TE WHARE WĀNANGA O TE ŪPOKO O TE IKA A MĀUI

VICTORIA
UNIVERSITY OF WELLINGTON

School of Economics and Finance

MMAF 527 SPECIAL TOPIC: DERIVATIVE SECURITIES

Trimester 1, 2016

COURSE OUTLINE

Prescription
An intensive examination of the pricing of options and option-like assets and their use in hedging financial risk. Topics include stochastic calculus, risk-neutral valuation, finite difference methods, Monte Carlo simulation, and fixed income 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 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: Application to Real Options (if time permits).

Trimester Dates
Teaching Period: Monday 29th February – Friday 3rd June

Study Period: Monday 6th June – Thursday 9th June

Examination Period: Friday 10th June – Wednesday 29th June (inclusive)

Withdrawal from Course
1. Your fees will be refunded if you withdraw from this course on or before Friday 11th March 2016.
2. The standard last date for withdrawal from this course is Friday 13th May 2016. 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 or online.

Names and Contact Details
Graeme Guthrie (course coordinator)
Room RWW 112
Email: graeme.guthrie@vuw.ac.nz

Class Times and Room Numbers
Monday   11:30 - 13:20   Railway West Wing RWW128

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

Mandatory course requirements
In addition to obtaining an overall course mark of 50% or better, students must score at least 50% on the final exam.

If you believe that exceptional circumstances may prevent you from meeting the mandatory course requirements, contact the Course Coordinator for advice as soon as possible.

If you cannot complete an assignment or sit a test or examination, refer to www.victoria.ac.nz/home/study/exams-and-assessments/aegrotat

Expected Workload
The workload for MMAF 527 is intended to be similar to that for other 500-level MMAF courses. The total expected workload is 200 hours.

Assessment
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%): 11:30 on Monday, March 21 (start of lecture 4).
- Assignment 2 (16%): 11:30 on Monday, May 2 (start of lecture 8).
- Assignment 3 (16%): 11:30 on Monday, May 30 (start of lecture 12).

The Assessment Handbook will apply to all VUW courses: see
http://www.victoria.ac.nz/documents/policy/staff-policy/assessment-handbook.pdf.

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 10th June – Wednesday 29th June (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.

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 submitted to Turnitin. A copy of submitted materials will be retained 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.

Materials and Equipment
None.

Student feedback
Student feedback on University courses may be found at www.cad.vuw.ac.nz/feedback/feedback_display.php.

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.

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.

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