Actuarial Studies Projects.....	115
ACTL90014 Insurance Risk Models II [SM2].....	117
ACTL90018 General Insurance Practice [SM1].....	119
ACTL90019 Data Analytics in Insurance II [SM2]	122

Subject Reviews: Breadth and Elective Subjects.....	124
BLAW10001 Principles of Business Law [SM1].....	125
BLAW10001 Principles of Business Law [SM1].....	127
COMP10001 Foundations of Computing [SM1].....	129
COMP10001 Foundations of Computing [SM1].....	131
COMP10002 Foundations of Algorithms [SM2].....	134
FNCE20005 Corporate Financial Decision Making [SM1].....	137
FNCE20005 Corporate Financial Decision Making [SM1].....	139
FNCE20005 Corporate Financial Decision Making [SM2].....	142
FNCE30001 Investments [SM1]	144
FNCE30007 Derivative Securities [SM2].....	146
FNCE30011 Essentials of Corporate Valuation [SM1]	148
FNCE30011 Essentials of Corporate Valuation [SM2]	150
ECOM20001 Econometrics 1 [SM2].....	152
ECOM30004 Time Series Analysis and Forecasting [SM2].....	154
ECON10005 Quantitative Methods 1 [SM1]	156
ECON20002 Intermediate Microeconomics [SM1]	158
ECON20002 Intermediate Microeconomics [SM1]	160
ECON30009 Macroeconomics [SM2]	162
MUSI20164 Free Play New Music Improv Ensem [SUM]	164
MUST20010 Singing and the Power of Pop Music [SM1].....	165
Appendix	167
Exemptions Guide.....	167
List of Core Principle Exemptions	169
Undergraduate Exemption Subjects.....	169
Postgraduate Exemption Subjects	170
Mathematics Prerequisites for the Actuarial major.....	171

Preface

Welcome to this guide on the subjects studied as part of an Actuarial Studies major under the Bachelor of Commerce degree. If you're reading this, you may be considering a career as an actuary, and you may be curious about what an actuarial student will encounter in their university studies.

While a quick online search will give you a definition of actuarial science as the discipline that uses mathematical and statistical methods to assess risk in various industries, this doesn't capture the full scope of becoming an actuary. The path to this career can be challenging and multifaceted, and as a result, the Actuarial Students' Society has made significant efforts to provide transparency regarding the subjects studied.

This guide is the result of our society's work, and we aim to provide you with an overview of each subject, written by students with diverse backgrounds, as well as general tips and advice based on their personal experiences. It's important to note that every review will be a subjective expression of opinion, and individual experiences may differ. Please keep in mind the year and semester of each subject review, as subject content, structure, and lecturers may change over time.

While we strive to ensure this guide is up to date, it's important to recognise that the reviewed curriculum may have been updated since the time of publication. However, we believe that these reviews will still be a valuable reference for understanding the general direction of each subject.

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

We hope that this guide will help you navigate the complex journey of becoming an actuary and provide you with the necessary tools to succeed in your studies!

— Matt Lambrianidis and Samuel Zong (Education Team), February 2023

Important Information on the 2022 Subject Review

Subject Reviews from Previous Editions

To provide the most value to our members, we have included reviews from previous editions of the *ASS Subject Review* for subjects not completed by any of our contributors in 2022. Each individual review specifies the year and semester in which the subject was completed.

Even though the curriculum, assessments, and/or other aspects of certain subjects may have changed since the original publication of their respective reviews, we still hope that these reviews will provide valuable guidance and insight to students who are enrolled in or considering enrolling in these subjects.

Inclusion of breadth and elective subjects

The change in the accreditation curriculum also meant that full-major Actuarial students seeking postgraduate study are only allowed one breadth/elective subject (if the student chooses not to take ACTL10001) and two non-math breadth subjects. With this in mind, the *Actuarial Students' Society Subject Review* will continue to include a range of breadths and electives available to our members. The inclusion of these reviews will assist all Actuarial students in deciding the right breadth or 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.

Finally, the *Actuarial Students' Society Subject Review* has always been a publication by Actuarial students for Actuarial students. Whilst the majority of our members have been pure Actuarial majors, a significant portion of our membership and committee alike undertake the Actuarial major with another. Therefore, we have expanded the 2022 edition of the *Actuarial Students' Society Subject Review* to include subjects relevant in obtaining double majors with Actuarial and the Economics or Finance majors – written by students taking double majors themselves. Ultimately, their experiences can relate to many other first or second year Actuarial students standing at this crossroad; we hope that these reviews will help facilitate the making of this decision.

About the Actuarial Students' Society

Founded in 1989, the Actuarial Students' Society has established itself as the University of Melbourne's official society for students undertaking actuarial studies, with the support of the University of Melbourne Centre for Actuarial Studies. Our aim at the society is to expand our members' career opportunities by bridging relationships between students and professionals alike, and by developing their actuarial skill sets.

By connecting our student members with like-minded peers, experienced lecturers and sponsorship representatives, we enable our members to get a head-start in their actuarial careers. To achieve this, our society holds multifarious events, both social and professional. The Actuarial Students' Society's social calendar includes events like Trivia Night and Poker Night; they emulate a warm and amicable atmosphere that encourages students to mingle with other students and ask sponsors meaningful questions. Our professional calendar includes events like our flagship Contact Night, where students can network with and learn from working actuaries in a more formal setting.

The Actuarial Students' Society's didactic workshops in Excel and R equip our members with fundamental skills for the profession and the fiercest tools for job-seeking. Employers have favoured candidates who are proficient in such areas; we take pride in helping our members take real strides in their career development early on. Through the coalescence of constant exposure to the actuarial world, our members will learn to love the actuarial degree and profession. Your first step starts with us – the Actuarial Students' Society.

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

www.melbourneactuary.com

www.facebook.com/actuarialstudentsociety

Subject Reviews: First-Year Subjects

ACCT10001 Accounting Reports and Analysis [SM1]

Exemption status	Not an exemption subject, but it is a prerequisite for ACCT10002 <i>Introductory Financial Accounting</i> (CB1 <i>Business Finance</i>).															
Lecturer(s)	Mr Noel Boys															
Weekly contact hours	1 × 1.5-hour lecture 1 × 1 hour tutorial															
Assessments	<table> <tr> <td>Tutorial participation and preparation:</td> <td></td> <td>6%</td> </tr> <tr> <td>Assessable test:</td> <td>1 × 4% =</td> <td>4%</td> </tr> <tr> <td>Individual assignment</td> <td>1 × 10% =</td> <td>10%</td> </tr> <tr> <td>Individual assignment</td> <td>1 × 10% =</td> <td>10%</td> </tr> <tr> <td>3-hour end-of-semester exam (hurdle)</td> <td></td> <td>70%</td> </tr> </table>	Tutorial participation and preparation:		6%	Assessable test:	1 × 4% =	4%	Individual assignment	1 × 10% =	10%	Individual assignment	1 × 10% =	10%	3-hour end-of-semester exam (hurdle)		70%
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3-hour end-of-semester exam (hurdle)		70%														
Textbook recommendation	Birt, J, Chalmers, K, Maloney, S, Brooks, A, Oliver, J & Bond, D 2020, <i>Accounting: Business Reporting for Decision Making</i> , 7th edn, Wiley, Australia ✓ Recommended. The lectures covered a significant amount of content, so the textbook was useful to understand those concepts in greater detail and with a different approach. There were also many useful practice questions for each topic.															
Lecture capture	Full (both audio and video)															
Year and semester reviewed	2022 Semester 1															

Subject content

The course focused on financial accounting (how entities prepare reports) and management accounting (how information informs decision making for different parties) with the first 6 chapters covering the former and the last 3 chapter covering the latter.

1. Regulatory Framework / Conceptual Framework

This topic examines the nature and purpose of accounting, the information needs of different groups, business structures and their respective reporting requirements.

2. Transaction Analysis & Financial Statements

This topic considers the statement of financial position and the statement of profit and loss as well as introducing the accounting equation. It further examines different line items and classifications of line items.

3. Assets

This topic builds to zoom in on what an asset is and how it is defined, recognised and classified. This includes short term vs long term assets and the different line items and their measurement.

4. Liabilities and Equity

Considering the second part of the balance sheet, this topic examines liabilities and equity in a similar fashion to assets, considering their classification, recognition and measurement. It further considers financial decisions making as well as leverage and required.

5. Income & Expenses / Other Comprehensive Income / Statement of Changes in Equity

This topic considers the profit and loss statements including the different line items, mandatory disclosures vs notes and the statement of changes in equity.

6. The Statement of Cash Flows

This topic examines the statement of cash flows, the different classification of cash flows and disclosure requirements. It further covers agency theory and earnings management (how accounting policy and techniques can be used to manipulate profit).

7. Financial Statement Analysis

This topic involves analysing financial statements to make findings about the health and value of a company using horizontal analysis, vertical analysis, trend analysis and ratio analysis. This topic involved many formulas and relationships to be used to conduct this analysis.

8. Budgeting

This topic considers how businesses use budgets to inform their operations and how to formulate cash budgets and variance reports. The content here flows logically from what was taught about the financial statements.

9. Cost-Volume-Profit Analysis

This topic introduces breakeven or cost-volume-profit analysis to consider how different sales models can influence profit and risk to a business. The topic involved equal parts of numerical calculations and interpretation of the results to a business's operation.

10. Sustainability in Accounting

This topic was conducted by Assistant Professor Brad Potter as a guest lecture and considers how accounting can be examined to include assessing a businesses' sustainability and different theories of examining said business sustainability.

Lectures

The lectures for ARA were very content heavy and moved at a brisk pace. Mr. Noel Boys made well-placed and occasionally humour jokes during the lectures which helped to stay engaged during the 1.5 hours. The lecture slides contained a condensed summary of the topic and thus served as great notes to have. Personally, it was more effective to annotate the provided slides that attempting to copy down the slides directly.

Tutorials

ARA had 1 × 1.5-hour tutorial each week covering questions and applications of the previous weeks content. The tutorial questions were released in advance to complete prior to the tutorial like the non-assessable quizzes. The quizzes were short-form textbook style questions whereas the tutorial questions were focused on application to longer questions. As the final exam contains both a financial statement section and multiple-choice section the two different styles of the quizzes and tutorial questions were useful to complete.

Assessments

Tutorials

The tutorial participation and attendance marks were (depending on tutor) awarded with some leeway. Despite this, attending the tutorials are usually quite valuable and the quizzes act as a good indicator of understanding. The assessable tests (only worth 1% each) are a valuable indicator of exam-style questions and assess understanding in a timed environment.

Assignments

The first assignment is individual and involved preparing a balance sheet and statement of profit or loss. This involved entering values into excel from interpreting a series of financial events, similar to the financial statement section of the exam. This assignment gave sufficient time and was followed the theory laid out in the lectures but required you to pay attention to the specific details given.

The second assignment was a group assignment but could realistically be done individually and covered financial analysis. This assignment was also completed on excel and involved manipulating provided values with formulas to present different financial ratios.

Both assignments were relatively straight-forward, and all ratios and information was in the lectures. The greater challenge was avoiding numerical or calculation errors.

Exam

The exam was open-book and 3 hours 15mins long (including reading and submitting time). The exam had two sections: Question 1 was creating a set of financial statements (worth 33 marks) and questions 2-68 were multiple choice (worth 1 mark each) adding to a total of 100 marks for the entire exam. As the examinations were open book, creating a comprehensive and easily traversable set of notes can be very useful. The primary difficulty of the ARA exam is the first question providing the transactions in a way different to what you are used to interpreting. It could be grouped by what financial statement it would fall under, by what the transactions involved, etc... and this causes you to be aware of what information each of the different financial statements presents and how to interpret what a transaction is conveying. Completing the past exams is very useful for this section. The multiple-choice section was similar to questions done previously and those provided in the practice exams, so completing the second section of the three practice exams is useful for this section.

Overall remarks

ARA is a very content heavy subject, and for someone without any accounting knowledge, I found the subject to require some commitment to understand. The course focusing on different aspects of accounting is useful to understand those concepts but it's important to understand how these different aspects link together which is left more to the student themselves. The course structure covers some content multiple times which refreshed understanding and provides an opportunity for holistic understanding. Despite ARA being rather dry to understand, its applications are very useful and practical in being able to understand financial statements and understand business operations.

ACCT10001 Accounting Reports and Analysis [SM1]

Exemption status	Not an exemption subject, but it is a prerequisite for ACCT10002 <i>Introductory Financial Accounting</i> (CB1 <i>Business Finance</i>).
Lecturer(s)	Mr Noel Boys
Weekly contact hours	1 × 1.5-hour lecture 1 × 1 hour tutorial
Assessments	Tutorial participation and preparation: 6% Assessable test: 1 × 4% = 4% Individual assignment 2 × 10% = 20% 3-hour end-of-semester exam (hurdle) 70%
Textbook recommendation	Birt, J, Chalmers, K, Maloney, S, Brooks, A, Oliver, J & Bond, D 2020, <i>Accounting: Business Reporting for Decision Making</i> , 7th edn, Wiley, Australia ✓ Recommended . Noel's lectures were very comprehensive, the textbook explained certain concepts While in more detail and had an abundance of practice questions for each topic.
Lecture capture	Full (both audio and video)
Year and semester reviewed	2021 Semester 1

Contents

Despite its content-heavy nature, I found ARA to be a highly practical and applicable subject that provides great insight into the vital role that accounting plays in any organisation. It covers in detail the components and purposes of different financial statements, as well as techniques used by management to ensure an organisation's functionality.

As someone who was new to Accounting, I felt the content was taught in a very logical structure and at a reasonable pace, even though the amount of memorisation required made the subject quite dry at times. The content was not difficult to understand, however it certainly took some time for me to form a solid idea of how different pieces of information combine to form the accounting system.

Subject content

The course is split into two. The first section consists of topics 1–6 exploring 'financial accounting', which is the preparation of reports. The second section covers topics 7–10 which discusses 'management accounting', how various information can inform decision making about the business and investors.

1. Regulatory and Conceptual Framework

Explores the nature and purpose of accounting, introduces the different users of accounting information, different types of organisation structures, elements of financial statements, and accounting policies.

2. Transaction Analysis & Financial Statements

Introduces the accounting equation which underpins the Statement of Financial Position and the Statement of Profit/Loss, both of which are explained in this topic.

3. Assets

This topic covers all the different types of short-term and long-term assets usually owned by an organisation as well as their measurement and recognition criteria.

4. Liabilities and Equity

This second part of the balance sheet preparation introduces the liability and equity classes and their respective measurement issues. It also investigates business financing and the weighted average cost of capital.

5. Income & Expenses / Other Comprehensive Income / Statement of Changes in Equity

This topic presents the profit and loss statement and investigates measurements in its preparation.

6. The Statement of Cash Flows

The last of the general-purpose financial reports is introduced in this topic. Boys also covers earnings management

techniques which are used to manipulate financial report requirements. It further covers agency theory and earnings management (how accounting policy and techniques can be used to manipulate profit).

7. Financial Statement Analysis

This begins the second half of the course investigating the management accounting aspects of accounting. Trends and ratios are calculated, and their relationships investigated.

8. Budgeting

Instead of looking into the past, this section tries to predict the future earnings and position of the business. The different styles of budgeting are also examined.

9. Cost-Volume-Profit Analysis

Another management accounting technique, this type of analysis is the most mathematical part of the course, with much emphasis put on interpreting the results you calculate.

10. Sustainability in Accounting

This topic is held by a guest lecturer. It examines the emerging area of sustainability accounting and introduces theories to explain business' actions. There will likely be a question on the exam in this vein.

Lectures

While I did not personally find ARA to be the most interesting subject, Mr. Noel Boys was certainly one of the most entertaining educators I have ever met. His well-placed humour made the 1.5-hour recorded lectures very bearable, and many of his jokes were directly related to the content taught, making it easier and more enjoyable to digest.

The lecture slides had clear explanations and were already quite condensed, so I found little marginal benefit in making notes for most topics. However, some people may find it useful to paraphrase certain explanations/terms in their own words; it is entirely up to the individual.

Tutorials

Each week's 1.5-hr online tutorial focused on the topic covered in the previous week's lecture. In contrast to the theory-focused lectures, the tutorial activities were predominantly application-based. These activities were especially helpful in giving a better grasp of certain small details in each topic.

Assessments

Tutorials

The 6% from tutorial participation and preparation are very leniently given, so make sure to attempt every preparation quiz and attend every tutorial if possible. The preparation quizzes are a very elementary representation of the material, so make sure to not underestimate the subject based on that. The assessable quizzes (each worth 1%) are good representations of the style and difficulty of the multiple-choice questions in the final exam.

Assignments

The individual assignment was given out very early in the semester and involved the preparation of a balance sheet and a statement of profit/loss. The group assignment focused on every aspect of financial analysis. Both were completed in Excel and both were relatively easy, but given the sheer number of entries, it is important to double-check every single number to prevent any "silly mistakes" from arising.

Exam

This semester's exam was open book. We had 3 hours to complete a financial report (with the balance sheet, statement of profit/loss, statement of cash flows) worth 40 marks in total and 80 multiple-choice questions worth 1 mark each. For those who are curious towards the many horror stories about ARA exams, this is mainly because the financial data provided for the report tends to be very scattered and convoluted, organised in unpredictable ways. I was quite shocked when attempting my first past exam, as it was much more difficult than any of the material covered during the semester. However, by repeatedly practicing with past exams, this notorious section becomes immensely easier, and can even turn out to be a huge mark-booster.

ACCT10002 Introductory Financial Accounting [SM2]

Exemption status	CB1 <i>Business Finance</i> , in conjunction with FNCE10002 <i>Principles of Finance</i> . An average mark of 73 across both subjects is required.								
Lecturer(s)	Mr Warren McKeown								
Weekly contact hours	1 × 1.5-hour lecture 1 × 1.5-hour tutorial								
Assessments	<table style="width: 100%; border: none;"> <tr> <td style="width: 80%;">Individual written assignment:</td> <td style="text-align: right;">5%</td> </tr> <tr> <td>3 × online quizzes:</td> <td style="text-align: right;">10%</td> </tr> <tr> <td>Individual Xero assignment</td> <td style="text-align: right;">15%</td> </tr> <tr> <td>3-hour end-of-semester exam</td> <td style="text-align: right;">70%</td> </tr> </table>	Individual written assignment:	5%	3 × online quizzes:	10%	Individual Xero assignment	15%	3-hour end-of-semester exam	70%
Individual written assignment:	5%								
3 × online quizzes:	10%								
Individual Xero assignment	15%								
3-hour end-of-semester exam	70%								
Textbook recommendation	None								
Lecture capture	Full (both audio and video)								
Year and semester reviewed	2021 Semester 2								

Overall comments

Contrary to Accounting Reports and Analysis which looked at accounting as a whole, Introductory Financial Accounting, or IFA, delves deeper into accounting from the perspective of a preparer of financial reports. While I personally found ARA to be easier and, frankly, more interesting, I think those who have done accounting in high school will find that the content simply builds upon what they previously learnt. Thus, this subject will probably come more easily to them than it will to others.

Subject content

IFA focused on the effects of transactions on the General Journal, individual ledger accounts, and ultimately the financial statements. Many concepts were familiar from ARA, this time extended with further details. The topics covered in each week are:

1. Introduction
2. Double Entry Accounting
3. Adjustments
4. Inventories
5. Receivables
6. Non-current Assets
7. Liabilities
8. Equity
9. Share Issues 1
10. Statement of Cash Flows
11. Accounting for GST

After the initial introductory content, Week 2 introduced the foundational concepts of IFA including T-accounts, debits, and credits. Familiarizing yourself with these processes is straightforward but essential, as the remainder of the subject relies on it. The following weeks discussed the debit and credit impact of various transactions on the accounts, separated into categories. Week 10 summarizes a lot of the content of the subject in the preparation of cash flow statements, which requires a thorough grasp of the interaction between accounts as the ultimate test of your understanding — this is a heavily examined topic, but also easily studied in the provided questions. The final week of the content pertains to the GST treatment of transactions in the accounts, which can be confusing initially but manageable with practice.

Heavy emphasis was placed on definitions of words from the Accounting Standards. These must be remembered as short answer questions often relate to these definitions.

Lectures

Lectures were around 1.5 hours long though some lectures were longer/shorter than others. The lectures were released at the beginning of each week. The lectures consisted of the lecturer going through a PowerPoint presentation; sometimes there will be a supplementary video going through past exam questions. You should have a go at these questions yourself before referring to the answers to consolidate your knowledge!

Tutorials

Each week there is a 1.5-hour tutorial. While tutorial attendance isn't mandatory, the tutorials provide good revision for the previous lecture's content. Some tutors give a short recap of the lecture contents to start the lecture; following this, they speak through the answers of the tutorial worksheet (you will be assigned questions to complete before the tutorial).

Assessments

Online quizzes

There are three online quizzes scattered throughout the semester. Each quiz is 1 hour, and they consist of calculation questions, journal entries or drop-down theory questions. These are mostly straightforward and should be okay to do without a copious amount of revision beforehand.

Assignment 1 (Written Assignment)

Another relatively straightforward assignment, although difficult to score highly in. In this assignment you are given a question stem and are required to provide a ~300-word response to the prompt. It is important to really tailor your answers to the rubric provided.

Assignment 2 (Xero Assignment)

Accounting practiced in real life. Students are tasked with the recording of transactions and preparation of financial reports for a small business using accounting software – Xero. The financial reports are then used to answer a set of multiple-choice questions; leave ample time to interpret these questions though, for they can be somewhat mindboggling.

End-of-semester Exam

The exam was 3 hours long; it had 80 multiple choice questions (80 marks) and 4 short answer questions (40 marks). The exam was not conducted under Zoom supervision, and as such, was open book and calculator friendly. I personally think it would be wise to do the short answer questions first, in the event you are tight on time and need to guess some of the multiple-choice questions.

ACTL10001 Introduction to Actuarial Studies [SM2]

Exemption status	None
Lecturer(s)	Prof Benjamin Avanzi
Weekly contact hours	2 × 1-hour lectures 1 × 1-hour tutorial
Assessments	Individual assignment: 10% Mid-semester exam: 10% Yellowdig participation: 10% End-of-semester exam (Hurdle): 70%
Textbook recommendation	Dickson, D. C. M., & Atkinson, M. E. (2011). <i>An Introduction to Actuarial Studies (2nd ed.)</i> . Cheltenham, UK: Edward Elgar Publishing. The text is mainly used as a source of supplementary questions to the provided tutorial questions. I found this useful for further revision on tricky topics in the latter half of the subject.
Lecture capture	Full (both audio and video)
Year and semester reviewed	2021 Semester 2

Subject content

1. Simple Interest and Simple Discount

Reminiscent of the first weeks of Principles of Finance. This was mostly straightforward material, but it is important to pay attention to the relationship between the interest and discount rate.

2. Compound Interest

3. Annuities

4. Bonds and Loans

The contents of Weeks 2–4 overlapped heavily with POF. Doing it again using actuarial notation and slightly different formulae yielded new insights for me, so definitely still pay close attention.

5. Demographics

This topic introduced the features of populations through ratios and population pyramids. The analysis is simple but interesting to interpret.

6. Life Tables

We covered the basic features and functions of a life table in this topic. The usage of life tables is heavy in the following topics, so it is important to become familiar with the notation and calculations involved.

7. Mortality, Fertility and Population Projections

This week contained a lot of scattered content focusing on analysing populations. These were all interesting to learn about but formed little of the final examined content.

8. Contingent Payments

Week 8 focuses on valuing future cashflows that are uncertain. I found this topic particularly challenging and found the textbook to provide some helpful additional practice.

9. Life Insurance

A quick introduction to common life insurance products and how to approach related calculations.

10. Premiums and Reserve

This week combined the material from Weeks 8 and 9 focusing on work in the life insurance industry. This week was full of tedious calculations where questions could get especially grotesque with changing interest and mortality rates.

11. General Insurance

12. Superannuation

The final two weeks contained no quantitative content, and the remainder of the subject simply discussed the features and products of the General Insurance and Superannuation practice areas. This content is still examinable, but much less time-consuming to cover and prepare for.

The subject begins with content resembling the financial mathematics portion of *Principles of Finance*. Since these concepts of present values, accumulations and interest rates were frequently applied in the subject, I found the first few weeks to be a good opportunity for revising these essential foundations. Actuarial notation is also introduced here, which students should familiarise themselves with as soon as possible.

The following weeks introduce interesting ideas of demographics and life tables, with heavy emphasis on probabilities of survival and mortality. Later on, this was combined with the financial mathematics from the initial weeks to calculate expected present values and insurance premiums. With my weak foundation in probability, I found this section of the course to be a bit confusing but manageable with practice.

Aside from these theoretical topics, Benjamin also gave us an insight into the actuarial industry, including discussions of professionalism and broad overviews of insurance types and superannuation. This was scattered throughout the semester in the form of interview recordings and analysis of related current events.

Lectures

Lectures were separated into chapters as covered in the textbook, and usually added up to two hours of material each week. Benjamin's lectures were well organized and structured intuitively. However, the delivery is sometimes clunky and hard to follow — especially in explaining the derivations of equations. Luckily, the detailed slides were able to somewhat make up for this, since I could pause the recording and work through the slides before continuing. Otherwise, the lecture quality was good. My favourite part of lectures were the example questions, where Benjamin made the rationale behind each solution very clear. This was very helpful in my study.

Tutorials

Attendance in tutorials were not marked this semester and the classes were held over Zoom. While I still found value in discussing in breakout rooms, the solutions provided on the LMS were easily detailed enough to study individually. The practice questions were all provided, supplemented by a collection of past exam questions and a further list of textbook questions.

In tutorials, the tutor began by recapping the lecture material then assigning us into breakout rooms to discuss the week's tutorial questions with each group being responsible for different questions. We reconvened at the end of the tutorial to share answers. Attending the Zoom tutorials was useful in cases where you may want to pursue further detail than what was provided in the solutions, but I rarely found this to be the case, primarily because the practice questions were all of adequate difficulty with comprehensive worked solutions. As the group assignment was made many times easier with a cohesive group, another benefit of attending the Zoom tutorials this semester was to meet potential group members for the assignment.

Assessments

Individual assignment

While the individual assignment traditionally involved calculation questions that were to be done using an Excel spreadsheet, the assignment for this semester was a 5-minute recorded presentation on the analysis of general insurance premiums across two legitimate insurance companies. Although almost everyone agrees that a question set would be more straightforward and less painful, this assignment certainly provided great training for one's communication and presentation skills. These qualities are invaluable in the workplace and could be the deciding factor to whether one lands their dream role or internship.

Yellowdig Participation

To encourage interaction and bonding between fellow students, 10% of the subject's final score is based on participation on a forum called Yellowdig. One can earn points by commenting on other people's threads or starting threads, etc. By the end of the last teaching week, one's score for this component is calculated based on whether they've achieved a certain number of total points. In all honesty, as long as you have 10 minutes to spare every week and do not forget about this component, it is free marks.

Mid-semester and end-of-semester exams

Compared to other subjects, I found timing to not be an issue for the 1-hour mid-semester exam and 3-hour final exam for this subject. The tutorial sheets alone provide ample revision for the calculation questions. However, the tutorial sheets barely contain any questions on general theory related to actuarial practice, despite its accounting for around half the marks in both exams. Despite it being rather tempting to overlook the worded theories that seem much drier than the mathematical techniques, it's important to include it in revision.

CMCE10001 Sustainable Commerce [SM1]

Exemption status	Not an exemption subject, but it is compulsory for the Bachelor of Commerce.	
Lecturer(s)	Prof Michael Davern Mr Paul Wiseman (And other lecturers from different faculties)	
Weekly contact hours	1 × 2-hour lectures 1 × 1-hour tutorials	
Assessments	Joining Melbourne Modules	20%
	750-word report	10%
	750-word essay	10%
	2250-word group business report	40%
	1000-word reflective essay	20%
Textbook recommendation	None	
Lecture capture	Full (both audio and video)	
Year and semester reviewed	2022 Semester 1	

Overall comments

Sustainable Commerce gives a snapshot into all the commerce disciplines offered at Melbourne University through the analysis of case studies. The subject gives an opportunity to apply concepts learnt from these various faculties throughout the semester. However, the subject poorly prepares you for the assessments giving very rudimentary and basic introductions to each discipline, while the assignments expect more complex and in-depth reports; reports that you are never taught how to write. Unfortunately, the subject is mandatory.

Subject content

There were 2 case studies this semester: the Aboriginal Carbon Foundation (AbCF) and Interchange Outer East (IOE). You study the AbCF in the workshops through the lens of Accounting, Actuarial Studies, Economics, Finance, Management and Marketing. By learning how to apply these disciplines to the AbCF throughout the semester, the subject attempts to prepare you for Assignment 3, where you apply the disciplines to the IOE yourself.

Tutorials/Practicals/Workshops

A workshop is a hybrid between a lecture and classroom environment. The subject's attempt at this is alright, as you might find yourself engaged or bored depending on the tasks given. What you learn in the workshops has no real application to the assignments apart from the basic analysis of the case studies. The workshops felt mostly dragged and useless.

The tutorials aren't compulsory and are mostly useless. The first session teaches you how to research properly and find credible sources which is the most important thing I learnt in the entire unit. However, you do get assigned pairs and groups in your tutorial groups, so make sure you attend and look out for who you want to work with.

Assessments

The Joining Melbourne Modules are the easiest 20% of a grade you will ever get. Just make sure you do them.

Assignment 1 and 2 is done with the same partner and is relatively easy if you partner with someone you already know. You will find that you won't have enough words to say what you need to say.

Assignment 3 is done with a group of up to 5 people, and your partner from assignment 1 and 2 can't be included. Words are also a problem in this assignment. Make sure you plan thoroughly ahead and keep on track, otherwise you will have to spend a lot of time fixing and possibly even re-doing parts of your report.

Assignment 4 is a reflection assignment and is pretty simple.

Part of your grades is heavily dependent on how lenient of a marker your tutor is.

ECON10003 Introductory Macroeconomics [SM2]

Exemption status	Not an exemption subject, but it is a prerequisite for ECON20001 <i>Intermediate Macroeconomics</i> (CB2 Business Economics).								
Lecturer(s)	Prof Chris Edmond								
Weekly contact hours	2 × 1-hour lectures 1 × 1-hour tutorial								
Assessments	<table style="width: 100%; border: none;"> <tr> <td>Tutorial attendance and participation:</td> <td style="text-align: right;">10%</td> </tr> <tr> <td>Online multiple-choice tests: 2 × 5% =</td> <td style="text-align: right;">10%</td> </tr> <tr> <td>Group assignments 2 × 10% =</td> <td style="text-align: right;">20%</td> </tr> <tr> <td>3-hour end-of-semester exam</td> <td style="text-align: right;">60%</td> </tr> </table>	Tutorial attendance and participation:	10%	Online multiple-choice tests: 2 × 5% =	10%	Group assignments 2 × 10% =	20%	3-hour end-of-semester exam	60%
Tutorial attendance and participation:	10%								
Online multiple-choice tests: 2 × 5% =	10%								
Group assignments 2 × 10% =	20%								
3-hour end-of-semester exam	60%								
Textbook recommendation	Bernanke, Olenick, Frank, Antonovics and Haffetz, MacGraw Hill, 2019, <i>Principles of Macroeconomics Fifth Edition</i> This textbook is X not recommended . It was not used very often throughout the semester, it served more as an additional resource for extra readings if anything was not explained well during the lectures, however, questions could also be posed during tutorials to be clarified.								
Lecture capture	Full (both audio and video)								
Year and semester reviewed	2021 Semester 2								

Overall comments

This subject was a good introduction to macroeconomics and Chris provides really good real-life applications and events like COVID subsidy programs that made this subject really engaging. This will really give you a good insight into how and why the government introduces new regulations and policies when seeing it on the news.

Subject content

1. Introduction to GDP

The first week of this topic introduces economics on a global scale, looking at GDP and how it is used to measure economic activity, as well as a comparison tool between economies.

2. Inflation and Interest Rates, Savings and Investments

This topic makes a start by introducing the Government goals for the economy and introduces price levels and responses made by the Reserve Bank of Australia, and the effects of these changes on the components of GDP.

3. The labour market and short-term economic fluctuations

The content in this week's lectures was quite simple, building upon the simple supply and demand market, with the labour market. This week also introduces the different types of unemployment and methods of measuring and categorising unemployment.

4. A Keynesian Model of the Macroeconomy

This topic is the first topic where new content is introduced on top of high school economics. There are many concepts covered including the background of the model, and how to effectively use the model to look at current economic outcomes. This model is heavily assessed throughout the semester, so learning the Keynesian Model is vital to doing well in this subject.

5. Fiscal policy, Financial markets and Intermediation

This topic introduces Government policy and intervention methods to sustain the economy as changes occur. This week also introduced concepts such as stabilisers, self-correcting the economy depending on the level of output.

6. RBA and monetary policy, aggregate demand and supply

This topic builds further on the interest rates set by the Reserve Bank of Australia, looking at how their decisions are made and the impact of changes in the interest rates on the economy. This is also the week where aggregate demand and aggregate supply are consolidated, studying their components in depth.

7. Solow-Swan Model

The Solow-Swan Model is the second model explored in this topic and is another key component to the

assessments in this subject. This model looks at the long-term economic growth by considering capital accumulation, population growth, and technological advances.

8. International trade and exchange rates

This topic introduces international trade as well as how the exchange rate for each currency is determined, looking at the supply and demand for the currency. This topic also makes a start to looking at the trilemma, where only two of a fixed exchange rate, free capital movement, and independent monetary policy, can be employed.

9. Balance of payments

This is the last topic covered in this subject, which looks at the overall Government Spending and transactions on a global scale.

Lectures

There are 2 1-hour lectures every week, and Chris starts from the short-run topics while introducing snippets of long-run topics then continues to move to long-run topics in the second half of the subject. Since it's an open book exam, don't focus on memorizing it but focus on understanding it and try testing yourself about what would happen in a different setting.

Tutorials/Practicals/Workshops

There is 1 1-hour tutorial every week, and these mainly explain the concepts from the lectures. They have a 5% participation score so you shouldn't skip it, and I'd recommend you to actively participate and ask questions to get the full 5% mark. Additionally, Nahid Khan usually holds fortnightly review sessions going through past papers, and they're really helpful in understanding the content, even more helpful than the tutorial questions in my opinion.

There are also 5% weekly pre-tutorial quizzes that have 2 tries hence you shouldn't find it too difficult to ace this as well.

Assessments

Group assignments

The assignments were in groups of 3, and they involved real-life online researching of data for different countries from different years. This was personally more interesting than the usual content-related assignments and gives you a good insight of how the contents taught in the lectures actually relate to real-life events.

Online quizzes

The online quizzes were only 30-minutes MCQ questions and were just a little more difficult than the pre-tutorial quizzes.

End-of-semester exam

There were two parts: the first was in MCQ format while the second was in short-answer True/False format. The MCQ was quite tricky but has similar difficulty to the online quizzes. The short-answer was more difficult since it required you to give a True/False answer while the questions usually seemed in the grey, but what matters most is your explanations. However, don't forget to watch the review sessions since about 20% of the questions are similar to those in the review sessions!

ECON10004 Introductory Microeconomics [SM1]

Exemption status	CB2 <i>Business Economics</i> , in conjunction with ECON20001 <i>Intermediate Macroeconomics</i> . An average mark of 73 across both subjects is required.								
Lecturer(s)	A Prof Laura Panza A Prof John Tang								
Weekly contact hours	2 × 1-hour lectures 1 × 1-hour tutorial								
Assessments	<table style="width: 100%; border: none;"> <tr> <td style="width: 70%;">Pre-tutorial quizzes</td> <td style="text-align: right;">5%</td> </tr> <tr> <td>Tutorial participation:</td> <td style="text-align: right;">5%</td> </tr> <tr> <td>Assignments</td> <td style="text-align: right;">2 × 15% = 30%</td> </tr> <tr> <td>3.5-hour end-of-semester exam (30-minute submission time)</td> <td style="text-align: right;">60%</td> </tr> </table>	Pre-tutorial quizzes	5%	Tutorial participation:	5%	Assignments	2 × 15% = 30%	3.5-hour end-of-semester exam (30-minute submission time)	60%
Pre-tutorial quizzes	5%								
Tutorial participation:	5%								
Assignments	2 × 15% = 30%								
3.5-hour end-of-semester exam (30-minute submission time)	60%								
Textbook recommendation	<p>Gans, J., King, S., Byford, M., Mankiw, N. G. (2021). <i>Principles of Microeconomics: Asia-Pacific Edition</i> (8th ed.). South Melbourne, AU: Cengage Learning Australia.</p> <p>Borland, J. (2021). <i>Microeconomics: Case Studies and Applications</i> (4th ed.). South Melbourne, AU: Cengage Learning Australia.</p> <p>✓ Recommended. Would recommend <i>Principles of Microeconomics</i> as it provides good explanations that you can use to independently learn the content yourself. Lectures, tutorials and review sessions were lacking in proper explanation and extended content. The textbook is a better source of learning material.</p> <p><i>Microeconomics: Case Studies and Applications</i> is X not recommended as it does not provide any additional benefit apart from real world scenarios of economic concepts. This real-world application is not assessed in the assignments or end of semester exam.</p>								
Lecture capture	Full (both audio and video)								
Year and semester reviewed	2022 Semester 1								

Overall comments

ECON10004 is a content heavy and fast introduction to microeconomics which forces the student to take their own time to really consolidate their understanding of the concepts learned. The content however is incredibly interesting and engaging with lots of practical application.

The course would most likely be incredibly difficult for students who haven't done VCE Economics 3&4, as I found myself benefiting from context and knowledge learnt from VCE which made the learning curve much smoother. Covering a new concept each week also made the course feel somewhat rushed, as I felt there were details that could be explained further that would have really helped with comprehension. This also means any background knowledge around Economics will be incredibly useful as you aren't learning content from scratch and therefore won't feel as rushed. I felt that the subject over-complicated certain concepts and provided lacking explanations and opportunities for these concepts learnt in the lectures. The textbook helped make up for some of these poor explanations. However, I did not find all of the tutorials very useful for applying the concepts learnt. This left a lot of interpretation and learning to the discretion of the student and this may be due to the design of the course or is just the different expectations set for university students.

Subject content

1. Supply and Demand

The basics of a market and the forces of supply and demand

2. Elasticity and Welfare

Responsiveness of demand and supply in terms of factors such as price, income and e.t.c and how to measure the welfare of a market using consumer, producer and total surplus.

3. Government intervention and trade

Different types of government intervention and the benefits of trade

4. Market failure

The different types of market failure

5. Theory of the Firm

How firms decide their supply curve through short run and long run cost curves

6. Tax System Design

How tax systems are designed

7. Game Theory

How individuals and firms make decisions given certain conditions

8. Market Structures

Look at 4 different market structures: monopolies, oligopolies, monopolistic competition and perfect competition.

However, you learn about these different types throughout the entire unit, not in one dedicated week, starting with perfect competition.

9. Labour Markets

Look at specifically how the price of labour is determined.

10. Historical applications

Look at the 4 moral philosophies of economics (such as communism, liberalism, utilitarianism and libertarianism) and historical applications of concepts learnt in the lectures.

Lectures

There were two lectures every week on Tuesday and Thursday. They're good for introducing content, but you'll need to take the time yourself to properly understand and grasp the material, as they don't really go in depth in explaining things.

Tutorials

I didn't find the tutorials useful. The questions offered in the tutorials are usually a shot in the dark either being incredibly good for preparing for assignments and the end of semester test being incredibly bad at times. Thankfully, the latter was a rare occurrence.

Assessments

Assignments/Mid-semester tests

Two assignments based on weeks 1 to 4 and 5 to 9 respectively. They do take a bit of time, but if you have a good grasp of the content you should be able to do these and achieve a H1 relatively easily. It is more mathematical based too, rather than short answer questions, so errors come from computational errors rather than conceptual misunderstandings.

The questions are reflective of the end of semester exam difficulty.

End-of-semester exam

The end of semester exam is open book and is 3 hours and 30 minutes long. If you have a good grasp of the concepts, the majority of the exam should be doable. I spent 1 hour+ on the last question. The exam this semester was poorly written with the final question making up more than 33% of the entire exam mark, and the question was based on a concept we weren't able to practically apply due to faculty not providing any questions for us to do it. Excluding this, the rest of the course prepares you decently well for the exam and I found that what was taught and what was assessed was generally fair and accurate. Also, drawing diagrams help and is required for some of the questions so get comfortable with doing that.

ECON10004 Introductory Microeconomics [SM1]

Exemption status	CB2 <i>Business Economics</i> , in conjunction with ECON20001 <i>Intermediate Macroeconomics</i> . An average mark of 73 across both subjects is required.								
Lecturer(s)	Prof Tom Wilkening Mr Jonathon Thong								
Weekly contact hours	2 × 1-hour lectures 1 × 1-hour tutorial								
Assessments	<table style="width: 100%; border: none;"> <tr> <td>Pre-tutorial quizzes</td> <td style="text-align: right;">5%</td> </tr> <tr> <td>Tutorial participation:</td> <td style="text-align: right;">5%</td> </tr> <tr> <td>Assignments</td> <td style="text-align: right;">2 × 15% = 30%</td> </tr> <tr> <td>3.5-hour end-of-semester exam (hurdle)</td> <td style="text-align: right;">60%</td> </tr> </table>	Pre-tutorial quizzes	5%	Tutorial participation:	5%	Assignments	2 × 15% = 30%	3.5-hour end-of-semester exam (hurdle)	60%
Pre-tutorial quizzes	5%								
Tutorial participation:	5%								
Assignments	2 × 15% = 30%								
3.5-hour end-of-semester exam (hurdle)	60%								
Textbook recommendation	<p>Gans, J., King, S., Byford, M., Mankiw, N. G. (2014). <i>Principles of Microeconomics: Australia and New Zealand Edition</i> (6th ed.). South Melbourne, AU: Cengage Learning Australia.</p> <p>Borland, J. (2016). <i>Microeconomics: Case Studies and Applications</i> (3rd ed.). South Melbourne, AU: Cengage Learning Australia.</p> <p>Would X not recommended the texts. The lectures, tutorials and review sessions are comprehensive enough that you do not require the supplementary material to consolidate your knowledge.</p>								
Lecture capture	Full (both audio and video)								
Year and semester reviewed	2021 Semester 1								

Comments

ECON10004 provides a good window into the principles of microeconomics, exploring, and extending upon, some of the concepts taught in high school economics. The content covered is both interesting and engaging, and can be linked to real life applications.

Subject content

The first couple weeks' worth of content from ECON10004 closely follows that of high school economics, so a lot of content is similar, however is sometimes explained differently and offers a new perspective on some concepts.

1. Introduction to Microeconomics

The subject begins by introducing some of the key concepts which form the foundations of microeconomics: opportunity cost, price elasticity of demand and supply, comparative and absolute advantage, efficiency, scarcity. These are explored further in the next few chapters and are very basic so the content should not be too difficult.

2. Perfectly Competitive Markets

This topic introduces students to the demand and supply curve in the context of a market with many idealising conditions – a perfectly competitive market.

3. Government Intervention and Market Failure

This topic went through the positive and negative externalities from company actions and methods that can be implemented by the Government to correct these externalities. This topic also introduced graphical interpretations of Government intervention and externalities.

4. Theory of the Firm

This lecture begins on talking about firms and the decisions they make in different circumstances and markets. This is also where cost, revenue, and profit come into play, and we are introduced to a more sophisticated graph to interpret data and make decisions for the firm based on it.

5. Price Discrimination

This topic presented ways that firms can act with differing amounts of information about buyers available to them, showing us the decisions firms would make to maximise profits by determining what prices to set, given a buyer's willingness to purchase.

6. Game Theory

Game theory involves many concepts which help determine outcomes in an oligopolistic market. A notable example of a concept similar to this is the *prisoner's dilemma*, and game theory just shows us how firms would act in an oligopoly in these circumstances.

Lectures

This semester, there was only one lecture stream and lectures were released on Tuesdays and Thursdays each week. The lectures, and their accompanying lecture slides, are fairly comprehensive and most of the concepts are explained clearly. My notes for this subject were just annotated versions of the lecture slides provided!

Tutorials

Tutorials for Introductory Microeconomics are compulsory, and you will be awarded a mark out of 10 for tutorial participation which will be counted towards the 5% "tutorial participation" mark. Additionally, there are 11 pre-tutorial quizzes that are released each Thursday and are due Sunday 11:59pm AEST. Your best nine scores from these quizzes are combined and count towards your 5% "pre-tutorial quizzes" mark. These quizzes are brief but are a good revision tool for the past week's lecture content.

The tutorials themselves go through the previous week's lecture content and provide practice questions similar to what will appear on the final exam. Thus, it is recommended that you pay good attention to the tutorials.

Assessments

Assignments

There were two assignments, the first one covered content from weeks 1-5, while the second covered content from weeks 6-10. Both assignments were quite comprehensive and required students to really understand the subject material. It is recommended that you begin on the assignments early as they require a lot of diagram drawing which can be a deceptively tedious process.

Tip: ensure you accurately label all appropriate axes, intercepts and graph lines or risk your tutor deducting marks for these small mistakes.

End-of-semester exam

The final exam was 3.5 hours long; this included reading, writing and submission time. Though it supposedly only contained 2 hours' worth of content, many students did not finish the exam within the timeframe provided. Thus, it is important that students are not only familiar with all of the content but can also apply their knowledge to solve application questions – these made up 80% of the exam marks. Additionally, students were required to draw diagrams in the exam so this should be another consideration when revising.

Tip: for questions where diagrams are not required explicitly, it still may be useful to use one for the assessor to better understand your answer.

FNCE10002 Principles of Finance [SM1]

Exemption status	CB1 <i>Business Finance</i> , in conjunction with ACCT10002 <i>Introductory Financial Accounting</i> . An average mark of 73 across both subjects is required.
Lecturer(s)	A Prof Asjeet Lamba
Weekly contact hours	1 × 2-hour lectures 1 × 1-hour tutorial
Assessments	Individual homework assignment 15% 1-hour mid semester exam: 25% 3-hour final exam (hurdle) 60%
Textbook recommendation	Graham, J. R., Smart, S.B., Adam, C. and Gunasingham, B. (2020). <i>Introduction to Corporate Finance: Asia-Pacific Edition</i> (3rd ed.). Cengage Learning Australia, Southbank. X Not recommended. The lecture notes cover the content in extreme detail and include several example questions. Content can be understood at a deep level without the text.
Lecture capture	Full (both audio and video)
Year and semester reviewed	2022 Semester 1

Overall comments

Principles of Finance was an interesting subject that introduced the concepts of financial markets and some other topics relating to the finance field. While I found this class quite challenging, the content that was covered was made relevant to the current day through the examples and real-life implications that was integrated into each lecture. Through this integration the content became less abstract and thus made class more engaging.

Subject content

1. Introduction to Financial Maths

This topic introduced the idea of cash flows and explored the time-value of money. We were introduced to the different kind of cash flows and the concept of simple and compound interest. Understanding this topic is very important, as everything else in this subject builds upon this.

2. Debt Markets and Securities

Using the knowledge from the previous topic, this second topic discussed the types of short-term and long-term debt securities and spoke about the cash flows associated with them

3. Equity Markets and Securities

Again, using the financial maths knowledge to evaluate equity securities, such as finding share price.

4. Portfolio Theory and Asset Pricing

This topic introduced some investment strategies that are common and discussed the factors of trade-off and expected return with regards to investing in a portfolio with different securities

5. Capital Budgeting

This topic delved into the different strategies that companies can use when deciding whether or not to invest in a project.

6. Capital Structure and Payout Policy

This topic discusses what it means for shareholders when a company uses different weightings for debt and equity to finance company operations. This topic explored the effects of different debt and equity proportions and how it affects the company and shareholders.

7. Introduction to Options

This topic discussed another investment strategy that is used. This topic looked at what a risk-averse investor would do to protect themselves from any issues that they may encounter.

Lectures

This subject consisted of 1 x 2-hour lecture. Each lecture was very full on as Asjeet covered a lot of content. Included in every lecture was an abundance of example questions which I found very beneficial to understanding this subject. For me this subject was quite challenging and some weeks where I had the time it was helpful to go over the Asjeet's teaching note and some of the readings prior to the lecture just to get a bit of exposure to the topics before class. However, I don't think the readings are essential as the lectures were very extensive.

Tutorials

The tutorial each week covered the tutorial worksheet from the previous week's lecture. In order to get the most out of the live tutorials attempting the questions prior to the class is essential as you are able to ask your tutor for help regarding where you are struggling. In most cases, other people in your class also struggle with the same questions, so attempting the questions before the tutorial can help you get the most out of the class. On top of the live tutorial a recorded tutorial was uploaded each week going over all the questions from the worksheet. I found these videos were beneficial to seeing a way to attempt every question, but these videos lacked the depth that was provided in my live tutorials on the questions where people struggled the most.

Assessments

Online homework assignment

This assignment consisted of 15 multiple choice questions on the financial maths topic. This assignment was definitely more challenging than some of the questions in the tutorial worksheets on financial maths as it consisted of many multi-step processes in order to reach the correct solution.

Mid-semester test

The mid-semester test had a very similar format to the homework assignment but instead covered the first 3 topics of PoF. The test was mostly composed of calculation questions, and I found that the questions were very similar to the practice questions we were provided. Being able to complete the practice questions will definitely help you complete the test.

End-of-semester exam

The final exam went for 2 hours and was open book. Personally, I found it quite challenging. Rather than just being calculation based like the previous 2 assignments this exam included a bunch of questions where you had to provide an explanation. Moving past the explanation questions the calculation-based questions I found were quite challenging, I felt they were more challenging than the ones from past papers. Completing the exam through Gradescope was a bit tedious in my opinion as you have to ensure that you upload your written response to the corresponding question so it was important to keep that in mind when thinking of time.

FNCE10002 Principles of Finance [SM1]

Exemption status	CB1 <i>Business Finance</i> , in conjunction with ACCT10002 <i>Introductory Financial Accounting</i> . An average mark of 73 across both subjects is required.						
Lecturer(s)	A Prof Asjeet Lamba						
Weekly contact hours	1 × 2-hour lectures 1 × 1-hour tutorial						
Assessments	<table style="width: 100%; border: none;"> <tr> <td style="width: 80%;">Individual homework assignment</td> <td style="text-align: right;">15%</td> </tr> <tr> <td>1-hour mid semester exam:</td> <td style="text-align: right;">25%</td> </tr> <tr> <td>3-hour final exam (hurdle)</td> <td style="text-align: right;">60%</td> </tr> </table>	Individual homework assignment	15%	1-hour mid semester exam:	25%	3-hour final exam (hurdle)	60%
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Textbook recommendation	Graham, J. R., Smart, S.B., Adam, C. and Gunasingham, B. (2017). <i>Introduction to Corporate Finance: Asia-Pacific Edition</i> (2nd ed.). Cengage Learning Australia, Southbank. X Not recommended. The lecture notes succinctly capture all the key ideas of each topic and includes many example scenarios and questions. They are entirely sufficient for each topic to be understood at a deep level.						
Lecture capture	Full (both audio and video)						
Year and semester reviewed	2021 Semester 1						

Comments

POF was an eye-opener to the interesting field of finance and a well-taught subject that gave us clear insights into financial markets and many other fundamental concepts. It was the subject I personally enjoyed the most in my first semester. While the theory behind almost every topic was underpinned by mathematical equations and models, it was always explored in terms of real-life implications, which made the content much more stimulating, and less abstract than what it seems at first.

Subject content

1. Introduction to financial mathematics

This topic introduces “the time value of money”, an important concept that is relevant to any topic involving cash flows. Simple and compound interest, present and future value, different types of cash flow streams such as perpetuities, annuities and growing perpetuities and annuities are also covered

2. Debt securities

Explained the cash flows, present and future values associated with the common types of short-term and long-term debt securities with reference to the mathematical formulae learnt in the first two weeks.

3. Equity securities

Examined equity securities in terms of the financial math learnt in the first two weeks, in particular how share price can be calculated and the factors that affect it.

4. Portfolio Theory and Asset Pricing

Examines the trade-off between risk and expected return when investing in a portfolio containing different securities and introduces common investment strategies like leveraging and shorting.

5. Capital Budgeting

Provides insight into the strategies that companies use to decide which projects they should invest in.

6. Capital Structure and Payout Policy

Investigates the effect of using different weightings of debt and equity in financing a company's operations, and the implications of this for shareholders.

7. Stock Options

Introduces another common investment strategy in which a risk-averse investor takes measures to protect their downsides. A highly useful topic for anyone interested in investing in the stock market.

Lectures

The 2-hour weekly lectures were recorded and uploaded to Lecture Capture and were always very content-heavy. After each small segment or subtopic, Asjeet would encourage us to pause the lecture to attempt an example question, which kept me concentrated and encouraged me to actively engage with the content. While it could be tempting to simply get through the entire recording as quickly as possible and not worry about the subject for another week, I highly suggest trying to enjoy and fully understand every detail of what is being taught, before moving to the next section. I often had to pause and rewind to ensure I did not misunderstand anything. This way, I just need to briefly skim over the lecture slides if a concept or topic is not fresh in my memory, instead of binge-watching every lecture again during SWOTVAC.

Tutorials

Each week's tutorial sheet was on the topic covered in that week's lecture. Worked solutions, along with a 1-hr recorded tutorial explaining the solutions in detail, are released in the week after. I found that the most efficient way to utilise these tutorial sheets was to complete them after the solutions were released. This way, I could immediately identify the subtopics I should focus on and resolve any misunderstandings I had. This also helped solidify each topic into my long-term memory, as the questions were always on the topic taught in the previous week.

Assessments

Online assignment

The online assignment consisted of 15 multiple-choice questions, solely on the topic Financial Mathematics. All questions had multiple steps and did not simply involve plugging numbers into equations. Hence, instead of trying to remember what equation to use for certain question types, try to make sense of the math behind every equation and why it works.

Mid-semester test

The mid-semester exam had the identical format as the online assignment but included Topics 1-3 and had easier questions than the assignment. This assessment was entirely calculation-based and can quite easily be aced after doing all the practice questions provided.

Final exam

The final exam was open book, had a 3-hr time limit and was submitted on Gradescope. The beginning of the paper consisted of a brief section of explanation questions, while the rest of the paper contained extended response questions which mainly involved calculations. I felt that the difficulty was noticeably higher than that of the past papers, which was expected since the exam was open book. However, the exam was still very reasonable and rewarded those who put in the effort throughout the semester.

MAST10005 Calculus 1 [SM1]

Exemption status	Not an exemption subject, but it is a valid prerequisite for <i>ACTL20001 Introductory Financial Mathematics</i> (CM1 <i>Actuarial Mathematics I</i>) and the <i>Actuarial</i> major (see <i>Mathematics Requirement</i>).	
Lecturer(s)	A Prof Diamuid Crowley Dr Binzhou Xia Dr Ting Xue	
Weekly contact hours	3 × 1-hour lectures 1 × 1-hour tutorial 1 × 1-hour workshop	
Assessments	Weekly assignments	20%
	3-hour final exam	80%
Textbook recommendation	None	
Lecture capture	Full (both audio and video)	
Year and semester reviewed	2022 Semester 1	

Overall comments

The content covered in calculus 1 was an extension of the maths that was taught in high school. While I believe a lot was covered in this class, I still found my overall experience to be enjoyable.

Subject content

1. Numbers and Sets

The first part of this topic goes over content that most people would have learnt in high school, so it was a bit of revision before introducing complex numbers and the complex plane. Additionally, this topic introduced proofs and how to go about completing them. For me this was the most challenging part of the whole subject.

2. Functions and Vectors

This topic explored functions, their properties and inverses. I found this part of topic 2 to build upon what was taught in high school and found the difficulty not too bad. The vectors portion of this topic discussed the scalar product, vector projections and parametric curves.

3. Differential Calculus

Differential calculus reintroduced differentiation along with stationary points, asymptotes and sketching graphs before extending into higher order derivatives, implicit differentiation, derivatives of inverse functions and differentiating parametric curves. I felt the setup on this topic was very connected each lesson, what was taught in previous lectures I found myself needing to remember in order to complete the questions.

4. Integral Calculus and Differential equations

The final topic explored integration by substitution a whole lot before introducing differential equations. This topic built upon a lot of the knowledge differential calculus, so I found that in order to be successful in this part of the course I had to have a strong understanding of the previous topic.

Lectures

There were three 1-hour lectures which I personally thought was great to break up the content covered throughout the week. Getting through one 3-hour session would be extremely challenging. As there were 3 lecturers and I couldn't attend the in person lectures I was able to experience all 3 teaching styles. Even if you are intending on attending the lectures in person if you have the time to, I think it could be beneficial to try out the other lecturers as you might find a teaching style more suitable to your own learning style.

Tutorials/Workshops

The workshop was a class where we were able to further practice the concepts discussed in the lecture. We received a worksheet to attempt each session, and I enjoyed being able to work through the questions with my friends and get help from the tutors where I needed it. I found the overall environment of this class was really stress-free and relaxing almost. It was extremely easy to get help on difficult questions and the overall learning experience was very positive for me.

The tutorial class was designed to be more groupwork based. Each class we were given a set of questions to work through with a group on whiteboards. These questions were tougher than the workshop questions in my opinion as I felt they weren't as straightforward and required more thinking. However, as we worked in groups to attempt the questions it made sense to increase the difficulty of them.

Assessments

Weekly assignments

This semester we had 9 assignments, almost all of which involved some webwork component. The webwork questions I found were straightforward and simple to work through. Most of the time some answer from the webwork assignment would be required to work through the rest of the assignment. So even if you get all your 3 attempts wrong, I still strongly suggest trying to find the correct answer, as you would likely need the correct answer to move forward in the assignment. The difficulty of the assignment really varied each week, sometimes they felt easy sometimes they were more challenging.

End-of-semester exam

This semester the final exam consisted of 12 questions and 121 marks. I found that the exam consisted of questions similar to the tutorial and workshop exercises, so I think that being able to complete those questions is a good starting point. Obviously, the past papers will provide some of the best practice, especially in regard to the length of the exam and for time management purposes.

MAST10006 Calculus 2 [SM2]

Exemption status	Not an exemption subject, but it is a valid prerequisite for <i>ACTL20001 Introductory Financial Mathematics</i> (CM1 <i>Actuarial Mathematics I</i>) and the <i>Actuarial</i> major (see <i>Mathematics Requirement</i>).	
Lecturer(s)	Dr TriThang Tran Dr Thomas Quella Prof Christian Haesemeyer	
Weekly contact hours	3 × 1-hour lectures 1 × 1-hour tutorial	
Assessments	9 weekly assignments	20%
	2-hour supervised Zoom exam	80%
Textbook recommendation	None	
Lecture capture	Full (both audio and video)	
Year and semester reviewed	2022 Semester 2	

Comments

The prerequisite for MAST10006 Calculus 2 is a study score of at least 29 in VCE Specialist Mathematics or equivalent, or completion of MAST10005 Calculus 1 or MAST10007 Linear Algebra.

Calculus 2 is an incredibly well thought and organised course extending upon the basics you learn in Specialists 3/4. It prepares you properly for the assignments and end of year exam given that you put the work in. The content is interesting and engaging and you are given plenty of opportunities to apply the knowledge you learn in the lectures.

Subject content

1. Sequences and Series

Introduction to limits, sequences and series and how to calculate the limits for these sequences and series. Arguably the hardest module due to the more creative applications of limit laws.

2. Hyperbolic Functions

Introduction to the hyperbolic functions and identities. Nothing too difficult.

3. Complex Numbers

The briefest section that touches on complex numbers. The majority of it is just a refresher from Specialists 3/4.

4. Integration

A more holistic overview of different integration techniques. Introduces more techniques on how to integrate. It is important you get good at this as they are required for the next 3 modules.

5. First Order Differential Equations

First order differential equations and how to solve them along with practical examples.

6. Second Order Differential Equations

Second order differential equations and how to solve them along with practical examples.

7. Functions of two variables

Introduction to the x,y,z plane and how to calculate gradients, tangents, tangent planes and areas on the x,y,z plane. This is the hardest to conceptually understand but the problems are relatively simple compared to the rest of the unit.

Lectures

Lectures are recorded and uploaded onto the LMS. In each lecture, the lecturer will annotate the slides given each week, explaining concepts and going through practice examples. These lectures are incredibly useful and are amazing at teaching you what is necessary to do well in the unit.

Tutorials/Practicals/Workshops

The tutorials are not compulsory, but I would recommend that you attend. Being able to go through questions with a tutor supervising to double check your answers and point out conceptual or arithmetic mistakes is incredibly helpful in identifying the areas that you need to improve on.

Assessments

Assignments/mid-semester tests

The assignments are based on the previous week's content. The assignments aren't incredibly difficult given that you do the required work. Make sure you check your work thoroughly for arithmetic mistakes.

End-of-semester exam

The end of year exam is moderately difficult. If you do all the work and put the time into the subject, you will be fine. Time isn't a major issue, just make sure you double check your answers and read the questions properly. There won't be any questions that will catch you by surprise as most of them are of a similar difficulty to the assignment, practical sheet and practice exam questions.

MAST10006 Calculus 2 [SM2]

Exemption status	Not an exemption subject, but it is a valid prerequisite for <i>ACTL20001 Introductory Financial Mathematics</i> (CM1 <i>Actuarial Mathematics I</i>) and the <i>Actuarial</i> major (see <i>Mathematics Requirement</i>).	
Lecturer(s)	Dr Anthony Morphet Dr Antoinette Tordesillas	
Weekly contact hours	3 × 1-hour lectures 1 × 1-hour tutorial	
Assessments	9 individual assignments (6 written, 3 webwork) 3-hour end-of-semester exam	20% 80%
Textbook recommendation	None	
Lecture capture	Full (both audio and video)	
Year and semester reviewed	2021 Semester 2	

Comments

In comparison to Linear Algebra, the content of Calculus 2 is much more similar to the mathematics one would study in high school. I also found it to be the more enjoyable of the two, due to a clearer connection between the mathematical concepts and real life, and an abundance of problem-solving questions which allowed me to appreciate the real-world applications of the math taught.

Subject content

1. Limits, Continuity, Sequences and Series
2. Hyperbolic Functions
3. Complex Numbers
4. Integral Calculus
5. First Order Ordinary Differential Equations
6. Second-Order Ordinary Differential Equations
7. Functions of Two Variables

I found *Limits, Continuity, Sequences and Series* and *Integral Calculus* more challenging than the rest. There were many rules and properties associated with sequences and series, and it can be difficult to determine which rule to choose when answering questions at times. For Integral Calculus, the difficult part to me was simplifying an integrated answer. However, by repeatedly solving similar types of questions from the green question booklet, you will definitely get accustomed to it and be able to solve integrations more easily.

Lectures

3 1-hour weekly lectures are delivered live via Zoom, with each recording uploaded to lecture capture. At the start of every week, pre-recorded videos covering the week's content are also uploaded. For each new concept taught, worked examples are explained thoroughly, making the learning process very engaging. I personally found the pre-recorded videos to be perfectly sufficient in learning the content but attending the live lectures will obviously have the benefit of allowing students to ask questions and resolve their inquiries on the spot.

Tutorials

The weekly 1-hour tutorials involve students working through questions on the previous week's content in a group setting. It's a great way to consolidate what's been taught and is an opportunity to resolve any confusions by receiving help from either the tutor or other students in the tutorial.

Assessments

Assignments

There were 9 assignments this semester, each containing several extended questions that either take a written form or are completed online via the WebWork platform. For the written assignments, the marking criteria for working steps is very rigorous, and should certainly be paid attention to. Sometimes, applying a seemingly obvious law without explicitly mentioning the law could cost marks.

End-of-semester exam

The 3-hour Zoom-supervised exam contained 12 extended questions for 110 marks in total, corresponding to different topics in the course. The tutorial questions provide decent revision, but doing past papers is immensely more beneficial, especially when it comes to time management. While some questions can be quite challenging, on the bright side, there is a large degree of similarity between the question types of different years' papers. As I practised more past papers, I found myself feeling more and more confident.

MAST10007 Linear Algebra [SM1]

Exemption status	Not an exemption subject, but it is a valid prerequisite for <i>ACTL20001 Introductory Financial Mathematics</i> (CM1 <i>Actuarial Mathematics I</i>) and the <i>Actuarial</i> major (see <i>Mathematics Requirement</i>).	
Lecturer(s)	Prof Paul Norbury Dr Binzhou Zia A Prof Craig Hodgson	
Weekly contact hours	3 × 1-hour lectures 1 × 1-hour tutorial 1 × 1-hour computer lab session	
Assessments	9 individual assignments	10%
	45-minute written computer laboratory test	10%
	3-hour end-of-semester exam	80%
Textbook recommendation	Anton, H., & Rorres, C. (2013). <i>Elementary Linear Algebra</i> , 11th edn, Wiley X Not recommended. Textbook was not mentioned throughout the semester. The lecture notes are sufficient material, so the textbook is not recommended. Ensure that you get the hard copy printed course guide in the first lecture as this contains all the set work and course materials.	
Lecture capture	Full (both audio and video)	
Year and semester reviewed	2020 Semester 1	

Comments

The organisation for Linear Algebra was very clear, with weekly emails to keep students up to date with what is expected of them. I found this subject to be constantly evolving with enough complexity to keep mathematically strong students interested while in small enough chunks that everyone can follow. Keeping up with the lectures and doing most, if not all, the homework problem sheets give a very rounded view of linear algebra.

Subject content

Each topic builds and is dependent on the topic prior, gradually building in complexity. Do not be fooled by the speed and complexity of Topics 1 and 2 as these are used to acclimatise from high school mathematics to university level courses.

1. Linear Equations

Introduced the system of equations and writing them in matrix form. This topic introduced fundamental skills such as row reduction to solve systems of equations, which was used a great deal throughout the rest of the subject.

2. Matrices and Determinants

Extended the manipulation of matrices to include basic matrix operations as well as finding determinants and how these apply to linear systems.

3. Euclidean Vector Spaces

This topic will be the most familiar for those who did advanced mathematics in high school. This topic introduced vectors and quickly expanded beyond the scope of the high school to more practical applications of vectors, such as finding volumes and areas. It began to show how vectors are used to describe geometric features that are already familiar, such as lines.

4. General Vector Spaces

In this topic, the quite abstract concept of vector spaces was reduced to a more useful notion of a subspace. Personally, I found that the first part of the topic is quite confusing, seeming quite arbitrary, however, the usefulness became apparent as the topic continued into describing different sets of vectors.

5. Linear Transformations

The introduction of linear transformations, translating one vector space to another, ties into the previous material in topic 4.

6. Eigenvalues and Eigenvectors

The concepts of eigenvalues and eigenvectors were introduced in this topic. Most of the emphasis is on how to find these vectors and values, with some exploration at the end for applications of this seemingly stand-alone unit to broader linear algebra.

7. Inner Product Spaces

This topic briefly introduced inner product spaces by extending the properties of the dot product to a wider implication. This is used for the only application that is explicitly examinable, fitting a line to a set of points.

Lectures

At the beginning of the semester, with face-to-face teaching, there were three lecture streams. The lectures were all well recorded, with no use of whiteboards, so they were quite accessible online. Consequently, the transition to fully online teaching was smooth. The three lecturers rotated weekly and I found that, although their methods of delivery differed (some using a tablet, others using a document camera), it was a seamless learning experience.

However, I did find that all three sometimes had unreadable handwriting, with little explanation to what was written. Also, although proof is not the emphasis of the course, the lecturers would sometimes talk through a proof, which I found very difficult to follow.

The lecture slides were released on the LMS, and the students were encouraged to attend and fill in the slides as the lecture progressed, as completed slides were not released.

Tutorials

Every week there was a 1-hour tutorial, followed by a 1-hour computer lab. Attendance at these is not mandatory. I attended in person for the first few weeks of semester, and found the group work to be adequate, although not that helpful. However, it is well worth attending the computer labs, as the tutors are well versed in MATLAB beyond the scope of the course, increasing efficiency in your learning.

As the university transitioned online, so did the tutorials. I did not attend these tutorials; however, the tutorial sheets and solutions are released on the LMS. The solutions are very detailed and the tutorial questions very achievable — at a similar standard to the homework problem sheets.

Assessments

Assignments

Throughout the semester, the assignments were released at midday on a Monday and due by midday the next Monday. Each assignments' difficulty was similar to that of the homework problem sheets. I recommend doing the homework problem sheets in addition to the tutorial sheets.

Of the nine assignments, three were online, facilitated through WebWorks. This system was intuitive and easy to navigate, three attempts for each question and revealing if your solution is correct. The written assignments were submitted through Gradescope and Canvas. However, the marking scheme was not well communicated nor were the comments very forthcoming.

End-of-semester exam

The MATLAB test was also facilitated through WebWorks. A practice test was also provided. I found the standard of the practice test to be similar to the final exam in difficulty and timing.

The end of semester exam was Zoom-supervised. The communication about this new type of examination was very detailed and precise. The setup had to meet a few requirements. The process was easy to navigate, with exam setup checks prior to the exam and the Gradescope system working as planned. Notes were able to be taken into the exam and the timing was generous to account for any technical difficulties, leaving a more than generous amount of time to complete the exam. The practice exams of past exams were of a similar difficulty to the actual exam.

To prepare for both these assessments, completing most of the practice material provided should be adequate.

MAST10008 Accelerated Mathematics 1 [SM1]

Exemption status	Not an exemption subject, but it is a valid prerequisite for <i>ACTL20001 Introductory Financial Mathematics</i> (CM1 <i>Actuarial Mathematics I</i>) and the <i>Actuarial</i> major (see <i>Mathematics Requirement</i>). Entry requirement of a study score of at least 38 in VCE Specialist Mathematics 3/4 or equivalent.								
Lecturer(s)	Dr Alexandru Ghitza								
Weekly contact hours	4 × 1-hour lectures 1 × 1-hour tutorial 1 × 1-hour lab workshop (using MATLAB)								
Assessments	<table style="width: 100%; border: none;"> <tr> <td style="width: 80%;">3 × online assignments</td> <td style="text-align: right;">7.5%</td> </tr> <tr> <td>3 × written assignments</td> <td style="text-align: right;">7.5%</td> </tr> <tr> <td>MATLAB test</td> <td style="text-align: right;">5%</td> </tr> <tr> <td>3-hour end-of-semester exam</td> <td style="text-align: right;">80%</td> </tr> </table>	3 × online assignments	7.5%	3 × written assignments	7.5%	MATLAB test	5%	3-hour end-of-semester exam	80%
3 × online assignments	7.5%								
3 × written assignments	7.5%								
MATLAB test	5%								
3-hour end-of-semester exam	80%								
Textbook recommendation	Elementary Linear Algebra, Applications Version (H. Anton and C. Rorres), 11th edn, Wiley, 2013. X Not recommended.								
Lecture capture	Full (both audio and video)								
Year and semester reviewed	2022 Semester 1								

Comments

All necessary resources were on Canvas with Alex's booklet being very thorough and effective not taking tools and the tutorial question, problem booklets and past exams being more than sufficient to source questions from. I did not use the recommended textbook at all but did find some useful videos and websites when stuck on questions or not understanding a particular part of a concept. The MATLAB software is also provided through Canvas.

MAST10008 is a rather content heavy subject (around 45 hours of lecture content) that moves at a fast pace. The content itself is interesting and moves logically making it easy to follow. Alex's teaching is engaging and lively, explaining new concepts clearly and taking the time to link new content to existing knowledge to create a strong understanding of the mathematical concepts. All in all, the effort put into MAST10008 yields a rewarding experience.

Subject content

1. Matrices, Vectors and Linear equations

The initial topic introduced the basic processes (e.g. Gaussian elimination, matrix operations, vector operations) that were used for the remainder of the subject. It began with largely a revision of high school topics but then expanded further into matrices and vectors (e.g. finding determinants and inverses of matrices, vector equation). Regardless of familiarity with these topics initially, the unit was conducted such that it would serve as both a good introduction and a revision.

2. Proofs

The proofs topic involved an introduction to set and number theory and then an examination of the various proof techniques. This topic was personally difficult to grasp initially as it required a different form of thinking to simply solving a problem. Initially it seemed difficult to understand how to find such a proof independently (as opposed to understanding a solution). Trying an array of questions interpedently (particularly important here as understanding proof solutions can provide a deceptive feeling of competency) and being familiar with common proof techniques and applications were good approaches in my experience.

3. Vectors Spaces and Linear Transformations

This topic formed the bulk of the subject (and the final examination) and took the longest to cover. Was covered very logically, making it easier to follow and interesting to learn about. Quite a lot of content to understand and was quite clunky to work with initially. A conceptual understanding is critical to this topic as (even more than the other topics) formulas and memorising is not sufficient.

4. Inner Product Spaces

A short topic that is very similar to using dot products, albeit expanded to general vector spaces. Generally, very intuitive and one of the easier topics. This was the last topic in the linear algebra content of AM1.

5. Functions in 2 variables

An extension of the calculus learned in high school to two variables. The computations are relatively straightforward but the geometric interpretations and conceptual understanding (particularly for double integrals) can be challenging. More formula heavy than the linear algebra portion of the subject.

6. Complex Numbers

A short extension of high school complex numbers (although this unit spends very little time recapping and begins with the newer content relatively quickly). Involves solving more difficult differentiation and antidifferentiation by simplifying using complex identities. Quite straightforward and presented similar questions in assessments.

Lectures

The subject had four 1-hour lectures which generally involved following the booklets that Alex released on Canvas and this structure made it easy to follow the content and have effective notes ready with all necessary information. Alex would generally introduce a concept and run through a set of examples of varying nature to demonstrate some properties of the concept. This structure was very helpful in understanding and seeing the application of the concepts. The concepts themselves were generally linked in an intuitive and logical manner to build on top of previous ideas. The lectures themselves were manageable with sufficient time to process what was being taught but having four hours of content per week lead to the subject being quite fast paced and covering a significant amount of content (as suggested in the name). Essentially, the content itself was well-paced, but there was simply a lot of it to cover.

Tutorials

The subject had one 1-hour tutorial and one 1-hour MATLAB class. The tutorials involved working through worksheets (released on Canvas) in groups under the supervision of the tutors. The tutorial worksheets progressed in difficulty and posed interesting problems in the later sections. While tutorial attendance is not required, it is highly recommended to solidify learning and resolve any queries.

The weekly MATLAB class involved learning and applying MATLAB functions and concepts to a series of different topics (ranging from fractals to Markov chains). These classes used mathematical concepts from the lectures and applied them to interesting and varied ideas. These MATLAB skills (not the specific applications themselves) were examined in the end of semester MATLAB test, so the MATLAB sessions are recommended to learn the necessary functions and how to use the commands to solve problems.

Assessments

Assignments

The assignments consisted of 3 x online Webworks assignments and 3 x written assignments, equally weighted and spread out through the semester. The Webworks assignments were quite straight-forward calculations and allowed multiple attempts making them more akin to textbook questions. The written assignments, however, required applying understanding and thinking more broadly about the concepts to prove, show or find an answer rather than perform a calculation. This served as a good check of whether you understood the content well or needed to review specific concepts.

End-of-semester exam

The final exam was generally quite approachable and required less abstract thinking than some of the written assignment questions. That being said, it held some interesting questions and required a thorough understanding of the content, with the applications being quite familiar. The timing of 3 hours allowed for adequate time to complete the exam methodically.

MAST10008 Accelerated Mathematics 1 [SM1]

Exemption status	Not an exemption subject, but it is a valid prerequisite for <i>ACTL20001 Introductory Financial Mathematics</i> (CM1 <i>Actuarial Mathematics I</i>) and the <i>Actuarial</i> major (see <i>Mathematics Requirement</i>).	
Lecturer(s)	Dr Alexandru Ghitza	
Weekly contact hours	4 × 1-hour lectures 1 × 1-hour tutorial 1 × 1-hour lab workshop (using MATLAB)	
Assessments	3 × individual online assignments (WebWorks)	6%
	3 × individual written assignments	9%
	1-hour online MATLAB test	5%
	3-hour end-of-semester exam	80%
Textbook recommendation	Anton, H., & Rorres, C. (2010). <i>Elementary Linear Algebra</i> (10 ed.). John Wiley & Sons X Not recommended.	
Lecture capture	Full (both audio and video)	
Year and semester reviewed	2020 Semester 1	

Comments

All of the resources required and recommended for this subject are available on Canvas. I did not open the recommended textbook at all, instead I relied on re-watching lectures and Google to hold my hand through questions I was not familiar with. Lectures, tutorial worksheets, MATLAB instructions, MATLAB software are all available through Canvas to download and to use.

MAST10008 is a very content-heavy subject and is taught at a fairly fast pace compared to some other mathematics offered. However, the content covered logically moves from one area to the next and the examples and information Alex fed us is very useful for both in a mathematical sense and for real-life applications (sometimes).

Subject content

1. Linear Equations, Vectors, Matrices

The fundamentals of the Linear Algebra content all rely on a good understanding and ability to work with vectors and matrices. Although linear equations are not as prevalent as the other two topics throughout the subject, it is also required through some interpretation methods and is useful for calculus. Vectors were worked through from a 2D and 3D perspective as well as linear equations, which was the only real new topic introduced in MAST10008. Other topics such as orthogonal projections and the dot product was knowledge carried over from high school.

2. Proofs

This topic personally was one of the more difficult topics to learn well as the method of thinking about a proof must be very specific to each circumstance-thinking about it in a different way would create a lot of chaos and lead to dead ends. The topic starts by exploring Number Theory and understanding sets, then moves onto common proof techniques, which was thoroughly explored in the first written assignment of the semester. The best way to become familiar with this topic is to expose yourself to numerous examples to see how common proofs are handled.

3. Vector Spaces

Vector spaces was the most content-heavy topic, taking a couple of weeks to work through all of the subject matter. Some may find it awkward working with vector spaces, as it is not a concept we are very familiar with and takes a little getting used to.

4. Linear Transformations

This topic leads on from vector spaces and brought the subject into a world where it is a little less arbitrary, and can be imagined (in 2D or sometimes, even 3D). This topic worked through the idea of eigenvalues and eigenvectors, and also leads into transformation matrices and change of base matrices.

5. Inner Product Spaces

This topic is very similar to the existing idea of dot products, however there are more rules to abide by.

6. Functions in 2 Variables

This topic officially closed the linear algebra section of the subject and started the Calculus 2 content. Functions in 2 variables is really just an extension from high school knowledge, with a couple more steps. It clicks very quickly and is fairly easy to pick up.

7. Complex Numbers

This topic was covered very quickly, due to most of the content overlapping with the complex numbers topics taught in high school. The only extension was learning about differentiation and antidifferentiation where it is possible to 'piggyback' off complex number ideas to solve harsh real number problems.

Lectures

The four, 1-hour lectures, spread over Monday, Wednesday, Thursday and Friday, were pretty manageable, since they were all bite-sized and gave ample time to process what was taught during that lecture. The lectures consisted of Alex explaining a mathematical concept and then moving onto a number of examples of varying nature, which let us better understand the topics. Lectures are fully recorded and the working out made by Alex can also be seen which made re-watching lectures (or in our case, just watching) very useful.

Tutorials

Tutorials are run weekly in 1-hour sessions where worksheets are given out (also uploaded onto Canvas) and the questions are worked through individually, in groups, or altogether, under the supervision of a knowledgeable tutor. The last question on each worksheet usually posed a challenge to most of us, making us work hard to finally manage a solution. Tutorial attendance and participation is not required for MAST10008, however is highly recommended to solidify the content learnt from the previous week's lectures.

There are also weekly 1-hour MATLAB sessions, where directly after your tutorial, you will head to a computer lab and work on learning MATLAB syntax and learning to interpret your results. MATLAB skills are examined in a 1-hour test towards the end of the semester, so the MATLAB sessions are strongly recommended to quickly learn the functions and how to effectively use commands to solve a problem.

Assessments

Assignments

The assignments were spread out across the semester and alternated between WebWorks assignments and written assignments. There were 3 of each type this semester, with WebWorks assignments being more easily completed relative to the written assignments. The WebWorks assignments were a handful of questions that required straight forward calculations which tested on whether we were able to apply the content learnt in previous weeks and were quite easy to complete as long as you understood the lectures beforehand. The written assignments were a little more difficult as they required more lateral thinking rather than blindly applying the things we learnt in the lectures. The questions posed some difficulty and gave us the chance to realise where we needed to know the content at a deeper level.

End-of-semester exam

The final exam was much easier than the written assignments throughout the semester, acting as a test, instead of a learning opportunity. This gave a lot of us relief once we saw the questions and felt a sense of home as we recognised all of the problems and knew broadly how to work through them. The time management was very relaxed; having 3 hours to complete the exam was more than enough.

MAST10009 Accelerated Mathematics 2 [SM2]

Exemption status	Not an exemption subject, but it is a valid prerequisite for <i>ACTL20001 Introductory Financial Mathematics</i> (CM1 <i>Actuarial Mathematics I</i>) and the <i>Actuarial</i> major (see <i>Mathematics Requirement</i>).	
Lecturer(s)	Prof. Barry Hughes	
Weekly contact hours	4 × 1-hour lectures 1 × 1-hour tutorial	
Assessments	2 × individual online assignments	10%
	Mid-semester test	10%
	3-hour end-of-semester exam	80%
Textbook recommendation	<i>MAST10009 Accelerated Mathematics 2 Textbook</i> , Barry Hughes, 2020. ✓ Recommended. This textbook contains all material from every lecture covered in the semester and provides many additional learning problems to be completed after each lecture. As the lectures and tutorials are based upon this textbook, this text is highly recommended.	
Lecture capture	Full (both audio and video)	
Year and semester reviewed	2020 Semester 2	

Comments

MAST10009 Accelerated Mathematics 2 builds on MAST10008 Accelerated Mathematics 1 to cover prerequisites for 3 mathematics subjects, being MAST10005 Linear Algebra, MAST10006 Calculus 2, and MAST20006 Real Analysis.

MAST10009 Accelerated Mathematics 2 was a very difficult subject to keep up with given its amount of content, however, as you follow the lectures throughout the weeks, the content becomes very interesting and requires deep thinking to fully understand the concepts and methodology used. Keeping up to date was a challenge, however, given the structured manner Barry employs, was very easy to catch up.

Subject content

1. Sequences

This topic builds on topics touched in high-school mathematics, looking at the idea of limits in a more formal method. The lectures cover concepts of convergence, divergence, asymptotic behaviour, and limits. These topics were covered in-depth with definitions required to be known for the assessments throughout the semester.

2. Functions, limits and continuity

This topic builds on the idea of limits and sequences, looking at various theorems for continuous functions. These concepts are assessed throughout the semester, so definitions and methodology should be closely followed from the lectures.

3. Differential calculus

This topic builds upon high-school calculus, looking at various rules while differentiating, and introducing new theorems such as L'Hopital's Rule, and the Mean Value Theorem. On top of these theorems, hyperbolic trigonometric functions are also covered, looking at identities and alternate methods of denoting these functions.

4. Integral calculus

This topic reviews integration and introduces new ideas such as Riemann sums, and Darboux integrals. These lectures are very content heavy and required additional time to process these ideas. The last couple of lectures in this topic covers techniques such as integration by parts and looks are different substitution integrals.

5. Differential equations

This topic looks at various types of differential equations and methods on how to approach and solve these equations. Some differential equations include population growth, motion and drag, and RC and LR electric circuits. These differential equations are assessed throughout the semester, so gaining a solid idea on how to approach these questions are required.

6. Improper integrals

This topic revisits integrals, specifically the idea of an indefinite integral, looking at where a function may be undefined or where a terminal for the integral is infinity. This topic explores the improper Riemann integral as well as various tests in assessing improper Riemann integrability.

7. Infinite series

This topic is the last topic covered in this subject and looks at infinite series of both numbers and functions. This topic focuses more on conceptual understanding and works on looking at determining the convergence or divergence of the series using number tests. This topic also contains various definitions, which will need to be recalled during assessments throughout the semester.

Lectures

The content throughout the semester was covered rather quickly, delivered through four 1-hour lectures throughout the week. During each lecture, topics are introduced by Barry and he works through some textbook example questions to solidify the concepts. This method of delivery was very useful, as we could clearly see how answers were meant to be set out and solved. The lectures are required to do well in the assessments as they cover each topic in-depth, however, as each lecture was very structured and was kept in order by the textbook, finding a specific lecture on topics that were missed is quite easy.

Tutorials

The tutorials for MAST10009 Accelerated Mathematics 2 were not compulsory, however, were a good source of time to clarify any questions for the problems from the textbook. These tutorials were mostly a time for students to discuss these queries, however, these tutorials worked out to be quite unnecessary as any questions could be brought up during consultation hours to be clarified. The tutorials were mostly used to work through questions from the textbook from the week, however, is quite repetitive if you had no trouble working through and answering the questions on your own.

Assessments

Assignments

There were two assignments spread over the semester, each worth 5% of your total grade. These assignments were relatively difficult compared to the examples covered in class and problems in the textbook, and as Barry requires a high level of rigour and precision, the assignment is difficult to wholly complete. Each assignment was due within two weeks, and given the difficulty of some questions, leaving the assignment to the last couple of days is not recommended.

The mid-semester test was a 45-minute supervised test which was worth 10% of the final grade. These questions in the test were easier compared to the questions posed in the assignments, however, the same degree of rigour and precision was expected to be displayed in the responses. The test also contained questions requiring specific definitions to be recalled, so having a good understanding of definitions of all concepts covered beforehand is recommended.

End-of-semester exam

The end of semester exam was out of 124 marks this year and followed closely in the structure of the mid-semester test, however, contained a couple of questions that required longer responses regarding series and proofs. The exam was mostly similar to past MAST10009 exams, except there were fewer differential equation questions presented this year. Again, definitions and theorems were required to be recalled for the exam and made a significant portion of the exam.



Subject Reviews: Second-Year Subjects

ACTL20001 Introductory Financial Mathematics [SM1]

Exemption status	CM1 <i>Actuarial Mathematics I</i> , in conjunction with ACTL30003 <i>Contingencies</i> . Satisfactory performance across both subjects is required. Prerequisites include either a 150 total from Calculus 2 and Linear Algebra, or 120 total from Accelerated Mathematics 1 and Accelerated Mathematics 2.
Lecturer(s)	Dr Ping Chen
Weekly contact hours	2 × 1-hour lectures 1 × 1-hour tutorial
Assessments	2 × 1000 words individual assignments 2 × 15% = 30% 2-hour end-of-semester exam 70%
Textbook recommendation	Subject CM1, <i>Actuarial Mathematics Core Principles for the 2019 exams</i> , from the Institute and Faculty of Actuaries. X Not recommended.
Lecture capture	Full (both audio and video)
Year and semester reviewed	2022 Semester 1

Overall comments

ACTL20001 is for some, the first actuarial subject in the course. This subject introduces you to a wide range of concepts required in the actuarial world and gives some basic training on modern financial mathematics methods. If you have taken ACTL10001, this should not be too content-heavy since at least half of this is just a revision. If you haven't, this should be an interesting start for you to dive into the actuarial world and find out if you truly enjoy this major. Don't forget that this and contingencies make up your CM1 exemption, so do your best to secure your exemption. FYI: 70% of the cohort achieved the exemption mark this semester.

Subject content

1. Data and Basics of Modelling

This topic talks about the forms and steps of data analysis, data sources, sampling schemes, big data and reproducible research. This was only theoretical and did not involve any calculations.

2. Principles of Actuarial Modelling

This topic talks about the components, steps, benefits and limitations of modelling, characteristics of stochastic and deterministic models, discrete and continuous state space and time sets, analysing the output of a model, sensitivity testing and communication of results. This topic was also only theoretical and did not involve any calculations.

3. Cash Flow Models

This topic is only an introduction to cash flow models, explaining about uncertain timing and amount of cash flows, and examples of scenarios such as index-linked security. There are only basic calculations here.

4. Fundamental Concepts

This topic enters the calculations part of the subject, starting from the basic concepts like simple and compound interest, present value and discounted value, nominal rates of interest and discount, interest rates that vary with time, force of interest, up to present value with varying interest rates and constant force of interests. If you have taken ACTL10001, this topic should be a gentle reminder of these concepts with only a few more concepts that you have to learn.

5. Valuing cash flow

This topic introduces the concept of annuity payments, along with variations like deferred annuities, multiple equal payments per time unit and introduces the new concept of constant continuous payments (not found in ACTL10001). This also further goes into different calculation techniques for valuing cash flow like changing the time units or using first principles, and variations requiring minor adjustments including incomplete time units, regular compound increases and when the force of interest is not constant. Furthermore, it also goes through payments subject to linear variations where the payment amount increases either discretely or continuously. Lastly, this topic goes through the concept of equations of value and how to solve these with bisection or interpolation methods.

6. Financial analysis of loan contracts and business projects

Firstly, this topic goes through loans with repayments that include principal and interest. This is very similar to what we learned about loans in FNCE10002 or ACTL10001. Secondly, this introduces flat rate loan contracts which is very straightforward and is a relatively short section. Third is project evaluation, similar to what we have learned in FNCE10002, this mainly focuses on net present value, internal rate of return, discounted payback period, accumulated profit and crossover rate. Lastly, this section focuses on allowing for inflation, introducing money return vs real return.

7. Characteristics of major asset types

This topic revises the three principal asset types: property, ordinary shares and debt, which we have learned in FNCE10002 and ACTL10001 as well. This is only theoretical with no calculations.

8. Applications in asset markets

Firstly, this topic introduces the calculations required for zero-coupon bond or discount securities, gross redemption yield and net redemption yields. Secondly, interest rate risk focuses on the nature of interest rate risk, and bond portfolio management tools like duration, volatility and convexity, and immunisation. Thirdly is bond market structure where we learn about how to convert and understand spot rates, par yields and forward rates of interest. Last is about using yield curves to conclude about the term structure of interest rates.

Lectures

There were 2 lectures every week, but they were quite short, normally only around 50 minutes each. The content was bite-sized too and would give you much time to process the information and prepare yourself for the tutorial questions in the following week. Ping had in-person lectures, where she welcomed any questions afterwards so if you have difficulty following the content, be sure to meet her in-person so you can ask directly your doubts.

Tutorials

The tutorials were quite straightforward. They directly followed the lecture in the preceding week and is helpful in helping you remember the theoretical questions and allows you to try a variety of calculation questions to ensure you have understood the content well.

Assessments

Assignments

There were 2 assignments and each weighted 15%. The first assignment is very straightforward, and if you have taken ACTL10001, you should already be able to do this since they follow the content from ACTL10001 directly. It was mostly practical work using excel to calculate loan repayment schedules. The second assignment was trickier, since it puts you in a situation, like for example you are about to take out a loan to buy a house, and then it requires you to think outside the box and calculate your own expenses, value of house and salary.

End-of-semester exam

The end-of-semester exam was a 2-hour Zoom-supervised examination. The questions were very similar to the tutorials, so if you fully understand the concepts and tutorial questions, you should not find it too difficult. However, the timing imposed the biggest challenge since it requires you to finish a lot of questions in only 2 hours. I would recommend taking your chances and do as much as you can, and only recheck your answers if you have extra time.

ACTL20001 Introductory Financial Mathematics [SM1]

Exemption status	CM1 <i>Actuarial Mathematics I</i> , in conjunction with ACTL30003 <i>Contingencies</i> . Satisfactory performance across both subjects is required.
Lecturer(s)	Dr Ping Chen
Weekly contact hours	2 × 1-hour lectures 1 × 1-hour tutorial
Assessments	2 × individual assignments 2 × 15% = 30% 3.5-hour end-of-semester exam (hurdle) 70%
Textbook recommendation	No textbook is explicitly mentioned. However, selected problems were given as additional questions from: Fitzherbert, R., & Pitt, D. (2013). <i>Compound Interest and its applications</i> . Melbourne, AU: University of Melbourne Custom Book Centre. It may be worthwhile to borrow a copy.
Lecture capture	Full (both audio and video)
Year and semester reviewed	2021 Semester 1

Subject content

1. Data and Basics of Modelling

A theoretical part of this subject that is easy to understand. This topic introduces you to data analysis, data collection and big data. Helpful to spend time to familiarise yourself with the concepts as it is an important part of the CM1 syllabus.

2. Principles of Actuarial Modelling

Theory about models, their impact, limitations, advantages and disadvantages. Another relatively straightforward topic.

3. Cashflow Models

Introduction to zero-coupon bonds and fixed-interest securities. This is the start to the core concepts of this subject.

4. Fundamental Concepts

This topic involves time value of money, different interest rates and calculating the present and accumulated values. Solidify your understanding by exposing yourself to various practice problems.

5. Valuing Cashflows

Introduces the different types of annuities that you should have already touched upon in ACTL10001. The only new concept is annuities of payment subject to linear variations. It is pretty straight forward so remembering the formulae might be your only challenge. This semester however, since the exam was open book, we did not face this issue.

6. Financial Analysis of Loan Contracts and Business Projects

A topic on loan repayments and project evaluation methods. You may be somewhat familiar with these concepts from ACTL10001 Introduction to Actuarial Studies and FNCE10002 Principles of Finance.

7. Characteristics of Major Asset Types

This is a straightforward theoretical chapter which gives a brief introduction into major asset classes. Personally, I appreciated this chapter as actuarial students in general lack basic financial literacy and jargon understanding in comparison to the average finance major student.

8. Applications in Asset Markets

Introduces the concept of immunisation and assessing bond prices adjusted to inflation in depth. The latter half explains the different interest rates available in the bond market structure and discusses their respective yield curves.

Lectures

The lecture slides are provided to you at the start of the semester so it is highly recommended to have a bound hardcopy of it so you can follow along with the content during the lecture as well as easily flick through to review topics during your study. The lectures provide a good foundation to the concepts but would require practice on more complex problems to solidify your understanding and be exam ready.

Tutorials

The tutorials are helpful as they allow you to discuss the tutorial questions with your peers and the tutor as well as solve any queries regarding the content that you may have. The tutorial questions and answers are uploaded on Canvas so you may attempt and correct them without attending the tutorials if you wish.

Assessments

Assignments

There are two individual assignments worth 15% each. The first assignment was a straightforward application of the concepts and mathematics taught in weeks 1-6. The second assignment required students to act as consultants and provide financial advice to a client regarding their home loan. The content taught in lectures was a foundation to this assignment but more importantly required us to do our own research on the characteristics involved with home loans and mortgages. Calculations and loan schedules are also involved. We then need to apply our research and calculations to outline recommendations to the client for various situations. Don't forget to add references if you take any information from websites.

End-of-semester exam

The end-of-semester exam was three and a half hours long. All questions must be written, scanned and uploaded. There were two parts to this exam consisting of ten multiple choice questions and ten calculation questions. The multiple-choice questions were rather straightforward and covered most of the theoretical concepts in the subjects. Students must select all correct options for each question otherwise no marks are awarded. The calculation questions were relatively tougher than the multiple choice and harder than those on the practice exam. I would highly recommend practicing as many calculation questions as you can before the final exam.

ACTL20003 Stochastic Techniques in Insurance [SM2]

Exemption status	Not an exemption subject, but it is a prerequisite for Actuarial Modelling I , Actuarial Modelling II and Actuarial Modelling III (CS2 <i>Risk Modelling and Survival Analysis</i>).		
Lecturer(s)	Prof Shuanming Li		
Weekly contact hours	2 × 1-hour lectures 1 × 1-hour tutorial		
Assessments	2 × group assignments	2 × 15% =	30%
	2-hour end-of-semester exam		70%
Textbook recommendation	None		
Lecture capture	Full (both audio and video)		
Year and semester reviewed	2021 Semester 2		

Subject content

1. Three types of random variables and their characteristics

Probability basics from MAST20004, with some additional details sprinkled in here and there regarding simulation and actuarial applications of the random variables. Whilst this topic began with familiar content, the subtopic on mixed variables was particularly tedious and was the first hard section of the subject.

2. Characteristics of sum of i.i.d. random variables

Again, covered familiar material from MAST20004 such as convolution and CLT, but very crucial to some other proofs and theories later in the subject.

3. Conditional Probabilities and Conditional Expectations

This topic was a more in-depth foray into the subtleties of conditional probability, expanding on briefly covered ideas in MAST20004. Learning this topic well and becoming confident with conditioning random variables is necessary for calculations further along in the subject.

4. Generating transform (function) and applications in solving difference equations

Short topic on solving difference equations and introduced a new tool to do so. Whilst the maths is more straightforward compared to the other topics, deriving the correct mathematical relationship from the worded scenario in the question could sometimes get difficult.

5. Ordinary Differential Equations (ODE)

Covered how to apply a compound interest interpretation to familiar forms of ODEs from calculus.

6. Laplace transform (LT) and applications

Almost a continuation of the previous topic, this time using the Laplace Transform and its properties to solve ODEs. Topics 5 and 6 are both kept short and sweet.

7. Poisson Process

This topic gave rigorous definitions to the Poisson process, and derived the quantities and distributions of interest that come from it. I found this to be quite hard, but tutorials shed a lot of light on this. This is a very dense topic.

8. Brownian Motions and Geometric Brownian Motions

Another tough topic on stochastic processes, which covered the definitions and properties of Brownian motion and Ito's integrals. In these last 2 topics 7 and 8, its crucial to understand the properties to perform calculations.

Lectures

Lecture content for this subject was very fast paced. Each recording was densely packed with information, but very clearly taught and well structured. Shuanming's delivery was very clear and engaging throughout the entire subject. The provided lecture notes were enough to give a general idea of the properties and important definitions in each topic, but key derivations and explanations were only provided the lecture recordings. I recommend being very thorough watching the lecture for the first time, as there were a lot of key details and techniques that were covered in the lecture to be applied to tutorial questions – getting a good grasp of these before attempting questions would save students a lot of time trying to find the corresponding section of lecture recordings.

Tutorials

Tutorials were recorded, with attendance not being assessed. The sheets, answers, and tutorial recordings are all available on the LMS. The structure of tutorials involved a quick recap of the week's content, then moving onto covering solutions of the week. I found the quality of the tutorials to be very good, tutors are often able to provide some much-needed intuition behind tricky concepts and derivations, as well as handy tips and tricks to help perform calculations.

Assessments

Assignments

There were 2 group assignments for this subject, with the option of doing it solo, but this is almost a non-option since the questions get quite tough. Having group mates to bounce ideas and insights off of makes the process of completing these much less painful. I'd also recommend attempting the entire assignment together as a group, since every question provided a great opportunity to study the content and test your handle of it. Combined, the assignments cover every topic save for the final parts on the Ito integral, which pressured students to keep up to date with the content, or else they'd be unable to contribute to the group.

End-of-semester exam

The final exam for this subject was 3 hours and 15 minutes long, with a mix of true/false, multiple choice, and long answer questions. Shuanming was extremely generous, pointing out the important techniques and relevant assignment and tutorial questions for us to cover. A practice exam was also provided. Following his recommended exam study regimen made it very easy to cover what was needed. That being said, on the exam of the semester reviewed, brief sections of other topics still appeared on the exams.

ACTL20004 Topics in Actuarial Studies [SM2]

Exemption status	CM2 <i>Financial Engineering and Loss Reserving</i> , in conjunction with ACTL30006 <i>Intermediate Financial Mathematics</i> and ACTL40004 <i>Advanced Financial Mathematics</i> . Satisfactory performance across all three subjects' end-of-semester exam is required.		
Lecturer(s)	Dr Zhuo Jin		
Weekly contact hours	2 × 1-hour lectures 1 × 1-hour tutorial		
Assessments	2 × individual assignments	2 × 15% =	30%
	3.5-hour end-of-semester exam		70%
Textbook recommendation	None		
Lecture capture	Full (both audio and video)		
Year and semester reviewed	2021 Semester 2		

Overall comments

Topics in Actuarial Studies as its name suggests covered many topics within actuarial studies. Instead of going deeply in any particular topic, it touched briefly on a range of content as shown below. This subject loosely builds off the knowledge of previous subjects including Probability MAST20004 and IFM ACTL20001 as well as the Poisson Process from ACTL20003 which runs at the same time. Overall, this subject introduced a variety of interesting and basic techniques which I enjoyed as it showed the more practical applications relevant to actuarial studies.

Subject content

1. Measures of investment performance

Introduces basic concepts surrounding how to assess the past performance of funds. It delves into a variety of ways to calculate rate of return and their purpose.

2. Valuing with defaults

This is one of the longer units. It delves further on the topic of accounting for uncertainty when calculating present values. It also goes into how we can discount and accumulate cash flows when interest is an i.i.d. variable. Life insurance applications, lognormals and simulations are also covered in this unit.

3. Dependent interest rates

Covers the time series models in particular the autoregressive process and the moving average process. It covers their properties and how to calculate their autocovariance and autocorrelation and simulate them.

4. Chain Ladder Method

This unit is all about how to calculate outstanding claims provision through a variety of techniques, including the chain ladder method, average cost per claim method and BF method.

5. Definitions of ruin

Ruin is similar to bankruptcy for insurance firms. This unit covers what it actually is. how to calculate it and its interaction with reinsurance.

6. Basic derivative securities

This chapter might feel like a continuation of the final chapter in ACTL20001. You will be introduced to futures and options, the concept of arbitrage and how the principle of no arbitrage and law of one price is used to derive the price of a forward contract. Again, the key to being successful in this section is understanding the financial jargon.

Lectures

There were 2 1-hour lectures per week pre-recorded by the lecturer. They would come out on the day they were scheduled. I found the lectures to be quite intuitive and the slides to be easily followed and reviewed. I found that the speed of lecturer and his content to be at a good pace, as the lecturer would often give longer explanations and plenty of examples to help understand the content.

Tutorials

Tutorials were held live once per week covering the previous weeks lecture content. There was also a recording of a tutorial posted on the LMS. Tutorials are a great place to check your answers, however the one I had did not provide much interaction with the tutor or the other students. An important part prior to the tutorials would be to actually attempt the questions beforehand as otherwise it is hard to follow along. The tutorial handouts themselves were overall not too lengthy to complete.

Assessments

Assignments

There are two individual assignments each worth 15% on Excel. The assignments were an extension of the content discussed in the lectures. Throughout the lectures, the lecturer would also showcase similar Excel spreadsheets as well. Being able to follow the lectures relating to the assignment and having basic Excel skills such as autofill and random values are a key to succeeding in these assignments.

End-of-semester exam

The exam was an LMS quiz worth 70% of the overall mark, it has 15 minutes reading and 3 hours of writing/scanning time. The exam was out of 70 marks and was open book. There were no multiple-choice in this year's exam however, there have been some in previous years. There are quite a few concepts that are covered in the subject and having a good grasp of each is important in the final exam. The exam required scanning and uploading to Canvas, so would recommend practicing this beforehand and setting aside around 30 minutes to do so.

ECON20001 Intermediate Macroeconomics [SM2]

Exemption status	CB2 <i>Business Economics</i> , in conjunction with ECON10004 <i>Introductory Microeconomics</i> . An average mark of 73 across both subjects is required. This subject is a core subject to double major in <i>Economics with Actuarial Studies</i>									
Lecturer(s)	Dr Yusuf Mercan Dr Faisal Sohail									
Weekly contact hours	2 × 1-hour lectures 1 × 1-hour tutorial									
Assessments	<table style="width: 100%; border: none;"> <tr> <td style="width: 60%;">2 × online multiple-choice test</td> <td style="width: 20%;">2 × 5% =</td> <td style="width: 20%;">10%</td> </tr> <tr> <td>2 × assignments</td> <td>2 × 15% =</td> <td>30%</td> </tr> <tr> <td>3-hour end-of-semester exam</td> <td></td> <td>60%</td> </tr> </table>	2 × online multiple-choice test	2 × 5% =	10%	2 × assignments	2 × 15% =	30%	3-hour end-of-semester exam		60%
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2 × assignments	2 × 15% =	30%								
3-hour end-of-semester exam		60%								
Textbook recommendation	Olivier Blanchard (2017). <i>Macroeconomics</i> . Seventh Global edition. Pearson. X Not recommended.									
Lecture capture	Full (both audio and video)									
Year and semester reviewed	2021 Semester 2									

Overall comments

Content-wise, similar to *Introductory Macroeconomics*, you spend time developing these seemingly strange models that attempt to explain economic activities. The main difference is that in this course, you begin to appreciate the effectiveness of these models a bit more and consider how particularly important variables were determined (endogenous vs exogenous). Overall, ensure you understand the purpose of each model in terms of how they fit together and how to derive them as this will ensure you truly comprehend their purpose and are ready for any complications posed by exams and assignments.

Subject content

The course is separated into 2 main broader themes.

1. In the short run, the macroeconomy experiences cyclical ups and downs (booms and recessions). To understand short-run fluctuations, the focus will be on changes in aggregate demand.
2. In the long run, the underlying or trend rate of economic growth dominates. To understand long-run growth, the focus will be on changes in aggregate supply. The course commences with a focus on the short-run fluctuations which naturally lends itself to a discussion of short-run monetary and fiscal policy. The course then turns to issues of macroeconomic adjustment and explores how the economy responds to shocks and long-run economic growth.

Detailed breakdown:

1. IS/LM Model (Weeks 1 – 4)

This topic gives students a chance to recap the contents from first-year economics. It particularly highlights the relationship between output and inflation by way of action taken by the government (fiscal) and reserve bank (monetary). This topic is extensively covered in the first multiple choice test.

2. Unemployment Model (Week 4)

This topic is heavily tested in the first assignment, but the content is rather digestible. Understanding of the models, their purpose and how to derive will be beneficial for the rest of the subject and the exam.

3. Dynamic AD/AS Model (Weeks 5 – 7)

The Dynamic AD/AS model goes further than previous models of the macroeconomy in that it includes an array of variables beyond inflation and output. There is an extensive derivation process that originates from 5 key formulae.

4. Solow-Swan and Growth Models (Weeks 8 – 10)

An introduction of more models that map economic growth. You will start to notice that you must do more than memorise formulas as the questions require you to prove that you understand these models and how to apply them. Ensure you have set a good foundation in understanding these models from the previous topics.

5. Open Economy IS/LM Model (Weeks 11 – 12)

This is a return of the first topic, however with additional levels of complexity as it now caters for an open economy. Often the effects will be intuitive, however it is important to think about things logically and ensure your resultant net income shown by your model is consistent with that.

Lectures

The semester's lectures are split in half whereby the first half of the semester is taught by Yusuf and the second half by Fasail. Each lecture involved the introduction of a new model or elaboration on ones previously covered. Both lecturers also complimented their teachings with empirical evidence and real-life examples, which is helpful for framing the content as the models could at times seem overly abstract and general. At the end of every section, there would also be a practice exam question related to the topic that they discussed.

Tutorials

These ran in a typical way with economics subjects. We were given pre tutorial and in tutorial work to do. Types of questions included true/false, short answer and extended response. They were excellent for testing your understanding and making sure you are across the niches of the model. True/false prepared you well for the multiple-choice quizzes, whilst the extended responses were very helpful when it came to exams and assignments. The extended questions revolved around the introduced model, whilst introducing additional levels of complexity.

Assessments

Quizzes

There were two quizzes in the form of multiple-choice questions. Administered over Canvas, these were particularly focused on the models introduced. Both gave you 30 minutes to do 15 questions. Whilst you need to understand the models, most of the questions can be done mentally. The second quiz was a bit more theoretical, so ensure to have lecture slides easily accessible.

Assignments

Both assignments could be chosen to be completed individually or as a group of your choice (max. 3 people per group) with a 1500-word limit. It is vital that you are able to find the right formulas to apply, make appropriate adjustments and elaborate in explanations to demonstrate your understanding. Explanations are not time consuming however there are a number of graphs that you must create in excel and include in your assignments.

End-of-semester exam

Exam structure:

- Section A: 12 Multiple-Choice Questions
- Section B: 3 Short Answer Calculation and Explanation Questions (Pick 2)
- Section C: 3 Short Answer Calculation and Explanation Questions (Pick 2)

Each question in Section B and C tests a particular topic in the subject, however, it is important to have a broad understanding across all the potential topics as there is no standard pattern of content covered across these sections. Completing past exam questions will be beneficial for the exam overall as the questions can be somewhat similar. Additionally, mid-semester quizzes are a good source to test your knowledge for Section A. Section B is generally similar to tutorial questions with process-driven calculations based on the standard models. In Section C, you must display your understanding of the models as they will give you certain adjustments that you have not been exposed to before.

MAST20004 Probability [SM1]

Exemption status	<p>CS1 <i>Actuarial Statistics I</i>, in conjunction with MAST20005 <i>Statistics</i> and ACTL30004 <i>Actuarial Statistics</i>. Satisfactory performance across all three subjects is required.</p> <p>Prerequisites include either Calculus 2 or Accelerated Mathematics 2, and Linear Algebra or Accelerated Mathematics 1.</p>						
Lecturer(s)	<p>Prof Peter Taylor Prof Mark Holmes</p>						
Weekly contact hours	<p>3 × 1-hour lectures 1 × 1-hour tutorial 1 × 1-hour computer lab</p>						
Assessments	<table style="width: 100%; border: none;"> <tr> <td style="width: 60%;">4 × individual assignments</td> <td style="width: 20%; text-align: right;">4 × 5% =</td> <td style="width: 20%; text-align: right;">20%</td> </tr> <tr> <td>3-hour end-of-semester exam</td> <td></td> <td style="text-align: right;">80%</td> </tr> </table>	4 × individual assignments	4 × 5% =	20%	3-hour end-of-semester exam		80%
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3-hour end-of-semester exam		80%					
Textbook recommendation	<p>Ghahramani, S. (2005). <i>Fundamentals of Probability, with Stochastic Processes (3rd ed.)</i>. Upper Saddle River, US: Pearson Education.</p> <p style="color: red;">X Not recommended.</p>						
Lecture capture	Full (both audio and video)						
Year and semester reviewed	2022 Semester 1						

Overall comments

MAST20004 explores the many concepts of probability. This subject is quite content-heavy, and it's best to stay on track with the lectures or else you might find it difficult to catch up. If you have never taken a probability course before, don't be shy to attend consultations if you have any questions during the course. Overall, this was quite intimidating for a lot of the students, but if you stay on top of your lectures, attend your tutorials and review a lot of past papers, you will be fine.

Subject content

1. Basics

This topic talks about real life applications of probability, axioms, conditional probability, multiplication theorem, independence and exclusion, law of total probability and Bayes' formula.

2. Random Variables

This topic introduces the concept of random variables, both discrete and continuous, and distribution functions and probability density functions. Next is the concept of expectation and variance, and higher moments of a random variable.

3. Special Probability Distributions

This topic introduces the many special probability distributions for both discrete (Bernoulli, binomial, geometric, Poisson) and continuous (exponential, gamma, beta, pareto). We go through each distribution, calculating their distribution function, probability density function or probability mass function (where they exist), expectation and variance. This topic also focuses on the normal distribution, explaining about the process of standardization into the standard normal distribution, moments, and the many approximations that the normal distribution can be used for.

4. Transformations

This topic focuses on the transformations of random variables, including monotonic functions, square functions and pseudorandom numbers. This also goes on to introduce more distributions, such as the Cauchy distribution and the lognormal distribution.

5. Bivariate Random Variables

This topic introduces the concept of bivariate random variables, which is a function which maps from the sample space into the real plane. We go through the distribution function of a bivariate random variable, joint and marginal pmf, pdf or df, conditional pmf, pdf or df, independence of these random variables, expectations, convolution integrals, variance, covariance, correlation and conditional expectation and variance. This also continues to the concept of Chebyshev's inequality.

6. **Generating functions and applications**

This topic dives into probability generating functions, moment generating functions, cumulant generating functions, coefficient of skewness and kurtosis, Laplace transforms, characteristic function. This is a useful concept to understand and is most certainly going to be a heavy-marked question in the final exam.

7. **Limiting distributions**

This topic explains the concept of convergence in distribution, law of large numbers, central limit theorem.

8. **Stochastic Processes**

This topic talks about stochastic processes, and more importantly, discrete-time Markov Chains where probabilities only depend on the value of the previous random variable. This also goes through transition matrix, equilibrium distribution (can be seen as limiting, stationary or ergodic).

Lectures

There were 3 lectures every week, normally around 50 minutes each. The content was quite fast-paced, and you should ensure you have time to digest the information and prepare yourself for the tutorials in the following week. Both lecturers had in-person lectures, where they welcomed any questions afterwards so if you have difficulty following the content, be sure to meet them in-person so you can ask directly your doubts.

Tutorials

The tutorials explored many calculation questions that are very helpful in allowing you to try a variety of calculation questions to ensure you have understood the content well. The exam questions are quite similar to the tutorials, so if you have any doubts, don't hesitate to ask your tutors.

Assessments

Assignments

There were 4 assignments and each weighted 5%. The assignments vary in difficulties but try to do as well as you can. If you are unable to do some of the questions, don't forget to ask your tutors/lecturers about them after they have been marked and the answers have been released.

End-of-semester exam

The end-of-semester exam was a 3-hour Zoom-supervised examination. The questions were quite similar to the past exams, so if you fully understand the concepts, tutorials and have done sufficient past exam questions, you should not find it too difficult. However, the timing imposed the biggest challenge since it requires you to finish a lot of questions in only 3 hours. I would recommend taking your chances and do as much as you can, and only recheck your answers if you have extra time.

MAST20004 Probability [SM1]

Exemption status	CS1 <i>Actuarial Statistics I</i> , in conjunction with MAST20005 <i>Statistics</i> and ACTL30004 <i>Actuarial Statistics</i> . Satisfactory performance across all three subjects is required.		
Lecturer(s)	Prof Aihua Xia Dr Sophie Hautphenne		
Weekly contact hours	3 × 1-hour lectures 1 × 1-hour tutorial 1 × 1-hour MATLAB session		
Assessments	4 × individual assignments	4 × 5% =	20%
	3-hour end-of-semester exam		80%
Textbook recommendation	Ghahramani, S. (2005). <i>Fundamentals of Probability, with Stochastic Processes (3rd ed.)</i> . Upper Saddle River, US: Pearson Education. X Not recommended. This textbook was never explicitly used, so I do not recommend purchasing it.		
Lecture capture	Full (both audio and video)		
Year and semester reviewed	2021 Semester 1		

Subject content

1. An introduction to probability and its axioms

Revision of the foundations of probability learnt in high school and builds a predominant focus on probability axioms as well as independence, conditional probability and mutual exclusion. Ensure you are familiar with axiomatic proofs and questions involving Law of Total Probability and Bayes' formula as these show very consistent trends in past exams.

2. Probability distribution functions and Random Variables

This expands from the binomial and normal distributions taught in high school. However, no prior knowledge is assumed, and it is all taught from scratch. A range of 14 discrete and continuous distributions and their characteristics is involved in this topic. A summary table of the distributions would be helpful, but it is not necessary to study each one intensively.

3. Bivariate Random Variables and Correlation

This is probably the most challenging topic in this subject where you now deal with two random variables. You should practice representing the relevant probability areas through a diagram as this would be the most clear and easiest way to understand and complete the questions. Additionally, the concepts of correlations and covariance are introduced. Ensure the relevant formulas are included in your cheat sheet.

4. Generating Functions, Limiting Distributions, Branching and Stochastic Processes

Take some time to understand these concepts and dive straight into past exam questions. The questions show high consistency in past years and will assist your understanding on these topics on the way.

Lectures

Just like other maths subjects, there are three one-hour lectures a week. The lecture slides are provided to you at the start of the semester so it is highly recommended to have a bound hardcopy of it so you can follow along with the content and examples during the lecture as well as easily flick through to review topics during your study. Professor Aihua held in-person and live lectures (through Zoom) at the same time and it was also recorded and uploaded on Lecture Capture. There were sometimes technical difficulties but still worth it if you prefer to ask questions during the lecture (live). If you are just watching your lectures on Lecture Capture, then Sophie's lectures are recommended. Her lectures are pre-recorded and uploaded week-by-week, so if you feel like watching all three lectures in one day, you can. Sophie's lectures are solid and cover everything you need to know with neater notes. Keeping up with the lectures is a must, as the content is covered relatively quickly and may take a lot of effort to catch up once you fall behind.

Tutorials

We had weekly quizzes during the first 20 minutes of the tutorial, discussed the answers as a class with the tutor and broke out into groups to complete tutorial questions on the whiteboard. The tutor would come around to each group every now and then to correct our work and answer any questions we might have. The tutorials are helpful but not overly necessary in my opinion. You can complete the tutorial questions at home and utilise the Zoom consultations which would be equally effective.

Assessments

Assignments

The assignments usually consist of four to five questions. Two questions are randomly selected and marked while the other questions are given one mark each for attempting. I highly recommend using the assignments to test your understanding as they are similar to the exam questions. It is important that you do well in the assignments as it not only affects your overall mark but is an indicator of whether you are understanding the topic or falling behind.

End-of-semester exam

The most effective way to improve your performance on the exam is to do past exams. These are provided to you with answers two weeks before SWOTVAC. Questions follow similar patterns and many questions are very consistent, you can get a very good idea of your exam structure from past exams. Go through your lecture slides and include all relevant formulas in your cheat sheet as well as concepts that have popped up in past exams that you are not familiar with.

MAST20005 Statistics [SM2]

Exemption status	CS1 <i>Actuarial Statistics I</i> , in conjunction with MAST20004 <i>Probability</i> and ACTL30004 <i>Actuarial Statistics</i> . Satisfactory performance across all three subjects is required.
Lecturer(s)	Dr Damjan Vukcevic
Weekly contact hours	3 × 1-hour lectures 1 × 1-hour tutorial 1 × 1-hour laboratory session
Assessments	3 × individual assignments 20% 45-minute R computer test 10% 3-hour end-of-semester exam 70%
Textbook recommendation	Supplementary textbook written by the University of Melbourne for MAST20005. X Not recommended. Textbook is freely available for download off the Canvas website but was never explicitly referred to. Nonetheless, it can form useful background reading if the lecture slides are insufficient. No harm in downloading for future reference.
Lecture capture	Full (both audio and video)
Year and semester reviewed	2021 Semester 2

Overall comments

MAST20005 Statistics naturally follows from MAST20006 Probability to develop basic statistical building blocks for further study in Actuarial, Economics or Finance.

However, I have found Statistics to be considerably less time-consuming and rigorous comparing to Probability. So, if you have found Probability to be manageable, Statistics shouldn't be too much of a challenge. It is quite a mechanical, formulaic subject.

In particular, once you understand the first few fundamental concepts in Statistics, such as Estimators, Confidence Interval, Hypothesis Testing, the assignments and exam should prove to be quite straightforward.

Subject content

1. Introduction and Review of Probability

The first module was a very basic introduction to statistics and mainly a review of probability concepts from MAST20004 Probability. All probability concepts covered in this module were assumed knowledge, and it is vital that these concepts are well understood as many statistical ideas rely on them.

2. Point Estimation

This was the first time that students were exposed to formal statistical concepts. It formalises the idea of estimators. Ensure that you have a strong grasp of the difference between a sampling distribution and population distribution, and how estimators are ultimately random variables. In particular, Maximum Likelihood Estimators are used very often throughout the subject in various settings, so a good understanding of this concept is key.

3. Interval Estimation (2 modules)

This module followed closely from the previous module on Point Estimation and seeks to provide more information about a population through confidence and prediction intervals. Deriving a confidence or prediction intervals is very formulaic but it is crucial that one understands the subtle differences between the many formulas and is also aware of the situations where each formula is appropriate.

4. Regression

Regression was found generally to be one of the more conceptually difficult modules in this course. While this is an idea that many of us have encountered before even in high school, this is the first time that you will learn the underlying concepts behind this widely used statistical method. Ensure that you completely understand the derivations behind the model and the assumptions that are made.

5. Hypothesis Testing

Overall, this was probably one of the easiest topics in terms of conceptual difficulty. It utilises the same ideas from Interval Estimation but in a slightly different context. Again, ensure that you understand when and why certain tests are one-sided or two-sided as this will appear in later modules.

6. Order Statistics, Quantiles and Resampling

This module introduced sampling distributions for estimators such as the sample median, maximum and minimum. Overall, a fairly manageable topic with a few tricky concepts around approximate confidence intervals.

7. Bayesian Estimation

While Bayesian Estimation is inherently different from classical estimation, it is quite easy to understand and apply in the situations that you will be presented with. Understanding the process of using a prior distribution in conjunction with collected data to derive a posterior distribution is the most important idea.

8. Asymptotics and Optimality

The last topic was of intermediate difficulty. Although some concepts were quite tricky to grasp, they were rarely assessed. The main ideas that needed to be well understood related to theory about the MLE and the Cramer-Rao lower bound, which was tested often.

Lectures

Unlike other subjects, each Statistics module is broken down into around a dozen concepts (each video is around 10 minutes) and released in the week prior. This way, you can watch the lectures at your own pace and was very beneficial when it came to revision for exams or for the lab test

Overall, the lectures were informative and Damjan did a great job of explaining the intuition behind each statistical method and concept. The lecture notes were sufficient to perform strongly in this subject. They covered content to good detail but still left room for you to add your own annotations and notes to build your understanding.

Tutorials

Tutorials and Lab are both done online in a 2-hour block. The tutorials usually run overtime and end up taking around 75 minutes while labs take around 45 minutes. You are allocated into small breakout rooms and attempt the tutorial questions. The tutor roams around the breakout rooms responding to help requests.

Assessments

Assignments

The assignments are quite straightforward consisting of some calculation questions and R questions. You do need a fairly good understanding of the underlying R codes used in lectures and tutorials to easily tackle the R questions.

End-of-semester exam

The final exam was held in strict Zoom-supervised conditions. Overall, I felt that the exam in 2020 was around the same difficulty as previous years (perhaps easier than 2019). The exam structures are quite similar from year to year so it is very important to become familiar with the type of questions that may appear. One question that many of us found particularly tricky this year (which was something that had not previously been tested before) was deriving estimators for a slightly different regression model. This question was not particularly difficult if you understood all the derivations in *Hypothesis Testing*, but it goes to show the importance of understanding concepts rather than being able to use the formulas.

MAST20026 Real Analysis [SM2]

Exemption status	Not an exemption subject, but it is a valid prerequisite for <i>ACTL20001 Introductory Financial Mathematics</i> (CM1 <i>Actuarial Mathematics I</i>) and the <i>Actuarial</i> major (see <i>Mathematics Requirement</i>).	
Lecturer(s)	Dr Christopher Duffy	
Weekly contact hours	3 × 1-hour lectures 2 × 1-hour tutorials	
Assessments	5 × individual assignments	20%
	3-hour end-of-semester exam	80%
Textbook recommendation	✓ Recommended . A problem booklet of questions is provided. This is not necessary to print out but definitely recommend working through.	
Lecture capture	Full (both audio and video)	
Year and semester reviewed	2021 Semester 2	

Comments

Real Analysis is a second-year pre-requisite to many third year maths subjects. The aim of this subject is to dig deeper into previous knowledge, especially from calculus 2 to question the fundamentals of maths. The course is built from the ground up, with prerequisite content mentioned but not explicitly built upon. I found the content to be fascinating as it deep dives into the concepts you already know, such as limits and continuity and proves them to you from the fundamentals of maths. Chris is also an incredible lecturer, explaining all the concepts in a clear and concise way. Also, his notes are thorough and extensive.

Subject content

1. **Mathematical Proof and Logic**
Introduction to the concepts of truth tables and proof logic (eg. direct proof, proof by contradiction, etc.)
2. **Set Theory**
Focus on constructing the real and rational numbers from sets
3. **Real Numbers**
Different properties of real numbers using the real number axioms
4. **Functions and Sequences**
Introduces techniques regarding sequence convergence and divergence
5. **Limits and Continuity**
Focuses on proving limits of functions and introduces formal definition of limits and continuity
6. **Differentiability and integrability**
Introduces formal definitions of differentiable and integrable
7. **Fourier Series**

Lectures

Chris is a fantastic lecturer. I thoroughly enjoyed his methodical nature of teaching and looked forward to reading the supplementary notes. The lectures were in an unusual format, where the three lectures were pre-recorded and posted on the LMS on Monday of each teaching week. The total lecture time was well below the stated 3 hours, likely closer to an hour a week. However, the videos were only used as an introduction to the concept rather than a thorough deep dive, so reading the supplementary notes is a must. The examples that appear in tutorials, assignments and exams are based on the material in the notes. I found this method of teaching to be very effective, especially when online learning made watching lectures very monotonous and boring especially with my shortened attention span.

The supplementary notes also had a very short “testing your understanding” section at the end of each subtopic, where there were some basic questions which should be attempted. Additionally, there are problem sheets for each section with more difficult, exam and assignment style questions which can be used as revision.

Tutorials

There are two tutorials a week for this subject, both which should be attended. Similar to other mathematics tutorials, there is a strong focus on group problem solving using Miro and Zoom. I found attending the tutorial to be a useful introduction to the level of understanding that was expected of the concepts. The tutorial questions have more of a focus on investigating different applications of the concepts rather than straight proofs, which was slightly different to the problem sheet and the exam, however being able to manipulate the concepts developed my understanding.

The tutors also were very useful in properly explaining the answers after giving the questions a go. The answers given on the LMS after the tutorials were quite limited, so I strongly encourage going to tutorials. I found the time spent thinking about the concepts to be invaluable in my understanding, especially for a concept heavy subject like this one.

Assessments

Assignments

The assignments for this subject were slightly different to typical maths assignments. All assignments had a short reading at the beginning and required a short (less than 250 word) response on what you found interesting or peculiar about the reading. The readings were on concepts which I would not otherwise have considered and not directly related to the topics. For example, one reading was about how computers are being used to come up with conjectures and then proving them without human input. This would only make up a small proportion of the marks of the assignment.

The majority of the marks are allocated to typical maths assignment style questions. A lot of the assignment questions were similar to the tutorials in that they were investigative in nature. Each part tended to build on the previous part to reach a final conclusion. The difficulty is similar to the tutorials and the questions are usually quite obscure so stack exchange and google are not that useful.

There is also an optional (non-marked) section of the assignment which encourages you to learn how to typeset with LaTeX. This is a useful skill to develop if you want your assignments to look more professional.

End-of-semester exam

The final exam was notable in that it covered most of the areas that were taught in some depth. All the definitions and theorems that were in the notes were also provided, which means that the notes sheet that you were allowed to bring could contain proof structures and concepts which you had difficulty with rather than straight definitions. The exam difficulty was similar to the tutorials and assignments with questions more similar to the problem sheets. The practice exam was very similar to the actual exam in terms of difficulty and the type of question.

MGMT20001 Organisational Behaviour [SUM]

Exemption status	None	
Lecturer(s)	Dr Joeri Mol	
Weekly contact hours	2 × 1-hour lectures 1 × 1-hour tutorials	
Assessments	Active tutorial participation	10%
	Individual assignment	10%
	Individual case study report	30%
	3-hour end-of-semester exam	50%
Textbook recommendation	McShane et al. <i>Organisational Behaviour 6th Edition</i>	
Lecture capture	Full (both audio and video)	
Year and semester reviewed	2021 Summer Term	

Comments

Organisational Behaviour goes into the different models of behaviour within organisations on both a micro and macro level. It utilises many relevant academic journals and past large company case studies to show the benefits and implications of the different models in real life. This subject was particularly interesting for me as I found that it was very applicable to the many different groups that I am involved with and gave me a better grasp of all the different factors that affect organisations.

Subject content

There are 12 lectures in total each on a different module.

1. Introduction to OB

Micro topics:

2. **Contrasting Management Approaches**
3. **Perceptions, Attributions and Decision Making**
4. **Teams and Leadership**
5. **Values, Attitudes and Behaviour**
6. **Motivation in Organisations**
7. **Conflict & Negotiation**

Macro topics:

8. **Ethics**
9. **Organisational Change**
10. **Organisational Culture**
11. **Organisational Communication**
12. **Power and Influence**

Lectures

Lectures were pre-recorded and uploaded on Lecture Capture on the Monday and Wednesday of each week. OB during the summer was a lot more fast-paced so it was necessary to stay on top of the lectures as the lectures released on Monday were covered in the tutorial on Tuesday and the lecture on Wednesday was covered in the tutorial on Thursday. The lectures are relatively short at an hour long. However, in some weeks they would run overtime. The content in each lecture is very structured as shown in the subject content above being divided into micro and macro topics. The lecture slides were a very good revision tool for myself and the content on them comprised most of the pre-tutorial quizzes for the tutorial covering the micro topics.

Tutorials

Tutorials were held twice a week on Tuesdays and Thursdays with each having a pre-tutorial quiz due 8 am the morning of the tutorial.

Only tutorials 3-12 were assessed with their pre-tutorial quiz worth 0.4% each and tutorial attendance worth 0.6% each, totalling up to a maximum of 10%

The tutorials began with a quick recap of the previous lecture and the pre-tutorial quiz before being broken into breakout rooms to discuss the readings and tutorial questions that were posted on the LMS. My tutor utilised collaborative workspaces such as Miro Boards and screen sharing Word documents in individual breakrooms. Towards the end of the tutorial, the breakout rooms would close and there would be a discussion of the different prompts discussed within the breakout rooms.

The tutorials really helped my understanding and gave me the opportunity to apply the theoretical concepts through group discussions. These quizzes and actual tutorials really helped me stay on top of the fast-paced summer subject. In order to better utilise these spaces, I would highly encourage students to take a proper attempt at the pre-tutorial quizzes and the case studies as much of the discussion hinges on the content in those.

Assessments

Assignments

Both assignments focused on micro-organisational topics, whereas the exam focused on macro-organisational topics. The first assignment was an individual essay worth 10% with a word limit of 1,000 words. It was given out in the first lecture and due at the end of the second week. With this assignment, there was a study skill session and many academic essay writing tips that were very helpful and specific to the essay. These were very helpful in finding academic journals and referencing them in APA style. This essay was only worth 10% but served as a great learning tool for the second assignment.

The second assignment was an individual case study report worth 30% with a word limit of 1,500 words. This assignment was released straight after the first assignment's due date, at the end of the second week, and was due at the end of week 5. I highly recommend starting this assignment earlier rather than leaving it to the last minute. as researching and finding academic journals, drafting, as well as finalising the case study report takes a considerable amount of time. Furthermore, ensure that you utilise the feedback that you received from the first assignment.

End-of-semester exam

The end of semester exam is worth 50% of your overall grade. It is typically two hours but to accommodate for the virtual nature, students were given three hours to complete the exam. The exam consisted of four long response questions based on a single case study from the tutorials covering macro topics. In this year's exam, it was Apple. The first question was based on a micro-organisational topic while the other three were based on a single macro-organisational topic. All the case studies and organisational topics were given throughout the semester, so I highly encourage you to stay on top of your readings and apply new concepts learnt to previous case studies. The questions were all equally weighted so time management is crucial.

Subject Reviews: Third-Year Subjects

ACTL30001 Actuarial Modelling I [SM1]

Exemption status	CS2 <i>Risk Modelling and Survival Analysis</i> , in conjunction with ACTL30002 <i>Actuarial Modelling II</i> and ACTL30007 <i>Actuarial Modelling III</i> . Satisfactory performance across all three subjects is required.						
Lecturer(s)	Prof Shuanming Li						
Weekly contact hours	2 × 1-hour lectures 1 × 1-hour tutorial						
Assessments	<table> <tr> <td>Individual assignment due in Week 5</td> <td>15%</td> </tr> <tr> <td>Individual assignment due in Week 11</td> <td>15%</td> </tr> <tr> <td>3-hour Zoom supervised end-of-semester exam</td> <td>70%</td> </tr> </table> <p>Important online examination information: This examination is the equivalent of a 2-hour assessment; however, students are provided with 3-hours to accommodate the time that will be required for typesetting of mathematical expressions and the uploading of documents. (However, students were only given 2 hours of writing time 2022 Semester 1.)</p>	Individual assignment due in Week 5	15%	Individual assignment due in Week 11	15%	3-hour Zoom supervised end-of-semester exam	70%
Individual assignment due in Week 5	15%						
Individual assignment due in Week 11	15%						
3-hour Zoom supervised end-of-semester exam	70%						
Textbook recommendation	<p>[1] Actuarial Mathematics for Life Contingent Risks, by Dickson, Hardy and Waters, Chapters 2, 3, 8.</p> <p>[2] Solutions Manual for Actuarial Mathematics for Life Contingent Risks, by Dickson, Hardy and Waters. There are two editions of the textbook. It is suggested that you work from the 2nd edition.</p> <p>[3] An Actuarial Survey of Statistical Models for Decrement and Transition Data, Part I by Macdonald, British Actuarial Journal, Volume 2, Part I, 129-156. (M1, available for Download from the library's online catalogue.)</p> <p>[4] An Actuarial Survey of Statistical Models for Decrement and Transition Data, Part II by Macdonald, British Actuarial Journal, Volume 2, Part II, 429-448. (M2, available for Download from the library's online catalogue.)</p>						
Lecture capture	Full (both audio and video)						
Year and semester reviewed	2022 Semester 1						

Overall comments

This subject aims to provide students with a grounding in mathematical and statistical modelling techniques that are of particular relevance to actuarial work, covering survival models concepts, estimation procedures for lifetime distributions, multiple state models, binomial and Poisson models of mortality, actuarial applications of discrete-time and continuous-time Markov chains. This subject focuses on modelling techniques in life insurance.

It is a must-take subject for an actuarial degree. This subject is very maths-based and content heavy, it involves a lot of symbols and formulas. Shuanming is a very good lecturer, who explains things very clearly. However, students might still find themselves lost in actuarial notations and their relationships. There is probably no better way to do this subject other than understanding thoroughly what each notation represents and practising tutorial questions. Also, prepare your "formula sheet" early! There will be a lot to be written! Good luck!

Subject content

1. Survival Models and Life Tables

Survival models covers the relationship between different concepts in future lifetime and force of mortality. Life Tables contains several concepts, such as l_x , L_x , N_x , m_x , etc... it is also where the fractional age assumptions were introduced.

2. Estimation of survival distributions

This unit we were dealing with the likelihood function of a random / right-censored / left-censored / interval-censored sample data via parametric and non-parametric methods. The Kaplan-Meier estimation and Nelson-Aalen approximation method along with hazard rate were also introduced.

3. Parametric Mortality Models

In this unit, students will learn things about the two-state Markov chain. Specifically, the formulas of ME/MLE of Binomial / Poisson models under UDD, DFM, Balducci assumptions will be taught, as well as the modified ME and actuarial estimate.

4. Markov Models and Actuarial Applications

The definition, key results and properties, applications, estimations and simulations of Markov models will be learnt in this unit. Kolmogorov forward differential equations, Chapman-Kolmogorov equations are important results.

5. Discrete Time Markov Chains

This unit becomes a little bit easier than other units. Transition probability matrix, first-step analysis, classes of state space are all important concepts in this unit. Applications, estimation and simulation were also taught.

Lectures

Each lecture is very important. Please make sure you watch each lecture even if you didn't attend the live one. Shuanming's lectures are always full of key points.

Tutorials

Tutorials are helpful, too. It allows you to understand the concepts taught in lectures practically, like how to use those formulas in actual questions.

Assessments

Assignments

Both assignments consist of doable questions, some are even hinted at in the lectures. If you watched the lectures and did the tutorials questions, you will be fine.

End-of-semester exam

It will be a 2-hour writing, 45 mins uploading exam. You are allowed to bring 2 pieces of A4 paper, double-sided, printed or handwritten. The level of difficulty was reasonable, but the writing time is very tight, so make sure you keep an eye on the time and answer the questions strategically.

ACTL30001 Actuarial Modelling I [SM1]

Exemption status	CS2 <i>Risk Modelling and Survival Analysis</i> , in conjunction with ACTL30002 <i>Actuarial Modelling II</i> and ACTL30007 <i>Actuarial Modelling III</i> . Satisfactory performance across all three subjects is required.	
Lecturer(s)	Prof Shuanming Li	
Weekly contact hours	2 × 1-hour lectures 1 × 1-hour tutorial	
Assessments	Individual assignment due in Week 5	15%
	Individual assignment due in Week 11	15%
	3-hour end-of-semester exam	70%
Textbook recommendation	None	
Lecture capture	Full (both audio and video)	
Year and semester reviewed	2021 Semester 1	

Overall comments

This subject focuses on modelling techniques in life insurance, covering estimation procedures for lifetime distributions, survival model concepts and actuarial applications of Markov processes. I really enjoyed this subject as it was heavily related to probability and featured extensions of many concepts previously learned in ACTL10001 Introduction to Actuarial Studies and ACTL20003 Stochastic Techniques in Insurance. Professor Shuanming made utmost effort to simplify challenging concepts as he provided additional handouts highlighting the key concepts in each module. Overall, the subject was challenging but at the same time engaging, well-structured and the topics were linked together implicitly or explicitly.

Subject content

1. Survival Models and Life Tables

Introduces actuarial notation for the probability a life aged “ xx ” will survive any given number of years. Explores mortality rates and assumptions on fractional age.

2. Non-parametric Estimations of Survival Functions

Delves into how to estimate the probability that a life will survive a given number of years, given censored and/or non-censored data, using a likelihood function. Introduces the Kaplan-Meier and Nelson-Aalen estimation methods.

3. Parametric Mortality Models

Estimates mortality rates using three models of mortality: the two-state Markov model, Binomial model and Poisson model, and studies each of their pros and cons.

4. Continuous-time Markov process and applications

The heftiest of units in this subject. Looks into different models that are being used for human lives. For example, in a permanent disability model (lives can either be “Healthy”, “Permanently Disabled” or “Dead”), looks at the probabilities of transitioning from one state to another.

5. Discrete-time Markov chains

Similar to high school Markov chains, where the probability of transitioning from one state to another follows discrete-time and is represented by a transition matrix. This unit also encompasses first-step analysis and some basic simulation by hand. This was my favourite unit, because it was intuitive and comparatively easy!

Lectures

The lecture notes were quite comprehensive, well-structured and a perfect blend of key concepts, proofs and applications. Shuanming recorded and uploaded both lectures on Canvas well in advance throughout the semester (in most cases, on the prior weekend!). I think this was really beneficial in terms of time management, particularly for students located overseas. He also provided concise preliminary notes and supplementary handouts which made some difficult concepts easier to understand. Sometimes, I even found hints on assignments and exam type questions in the lectures. This was my third and final subject under Professor Shuanming and I will miss his lectures and consultations.

Tutorials

The weekly tutorials were delivered on Zoom and uploaded on Canvas later. Attempting (or at least previewing) the questions before the tutorial is a great way to check conceptual understanding. Exam and assignment questions were like the tutorial questions; completing all questions gives a huge advantage for the completion of the exam (particularly the MCQs).

I tried my best to attend the tutorials as it motivated me to stay up-to-date with lectures. However, in rare cases, I would listen to Shuanming's recorded tutorials. The official solutions (uploaded on Canvas later in the week) were easy to understand but I mostly referred to my tutor's solutions, as they included additional summary notes.

Assessments

Assignments

There were two individual assignments, with one due mid-semester and the other towards the end of the semester. The questions were quite similar to the tutorial problems. As stated earlier, Shuanming would occasionally give hints for the challenging assignment questions in the lecture recordings. The second assignment was slightly easier than the first one. Both assignments required a decent amount of Excel or R software applications, which made them more enjoyable. Overall, I performed quite well in the assignments.

End-of-semester exam

The final exam was an online, open-book exam. In terms of structure, it was quite similar to the practice exam, with a decent amount of MCQs, True/False, short answer and long answer questions. However, in terms of difficulty, it was more challenging. Although we had an additional 30 minutes due to this year's online format and I made the most out of the time I had, I still almost ran out of time as I failed to prioritise the questions and did not manage my time well. I would highly recommend utilising any online resource to save your time on calculations, such as using matrix and simultaneous equation solvers, Excel, and R.

ACTL30002 Actuarial Modelling II [SM1]

Exemption status	CS2 <i>Risk Modelling and Survival Analysis</i> , in conjunction with ACTL30001 <i>Actuarial Modelling I</i> and ACTL30007 <i>Actuarial Modelling III</i> . Satisfactory performance across all three subjects is required.	
Lecturer(s)	Dr Ping Chen	
Weekly contact hours	2 × 1-hour lectures 1 × 1-hour tutorial	
Assessments	Individual assignment 1 (Week 8)	15%
	Individual assignment 2 (Week 12)	15%
	3.5-hour Zoom-supervised end-of-semester exam	70%
	Important online examination information: This examination is the equivalent of a 2-hour assessment; however, students are provided with 3-hours to accommodate the time that will be required for typesetting of mathematical expressions and the uploading of documents. (However, students were only given 2 hours of writing time 2022 Semester 1.)	
Textbook recommendation	There is no reference book for this subject. The lecture slides are expected to cover all the materials required by this subject.	
Lecture capture	Full (both audio and video)	
Year and semester reviewed	2022 Semester 1	

Overall comments

The aim of this subject is to provide students with grounding in mathematical and statistical modelling techniques that are of particular relevance to actuarial work, including methods of estimating mortality rates and assessing their adherence to data and smoothness, as well as techniques for mortality projections. Also, elementary principles of machine learning are covered, with applications to mortality modelling.

It is a must-take subject for an actuarial degree. Ping is a very good lecturer, who explains things very clearly. Most of the points are relatively easy to understand, however, there are some really hard concepts spread in different units, which need some time to fully understand. It also involves some Excel skills. Good luck!

Subject content

1. Exposed to Risk Methods

In this unit, students will explore the estimation of mortality rates from crude data, concept of rate interval and mortality investigation. Which brings us to the concepts of central exposed to risk, initial exposed to risk, life / policy / calendar year rate intervals. From which, the concept of rate interval is the hardest one in this subject, please spend some time on understanding what each rate interval represents.

2. Hypothesis Testing

In this unit, we want to make sure that the stats from a life table actually describe our underlying mortality well. In order to do that, some hypothesis testing was involved, such as Chi-squared test, Individual standard deviations test, cumulative deviations test, signs test, runs test, serial correlation.

3. Methods of Graduation

Techniques for smoothing crude mortality rates will be learnt in this unit, such as, Whittaker-Henderson, graphical, mathematical formula, standard table and cubic splines. From which, Whittaker-Henderson is a really important method, which students may want to pay extra attention to.

4. Mortality Projection and Machine Learning

Now we want to forecast the mortality rates, techniques include: Lee-Carter, age-period-cohort and p-spline regression methods. From which, the Lee-Carter method is a really important method, which students may also want to pay extra attention to. In the meantime, the p-spline method might be a little bit hard to understand, so please keep that in mind. Applying these models to a mortality dataset using some computer package will be taught as well.

Lectures

Each lecture is very important. Ping explains things very clearly, so it is worth watching each lecture even if you didn't attend the live one.

Tutorials

Tutorials are helpful, too. It allows you to understand the concepts taught in lectures practically, like how to use those formulas in actual questions.

Assessments

Assignments

Both assignments are rather practical, they consist of long or real questions from the Actuaries Institute, which involves some Excel skills and is a little bit time-consuming, but doable.

End-of-semester exam

It will be a 2-hour writing, 45 mins uploading exam. You are allowed to bring 2 pieces of A4 paper, double-sided, printed or handwritten. Ping's exam papers are rather unusual, so please expect any kind of questions to appear in the final exam. This year's (2022) was rather hard and short of time, so make sure you keep an eye on the time and answer the questions strategically.

flowed into policy valuation. We learnt profit analysis on an annual basis and Thiele's Different Equation under the context of policy value.

3. Multiple state models

This part started with a review of the Markov process learnt in Actuarial Modelling I. Topics in multiple state models are extensions of materials in Week 4 to Week 6 where the alive-dead model was used. Several other famous multiple state models were discussed.

4. Joint Life Theory

This was the most interesting but challenging topic for me in this subject. Further to the standard notations in Week 1 to Week 3, functions on joint life, last survivor and contingent life were introduced. The difficulty came from questions that applied these functions. I found drawing timelines to understand the relationships between two lives before writing down formulae is the best approach to tackle these questions.

5. Multiple Decrement Model

The multiple decrement model is a special case of the multi-state model where there is one alive state and n absorbing states (not necessarily a dead state). Knowledge on constructing relationships between the single decrement model and multiple decrement model, and finding probabilities under fractional age assumptions were discussed.

6. Emerging costs and Unit-linked Insurance

So far in the course, we had focused on determining the EPV of cash flow series. This topic mainly talked about how to project the cash flow emerging from a contract in each time period for pricing, reserving and profit testing.

Lectures

The lecture notes were concise, well-structured and a perfect blend of key concepts, proofs and applications. Rui is very organised and sent us an email each week beforehand summarising topics. She recorded and uploaded both lectures on Canvas well in advance throughout the semester. I think this was really beneficial in terms of time management, particularly for students located overseas. In terms of lecture consultations, I really enjoyed attending all of them as she would make concepts more clear. Overall, I believe that Rui did an amazing job in teaching such an extensive subject within 12 weeks and it doesn't get any better.

Tutorials

The weekly tutorial was delivered on Zoom and uploaded on Canvas later. Attempting (or at least previewing) the questions before the tutorial is a great way to check conceptual understanding. Exam and assignment questions were like the tutorial questions. I tried my best to attend the tutorials as it motivated me to stay up-to-date with lectures. The official solutions (uploaded on Canvas later in the week) were easy to understand but I mostly referred to my tutor's solutions as they also included summary notes. Both tutors in my cohort were very good at explaining intuitions behind formulae.

Assessments

Assignments

There were two individual assignments. Each consisted of six or seven long answer questions. In terms of difficulty, both assignments were manageable and on a comparative scale – easier than Prof Shuanming's ACTL30001 Actuarial Modelling 1 assignments. Rui likes to make assignments available before the knowledge required for the majority of questions has even been taught yet. As such, both assignments included questions that were learnt within the same week of the due date. Having good time management skills is essential and you should not leave all questions until a few days before the due date. In terms of content, the first assignment required extensive use of excel (in construction of annuity tables from scratch, etc.).

Most questions in the second assignment were similar to tutorial questions and required handwritten answers. Overall, I performed quite well in the assignments.

End-of-semester exam

The final exam was closed book and Zoom invigilated. Unlike usual 3 hour + 30 min online exams, it was a 2-hour exam + 15 minutes reading time. We were allowed two A4 sheets of paper with notes, handwritten and/or typed, on both sides. I tried to keep it concise with all the main concepts (as I did in previous Probability and Statistics exams). However, I had no time to look at them during the exam. In terms of structure, there were 8 questions (mix of long and short answer!) worth 50

marks in total. There were no MCQ and T/F questions. Each question required a decent amount of concept application and calculations. In terms of difficulty, the exam was very challenging. The main issue was time constraint with a lot of life table calculations. Two-hour exam with 8 questions meant there is no time to think. So, it's either you know how to solve the question, or you do not. Most of the people in my cohort had the same experience. I strongly recommend students to:

1. Practice – till you are comfortable solving questions under time pressure.
2. Have a back-up plan – Will you skip the challenging questions and focus on the ones you know, or will you try to attempt every question?
3. Utilise the reading time well to get the answer to the above question.

Students who achieve these goals will perform well and stand out in the cohort. Good luck!

ACTL30004 Actuarial Statistics [SM2]

Exemption status	CS1 <i>Actuarial Statistics I</i> , in conjunction with MAST20004 <i>Probability</i> and MAST20005 <i>Statistics</i> . Satisfactory performance across all three subjects is required.	
Lecturer(s)	Dr Enrique Calderin	
Weekly contact hours	2 × 1-hour lectures 1 × 1-hour tutorial	
Assessments	Individual assignment 1	15%
	Individual assignment 2	15%
	End-of-semester exam (hurdle)	70%
Textbook recommendation	<p>Prescribed Reading Actuarial Statistics Reading ✓ Recommended. The prescribed reading is pretty much the same as the lecture materials with additional background information and an appendix. I read it on a weekly basis before lectures to give myself an overview of each week's material.</p> <p>Supplementary Reading Frees, E. W., Derrig, R. A. and Meyers, G. (eds) (2014) <i>Predictive Modeling Applications in Actuarial Science</i>. Cambridge: Cambridge University Press (International Series on Actuarial Science). Boland, P., 2007. <i>Statistical And Probabilistic Methods In Actuarial Science</i>. 1st ed. CRC Press. De Jong, P. and Heller, G., 2013. <i>Generalized Linear Models For Insurance Data</i>. Cambridge: Cambridge University Press.</p>	
Lecture capture	Full (both audio and video)	
Year and semester reviewed	2021 Semester 2	

Overall comments

This subject covers the basics of advanced linear regression analysis. It starts off with measures of correlation, principal component analysis and multiple linear regression. The second half of the semester focuses on generalised linear models and credibility theory. A few of the earlier contents were already touched upon in my previous subject, such as Statistics and Actuarial Analytics and Data I so personally, I found the latter topics more challenging. This subject also involves a heavy use of R.

Subject content

1. Exploratory Data Analysis with R (Week 1 – Week 2)

Exploratory Data Analysis is a technique for analysing datasets to summarise their main features, often with visual methods. The main goal of exploratory data analysis is for observing what the data can tell us beyond the formal modelling or hypothesis testing. The use of statistical software is crucial to perform the analysis. The first part of this chapter gives an introduction to exploratory Data Analysis and the second part discusses different methods of multivariate exploratory data analysis and their implementation in R.

2. Properties Estimation and Estimates (Week 3 – Week 4)

Most of the knowledge covered in this unit regarding MLE, simulation and introduction of bootstrap method will be a revision of ideas that you have already met in Statistics, Actuarial Modelling I and Actuarial Analytics and Data I, respectively. There will, however, be some new material related to the use of the bootstrap method to estimate the properties of an estimator.

3. Multiple Linear Regression (Week 4 – Week 6)

This unit introduces linear regression in the case of several explanatory variables. Many of the results derived for the simple linear regression extend directly including goodness-of-fit measures and inference. Further materials on residual analysis, multicollinearity, variable selection procedures and some special explanatory variables are discussed afterwards.

4. Generalised Linear Models (Week 6 – Week 9)

GLM is the most important topic in this subject and serves as an extension of the multiple regression models where the assumption of a normally distributed response variable is no longer needed. This is particularly important in actuarial work where the data very often do not have a normal distribution and this method is often used in general insurance for determining premiums. This unit aims to provide an in-depth understanding and applications of the exponential family of probability distributions and the parameter estimation procedure.

5. Credibility Theory (Week 9 – Week 12)

Credibility theory can be considered to calculate premiums or to estimate claim frequencies in general insurance. The mechanism to design a way of combining the experience of the group with the experience of the individual risk to calculate a better premium can be formulated in an either frequentist or Bayesian statistical settings. The Bayesian statistical method is often preferred and is a focus of this chapter due to its flexibility to recognise more than one source of randomness via sampling and prior information.

Lectures

Enrique is a great lecturer who explains answers clearly for the questions you have in the consultations and he often provides you with the background knowledge required first and then guides you through the questions patiently. For most of the time, Enrique liked to read off slides firstly and then provided further explanations on concepts and deviations. Admittedly, you may find that it will take you a few weeks to adapt to his accent and his way of teaching.

Tutorials

The tutorial questions are of the right length and the right difficulty. The first tutorial was revision of some concepts in previous subjects, but latter ones relate closely to the course and lectures. To perform well in the exam, I highly recommend using the tutorial problems as a good resource for revision since one or two questions in this year's final exam are closely related to some of the tutorial questions.

Assessments

Assignments

The two assignments involve the heavy use of R and you need to submit a pdf file that includes sufficient R codes, so I used R Markdown. Even though the concept tested is not difficult, I personally found the making criteria provided to us not very clear, so I lost some unnecessary marks. My advice is to go back to the lectures and try to link as much concept as possible and include it in your assignment.

End-of-semester exam

This year, the final exam was manageable in terms of difficulty compared to the other two core subjects offered in the same semester. There were a specimen paper and a practice exam available on Canvas. Due to the curriculum change, the specimen paper became less valuable as only three questions in the paper examined knowledge learnt in this subject. The practice exam, however, reflected the styles and difficulties of the questions in the actual exam very well and I suggest you use it as guidance.

ACTL30006 Intermediate Financial Mathematics [SM2]

Exemption status	CM2 <i>Financial Engineering and Loss Reserving</i> , in conjunction with ACTL20004 <i>Topics in Actuarial Studies</i> and ACTL40004 <i>Advanced Financial Mathematics</i> . Satisfactory performance across all three subjects' end-of-semester exam is required.
Lecturer(s)	Dr Ping Chen
Weekly contact hours	2 × 1-hour lectures 1 × 1-hour tutorial
Assessments	Individual assignment 1 15% Individual assignment 2 15% 3-hour end-of-semester exam 70%
Textbook recommendation	Prescribed References: Joshi, M.S. and Paterson, J.M., 2013. <i>Introduction to mathematical portfolio theory</i> . Cambridge University Press. Supplementary Readings: Goetzmann, W.N., Brown, S.J., Gruber, M.J. and Elton, E.J., 2014. <i>Modern portfolio theory and investment analysis</i> . John Wiley & Sons, 237.
Lecture capture	Full (both audio and video)
Year and semester reviewed	2020 Semester 2

Overall comments

This subject takes the ACTL20001 Introductory Financial Mathematics one step further. Intermediate Financial Mathematics aims to explain the mathematics underlying Modern Portfolio Theory. It examines the fundamental question of how to divide an investment amongst many possible investment opportunities under the assumption that those investments are correctly priced. One thing you should consistently keep in mind throughout the semester is no single model is flawless. A large part of the content discussed was how to conduct experiments and analyse the downsides of the models.

Personally, the concepts were easy to understand as they were well-structured and based on different assumptions of investments and investors. Most of the material in this subject served as the background for further studies. The most rewarding part for me was the process of developing the intuition of financial models using mathematical knowledge learnt in previous subjects.

Subject content

1. Introduction to Modern Portfolio Theory (Lecture 1)

The objective of the modern portfolio theory is to maximise the risk-return trade-off when investing in the markets through the use of mathematical tools. Notably, in financial mathematics, we generally focused on the future rather than the past. Therefore, the expected return is the centre of focus.

2. Mean-variance Theory (Lectures 2 – 5)

The mean-variance theory provides a way of choosing a combination of assets based on the idea that investors only care about mean-variance efficiency. This topic guides you through the steps of constructing an opportunity set and finding efficient frontier and typical portfolios.

3. Single-factor model and Multi-factor model (Lectures 6 – 9)

These two models simplify the mean-variance theory via relating assets to the market portfolio, which largely reduces the data required in the analysis. I found that it helped to understand the topic by treating the model as a financial application of the linear regression model learnt in Actuarial Analytics and Data I and Actuarial Statistics.

4. Expected Utility Theory (Lectures 10 – 13)

Expected Utility Theory helps to choose portfolios by giving assumptions on risk preferences. This is in comparison to the mean-variance analysis, which does not show which portfolio to hold, which instead reduces the set of investments worth considering.

5. Geometric Means (Lecture 14)

Given the previous two criteria in portfolio selection (mean-variance criteria and expected utility theory), geometric means is another method used for long-time (lifetime) growth of a portfolio.

6. Stochastic Dominance (Lecture 15)

The three criteria derived so far require very strong assumptions on the investor. Here, Stochastic Dominance requires strong assumptions on the investments, but only very weak assumptions on the investor.

7. Capital Pricing Asset Model (CAPM) (Lectures 16 – 17)

Depending on the investor's analysing ability, the investment pool varies from investor to investor. The CAPM develops a simple relationship between the expected return of an asset and its covariance with the market portfolio by making an unrealistic assumption that investors have identical analysing abilities.

8. Arbitrage Pricing Theory (APT) (Lectures 18 – 19)

APT provides analysis based on the multiple factor model but with no diversifiable risk involved.

9. Efficiency and Rationality (Lecture 20)

This lecture examines three different forms of market efficiency. It is one of the most theoretical topics in the subject.

10. Risk Measures – Value at Risk (VaR) (Lectures 21 – 22)

To this point, the variance has been used as the principal measure of risk. Value at Risk is another measure of risk that compensates for some disadvantages of the variance. For example, the variance penalises upside variance as well as down-size variance.

Lectures

The lecture slides were very clear and connected. Ping explained abstract concepts extremely well, so I found that not much time was needed to digest concepts after attending lectures. Therefore, I highly recommend that you should keep up to date with the lectures to make your learning enjoyable. In terms of content, lectures were theory based with one to two examples after each topic.

Tutorials

Tutorial questions were straight-forward, with no complicated calculations or proofs required. If a consistent effort is applied throughout the semester (by watching lectures), the level of difficulty should not be a concern. However, I found attending tutorials helpful in terms of consolidating my understanding, as my tutor provided concise recaps of the previous week's content. I do suggest that you attempt questions prior to attending tutorials as then you will find tutorials to be much easier to follow.

Assessments

Assignments

Both assignments were Excel-based and intended to mimic a real-life scenario you may encounter at work. The first assignment examined the knowledge of the mean-variance theory with five assets and required a spreadsheet model built using Excel. In the second assignment, the task was to estimate the CAPM betas of four self-selected stocks and also write an 800 words commentary essay.

End-of-semester exam

There were five multiple-choice questions and seven file-uploading questions, examining all topics in the course. Personally, the difficulty level of the exam was unexpected, given the straightforward nature of the tutorial questions. A few questions examined the understanding of definitions and intuition behind models. For the most part, the final exam had a similar difficulty to the practice exam, and a similar format to the tutorial questions – with just extra layer of complexity.

ACTL30007 Actuarial Modelling III [SM1]

Exemption status	CS2 <i>Risk Modelling and Survival Analysis</i> , in conjunction with ACTL30001 <i>Actuarial Modelling I</i> and ACTL30002 <i>Actuarial Modelling II</i> . Satisfactory performance across all three subjects is required.	
Lecturer(s)	Prof Benjamin Avanzi	
Weekly contact hours	2 × 1-hour lectures 1 × 1-hour tutorial	
Assessments	Mid-semester test (Week 7)	15%
	Individual video presentation (Week 10)	25%
	3-hour end-of-semester exam	60%
Textbook recommendation	<ul style="list-style-type: none"> [MW]: Wuthrich, Mario V., <i>Non-Life Insurance: Mathematics & Statistics</i> (December 17, 2020) [TS]: Shumway, Robert H., Stoffer, David S. (2017) <i>Time Series Analysis and Its Applications With R Examples</i>, Springer [CS2]: Institute and Faculty of Actuaries, CS2 Core Reading, Unit 3 Copulas and Unit 4 Extreme Value Theory 	
Lecture capture	Full (both audio and video)	
Year and semester reviewed	2022 Semester 1	

Overall comments

Actuarial Modelling III is a very practical subject grounded in coding in R and provides an interesting insight into modelling techniques in General Insurance. It builds on some basic R learnt in MAST20005 Statistics and some time series models briefly covered in ACTL20004 Topics in Actuarial Studies. The subject was broken up into two main components, risk modelling and time series. Overall, I found this subject to be quite interesting despite it being quite content heavy.

Prerequisites include either a 150 total from Calculus 2 and Linear Algebra, or 120 total from Accelerated Mathematics 1 and Accelerated Mathematics 2.

Subject content

- Module 2: Collective Risk Modelling**
Modelling claims with a deterministic vs random number of losses (Individual vs Collective Risk Modelling). Compound Distributions such as the compound Poisson.
- Module 3: Claim Size Modelling**
Fitting a loss model to data with practical examples. It dives into intricacies that are commonly found in insurance data, where observations are incomplete, truncated or censored.
- Module 7: Characteristic of Time Series**
This module defines from the bottom up what is a time series, how to describe the characteristics of time series and the importance of stationarity with relation to white noise.
- Module 8: Time Series Regression and Exploratory Data Analysis**
How to detrend a time series to become stationary through processes such as regression and differencing. It also touches on how to smoothing in time series.
- Module 9: AR and MA models**
The main models of such as AR and MA which is covered in ACTL20004 Topics in Actuarial Studies, however it builds heavily onto these.
- Module 10: Forecasting**
How to identify the underlying models within time series to be able to forecast future patterns.
- Module 5: EVT**
How to model claims where there is a heavy right-tail, that is high chance of large loss, which often happens in insurance.
- Module 6: Copulas**

Lectures

Benjamin goes through the lectures module by module and separates them by each subtopic. This year lectures were back-to-back in person with a short break in between. The lectures are quite fast paced covering numerous slides, however Benjamin often tries to provide many examples and a more practical approach when teaching difficult areas of this subject. Lecture recordings were also available and great for revision later on in the semester.

Tutorials

Unlike your other actuarial tutorials, the questions for ACTL30007 are not provided in a weekly manner, but rather on a module basis. This structure confused many students at the beginning of the semester, but we, as all do, adapt. What surprised many of the students was the sheer amount of the questions included in a single week's tutorial. Tutors hence could not always go through the entire set of questions and instead selected a few questions to cover based on difficulty, importance and the students' needs. As if structured to compensate for the lack of time spent in tutorials covering the questions, the provided solutions were more detailed compared to other subjects. It also included full scripts of R codes for questions which required its usage.

Assessments

Mid-semester exam

The mid-semester exam will be a quiz on Canvas with multiple choice questions (single or multiple correct answers) and open questions, some of which will require some R calculations using individual data sets. You must hence have a computer that can run R for the examinations. The mid-semester exam will assess contents from Modules 2 and 3 (lectures of weeks 1-3) and associated tutorial exercises, readings, R codes, and course contents. This focuses on the claims modelling component of the subject.

Individual assignment: video presentation

This assignment is very unique in that there is much freedom in topic choice and assesses communication skills through a video presentation. A five minute oral presentation with slides had to be recorded and submitted. The presentation was about analysing a time series of your choice. A mistake that many students made (including myself) was focusing too much on trying to find the "perfect fit" and describing every single analysis that took place. Should I have the chance to re-attempt the assignment, I would first give myself plenty of time to plan out the "presentation" aspect of the assignment, and take a rather holistic approach, honestly stating any limitations of my analysis as I would in a real interview.

End-of-semester exam

Although some exams reverted back to 2 hour exams, this exam was still an online 2-in-3 hour canvas exam, with a similar format to the mid-semester exam. Many of these questions had extensive use of R.. Benjamin also provided a detailed break-down of the mark distribution for the exam, which was quite helpful for allocating limited revision time across the different units. The datasets were released earlier than the exam time so they could be imported into R earlier without any troubles.

ACTL30007 Actuarial Modelling III [SM1]

Exemption status	CS2 <i>Risk Modelling and Survival Analysis</i> , in conjunction with ACTL30001 <i>Actuarial Modelling I</i> and ACTL30002 <i>Actuarial Modelling II</i> . Satisfactory performance across all three subjects is required.						
Lecturer(s)	Prof Benjamin Avanzi						
Weekly contact hours	2 × 1-hour lectures 1 × 1-hour tutorial						
Assessments	<table> <tr> <td>Individual assignment due in Week 6</td> <td>15%</td> </tr> <tr> <td>Individual assignment due in Week 12</td> <td>15%</td> </tr> <tr> <td>3-hour end-of-semester exam</td> <td>70%</td> </tr> </table>	Individual assignment due in Week 6	15%	Individual assignment due in Week 12	15%	3-hour end-of-semester exam	70%
Individual assignment due in Week 6	15%						
Individual assignment due in Week 12	15%						
3-hour end-of-semester exam	70%						
Textbook recommendation	<p>Multiple textbooks were recommended for different parts of the course (refer to Subject Content):</p> <ul style="list-style-type: none"> [MW]: Wuthrich, Mario V., <i>Non-Life Insurance: Mathematics & Statistics</i> (January 7, 2020) ✓ Recommended. Highly recommended as there are some proofs worth reading that are not discussed in the lectures. [FV]: Frees, E.W. and Valdez, E.A. (1998), <i>Understanding Relationships Using Copulas</i>, North American Actuarial Journal 2:1, pp. 1-25 ✗ Not recommended. Not necessary, but it is still a good resource [RS]: Shumway, Robert H., Stoffer, David S. (2017) <i>Time Series Analysis and Its Applications With R Examples</i>, Springer ✗ Not recommended. The lecture materials are comprehensive, so do not recommend. 						
Lecture capture	Full (both audio and video)						
Year and semester reviewed	2021 Semester 1						

Subject content

Essentially, the course is constituted of two main parts with 9 modules in total:

Part 1: Random Variables and Distributions for Risk Modelling

This part studies the aggregate sum SS of losses of a portfolio of contracts or a contract over a certain period. Three of the different ways that SS is modelled is taught in the first half of the subject:

- Weeks 1 – 2: Collective Risk Modelling [MW]
- Weeks 3 – 4: Individual Claim Size Modelling [MW]
- Week 6: Approximations for Compound Distributions [MW]

The next two selected topics focus on demonstrating how the copulas function represents the dependent structure of its joint function with impacts of the marginal distribution removed and how to analyse extreme values of a dataset using Generalised Extreme Value distribution and Generalised Pareto distribution, respectively.

- Week 7: Copulas [FV]
- Week 8: Extreme Value Theory [FV]

Part 2: Time Series

Time series refers to the systematic approach by which one goes about answering the mathematical and statistical questions posed by these time correlations. The primary objective is to develop mathematical models that provide plausible descriptions for sample data that are connected at adjacent time periods.

6. Week 9: Characteristics of Time Series [RS]
7. Week 10: Time Series Regression and Exploratory Data Analysis [RS]
8. Weeks 11–12: ARIMA Models [RS]

As remarkably emphasised by the lecturer, this subject requires a deep understanding of concepts. Rote learning and memorising concepts will not suffice. Therefore, I would recommend taking time after classes to digest concepts and make sure you can apply knowledge to not only tutorial exercises but also real-life problems that demonstrate your understanding. Consultation is always a good place to go if you find topics confusing.

Time series is the most interesting part for me in this subject. Being able to correctly analyse relationships between two time series and demonstrate potential stationarity of time series always make me satisfied.

Lectures

Benjamin goes through the lectures module by module and separates them by each subtopic. The lecture recordings are provided in a similar manner, which I personally found very helpful, as it made it much easier to navigate through different topics during revision. Whilst the slides were self-explanatory in terms of the theory taught, Benjamin's interpretation of the different diagrams/graphs and derivations were only available through the recordings.

Tutorials

Unlike your other actuarial tutorials, the questions for ACTL30007 are not provided in a weekly manner, but rather on a module basis. This structure confused many students at the beginning of the semester, but we, as all do, adapt. What surprised many of the students was the sheer amount of the questions included in a single week's tutorial. Tutors hence could not always go through the entire set of questions and instead selected a few questions to cover based on difficulty, importance and the students' needs. As if structured to compensate for the lack of time spent in tutorials covering the questions, the provided solutions were more detailed compared to other subjects. It also included full scripts of R codes for questions which required its usage.

Assessments

Assignments

The assignment, as mentioned previously, was arguably the most unique and least guided one I have experienced. Students were given a scenario and a large set of claims data, for which they were asked to observe, analyse, fit a model, and finally present the process and conclusion in a case analysis-style format as a 5-minute video interview. A mistake that many students made (including myself) was focusing too much on trying to find the "perfect fit" and describing every single analysis that took place. Should I have the chance to re-attempt the assignment, I would first give myself plenty of time to plan out the "presentation" aspect of the assignment, and take a rather holistic approach, honestly stating any limitations of my analysis as I would in a real interview.

End-of-semester exam

The exam, like many other online exams, was a 2-in-3-hour exam, taking the same format as the mid semester test. The final exam also encompassed questions requiring an extensive use of R, of which 18 out of 60 marks were designated to. Thankfully, Benjamin provided a detailed break-down of the mark distribution for the exam, which was quite helpful for allocating limited revision time across the different units. One difficulty many students faced was the multiple answer questions, (MAQ, not MCQ), where you are asked to choose correct answers out of 4 options, of which none or all could be correct. As every incorrect choice costs a mark, I suggest being very prudent when answering the MAQ and only selecting the options you are 100% sure of to reduce the risk of losing any marks. That is, however, unless you claim to be less risk-averse and wish to go for the chance of earning an extra mark at the cost of possibly losing one.

ACTL30008 Actuarial Analytics and Data I [SM1]

Exemption status	Not an exemption subject, but it is a prerequisite for ACTL40012 <i>Actuarial Analytics and Data II</i> (DAP <i>Data Analytics Principles</i>)	
Lecturer(s)	A Prof Xuyuan (Shane) Wu	
Weekly contact hours	2 × 1-hour lectures 1 × 1-hour computer lab	
Assessments	Group assignment due in Week 6	15%
	Group assignment due in Week 12	15%
	Standard online end-of-semester exam	70%
Textbook recommendation	James, G., Witten, D., Hastie, T. and Tibshirani, R., 2017. <i>An Introduction To Statistical Learning</i> . Springer. ✓ Recommended . Highly recommended due to the lecture notes and tutorial sheets being heavily dependent on the textbook and the textbook website. Thus, previewing before semester and using the textbook during semester can help you get a better understanding of this subject.	
Lecture capture	Full (both audio and video)	
Year and semester reviewed	2022 Semester 1	

Overall comments

This subject is a core subject for actuarial students in the third year even if it is not an exemption subject itself. It is an essential subject as it is a prerequisite for ACTL40012 (one exemption subject). The subject is heavily R-based, you need to write your own R codes to solve problems and understand them to help you explain in assignments and exam.

In terms of difficulty, it is on the easier side compared with AM1, AM2 and AM3. This subject is quite practical. The lectures mainly focus on 'what' and 'why', and the computer labs focuses on 'how'. I find the hardest part of the subject is to write your own R-code to apply a model when provided limited amount of code taught in class. We have to understand the codes to use them corresponding to correct situations. It starts off with the R fundamentals and gradually gets more in-depth. This subject is friendly to those who have coding background before.

Subject content

1. Overview of Statistical Learning

This unit introduces the concept of supervised learning (covers Unit 2 to Unit 7) and unsupervised learning (covers Unit 8). It is relatively easy, but make sure that you get a good grasp on concepts such as classification vs regression, bias-variance trade-off, training MSE and test MSE. These theories are applied extensively in later units.

2. Linear Regression

This unit builds on the knowledge of simple linear regression in MAST20005 and is an extension of linear regression.

3. Resampling methods

Resampling methods involve repeatedly drawing samples from a training set and refitting a model of interest on each sample to obtain additional information about the fitted model.

4. Subset Selection; shrinkage methods

Make sure you understand the algorithm of best subset selection, forward stepwise selection and backward stepwise selection, and also be able to implement them in R and interpret the results.

5. Non-linear models

This unit covers several more complex non-linear models. I would recommend that you spend some extra time to understand how each of these models work and also be able to implement each of them in R.

6. Classification methods

This unit shifts to the classification setting. It is important to understand which model suits different kinds of

datasets, their pros and cons, as well as whether there are any assumptions made behind the models, for example, the assumptions behind linear discriminant analysis (LDA).

7. **Tree based methods**

I found decision trees quite intuitive and fun to implement. Bagging, random forests and boosting are their more complex variations.

8. **Unsupervised learning methods**

This unit takes a different statistical learning approach from the previous chapters and explores situations where the response variable is not present, for example, identifying shoppers with a similar interest.

Lectures

The lectures mainly focus on the theoretical part which provides the basis of practical applications in the computer labs. I found Shane well-organised the structure of this subject so you could find it easy to tell which question belongs to which part. In lectures, Shane spends lots of time explaining the different models in detail to make students understand easily. In addition, most of the lecture contents are extracted from the textbook, so the textbook would help a lot when you still have questions after lectures.

Tutorials

The tutorials focus on the R applications. I would recommend attending all the tutorials and writing the R codes again after each tutorial by yourself as the assignments and final exams are heavily based on the practical part of R coding.

Assessments

Assignments

Both assignments are quite similar R-based group assignments. Tutorial material and the textbook are really good resources you can refer to. Generally speaking, decent marks can be achieved in both assignments.

End-of-semester exam

The final exam is a 3-hour standard online exam, and it is an open book exam. Thus, I recommend preparing a well-organised document with all codes provided in the lectures and computer labs before exam.

Since a large proportion of the marks comes from R-based questions, the lab material is just as important as the lecture content in the preparation of your final exam. It is not enough to just memorise the theory and code. A good way to tackle this subject would be to take a practical approach and try to understand how your model would perform in real life settings. So, I would highly recommend after each week's lectures and tutorials, you could write your codes again and ask yourself with some questions like that can I tackle the same problems with different codes? And how to explain that to someone?

ACTL30008 Actuarial Analytics and Data I [SM1]

Exemption status	Not an exemption subject, but it is a prerequisite for ACTL40012 <i>Actuarial Analytics and Data II</i> (DAP <i>Data Analytics Principles</i>)	
Lecturer(s)	A Prof Xuyuan (Shane) Wu	
Weekly contact hours	2 × 1-hour lectures 1 × 1-hour computer lab	
Assessments	Group assignment due in Week 6	15%
	Group assignment due in Week 12	15%
	Take-home end-of-semester exam	70%
Textbook recommendation	James, G., Witten, D., Hastie, T. and Tibshirani, R., 2017. <i>An Introduction To Statistical Learning</i> . Springer. ✓ Recommended . This textbook is essential as the subject is heavily based on the textbook and the resources provided on the textbook website. It is highly recommended to have a preview of this book before taking the course as you will get a clear and comprehensive overview of the subject.	
Lecture capture	Full (both audio and video)	
Year and semester reviewed	2021 Semester 1	

Overall comments

This subject introduces the basic statistical learning methods as well as their applications in R. It is not an exemption subject but it forms a solid foundation for the exemption subject ACTL40012.

In terms of difficulty, it is on the easier side compared with AM1, AM2 and AM3. I enjoyed the practical aspect of this subject. However, the practical aspects made it challenging for me, since it was easy to apply a model but much more difficult to understand that model and how it would suit or not suit a particular dataset.

This subject is heavily R based. It starts off with the R fundamentals and gradually gets more in-depth. As someone who has never taken a computing subject before, I was still quite comfortable with the use of R in this subject.

Subject content

9. Overview of Statistical Learning

This unit introduces the concept of supervised learning (covers Unit 2 to Unit 7) and unsupervised learning (covers Unit 8). It is relatively easy, but make sure that you get a good grasp on concepts such as classification vs regression, bias-variance trade-off, training MSE and test MSE. These theories are applied extensively in later units.

10. Linear Regression

This unit builds on the knowledge of simple linear regression in MAST20005 and is an extension of linear regression. The KNN method discussed in this unit was quite intuitive for me.

11. Resampling methods

Resampling methods involve repeatedly drawing samples from a training set and refitting a model of interest on each sample to obtain additional information about the fitted model.

12. Subset Selection; shrinkage methods

Make sure you understand the algorithm of best subset selection, forward stepwise selection and backward stepwise selection, and also be able to implement them in R and interpret the results.

13. Non-linear models

This unit covers several more complex non-linear models. I would recommend that you spend some extra time to understand how each of these models work and also be able to implement each of them in R.

14. Classification methods

This unit shifts to the classification setting. It is important to understand which model suits different kinds of

datasets, their pros and cons, as well as whether there are any assumptions made behind the models, for example, the assumptions behind linear discriminant analysis.

15. Tree based methods

I found decision trees quite intuitive and fun to implement. Bagging, random forests and boosting are their more complex variations.

16. Unsupervised learning methods

This unit takes a different statistical learning approach from the previous chapters and explores situations where the response variable is not present, for example, identifying shoppers with a similar interest. This unit was examinable as well.

Lectures

The lectures offer a detailed theoretical understanding of the various statistical learning methods, which forms the basis of practical applications in the computer labs. Shane explains the different models in detail, in a way that I found quite easy to comprehend. Additionally, the lecture material is extracted mostly from the textbook so the textbook offers more explanation. I also enjoyed the way that Shane structures the course in a very organised way and you will find it very easy to navigate on Canvas.

Tutorials

The tutorials focus on the R applications. I would highly recommend you to attend or watch all tutorials and implement the R code by yourself because both assignments and a large proportion of the final exam are based on coding in R.

Assessments

Assignments

Both assignments are quite similar R-based group assignments. Tutorial material and the textbook are really good resources you can refer to. Generally speaking, decent marks can be achieved in both assignments.

End-of-semester exam

Since a larger proportion of the marks comes from R-based questions, the lab material is just as important as the lecture content in the preparation of your final exam. Apart from the lectures and tutorials, I would recommend using the after class exercises that Shane organises as a good resource.

It is not enough to just memorise the theory and code. A good way to tackle this subject would be to take a practical approach and try to understand how your model would perform in real life settings. Some example considerations that should be made are (please note that they are not limited to the below):

- What type of problem are you presented with?
- Why would you choose a particular model? Are there any other candidate models?
- What are the fundamental assumptions behind your model?
- How would you analyse your model fit based on the R codes?
- What are the advantages and disadvantages of your model?
- How could you improve your model?

Subject Reviews: Graduate Subjects

Equivalent Graduate Subjects

Subjects offered as part of the 150 credit MC-COMACTS *Master of Commerce (Actuarial Science)* program and the 200 credit MC-ACTSCI *Master of Actuarial Science* program (as well as its variants) also 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 BH-COM *Honours* programs, we have listed graduate actuarial subjects with their undergraduate counterparts below.

Some of these graduate actuarial subjects will share the same lectures as their undergraduate counterparts, as in Table 1. Others will just contribute to the same exemption subject as their undergraduate counterparts (and hence have common content), as in Table 2. Whilst we continue to accumulate reviews from graduate-level actuarial subjects, the reviews for Masters subjects included in the *Actuarial Students' Society Subject Review* will also serve as an accurate reference of the content in the corresponding Honours subjects.

Please note the year and study period that each subject was reviewed in, as some subjects reviewed before 2019 will still refer to the old actuarial curriculum.

Table 1: 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
ACTL90014	Insurance Risk Models II	ACTL40003	Risk Theory II
ACTL90010	Actuarial Practice And Control I	ACTL40006	Actuarial Practice And Control I
ACTL90011	Actuarial Practice And Control II	ACTL40007	Actuarial Practice And Control II
ACTL90016	Actuarial Science Research Report	ACTL40001	Actuarial Studies Research Essay
ACTL90013	Actuarial Studies Projects	ACTL40010	Actuarial Studies Projects Part 1
		ACTL40011	Actuarial Studies Projects Part 2

Table 2: Graduate and undergraduate actuarial subjects with common CP exemption subjects

CP	Graduate subject		Undergraduate subject	
CM1	ACTL90001	Mathematics of Finance I	ACTL20001	Introductory Financial Mathematics
	ACTL90005	Life Contingencies	ACTL30003	Contingencies
CM2	ACTL90021	Topics in Insurance and Finance	ACTL20004	Topics in Actuarial Studies
	ACTL90002	Mathematics of Finance II	ACTL30006	Intermediate Financial Mathematics
	ACTL90003	Mathematics of Finance III	ACTL40004	Advanced Financial Mathematics
CS1	MAST20004	Probability	MAST20004	Probability
	MAST20005	Statistics	MAST20005	Statistics
	ACTL90008	Statistical Techniques in Insurance	ACTL30004	Actuarial Statistics
CS2	ACTL90006	Life Insurance Models I	ACTL30001	Actuarial Modelling I
	ACTL90007	Life Insurance Models II	ACTL30002	Actuarial Modelling II
	ACTL90020	General Insurance Modelling	ACTL30007	Actuarial Modelling III
CB1	ACTL90042	Accounting and Finance for Actuaries	ACCT10002	Introductory Financial Accounting
			FNCE10002	Principles of Finance
CB2	ACTL90022	Economics for Actuaries	ECON10004	Introductory Microeconomics
			ECON20001	Intermediate Macroeconomics
ACC	ACTL90010	Actuarial Practice And Control I	ACTL40006	Actuarial Practice And Control I
	ACTL90011	Actuarial Practice and Control II	ACTL40007	Actuarial Practice And Control II
DAP	ACTL90019	Data Analytics in Insurance II	ACTL40012	Actuarial Analytics and Data II

ACTL90001 Mathematics of Finance I [SM1]

Exemption status	CM1 <i>Actuarial Mathematics I</i> , in conjunction with ACTL90005 <i>ACTL90005</i> . Satisfactory performance across both subjects is required.						
Lecturer(s)	Dr Zhuo Jin						
Weekly contact hours	2 × 1-hour lectures 1 × 1-hour tutorial						
Assessments	<table> <tr> <td>Group Excel assignment, due in Week 11</td> <td>10%</td> </tr> <tr> <td>1-hour mid-semester test (topics 1-3) in Week 10</td> <td>20%</td> </tr> <tr> <td>2-hour end-of-semester exam</td> <td>70%</td> </tr> </table>	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%
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	<p>Fitzherbert, R., & Pitt, D. (2012). <i>Compound Interest and its applications</i>. Melbourne, AU: University of Melbourne Custom Book Centre.</p> <p>✓ Recommended. I highly recommend buying this textbook.</p>						
Lecture capture	Full (both audio and video)						
Year and semester reviewed	2017 Semester 1						

Overall 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.

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.

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

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

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 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.

Assessments

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.

ACTL90002 Mathematics of Finance II [SM2]

Exemption status	CM2 <i>Financial Engineering and Loss Reserving</i> , in conjunction with ACTL90003 <i>Mathematics of Finance III</i> and ACTL90021 <i>Topics in Insurance and Finance</i> . Satisfactory performance across all three subjects' end-of-semester exam is required.						
Lecturer(s)	Dr Jane Joshi						
Weekly contact hours	2 × 1-hour lectures 1 × 1-hour tutorial						
Assessments	<table style="width: 100%; border: none;"> <tr> <td style="width: 80%;">Individual assignment, due in Week 11</td> <td style="text-align: right;">10%</td> </tr> <tr> <td>1-hour mid-semester test (topics 1 – 6) in Week 10</td> <td style="text-align: right;">20%</td> </tr> <tr> <td>2-hour end-of-semester exam</td> <td style="text-align: right;">70%</td> </tr> </table>	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%
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	<p>Joshi, M. S., & Paterson, J. M. (2013). <i>Introduction to Mathematical Portfolio Theory</i>. Cambridge, UK: Cambridge University Press.</p> <p>This is a required textbook, however there are a number of copies in the library available for short term loans.</p>						
Lecture capture	Full (both audio and video)						
Year and semester reviewed	2017 Semester 2						

Overall 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.

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.

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.

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

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

Assignments

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.

Mid-semester exam

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.

End-of-semester 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.

ACTL90003 Mathematics of Finance III [SM1]

Exemption status	Students who perform at a suitably high level in both assignments and the end of semester exams in both this subject and ACTL30006 <i>Intermediate Financial Mathematics</i> will be recommended for exemption from the professional subject CM2 <i>Financial Engineering and Loss Reserving</i> .						
Lecturer(s)	Dr Zhou Jin						
Weekly contact hours	3 × 1-hour lectures						
Assessments	<table style="width: 100%; border: none;"> <tr> <td style="width: 70%;">Individual assignment due in Week 12</td> <td style="text-align: right;">20%</td> </tr> <tr> <td>Mid-semester exam (Week 6)</td> <td style="text-align: right;">10%</td> </tr> <tr> <td>3-hour open book end-of-semester exam</td> <td style="text-align: right;">70%</td> </tr> </table>	Individual assignment due in Week 12	20%	Mid-semester exam (Week 6)	10%	3-hour open book end-of-semester exam	70%
Individual assignment due in Week 12	20%						
Mid-semester exam (Week 6)	10%						
3-hour open book end-of-semester exam	70%						
Textbook recommendation	Joshi, M. S. (2008). <i>The Concepts and Practice of Mathematical Finance</i> (2nd ed.). Cambridge, UK: Cambridge University Press. X Not recommended.						
Lecture capture	Full (both audio and video)						
Year and semester reviewed	2021 Semester 1						

Overall comments

I found Mathematics of Finance III to be very challenging. When you break down the subject content, it may seem like there were not a lot of topics, the abstract nature of many concepts meant that you need to invest a lot more time in going through the content and completing practice questions. I also recommend that you try to find additional practice questions using the textbook and online resources, as there may not be enough relevant practice content for the final exam given in the subject alone.

Subject content

This subject focuses on the pricing of derivative securities and is very theoretical.

- Topics 1 – 2: Using the Binomial Model to Price Options
- Topics 3 – 5: Martingales, Brownian Motion and Stochastic Calculus
- Topics 6 – 8: The Deviation of Black-Scholes Model and the Greeks
- Topics 9 – 12: Interest Rate and Credit Models used to Price Derivatives

While the first few weeks of content may not seem to be too difficult, it gets progressively harder as stochastic calculus and the derivation of the Black-Scholes model is introduced. Retaining prior knowledge from ACTL30005 Models for Insurance and Finance or ACTL20003 Stochastics Techniques in Insurance will certainly be helpful since many of the content is covered in MoF3 in a lot less detail.

Lectures

In terms of time commitment, I had a three-hour lecture per week rather than a two-hour lecture that I had been used to during the bachelor's course. Twelve more lectures mean more time and energy needed to absorb knowledge, take notes and revise for the final exam. I should not forget to mention that we still have specimen questions included in the lecture notes for us to practice weekly.

Tutorials

As there is no tutorial, you might get less motivated to keep up with practice. I would recommend you to attempt them weekly as some questions can be difficult at first sight and you will regret it if all of them are left to SWOTVAC.

Assessments

Assignments

This subject has one assignment due at the end of the semester and it was released two weeks prior to the due date in my year. I felt that the assignment was easy and we were required to build an Excel spreadsheet for option pricing using a

hundred steps binomial tree and the Black-Scholes formula. Your life will be easier if you have completed the lecture materials up until week 8. That being said, you still need to be careful about it as it is quite heavily weighted (20%).

End-of-semester exam

The final exam consisted of 10 multiple choice questions and eight long answer questions. Admittedly, those long answer questions were much more complicated than the weekly specimen questions. It required a holistic understanding of the concepts of a class of methods or models. One tip I can give is that you might find the revision tutorial (the last lecture in the semester) to be very useful, as those are the key concepts and are highly likely to be examined in the final exam.

ACTL90004 Insurance Risk Models [SM1]

Exemption status	None						
Lecturer(s)	Dr Enrique Calderin Prof Shuanming Li						
Weekly contact hours	3 × 1-hour lectures						
Assessments	<table style="width: 100%; border: none;"> <tr> <td style="width: 80%;">1-hour mid-semester exam</td> <td style="text-align: right;">10%</td> </tr> <tr> <td>Individual assignment (problems)</td> <td style="text-align: right;">20%</td> </tr> <tr> <td>3-hour open book end-of-semester exam</td> <td style="text-align: right;">70%</td> </tr> </table>	1-hour mid-semester exam	10%	Individual assignment (problems)	20%	3-hour open book end-of-semester exam	70%
1-hour mid-semester exam	10%						
Individual assignment (problems)	20%						
3-hour open book end-of-semester exam	70%						
Textbook recommendation	<p>Dickson, D. C. M. (2005). <i>Insurance Risk and Ruin</i>. Cambridge, UK: Cambridge University Press.</p> <p>X Not recommended. The textbook is not essential. I personally did not use it, instead relied upon the questions sets that were provided by lecturers. These were based on each topic, some of which were from the textbook.</p>						
Lecture capture	Full (both audio and video)						
Year and semester reviewed	2022 Semester 1						

Overall comments

This subject is interesting in that a tangible connection between actuarial theory and insurance is a feature, with a big application being re-insurance, which features heavily in many of the units. Most of the units/topics were relatively new to me, including premium principles and stochastic ordering, so it was fascinating to be exposed to this. This subject has a heavy proof and theorem focus, in that most lectures will introduce theories, go through their proofs, followed by applications of these theories. The lectures and units are structured in a way that much of the content builds upon itself and is used later on in the subject. In particular, units 1 and 2 were important fundamentals which were picked up and used in later applications of subsequent units.

The professors were very knowledgeable and clear and were happy to take any questions in lectures or on the discussion forums. They also went out of their way to provide detailed solutions to problem sets and tutorial questions, so that even if the speed was quite quick in class, there was plenty of resources on the LMS to follow up on.

Subject content

This subject is split into 5 units:

1. Utility Theory

Introduction to how utility theory affects decision making, different types of utility functions, and insurance applications of utility theory including re-insurance. Introduces Jensen's inequality and risk aversion theory

2. Principles of Premium calculation

A crucial part of the subject, which introduces different types of insurance premium calculation methods, their properties and how they relate to re-insurance.

3. Optimal Reinsurance

Quite a repetitive but interesting unit, in which various theories/lemmas are proven to demonstrate the optimal type of reinsurance, including stop-loss, excess of loss and proportional reinsurance. Such proofs are quite similar to what is expected in assignments and the exam.

4. Ruin theory

In my experience, the most difficult part of the course. Extends on prior knowledge of ruin theory, by demonstrating how it is used in reinsurance. Provides greater insight into the actual application of ruin theory, utilising Poisson process. A bit disjointed in that we were also taught Laplace theorem, and it was initially unclear what the relation to ruin theory was.

5. Risk measures and stochastic ordering

Introduces risk measures such as value at risk, TVaR, conditional tail expectation. Then delves into their properties, and relationships between these risk measures. Stochastic ordering was an interesting part of the unit, where we were taught how to compare different risks. However, theories were quite abstract and took a while to grasp.

Personally, I found units 4 and 5 the most difficult to understand, they were also more theoretical than previous units and the connection to insurance was less material in my view.

Lectures

Units 1, 2 and 3 were taught by Prof Shuanming Li, the last 2 by Dr Calderin. Rather than weekly tutorials, after each unit, one lecture was dedicated as a tutorial session for the lecturer to go through the tutorial questions. For me, these seemed a little rushed, and I found myself having to watch the re-recordings to understand the tutorial questions fully. Overall, both lecturers were excellent, with both providing extra details and techniques which weren't necessarily covered in the lecture material but were useful when answering tutorial questions. These questions were supplemented with both typed and handwritten solutions which went into more detail, personally I found the typed solutions to be too vague, often struggling to see how solutions were constructed.

Assessments

Assignments

Consisted of 6 questions, each with multiple parts, to be completed individually and submitted in week 12. Contributed 20% of unit mark. The questions encapsulated all 5 units of the subject, which I found a little problematic as we hadn't learnt all of unit 5 by the time the assignment was released, which was needed for the assignment. Difficulty largely followed that of the tutorial questions and extra problem sheets, perhaps a little more complex. The use of programming languages such as R was recommended for one question, despite programming not being part of the subject or being taught. Assignment submission requirements were typed (or handwritten and scanned) solutions, along with any programming code.

Mid-semester test

This was held in week 7 for one hour (including reading time), was open book over the LMS, and was worth 10%. There was a mix of true/false questions, MCQ's and 3 short answer questions. Covered material included units 1, 2 and most of unit 3, with 2 practice papers being uploaded on the LMS. Answers were to be scanned and uploaded within the hour, a time limit that I personally found a little restricting.

End-of-semester exam

The exam was online on the LMS, open book, and 3 hours as well as 30 minutes uploading time and 15 minutes reading time. The exam consisted of around 15 multiple choice or true/false questions, and 8 short answer questions. Marks for these short answer questions weren't distributed evenly, reflecting that some questions were longer and more difficult than others. The open book allowance was very much welcomed, as there was a wealth of theorems, lemmas and proofs that were required to be utilised. This said, it wasn't necessarily the replication of these theorems and proofs that was assessed, rather the underlying techniques that were to be employed when answering questions. A few of these short answer questions required numerical calculations and decimal point answers, however a large proportion of questions were 'show that' questions, proofs or problems which needed you to suggest a possible solution.

The time limit should be ample time to complete the paper, although the luxury of panning through and re-studying notes and proofs would limit your capacity to answer all questions. Techniques suggested and covered through lectures and 'tutorials' were definitely applicable and helpful in the exam; however, it is certainly true that there is much assumed knowledge in terms of mathematical techniques that was used, as with most actuarial subjects.

ACTL90004 Insurance Risk Models [SM1]

Exemption status	None	
Lecturer(s)	A Prof Xueyuan (Shane) Wu	
Weekly contact hours	3 × 1-hour lectures	
Assessments	1-hour mid-semester exam in Week 7	20%
	Individual assignment due in Week 12	10%
	3-hour open book end-of-semester exam	70%
Textbook recommendation	Dickson, D. C. M. (2005). <i>Insurance Risk and Ruin</i> . Cambridge, UK: Cambridge University Press. Online version is available through the University of Melbourne's library website. A few questions in problem sheets will be from this text, and additional questions are useful in exam preparation. ✓ Recommended.	
Lecture capture	Full (both audio and video)	
Year and semester reviewed	2020 Semester 1	

Overall comments

This subject begins by introducing various probability distributions and their properties. It then provides various actuarial models for the purpose of estimating premiums and claim costs for insurers and reinsurers of non-life insurance products.

Throughout this subject, an adequate understanding of concepts such as the various distributions, conditioning and moments, MGFs and PGFs taught in MAST20004 Probability, as well as MLE, Bayesian Estimation from MAST20005 Statistics will be very useful.

Although not conceptually difficult, this subject is quite heavy in proofs and formula derivations. Rather than remembering every step of a proof, it is much more important to understand the techniques involved, as proofs are usually tested with slight variations. The calculations involved in this subject are not hard, however, it can be easy to make careless mistakes since it can be quite long and tedious.

To do well in the exam, it is important to be able to fully understand the question and apply the steps and techniques taught in lectures. Some questions may require a lot of personal judgement by asking you to select the most suitable method to apply rather than referring to a particular theory or formula; explanation of the rationale behind model set-ups may also be required in exam questions. Moreover, it is important to be familiar with the formula sheet and know some of the tricks that can be used to solve some otherwise very lengthy expectation calculations (mainly for Pareto and Gamma distributions).

I found this subject very interesting and well taught. It built on the probability and statistics concepts from earlier years in an insurance context. Shane taught the subject with clarity and dedication; he made sure to go through all the content even though the semester was cut short by a week. There were many practice questions with detailed solutions which greatly aided learning, and Shane provided even more clarification when needed. Overall, this was a subject I thoroughly enjoyed.

Subject content

The subject is well structured and split into 5 sections.

1. Distributions in Non-life Insurance

This section begins with a revision of some basic results of some important distributions within the subject. Later on, we will see how we can find expected payoffs for the insurer and reinsurer under excess of loss and proportional reinsurance agreements. A very crucial lemma for the multiplication of summations is introduced. This result will be used repeatedly in the subject for almost every recursion proof. Finally, the concepts of parameter estimation techniques and the goodness of fit test will be reviewed.

2. 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 and remembering the results for the Compound Poisson will be useful. Not only that, 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 enough how important it is to understand the techniques being used in the proofs, in particular, for Panjer's Recursion. 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. Although De Pril's Recursion was incredibly lengthy, the techniques used within it are definitely examinable. Finally, some estimation techniques using Compound Poisson caps out this section.

4. Introduction to Ruin Theory

In our context, Ruin theory says that if an insurer's capital follows a certain process, how long it would take them to go bankrupt. In this subject, only a brief introduction is made for this concept and more details will be involved in RT2. The main concept taught is to find upper bounds for this ruin probability.

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 soon be apparent that 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 may seem all over the place, but once you get a grasp of the bigger picture and the meaning of each formula, they can possibly be more intuitive than you first thought. Since the exam was open book, we were asked to use Excel to build the EBCT models and compute the results.

While many techniques will have been familiar from prior studies, there are some new and simple results that are important to know, such as the CDF of a gamma distribution, variations of the Pareto distribution, relationships between different distributions, and so on. Many proofs in this subject are examinable, hence having a good understanding on the techniques used is essential. Utilising first principles to find probabilities and other results is also quite useful when initially attempting a question.

Lectures

This subject involves 3 lectures per week. In addition, there were 6 'tutorials' throughout the semester which take place of a lecture, where Shane will go through questions on the tutorial sheet.

Overall, I really enjoyed Shane's teaching style. He was excellent in explaining every concept in a clear and logical way to ensure that everything makes sense to us. Shane also supplied us with handwritten notes for some of the long proofs and I found these to be very useful. These notes would then be uploaded onto a OneNote file, accessible to the class, which he shared at the start of the semester. I found the tutorial problems to be more difficult than the problem sheets and textbook questions, so they are probably the best practice materials for the exams.

Assessments

Assignments

The assignment was provided in Week 10 and due in Week 12. It contained only 2 questions, but they were expanded and explored in depth. A significant part of the assignment was on Ruin Theory and being able to calculate the adjustment coefficient in different reinsurance contracts. Most of the calculations were done in Excel, as required by Shane, forming a part of the required submission. The other part of the submission can be handwritten or typed into a Word document.

Mid-semester test

The MST was held online in Week 7. Unlike the undergraduate subjects, the MST counts towards exemption. We were given one and a half hour to complete and upload the test. The MST had 2 multiple choice questions and 3 short-answer questions. The questions were quite standard and focused on utilising techniques previously used in the tutorial and problem sheets.

End-of-semester exam

The exam was held online in 2020. Different to prior years, we were given three and a half hours to complete and upload our answers. Since this year's exam was open-book, proofs and questions where you could find from lecture slides or textbook were not directly tested, there was a stronger emphasis on understanding the underlying techniques. One practice paper was given; some questions were quite difficult and introduced new ways of applying textbook concepts, which was helpful for the actual exam. Overall, the exam was well written, especially since it was the first time this subject offered an open book exam. It had a good range/length of questions and, with sufficient revision, should all be doable. One point to note was that many questions required numerical solutions that may not seem 'pretty', i.e., having complicated equations, hence it is important to be both fast and accurate.

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.

Assessments

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.

ACTL90006 Life Insurance Models I [SM1]

Exemption status	CS2 <i>Risk Modelling and Survival Analysis</i> , in conjunction with ACTL90007 <i>Life Insurance Models II</i> and ACTL90020 <i>General Insurance Modelling</i> . Satisfactory performance across all three subjects is required.								
Lecturer(s)	Prof 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	<table> <tr> <td>Group assignment 1 due in Week 5</td> <td>10%</td> </tr> <tr> <td>Mid-semester test in Week 8</td> <td>20%</td> </tr> <tr> <td>Group assignment 2 due in Week 11</td> <td>10%</td> </tr> <tr> <td>End-of-semester exam</td> <td>60%</td> </tr> </table>	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%
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	<p>Dickson, D. C. M., Hardy, M. R., & Waters, H. R. (2013). <i>Actuarial Mathematics for Life Contingent Risks (2nd ed.)</i>. Cambridge, UK: Cambridge University Press.</p> <p>X Not recommended. 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.</p>								
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

1. Modelling mortality

This section introduces lifetimes and how to model these lifetimes. New concepts such as lifetime distribution, survival function and force of mortality, which underpin the remainder of this subject, are introduced. It is important to know the intuitive interpretation and the derivation of the equations.

2. Non-parametric methods

This section looked at applying data to model the lifetime distribution introduced in section 1. We start with an introduction to different types of censoring (when data is incomplete) and how to work with censored data then look at two different techniques to model a lifetime distribution.

3. Estimating Mortality Rates

This section looks at modelling the mortality rate rather than the lifetime distribution. We examine three techniques; the Two-State Markov model, the Binomial model and the Poisson model. 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, Balducci, Uniform Distribution).

4. 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.

5. The Poisson Process

This section is very proof heavy and focuses on different theorems associated with the Poisson Process. This review was previously published in the 2019 mid-year edition of the Actuarial Students' Society Subject Review. 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.

6. Simulation

This is the shortest section in the course and was covered in the last week of lectures. This topic covers simulating random variables from a discrete or continuous distribution using random drawings from a uniform distribution.

Lectures

The lectures for this subject were delivered purely online. 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.

Tutorials

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.

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.

Assessments

Assignments

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.

Mid-semester 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.

End-of-semester 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 II [SM2]

Exemption status	CS2 <i>Risk Modelling and Survival Analysis</i> , in conjunction with ACTL90006 <i>Life Insurance Models I</i> and ACTL90020 <i>General Insurance Modelling</i> . Satisfactory performance across all three subjects is required.	
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 II. Available from the bookstore. ✓ Recommended . Yes, I recommend getting this textbook, although all problems, tutorials and lecture material are also provided online as a PDF.	
Lecture capture	Full (both audio and video)	
Year and semester reviewed	2018 Semester 2	

Comments

I thought ACTL90007 Life Insurance Models II 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

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.

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.

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.

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.

Assessments

Assignments

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.

End-of-semester 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 [SM2]

Exemption status	CS1 <i>Actuarial Statistics I</i> , in conjunction with MAST20004 <i>Probability</i> and MAST20005 <i>Statistics</i> . Satisfactory performance across all three subjects is 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 ✓ Recommended . 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.

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.

Subject content

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.

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.

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.

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.

5. Outstanding Claims Provision

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

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.

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.

Assessments

Assignments

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.

Mid-semester 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.

End-of-semester 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 practice 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.

ACTL90010 Actuarial Practice and Control I [SM1]

Exemption status	ACC <i>Actuarial Control Cycle</i> , in conjunction with ACTL90011 <i>Actuarial Practice and Control II</i> . Satisfactory performance across both subjects' end-of-semester exam is required.
Lecturer(s)	Mr David Heath: FIAA Mr Donald Campbell: FIAA Mr Julian Gribble: FIAA
Weekly contact hours	2 × 2-hour lectures
Assessments	Group assignment 30% 3-hour open-book end-of-semester exam 70%
Textbook recommendation	<p>Bellis, C., Lyon, R., Klugman, S., & Shepherd, J. (Eds.). (2010). <i>Understanding Actuarial Management: the actuarial control cycle (2nd ed.)</i>. Sydney, AU: The Institute of Actuaries of Australia</p> <p>X Not recommended. The textbook is not essential. I personally did not use it, instead relying on background documents posted on the LMS which were really important, useful and examinable. This included background/fundamental knowledge on general/life insurance and superannuation, which were the building blocks upon which the lecture material expanded.</p>
Lecture capture	Full (both audio and video)
Year and semester reviewed	2022 Semester 1

Comments

David prefaced the subject – and consistently reminded us – that this was unlike any actuarial subject we would have studied previously. This subject focuses on largely the three lines of general insurance, life insurance and superannuation. It was a movement away from typical actuarial theories and formulas, instead placing us in the shoes of an actuarial consultant, and the considerations and decision making that come with it. David often stressed that in this subject, it was critical to take into consideration different stakeholder perspectives, something that I found to work well in assessments. It was also made apparent to us that there are different ways of viewing and answering a problem.

The content followed a very structured approach, in which the content was delivered covering seven learning objectives, based upon the syllabus of the Actuaries Institute. Throughout the lectures, these objectives would be referred back to, to make it easier for us to recognise the relevance of the content and structure our revision. Overall, this subject was a welcome change from the standard mathematic-heavy subjects studied prior and gave us an insight into the larger picture of life as an actuary, beyond the theory.

Subject content

As mentioned, the content covered seven learning objectives, based upon the actuary program of the Actuaries Institute:

1. **Discuss and apply an Actuarial Control Cycle in a variety of practical commercial situations**
2. **Relate the main features within the general environment to medium and long-term commercial decisions**
3. **Analyse the main features and risks of financial product and contracts, from the point of view of consumers and providers**
4. **Demonstrate an understanding of Enterprise Risk Management**
5. **Apply a risk assessment framework in a range of situations**
6. **Discuss and apply the process of product design**
7. **Understand how models are used to solve client problems**

We were often told that the subject was a balancing of these learning objectives, and that for our assessments, problems would consider an interaction of these objectives.

Personally, I found objectives 4 and 5 the most difficult to understand, however there were a couple of specialised lectures on these to help provide greater understanding, and this part of the content was in my opinion the least interesting. There was a large crossover in these 2 objectives with MULT90014 (Business Risk Management). The only quantitative/mathematical part of the content was one lecture on reinsurance (which did appear on the exam).

Lectures

Each lecturer focussed on different aspects of the unit given their different specialities, with David focussing on general insurance, Julian on life insurance and risk management and Donald on superannuation, although all three also covered more general concepts. David and Donald's lectures were delivered in person and online, and I would recommend attending on-campus as there were many interesting discussions to be had – something that David also stressed. I did find that some of the later lectures were a bit repetitive, but they expanded on topics covered earlier, and were to our benefit as they covered important topics that previous cohorts had struggled on. Julian's lectures were uploaded to the LMS and split into 5 or 6 parts, normally totalling between 1.5 – 2 hours per lecture.

I often found it difficult to take all my notes in a lecture, especially the more content-heavy ones, and there was rarely a break in the 2 hours lectures. I would normally re-watch the uploaded lectures to cover anything I missed. On the occasions which I couldn't attend campus, watching the uploaded recordings was a little tiresome, and I often found myself watching on 2x speed.

Each lecture was prefaced with which learning objective(s) was covered, and the lecturer would highlight this. While they tried to cover each learning objective in sequential order, it got a little bit confusing when moving from one objective to another, especially when a totally new topic was covered in the next lecture.

Assessments

Assignments

There was one assignment, which was a group assignment (3-4 members) worth 30% of the total grade. Groups were assigned for us. We were positioned as members within the actuarial division of a financial services company, which provided different products. We were tasked to work as a group and write a report which covered the risks faced for each product, following the 'control cycle' and 'enterprise risk management' approach which was taught.

A draft report (worth 30% of the assignment marks) was due within 3 weeks of the assignment release, and feedback was provided on this. The assignment was designed this way to allow us to incorporate this feedback into our final report, which was due around 3 weeks later. I personally found the feedback provided by David to be very helpful, as it highlighted when we were on the wrong path and where we were focussing too much/little attention.

End-of-semester exam

The exam was online on the LMS, open book, and 3 hours as well as 30 minutes uploading time. It was worth 70% of the total unit marks. During the revision lectures, we were given the exam format, as well as suggestions as to which questions would cover which topics. Exam technique was also thoroughly discussed, in which it was emphasised that answering the question directly would be rewarded rather than regurgitating notes, something that I found to be true with the marking scheme. Majority of the marks were awarded for covering the 'major points', and the remaining marks for embellishing your responses with other details. Thus, it was critical to answer every question on the exam and not fine-tune them unless time permitted, otherwise you could be missing out on achievable marks. Other recommended techniques included forming your own exam-style questions (using inspiration from the 2 practice papers provided) and awarding a mark scheme for these devised questions, then swapping with other students. Additionally, each question covered multiple learning objectives, so it was important to practise weaving these different objectives into your answers.

The 3 hours should be ample time to complete the paper, although the luxury of panning through notes and lecture slides would hamper you if the content wasn't thoroughly revised. I would say that over the course of the semester, the lectures helped prepare me for the exam in that my mindset and thought process when viewing a problem shifted by week 12.

ACTL90010 Actuarial Practice and Control I [SM1]

Exemption status	ACC <i>Actuarial Control Cycle</i> , in conjunction with ACTL90011 <i>Actuarial Practice and Control II</i> . Satisfactory performance across both subjects' end-of-semester exam is required.
Lecturer(s)	Mr David Heath: FIAA Mr Andrew Brown: FIAA Mr Donald Campbell: FIAA Mr Julian Gribble: FIAA
Weekly contact hours	2 × 2-hour lectures
Assessments	Group assignment 30% 3-hour open-book end-of-semester exam 70%
Textbook recommendation	Bellis, C., Lyon, R., Klugman, S., & Shepherd, J. (Eds.). (2010). <i>Understanding Actuarial Management: the actuarial control cycle (2nd ed.)</i> . Sydney, AU: The Institute of Actuaries of Australia X Not recommended. The textbook is not essential. However, there are also background documents provided on the LMS at the start of the semester. These provide students with some basic knowledge of the three industries mentioned above.
Lecture capture	Full (both audio and video)
Year and semester reviewed	2021 Semester 1

Comments

As David would frequently say, "This subject is unlike previous actuarial subjects that you would have completed." Actuarial Practice and Control I (APC1) takes a step back from all the formulas and theory taught throughout the actuarial major and instead teaches the core skills and considerations that actuaries make in their day-to-day lives. As a result, the subject generally takes a bigger picture view on stakeholders and analyses the need for the actuarial profession in the first place – to be able to consider the different needs of the consumers, providers and the environment whilst solving commercial problems.

The subject itself is somewhat similar to Organisational Behaviour. Many of the concepts taught are qualitative in nature, where there is no black or white answer. To do well in APC1, it is important to recognise that many of the different learning objectives are intertwined, and to account for this when answering questions. Case studies such as the *2019 Hayne Royal Commission*, *ASIC's report into Consumer Credit Insurance* and *APRA's 2018 prudential inquiry into CBA* are considered to provide examples of where some or more of the learning objectives are not properly considered in practice.

I found this subject a refreshing deviation from the normal derivations and numerical problem-solving by virtue of traditional actuarial subjects. Whilst three-hour lectures can be sometimes hard to sit through when pre-recorded, the content taught is interesting and trains a mindset of a professional actuary. APC1 also introduces many of the different products used in life and non-life insurance, and superannuation – this knowledge is helpful in understanding the industries when you inevitably have interviews and assessment centres.

Subject content

This subject, alongside its twin Actuarial Practice and Control II, includes 14 learning objectives that cover the Actuarial Control Cycle component of the Actuary Program syllabus. APC1 covers the first seven learning objectives, which tend to focus more on the professional aspects and knowledge required for the actuarial profession. This includes topics such as the products that actuaries work with; professionalism; regulation; risk assessment and management; and policy.

8. **Discuss and apply an Actuarial Control Cycle in a variety of practical commercial situations**
9. **Relate the main features within the general environment to medium and long-term commercial decisions**
10. **Analyse the main features and risks of financial product and contracts, from the point of view of consumers and providers**
11. **Demonstrate an understanding of Enterprise Risk Management**

12. Apply a risk assessment framework in a range of situations
13. Discuss and apply the process of product design
14. Understand how models are used to solve client problems

Lectures

This year's lectures were again taught online, with all of the lectures pre-recorded and uploaded onto Canvas. The traditional two-hour lectures were often split up into two or three separate recordings to help make them more manageable to go through. Each of the lectures would also be taught in 'blocks' of material, followed by exercises. This allowed for more natural breaks within each lecture and also made good practice for the exams.

As all the learning objectives can be applied in any industry, often two or three lectures would cover the same topic but from the point of view of a different industry. For example, David would provide a lecture on the features and risks of general insurance products and Donald would then have a lecture on the features and risks of products in superannuation. Whilst the material was generally taught in the order of the learning objectives, sometimes the order of upload can be confusing as one lecturer moves onto the next learning objective before the others – make sure you keep your notes separate for each learning objective!

Personally, I could not watch a whole lecture without getting distracted – a couple of hours of staring at a screen certainly does not do well for your eyes either! I eventually found that listening to the lectures as a podcast whilst travelling helped me stay a lot more engaged. Afterwards, I would go through the slides and properly take notes, which reinforced my learning as I was going through the material multiple times – something to try if just watching lectures does not work for you!

Assessments

Assignments

The group assignment mimicked a consulting project where students were required to advise a company about the impacts of mortality improvement and other risks that may be associated with it. In line with a '*control cycle*' approach, the deliverables included a draft report and client newsletter (10% of total marks) for which feedback was given. The feedback was then to be incorporated in a revised report and newsletter (20% of total marks).

Ultimately, the group assignment is a 'group' assignment. You are given around four weeks for the draft submission and around one and a half weeks for the final submission. As a result, starting early, setting achievable goals and having regular catch ups are key to having a good mark. This year, the assignment was due right after the mid-semester exams of the three other ACTL subjects, so setting deadlines for each stage of the report was essential to be able to finish before everyone goes to cram for their other subjects.

End-of-semester exam

The exam was delivered online through Canvas, where we were required to upload our typed solutions to answer each of the questions. As the exam was open-book in the past, the format and type of the exam did not change much from the practice papers. As mentioned in the overall comments, many of the learning objectives are connected. It is important to not only discuss an answer related to one objective, but also the relationships among each of the objectives. For example: How would the current environment affect how you design a product? (LO 2 & 6)

Three hours is very achievable for the exam if you know your content well. However, if you need to check your notes for each question, then you could be pressed for time. As a result, make sure that your notes are organised in a way for you to easily navigate and try to provide your answers in dot-points – this makes it easier for the marker to highlight which points to mark and also means you write less.

ACTL90011 Actuarial Practice and Control II [SM2]

Exemption status	ACC <i>Actuarial Control Cycle</i> , in conjunction with ACTL90010 <i>Actuarial Practice and Control I</i> . Satisfactory performance across both subjects' end-of-semester exam is required.	
Lecturer(s)	Mr David Heath: General Insurance – Subject Coordinator 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 5	15%
	Group assignment, due in Week 10	15%
	3-hour end-of-semester exam	70%
Textbook recommendation	Bellis, C., Lyon, R., Klugman, S., & Shepherd, J. (Eds.). (2010). <i>Understanding Actuarial Management: the actuarial control cycle</i> (2nd ed.). Sydney, AU: The Institute of Actuaries of Australia. X Not recommended. The textbook is not essential.	
Lecture capture	Full (both audio and video)	
Year and semester reviewed	2020 Semester 2	

Comments

Actuarial Practice and Control II is the continuation of the previous course, APC I. Both APC subjects form a bridge between the technical skills previously taught in Part I subjects and their applications in a business and commercial context. Therefore, they require, to a large extent, personal judgement and experience. Consequently, you should be thinking comprehensively and considering all potential implications when provided with specific cases.

APC II is slightly more technical and challenging compared to APC I, as it covers the techniques relevant in pricing products and calculating financial statement item and requires more industry knowledge together with a deeper understanding of the inter-relationships between the topics. In terms of succeeding in this subject, I found that studying in groups allowed me to best strengthen my understanding for each topic.

Subject content

1. Model

Selecting an appropriate model to solve actuarial problems. The majority of this topic has been studied in APC I, hence it is not explored in detail here.

2. Capital

Recognizing the importance of capital, which is defined as the “excess of assets over liabilities”, and the difference between regulatory and economic capital. We mainly discuss the purpose of capital, how capital is acquired, the quality of capital, and the calculations of regulatory capital requirements.

3. Liabilities

This includes liability valuation, different types of liabilities of an insurer, and relevant economic and financial assumptions used in the valuation process.

4. Pricing

This topic covers pricing of products and contracts. In particular, how premiums are calculated and what risks should be considered in the process of pricing.

5. Solvency

Measuring, reporting, and managing solvency of an insurance company, which is defined as the issue arising if insurers cannot meet the obligations as they fall due. We explored different types of solvencies in each actuarial industry and the corresponding solvency measures.

6. Profit

Measuring and reporting profits as they emerge. The Accounting Principle indicates that revenue is only recognised

when services are conducted. In terms of insurance companies, the emergence of profit is largely affected by liability valuation. We studied how profit emerges in each actuarial industry and ways to distribute or retain profit.

7. Monitoring & Managing the business

These two topics complete the control cycle, highlighting its nature as a feedback loop. It is crucial for actuaries to monitor assumptions, evaluate performance, and make appropriate adjustments according to either favourable or unfavourable outcomes.

Lectures

The lecturers cover the previously mentioned topics by industry. For example, we would often have a lecture on Superannuation Solvency, followed by Life Insurance Solvency and General Insurance Solvency. The lectures are very similar to those in APC I, except that there is an additional lecturer for Health Insurance — Andrew Gale. There are only two lectures on Health Insurance, and they are pretty much introductory compared to most of the lectures in the other industries.

Some of the lectures contain case studies, which can be used to test yourself on the ability to apply knowledge to real-life problems. However, solutions were not provided for all of the examples, and students were encouraged to post their answers in the discussion forum to share answers with other students and have meaningful discussions. I personally found it useful to compare my approaches and ways of thinking with other students to enrich my understanding of the subject content and identify any areas where I might need to improve on.

Assessments

Assignments

For the group assignment, we acted as consultants to a superannuation fund to provide actuarial advice and develop a detailed methodology for the valuation of the fund's long service leave liability. Final submissions required a draft report and a final report.

The assignment was designed to imitate the stages of an actual work project. The reports were written in an executive summary format and advice provided was required to touch on the relevant accounting and actuarial regulations. Since the methodology for valuing long service leave liability was not covered in lectures, my group spent days researching the correct valuation method used by insurers in Victoria. What also proved to be difficult in completing the assignment was explaining actuarial concepts and formulae in plain language to the intended client — an accountant with no actuarial background. Luckily, David provided us with detailed feedback after reading through our draft report and we were able to produce a much better final report.

Overall, the assignment was harder compared to the assignment in APC I, since the knowledge required to complete this assignment was not covered in detail in lectures. However, with a reasonable amount of research, this assignment could be managed and completed within time frames. It should also be noted that, in this semester, the assignment was not considered for Part II exemptions, but it will affect your subject score at the end of the semester.

End-of-semester exam

The final exam is open book, so we were allowed to bring annotated lecture slides, the textbook, and other notes. When preparing for the exam, it is important to consider the interconnection between the topics, since, in reality, they do not exist in isolation. All questions required short and long answers, which can be done either in paragraphs or dot point form, depending on the question. Some questions can require an email or letter type of answer format. One exam question typically covers content from more than one topic. Marks were allocated based on whether key points have been covered in the answer and sometimes bonus marks are given out for answers that showed a reasonable level of "thinking outside the box". Overall understanding of all the issues learned throughout the semester is required to be expressed effectively in the exam.

The exam was quite lengthy, although three hours sounds like a long time, it was definitely packed with writing (or in the case of an online exam, typing) from start to end. The specimen exam provided prior to the exam was both shorter and easier than the actual exam.

ACTL90013 Actuarial Studies Projects

Exemption status	None
Lecturer(s)	Dr Kevin Fergusson Dr Rui Zhou Dr Zhuo Jin
Weekly contact hours	3 × 1-hour workshop per project
Assessments	3,000-word report, due at the end of Week 8, Semester 1 25% 3,500-word report, due at the end of Week 4, Semester 2 35% 4,000-word report, due at the end of Week 12, Semester 2 40%
Textbook recommendation	None
Lecture capture	Full (both audio and video)
Year and semester reviewed	2020 All Year

Comments

Actuarial Studies Projects is one of the two research subjects offered by the faculty, the other being the year-long research thesis. For those that are interested in completing a PhD, it is recommended to do the research essay. However, the majority of the cohort had chosen to undertake this subject, as it appears to be less demanding. This subject consists of three eight-week long projects, and there is no exam at the end of the year.

Being successful in this subject, largely depends on how well you can manage time. The advice is obviously to complete as much as possible, as early as possible, because as the semester goes on, you usually get assignments from other subjects (they all come at once!), or it is getting closer to the exam period and you do not want to be stressed out. The project leaders were quite helpful and would respond to questions through emails, so do not wait for consultations which only occur every three weeks.

Another key factor for success was being innovative. Whilst not as important for the first project, the second and third projects had specific requirements of 'innovation' in the marking criteria, as such it is important to look beyond the readings provided by project leaders, and find ways to incorporate something different into your report.

Looking back, this was one of my favourite subjects in my postgraduate degree as it provided good practical experience and allowed me to apply knowledge learnt to a more 'real-life' situation. It is also something worthwhile to bring up in an interview, especially if you did not get the opportunity to work on large projects during your undergrad degree. For those who are not sure what subjects to take, I would strongly recommend giving this subject some consideration!

Subject content

1. Project 1

The first project was led by Dr Kevin Fergusson and focused on analysing investment strategies for the purposes of mitigating interest rate risks. Key concepts used were from second-year financial mathematics subjects, as well as the Black-Scholes option pricing model which was taught in Advanced Financial Mathematics in the first semester of my postgraduate studies. For this project, Excel was sufficient to complete all the tasks, though it may have been possible to utilise R packages as well. Kevin had provided a detailed template on how to tackle each part of the problem, as such the overall difficulty of the project was not too high.

2. Project 2

The second project was led by Dr Rui Zhou and focused on analysing longevity risk hedge products. Some parts of the projects were quite similar to Assignment 1 have done in Contingencies back in 2019. For this project, R was required, and it was a bit of a struggle at first since I have not used R in quite a while. Nevertheless, once I remembered how to write functions, the majority of the technical portion of the project was fairly straightforward. More research was required by this project compared to Project 1, as concepts such as basis risk were not taught in previous subjects. There were quite a few research papers online, which you could find by either googling or going through the sources of the required reading provided.

3. Project 3

The third project was led by Dr Zhuo Jin and focused on analysing a ten-stock portfolio, as well as related options contracts and the volatility index (VIX). This project requires knowledge taught in Zhuo's third year and fourth year financial mathematics subjects, including single and multi-factor models, mean-variance analysis, and options knowledge. Excel was more than capable of completing the technical analysis, as long as you know how to use the Regression tool and Solver. However, no readings were provided for this project, as such it was hard to tell what extent was required by Zhuo's standards. Overall, it did not feel like a particularly hard project, I was able to complete most of the project by watching several YouTube tutorials or explanatory videos, as well as going through just a few chapters of an eBook I have found from the university library website.

ACTL90014 Insurance Risk Models II [SM2]

Exemption status	None						
Lecturer(s)	Dr Enrique Calderin						
Weekly contact hours	3 × 1-hour lectures						
Assessments	<table> <tr> <td>Mid-semester exam in Week 7</td> <td>20%</td> </tr> <tr> <td>Individual assignment, due in Week 10</td> <td>10%</td> </tr> <tr> <td>3-hour end-of-semester exam</td> <td>70%</td> </tr> </table>	Mid-semester exam in Week 7	20%	Individual assignment, due in Week 10	10%	3-hour end-of-semester exam	70%
Mid-semester exam in Week 7	20%						
Individual assignment, due in Week 10	10%						
3-hour end-of-semester exam	70%						
Textbook recommendation	<p>Dickson, D. C. M. (2005). <i>Insurance Risk and Ruin</i>. Cambridge, UK: Cambridge University Press.</p> <p>X Not recommended. The textbook is not essential. However, it is extremely good at explaining some of the more complex concepts learnt. The exercises in the textbook are also useful for exam practices.</p>						
Lecture capture	Full (both audio and video)						
Year and semester reviewed	2020 Semester 2						

Comments

Insurance Risk Models II (IRM2) is an extension of ACTL90004 Insurance Risk Models (IRM) and has a similar level of difficulty. In comparison to IRM this subject concentrates more on the application of theories in practical insurance problems, instead of the models that insurance companies use. The concepts in this subject are a lot easier to understand than the abstract martingale theory of financial mathematics, however, the challenging part of this subject is to derive and solve complicated differential equations, which often requires solid computational skills. Nonetheless, if you have done well in IRM, this subject should not be too difficult.

Overall, IRM2 will not be as conceptually challenging as many of the subjects you will have taken in the past. Resultantly, many of your mistakes in calculations will be silly mistakes, so it is always useful to double-check your working before moving onto the next step. In the assessments, the questions that differentiate good and excellent students are likely to be those that require you to prove something or derive/solve complicated differential equations. To conquer those questions, you will need to find your best way to understand the proof of each theorem and be able to use them flexibly.

Honestly, if you have made it this far into your degree, it should not be too hard to do decently well in this subject. Best of luck!

Subject content

While this subject's precursor deals with models for a general insurance company, Insurance Risk Models II is concerned with the decisions made by the Insurer in a variety of contexts. The subject content is split into 4 distinct units.

1. Utility Theory

Utility Theory makes its return from ACTL30006 Intermediate Financial Mathematics. Calculations on the minimum and maximum premium amounts that should be charged for a given risk and utility function are the focus of this unit.

2. Premium Principles

Premium Principles explores a wide range of methods to calculate premiums by taking into account the moments of the corresponding distribution of risk.

3. Optimal Reinsurance Arrangements

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

4. Ruin Theory

Insurers are always at risk of becoming ruined (i.e., having no more money). Assuming that claims paid follow a compound-counting process, we are interested in the probability that this actually occurs over both finite and infinite

time intervals. Interestingly, the answer is not always 1 in the infinite time case. This topic derives *Lundberg's inequality for the probability of ruin* (which you may remember from IRM), covers finding the analytic solutions for the *ruin probabilities* (assuming certain distributions) using various calculus techniques and derives approximations to the ruin probability.

Lectures

Much like in IRM, slides were released in units (with the exception of Unit 4 which was released on a rolling basis). Enrique went through each slide, filling in any blank space with proofs and examples as they appeared. However, the pace of teaching was quite fast and sometimes it could be difficult to follow up on the lectures. Other than that, Enrique explained the theorems comprehensively using additional diagrams not found in the lecture notes; I found those diagrams very helpful to understand the theorems.

Occasionally, a tutorial was held in place of a lecture, in which Enrique worked through around 5 questions. In addition to tutorials, problem sheets were provided on LMS on a weekly basis for students to practice. Some of the questions in the problem sheets were closely related to knowledge taught in IRM (especially for $(a, b, 0)$ and $(a, b, 1)$ classes of distributions), hence you need to be very familiar with those concepts and formulas. Additionally, some of the questions referred to the textbook.

Assessments

Assignments

Questions in the assignment were primarily related to Unit 3, with one question on Unit 4. It was a very long assignment, with seven lengthy questions. Overall, none of the questions in the assignment were too difficult to answer. However, there was one question whose tasks were to conduct additional reading outside the scope of the subject to reproduce the proof from a specific paper; another question that required the use of RStudio to produce different diagrams.

Mid-semester exam

The mid-semester exam was held in Week 7, with a specimen mid-semester exam provided as practice beforehand. In 2020, the only units that were examinable were Units 1 and 2.

Due to the pandemic, all exams were taken remotely and therefore the exam structure was quite different from previous years. Questions in the exam ranged from theoretical questions to computational questions, and these were asked in forms of multiple-choice, short-answer and long-answer formats. The mid-semester exam was relatively easy, considering the strong set of mathematical tools that the undergraduate course should have equipped you with.

End-of-semester exam

There was a specimen final exam provided as a practice, although only a few of the practice questions were closely related to those in the real final exam. Due to the nature of an online exam, questions focused more on your understanding instead of your computational skills. For example, instead of asking students to derive a specific mathematical expression – like what would be normally asked, students were given the derivation and were asked to explain the derivation in detail.

There were three multiple-choice questions and eight long-answer questions in total, with more of a focus on Units 3 and 4. Many of the questions were quite approachable. Questions ranged from some calculation questions like: “*Should an individual purchase an insurance at a specific premium using utility theory*” and “*Prove that a reinsurance arrangement is optimal*”, to explanatory questions like: “*Explain intuitively what this mathematical expression means*”.

ACTL90018 General Insurance Practice [SM1]

Exemption status	None; this subject does not constitute any exemption requirement but is intended to prepare students for their <i>Fellowship Program</i> exams.	
Lecturer(s)	Mr David Heath Ms Lynda Young Mr Cameron Lucas	
Weekly contact hours	2 × 1.5-hour lectures	
Assessments	Group assignment due in Week 12	30%
	3-hour end-of-semester exam	70%
Textbook recommendation	Hart, D., Buchanan, B., Howe, B. (2007). <i>Actuarial Practice of General Insurance</i> (7th Ed). Sydney, AU: The Institute of Actuaries of Australia. X Not recommended. 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 Master 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.

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!

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.

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:

1. 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.

2. 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.

3. Reserving (4 lectures)

Balance sheets for an insurer are quite interesting. Recall that an asset/liability is an expected cash inflow/outflow from an entity arising from events that have occurred in the past. For an insurer, reserves are created for claims that have been made in the past, but these amounts are unknown: we don't know if an injured person will need \$1,000 to pay for medical fees in the future or \$100,000! Touching upon the accounting principles of revenue recognition, This review was previously published in the 2018 mid-year edition of the Actuarial Students' Society Subject Review. 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.

4. 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).

5. 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!

Assessments

Assignments

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.

ACTL90019 Data Analytics in Insurance II [SM2]

Exemption status	DAP <i>Data Analytics Principles</i> , Satisfactory performance in this subjects' end-of-semester exam is required.
Lecturer(s)	Dr Rui Zhou
Weekly contact hours	2 × 1-hour lectures 1 × 1-hour tutorial
Assessments	2 × group presentations, due in Week 8 and Week 12 30% 4-hour open-book end-of-semester exam 70%
Textbook recommendation	James, G., Witten, D. Hastie, T., & Tibshirani, R. (2013). <i>An Introduction to Statistical Learning with Applications in R</i> . ✓ Recommended . The textbook is essential, as it provides in-depth explanations of the intuition behind many concepts taught in the lectures.
Lecture capture	Full (both audio and video)
Year and semester reviewed	2020 Semester 2

Comments

This is a new fourth-year subject and is one of the Actuary Program exemption subjects. It builds on the concepts taught in ACTL30008 Actuarial Analytics and Data I, going through almost identical topics, and focuses on many practical examples throughout lectures and tutorials. While technical skills in R is essential, the subject also requires strong analytical skills. Being able to interpret results is key to learning the content well.

The subject was quite enjoyable, as I really enjoy Rui's style of lectures, and the content taught throughout this subject does seem more practical than many others in the past. To future students, I would encourage everyone to not just aim to master the R programming language, but also work on interpreting results, as you definitely need the combination of both to do well in this subject.

Subject content

The subject covers the following topics:

1. Regression & Classification

Linear regression is a useful tool for predicting a quantitative response, whereas predicting a qualitative response for an observation can be referred to as classifying that observation since it involves assigning the observation to a category, or class.

2. Resampling

Resampling methods involve repeatedly drawing samples from a training set and refitting a model of interest on each sample to obtain additional information about the fitted model.

3. GLM

Generalized linear models can be used to model both frequency and severity from claim data

4. Tree-Based Methods

Tree-based methods involve stratifying or segmenting the predictor space into a number of regions, methods include bagging, random forest and gradient boosting.

5. Neural Network

The central idea of neural network is to extract linear combinations of the inputs as derived features, and then model the target as a nonlinear function of these features

Lectures

Rui releases lecture slides and recordings at the beginning of each week. The lectures are quite often split between theoretical content and practical demonstrations on R. Most of the theoretical content is directly extracted from the textbook, with some level of restructuring. Generally, the theory covers the concepts used in the practical example that follows, where Rui applies these concepts to a dataset of her liking. Personally, I really enjoyed the lecture structure, as Rui's demonstration on R certainly reinforced the theory that precedes it, giving students a better grasp on how textbook knowledge works in real life. The lecture slides are not necessarily considered comprehensive, as only brief descriptions are provided. Therefore, reading the textbook is recommended in order to get a deeper understanding of the intuition behind the concepts.

Tutorials

The tutorials focused on R applications of the concepts taught in lectures. I personally found the tutorials useful, as the relevant techniques demonstrated by Rui were very helpful when it came to completing assignments or the exam. Detailed solutions are uploaded as well, though it goes without saying that listening to how Rui interprets the outputs is extremely beneficial in improving your own understanding.

Assessments

Assignments

The only in-semester assessment was the group assignment. Students formed themselves into groups of three, chose any dataset of interest and utilised data analytics techniques taught throughout the semester to analyse the dataset. Groups were judged on two presentations. The first covered mainly introductory content, outlining the objective of the analysis, and conducting exploratory data analysis. The second focused more on the methodologies used for the analysis and how groups responded to any issues they faced. Overall, this assignment was a great way to summarise the majority of the course content, as you need to have a thorough understanding of the advantages and disadvantages of different models and methods.

End-of-semester exam

The end of semester exam was conducted using R, lasting for four hours. While this may seem like a long time, do not be fooled. The exam was still packed with many questions, and most people ran out of time. The exam was split into two sections (six questions each). The first section was spent answering general theory questions, whilst the second was spent analysing a specific dataset. The marks were not allocated proportionally, however, as the second section of the exam was worth about double the marks of the first half, so do spend time wisely. I would say that most of the content did come from lectures and tutorials, but you definitely need to be very familiar with both coding and interpretation to complete all questions in a sufficient time manner.

Subject Reviews: Breadth and Elective Subjects

BLAW10001 Principles of Business Law [SM1]

Lecturer(s)	Dr Tanya Josev A Prof Arlen Duke
Weekly contact hours	2-hour pre-recorded lecture Optional discussion boards, drop-in zoom consultations
Assessments	2 × 1-hour open-book Canvas multiple-choice quizzes 20% Open-book Zoom supervised end-of-semester exam 80%
Textbook recommendation	Michael Lambiris, Laura Griffin, <i>First Principles of Business Law</i> (Thomson Reuters, 11th, 2020 edition).
Lecture capture	Full (both audio and video)
Year and semester reviewed	2022 Semester 1

Comments

Principles of Business Law (BLAW10001) is a breath of fresh air as compared to actuarial subjects that you have undertaken. As all materials are conducted online, you will be able to go at your own pace. However, it has a different format as compared to commerce subjects and is pretty content-heavy. Personally, I found the subject very interesting and was able to score well with some effort.

Subject content

Introduction

1. The nature and function of law

This topic introduces different types of law (contract law, agency law, etc.) and who has the ability to “make” law.

2. Legislation as a source of law

This topic explores the legislative process in great detail and the different sources of law in Australia.

3. Role of the courts in law-making

This topic outlines the civil trial process, explores case-law as a source of law, the origins of common law and equity, and how to interpret case-law by analogy. There are a couple of important law jargon introduced such as ‘stare decisis’ and ‘ratio decidendi’.

Contract law topics:

4. Contract Formation

This topic gives an overview of contract law, the importance of contract law, the objective approach, executory/bilateral versus unilateral contracts, capacity to contract, the formation requirements of a contract, privity of contract, and estoppel.

5. Terms of a Contract

This topic presents the terms of a contract which are essential in deciding whether a contract has been breached. It also explores the freedom of contract, how terms are final once the contract is formed, how express terms become part of a contract, and various implied terms in a contract.

6. Discharge of Contractual Obligation

This topic introduces different levels of performance and different types of breach. In addition, the concepts of performance of divisible contract and frustration are introduced.

7. Remedies for Breach of Contract

This topic explores the various remedies that are available for breach of contract (common law remedies, equitable remedies, statutory remedies, and agreed remedies).

8. Circumstances that may invalidate legal transactions

The last topic for contract law discusses different situations in which contracts can be defaulted. These are duress, undue influence, mistake, unconscionable dealing, and illegality.

Other topics

9. Consumer Law

This topic addresses the need for consumer protection law (Australian Consumer Law) in the event of misleading

conduct, unconscionable conduct, unfair contract terms, consumer guarantees, unfair business practices, and unsolicited consumer agreements.

10. Tort Law

This topic explores tort law which concerned with wrongful conduct by one person that causes harm to another. In Principles of business law, we explore only tort of negligence in great detail. This involves learning elements to establish negligence, and remedies if negligence had been deemed existent.

11. Agency Law (not examinable)

Lectures

Tania and Arlen broke down the weekly lectures into shorter videos covering each sub-topic. The number of videos will vary depending on the number of sub-topics. These shorter videos allow greater flexibility and are easier to comprehend. At the end of every topic, there is a case study video that covers a hypothetical situation. In this case study, I was able to see how different concepts are applied. In addition, the format of the case studies, as well as different cases presented in the lectures, is similar to the short answer questions in the exam.

Workshops

A sample paper will be released before every test in B-law. The workshops involve discussing questions from this sample paper. Personally, I did not attend any of the workshops as recordings of the workshops were released online. These recordings separated different questions by topics.

I suggest attempting the sample papers first to see which areas you need to improve or read more on. As the recordings were lengthy in nature, I suggest reviewing questions/topics that you are unsure of only.

Assessments

Multiple-choice quizzes

There were two online multiple-choice quizzes consisting of 40 questions each. These open-book tests have a 3-day window but have to be completed in an hour in one sitting.

The first test covers topics 1-3 and the second test covers topics 4-8. One of the study methods that was very useful for me was to make summary notes before every test. These summary notes include everything in the lecture slides, key points mentioned in the lecture recordings, as well as supplementary notes from the textbook. These will be very helpful as you have control F on your laptop which enables you to search for key points/topics with ease.

End-of-semester exam

The end-of-semester exam is usually held in the third week of examinations. The format of the exam is 40 multiple choice questions (60 marks, worth 1.5 each) and short-answer questions (20 marks, new exam format in 2022). The time frame of the examination is 90 minutes.

Similar to the multiple-choice quizzes, there is only one sample practice paper made available. However, you are able to search for past sample papers online which I found to be very good practice. Again, I would like to emphasize that summary notes (covering all chapters) is your best friend during the exam! Be mindful of the time when completing the exam as short answer questions might be time-consuming. I suggest aiming to complete the short answer questions in 30 minutes but complete the multiple-choice questions first as they are worth more marks.

If you are worried about not having enough time to read the textbook, worry not as the majority of the questions tested us on the understanding of the content itself, instead of our knowledge of the textbook. Personally, I only read chapters that I was least confident in.

BLAW10001 Principles of Business Law [SM1]

Lecturer(s)	Dr Tanya Josev	
Weekly contact hours	1 × 2-hour lectures 1 × 1-hour workshop in Weeks 3, 8 and 12 (optional)	
Assessments	2 × multiple-choice quizzes in Weeks 4 and 9	20%
	1.5-hour end-of-semester exam	80%
Textbook recommendation	Lambiris and Griffin. (2017). <i>First Principles of Business Law</i> .	
Lecture capture	Full (both audio and video)	
Year and semester reviewed	2020 Semester 1	

Comments

Principles of Business Law should have a considerably less workload compared to your other actuarial subjects, giving you more time to focus on them. Through this subject, I got an understanding of what it is to actually study law and learnt about important real-life scenarios which could potentially affect me when it comes to contract law. I highly recommend this subject if you are keen on getting a taste of what learning law is like.

Subject content

1. The nature and function of law

This section introduced different types of law and gave a summary of who makes law.

2. Legislation as a source of law

This was the first content-heavy week in terms of material. It talked about the legislative process in significant detail and introduced the legislatures in each state of Australia.

3. Role of the courts in law-making

We were presented with the basic procedure of a civil case and made familiar with important law jargon such as Stare Decisis and Ratio Decidendi. I'd suggest understanding these two concepts thoroughly, as they were tested in both the first quiz and in the final exam. It was also in this chapter where different cases were first introduced.

4. Contract Formation

This subject heavily focuses on contract law and devoted 5 weeks of learning to it. Here, we were presented with what a contract is and what it means for a contract to be created and enforced in law.

5. Terms of a Contract

Here, we were presented with some terms that later become essential when deciding if a contract has been breached or not. Classifications such as Conditions and Warranties is paramount to your understanding this section, particularly the hypothetical tests to classify each term. The latter half of this topic touches upon the key sections of the Goods Act and how they protect consumers.

6. Discharge of Contractual Obligation

We were introduced to different levels of performance and the different kinds of breaches. Understanding the terms learnt in the previous topic is key to fully comprehending this topic's content.

7. Remedies for Breach of Contract

We were presented with different remedies that are available for different degrees of contract breaches.

8. Circumstances that may invalidate legal transactions

This was the last week of contract law and discussed in depth the situations in which contracts can be defaulted. This was possible via proving that vitiating factors existed, such as: duress, undue influence, mistake, unconscionable dealing, misinterpretation and illegality. Proving these existences required us to implement hypothetical tests and compare these to the outcomes to past cases that had been decided upon.

9. Consumer Protection

This week discussed important sections of the Australian Consumer Law and how it protects consumers. A key section is classifying who a consumer is and how they are defined. This is important because different sections of the Australian Consumer Law state whether it applies to only consumers or anyone.

10. Tort Law

A brief summary of the different types of tort law was introduced before learning in detail the tort of negligence. We were presented with the necessary elements to establish negligence, and later discussed remedies if negligence had been deemed existent.

Lectures

Tanya broke down 2-hour lectures into 4–5 smaller videos that were much easier to digest and also gave me the freedom to take breaks in between the lectures. These videos were again broken down into topics, making the content much easier to comprehend. Moreover, what I really enjoyed about Tanya's lectures was the last video in each of her lecture, where she discusses a hypothetical situation. Here, we applied theory and concepts learnt in the former sections of the lecture to new hypothetical situations.

Workshops

Before each of the online quizzes and the final semester exam, a sample paper was released. Workshops would involve discussions on the questions from this paper. Similar to the lectures, workshop videos were broken down and separated the questions by topics. This made it easier for students to keep track of the content and identify sections they struggle with. I'd suggest attempting the sample papers before watching the workshop videos, because the questions are much trickier than you think and the explanation then helps to clarify any doubts.

Assessments

Multiple-choice quizzes

There were two online multiple-choice tests consisting of 40 questions each and were to be completed in an hour in one sitting. Each test makes up 10% of your final grade and were open book, so I suggest writing your notes and keeping up with the lectures accordingly.

The first assessment tested our knowledge of the first three weeks. Since this was open-book, I went into this quiz with minimal preparation and assumed that the lecture slides were sufficient. However, there was a lot of details that were explained in the lectures instead of being written in the slides. In retrospect, as the lecturer mainly tested us on her explanations, noting down everything important would have proved as a more effective studying technique. Having noticed this, I found the second assessment much easier than the first, as I prepared more for it with more concrete notes.

End-of-semester exam

There wasn't as much practice available for this subject compared to your normal math subjects, so I'd recommend becoming familiar with its contents. I found the end-of-semester exam much harder than the sample paper and the assessments, so don't take this subject lightly just because it's open-book and multiple choice. Tanya and the teaching coordinators emphasised how this subject isn't just about memorising; in my opinion if you are someone who can easily memorise content, you will have an added advantage over other students. That said, the majority of the questions tested us on the understanding of the content itself, instead of our knowledge of the textbook.

COMP10001 Foundations of Computing [SM1]

Lecturer(s)	Dr Chris Ewin Dr Nic Geard Dr Kat Vylomova										
Weekly contact hours	3 × 1-hour lectures 1 × 1-hour workshop										
Assessments	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 80%;">Weekly Grok worksheets</td> <td style="text-align: right;">10%</td> </tr> <tr> <td>1-hour mid-semester test</td> <td style="text-align: right;">10%</td> </tr> <tr> <td>Individual project 1</td> <td style="text-align: right;">15%</td> </tr> <tr> <td>Individual project 2</td> <td style="text-align: right;">15%</td> </tr> <tr> <td>End-of-semester exam</td> <td style="text-align: right;">50%</td> </tr> </table>	Weekly Grok worksheets	10%	1-hour mid-semester test	10%	Individual project 1	15%	Individual project 2	15%	End-of-semester exam	50%
Weekly Grok worksheets	10%										
1-hour mid-semester test	10%										
Individual project 1	15%										
Individual project 2	15%										
End-of-semester exam	50%										
Textbook recommendation	None										
Lecture capture	Full (both audio and video)										
Year and semester reviewed	2022 Semester 1										

Comments

Foundations of Computing is an introductory programming subject on Python, assuming no prior programming or computing experience and a popular breadth for actuarial students. I found this subject very practical and enjoyable, although it may not have the smoothest learning curve at times. I highly recommend it as a breadth for actuarial students who prefer an interesting and useful subject over a WAM booster.

There is a hurdle requirement of 30/60 in total for the mid semester and end of semester exams

Subject content

1. Introduction to Computing and Grok (Week 1)

Introducing the logic of programming and the online platform Grok, where all worksheets, assignments and exams will be completed

2. Python (Weeks 2 – 12)

The subject uses Python exclusively. Concepts such as functions, while loops and for loops, data types such as lists, floats, dictionaries, tuples are covered. The aforementioned topics make up the mid semester exam. The content following that included how to open, read, edit and save CSV and text files. The last topic was a special application of functions: recursion.

Lectures

The 3 weekly lectures involve the professors explaining new programming concepts while demonstrating their applications using sample code. Since programming is almost purely application-based, the examples were certainly very helpful in aiding one's understanding. In fact, if the theoretical explanations feel confusing or abstract at times, it's worth simply skipping to the examples to see how the code works in action.

Tutorials and workshops

All tutorials went fully online on Zoom starting from week 3, with a tutorial recording being made available on Canvas each week. In the tutorial recordings, the tutor would go through each of the tutorial questions and provide explanations for the solutions. Even though students would not be able to answer the questions or interact with the tutor during such recordings, you could still participate in any of the live Zoom tutorials. I did not attend the live tutorials and simply relied on the recordings and the solution sheets as I found it more convenient to go through them at my own pace.

Assessments

Grok worksheets

The Grok Worksheets are the bread and butter of the subject and essentially condense the lecture material into small sections that are a great help for revision. They also include several questions that offer quality practice for the students, due

weekly and contributing to 10% of the subject's overall grade. A few individual worksheets in the latter half of the semester are non-compulsory and offer 'bonus marks' that can make up for marks students may lose in other sections of the subject.

Assignments (projects)

Project 1 contained 3 questions while Project 2 contained 5. All questions were much more advanced than those in the Grok Worksheets. I and other very high-achieving students may have sometimes spent several days trying to crack a single one of them, so it's certainly not something to be left till the last minute! It needs not only patience, but a bit of creativity as well. I would suggest planning out the solutions for each question in simple words before translating it into code.

Mid-semester test

The mid semester exam was 1-hour long and run on Grok. The question types were quite different to the assignments and worksheets, and similar to that of the final exam. The practice sample exam provided was excellent study material and gives an accurate representation of what the real thing looks like. I recommend practicing how to produce and interpret code under stringent time conditions, and of course being familiar with the content prior to reading CSV files.

End-of-semester exam

The 3-hour final exam was worth 50% and contained 9 questions for a total of 120 marks. The style was similar to the mid semester exam, in fact many questions were of the same type. Personally, I found the timing to be quite tough and the overall difficulty to be higher. This was not necessarily due to the questions themselves being harder, but rather that the later topics in the second half of the semester elevated the difficulty. I would recommend the same revision technique as the mid semester test. Remember you need a combined 30 out of 60% across the two exams as a hurdle!

COMP10001 Foundations of Computing [SM1]

Lecturer(s)	Prof Tim Baldwin Dr Nic Geard Ms Marion Zalk										
Weekly contact hours	3 × 1-hour lectures 1 × 1-hour tutorial 1 × 1-hour workshop										
Assessments	<table> <tr> <td>Weekly Grok worksheets</td> <td>10%</td> </tr> <tr> <td>40-minute Grok-based mid-semester test in Week 8</td> <td>10%</td> </tr> <tr> <td>Individual project 1, due in Week 9</td> <td>15%</td> </tr> <tr> <td>Individual project 2, due in Week 12</td> <td>15%</td> </tr> <tr> <td>2-hour and 15-minutes end-of-semester exam</td> <td>50%</td> </tr> </table>	Weekly Grok worksheets	10%	40-minute Grok-based mid-semester test in Week 8	10%	Individual project 1, due in Week 9	15%	Individual project 2, due in Week 12	15%	2-hour and 15-minutes end-of-semester exam	50%
Weekly Grok worksheets	10%										
40-minute Grok-based mid-semester test in Week 8	10%										
Individual project 1, due in Week 9	15%										
Individual project 2, due in Week 12	15%										
2-hour and 15-minutes end-of-semester exam	50%										
Textbook recommendation	None										
Lecture capture	Full (both audio and video)										
Year and semester reviewed	2020 Semester 1										

Comments

COMP10001 Foundations of Computing (FoC) is an introductory subject on programming and the basics of algorithmic thinking, taught with Python 3. As the subject does not expect students to have prior knowledge in computing, everything is taught from scratch with the help of a highly interactive online programming platform, Grok. Therefore, for those of you who are completely unfamiliar with computing but are interested in gaining some basic knowledge in it, do not hesitate to take up this subject as you will be guided through the fundamentals step by step.

A considerable amount of effort and time is required to score well in the subject. However, I believe it is engaging and enjoyable enough for most of you to put in the effort voluntarily and is definitely a breadth subject worth taking! The coolest part of the subject is that, if you manage to complete all the required worksheets or the projects, bonus marks are rewarded to those who also successfully completes the bonus worksheets and questions. This gives us a chance to compensate for any lost marks during our assessments.

There is a hurdle requirement of 30/60 marks across the mid-semester test and end-of-semester exam.

Subject content

- 1. Introduction to Computing and Grok; Programming Basics (Week 1)**
Introducing the building blocks of programming
- 2. Python Fundamentals (Weeks 2 – 9)**
Covers the Python basics such as functions, methods and loops and different data types like lists, tuples and dictionaries. Later, we were introduced to the different bug types and the general approach to debugging. Then, we were taught how to write, read and open normal and CSV files using input/output operations. Recursion was the last topic being covered under the Python Fundamentals.
- 3. HTML; Algorithm Fundamentals and Families (Week 10)**
Introduces the simple mark-up language of HTML, allowing us to form lists and tables. Also covers the basics and the different approaches of algorithms.
- 4. Computational Counting; Digital Representation; Fairness and Ethics (Week 11)**
Covers the conversion between decimal, binary, octal and hexadecimal numbers. Also discusses about different types of text document encodings. The last topic, Fairness and Ethics, talks about the professional conduct and dual use of computing.

Lectures

Initially, the on-campus lectures were split into two streams, before transitioning to recorded online lectures in week 4. Lecture slides were posted the night before their corresponding online lectures were uploaded on Canvas.

Lectures in the first eight weeks of the semester were delivered by Tim, mainly covering topics related to the fundamental concepts and building blocks in Python to construct simple programs. Tim would split the lecture into 2 recordings, the first one being announcements and the second being the lecture content itself. Personally, lectures in these weeks were easy to follow coupled with the weekly worksheets on Grok.

For weeks 9 and 10, lectures were delivered by Nic, covering contents such as CSV files, recursion and the basics of HTML. Similar to Tim, Nic would also split the lecture into several recordings, each corresponding to a specific topic covered in that lecture. I found recursion to be the most challenging topic in the subject as the concept of breaking the problem into the same problem with smaller input was quite difficult to grasp. Fortunately, during the exam, instead of asking you to write a code using recursion, they would only test on our understanding of the concept behind it.

During the lecture, both Tim and Nic would typically start off by briefly introducing and explaining the concepts before discussing the in-class exercises. It is recommended that you pause the lecture recording and attempt the exercises on Grok yourself before proceeding to watch the solution suggested by the lecturers.

Tutorials and workshops

All tutorials went fully online on Zoom starting from week 3, with a tutorial recording being made available on Canvas each week. In the tutorial recordings, the tutor would go through each of the tutorial questions and provide explanations for the solutions. Even though students would not be able to answer the questions or interact with the tutor during such recordings, you could still participate in any of the live Zoom tutorials. I did not attend the live tutorials and simply relied on the recordings and the solution sheets as I found it more convenient to go through them at my own pace.

Originally, we were also supposed to attend a separate weekly workshop, where its main purpose was to allow students to ask Grok or project-related questions. Students would attend the workshop together with around 30 other students in a computer lab. However, it was completely cancelled during the studying-at-home period. Though if you have any questions regarding the Grok worksheets, I would highly recommend you make use of the tutoring help on the Grok platform or post your questions onto the forum! The forum is a space where students are allowed to post general questions and interact with other students by answering their questions, if you are able to and would like to help out. The tutors were very helpful and responsive, usually answering the questions on the same or following day. Besides that, I found that most of the time the questions I had in mind would already be asked and answered by other students on the forum.

Assessments

Grok worksheets and projects

There was a total of 18 Grok worksheets this semester, usually with 2 or 3 due each week. Each worksheet consisted of notes and exercises (in the form of diamonds). The notes would first introduce you to contents related to the topic covered in the specific worksheet. You would then be asked to complete exercises revolving around the concepts introduced and achieve the green diamonds after passing all the tests in the exercise. To me, Grok worksheets were the most enjoyable part of the subject as achieving the green diamonds kept me engaged in the subject and the notes were also easy to follow and understand. Therefore, by putting consistent effort into completing the worksheets, you would already have scored an easy 10% of the subject!

Apart from the weekly Grok worksheets, there were two individual projects to be completed during the semester, each contributing 15% to the subject's final marks. Each project was broken down into four to five parts and there would be one bonus question at the end. Since we were given around five to seven weeks for each project, many students only started attempting the projects a few days before the deadline. A lot of them actually posted on the forum around the deadline of project 2 saying that they found the last diamond too challenging and almost impossible for them to complete within such a short period of time. Therefore, I would advise students to start attempting the projects earlier, even if it just meant getting yourself familiar with the questions and not leave it to the last minute.

Mid-semester test

Unlike previous years, this year's mid-semester test was run on Grok. The test was 40 minutes long and there were 4 questions in the paper, for a total of 40 marks. Before the day of the mid-semester test, a practice test was made available for us to familiarise ourselves with the format and structure of the test.

The questions given in the mid-semester test were related to code interpretation and code generation, such as writing a single expression that satisfies certain conditions to generate a specified output and rearranging lines of a function. As long as you consistently put in the effort and keep up with the lectures, tutorials and worksheets, you should be able to perform well in the test.

End-of-semester exam

Similar to the mid-semester test, the end-of-semester exam was also being run on Grok with the same format. Except that there were 9 questions in total, adding up to 120 marks. Rather than just having two sections, an additional section on conceptual questions was tested. A dry-run final exam was again made available for a few days before the actual exam took place.

Overall, the final exam was not too difficult as we would have been familiar with the concepts and style of questions. However, I did find two questions under code generation to be slightly more challenging than the rest. One of the questions required us to fill in the missing lines of code in a function and I took the majority of the time trying to figure out the purpose of the function. To tackle such questions, it was useful to look for the links between the missing lines and the rest of the code as there would often be hints. Besides, I found it helpful to attempt the past year papers, which were uploaded onto Canvas, even if the format was slightly different as the style of questions were very similar. So definitely attempt those past year papers and do not hesitate to post your questions on the forum if you are stuck!

COMP10002 Foundations of Algorithms [SM2]

Lecturer(s)	Prof. Alistair Moffat Dr Artem Polyvyanyy								
Weekly contact hours	3 × 1-hour lectures 1 × 2-hour workshop								
Assessments	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 80%;">3 × online quizzes</td> <td style="text-align: right;">30%</td> </tr> <tr> <td>Individual assignment 1, due in Week 8</td> <td style="text-align: right;">20%</td> </tr> <tr> <td>Individual assignment 1, due in Week 12</td> <td style="text-align: right;">20%</td> </tr> <tr> <td>1-hour and 15-minutes end-of-semester exam</td> <td style="text-align: right;">30%</td> </tr> </table>	3 × online quizzes	30%	Individual assignment 1, due in Week 8	20%	Individual assignment 1, due in Week 12	20%	1-hour and 15-minutes end-of-semester exam	30%
3 × online quizzes	30%								
Individual assignment 1, due in Week 8	20%								
Individual assignment 1, due in Week 12	20%								
1-hour and 15-minutes end-of-semester exam	30%								
Textbook recommendation	<p>Moffat, A. (2012). <i>Programming, Problem Solving, and Abstraction with C, Revised Edition</i>. Pearson. ISBN 9781486010974</p> <p>✓ Recommended, especially as a useful revision material closer to the exam period. It is an extension of the lecture slides as most of the content in the lecture slides come from the textbook, which covers the concepts taught in more details.</p>								
Lecture capture	Full (both audio and video)								
Year and semester reviewed	2020 Semester 2								

Comments

COMP10002 Foundations of Algorithms (FoA) is a continuation from COMP10001 Foundations of Computing (FoC). It is a prerequisite for most of the second and third-year computing subjects and uses the programming language C. Students are encouraged to download a compiler and code editor early in the semester to familiarise themselves with the programming environment on their laptops.

An important thing to note is that due to the structure of the Bachelor of Commerce, students can only take a maximum of 125 points of Level 1 subjects. Therefore, unless you plan to enrol in the Diploma in Computing, you would need to replace ACTL10001 with COMP10001 in order to achieve the prerequisites for this subject (unless you can enrol with the programming competency pathway).

Overall, I found COMP10002 challenging yet fun. It has enabled me to learn and think about the different approaches and algorithms when solving a problem. Although it took me some time to get used to not coding on Grok, I soon appreciated the accessibility of programming using a code editor and compiler.

This subject is only available for students who are completing the [Diploma of Computing](#) or able to achieve the [programming competency](#) prerequisite.

Subject content

1. **Introduction to Algorithms; Introduction to C Programming**
2. **Selection, Iteration and Abstraction in C**
Introduces the precedence of operators in C programming, the different types of loops and functions.
3. **Functions and Pointers**
Discusses how we can call and pass variables into a function.
4. **Arrays and Algorithms**
Introduces arrays and pointer variables.
5. **Analysis of Algorithms**
Discusses the efficiency of algorithms using the Big O notation. Introduces the algorithms and efficiency behind binary search and quicksort.
6. **Strings and Pattern Search Algorithms**
Introduces the different string and pattern search algorithms such as sequential pattern search, KMP search and BMH search.

7. String Search Algorithms (cont.) and Indexing Data Structures

Continuation from Week 6's lectures. Introduces indexing and suffix array construction.

8. Structs, Dynamic Memory and Linked Data Structures

Delves deeper into the usage of pointers and introduces the concept of dynamically allocating memory that is sized according to run-time values. This is personally the most challenging topic in the subject as I find the extensive use of pointers very complex.

9. Linked Data Structures (cont.), Binary Search Trees, Function Arguments, Modules

10. Files, Number Representations

Introduces different file operations, such as writing, reading and appending.

11. Number Representations (cont.), Problem Solving Techniques

Discusses the different types of number representations, such as binary numbers with their integer and floating-point representations.

12. Dictionary and Priority Queue Structures; Hashing; Mergesort and Heapsort

Introduces more sorting algorithms that have time complexity of $O(n \log n)$.

Lectures

Alistair and Artem took turns delivering the lectures. Both of the lecturers were very passionate and I often found the lectures interesting since they discuss many sample programs introduced in the textbook. Besides just showing the code and how it runs, sometimes the lecturers would prepare an excel spreadsheet to go through how the program or algorithm works step by step, which helped me visualise the concept better.

One key thing to note is that the lecture slides only covered the basics and do not include much details. Therefore, Alistair always stressed the importance of reading the textbook to get a better understanding. I personally annotate my lecture slides as I go through the lecture captures and only read a few chapters on the topics that I found challenging closer towards the exams.

Tutorials and workshops

In the weekly 2-hour online workshops, tutors usually went through the allocated exercises that week and recap contents that were covered in the previous week during the first hour. My tutor broke us out into breakout rooms to come up with solutions for some of the questions before discussing together in the main room. Although there were no tutorial recordings, pre-workshop videos that covered the overview of some concepts and some Grok exercises are posted up at the beginning of each week. Videos going through the solution to the Grok exercises were also made available at the end of the week.

In the second half of the workshop, students were given time to work on their own codes. If you encounter a problem, you could always use the "tutoring help" function on Grok or "raise hand" on Zoom to ask for help. I personally found it very helpful to attend workshops since we were given a chance to discuss the concepts with other students, which helps to solidify our understanding.

Assessments

Online quizzes

There were three online quizzes this semester, each of them contributed 10% to the final marks and was 30 minutes long within a 45 minute time window, taken via the LMS. The quizzes are closed book assessments, and without any use of gcc/Grok permitted. Each quiz included five multiple-choice content question and one function writing question. As long as students keep themselves up-to-date with the lectures, the quizzes will not be too challenging.

Assignments

There were two individual assignments, each contributing 20% to the final marks. Each assignment was broken down into three stages, which guided us to progressively develop a full program. The stages were usually dependent on each other, so it was encouraged to tackle them step by step. We had two and a half weeks to complete each assignment. The first assignment tested our knowledge on functions, sorting and displaying data. Whereas the second assignment tested us on utilising dynamic memory allocation, pointers and linked lists.

Both assignments required us to combine the concepts and techniques learned during the lectures and were challenging yet very stimulating. Marks were allocated based on the program presentation, execution and structure, and approach of the code. By putting in enough effort and starting early, it is very doable to achieve high marks for both the assignments.

End-of-semester exam

In the final exam, students were given an hour writing time with 15 minutes of reading time. Although no past exam papers were provided due to the different exam format this year, a practice exam which highly resembles the final exam was provided in the first week of exams. The exam was separated into three sections: short answer, programming and algorithms. Each of the section contributed 10 marks to the final exam. The exam was heavily focused on the latter parts of the subject content, covering trees, pointers and algorithms. These topics were barely included in the quiz and hence students might tend to overlook. Therefore, I would advise students to go through these topics in more detail to familiarise themselves with the concepts.

FNCE20005 Corporate Financial Decision Making [SM1]

Lecturer(s)	Dr Chander Shekhar	
Weekly contact hours	1 × 2-hour lectures 1 × 1-hour tutorial	
Assessments	MCQ individual assignment, due Week 5	15%
	MCQ mid-semester test in Week 6	25%
	2-hour end-of-semester exam	60%
Textbook recommendation	Readings given on LMS X Not recommended. These are mostly optional and not necessary to do well in the subject.	
Lecture capture	Full (both audio and video)	
Year and semester reviewed	2022 Semester 1	

Comments

Overall, Corporate Financial Decision Making (CFDM) is fairly easy to understand and do well in as long as you attend/watch the lecturers and attend the tutorials. The lecturer in Sem 1, 2022 was Chander Shekhar, and he was very good at teaching the subject: explained all concepts clearly, used lots of real-life examples to make the theories straightforward. Would recommend attempting the weekly tutorial worksheets as well since they are not very time-consuming but are useful in grasping a better understanding and application of the theories/formulas introduced. There is never easy H1 but as long as you do everything prescribed in the subject you should be on your way to an H1 for CFDM.

I would recommend taking CFDM if you can, as it is a WAM booster (final grade scaled up by 12 points) but also an interesting one. You get a more holistic understanding of the financial world from this subject as a step up from Principles of Finance (PoF). The type of content introduced in the subject is fairly similar to PoF but more applicable, including things such as real options, IPOs, corporate distress, and basic valuation methods.

Principles of Finance is a prerequisite.

Subject content

1. Raising capital: Equity
2. Payout Policy
3. Debt and Leases
4. Issues with WACC and Capital Structure Policy
5. Advanced Topics in Capital Budgeting: Sensitivity, Break-Even and Decision Tree Analyses
6. Advanced topics in Capital Budgeting: Real options
7. Analysis of Takeovers: Part I
8. Analysis of Takeovers: Part II
9. Corporate restructuring
10. Corporate distress
11. Risk Management

Assessments

Assignments

Individual Assignment is an MCQ test consisting of 9 questions (mostly calculation based), and you are given 5 days to complete it. The questions are fairly challenging, but it is not extremely difficult to get full marks on that 15% if you start early (allocate at least one to two full days to it, since each question takes a fair bit of time to figure out and you want to make sure you are not rushing your calculations to avoid silly mistakes).

Mid-semester test

MST in comparison is more time constrained. It is also an MCQ test but includes more theory-based questions than calculations. It can be quite a hit-or-miss as MCQ can be tricky but making sure you have a solid understanding of the first 4 weeks of content should put you in a decent position.

End-of-semester exam

Final exam is 2 hours + 15 minutes reading time + 30 minutes submission time, and most people should have experience with the submission software Gradescope from PoF, so most of us would realistically only require 5 minutes to submit. Therefore, it is essentially a 2-hour 40 minutes exam. However, it is a relatively long exam with lots of written answers that could be time-consuming, so make sure you have a good time allocation plan before heading into the exam.

FNCE20005 Corporate Financial Decision Making [SM1]

Lecturer(s)	Dr Chander Shekhar						
Weekly contact hours	1 × 2-hour lectures 1 × 1-hour tutorial						
Assessments	<table> <tr> <td>Tutorial participation</td> <td>10%</td> </tr> <tr> <td>Mid-semester exam in Week 5</td> <td>20%</td> </tr> <tr> <td>3-hour end-of-semester exam</td> <td>70%</td> </tr> </table>	Tutorial participation	10%	Mid-semester exam in Week 5	20%	3-hour end-of-semester exam	70%
Tutorial participation	10%						
Mid-semester exam in Week 5	20%						
3-hour end-of-semester exam	70%						
Textbook recommendation	Peirson, G., Brown, R., Easton, S., Howard, P., & Pinder, S. (2015). <i>Business Finance</i> (12th ed.). North Ryde, AU: McGraw-Hill. X Not recommended. I do not believe the textbook is necessary.						
Lecture capture	Full (both audio and video)						
Year and semester reviewed	2020 Semester 1						

Comments

Overall, I enjoyed this subject very much given its grounding in real-life and focus on decision making (hence the name I suppose). The content was stimulating and easy to absorb if you have an interest in the world of finance. Some of the concepts Chander touched on were initially counter-intuitive or perplexing, however one could often get to the bottom of this by reflecting on lessons taught in PoF or even accounting subjects such as ARA or Introductory Financial Accounting. Finally, Chander always includes additional resources and articles about the covered content. While these are not examinable, they do allow you to make some interesting connections between the content and deals you see in the media.

I would definitely recommend this if you are interested in developing a more holistic understanding into the world of finance!

This subject is a required prerequisite for the two core FNCE subjects (Investments and Derivative Securities) to double major in Finance with Actuarial Studies.

Subject content

12. Introduction and Options

This section offers a deeper look into options. It is a useful refresher and also lays the foundation for future topics in Real Options and Risk Management. It is important to understand the hedging benefits of options, how certain phenomena influence pricing and the relevant payoffs to different stakeholders.

13. Raising capital: Equity

This topic offered a comprehensive overview into equity raisings and was quite content driven, describing the motivations for different approaches. While Chander includes a lot of empirical research here, the main study to prioritise concerns of and rationale behind under-pricing.

14. Debt and Leases

This topic provided an insight into why firms may decide to lease assets instead of purchasing them outright, and how to evaluate this decision via incremental NPV analysis. Ensure you have a clear understanding as to how incremental value is derived by the lessor and lessee.

15. Payout Policy

This section investigates a more realistic look into how firms decide to utilise excess cash rather than the Modigliani and Miller (M-M) propositions covered in PoF. Whilst M-M is introduced as a base case, you learn about how firms can look to reward shareholders and implications of these strategies for different parties. Ensure you understand the process of a share buyback, notably the impacts that the imputation system has on this and the motivations for choosing between stock buybacks, dividends and reinvestment.

16. Issues with WACC and Capital Structure Policy

This topic introduces a suite of different theories that offer insight into the debt-equity make up of a firm. In addition to WACC learnt in first year subjects, you must pay extra attention to the influence of taxes and the need to lever beta, allowing the relative risk measure to account for the firm's financial risk. The main point to understand in this

topic is the trade-off between using debt (tax benefits, lower cost but higher financial risk) and equity (expensive to issue, higher returns expected, no tax benefits but minimal financial risk).

17. Advanced Topics in Capital Budgeting: Sensitivity, Break-Even and Decision Trees

Sensitivity analysis is simply NPV analysis but changing one variable at a time based on different sentiments and viewing the consequences of doing so. Break-even analysis, as the name suggests, involves letting NPV equal 0 and noting how much a certain variable would have to change for this to occur. Finally, decision trees allow you to map out potential decisions you will encounter and calculate the benefits of pursuing the best pathway.

18. Advanced topics in Capital Budgeting: Real options

This is a direct continuation of decision trees, however incorporating a sense of optionality in making decisions: you do not have to fully go through with a project if it is initially unsuccessful. Value is therefore derived from being able to make this decision in the future.

19. Analysis of Takeovers: Part I

This topic is a comprehensive introduction to the types of mergers & acquisitions and techniques to value targets. The valuation methods are intrinsic valuation (discounted cash flow models), relative valuations (multiples and comparable methods), contingent claim valuation (viewing the takeover as a real option). Make sure you understand the economic rationales of performing a takeover, namely the synergistical benefits.

20. Analysis of Takeovers: Part II

This topic continues on from the previous lecture and offers a greater insight into how companies fund such ventures. It is imperative to understand the differences between cash and scrip bids and the incentives behind each. There is also an introduction to governance and regulation. This gives an insight into the hurdles encountered through the engagement process and how different engagements can look from a legal standpoint.

21. Corporate restructuring

This topic ran through the reorganisation of businesses that make them more profitable. The most important thing is to understand the different types of business (divestitures, spin-offs & equity carve outs) and financial restructurings (management buyouts, leveraged buyouts and debt restructuring). A good way to remember these is by drawing diagrams outlining the old and new structures of the business after undergoing restructuring.

22. Risk Management

Risk management offered a brief look into how firms manage uncertainty. The main thing here is to understand that risk is not a bad thing, it is how firms become profitable. However, risk should be controlled in a manner that limits downside losses without inhibiting upside gain. Techniques covered include hedging through derivatives and Value at Risk measures.

Lectures

Chander creates quite comprehensive slides. However, it is important you have your own set of notes that cover the main ideas he brings up, as these slides are quite dense. You will quickly notice that he places a great emphasis on understanding the motivation and incentives of particular alternatives, so ensure you have these noted. He will often include what he terms "dubious reasons", which are points that may seem valid on surface level but are not supported in theory or in practice. It is important that you flag these and understand the rationale behind them as they are often embedded into multiple-choice or true/false questions on assessments. Chander also puts a set of general questions at the end of each lecture. Ensure you have an idea of how to answer each of these as they act as a good method of revision.

Tutorials

The tutorial structure is very similar to PoF in that one half of it is to be completed prior to and submitted at the start of class. Each tutorial worksheet you submit that is deemed to be a "reasonable effort" will equate to 2%, which contributes to a maximum of 10% of your final mark. This means you only have to submit 5 in total to secure full tutorial marks.

The tutorials themselves are useful as a foundation, however, do not rely on them to prepare you for the exam as they are generally quite basic. There are often points of discussion or evaluation which can be quite useful for consolidating and justifying your understanding. This is particularly important in the 'true or false' portion of the final exam.

Assessments

Mid-semester test

Multiple-choice out of 20 marks. Most questions will have a “none of above” or “more than one of above option”, hence it is imperative that you understand the content as it will not be enough to simply take educated guesses. The weighting is generally spread equally across all of the covered lectures, so ensure you are comfortable with each of the topic areas.

End-of-semester exam

Part A (40%):

This section included 10 multiple choice questions worth 4 marks each. This section was particularly brutal as you either received 4 marks or 0 marks. For each question, you need to have chosen true or false correctly and accurately justified it. They also provided a rough limit of 200 words in your justifications, so try and be succinct in your responses. The content relates to every topic and sometimes requires calculations, so ensure you understand each topic's relevant formulas.

Part B (60%):

This section involved 7 questions with varying marks. While it may be tempting to be extremely picky in section A, it is important that you move onto this section quickly as a lot of these are time consuming. A lot of fiddly calculations means you must be confident on your calculator and ensure you do not combine too many steps.

We only had one practice exam offered to us, and it was significantly simpler than the final. Other past exams can be found through the library or StuDocu. As mentioned, the tutorials are not really sufficient to prepare for the final exam, as they are quite short and basic. I would encourage you to use online resources in addition to your reflections, such as Investopedia and the Corporate Finance Institute to explore the intuition of topics further.

FNCE20005 Corporate Financial Decision Making [SM2]

Lecturer(s)	A Prof Sean Pinder				
Weekly contact hours	1 × online module 1 × 1-hour tutorial				
Assessments	<table style="width: 100%; border: none;"> <tr> <td style="width: 70%;">1-hour mid-semester test in Week 6</td> <td style="text-align: right;">20%</td> </tr> <tr> <td>3-hour end-of-semester exam</td> <td style="text-align: right;">80%</td> </tr> </table>	1-hour mid-semester test in Week 6	20%	3-hour end-of-semester exam	80%
1-hour mid-semester test in Week 6	20%				
3-hour end-of-semester exam	80%				
Textbook recommendation	<p>Peirson, G., Brown, R., Easton, S., Howard, P., & Pinder, S. (2015). <i>Business Finance</i> (12th ed.). North Ryde, AU: McGraw-Hill.</p> <p>X Not recommended. Sean continually reiterates that the lecture slides are sufficient and that students should use the slides to guide any further reading, so I never felt a need to use the textbook.</p>				
Lecture capture	Full (both audio and video)				
Year and semester reviewed	2020 Semester 2				

Comments

FNCE20005 Corporate Financial Decision Making is a core subject for Finance majors and seeks to develop further topics covered previously in FNCE10002 Principles of Finance such as capital structure and capital budgeting. The subject covers 10 topics across corporate finance, with each topic following on from the previous topic to some degree. Overall, I found that this subject provided me with a very solid overview of the corporate landscape scene and placed many of the things I have read in the Australian Financial Review into perspective. For those with an extra breadth or elective slot, I would recommend taking this subject for this very reason. Sean is also a fantastic lecturer and makes the course as enjoyable as possible.

This subject is a required prerequisite for the two core FNCE subjects (Investments and Derivative Securities) to double major in Finance with Actuarial Studies.

Subject content

1. Options
2. WACC and Capital Structure Policy
3. Raising Capital — Equity
4. Raising Capital — Debt & Leases
5. Payout Policy
6. Sensitivity, breakeven and decision tree analysis
7. Real options
8. Takeovers
9. Corporate restructuring
10. Risk management

For the most part, the content in this subject is very theoretical and conceptual. Sean often ties in empirical evidence and real-world examples into the lecture slides, which helps to contextualise many of the topics. The only calculation heavy topics are Topics 6 and 7 to a degree. Make sure that you focus on understanding the logic and concepts behind all these topics since this is what will be tested more than anything. It is imperative that you take note of what Sean says during the lectures since it is logic that appears most on exams.

Lectures

All lectures were delivered online this year in line with COVID-19 restrictions. Overall, Sean's lectures were very informative, and he was a very knowledgeable and enthusiastic lecturer. The lecture slides are content-heavy, but this meant that you had almost complete knowledge of everything that would be assessed. I found it effective to annotate Sean's slides with insights that he would provide over the recording. Sean would also include "Key Takeaway" slides after each concept, which I found incredibly useful for revision going into the mid-semester test or exam.

Tutorials

Due to the unique nature of online learning, tutorials were not compulsory this semester. Despite this, I would still recommend attending them virtually since you have paid for them and there is no harm in listening in over Zoom. Personally, my tutor was great at going over the previous week's content and reinforcing the knowledge that I had learnt about in that week. He would also go over the tutorial questions, but I would recommend having a look at them before the class so that you are more easily able to understand the solution.

Assessments

Mid-semester test

This year's mid-semester test was administered online on Canvas, which meant that it was open book, unlike previous years. The test consisted of 20 questions covering Topics 1 – 5 and lasted for an hour. Despite being online, I did not find any noticeable increases in the level of difficulty. As is commonly the case with finance multiple-choice exams, the options are set to be as tricky as possible to really test your understanding of the content. The best way to study for the mid-semester test is to go through the lecture slides and really consolidate your understanding, before reviewing some of the tutorial questions from previous weeks.

End-of-semester exam

The end of semester exam lasted 3 hours and comprised of 80% of your final grade. Similar to the mid-semester test, it was held online and was open book as a result. However, much like the mid-semester test again, I did not find any increases in difficulty and found that, if anything, it was easier than previous years despite being open book. Usually, Sean's exams are known for being notoriously difficult, and marks were often scaled significantly to reflect this, but this may not be the case this year. There were no surprises with the structure of the exam; Sean made everyone well aware of the exam and provided a sample exam to use as revision. Once again, theory questions dominated the exam, so it is imperative that students devote most of their revision time towards this. Only 10 of the available 80 marks were calculation-based questions.

FNCE30001 Investments [SM1]

Lecturer(s)	A Prof Antonio Gargano	
Weekly contact hours	1 × 2-hour lectures 1 × 1-hour tutorial	
Assessments	Tutorial participation quizzes	10%
	Mid-semester test held in Week 8	20%
	3-hour end-of-semester exam	70%
Textbook recommendation	None, the lecture slides are sufficient as study material.	
Lecture capture	Full (both audio and video)	
Year and semester reviewed	2020 Semester 1	

Comments

Overall, Investments is an enjoyable subject to learn if you would like to pursue a major in Finance. Compared to the other level 3 subjects in Actuarial, this will feel somewhat like a breeze, and helps you to build some confidence while you're struggling with all the formula manipulations in Actuarial Modelling. However, I did sometimes find the terminologies used in Investments confusing, as there can be many different terms that correspond to the exact same idea. According to this, I would recommend reading more financial news to make yourself comfortable with these expressions.

Subject content

Topic 1: Security Market

1. Capital Allocation

Allocating wealth between a risky portfolio and a risk-free asset with mean-variance utility function and capital allocation line.

2. Asset Allocation

Solution of the best portfolio with two risky assets with concepts like: Opportunity Set of risky assets and Minimum Variance Portfolio.

3. Security selection

Markowitz approach to solve the optimal portfolio with many risky assets

4. The Capital Asset Pricing Model

Estimating the expected return of a portfolio under CAPM

5. Multifactor models, Arbitrage Pricing Theory (APT) and Factor Investing

Estimating the expected return using multifactor models under the APT

Topic 2: Fixed Income Market

6. Intro to Fixed Income and Zero-Coupon Bond

Introducing features of the fixed income market and a review of zero-coupon bond, which was covered in Corporate Financial Decision Making.

7. Bond Pricing

Price coupon bonds using its yield to maturity and varying interest rates and an in-depth look at the price evolution.

8. Yield curve

Introducing three theories that explain the shape of the yield curve and the trading strategies in practice.

9. Managing Bond Portfolios

Overview of the risks in managing bonds and the measuring of the sensitivity to interest rate-risk with duration.

Lectures

Antonio claimed that he's the only one who would teach Investments "in this way" at a bachelor level; he always started each lecture with a real-world problem. For example, we would take a problem, "your boss expects the interest rates to decrease and asks you to implement a strategy that profits from this expectation" and try to solve it using the concepts learned throughout the lecture, so "you wouldn't look stupid on the first day of your internship".

Excluding the theory and pure application of formulas, Antonio spent a great amount of time in his lectures to link the topics to real-world practices, which I found it very helpful to get the intuition behind the theory and also improved my financial knowledge. For example, when illustrating the idea of the *liquidity of bonds*, he spent nearly 20 minutes manipulating a brokerage account to demonstrate how to make a transaction in practice.

Tutorials

Compared to the lectures, tutorials are more exam focused. Due to the special situation of this semester, they were all recorded and, therefore, pretty well-structured. The key points of each lecture were summarised systematically and were followed by the corresponding exercises. The tutorial questions themselves are also good practice and can involve some concepts and terminologies which were not mentioned in the lectures. So, even though without the recording, tutorial questions were still valuable materials and I recommended you use them wisely for the exam preparation.

Assessments

Mid-semester test

The mid-semester test was held online and contained 20 multiple-choice questions, to be completed in an hour. It covered the contents from the first four lectures. The questions were not hard but did have a certain level of complexity which required you to fully understand the concepts taught in both lectures and tutorials. As long as you have sufficient preparation, you will be fine.

End-of-semester exam

The final exam was a 3-hour exam with 15 minutes reading time. There were two sections in the exam: 32 multiple-choice questions and 9 problem solving questions. Most of the problems were pretty straightforward, as Antonio is famous for being generous to give marks (from what I've experienced). So, make sure to catch this chance, prepare well, and boost your WAM.

FNCE30007 Derivative Securities [SM2]

Lecturer(s)	Prof Federico Nadari	
Weekly contact hours	1 × 2-hour lectures 1 × 1-hour tutorial	
Assessments	Mid-semester test held in Week 7	25%
	3-hour end-of-semester exam	75%
Textbook recommendation	John C Hull (2016). <i>Fundamentals of Futures and Options Markets</i> . 8th edition, Pearson Education Inc. X Not recommended. I do not believe the textbook is necessary.	
Lecture capture	Full (both audio and video)	
Year and semester reviewed	2020 Semester 2	

Comments

Overall, I enjoyed Derivative Securities very much given its grounding in real life and rigour (compared to a more content-based subject in CFDM). Once you start to understand the benefits of the products and think like an investor, you begin to appreciate the role of derivatives in the world of finance (even if Warren Buffet is not a fan).

I would definitely recommend this subject if you are interested in developing a more holistic understanding of the world of finance or would like to get into trading shops.

This subject is required for double major in Finance with Actuarial Studies, alongside Investments and an additional Level-3 FNCE subject.

Subject content

1. Futures and forwards

In this topic, you are introduced to derivative products in futures and forwards. There is a lot of content covered in this topic. However, the three most important foundational concepts to keep in mind are the different niches between futures and forwards, the different reasons to use such securities (hedging, arbitrage and speculating) and how to construct a portfolio with them. Finally, you are introduced to the pricing of these contracts and given a mountain of formulas, depending on if the asset pays dividends, offers a yield or has storage costs for example. The most important pillar to understand is the intuition behind why these affect the relative price of the derivatives, as you will be given each of these formulas in the final exam.

2. Options Introduction

The first 30 minutes of this lecture is a nice recap of Principles of Finance Week 12 and CFDM Week 1, however ensuring you understand how different variables influence option prices is integral for proceeding topics (such as volatility, time, interest rates, dividends). You are then introduced to an array of strategies that involve certain positions in options and the underlying asset. Whilst these were easy to access given the assessments were open book, in typical years you will need to know these off the top of your head. A good way to do this is to match the name of the strategy with the pay-off diagram, and then you can understand the strategy if asked (and infer the positions from that too).

3. Options pricing

The final section of the course involves introductions of two ways to price options: The Black-Scholes-Merton and Binomial models. Federico does a good job of building up to these through the course and gradually rolling out different layers of the respective model to make their construction quite intuitive. The questions related to this can seem very focused on the number-crunching (quite fiddly calculations). However, you will not do well if you don't understand the rationale behind each step or you will likely incur silly mistakes (again this comes back to the earlier idea of grasping the effect of particular events on the prices of options).

Overall, all the main theories in this subject are derived from the idea of arbitrage, so ensure you understand how to create payoff tables for a range of scenarios. The main bodies that trade derivative products are quant and high-frequency trading firms, so it is realistic to consider arbitrage in this case.

Lectures

Federico is a great lecturer and spends ample time on all the fundamental ideas. Whilst his slides seem to have been made in the early 2000s, all the information you need is usually on there. Just going through them is not enough, in my opinion, as he offers an incredible amount of value in his explanations. The slides are also filled with examples, and I would definitely recommend pausing the lecture for a while, working through the example in your head before progressing, as these types of questions will undoubtedly arise in tutorials and exams. They also assist in consolidating your overall understanding of the content. Whilst he sometimes goes overtime, it is often a by-product of him spending extra time showing you how the assets work in real life (for example showing you a real exchange or a move that features trading). Whilst you can skip through these quite quickly, keep in mind that these may be tested, so try and at least have the core ideas written down from his explanations.

Tutorials

The tutorial structure is very similar to other finance subjects, with the lecturer going through provided questions. The tutorials themselves are very useful, both to build a foundation and to consolidate understanding, so spend ample time on these. I started off by just attending the tutorials themselves, but there was often too much to go through in the 1-hour block and I didn't feel as though I was learning the content properly. Given pre-recorded videos of the head tutor were uploaded to Canvas, I ended up trying the questions myself prior and then watching his videos with a friend. Whilst this generally took upwards of two hours, I felt it was incredibly beneficial for understanding and I developed a greater level of appreciation for the content, beyond just brute-forcing calculations.

Assessments

Mid-semester test

The mid-semester test was a multiple-choice quiz out of 16 marks. You are only tested on futures and forwards. Weighting is generally spread equally across all of the covered lectures, so ensure you are comfortable with all the sections. These take place during your usual lecture slot, so many people thought it would be a good idea to change the lecture they were enrolled in from Tuesday to Thursday, to get more time to revise. Unfortunately, the difficulty of the Thursday test was significantly harder than that of Tuesday (Median of 7 for Thursday vs 11 for Tuesday) so that backfired for several students. Fortunately, Federico is a reasonable lecturer and scaled the Thursday session up 3 – 4 marks, but this is something to keep in mind.

End-of-semester exam

While the Semester 1 exam had no Futures/Forwards content, about 35% of ours was focused on that. Accordingly, it is essential to listen to what the lecturer announces about the make-up of the exam as can change between semesters. For anyone patrolling Reddit or Unimelb Love Letters, you would have probably seen the stream of complaints after this semester's exam. Derivatives is notorious for having hard exams, but what made this one so controversial was the number of difficult questions and lack of marks allocated to the hardest parts. In some ways, I can see why this was done as students can simulate a lot of the processes via excel and then copy it in given it was open book; but equally, it disadvantaged those students that attempted to do it properly. Regardless, scaling is common for this subject (Semester 1's exam was scaled up 14 marks) so the difficulty will likely be balanced out.

FNCE30011 Essentials of Corporate Valuation [SM1]

Lecturer(s)	Prof John Handley	
Weekly contact hours	1 × 3-hour lectures	
Assessments	Take home exam, 500-words, due in Week 6	10%
	Group assignment, 2000-words, due in Week 11	25%
	3-hour end-of-semester exam	65%
Textbook recommendation	No prescribed textbook. Lectures slides are sufficient.	
Lecture capture	Full (both audio and video)	
Year and semester reviewed	2022 Semester 1	

Comments

Essentials of Corporate Valuation is a well-designed subject without too much content and a moderate level of difficulty. At the end of the course, students will have a profound understanding of investment bankers' role in corporate valuation.

Subject content

In this subject, we examined three approaches in valuing corporations and other business interests including stand-alone projects, joint ventures and private equity.

Class 1: The framework for valuation (not examinable)

Approach 1: Valuation using Discounted Cash Flow (DCF) (Classes 2 – 6 and Class 11)

1. Free Cash Flow for Equity (FCFE) model and Dividend Discount Model (DDM)

Introduces the concepts of Free Cash Flow (FCF), Unlevered Free Cash Flow (FCFU), Free Cash flow to Equity (FCFE), measurements of these cash flows using financial statements, and their applications in the FCFE and DDM models to value equity value of firms.

2. Standard WACC model

Explores the Standard WACC model which is used to measure the enterprise value and unlevered value of a firm in detail.

3. Vanilla WACC model

Explores the Vanilla WACC model in detail and distinguish the key differences as compared to the Standard WACC model.

4. Estimating discount rates for DCF valuations

Introduces various methods to estimate the discount rate in the DCF models. These include estimating the cost of equity using CAPM and Fama-French, the cost of debt using credit spread and the beta of a stock through comparator firms.

5. Miscellaneous issues in DCF valuations

Highlights important elements to take note of under the DCF approach - treatment of surplus assets, one-off cash flow items, estimation of taxes, risk-free rate, terminal value and forecast of future cash flows.

6. Valuation and imputation tax system

Explores the various adjustments needed for valuation in an imputation tax system.

Approach 2: Valuation using multiples (Classes 7 – 9)

7. Valuation using PE multiples

Introduces PE multiples and how to value a firm using PE Ratios of comparator firms.

8. Valuation using Other multiples

Explores other multiples such as EBIT, EBITDA and EBITDA less CAPEX and their application on corporate valuation.

9. Where does value come from?

Explores how value of the proxies of multiples is determined – growth, flexibility to exercise the underlying options, value of ideas, and dilution of wealth and power when new shares are issued.

Approach 3: Valuation using replications (Class 10)

10. Valuation using replications

Demonstrates the idea of replication to value complex financial securities such as convertible bonds, bonds with Bull Spread Warrants, and Floating Priced Options.

Class 12: Introduction to EQT and Private Equity (guest lecture, not examinable)

Classes

Each lecture is divided into two parts – approximately a 2-hour lecture on lecture materials, a 1-hour collaborative learning exercise, and a 15-minute coffee break in between. John explained the models and relevant concepts in detail, citing relevant quotes from McKinsey, Bloomberg, and other sources. Additionally, John includes optional extension notes after every relevant topic for students who are keen to dig deeper into various topics.

The collaborative learning exercise is more engaging, practical and is usually based on a real-world case. An example is the learning exercise in Class 9 which explores the movie – ‘the Social Network.’ This exercise explores the dilution of power of Facebook’s founding owners during three rounds of shares. Data is extracted from a clip in the movie. Note that the collaborative learning exercise may be tested during the exams. I did not attend lectures in person as I was not able to stay focused for three hours. I discovered that watching recorded lectures was more beneficial as I was able to go at my own pace.

Assessments

Take home exam

The take-home exam has a similar format to a typical assignment in Finance subjects. It consists of two questions – the first being a short answer response whilst the second involves calculation using Excel. Both of the questions were straightforward and tested your understanding of chapters 1 to 4.

Assignments

This assignment may be undertaken individually or in groups of up to three students. The topic this year explores one of the two biggest social media platforms – Meta Platforms, Inc. (FB) and Twitter, Inc. (TWTR). Using the data given (financial reports and relevant information), we were asked to calculate earnings multiples of the companies and value Twitter using Meta as a sole comparator. In addition, we should also compare our valuation to the offer from Elon Musk to buy Twitter for \$54.20 per share.

Overall, this assignment was tedious as there were a lot of areas where you had to use your judgment (e.g., figuring out the surplus assets of each company). However, I found this assignment very practical and rewarding, as not only did I apply techniques of valuation in practice, but I also develop strong research and teamwork skills. This assignment was also relevant to the current trending news of Elon’s Twitter takeover which I was able to track in real-time.

End-of-semester exam

The final exam consists of four questions and accesses your understanding from all topics excluding topics 1, 8, and 12. The practice exam and weekly problem sets are useful materials to test your understanding of relevant topics. Since this subject does not have tutorials, students are expected to complete the problem sets at their own pace. It is highly recommended to finish the problem set every week, but I was able to cram and complete the problem sets during SWOTVAC (not recommended, but possible).

John mentioned that there is no proof tested in the final exam. Hence, I skipped any questions that involves proving in the problem sets and practice exams. Questions in the final exam have a similar format to the problem sets. It is highly recommended to do calculations in Excel as you can submit screenshots of your Excel file in the final exam, and this will save you a lot of time. The collaborative learning exercise that involves Facebook was tested in the final exam.

I found the final exam to have a higher difficulty than the practice exam. Two of the questions are more theoretical, and you have to have a deep level of understanding of topics in Class 6 (specifically, Estimating The Risk Free Rate In A Low Interest Rate Environment), and the theory behind PE ratios in class 7.

FNCE30011 Essentials of Corporate Valuation [SM2]

Lecturer(s)	Prof John Handley						
Weekly contact hours	1 × 3-hour class (lecture and in-class collaborative learning)						
Assessments	<table style="width: 100%; border: none;"> <tr> <td style="width: 70%;">Take home exam due in Week 6</td> <td style="text-align: right;">10%</td> </tr> <tr> <td>Group assignment due in Week 10</td> <td style="text-align: right;">25%</td> </tr> <tr> <td>3-hour end-of-semester exam</td> <td style="text-align: right;">65%</td> </tr> </table>	Take home exam due in Week 6	10%	Group assignment due in Week 10	25%	3-hour end-of-semester exam	65%
Take home exam due in Week 6	10%						
Group assignment due in Week 10	25%						
3-hour end-of-semester exam	65%						
Textbook recommendation	None needed, lecture slides are sufficient study material.						
Lecture capture	Full (both audio and video)						
Year and semester reviewed	2020 Semester 2						

Comments

Essentials of Corporate Valuation is a well-designed subject without too much content and a moderate level of difficulty. It provides students an overall understanding of what investment bankers do when they analysing acquisitions.

This subject is available as the Level-3 FNCE subject to attain a double major in Finance with Actuarial Studies.

Subject content

Three valuation approaches of measuring different types of value of firms and projects were spread over 10 classes (Classes 2 – 11) throughout the semester.

1. The framework for valuation (Not examinable)

Approach 1: Valuation using Discounted Cash Flow (DCF) (Classes 2 – 6 and Class 11)

2. Free Cash Flow for Equity (FCFE) model and Dividend Discount Model (DDM)

Introduced the concepts of Free cash flow (FCF), Unlevered free cash flow (UFCF) and Free Cash flow for Equity (FCFE), measurements of them using financial statements and applications in the FCFE model and DDM model to value the equity value of firms and projects.

3. Standard WACC model

Illustrated the Standard WACC model in detail to measure the enterprise value and unlevered value of a firm and the important assumptions of the model.

4. Vanilla WACC model

Illustrated the Vanilla WACC model, the key assumptions and how to distinguish the differences compared to the Standard WACC model.

5. Estimating discount rates for DCF valuations

Introduced different methods to estimate the discount rate in the DCF models. (i.e., Estimate the cost of equity using CAPM and FAMA-FRENCH, estimate the cost of debt using credit spread and estimate the beta of a stock through comparator firms.)

6. Miscellaneous issues in DCF valuations

Highlighted important elements to be aware of under DCF approach – treatment of surplus assets, one-off cash flow items, estimation of taxes, risk-free rate, terminal value and forecast of future cash flows.

7. Valuation and imputation tax system

Explained through the adjustments to be made in the above models for imputation.

Approach 2: Valuation using multiples (Classes 7 – 9)

8. Valuation using PE multiples

Introduced the measurement of PE multiples and how to choose PE ratios from comparator firms to be used as multiples on the firm being valued.

9. Valuation using Other multiples

Measurement of multiples EBIT, EBITDA and EBITDA less CAPEX and application of these multiples in practice on corporate valuation.

10. Where does value of the proxies in valuation come from

Value of the proxies of multiples is determined by the following factors: growth of the firm or project, flexibility to

exercise the underlying options, value of ideas at start-ups and dilution of wealth and power when issuing new shares. Each of them was illustrated in detail.

Approach 3: Valuation using replications (Class 10)

11. Valuation using replications

Demonstrated the idea of replication to value complex financial securities, convertible bonds, bonds with Bull Spread Warrants, Floating Priced Options which are too complex to be valued directly.

Classes

Each class consists of a 2-hour lecture and a 1-hour collaborative learning exercise. During the lecture part, John explained the models and concepts in detail, and included demonstrations using Wall Street Journal (WSJ) and Bloomberg to obtain relevant financial information. Additionally, there are a number of extension notes on the slides which are not examinable but were interesting papers to read.

The collaborative learning exercise is usually based on a real-world case. For example, the dilution of power during the three rounds of share issuing of Facebook. John extracted data from a movie for us to do the calculations on. This made that lesson quite impressive and engaging. In order to mirror the real-life practices, John paused in between the questions to allow us to attempt the problem before he walked us through. These questions are normally very practical, and it was important to do them individually to prepare for the assignment and exams.

Assessments

Take home exam

The take home exam was equivalent to an assignment which was the simplest assessment compared to the other two. There are two questions in total, the first one being a short response whilst the second was to be done with Excel. Both of them were fairly straightforward and you should be able to find the answers on the demonstrations or the lecture slides.

Group assignment

The assignment was to be done in groups of up to three people. The topic this year was, "Is Apple Inc. actually worth \$2 trillion?" A couple of links to Apple's financial reports and screenshots of WSJ data was provided and we were asked to provide a 10-page valuation of the company. I personally really enjoyed this assessment because it felt like a case competition that pushes you to do a lot of research. On top of that, it provided a certain level of flexibility for you to design your own flow for the presentation. Ultimately, practical application of the assignment helped me understand the concepts learnt, whilst the research and teamwork components helped me develop valuable skills for future career development.

End-of-semester exam

The practice exam and weekly problem sets are useful materials for final exam preparation. Unlike most of the subjects we have, Essentials of Corporate Valuation does not have tutorials and therefore, requires you to keep track on your own. The problem sets questions are not hard, so you should be able to do them on your own and understand the solutions.

The problems in these preparation materials have a similar format to the exam questions except that in the actual exam, rather than clearly stating out the direct actions you need to take, questions prefer a style such as "*What would you recommend the firm to do*" or "*comment on this firm with the data provided*". This made the exam harder than the questions with a straightforward format that tells you what they want. Hence, you have to fully understand the concepts and be able to analyse a scenario using right concepts learnt throughout the semester.

ECOM20001 Econometrics 1 [SM2]

Lecturer(s)	Prof Marc Chan		
Weekly contact hours	2 × 1-hour lectures 1 × 1-hour tutorial		
Assessments	12 online quizzes due every Friday		10%
	3 group assignments due in Weeks 5, 9 and 12		15%
	Tutorial attendance and participation		5%
	3-hour and 30 min reading time end-of-semester exam		70%
Textbook recommendation	None needed. The lecture slides and tutorial handouts are ample study material.		
Lecture capture	Full (both audio and video)		
Year and semester reviewed	2020 Semester 2		

Comments

For those who set on the path of Actuarial Studies, 80% of the topics in Econometrics 1 are covered in the core subjects spreading over Probability, Statistics and Actuarial Statistics. Therefore, I would not recommend this as a value-adding subject to choose as a breath or elective in regards to the content. However, if you have done all the actuarial subjects but still wanted to maintain your skills in your final year, and are also interested in their econometric applications, you could consider taking this subject. I still found it to be enjoyable and interesting to learn.

Subject content

1. **Overview of Econometrics**
2. **Probability review (covered in MAST20004)**
Random variables, distributions, random sampling.
3. **Statistics review (covered in MAST20005)**
Hypothesis tests, confidence intervals, sample variance and standard error, scatterplots.
4. **Single linear regression estimation (covered in ACTL30004)**
Population regression line, ordinary least squares estimator, OLS assumptions, model fit measurement.
5. **Single linear regression hypothesis testing (covered in ACTL30004)**
Confidence intervals for coefficient estimates, t-statistic, dummy variables, heteroskedasticity and homoskedasticity.
6. **Multiple linear regression model estimation**
Omitted variable bias, population multiple linear regression line, control variables, OLS estimators, measures of model fits, perfect multicollinearity, dummy variable trap, imperfect multicollinearity.
7. **Multiple linear regression model testing**
Testing joint hypotheses, F-statistic, single restriction with multiple coefficients, model specification, applications.
8. **Nonlinear regression**
General framework of estimating and testing nonlinear regression models, partial effects, polynomial regression functions, logarithmic regression functions, interactions between independent variables, differences-in-differences and quasi-experiments.
9. **Assessing studies based on multiple regression**
External validity, internal validity and threats to them.
10. **Time series regression (covered in ACTL30004)**
Basic structure of time series data, autocorrelations, autoregressions, basic principles of forecasting, ADL models, AIC, BIC, seasonality.

Lectures

Lectures are well-designed with a fairly logical structure covering all the non-coding content. The lecture notes are ample study material which covers all the knowledge points we need to know. During the lecture, Marc delivers clear and concise explanations of the notes with annotations and highlights of the important parts. He is also very patient when providing online supports and consultations, which make the course enjoyable to learn.

Tutorials

Tutorials are mainly focusing on R programming and the interpretations of the outputs. The handouts are well designed to walk you step-to-step through every line of the code, the economic interpretations of the estimates and the estimation errors. Most of the code should also be covered in Statistics and Actuarial statistics. It is recommended to attend the tutorials if you take this course for two reasons, earning the 5% participation mark and learning the language used in economic interpretations from the tutor's explanation and interaction with other students.

Assessments

Assignments

Assignments are to be done in groups up to three people of which you get to choose. All of the assignments are R based and are pretty straightforward. They do not require you to program yourself but require an understanding of the code taught in the tutorials to identify which code should be used in the model provided in the assignment.

End-of-semester exam

Even though you may find the maths, code and ideas quite familiar, there is some extension to a couple of the previously taught ideas and many details to be aware of. Past exam papers and a practice exam are given, which are useful material for exam preparation. However, you should only expect the actual exam to have a similar format with as these materials, not necessarily the questions, as these can be quite flexible

The end-of-semester exam was held online this semester in a quiz form. 25 questions (ten multiple choices, three short responses and two comprehensive problem-solving questions with multiple sub-questions under each) were to be done in 3 hours plus 30 reading time. The typing of formulae was a disaster and made the exam an intense experience. It was difficult to finish all the questions in time. Therefore, sufficient preparation is essential to perform well in the final exam.

ECOM30004 Time Series Analysis and Forecasting [SM2]

Lecturer(s)	Prof Vance Martin	
Weekly contact hours	2 × 1-hour lectures 1 × 1-hour tutorial	
Assessments	4 individual assignments during the semester 2-hour end-of-semester exam	40% 60%
Textbook recommendation	None	
Lecture capture	Full (both audio and video)	
Year and semester reviewed	2021 Semester 2	

Comments

This subject is one of the most enjoyable courses I did throughout my four-year university study. The contents are fairly easy to understand given our strong mathematical background. If you have studied some basic knowledge in Time Series prior to taking this subject, this would definitely be an insightful while chill subject for you. (i.e., you would not need that much time commitment compared to actuarial subjects).

Overall, this is a good subject to take as an actuarial breadth (particularly for Honours/Master's students) as it is relevant to actuarial studies while not being time-consuming and conceptually difficult like many actuarial subjects.

Subject content

The contents are well structured into four parts:

- 1. Univariate Models**
 - a. Preliminaries (Week 1)
 - b. AR (Auto Regression) and Forecasting (Week 2)
 - c. MA (Moving Average), ARMA and ARMAX (Week 3)
- 2. Multivariate Models**
 - a. VAR (Vector Autoregression), Forecasting and Causality (Week 4)
 - b. Recursive SVAR (S-Structural) (Week 5)
 - c. No-recursive SVAR (Week 6)
- 3. Nonstationary Models**
 - a. Unit Roots (Week 7)
 - b. Cointegration (Week 8)
 - c. VECM (Vector Error Correction Model) (Week 9)
- 4. Volatility Models**
 - a. GARCH (General Auto Regression Conditional Heteroskedasticity) (Week 10)
 - b. Forecasting and Extensions (Week 11)

Week 12 is revision.

Lectures

Personally, lectures are definitely the most important and joyful part of the course. Vance is the funniest lecturer I have ever met. His lectures are always engaging and entertaining. In terms of time commitment per week, I found watching lectures itself is sufficient. My experience is that having a full understanding of lecture material should be the highest priority.

Regarding the structure of lectures, Vance likes to start with some hooks grabbing our attention, so students are likely to be interested in or curious about the course content. Main contents are generally followed by EViews commends and practice questions. (EViews is a statistical package for Windows, used mainly for time-series oriented econometric analysis.)

Tutorials

Tutorials were focused on consolidating concepts taught in lectures and practices using EViews. However, knowing how to use EViews is not required for the final exam which means you should be wise about how much commitment you want to put in regarding tutorial practice. That being said, assignments are where you demonstrate abilities to use EViews to complete tasks. My tutor did conduct lectures reviews in the tutorial which helped a lot for me to refresh what I learnt the week before.

Assessments

Assignments

As you may have noticed, this subject has four assignments throughout the course, which is not common for actuarial students. Difficulty-wise, it should be quite manageable if you keep up with the lecture schedule. I personally did not find tutorials helpful for assignment preparation. One worthwhile thing to mention is the tight timeline of assignment schedules. You may only have a weekend between two assignments, usually no more than one week. Assignments are manageable but achieving full marks is not easy. Summary statistics for the cohort's performance in the assignments were not published. Aiming for relatively high marks in assignments should be considered as a final exam in this subject is more difficult in my opinion and counts more marks for each question.

End-of-semester exam

The final exam consists of three questions with four subsections each. Questions can cover all materials in lectures, tutorials and assignments. Questions were of different styles, but similar structures compared to assignments. They often require a holistic understanding of concepts of a class of methods/models. Two practice exams were supplied for the final exam. Vance made it available at the start of the semester, which means you can check it out whenever you are ready.

ECON10005 Quantitative Methods 1 [SM1]

Lecturer(s)	Prof David Harris								
Weekly contact hours	2 × 1-hour lectures 1 × 1-hour tutorial								
Assessments	<table style="width: 100%; border: none;"> <tr> <td style="width: 80%;">Weekly online quizzes</td> <td style="text-align: right;">10%</td> </tr> <tr> <td>2 × online tests due in Week 4 and Week 8</td> <td style="text-align: right;">20%</td> </tr> <tr> <td>Assignment due in Week 12</td> <td style="text-align: right;">10%</td> </tr> <tr> <td>3-hour end-of-semester exam</td> <td style="text-align: right;">60%</td> </tr> </table>	Weekly online quizzes	10%	2 × online tests due in Week 4 and Week 8	20%	Assignment due in Week 12	10%	3-hour end-of-semester exam	60%
Weekly online quizzes	10%								
2 × online tests due in Week 4 and Week 8	20%								
Assignment due in Week 12	10%								
3-hour end-of-semester exam	60%								
Textbook recommendation	<p>QME textbook provided by University.</p> <p>The textbook covers all the concepts taught in QM1 in far greater detail than what is required to score well in the subject. Only refer to this textbook if you are very capable in mathematics and want a deeper level of understanding, otherwise it may do more harm than good.</p>								
Lecture capture	Full (both audio and video)								
Year and semester reviewed	2020 Semester 1								

Comments

Quantitative Methods 1 is a subject that can be taken to satisfy the quantitative requirement of the *Bachelor of Commerce* (standard pathway). It teaches the basics and foundations of probability and statistical analysis that is required for future studies in econometrics and finance.

Overall, the subject is fairly reasonable. The lectures are well structured, with each lecture covering a different topic or concept. With regular attendance in tutorials and completion of the online quizzes, most should find it quite manageable. Much of the subject is devoted to the application of the techniques and concepts, rather than conceptual understanding. That said, some of the trickier questions do test your understanding of the content but these only make up a small portion of assessment and tutors are often lenient in marking these types of questions.

Overall, the subject is not the most interesting but definitely manageable if you put in the time to become comfortable with the applications. The exam and online tests are the trickiest parts of the course, so do plenty of practice questions before going into them.

Subject content

1. **Introduction to Statistics**
2. **Basics of probability**
3. **Bivariate probability distributions**
4. **Continuous random variables**
5. **t-distribution and binomial distribution**
6. **Introduction to statistical inference**
7. **Hypothesis testing**
8. **Confidence intervals and testing errors**
9. **Comparing means**
10. **Linear regression**
11. **Statistical inference with regression**

The content in this subject is manageable in terms of difficulty. The first few weeks of content is quite easy, covering concepts that students will have already seen in high school. However, from Week 4 onwards, content becomes unfamiliar as the lecturers introduce statistical inference, which can be conceptually challenging at first. However, once you are able to understand the thinking behind hypothesis testing, the rest of the content essentially becomes applying that one concept in various settings.

Lectures

With the changes to teaching in 2020 resulting from the COVID-19 outbreak, all lectures bar the first 4 were held online. Regardless, they were informative and explained the concepts concisely but thoroughly. It is encouraged that students pause throughout the lectures to fully understand the reasoning and method behind each statistical technique, as well as trying to do the calculations themselves.

Tutorials

Again, with the changes to on-campus learning, all tutorials were held online. Each tutorial ran for an hour. While my tutor did his best to engage the class despite the change, I found that it was still difficult to maintain focus, but that is something that is inevitable with remote learning. The tutorials would consist of the tutor walking through the previous week's tutorial questions, some of which were appeared on the weekly quizzes that makes up 10% of your grade overall. We had the opportunity to attempt the questions ourselves in breakout rooms, but again this was rarely successful as students were quite reluctant to talk or discuss the problems. Nonetheless, I attended all tutorials anyway as it forced me to keep up to date with the content. Note that normally the 10% quiz mark requires of both attendance at the tutorial in addition to passing the online quiz, but with the change in teaching, passing the quiz was enough to secure the marks for that component.

Assessments

Online tests

There were two online tests, one in Week 4 and Week 8. Since the first few weeks of material are considerably easier than the latter weeks, students will naturally find the first online test to be far easier than the second. The second online test was quite challenging for many, since it covered statistical inference which can be difficult at first. The average mark for the second online test was around 13/21. Both tests contributed 5%, amounting to 10% in total.

Assignments

The assignment is worth 10% and is a business report. You were required to provide recommendations to a number of potential home buyers, using statistical evidence drawn from a provided dataset to support your recommendations. The assignment is intended to be a group assignment of up to 4 members, but it is definitely manageable to complete it individually. The analysis is not particularly difficult and consists of applying the concepts learned in lectures but with more realistic data sets.

End-of-semester exam

The final end-of-semester exam was administered through Canvas and lasted for 3 hours, comprising 60% of your grade. Despite the fact that the exam was open-book, I found it to be harder than expected. The exam was quite long, and you had to spend almost all of your time typing, leaving little time to even look concepts up and go through your notes. Content-wise, most of it was quite standard and again testing the practical applications of the concepts taught in lectures. There were a few tricky questions around the central limit theorem but for the most part, the exam questions were mainly about constructing and testing hypotheses. Therefore, being comfortable with hypothesis testing is of utmost important going into the exam.

ECON20002 Intermediate Microeconomics [SM1]

Lecturer(s)	Dr Svetlana Danilkina								
Weekly contact hours	2 × 1-hour lectures 1 × 1-hour tutorial								
Assessments	<table> <tr> <td>Assignment 1</td> <td>10%</td> </tr> <tr> <td>Assignment 2</td> <td>10%</td> </tr> <tr> <td>Mid-semester test</td> <td>20%</td> </tr> <tr> <td>End-of-semester exam</td> <td>60%</td> </tr> </table>	Assignment 1	10%	Assignment 2	10%	Mid-semester test	20%	End-of-semester exam	60%
Assignment 1	10%								
Assignment 2	10%								
Mid-semester test	20%								
End-of-semester exam	60%								
Textbook recommendation	<p><i>A Short Course in Intermediate Microeconomics with Calculus</i> by Allan Feldman and Roberto Serrano</p> <p>X Not recommended. Lecture notes are sufficient.</p>								
Lecture capture	Full (both audio and video)								
Year and semester reviewed	2022 Semester 1								

Comments

This subject builds upon the foundations of microeconomics taught in Introductory Microeconomics (ECON10004). It's a really enjoyable subject for those who enjoy combining economics with some elements of mathematics. To perform well in the subject, it is recommended that students watch all the lectures and keep up with the tutorial tasks each week – particularly as the tutorials are what teaches students how to apply the knowledge to quiz/exam style questions.

This subject is a core for anyone planning to major in Economics. Prerequisite: Introductory Microeconomics ECON10004.

Subject content

1. Consumer Theory

Discusses concepts such as the budget line, preferences, utility functions and utility maximisation. Introduces various graphs: income consumption curve, Engel curve, income elasticity of demand etc. and uses these to determine income and substitution effects.

2. Producer Theory

Similar to concepts in consumer theory but looking at it from a producer's perspective i.e., isocost lines, cost minimisation, profit maximisation, long run output expansionary path.

3. Markets (Partial Equilibrium)

A deeper dive into perfectly competitive and monopolistic markets.

4. General Equilibrium

Students are introduced to Edgeworth Boxes and go through many applications of the E-box in the context of different economies - Robinson Crusoe Economy, Robinson Crusoe and Friday Economy.

5. Game Theory and Oligopoly

The content in this topic is very similar to the content taught in Introductory Microeconomics; it's probably one of the easiest topics in the subject.

6. Choice Under Uncertainty

Brief topic combining probability concepts such as expected value and variance with economic concepts like utility. Touches on the insurance market in an economic sense, comparing actuarially fair and actuarially unfair insurance.

Lectures

Lectures were held twice a week with two streams (morning/afternoon) of the same lecture - both run by Svetlana. Lectures were spent talking through the (at times, incredibly lengthy) lecture slides available on the LMS. As such, they felt very theory based with not a lot of opportunity given to practice applying any of the concepts (attend tutorials for this).

Tutorials

Tutorials were a really great place to consolidate the knowledge taught in the previous week's lectures, as well as practise applying this knowledge to longer form questions. Would highly recommend Cameron Low as a tutor. Though his tutorials weren't the most interactive (in large part due to his mostly unresponsive online audience), he is able to explain concepts very articulately and has useful PowerPoint slides.

Assessments

Assignments

Each assignment consisted of two parts. Part A consisted of an online quiz completed individually and Part B consisted of extended response questions to be completed in groups of up to 4 people (in your tutorial). The assignments, though somewhat tedious to do, were relatively easy to score well in.

Mid-semester test

The MST was a timed online test completed in the same format as the weekly quizzes. However, the content of the MST was much more difficult than the practice material provided to us weekly, and some questions really tested the depths of our microeconomic knowledge and our ability to apply concepts.

End-of-semester exam

The 3.5-hour exam is a hurdle requirement, meaning you have to pass the exam to pass the subject. The exam consisted of:

- Section A: 10 multiple choice questions. (20 marks)
- Section B: 2 long answer questions. (20 marks)
- Section C: 2 extended response questions. (40 marks)

Section A questions were chosen from a variety of topics and were generally longer than the normal weekly quiz questions. Section B1 and B2 involved responding to prompts and using graphs and curves to support your answer. Both questions in Section C incorporated multiple topics and were very lengthy, each containing their own parts within. Though 3.5 hours seems like a long period of time, given the length of some of the later questions, it is important to manage your time to ensure that you're able to work through the whole exam.

ECON20002 Intermediate Microeconomics [SM1]

Lecturer(s)	A Prof Joshua Miller
Weekly contact hours	2 × 1-hour lectures 1 × 1-hour tutorial
Assessments	Online mid-semester test in week 7 20% 2 × group assignments 20% 3-hour end-of-semester exam 60%
Textbook recommendation	<i>A Short Course in Intermediate Microeconomics with Calculus</i> by Allan Feldman and Roberto Serrano X Not recommended. Useful for further reading but not required. Lecture slides are sufficient.
Lecture capture	Full (both audio and video)
Year and semester reviewed	2021 Semester 1

Comments

In Intermediate Microeconomics, you learn about the basic building blocks of modern-day microeconomics. Compared to the first-year Introductory Microeconomics subject, there is somewhat less graphing, and significantly more mathematics and economic intuition involved. However, the mathematics should be very manageable for most actuarial students. There are plenty of real-world applications sprinkled throughout the semester.

Overall, it is quite an easy subject and should definitely be considered if you are interested in Economics or looking for a simple Commerce elective.

This subject is a core subject to double major in Economics with Actuarial Studies.

Subject content

Overall, the content is not conceptually difficult, especially for those who are competent in maths. Almost all of the content is mathematical in some way or another, and there is very little analysis beyond the pure mathematics of the concepts. There is not a lot of content in this course so students should be focusing on being able to work through the mathematics and developing familiarity with the types of functions that are commonly seen in the tutorial questions.

1. Consumer Choice

The first 4 weeks of the semester looks at how consumers behave under a set of given assumptions. This later expands into the derivation of the demand curve and other interesting characteristics of goods.

2. Consumer Behaviour

This builds on the knowledge of the first topic and varies certain assumptions to introduce the concept of consumption across time periods, exchange economy, and uncertainty.

3. Firm Behaviour

The second half of the semester looks at how firms make their production decisions, such as labour vs capital, profit maximisation. Specifically, you will re-learn how firms set their prices in perfectly competitive markets, oligopolies as well as monopolies.

Lectures

This semester, there are two one-hour lectures delivered every week. At the start of the lecture, there is usually some real-world link made or question proposed to introduce the content later learnt. Some people found the applications quite interesting while others found it quite confusing. It was Joshua's first semester teaching the subject and I found him to be a capable lecturer. He clearly understands the economic intuition very well and has no problem articulating it.

Tutorials

For each tutorial, you will have to complete a pre-tutorial sheet to which the solution will be posted later in the week. During the tutorial, there is another set of tutorial questions which are conceptually or mathematically more difficult. The answer is not published in an attempt to nudge more students to go to online tutorials.

I highly recommend you attend every tutorial given this is a great opportunity to practice the theory learnt in lectures and these questions are very similar to exam style questions.

Assessments

Assignments

You are required to choose your group members from your allocated tutorial and form a group of 1-4 for the two assignments. These questions are quite tricky, and some are way beyond what is taught in the lectures or tutorials. I highly recommend giving these questions a crack as early as possible, so you have some time to think about the more difficult ones.

Mid-semester test

The mid-sem test is worth 20% of the final grade and consists of 20 multiple choice questions. Some questions are quite conceptually challenging and require a very solid understanding of the economic theory behind it.

End-of-semester exam

The final exam this semester consists of just 6 questions each with 1-5 sub parts. They are either on par or somewhat harder than the tutorials questions but easier than assignment questions. One sample exam with a very sketchy handwritten solution was provided. More past-year papers can be found in the library with no solutions.

To prepare, I highly recommend going over the lecture slides and re-doing every single question on the pre-tutorial and in-tutorial sheets. If you can successfully do those questions, that should cover you for over 90% of the marks on the exam. The other 10% requires some mathematical "trickery" or deeper economic intuition.

ECON30009 Macroeconomics [SM2]

Lecturer(s)	Dr James Hansen		
Weekly contact hours	2 × 1-hour lectures 1 × 1-hour tutorial		
Assessments	Group assignment, due in Week 5	8%	
	90-minute mid-semester exam in Week 6	20%	
	Group assignment, due in Week 10	7%	
	2-hour end-of-semester exam	65%	
Textbook recommendation	Auerbach, A.J. and Kotlikoff, L.J., 1998. <i>Macroeconomics: An integrated approach</i> . MIT Press.		
Lecture capture	Full (both audio and video)		
Year and semester reviewed	2020 Semester 2		

Comments

Macroeconomics takes a break from classical and Keynesian economics taught in its prerequisites and takes a “micro-founded” approach to answering macro questions. This subject teaches neoclassical economics – mainly in the form of the Overlapping Generations (OLG) model – to take another look at economic growth, business cycles, fiscal and monetary policies and open economies.

The maths used in this subject and outcomes learnt were intuitive; however, the use of the same model throughout the semester (often only changing one or two variables/assumptions in each topic) made learning quite monotonous. You can sometimes grasp links between concepts learnt and real life, but these were few and far between. Ultimately, this subject seemed like a preparatory for research in economics and I would not recommend this subject unless you are very interested in economics/macroeconomics or pursuing further study in economics.

This subject can be taken as a commerce elective for the Actuarial major or count towards a double major in Economics.

Subject content

- 1. Review of Macroeconomic Research**
 Recounted classical and Keynesian economics taught in earlier years and introduced neoclassical economics – the main approach taught in this subject – which uses microeconomic assumptions (household and firm optimisation) to build macroeconomic models.
- 2. Introduction to the OLG model**
 Builds the OLG or life-cycle model using the assumptions touched on in the previous topic and forms the basis for the rest of the semester. This topic also talks about long-run equilibrium and how the model can be adapted to simulate sustained economic growth.
- 3. Real Business Cycle theory with OLG and Unemployment**
 Touches on how the OLG model can be used to model short-run fluctuations in output and compares them to the stylised facts seen in empirical data. This topic also briefly introduces unemployment into the OLG model.
- 4. Government Consumption and Fiscal Policies**
 Introduces the Government entity into the OLG model and how different types of government intervention can affect consumer welfare and economic growth.
- 5. Monetary Policy and Inflation**
 Introduces money into the OLG model and discusses the neutrality and superneutrality of money.
- 6. Two-country OLG model**
 Models two countries using the OLG model to discuss the long-run effects of free capital flow for both economies. This topic also covers topic such as the trilemma, exchange rates and balance of payments.
- 7. Epidemiology in Macroeconomics**
 Although interesting, this topic felt rushed and tacked on. This topic briefly introduced the SIR model and discussed how it can be combined with the OLG model to showcase how economic decisions of individuals and policymakers can influence health and economic outcomes.

Lectures

Due to this semester's online delivery, lectures were split up into smaller subtopics and were pre-recorded and uploaded well in advance. Although some people might appreciate this format, I found that the transitions between lectures were jarring and affected my concentration. If you like to study in short 20-minute sprints, then this style will suit you.

The lecture slides are not sufficient for study. Although James does read off the slides quite a bit, he also spends a good majority of the lecture time elaborating on the concepts and providing examples. Therefore, it is helpful to follow along annotating your slides with his comments.

Tutorials

Tutorials were delivered weekly via Zoom and were generally conducted in two ways. In math-heavy tutorials, the tutor would talk us through the working out and intuition behind the formulae. Otherwise, theory-heavy tutorials involved separating into breakout rooms for discussion. Similar to past economics subjects, you would have a tutorial sheet with a pre-tutorial section and an in-tutorial section. It is expected that the pre-tutorial section is to be completed before the tutorial, but I advise that you attempt both sections to meaningfully contribute to discussions in the tutorial.

Personally, the tutorials were the highlight of this subject. My tutor created a welcoming atmosphere that allowed students to feel comfortable sharing their cameras and facilitated engaging breakout rooms (contrasting to most other breakout room experiences this semester). Although this subject has tutorial participation marks in on-campus semesters, I definitely recommend attending tutorials regardless of this incentive. The tutorials help provide a more intuitive understanding of the models covered in lectures and will often answer questions that you did not know you needed answers to.

Assessments

Assignments

The two group assignments were so easy, you would constantly question where you might have misunderstood the question. This sentiment was reflected in the high average marks (88%) and low standard deviations published for the assignments. For both assessments, you could choose your own groups and were given approximately two weeks to complete it. The assignments required you to derive OLG models (see end-of-semester exam section), plot the time trends in Excel, and comment on how your economy changes with different initial values and/or policies. The questions that required derivations and explanations are both textbook, so referring to the slides and tutorials will help you score well.

Mid-semester test

The format of the mid-semester exam was also similar to previous economics subjects with a true/false, short answer and long answer sections. You are given 90 minutes to read, write and submit your paper. As I had a relatively strong math background, I found this semester's MSE to be fairly straight forward and straight out of the lectures. However, two key skills that could prove useful for future exams are: your ability to take partial derivatives for variables with time subscripts; and using the method of Lagrange multipliers to optimise functions with multiple constraints.

End-of-semester exam

The format of the end-of-semester exam was the same as the mid-semester exam's – just longer. For this semester's online exam, we had three and a half hours to read, write and submit your paper. Although the exam itself was "designed" to be completed in two hours, I felt that it was made a bit longer and harder than the practice exams provided. The exam itself was fairly challenging compared to the in-semester assessments. Whilst the multiple-choice and short answer questions are possible adaptations of tutorial and assignment questions, the long answer questions will very likely ask you to derive the OLG model and analyse the time trends and/or equilibrium. These types of questions often follow the same structure:

1. Find optimal household consumption
2. Find optimal firm profit conditions
3. Solve for market clearing conditions
4. Derive the capital transition equation using 1 – 3

To maximise your chances of success, make sure you are familiar with performing these derivations no matter what initial assumptions you might have for the model.

MUSI20164 Free Play New Music Improv Ensem [SUM]

Lecturer(s)	Mr Alex Pertout	
Weekly contact hours	3 × 2-hour classes (intensive summer period)	
Assessments	Active contribution to all class discussions and performances as directed	50%
	Self-reflection essay	15%
	Final video performance	35%
Textbook recommendation	None	
Lecture capture	No record, need to participate each class in person/online Zoom	
Year and semester reviewed	2022 Summer Term	

Comments

This subject is a breadth level-2 subject for actuarial students. It is also friendly to people without any music background. It is highly recommend to participate each classes planned in your timetable, not only for the participation marks, but also you can learn a lot new knowledge in music field which can be used in your self-reflection essay and final video performance. People who enjoy participating in class would enjoy this subject a lot.

Subject content

1. **Sound parameter**
2. **Generating ideas**
3. **Formal Structures for Improvisation**

Classes

The participation of the classes is essential for this subject, normally the class would be divided into three parts: meditation, guessing what materials produced the sound from the audio and learning music knowledge. Most of the time after each class, students need to capture some beautiful or interesting sounds from daily life for others to guess in the next class. Lecturer really wants students to engage each class well, so I really recommend making yourself engaged in each class well maybe by answering lecturers' questions, discussing sound parameters in the breakout room and guessing the sound origins in class.

Assessments

Self-reflection essay

A 500-word of essay would be required at the end of study, so making notes of every classes' music knowledge would be preferred so that you can write the self-reflection essay easier. I also recommend writing your improvement after the whole semester study in the essay in detail.

Final video performance

The final video performance is that you need to record yourself a 4 to 5 mins video with performance of improvisation. It is recommended to start thinking of your topic of the story after mid-semester. It is preferred to think a rather interesting topic or idea to play and using different various of materials to make that sound. An interesting idea would attract lecturer and other students' attentions so it would be easier to get a higher mark. The students are given a chance to play their trial video in front of lecturer and other students to get some feedback to improve before giving their final performance in the last class. Also, a description of the video is also required to describe the story of the video's sounds trying to make. It is recommended to use all the points you study during the whole semester into the video and make it attractive while changing the sound parameters.

MUST20010 Singing and the Power of Pop Music [SM1]

Lecturer(s)	Mr Geoffrey Williams								
Weekly contact hours	1 × 1-hour lectures 1 × 2-hour tutorial								
Assessments	<table border="0"> <tr> <td>In-class group performance of one pop song (learnt in class) – Week 6</td> <td style="text-align: right;">10%</td> </tr> <tr> <td>Weekly contributions to an online forum (guided questions will ask students to discuss assigned readings and reflect on the experience of learning to sing in a group setting through further reading and research) <i>N.B. – all weekly discussion posts must be completed to pass this subject.</i></td> <td style="text-align: right;">40%</td> </tr> <tr> <td>Group performance of three pop songs (learnt in class) – Week 12</td> <td style="text-align: right;">10%</td> </tr> <tr> <td>Creative written assignment (1600 words) – due at the end of SWOTVAC</td> <td style="text-align: right;">40%</td> </tr> </table>	In-class group performance of one pop song (learnt in class) – Week 6	10%	Weekly contributions to an online forum (guided questions will ask students to discuss assigned readings and reflect on the experience of learning to sing in a group setting through further reading and research) <i>N.B. – all weekly discussion posts must be completed to pass this subject.</i>	40%	Group performance of three pop songs (learnt in class) – Week 12	10%	Creative written assignment (1600 words) – due at the end of SWOTVAC	40%
In-class group performance of one pop song (learnt in class) – Week 6	10%								
Weekly contributions to an online forum (guided questions will ask students to discuss assigned readings and reflect on the experience of learning to sing in a group setting through further reading and research) <i>N.B. – all weekly discussion posts must be completed to pass this subject.</i>	40%								
Group performance of three pop songs (learnt in class) – Week 12	10%								
Creative written assignment (1600 words) – due at the end of SWOTVAC	40%								
Textbook recommendation	<p>Readings prescribed on LMS</p> <p>X Not recommended. Would be useful for the weekly reflections but not necessary for the final essay as you will be required to do your own research on a topic + song of your choice instead. As the readings are usually poor-quality scans and are very time-consuming to read, would not recommend.</p>								
Lecture capture	Full (both audio and video)								
Year and semester reviewed	2022 Semester 1								

Comments

Although the name and code of the subject suggest that it is a music and singing subject, the lecture content does not relate to singing at all, it is mostly about music and its progression over the decades (you start by learning Elvis, some things about slavery, civil rights movement, and slowly progress to MJ, Lady Gaga, and rap + politics). The content can be cool and interesting if you are passionate about music and its impact on history and politics but be warned most of the lectures are just the lecturer screen-sharing YouTube videos. The subject is relatively chill and relaxed in its teaching style as it is designed to be a breadth subject, I don't recall having actual music students in the class, it was mostly arts majors. In my opinion it is more an arts subject than a music subject, since only 20% of the assessments were singing - and they were both group performances so not much preparation needed - but 80% of your grade depends on written assignments. That being said, you still learn singing techniques in tutorials and the tutor Jackie is very fun.

The writing part of the subject is quite challenging and requires a fair bit of commitment, since there is a reflection due every week (150 words) that requires quite a bit of research and you will be marked on your research and citations (Chicago A footnotes), as well as how logical your arguments are, and how well everything flows etc. It was also very hard for me to get an H1 in them - I in fact never did in any of my 11 reflections. However, that is definitely not to say that it is impossible to do well in the subject, the standard of writing might have just been set higher in my cohort by the 80% of arts students taking the subject.

Overall, would recommend taking this subject if 1. you are confident in research and writing, 2. you have an interest in music, history, and/or politics, 3. you don't mind travelling to south bank campus once a week. Otherwise, would not recommend.

No prerequisite, offered both semesters, level 2 breadth

Subject content

1. **What are you empowering yourself with when you sing?**
Overview of the course; what is expected of you; what are you empowering yourself with when singing these songs?
2. **1950s: Elvis Presley, Appropriation and the invisible women**
Artist focus on Elvis Presley, the music industry at the time and key socio-cultural factors influencing music.
3. **1960s: Girl Groups, Motown & The Beatles pt 1.**
Focus on The Beatles, Motown music and the numerous girl groups that were part of pop music in the 1960s and what this reflected about (western) society at the time.
4. **1960s: Girl Groups, Motown & The Beatles pt 2.**
Focus on The Beatles, Motown music and the numerous girl groups that were part of pop music in the 1960s and what this reflects about (western) society at this time.
5. **1960s/70s: Aretha Franklin & Stevie Wonder**
Focus on two highly influential artists, Aretha Franklin and Stevie Wonder.
6. **1960s/70s: Artists – Bowie & Joni Mitchell**
Focus on pop artist David Bowie and jazz folk artist Joni Mitchell and looking at the socio-cultural factors influencing these areas of popular music.
7. **1970s/80s: Michael Jackson and the redefining of the mainstream**
Focus on Michael Jackson as a pop artist who redefined mainstream pop music. But there was also someone else who was equally innovative... here's a hint: who had the most top 5 hits from one album at this time?
8. **1980s/90s: Madonna and Whitney Houston**
Focus on two big pop stars of the 1990s gives us an insight into some key socio-cultural issues that were impacting on pop music at the time.
9. **The Birth of Rap**
Looking at its place in pop music, tracing early beginnings towards its mainstream inclusion. Considering the social and political impact of rap.
10. **Southbank Library Research skills session & The Cutting Room Floor**
Looking at the phenomenon of manufactured music, YouTube & Reality TV and what this tells us about society at this time.
11. **Academic Skills Unit Session & 2000s Genre-blurring Political Pop**
Southbank Library will come and deliver a session on research skills specific to this subject and will also discuss referencing and finding appropriate sources to help with the final creative writing task. Lecture will focus on the 2000's where pop styles and genres start to become more blurred, reflecting increased globalisation. This has a relationship to politics too, as we see pop artists using their music to convey political messages and politics using pop music for their benefit.
12. **Performance week, no lecture**

Appendix

Exemptions Guide

The University of Melbourne allows you to fulfil the Actuaries Institute accreditation requirements for all of the **Foundation Program** and half of the **Actuary Program** — the other half of which is obtained through the Institute. Exemptions are obtained by completing groups of university subjects with satisfactory grades, which allow you to be exempt from the exam of the corresponding Institute subjects shown in Table 4 and Table 5.

Exemption Marks

Exemption marks are used to calculate whether an exemption is awarded. These marks are calculated after the corresponding subject is graded, and is chosen by the Centre for Actuarial Studies based off the strength of the cohort and distribution of the final scores with the following formula:

$$\text{exemption mark} = \text{subject score} - \text{exemption cutoff}$$

From 2021, for university subjects involved in the exemption of **Foundation Program** subjects, the final subject score will be used to calculate the exemption mark; for university subjects involved in the exemption of **Actuary Program** subjects, only the score achieved in the final exam counts towards the exemption mark. Although the exemption cut-off mark varies across cohorts, the marks shown in Table 3 can be used as a reference for the marks needed to obtain exemptions.

To secure the exemption for a particular institute subject, the weighted average of the exemption marks associated with the institute subject must be above zero:

$$\text{exemption} = \sum_{i \in A} \text{exemption mark}_i \times \text{weight}_i$$

Where A is the group of university subjects that contribute towards the institute subject.

E.g., ACTL20001 and ACTL30003 count towards the CM1 exemption (and are equally weighted). These weights and groupings can be viewed in Table 4 and Table 5.

Example: Grace would like to determine her eligibility for the CS2 exemption.

1. She received 71, 82, 74 for ACTL30001, ACTL30002 and ACTL30007.
2. She calculates her exemption marks using the 2020 exemption cut-offs as -4, +9 and +4 for the three subjects respectively.
3. The weighted average of her exemption marks is: $-4 \times 0.3333 + 9 \times 0.3333 + 4 \times 0.3334 = 3.0001$, which is greater than zero.

Grace is eligible for the CS2 exemption.

Exemption Cut-Offs for 2021

Table 3: Exemption Cut-offs for 2021

University Subject	Exemption Cut-off
Non-ACTLXXXXX Subjects	73
Undergraduate ACTL Subjects	
ACTL20001 Introductory Financial Mathematics	75
ACTL20004 Topics in Actuarial Studies	72
ACTL30001 Actuarial Modelling I	75
ACTL30002 Actuarial Modelling II	73
ACTL30003 Contingencies	72
ACTL30004 Actuarial Statistics	75
ACTL30006 Intermediate Financial Mathematics	72.5
ACTL30007 Actuarial Modelling III	70
Postgraduate ACTL Subjects	
ACTL90001 Mathematics of Finance I	75
ACTL90002 Mathematics of Finance II	73
ACTL90003 Mathematics of Finance III	73
ACTL90005 Life Contingencies	71
ACTL90006 Life Insurance Models I	73
ACTL90007 Life Insurance Models II	75
ACTL90008 Statistical Techniques in Insurance	Subject not offered in 2020
ACTL90010 Actuarial Practice and Control I	66% (Final Exam)
ACTL90011 Actuarial Practice and Control II	69% (Final Exam)
ACTL90019 Data Analytics in Insurance 2	65% (Final Exam)
ACTL90020 General Insurance Modelling	70
ACTL90021 Topics in Insurance and Finance	72
ACTL90022 Economics for Actuaries	73

Source: Centre for Actuarial Studies

List of Core Principle Exemptions

Undergraduate Exemption Subjects

Table 4: Actuaries Institute Core Principle subjects and corresponding undergraduate university subjects

Table 1: Actuaries Institute Core Principle subjects and corresponding undergraduate university subjects

Institute subject	University subject(s)	Weight
Foundation Program		
CM Actuarial Mathematics		
CM1 <i>Actuarial Mathematics I</i>	ACTL20001 Introductory Financial Mathematics	50%
	ACTL30003 Contingencies	50%
CM2 <i>Financial Engineering and Loss Reserving</i>	ACTL20004 Topics in Actuarial Studies	33.33%
	ACTL30006 Intermediate Financial Mathematics	33.33%
	ACTL40004 Advanced Financial Mathematics	33.34%
CS Actuarial Statistics		
CS1 <i>Actuarial Statistics I</i>	MAST20004 Probability	33.33%
	MAST20005 Statistics	33.33%
	ACTL30004 Actuarial Statistics	33.34%
CS2 <i>Risk Modelling and Survival Analysis</i>	ACTL30001 Actuarial Modelling I	33.33%
	ACTL30002 Actuarial Modelling II	33.33%
	ACTL30007 Actuarial Modelling III	33.34%
CB Business		
CB1 <i>Business Finance</i>	ACCT10002 Introductory Financial Accounting	50%
	FNCE10002 Principles of Finance	50%
CB2 <i>Business Economics</i>	ECON10004 Introductory Microeconomics	50%
	ECON20001 Intermediate Macroeconomics	50%
Actuary Program		
ACC Actuarial Control Cycle	ACTL40006 Actuarial Practice and Control I	50%
	ACTL40007 Actuarial Practice and Control II	50%
DAP Data Analytics Principles	ACTL40012 Actuarial Analytics and Data II	100%

Source: Centre for Actuarial Studies and the Actuaries Institute
Current as of 17th December 2020.

Postgraduate Exemption Subjects

Table 5: Actuaries Institute Core Principle subjects and corresponding postgraduate university subjects

Table 2: Actuaries Institute Core Principle subjects and corresponding postgraduate university subjects

Institute subject	University subject(s)	Weight
Foundation Program		
CM Actuarial Mathematics		
CM1 <i>Actuarial Mathematics I</i>	ACTL90001 Mathematics of Finance I	50%
	ACTL90005 Life Contingencies	50%
CM2 <i>Financial Engineering and Loss Reserving</i>	ACTL90021 Topics in Insurance and Finance	33.33%
	ACTL90002 Mathematics of Finance II	33.33%
	ACTL90003 Mathematics of Finance III	33.34%
CS Actuarial Statistics		
CS1 <i>Actuarial Statistics I</i>	MAST20004 Probability	33.33%
	MAST20005 Statistics	33.33%
	ACTL90008 Statistical Techniques in Insurance	33.34%
CS2 <i>Risk Modelling and Survival Analysis</i>	ACTL90006 Life Insurance Models I	33.33%
	ACTL90007 Life Insurance Models II	33.33%
	ACTL90020 General Insurance Modelling	33.34%
CB Business		
CB1 <i>Business Finance</i>	ACCT90042 Accounting and Finance for Actuaries	100%
CB2 <i>Business Economics</i>	ACTL90022 Economics for Actuaries	100%
Actuary Program		
ACC Actuarial Control Cycle	ACTL90010 Actuarial Practice and Control I	50%
	ACTL90011 Actuarial Practice and Control II	50%
DAP Data Analytics Principles	ACTL90019 Data Analytics in Insurance 2	100%

Source: Centre for Actuarial Studies and the Actuaries Institute
Current as of 17th December 2020.

Mathematics Prerequisites for the Actuarial major

The second-year subjects that sets the foundation for all subjects in the Actuarial Studies major are MAST20004 Probability and ACTL20001 Introductory Financial Mathematics – the prerequisites for every ACTL subject can be traced back to these two subjects. To be eligible to enrol in MAST20004 and ACTL20001 in your second year, you must have fundamentals in both linear algebra and calculus, shown through your satisfactory performance in the University of Melbourne subjects or equivalent.

Linear Algebra	Calculus
MAST10007 Linear Algebra	MAST10006 Calculus 2
MAST10022 Linear Algebra: Advanced	MAST10021 Calculus 2: Advanced
MAST10008 Accelerated Mathematics 1	MAST10009 Accelerated Mathematics 2

Whilst the requisite conditions for MAST20004 Probability is fairly straight forward:

- Obtaining a pass in any subject from the list of Linear Algebra subjects, and;
- Obtaining a mark of 60 or greater in any subject from the list of Calculus subjects.

Meeting the requisite conditions for ACTL20001 Introductory Financial Mathematics can be confusing and the Actuarial Students' Society have tried to summarise these conditions with Table 6. To meet the requirements of ACTL20001, you must complete one of the Linear Algebra subjects and one of the Calculus subjects, and receive a combined mark greater or equal to the cell that corresponds to the associated row and column.

Table 6: Requisites for ACTL20001 Introductory Financial Mathematics

		Linear Algebra		
		MAST10007	MAST10022	MAST10008
Calculus	MAST10006	150	150	135
	MAST10021	150	150	135
	MAST10009	135	135	120

For more information, visit the [handbook](#) entry for [ACTL20001](#)

Example:

Rose received a 68 and 83 for MAST10008 and MAST10006 respectively. As the combined score is 151 and is greater than 135, Rose can enrol in ACTL20001.

Ineligible for MAST10006/MAST10007

If you have not met the high school prerequisites for MAST10006 and/or MAST10007, you may replace ACTL10001 with MAST10005 in your study plan to meet the prerequisites for MAST10006 and MAST10007.

UMEP Mathematics

If you have completed MAST10018 Linear Algebra Extension Studies and MAST10019 Calculus Extension Studies

- with a combined score of 150 or more, you are eligible for ACTL20001.
- with a combined score above 135 but lower than 150, you must pass MAST20026 Real Analysis to be eligible for ACTL20001.