TE WHARE WĀNANGA O TE ŪPOKO O TE IKA A MĀUI
VICTORIA
UNIVERSITY OF WELLINGTON

School of Economics and Finance

MMAF 531

SPECIAL TOPIC: MATHEMATICS OF FINANCE

Trimester 2, 2014

COURSE OUTLINE

Lecturer Leigh Roberts, RH 323, phone 463-5937 (coordinator)
office hour: 11.30 - 12.20 Wednesdays 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 Wednesday, 12.40 - 2.30, GB LT3

Tutorial times Wednesday 11.30 - 12.20, RWW 221

Trimester dates

Teaching Period: Monday 14 July to Friday 17 October 2014
Study Period: Monday 20 October to Thursday 23 October 2014
Examination Period: Friday 24 October to Saturday 15 November 2014 (inclusive)

Withdrawal from the course

Your fees will be refunded if you withdraw from this course on or before Friday 25 July 2014.

The standard last date for withdrawal from this course is Friday 26 September 2014. 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, 2014	Week	Theme	Project	Ass set	Ass due	Tuts
14 - 18 July	1	EAR, APR: $i, i^{(2)}, d, \delta$		1		
21 - 25 July	2	Yield curve, forward curves				Tut
28 July - 1 August	3	Annuities		2	1	Tut
4 - 8 August	4	Loans, bonds				
11 - 15 August	5	Unitised funds/securities	App	3	2	Tut
18 - 22 August	6	Forward interest rates				Tut
Mid-trimester break, 2 weeks: Monday 25 August - Friday 5 September 2014						
8-12 September	7	Parameters of the yield curve			3	
15-19 September	8	Libor; FRAs				Tut
22-26 September	9	Lognormal distribution, volatility				Tut
29 September - 3 October	10	Implied, realised volatility				
6 - 10 October	11	FVAs	Due			Tut
13 - 17 October	12	Revision				Tut

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.

Assignments are set in the week indicated above, to be handed in to blackboard by the Friday (midnight) two (course) weeks later. The coordinator may give permission for more mathematical assignments to be handed in by hard copy, generally by 5 pm on the due date, to Box 40 on the Mezzanine floor, Rutherford House.

Details of the requirements for the Project are to be circulated on blackboard, and discussed in a lecture, within the first three weeks of the course. Details of the students' topics and data to be used is to be sent to the coordinator, by email, no later than the end of week 5. 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.

The Project is due by the middle of week 11, Wednesday 8 October 2014, and is to be submitted electronically to Blackboard, by midnight on the due date. The coordinator

may give permission for the Project to be submitted in hard copy, by 5 pm on the due date, as above for the assignments.

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

In weeks when there is a tutorial you should spend 3 hours in class per week (2 lectures and 1 tutorial); in the remaining weeks you should spend 2 hours in class per week (2 lectures). 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. Particular R packages to be used may include dlm, which should be downloaded onto student computers at the same time.

Assessment

- 30% Three assignments, each worth 10%
- 30% Project, of 2000-3000 words, to be submitted electronically to Blackboard by the middle of week 11, Wednesday 8 October 2014.
- 40% Three hour final examination, during the examination period, Friday 24 October - Saturday 15 November 2014 (inclusive).

From Trimester 1, 2014, a revised Assessment Handbook will apply to all VUW courses: see http://www.victoria.ac.nz/documents/policy/staff-policy/assessment-handbook.pdf.

In particular, there will be a new grade scheme, in which the A+ range will be 90-100% and 50-54% will be a C-.

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 24 October - Saturday 15 November 2014 (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

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 rep-

resentative 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.

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.