

School of Economics and Finance

MMAF 527 SPECIAL TOPIC: DERIVATIVE SECURITIES

Trimester One 2012

COURSE OUTLINE

Names and Contact Details

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Trimester Dates

Teaching Period: Monday 5 March – Friday 8 June

Study Period: Monday 11 June – Thursday 14 June

Examination Period: Friday 15 June – Wednesday 4 July (inclusive)

Withdrawal from Course

1. Your fees will be refunded if you withdraw from this course on or before Friday 16 March 2012.
2. The standard last date for withdrawal from this course is Friday 18 May. After this date, students forced to withdraw by circumstances beyond their control must apply for permission on an 'Application for Associate Dean's Permission to Withdraw Late' including supporting documentation

The application form is available from either of the Faculty's Student Customer Service Desks.

Class Times and Room Numbers

Lectures will be held on Wednesday in room RWW126 from 12:40-2:30pm.

Course Content

Topic 1: Introduction Derivative securities. Arbitrage.

Topic 2: Stochastic Calculus Wiener processes. Ito processes. Examples. Ito's Lemma. Estimation of Ito processes.

Topic 3: Risk-Neutral Pricing Hedging portfolio. Fundamental pricing equation. Risk-neutral pricing. Black-Scholes formula. Delta hedging. Discrete rebalancing. Gamma hedging.

Topic 4: Dividends Hedging portfolio. Fundamental pricing equation. Risk-neutral pricing. Options on stock indices. Currency derivatives. Options on futures.

Topic 5: Monte Carlo Simulation Black-Scholes revisited. Central Limit Theorem. Measuring efficiency. Antithetic variates method. Control variate method. Using the Euler approximation. Path-dependent securities.

Topic 6: Finite Difference Methods Finite differences. Explicit method. Implicit method. Crank-Nicholson method.

Topic 7: Early Exercise Opportunities Exercise strategies. Bermudan options. Dynamic programming. American options. Compound options.

Topic 8: Modelling Volatility Implied volatility. Empirical evidence. Stochastic volatility. Hedging. Fundamental pricing equation. Risk-neutral pricing. Monte Carlo simulation.

Topic 9: Interest Rate Models (If time permits) Single factor models. Risk-neutral pricing. Merton's model. Affine yield curve models. Term structure derivatives.

Course Learning Objectives

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

- Demonstrate understanding of stochastic calculus, estimate Ito processes' underlying parameters, and use Ito's lemma
- Derive the partial differential equations that determine derivative prices
- Use risk-neutral pricing to value derivative securities
- Use finite difference and Monte Carlo techniques to price derivative securities
- Hedge and replicate derivative securities using portfolios of stocks and bonds

Course Delivery

Course delivery takes the form of 12 approximately two-hour long lectures.

Expected Workload

The workload for MMAF 527 is intended to be similar to that for other 500-level MMAF courses with weekly lectures. The total expected workload is 200 hours, comprising 16-17 hours per week.

Group Work

None.

Readings

There is no set textbook for this course as comprehensive lecture notes will be available from <http://blackboard.vuw.ac.nz/>.

Materials and Equipment

Non-programmable calculators will be allowed in the final examination.

Assessment Requirements

The final grade will be determined by three assignments (contributing 40% in total) and a two-hour final exam (covering the whole course and contributing 60%).

The assignment due dates are

- Assignment 1 (8%): 12:40pm on Wednesday, March 28 (start of lecture 4).
- Assignment 2 (16%): 12:40pm on Wednesday, May 9 (start of lecture 7).
- Assignment 3 (16%): 12:40pm on Wednesday, June 6 (start of lecture 11).

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.

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 period from Friday 15 June – Wednesday 4 July (inclusive).

Penalties

Assignments handed in late will not be marked. If a satisfactory medical certificate is provided, the weight from the assignment will be shifted onto the other pieces of assessment; otherwise, the assignment score will be recorded as 0.

Material exceeding word limits will not be marked.

Mandatory Course Requirements

A necessary condition for passing the course is that the score on the final exam is at least 50%.

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 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

Course documents and other information will be available on the course website at <http://blackboard.vuw.ac.nz>. Announcements will also be posted there.

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.

For the following 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 www.victoria.ac.nz/home/study. Find out about academic progress and restricted enrolment at <http://www.victoria.ac.nz/home/study/academic-progress.aspx>. The University's statutes and policies are available at 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.aspx> (See Section C). Further information about the University's academic processes can be found on the website of the Assistant Vice-Chancellor (Academic) at 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 and Administration Offices

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

Te Putahi Atawhai

Maori and Pacific Mentoring Programme

http://www.victoria.ac.nz/st_services/tpa/index.aspx