ACST2002

Mathematics of Finance

Session 1, Special circumstances 2021

Department of Actuarial Studies and Business Analytics

Contents

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Notice

As part of Phase 3 of our return to campus plan, most units will now run tutorials, seminars and other small group activities on campus, and most will keep an online version available to those students unable to return or those who choose to continue their studies online.

To check the availability of face-to-face activities for your unit, please go to timetable viewer. To check detailed information on unit assessments visit your unit's iLearn space or consult your unit convenor.

General Information

Unit convenor and teaching staff
Unit Convenor
Han Li
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Lecturer
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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

Assessment criteria for all assessment tasks will be provided on the unit iLearn site.

It is the responsibility of students to view their marks for each within-session-assessment on iLearn within 20 days of posting. If there are any discrepancies, students must contact the unit convenor immediately. Failure to do so will mean that queries received after the release of final results regarding assessment tasks (not including the final exam mark) will not be addressed.

Late submissions and extensions

Tasks 10% or less – No extensions will be granted. Students who have not submitted the task prior to the deadline will be awarded a mark of 0 for the task, except for cases in which an application for special consideration is made and approved.

Tasks above 10% - No extensions will be granted. There will be a deduction of 10% of the total available marks made from the total awarded mark for each 24 hour period or part thereof that the submission is late (for example, 25 hours late in submission – 20% penalty). This penalty does not apply for cases in which an application for special consideration is made and approved. No submission will be accepted after solutions have been posted.

Assessment Tasks

Name	Weighting	Hurdle	Due
Class Test	20%	No	Week 6
Assignment	20%	No	Week 10
Final Exam	60%	No	Standard Exam Period

Class Test

Assessment Type [1]: Quiz/Test
Indicative Time on Task [2]: 10 hours
Due: **Week 6**

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.

Assignment

Assessment Type [1]: Quantitative analysis task
Indicative Time on Task [2]: 20 hours
Due: **Week 10**
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.

Final Exam

Assessment Type [1]: Examination
Indicative Time on Task [2]: 28 hours
Due: **Standard Exam 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.

[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/2021/

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
- Grade Appeal Policy
- Complaint Management 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

Student Support

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

Learning Skills

Learning Skills (mq.edu.au/learningskills) provides academic writing resources and study strategies to help you improve your marks and take control of your study.

- Getting help with your assignment
- Workshops
- StudyWise
- 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

Students with a disability are encouraged to contact the Disability Service who can provide appropriate help with any issues that arise during their studies.

Student Enquiries

For all student enquiries, visit Student Connect at ask.mq.edu.au

If you are a Global MBA student contact globalmba.support@mq.edu.au

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.