



# ACST881

## Mathematics of Finance

S1 Day 2019

*Department of Actuarial Studies and Business Analytics*

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### Disclaimer

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## General Information

Unit convenor and teaching staff

Unit Convenor, Lecturer

Han Li

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Contact via Email

E4A 724

Credit points

4

Prerequisites

Admission to MActPrac

Corequisites

Co-badged status

Unit description

This unit begins by providing a rigorous mathematical development of compound interest theory, using calculus where appropriate. 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, data and the basics of modelling and the definitions of various insurance and annuity contracts. Students are assumed to be able to use the basic functionality of a spreadsheet package of their choice.

## 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:

Be able to describe the basic principles of actuarial modelling.

Be able to describe, interpret and discuss the theories on interest rates.

Be able to describe and use the concept of equation of value to solve various practical problems.

Be able to define life table functions and various assurance and annuity contracts.

## General Assessment Information

For all assessments:

- Assessment criteria for all assessment tasks will be provided on the unit iLearn site.
- All individual assessment results will be made available under Grades on the website.
- It is the responsibility of students to view their marks for each within-session assessment on iLearn within 20 working 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 marks (not including the final exam mark) will not be addressed.

## Assessment Tasks

Name	Weighting	Hurdle	Due
<a href="#"><u>Assignment 1</u></a>	10%	No	12th April 2019
<a href="#"><u>Mid-Semester Examination</u></a>	20%	No	Week 8
<a href="#"><u>Assignment 2</u></a>	10%	No	24th May 2019
<a href="#"><u>Final Examination</u></a>	60%	No	Standard Exam Period

### Assignment 1

Due: **12th April 2019**

Weighting: **10%**

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

You are required to submit your Excel spreadsheet to iLearn.

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

On successful completion you will be able to:

- Be able to describe, interpret and discuss the theories on interest rates.

### Mid-Semester Examination

Due: **Week 8**

Weighting: **20%**

The duration of the mid-semester exam is 90 minutes. See details below:

1. Non-programmable calculators with no text-retrieval capacity are allowed.
2. No dictionaries permitted.
3. The mid-semester exam will be held in the lecture.
4. It is a close-booked exam. The exam paper includes a formulae sheet.

On successful completion you will be able to:

- Be able to describe the basic principles of actuarial modelling.
- Be able to describe, interpret and discuss the theories on interest rates.
- Be able to describe and use the concept of equation of value to solve various practical problems.

## Assignment 2

Due: **24th May 2019**

Weighting: **10%**

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

You are required to submit your Excel spreadsheet to iLearn.

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

On successful completion you will be able to:

- Be able to describe and use the concept of equation of value to solve various practical problems.

## Final Examination

Due: **Standard Exam Period**

Weighting: **60%**

The duration of the final exam is 3 hours plus 10 minutes reading time. See details below:

1. Non-programmable calculators with no text-retrieval capacity are allowed.
2. No dictionaries permitted.
3. It is a closed-book exam. The exam paper includes a formulae sheet.
4. The exam consists of both traditional mathematical/computational questions (about 85%) and Excel spreadsheet related questions (about 15%).

On successful completion you will be able to:

- Be able to describe the basic principles of actuarial modelling.

- Be able to describe, interpret and discuss the theories on interest rates.
- Be able to describe and use the concept of equation of value to solve various practical problems.
- Be able to define life table functions and various assurance and annuity contracts.

## Delivery and Resources

The timetable for classes can be found on the University website at: <https://timetables.mq.edu.au>

Lecture notes are available for download from iLearn. You will need to print the lecture notes and bring them to classes.

Recommended textbook:

Garrett, S., 2013. An introduction to the mathematics of finance: a deterministic approach. Butterworth-Heinemann.

## Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central](https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central) (<https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central>). 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](#) (**Note:** *The Special Consideration Policy is effective from 4 December 2017 and replaces the Disruption to Studies Policy.*)

Undergraduate students seeking more policy resources can visit the [Student Policy Gateway](https://students.mq.edu.au/support/study/student-policy-gateway) (<https://students.mq.edu.au/support/study/student-policy-gateway>). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

If you would like to see all the policies relevant to Learning and Teaching visit [Policy Central](https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central) (<https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central>).

## Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: <https://students.mq.edu.au/study/getting-started/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](mailto:ask.mq.edu.au) or if you are a Global MBA student contact [globalmba.support@mq.edu.au](mailto: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](http://mq.edu.au/learningskills)) provides academic writing resources and study strategies to improve your marks and take control of your study.

- [Workshops](#)
- [StudyWise](#)
- [Academic Integrity Module for Students](#)
- [Ask a Learning Adviser](#)

## 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](mailto:ask.mq.edu.au)

If you are a Global MBA student contact [globalmba.support@mq.edu.au](mailto: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/](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.

## Graduate Capabilities

### PG - Discipline Knowledge and Skills

Our postgraduates will be able to demonstrate a significantly enhanced depth and breadth of knowledge, scholarly understanding, and specific subject content knowledge in their chosen fields.

This graduate capability is supported by:

## Learning outcomes

- Be able to describe the basic principles of actuarial modelling.
- Be able to describe, interpret and discuss the theories on interest rates.
- Be able to describe and use the concept of equation of value to solve various practical problems.
- Be able to define life table functions and various assurance and annuity contracts.

## Assessment tasks

- Assignment 1
- Mid-Semester Examination
- Assignment 2
- Final Examination

## PG - Critical, Analytical and Integrative Thinking

Our postgraduates will be capable of utilising and reflecting on prior knowledge and experience, of applying higher level critical thinking skills, and of integrating and synthesising learning and knowledge from a range of sources and environments. A characteristic of this form of thinking is the generation of new, professionally oriented knowledge through personal or group-based critique of practice and theory.

This graduate capability is supported by:

## Learning outcomes

- Be able to describe the basic principles of actuarial modelling.
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- Be able to describe and use the concept of equation of value to solve various practical problems.
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## PG - Research and Problem Solving Capability

Our postgraduates will be capable of systematic enquiry; able to use research skills to create new knowledge that can be applied to real world issues, or contribute to a field of study or practice to enhance society. They will be capable of creative questioning, problem finding and problem solving.

This graduate capability is supported by:

## **Learning outcomes**

- Be able to describe the basic principles of actuarial modelling.
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