ACTL90001
Mathematics of Finance I

SUBJECT GUIDE

*Semester 1, 2014*

Prepared by
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Centre for Actuarial Studies
Department of Economics
Faculty of Business and Economics
Subject Outline

Introduction

Welcome to ACTL90001 Mathematics of Finance I. It is a one-semester 12-week subject of approximately two-hour lectures and one tutorial per week for post-graduate students. This subject will provide you with an introduction to financial mathematics and meet the syllabus of the Institute and Faculty of Actuaries Subject CT1.

Subject Aims

The overall aim of this subject is to provide a grounding in financial mathematics and its simple applications.

Prescribed Reading

The prescribed text is “Compound Interest and its applications” by Fitzherbert and Pitt. This is available from the University Bookroom (ground level, Baillieu Library). You will be expected to read this from cover to cover, and to attempt exercises from it throughout the semester.

Learning Outcomes

Subject Objectives

On successful completion of this subject students should be able to:

• Apply relevant pre-requisite mathematical knowledge in the solution of a range of practical problems;

• Describe and apply the main methods of finding the accumulation or present value of money under simple and compound interest and discount;

• Derive and apply formulae to calculate the accumulation or present value of a series of payments, including the cases of continuous payments and variable interest rates;

• Analyze and solve equations of value for rates of interest;

• Calculate rates of return on investment portfolios using methods employed by actuaries;

• Construct and analyze a loan schedule, including cases when terms of a loan are altered;

• Analyze financial aspects of projects using discounted cash flow techniques;

• Explain the key features of the main types of financial assets, including shares, bonds, property and derivatives;
• Perform compound interest calculations relating to financial assets, including the calculation of price and yield;

• Calculate the delivery price and the value of a forward contract using arbitrage free pricing methods;

• Perform calculations relating to the term structure of interest rates;

• Derive results for simple stochastic models for investment returns, and apply these results.

To view the learning goals, generic skills and graduate attributes for your degree, please locate the University Handbook entry for your degree at: http://handbook.unimelb.edu.au/

Generic Skills

In this subject you will have the opportunity to develop important generic skills. These include: written communication; problem solving; application of theory to practice; synthesis of data and other information; use of computer software.

Prerequisites

Students who have not previously studied probability theory must take MAST20004 Probability (which may be taken concurrently with this subject).

Academic Staff Contact Details

Lecturer Contact Details

The lecturers for Financial Mathematics I are

Professor Daniel Dufresne (lectures in weeks 1-4 and tutorials in weeks 2-5)

Email dufresne@unimelb.edu.au, Room 3.25 in the FBE Building

Dr Zhuo Jin (lectures in weeks 5-8 and tutorials in weeks 6-9)

Email zjin@unimelb.edu.au, Room 3.18 in the FBE Building

Professor David Dickson (lectures in weeks 9-12, tutorials in weeks 10-12)

Email dcmd@unimelb.edu.au, Room 3.24 in the FBE Building

Individual staff will advise you of their office hours.
Email Protocol

Please note that we are only able to respond to student emails coming from a University email address. Please do not use personal email addresses such as Yahoo, Hotmail or even business email addresses. Emails from non-University email addresses may be filtered by the University’s spam filter, which means that we may not receive your email. All correspondence relating to this subject will only be sent to your University email address. Note that you must first activate your University email address before you can send or receive emails at that address. You can activate your email account at this link: http://accounts.unimelb.edu.au/.

While academic staff endeavor to address queries received via email, it is more appropriate to resolve substantive questions during lectures and tutorials and during normal consultation hours. With this in mind, we encourage students to attend all lectures and tutorials and to familiarise themselves with the consultation hours offered by the lecturers and tutors in this subject.

Lectures and Tutorials

Lecture Times

Monday 9:00-10:00am, Chisholm Theatre, Babel Building
Thursday 9.00-10.00am, Alan Gilbert Building, Theatre 2

Lecture Participation Requirements

Attendance at all lectures and tutorials is important.

Tutorial Times

Monday 1-2pm, The Spot, Room 2.016

Tutorial Participation Requirements

The tutorial problems will be based on the previous week’s materials and be posted on the LMS after tutorial classes. It is expected that all students will attempt tutorial questions ahead of tutorial classes, and will participate in answering questions at tutorials.

Using Lectopia

This subject does not use the Lectopia service. This is a deliberate decision as Lectopia will not benefit students given the nature of this subject. Success in this subject is strongly related to attentiveness at lectures and tutorials, and thorough preparation for tutorials. It is strongly recommended that you attend all lectures and tutorials.
Assessment

Assessment Overview

Your assessment for this subject comprises the following:

<table>
<thead>
<tr>
<th>Assessment Task</th>
<th>Due</th>
<th>Weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignment</td>
<td>To be advised</td>
<td>10%</td>
</tr>
<tr>
<td>Mid-semester exam</td>
<td>Week 7</td>
<td>20%</td>
</tr>
<tr>
<td>End-of-semester exam</td>
<td>Assessment period</td>
<td>70%</td>
</tr>
</tbody>
</table>

- The mid-semester exam will take place on the Thursday of week 7, i.e. 17 April.
- A 2 hour final exam will be given during exam period.

Note that exams will be based on the prescribed reading.

Exam Policy

The Faculty requires that you are available for the entire examination period. Supplementary exams will not be provided in cases of absence during the examination period, unless the absence is due to serious illness or other serious circumstances. See the Special Consideration web site for more information:

http://www.ecom.unimelb.edu.au/students/special/#missing

In the mid-semester and end of semester exams you may only use one of the following calculators:

- Casio FX82 (with or without any suffix)
- Casio FX83 (with or without any suffix)
- Casio FX85 (with or without any suffix)
- Sharp EL531 (with or without any suffix)
- Texas Instruments BA II Plus (with or without any suffix)
- Texas Instruments TI-30 (with or without any suffix)
Using the Assignment Tool

The Assignment Tool allows you to submit your assignment to your lecturer online from home or from any of the student labs on campus.

During the course of the semester, you’ll be asked to submit an assignment in electronic format into the Assignment Tool. You can access the Assignment Tool by clicking on Assignment Tool in the navigation menu from the LMS page for this subject.

Please note that you are required to keep a copy of your assignment after it has been submitted, as you must be able to produce a copy of your assignment at the request of your tutor or lecturer at anytime after the submission due date.

Plagiarism and Collusion

Presenting material from other sources without full acknowledgement (referred to as plagiarism) is heavily penalised. Penalties for plagiarism can include a mark of zero for the piece of assessment or a fail grade for the subject.

Plagiarism is the presentation by a student of an assignment identified as his or her own work even though it has been copied in whole or in part from another student’s work, or from any other source (e.g. published books, web-based materials or periodicals), without due acknowledgement in the text.

Collusion is the presentation by a student of an assignment as his or her own work when it is, in fact, the result (in whole or in part) of unauthorised collaboration with another person or persons. Both the student presenting the assignment and the student(s) willingly supplying unauthorised material are considered participants in the act of academic misconduct.


The Teaching and Learning Unit has developed a web-based ‘Academic Honesty Module’ that allows you to learn more about and test your knowledge of plagiarism and collusion. You are strongly encouraged to complete this module, which can be accessed at: http://tlu.ecom.unimelb.edu.au/AcademicHonestyTest/index.cfm

Penalties for Late Submission and Exceeding Word Limits

In order to ensure equality for all students, assignments must be completed within specified time limits. Late submissions will attract a marking penalty where approval for late submission has not been given.

Assignments that exceed word limits may also attract a marking penalty.

The late penalty that will apply is 2 marks for an assignment that is up to 24 hours late, with a further deduction of 2 marks for every hour after that. Thus, an assignment that is 32 hours overdue will receive a mark of zero.
Special Consideration

Students who have been significantly affected by illness or other serious circumstances during the semester may be eligible to apply for Special Consideration.

The following website contains detailed information relating to who can apply for Special Consideration and the process for making an application:

http://www.ecom.unimelb.edu.au/students/special/

Other Subject Resources

The following resources are provided to assist your learning:

Supplementary Readings


Institute and Faculty of Actuaries. Subject CT1 Core Reading.

LMS Discussion Board

The Discussion Board for this subject can be accessed via the LMS subject page and allows you to post messages and read messages at any time. All students are free to communicate with each other using the Discussion Board by posting, reading, and replying to messages.

The discussion forum is organised into threads (conversations within a topic). Messages are posted by starting a new thread or replying to an existing posting. To access the Discussion Board, click on the Discussion Board located in the navigation menu of the LMS page for this subject.

Always be polite when asking questions or posting replies. Impolite language will not be tolerated. The lecturer reserves the right to ban students who use inappropriate/impolite language from using the Discussion Board.

Credit for Professional Examinations

University of Melbourne students seeking exemption for corresponding examinations of the Actuaries Institute should note that performance in assignments is not taken into account. Recommendation for exemption in Subject CT1 is based on the combined mid-term and end-of-semester examination results of Mathematics of Finance I. Exemption lists will be posted on the Centre’s website.
Professional Examinations

Professional exams and solutions are available at

http://www.actuaries.org.uk/students/pages/past-exam-papers