

School of Economics and Finance

**MMAF 533**

**SPECIAL TOPIC:  
FINANCIAL ENGINEERING AND RISK MANAGEMENT**

Trimester 2, 2009

**COURSE OUTLINE**

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**Lecture times** Monday 11.30 - 1.20, RWW 313

**Tutorial times** TBA

**Dates**

Trimester 2 starts on Monday 13 July 2009, and the exam period finishes on Saturday 14 November 2009.

**Withdrawal from the course**

Information on withdrawal from the course can be found in  
<http://www.victoria.ac.nz/home/admisenrol/payments/withdrawalsrefunds.aspx>

## **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.
- to be able to 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.
- to 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 models (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.

## **Expected Workload**

It is expected that the course will require approximately 200 hours of work, including class time.

## Readings

Notes and readings will be made available, generally on Blackboard although sometimes in class.

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.

You can find Blackboard at <http://www.blackboard.vuw.ac.nz/>

The VUW library has a web page that contains detailed information about available library resources and has links to several other sites. Its URL is <http://www.vuw.ac.nz/library>

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. The requirement to use *R* may however be waived for individual students, at the coordinator's discretion. A scientific calculator is also required.

## Assessment

- 50% Three hour final examination, during the period 27 October - 14 November 2009.
- 30% Project of approximately 3000 - 4000 words.
- 20% Weighted average assignment mark

The project will be set no later than the end of week 4 of the course (Friday 7 August). The due date for submission of the project will be approximately 3/4 of the way through the course (roughly the end of September or beginning of October), on a date to be fixed in consultation with the class.

Some assignments may be weighted more heavily than others. The weighting will be explained to the class when the assignment is set, with the due date normally two weeks after setting the assignment.

Provided the student has good reason (for instance a medical certificate), and obtains permission *before* the due date from the course 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.

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 is compulsory; and in order to pass the course, it is necessary to obtain at least 40% in the final examination.

## Communication

Additional information or information on changes will be posted on Blackboard. Some information may be emailed to you via your SCS address, so check this regularly.

## SUPPLEMENTARY INFORMATION

### Faculty of Commerce and Administration Offices

#### Railway West Wing (RWW) - FCA Student and Academic Services Office

The Faculty's Student and Academic Services Office is located on the ground and first floors of the Railway West Wing. The ground floor counter is the first point of contact for general enquiries and FCA forms. Student Administration Advisers are available to discuss course status and give further advice about FCA qualifications. To check for opening hours call the Student and Academic Services Office on (04) 463 5376.

#### Easterfield (EA) - FCA/Education/Law Kelburn Office

The Kelburn Campus Office for the Faculties of Commerce and Administration, Education and Law is situated in the Easterfield Building on the ground floor (EA 005). This counter is the first point of contact for:

- Duty tutors for student contact and advice.
- Information concerning administrative and academic matters.
- Forms for FCA Student and Academic Services (e.g. application for academic transcripts, requests for degree audit, COP requests).
- Examinations-related information during the examination period.

To check for opening hours call the Student and Academic Services Office on (04) 463 5376.

### General University Policies and Statutes

Students should familiarise themselves with the University's policies and statutes, particularly the Assessment Statute, the Personal Courses of Study Statute, the Statute on Student Conduct and any statutes relating to the particular qualifications being studied; see the Victoria University Calendar or go to <http://www.vuw.ac.nz/policy>.

For information on the following topics, go to the Faculty's website <http://www.vuw.ac.nz/fca>

- Academic Grievances
- Student and Staff Conduct
- Meeting the Needs of Students with Impairments
- Student Support

### Academic Integrity and Plagiarism

Academic integrity is about honesty – put simply it means **no cheating**. All members of the University community are responsible for upholding academic integrity, which means staff and students are expected to behave honestly, fairly and with respect for others at all times.

Plagiarism is a form of cheating which undermines academic integrity. The University defines plagiarism as follows:

*The presentation of the work of another person or other persons as if it were one's own, whether intended or not. This includes published or unpublished work, material on the Internet and the work of other*

*student or staff.*

It is still plagiarism even if you re-structure the material or present it in your own style or words.

*Note: It is however, perfectly acceptable to include the work of others as long as that is acknowledged by appropriate referencing.*

Plagiarism is prohibited at Victoria and is not worth the risk. Any enrolled student found guilty of plagiarism will be subject to disciplinary procedures under the Statute on Student Conduct and may be penalised severely. Consequences of being found guilty of plagiarism can include:

- an oral or written warning
- cancellation of your mark for an assessment or a fail grade for the course
- suspension from the course or the University.

Find out more about plagiarism, and how to avoid it, on the University's website at:  
<http://www.vuw.ac.nz/home/studying/plagiarism.html>.

### **Notice of Turnitin Use**

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 identifies material that may have been copied from other sources including the Internet, books, journals, periodicals or the work of other students. Turnitin is used to assist academic staff in detecting misreferencing, misquotation, and the inclusion of unattributed material, which may be forms of cheating or plagiarism. At the discretion of the Head of School, handwritten work may be copy typed by the School and subject to checking by Turnitin. You are strongly advised to check with your tutor or the course coordinator if you are uncertain about how to use and cite material from other sources.

### **Manaaki Pihipihinga Programme**

Manaaki Pihipihinga is an academic mentoring programme for undergraduate Māori and Pacific students in the Faculties of Commerce and Administration, and Humanities and Social Sciences. Sessions are held at the Kelburn and Pipitea Campuses in the Mentoring Rooms, 14 Kelburn Parade (back courtyard), Room 109D, and Room 210, Level 2, Railway West Wing. There is also a Pacific Support Coordinator who assists Pacific students by linking them to the services and support they need while studying at Victoria. Another feature of the programme is a support network for Postgraduate students with links to Postgraduate workshops and activities around Campus.

For further information, or to register with the programme, email [manaaki-pihipihinga-programme@vuw.ac.nz](mailto:manaaki-pihipihinga-programme@vuw.ac.nz) or phone (04) 4636015. To contact the Pacific Support Coordinator, email [pacific-support-coord@vuw.ac.nz](mailto:pacific-support-coord@vuw.ac.nz) or phone (04) 463 5842.