TE WHARE WĀNANGA O TE ŪPOKO O TE IKA A MĀUI
VICTORIA
UNIVERSITY OF WELLINGTON

VICTORIA INTERNATIONAL APPLIED FINANCE PROGRAMME

School of Economics and Finance

MMAF514: Derivatives

Trimester Two 2010

COURSE OUTLINE

Your coordinator for MMAF514 - Derivatives is Professor Christine Brown.

Email: Christine.Brown@buseco.monash.edu.au
Phone: 613 99031793

I will endeavor to answer queries via email. Please give me a few days to get back to you and if I haven't responded to a query then prompt me again.

The administrator for the course is Anna Potts.

Email: Anna.Potts@vuw.ac.nz
Phone (04) 463 6148
Room RH 307

Trimester Dates
Study/Teaching Period: Monday 12 July to Friday 15 October 2010
Final Assignment Due: 8 November 2010

Withdrawal dates: Information available via
http://www.victoria.ac.nz/home/admisenrol/payments/withdrawlsrefunds.aspx

Block Courses

First: Tuesday 31st August: 9.15am – 5.30 pm
Wednesday 1st September: 9.00 am – 5.30 pm
Thursday 2nd September: 9.00 am – 12.20 pm

Second: Tuesday 26th October: 9.15am – 5.30 pm
Wednesday 27th October: 9.00 am – 5.30 pm
Thursday 28th October: 9.00 am – 12.20 pm

The courses will take place in room MY632 on the Kelburn Campus

Course Content

Welcome to MMAF-514 Derivatives, Semester 2 2010. This subject focuses on the conceptual aspects concerning the mechanics and pricing of the three main categories of derivative securities: forwards/futures, options and interest rate derivatives (for example swaps/caps/floors/collars). Specific topics that will be covered include basic pricing concepts, arbitrage and trading strategies, cost-of-carry, the Binomial model, Black-Scholes analysis, risk management and hedging principles and some regulatory and structural aspects of derivative markets.

This subject is neither an input-output numerically-based course, nor is it a descriptive institutional-background course in specific derivative markets (although we do cover elements of both from time to time). The focus will *not* be on deriving the mathematics underlying the pricing models, rather on understanding the elements of the pricing models and how they are used in practice. In this subject, students are expected to comprehend the nature of derivative instruments as they study various analytical and conceptual aspects of derivative pricing. Students will learn through reading, problem solving (with and without the computer), lectures and cases. To that end, the prescribed textbook contains most of the subject material covered in the course. It is your source of most information and problem sets. The lecture slides for each topic provide a good summary of the coverage and can be used in conjunction with the textbook for your preparation prior to the block teaching, where any problems or misunderstandings will be resolved. Additional readings and other materials may be posted on BlackBoard.

Course Learning Objectives

Course Objectives

On successful completion of this subject students should be able to:

- Establish a link between spot and futures price
- Implement basic hedging with futures contracts
- Explain factors affecting option prices, including dividends.
- Devise option trading strategies
- Understand the implications of arbitrage bound violations
- Understand the pricing principles behind Black Scholes and binomial models
- Incorporate dividends into option pricing
- Extend the pricing principle on currency and index options
- Explain the mechanics, design and pricing of interest rate options
- View hybrids in terms of components parts for pricing purposes
- Identify some commonality across derivatives disasters (optional)

Generic Skills

In this subject you will have the opportunity to develop important generic skills. These include:

- Oral communication;
- Written communication;
- Collaborative learning;
- Problem solving;
- Team work;
- Statistical reasoning;
- Application of theory to practice;
- Interpretation and analysis;
- Critical thinking;

- Synthesis of data and other information;
- Using computer software.

Subject Aims

The overall objective of this subject is to gain insight into pricing derivative securities, and how they can be used for risk management purposes. Ultimately the aim is to get you to understand the models used to price derivatives and the arbitrage relationships that drive them. Some of the concepts may at first appear difficult and it takes some time for them to gel. It is therefore necessary to do the pre-reading. This is a doing course, and you do gain understanding of these sometimes difficult concepts, through problem solving. I encourage you to do all the problem sets.

Course Delivery

The contact hours of the course will be during the two block releases detailed above. During the rest of the trimester, students will be expected to be engaged in self directed study using their textbook and material posted on Blackboard, and completing assignments which will be posted on Blackboard. **Attendance at all sessions of both block releases is compulsory.**

Course Schedule and Expected Workload

This section provides an estimated timetable for students preparing each of the ten topics. My aim is to cover topics 1 to 6 in the first teaching block: 31st August – 2nd September, 2010. Topics 7 to 10 will be covered in the second teaching block: October 26th – 28th 2010. Total average workload is around 200 hours. During the approximately 6 weeks of term prior to each block release, students will need to allow about 14 hours per week for study, research and preparation of assignments for this course. The two block courses each involve approximately 16 hours of work.

Topic Number	Topic no. & short title	Estimated time to be spent on reading, problem solving and assignment preparation prior to the block release
1	Introduction to futures; Futures markets and trading; Interest rates	12 hours
2	Forward and futures pricing	13 hours
3	Hedging with futures	14 hours
4	Introduction to options; Option trading strategies	16 hours
5	Binomial option pricing	12 hours
6	Black-Scholes-Merton I	15 hours
7	Black-Scholes-Merton II	15 hours
8	Hedge parameters	15 hours
9	Volatility	10 hours
10	Interest rate derivatives	15 hours

Readings
Prescribed text (*) and other references

- *John C Hull. *Fundamentals of Futures and Options Markets (7th edition)*. Prentice Hall, New Jersey, 2011.

- Don M. Chance and Robert Brooks, *An Introduction to Derivatives and Risk Management*, 7th ed, Thomson South-Western, Mason OH 2007.

- Jarrow, R. and S. Turnbull, *Derivative Securities*, 2nd ed, South-Western, 2000.
- John C Hull. *Options Futures and Other Derivatives* (7th edition). Prentice Hall, New Jersey, 2007.

- Stulz, R. M., *Risk Management and Derivatives*, 1st edition, 2003, South-Western.
- Salih N. Neftci, *An Introduction to the Mathematics of Financial Derivatives*, 2nd edition, Academic Press, 2000.

- Paul Wilmott on Quantitative Finance, Wiley, (3 volume set).

Lecture slides will be distributed prior to each teaching block time. The lecture slides can be used in conjunction with the text-book. The text book coverage as listed below constitutes what you need to know from the course. The text book is not very mathematical in nature. If you want a slightly more in depth mathematical treatment then the second Hull textbook listed above provides it. Otherwise the book by Neftci listed above gives a good treatment for the quantitative lay person. Paul Wilmott has written numerous books on quantitative finance and derivatives.

At the end of each topic I will have a list of what you need to know from the lecture/workshop/case study discussion. Also there will be "examination type" questions given in each of the problem sets so that you will have a good idea of the difficulty level and type of question required of you in the exams. Electronic copies of most materials will be available from the LMS subject webpage: blackboard.vuw.ac.nz

Reading List

Topic 1 *Futures markets and trading; interest rates*
Contractual specifications; institutional features; the role of the clearinghouse
Reading: Hull, J., Chapters 1, 2 and 4

Topic 2 *Forward, futures and spot prices*
Forwards versus futures; spot and futures prices; cost of carry arguments
Reading: Hull, J., Chapter 5

Topic 3 *Hedging with futures*
Principles of hedging; basis risk; minimum variance hedge ratio
Reading: Hull, J., Chapter 3

Topic 4 *Options, bounds and trading strategies*
Arbitrage bounds; put-call parity, option portfolios (spreads and combinations)
Reading: Hull, J., Chapters 9, 10 &11

Topic 5 *Binomial option pricing*
Risk neutral valuation; early exercise premium in a multi-period binomial model
Reading: Hull, J., Chapter 12

Topic 6 *Black-Scholes-Merton analysis I*
Continuous compounding; core of the model: put-call parity; no-arbitrage argument; input parameters; technical aspects of the model
Reading: Hull, J., Chapter 13

Topic 7 *Black-Scholes-Merton analysis II*
Extending Black Scholes pricing concept to handle options on dividend paying stocks; early exercise conditions; currency, index and futures options
Reading: Hull, J., Chapters 15 and 16

Topic 8 *Hedge parameters*
Delta and gamma hedging, other hedge parameters.
Reading: Hull, J., Chapter 17

Topic 9 *Volatility*
Volatility input, historical and implied volatilities, volatility smiles
Reading: Hull, J., Chapter 19

Topic 10 *FRAs, caps, floors and collars, options on interest rate futures*
Forward rate agreements (FRAs), OTC interest rate options, exchange traded interest rate options
Reading: Hull, J., Chapters 4, 6 & 21

Materials and Equipment
A calculator will be essential for the tests.

Assessment Requirements
Assessment in this subject is as follows:

Number	Type	Due Date	Weight
1	One test at each block release session based on reading assigned for period leading up to the block release and material presented at the block release. These are worth 35% each. Please bring your calculator.		70%
2	Major assignment 1	4pm September 14, 2010	15%
2	Major assignment 2	4pm November 8, 2010	15%
			100%

Note that students must attain an overall mark of 50% in order to achieve a passing grade.

If a word limit is stated for an assignment or assignment questions, credit will be given only from the beginning of the assignment/question up to the word limit. No credit will be given for the portion of work extending beyond the word limit.

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.

Assignment Submission

All assignments must be submitted via the Blackboard assignment submission tool. All assignments are due at 4pm on the due date. Students are responsible for ensuring their name and student ID appears on each page of all submitted work.
Student work provided for assessment in this course will 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 dection of future plagiarism, but access to the full text of submissions will not be made available to any other party.

Penalties

Each of the assignments will be marked out of a maximum that diminishes by 5% for every day late. Please note that the weekend no longer counts as one day (ie if an assignment is due by 4pm Friday and you hand it in 3pm Sunday, you will be penalised for 2 days). Please carefully read the assignment guidelines for details of how assignments should be submitted. There will be a final cut off date, one week after the due date for each assignment, after which no assignment can be accepted.

Mandatory Course Requirements

To pass, a student must: (i) attend all sessions of both block release courses; (ii) obtain an average mark of at least 50% over the two tests.

Class Representative

A class representative will be elected at the start of the trimester, and that person's 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.

Communication of Additional Information

Additional information including assignment questions, details of the block course schedule, feedback on course assessments, etc will be provided online via Blackboard. Students are responsible for logging onto Blackboard regularly to check for any updates or announcements, and for ensuring that the VIAF Senior Administrator, has their up to date email and postal addresses. Viaf-programme@vuw.ac.nz

If you have, or become aware of, any health condition that could prevent you attending a VIAF compulsory block release, then you should notify the Programme Director immediately, preferably by email, dawn.lorimer@vuw.ac.nz .

Use of Turnitin
Student work provided for assessment in this course may be checked for academic intergrity 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 dection 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
http://www.victoria.ac.nz/home/about/policy/academic.aspx

Faculty of Commerce and Administration Offices
http://www.victoria.ac.nz/fca/studenthelp/Contactus.aspx

Manaaki Pihipihinga Programme
http://www.victoria.ac.nz/st_services/mentoring/