# VICTORIA

### UNIVERSITY OF WELLINGTON

## School of Economics and Finance

## FINA 406

## FIXED INCOME SECURITIES

Trimester 2, 2012

### COURSE OUTLINE

**Coordinator/Lecturer**    Leigh Roberts, RH 323, phone 463 5937
office hour:   10.30 - 11.20 Thursdays in RH 323
email:   leigh.roberts@vuw.ac.nz

**Administrator**    Anna Potts, RH 307, phone 463 6148
email:   anna.potts@vuw.ac.nz

**Lecture times**    Wednesday 14.30 - 16.20,  RWW 126

**Trimester dates**

Teaching Period: Monday 16 July to Friday 19 October 2012
Study Period: Monday 22 October to Thursday 25 October 2012
Examination Period: Friday 26 October to Saturday 17 November 2012 (inclusive)

Note: Students who enrol in courses with examinations should be able to attend an examination at the University at any time during the formal examination period.

**Withdrawal from the course**

Your fees will be refunded if you withdraw from this course on or before 27 July 2012.

The standard last date for withdrawal from this course is Friday 28 September 2012. 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 the Faculty's Student Customer Service Desks.

**Course Learning Objectives**

By the end of this course, students should be able to

- exhibit a sound comprehension of the yield curve and interest rate functions derived therefrom.
- exhibit a sound comprehension of the elements of stochastic calculus and its applications utilising interest rate models.
- exhibit a sound comprehension of the applications of stochastic calculus to pricing and analysis of fixed income and related securities.
- apply financial mathematical tools to pricing and analysis of fixed income derivatives depending on joint survivorship, modelled using copulas.
- apply finite difference and Monte Carlo techniques to analysis and pricing of financial securities.
- evaluate credit risk models in wide current usage; and apply financial mathematical tools to credit risk analysis and modelling, using asset swaps and credit spreads.
- realise the potential of, as well as the limitations of, quantitative models and methodologies in dealing with interest rate and credit risk.
- place financial mathematics principles within the framework of financial risk management in general, and financial engineering and credit risk in particular.

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

**Course Content**

The course is divided into three main parts, viz.:

- Fixed income modelling (6 weeks);
- Credit risk (3 weeks); and
- Firm time to default (3 weeks)

The teaching sequence does not necessarily follow this order; and the timing shown is only approximate.

**Course Delivery**

One two hour lecture per week for 12 weeks.

**Expected Workload**

It is expected that the course will require approximately 150 hours of work, including class time.

**Readings**

Notes and readings will be made available on Blackboard.

It is *not* recommended that you purchase any text books for this course. Books which may be useful for parts of the course, however, include:

- M. Baxter and A. Rennie (1996), *Financial Calculus: an Introduction to Derivative Pricing*. Cambridge University Press.
- A. G. J. Cairns (2004), *Interest rate models: an introduction*. Princeton University Press.
- J. C. Hull (2000), *Options, Futures and other Derivatives*, fourth edition. Prentice Hall.
- J. C. Hull (2006), *Options, Futures and other Derivatives*, sixth edition. Pearson Prentice Hall.
- J. C. Hull (2007), *Risk Management and Financial Institutions*. Pearson Prentice Hall.
- L. Martellini and P. Priaulet (2001), *Fixed-Income Securities*. Wiley.
- A. J. McNeil, R. Frey and P. Embrechts (2005), *Quantitative Risk Management*. Princeton University Press.
- P. J. Schönbucher (2003), *Credit Derivatives Pricing Models*. Wiley.

The preferred computing environment for the course is the statistical package $R$, available in student labs and also as open-source freeware from the internet.

A calculator is required, with the capacity to evaluate powers, exponentials and logarithms. A basic calculator suitable for the course costs about $20.

**Assessment**

- 50%  Three hour final examination, during the period
       Friday 26 October - Saturday 17 November 2012.
- 30%  project of approximately 2000-3000 words, due at the end of week 11.
- 20%  Weighted average mark for four assignments.

A list of available topics for the projects will be made available by the coordinator within the first two weeks of the course.

A student's choice of project topic, along with a brief indication of the scope and nature of the project, are to be submitted by email to the coordinator no later than the end of week 5 (Friday 17 August 2012). Projects are due at the end of week 11 (Friday 12 October 2012).

It is anticipated that assignments will be due at the end of weeks 4, 6, 9 and 12. Any variation from this schedule will only be made with the approval of the class. At least two weeks will be allowed between setting and submitting assigments.

It is anticipated that the projects will involve programming in R; and it is preferred to have the text written up in Latex. These conditions may be relaxed at the coordinator's discretion.

Provided the student has good reason (for instance a medical certificate), and obtains permission *before* the due date from the coordinator, there will be no penalty for handing in a project or assignment late. In other cases the project or assignment will first be graded on a basis comparable with those assignments handed in on time, and then have 5% of that grade subtracted for each day or part-day for which the assignment is late. Projects of length outside the recommended limits may be penalised.

A project or assignment is expected to be written *entirely* by the student. In cases where there is any doubt in the marker's mind as to whether the assignment is entirely the student's own work, the coordinator reserves the right to withhold the mark until the situation has been clarified.

*Note: 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 audit purposes. The findings may be used to inform changes aimed at improving the quality of FCA programmes. All material used for such purposes will be treated as confidential, and the outcome will not affect your grade for the course.*

### Mandatory course requirements

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

### Class Representative

A class representative will be elected in the first class, and that person's name and contact details made available to VUWSA, the coordinator and the class. The class representative provides a communication channel to liaise with the coordinator on behalf of students.

### Communication of additional information

Additional information will be conveyed to students via Blackboard and/or email.

Emails may be sent to the address that you supplied with your enrolment; but they may also be sent to your SCS email address, which is your official university email address. You should look at both email addresses on a regular basis.

### 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 my 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.

**For the following important information follow the links provided:**

**Academic Integrity and Plagiarism**
http://www.victoria.ac.nz/home/study/plagiarism.aspx

**General University Policies and Statutes**
Find key dates, explanations of grades and other useful information at
http://www.victoria.ac.nz/home/study

Find out about academic progress and restricted enrolment at
http://www.victoria.ac.nz/home/study/academic-progress

The University's statutes and policies are available at
http://www.victoria.ac.nz/home/about/policy,
except qualification statutes, which are available via the Calendar webpage at
http://www.victoria.ac.nz/home.study/calendar (See Section C)

Further information about the University's academic processes can be found on the website of the Assistance Vice-Chancellor (Academic) at
http://www.victoria.ac.nz/home/about_victoria/avcacademic/default.aspx

**AVC (Academic)Website: information including: Conduct, Academic Grievances, Students with Impairments, Student Support**
http://www.victoria.ac.nz/home/about_victoria/avcacademic/Publications.aspx

**Faculty of Commerce Offices**
http://www.victoria.ac.nz/fca/studenthelp/

**Te Putahi Atawhai**
**Maori and Pacific Mentoring Programme**
http://www.victoria.ac.nz/tpa/