ACST3006

Quantitative Asset and Liability Modelling 1

Session 1, Weekday attendance, North Ryde 2020

Department of Actuarial Studies and Business Analytics

Contents

General Information

Unit convenor and teaching staff
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Credit points
10

Prerequisites
(ACST202 or ACST2002) and (STAT272 or STAT2372)

Corequisites

Co-badged status

Unit description
This unit examines: utility theory and simple asset allocation; mean-variance portfolio theory; the capital asset pricing model; measures of investment risk; single and multifactor models; arbitrage pricing theory; and the efficient market hypothesis. With the introduction of options, the binomial option pricing models are covered for European, American and exotic options. Stochastic interest rates and moments of the accumulation of annuities are also studied. Students gaining a Credit average in both ACST3006 and ACST3007 (minimum mark of 60) will satisfy the requirements for exemption from professional subject CT8 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: Analyse decision making via utility functions.

ULO2: Demonstrate an understanding and the use of Capital Asset Pricing Model (CAPM), single/multi index models and Arbitrage Pricing Theory (APT) model.

ULO3: Analyse investment risk using various risk measures and distinguish three different forms of market efficiency.

ULO4: Apply a stochastic approach to the theory of interest on the mean and variance of the accumulation of a sequence of payments.

ULO5: Apply the binomial option pricing models to value various types of options.

Assessment Tasks

Coronavirus (COVID-19) Update

Assessment details are no longer provided here as a result of changes due to the Coronavirus (COVID-19) pandemic.

Students should consult iLearn for revised unit information.

Find out more about the Coronavirus (COVID-19) and potential impacts on staff and students

General Assessment Information

GradeBook

Assignment and class test marks are available on GradeBook. 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.

Assignment

Due: **Monday 6 April 12:00noon**

Weighting: **20%**

Assignment has to be submitted via both on iLearn and ACST3006 Assignment Box in BESS.

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.

Class Test

Due: **Monday 18 May 9:00am**

Weighting: **20%**

Class test will be approximately 90 minutes written papers with no reading time, held during the lecture time.

You are permitted ONE A4 page of paper containing reference material printed on both sides. The material may be handwritten or typed. The page will be returned to the students at the end of the class test. Non-programmable calculators with no text-retrieval capacity are allowed.

Dictionaries are not permitted.

Students who do not sit the test will be awarded a mark of 0, except for cases in which an application for special consideration is made and approved.

Final Examination

Due: **Examination period**

Weighting: **60%**

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

You are permitted ONE A4 page of paper containing reference material printed on both sides.

The material may be handwritten or typed. The page will be returned to the students at the end of the final examination. Non-programmable calculators with no text-retrieval capacity are allowed. Dictionaries are not permitted.

Delivery and Resources

Coronavirus (COVID-19) Update

Any references to on-campus delivery below may no longer be relevant due to COVID-19.

Please check here for updated delivery information: https://ask.mq.edu.au/account/pub/display/unit_status

CLASSES

This unit consist of 2 hours of lectures and 1 hour tutorial per week, Lectures are held at the following times: Monday 9:00-11:00am, 14 SCO T3.

ACST3006 Tutorials are held on Monday, commencing in **Week 2**:

You must attend the tutorial class in which you are enrolled. The tutorial is an opportunity for you to attempt the section exercises given at the end of each section of work, and to discuss problems with the tutor.

Any alterations to the class times or locations will be advised in lectures and via the website.

REQUIRED and RECOMMENDED TEXTS and/or Materials

Required texts

Lecture materials are available for downloading from ACST3006 teaching website.

Recommended textbooks

• Investment Science; David Luenberger

• Modern Portfolio Theory and Investment Analysis; Edwin J. Elton, Martin J. Gruber, Stephen J. Brown and William N. Goetzmann

• Investment Mathematics and Statistics; Andrew Adams, Della Bloomfield, Philip Booth and Peter England

• Options, Futures and Other Derivatives; John Hull

Each copy of these books is available in the Reserve section of the Library and can be purchased from the Macquarie University Co-op bookshops.

Unit Schedule

Coronavirus (COVID-19) Update

The unit schedule/topics and any references to on-campus delivery below may no longer be relevant due to COVID-19. Please consult iLearn for latest details, and check here for updated delivery information: https://ask.mq.edu.au/account/pub/display/unit_status

Week	Lecture Topics
1.	Utility Theory
2.	Decision making via utility functions
3.	Mean-Variance portfolio theory
4.	The CAPM
5.	Single/Multi index models
6.	Arbitrage pricing theory (APT)
7.	Measurements of investment risk
	(Assignment due - Monday 6 April at 12noon)
Semester Break	
8.	Options
9.	Single/Multi period Binomial option pricing model
10.	American and Exotic option pricing via Binomial model
11.	Class Test (Monday 18 May 9:00-11:00am)
12.	Stochastic interest rate models / Efficient market hypothesis
13.	Revision

Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central (https://staff.m

q.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.)*

Students seeking more policy resources can visit the 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).

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 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.

Changes from Previous Offering

The unit code has changed to ACST3006 from ACST306.