

School of Economics and Finance
MMAF527 Special Topic: Derivative Securities

Trimester 1 2010

COURSE OUTLINE

Names and Contact Details

Lecturer and Coordinator: Toby Daghish, RH309, phone 463-5451,
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Administrator: Sue Freear, RH327, phone 463-5380,
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Trimester Dates

Monday 1 March to Wednesday 30 June.

Class times and Room numbers

Tuesday 2:40-4:30pm, RWW414

Course delivery

The course is composed of lectures, consisting of the lecturer presenting notes and discussing the course material with students.

Course content

The following is the timetable for the course, with suggested readings for each section. The readings are fairly extensive, but hopefully should give you plenty of alternative explanations of the material covered in lectures.

Date	Lecture	Readings
March 2	Introduction to derivatives.	H, chapters 1-2,5,8,10. WHD, chapter 1.
March 9	Stochastic Calculus.	H, chapter 12. WHD, chapter 2. BR sections 3.1-3.3.
March 16	Risk-Neutral Valuation: PDE Approach. <i>Assignment 1 due.</i>	H, chapter 13. WHD, chapters 3-5.
March 23	Risk-Neutral Valuation: Martingale Approach.	BR, chapters 1-3.
March 30	Dividends and Options on different securities.	H, chapter 14. WHD, chapter 6. BR, chapter 4
April 20	Dividends and Options on different securities, cont'd <i>Assignment 2 due.</i>	
April 27	<i>Midterm Exam</i>	
May 4	Numerical Methods: Finite Difference Methods.	H, chapter 17. WHD, chapters 8-10.
May 11	Numerical Methods: Monte Carlo Simulation.	H, chapter 17.
May 18	Stochastic Volatility. <i>Case due.</i>	–
May 25	Fixed income derivatives.	H, chapters 4, 28-29. WHD, chapter 17. BR, chapter 5. C, chapter 4.
June 1	Fixed income derivatives, cont'd <i>Assignment 3 due.</i>	

Course Learning Objectives

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

- C1 Understand stochastic calculus, and use Ito's lemma to solve option pricing problems.
- C2 Apply the partial differential equation and martingale approaches to option pricing (including being able to derive the Black-Scholes formula).
- C3 Use finite difference and Monte Carlo techniques to price options where a closed form solution does not exist.
- C4 Hedge options and evaluate Value at Risk for portfolios of stocks and derivatives.
- C5 Appreciate the general problem of pricing fixed income securities.
- C6 Use the Vasicek and Cox-Ingersoll-Ross models for the short rate to price coupon bonds, and the Vasicek model to price options on coupon bonds.

Readings

Readings will be taken from a variety of sources. Probably the most used reference on this material is :

- J. Hull, "Options, Futures and Other Derivatives", Prentice Hall, 6th edition. [H]

However, for some of the topics, we will find the following books useful:

- M. Baxter and A. Rennie, "Financial Calculus: An introduction to derivative pricing", Cambridge, First edition. [BR]
- P. Wilmott, S. Howison and J. Dewynne, "The Mathematics of Financial Derivatives: A Student Introduction", Cambridge, First edition. [WHD]
- A. J. G. Cairns, "Interest Rate Models: An Introduction", Princeton, First edition. [C]

Expected workload

Expected workload for this course is 200 hours. 22 hours of lectures, 4 hours of exams and 174 hours of study/work on assignments.

Materials and Equipment

Non-programmable calculators are allowed for the midterm and final exams.

Assessment Requirements

Your course mark will be a weighted average, made up as follows:

Assignment 1:	5%	due March 16.
Assignment 2:	5%	due April 20.
Midterm exam:	30%	on April 27 (during regular class time).
Live case:	25%	due May 18.
Assignment 3:	5%	due June 1.
Final exam:	30%	two hours, date will be scheduled during the university examination period.

The assignments will contain problems similar to those which will be found in the exam, while the live case will allow you to use some of the tools from the course to tackle a realistic options pricing problem using actual market data.

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 processes will be treated as confidential, and the outcome will not affect your grade for the course.

Penalties

Assignments and cases are due at the start of the lecture indicated. Assignments and cases handed in late will not be marked.

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.

Examination dates for trimester one: Friday 11 June Wednesday 30 June 2010.

Mandatory course requirements

None.

Communication of additional information

Information on the course, including assignments and lecture notes, will be distributed via blackboard, which can be found at <http://blackboard.vuw.ac.nz/>.

Withdrawal dates

Information available via

Withdrawal dates: Late withdrawals with Associate Dean (Students) permission (See Section 8: Withdrawals - from the Personal Courses of Study Statute)

[http://policy.vuw.ac.nz/Amphora! ~ ~ policy.vuw.ac.nz ~ POLICY ~ 000000001743.pdf](http://policy.vuw.ac.nz/Amphora!~%20policy.vuw.ac.nz~POLICY~000000001743.pdf)

Withdrawal dates: refunds:

<http://www.victoria.ac.nz/home/admisenrol/payments/withdrawalsrefunds.aspx>

Class representative

A class representative will be elected in the first class, and that persons name and contact details will be 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.

SUPPLEMENTARY INFORMATION

Academic Integrity and Plagiarism

<http://www.victoria.ac.nz/home/study/plagiarism.aspx>

General University Policies and Statutes

<http://www.victoria.ac.nz/home/about/policy>

AVC (Academic) Website: information including: Conduct, Academic Grievances, Students with Impairments, Student Support

<http://www.victoria.ac.nz/home/about.victoria/avcademic/Publications.aspx>

Faculty of Commerce and Administration Offices

<http://www.victoria.ac.nz/fca/studenthelp/>

Manaaki Pihipihinga Programme

<http://www.victoria.ac.nz/st.services/mentoring/>

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