ACST2002

Mathematics of Finance

Session 1, In person-scheduled-weekday, North Ryde 2022

Department of Actuarial Studies and Business Analytics

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General Information

Unit convenor and teaching staff Unit Convenor Chong It Tan chongit.tan@mq.edu.au Refer to iLearn
Credit points 10
Prerequisites (ACST101(Cr) or ACST1001(Cr) or WACT101(Cr) or WACT1001(Cr) or ACST152 or ACST1052) and (MATH133 or MATH1025)
Corequisites
Co-badged status
Unit description This unit begins with coverage of the basics of data analysis and modelling. It continues with a rigorous mathematical development of compound interest theory, using calculus where appropriate, applying the theory to more complex financial problems. Topics include the force of interest and its relationship to interest rates, inflation and capital gains tax, discrete and continuous term certain annuities, project appraisal, loans, bonds, yield curves, matching and immunisation and the definitions of various insurance and annuity contracts. Students will be required to use an Excel spreadsheet to solve problems throughout the unit. The concepts developed in this unit are required in several subsequent units in the actuarial degree. Students gaining a credit average in both ACST2002 and ACST2055 (minimum mark of 60 on both units) will satisfy the requirements for exemption from the professional subject CM1 of the Actuaries Institute.

Important Academic Dates

Information about important academic dates including deadlines for withdrawing from units are available at https://www.mq.edu.au/study/calendar-of-dates

Learning Outcomes

On successful completion of this unit, you will be able to:

ULO1: Demonstrate an understanding of compound interest theory.

ULO2: Identify and describe various types of annuities and apply them to solve complex

financial problems involving annuities.

ULO3: Apply the compound interest theory to a range of practical problems in finance, including loans, analysis of investment projects, valuation of fixed interest securities, yield curves, the no-arbitrage pricing method, forward contracts and immunisation theory.

ULO4: Describe the basic principles of actuarial modelling.

ULO5: Define simple life table functions and various assurance and annuity contracts.

General Assessment Information

Late submissions of assessments Unless a Special Consideration request has been submitted and approved, no extensions will be granted. There will be a deduction of 10% of the total available assessment-task marks made from the total awarded mark for each 24-hour period or part thereof that the submission is late. Late submissions will only be accepted up to 96 hours after the due date and time.

No late submissions will be accepted for timed assessments – e.g., quizzes, online tests.

Table 1: Penalty calculation based on submission time

Submission time after the due date (including weekends)	Penalty (% of available assessment task mark)	Example: for a non-timed assessment task marked out of 30
< 24 hours	10%	10% x 30 marks = 3-mark deduction
24-48 hours	20%	20% x 30 marks = 6-mark deduction
48-72 hours	30%	30% x 30 marks = 9-mark deduction
72-96 hours	40%	40% x 30 marks = 12-mark deduction
> 96 hours	100%	Assignment won't be accepted

Special Consideration

To request an extension on the due date/time for a timed or non-timed assessment task, you must submit a Special Consideration application. An application for Special Consideration does not guarantee approval.

The approved extension date for a student becomes the new due date for that student. The late submission penalties above then apply as of the new due date.

Assessment Tasks

Name	Weighting	Hurdle	Due
Assignment	20%	No	12 May
Class Test	20%	No	28 April
Final Exam	60%	No	University Examination Period

Assignment

Assessment Type [1]: Quantitative analysis task
Indicative Time on Task [2]: 20 hours
Due: **12 May**
Weighting: **20%**

This is an individual assignment which focuses on problem solving using Excel spreadsheet.

On successful completion you will be able to:

- Demonstrate an understanding of compound interest theory.
- Identify and describe various types of annuities and apply them to solve complex financial problems involving annuities.
- Apply the compound interest theory to a range of practical problems in finance, including loans, analysis of investment projects, valuation of fixed interest securities, yield curves, the no-arbitrage pricing method, forward contracts and immunisation theory.

Class Test

Assessment Type [1]: Quiz/Test
Indicative Time on Task [2]: 10 hours
Due: **28 April**
Weighting: **20%**

The test will be approximately 90 minutes, to be held during class time.

On successful completion you will be able to:

- Demonstrate an understanding of compound interest theory.

- Identify and describe various types of annuities and apply them to solve complex financial problems involving annuities.
- Apply the compound interest theory to a range of practical problems in finance, including loans, analysis of investment projects, valuation of fixed interest securities, yield curves, the no-arbitrage pricing method, forward contracts and immunisation theory.
- Describe the basic principles of actuarial modelling.

Final Exam

Assessment Type [1]: Examination
Indicative Time on Task [2]: 28 hours
Due: **University Examination Period**
Weighting: **60%**

The final examination will be closed book, a three-hour written paper with ten minutes reading time, to be held during the University Examination period.

On successful completion you will be able to:

- Demonstrate an understanding of compound interest theory.
- Identify and describe various types of annuities and apply them to solve complex financial problems involving annuities.
- Apply the compound interest theory to a range of practical problems in finance, including loans, analysis of investment projects, valuation of fixed interest securities, yield curves, the no-arbitrage pricing method, forward contracts and immunisation theory.
- Describe the basic principles of actuarial modelling.
- Define simple life table functions and various assurance and annuity contracts.

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[1] If you need help with your assignment, please contact:

- the academic teaching staff in your unit for guidance in understanding or completing this type of assessment
- the Writing Centre for academic skills support.

[2] Indicative time-on-task is an estimate of the time required for completion of the assessment task and is subject to individual variation

Delivery and Resources

The timetable for classes can be found on the University website at:

https://timetables.mq.edu.au/2022/

There is no required textbook.

Unit materials are available for download from iLearn.

Students will be required to use iLearn, Excel and a non-programmable calculator.

Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central (https://policies.mq.edu.au). Students should be aware of the following policies in particular with regard to Learning and Teaching:

- Academic Appeals Policy
- Academic Integrity Policy
- Academic Progression Policy
- Assessment Policy
- Fitness to Practice Procedure
- Assessment Procedure
- Complaints Resolution Procedure for Students and Members of the Public
- Special Consideration Policy

Students seeking more policy resources can visit Student Policies (https://students.mq.edu.au/support/study/policies). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

To find other policies relating to Teaching and Learning, visit Policy Central (https://policies.mq.edu.au) and use the search tool.

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: https://students.mq.edu.au/admin/other-resources/student-conduct

Results

Results published on platform other than eStudent, (eg. iLearn, Coursera etc.) or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be made available in eStudent. For more information visit ask.mq.edu.au or if you are a Global MBA student contact globalmba.support@mq.edu.au

Academic Integrity

At Macquarie, we believe academic integrity – honesty, respect, trust, responsibility, fairness and courage – is at the core of learning, teaching and research. We recognise that meeting the expectations required to complete your assessments can be challenging. So, we offer you a range of resources and services to help you reach your potential, including free online writing and maths support, academic skills development and wellbeing consultations.

Student Support

Macquarie University provides a range of support services for students. For details, visit http://students.mq.edu.au/support/

The Writing Centre

The Writing Centre provides resources to develop your English language proficiency, academic writing, and communication skills.

- Workshops
- Chat with a WriteWISE peer writing leader
- Access StudyWISE
- Upload an assignment to Studiosity
- Complete the Academic Integrity Module

The Library provides online and face to face support to help you find and use relevant information resources.

- Subject and Research Guides
- Ask a Librarian

Student Services and Support

Macquarie University offers a range of Student Support Services including:

- IT Support
- Accessibility and disability support with study
- Mental health support
- Safety support to respond to bullying, harassment, sexual harassment and sexual assault
- Social support including information about finances, tenancy and legal issues

Student Enquiries

Got a question? Ask us via AskMQ, or contact Service Connect.

IT Help

For help with University computer systems and technology, visit http://www.mq.edu.au/about_us/offices_and_units/information_technology/help/.

When using the University's IT, you must adhere to the Acceptable Use of IT Resources Policy. The policy applies to all who connect to the MQ network including students.