

School of Economics and Finance

MMAF 531

SPECIAL TOPIC: MATHEMATICS OF FINANCE

Trimester 2, 2015

COURSE OUTLINE

Lecturer Leigh Roberts, RH 323, phone 463-5937 (coordinator)
office hour: 15.40 - 16.30 Tuesdays in RH 323
email: leigh.roberts@vuw.ac.nz

Administrator Rachel Zhang, RH 307, phone 463-6148
email: viaf.programme@vuw.ac.nz

Lecture times Tuesday, 16.40 - 18.30, GB LT4

Tutorial times tba

Trimester dates

Teaching Period: Monday 13 July to Friday 16 October 2015

Study Period: Monday 19 October to Thursday 22 October 2015

Examination Period: Friday 23 October to Saturday 14 November 2015 (inclusive)

Withdrawal from the course

Your fees will be refunded if you withdraw from this course on or before Friday 24 July 2015.

The standard last date for withdrawal from this course is Friday 25 September 2015. After this date, students forced to withdraw by circumstances beyond their control must apply for permission on the form 'Application for Associate Dean's permission to Withdraw Late', and include supporting documentation. This form is available from either of the Faculty's Student Customer Service Desks.

Prescription

Valuation of loans and related securities; duration, volatility and immunisation, yield curves and the valuation of interest rate derivatives; credit risk and credit risk derivatives.

Course Learning Objectives

By the end of this course, students should

- exhibit a sound comprehension of the theory of compound interest and its applications to insurance in particular, and to the financial world in general.
- be able to apply financial mathematical tools to the pricing and evaluation of fixed interest and insurance contracts, and the simpler financial derivatives.
- exhibit a sound comprehension of the concepts underlying the yield curve and credit spreads.
- be able to place financial mathematics principles within the framework of financial risk management.

The course learning objectives apply to all sections of the course and are subject to testing in each item of assessment.

Course Content

The content and timing of the course, and the order of presentation, may differ slightly from the information given in the following table.

Date, 2015	Week	Theme	Project	Ass set due
13 - 17 July	1	EAR, APR, annuities		1
20 - 24 July	2	annuities, loans, deposits		
27 - 31 July	3	loans, bonds		2 1
3 - 7 August	4	bonds, yield curves		
10 - 14 August	5	forward rates, interest rate derivatives	App	3 2
17 - 21 August	6	unitised funds, indexed securities		
<i>Mid-trimester break, 2 weeks: Monday 24 August - Friday 4 September 2015</i>				
7-11 September	7	duration, volatility (1), convexity		4 3
14-18 September	8	immunisation, stochastic interest rates		
21-25 September	9	lognormal distribution, asset returns		4
28 September - 2 October	10	volatility (2); volatility derivatives		
5 - 9 October	11	credit derivatives	Due	
12 - 16 October	12	Revision		

Under the Project column, 'App' denotes approval by the coordinator of the student's choice of topic for the Project, as well as the student's choice of data to be used, and the approach taken. Approval for the project is to be sought by email from the coordinator, no later than midnight on the Friday of week 5, viz. Friday 14 August 2015.

Guidelines for the project will be distributed on blackboard and discussed in lectures, no later than the third week of the course. The project itself is due at the end of week 11, on Friday 9 October 2015.

Students are however encouraged to think about their projects from inception of the course, and to seek the coordinator's approval of their intended approach well before the deadline.

Assignments are set in the weeks indicated above in the Table, to be handed in by the Friday two (course) weeks later, as indicated in the final column in the Table. Project

and assignments are to be handed in by hard copy, by 5 pm on the due date, to Box 29 on the Mezzanine floor, Rutherford House.

Submitted projects should list the approximate number of words, and have page numbers inserted. Penalties may be imposed if the length of work submitted does not lie within the recommended range of the number of words.

Penalties are imposed for late submission of assignments and projects: see the Penalties section below.

Expected workload

You should spend 3 hours in class per week (2 lectures and 1 tutorial). You should expect to spend an additional 10-12 hours per week reading, studying and completing assignments and the Project. Overall it is expected that you will spend approximately 200 hours on completing this course.

Readings

Lecture notes and readings will be made available on Blackboard.

It is *not* recommended that you purchase any text books for this course.

Materials and Equipment

A calculator may be needed for tutorials and assignments, as well as for the final exam. The calculator must be able to work out powers, and have the exponential and the logarithmic functions. In addition, the calculator must be silent and have its own power source.

More advanced calculators, such as graphics and programmable calculators, are not needed for this course. Programmable calculators must be reset prior to the exam.

If you do not already have a calculator, talk to the lecturer before you buy one. A basic calculator suitable for the course should cost no more than about \$20.

The Project, and one or more assignments, will involve the use of the computer suite R, available to students in RWW 202. No previous knowledge of R is assumed. If they wish, students may download R onto their own computers: it is open-source software, available free from <http://www.r-project.org/>; alternatively they should search for 'cran' on the internet.

Assessment

- 40% Four assignments, each worth 10%
- 20% Project, of 1500-2000 words, to be submitted to Box 29 on the mezzanine floor of Rutherford House by 5 pm on Friday 9 October 2015.
- 40% Three hour final examination, during the examination period, Friday 23 October - Saturday 14 November 2015 (inclusive).

All items of assessment address all of the CLOs.

Penalties

Except in the matter of illness (for which a doctor's certificate is required), or other highly exceptional circumstances, marks for Projects and assignments are reduced by 5% for each day late.

Projects and assignments appearing to be copied will be marked as zero. Appeals on marking may be made to the coordinator.

Use of Turnitin

Student work provided for assessment in this course may be checked for academic integrity by the electronic search engine <http://www.turnitin.com>. Turnitin is an on-line plagiarism prevention tool which compares submitted work with a very large database of existing material. At the discretion of the Head of School, handwritten work may be copy-typed by the School and subject to checking by Turnitin. Turnitin will retain a copy of submitted materials on behalf of the University for detection of future plagiarism, but access to the full text of submissions will not be made available to any other party.

Examinations

Students who enrol in courses with examinations are obliged to attend an examination at the university at any time during the formal examination period. The final examination for this course will be scheduled at some time during the following period:

Friday 23 October - Saturday 14 November 2015 (inclusive)

Mandatory course requirements

Submission of the project and attendance at the exam are compulsory.

If you cannot complete an assignment or the project, or sit a test or examination, refer to

www.victoria.ac.nz/home/study/exams-and-assessments/aegrotat

A minimum mark of 40% is required in the final exam for a pass in the course.

Class representative

A class representative will be elected in the first class, whose name and contact details will be made available to VUWSA, the Course Coordinator and the class. The class representative provides a communication channel to liaise with the Course Coordinator on behalf of students.

Communication of additional information

Additional information will be conveyed to students via Blackboard.

Note that emails sent from blackboard by the coordinator are sent to the students' university email addresses (name@myvuw.ac.nz), so look this email address up frequently even if it is not the email address that you normally use. In addition you should of course check frequently on blackboard itself.

Student Feedback

Student feedback on University courses may be found at www.cad.vuw.ac.nz/feedback/feedback_display.php

Link to general information

For general information about course-related matters, go to <http://www.victoria.ac.nz/vbs/studenthelp/general-course-information>

Note to Students

Your assessed work may also be used for quality assurance purposes, such as to assess the level of achievement of learning objectives as required for accreditation and academic audit. The findings may be used to inform changes aimed at improving the quality of VBS programmes. All material used for such processes will be treated as confidential, and the outcome will not affect your grade for the course.