THE UNIVERSITY OF NEW SOUTH WALES

SCHOOL OF BANKING & FINANCE

FINS5535 DERIVATIVES & RISK MANAGEMENT TECHNIQUES

Course Outline for Session 2 2005

OBJECTIVE

This course provides both introductory theory and a working knowledge of futures, options, and swaps, with an emphasis on the use of derivatives in risk management. The theory component is important, as with the rapid expansion of different derivative types we must know the fundamental pricing principle. The working knowledge component will cover the main types of derivatives contracts and valuation techniques. This subject is both theoretical and practical; the emphasis will be on problem solving.

RELATIONSHIP TO OTHER COURSES

This course is introductory in nature. It does, however, assume a working knowledge of finance concepts, including time value of money, and of higher mathematics, including probability distribution and stochastic calculus. There is some overlap with material discussed in FINS 5513, Security Valuation, though the course will explore these topics in much greater depth. Students interested in FINS5536, Interest Rate Derivatives or FINS5517, Applied Portfolio Management, will benefit from concepts explained in FINS5535.

INSTRUCTORS

	Office	Telephone	Email
Dr. Raymond Liu	Quad 3050	9385-5852	wmr.liu@unsw.edu.au
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Dr. Li Yang*	Quad 3058	9385-5857	l.yang@unsw.edu.au

**Lecturer in charge*

Consultation hours to be announced on WebCT website.

STUDENT RESOURCES

WebCT

This course uses WebCT to deliver lecture notes, supplementary material and announcements. You must be enrolled in the course to access the website. Lecturers CANNOT grant access to the site; you must check with the Faculty or the lab supervisors if you have trouble logging in to WebCT. Access the Faculty web site and link to WebCT through the "current students" tab: at http://www2.fce.unsw.edu.au/

Required Textbook

The following resources are available for purchase in the UNSW bookstore and on reserve in the UNSW library:

Hull, J., Options, Futures, and Other Derivatives, 5th edition, Prentice-Hall.
Hull, J., Solution manual to Options, Futures, and Other Derivatives, 5th ed., Prentice-Hall

This text has been used for several courses, so used copies may be available.

Additional References

Most securities exchanges provide materials related to various derivatives traded in those exchanges. These materials may be accessed via the relevant web pages and the usual search mechanisms may be used to locate such sites. Here are some examples of relevant exchanges: CBOT (Chicago Board of Trade), CME (Chicago Mercantile Exchange), LIFFE (London International Financial Futures Exchange), SFE (Sydney Futures Exchange), ASX (Australian Stock Exchange), etc.

GENERAL STUDENT RESOURCES

Learning Centre

The Learning Centre provides a free and confidential service offering learning and language support to UNSW students. Assistance is provided through workshops, discipline-based courses and individual consultations. The Learning Centre is located in Room 231, Level 2, Library Building; phone 9385 3890.

Education Development Unit (EDU)

Additional learning and language support or a "discipline-specific" support class can be arranged with the EDU in the Faculty. Students may consult the EDU for advice and assistance with assignment writing, academic reading and note-taking, oral presentation, study skills or other learning needs. The EDU is located in Room 2039, Level 2, Quadrangle Building; phone 9385 6163 or 9385 6087.

Counselling Service

Counsellors offer assistance in planning, decision-making, problem solving, and social and emotional development. This service is free and confidential. The Counselling Service is located at Level 2, East Wing, Quadrangle Building; phone 9385 5418.

ILLNESS, MISADVENTURE, ACADEMIC MISCONDUCT, OTHER UNIVERSITY POLICY ISSUES

Additional information is available via the **current students** tab of the Faculty web site: http://www.fce.unsw.edu.au/. Students are expected to be familiar with all relevant material presented there. On most administrative issues the course lecturers are constrained by University policy, so please consult the website before referring questions to the lecturer. **Policies and procedures for special consideration due to illness or misadventure are described in detail on the Faculty website=> Current Students tab=> Key Information heading => Policy & Guidelines bullet point.**

TEACHING METHOD

The primary source for teaching material in this subject is the textbook. The chapters and/or section numbers to be covered in this course are identified later in this document. The instructors will explain the relevant concepts in the class and where appropriate will use exercises/problems from the textbook to illustrate the points. Additional problems from the text will be recommended for practice. The instructor will use slides during class. These slides, available to students on WebCT, are a supplement to the lecture presentations. **They are not comprehensive and are not designed to substitute for attendance at lectures.**

Students are strongly encouraged to read the topics before attending the lectures. This subject is very analytical and there are many new concepts to be understood. It will be difficult to grasp all the underlying principles without preparation. The second half of this course, in particular, requires use of stochastic calculus. Instructors will assume that the students have such knowledge. If any student(s) feel that they should revise these concepts, then they should do so prior to attending the lectures to get the most out the lectures.

Finally, it should be realized that attendance in class lectures is extremely important. If you miss a lecture, it is your responsibility to prepare the topic yourself. You cannot use the consultation time to have a private tuition for the missed lecture.

Email

Students may communicate with the instructors via their respective e-mail addresses, however, please do not consider email to be a 24-hour answering service. E-mails must not be thought of as a substitute of class lectures. In an analytical subject like this one it is extremely difficult to convey mathematical notations and formulas via standard e-mails.

All e-mails must identify the student with full name and student number.

Finally, e-mail enquiry should not be sent to the instructor for trivial matters. Most information of general nature is available on the extensive web sites maintained by the faculty.

ASSESSMENT

The design of this course presupposes that participating students are interested in the topics and will endeavour to learn the material presented. Lectures, in-class problem solving, recommended practice problems and the solution manual, and consultation with lecturers are all provided to facilitate learning, however, ultimately the time and effort each student devotes to the course will determine how much he or she learns from it. Assessments for this course are limited to examinations designed to certify a level of understanding. **The exams are not learning tools and will not be returned to or discussed with students.**

There are three parts of the assessment process:

Quiz	10%
Mid-session test	40%
Final examination	50%

The quiz will be one hour in duration, administered at the beginning of class in week five (lecture follows). The mid-session test will be in week 10 in the normal lecture rooms and will last for 2 hours. The final examination will be held during the formal examination period and will last for three hours. Tests and exams are cumulative, with a focus on the more recent material covered in class.

If applicable, students should notify their employers of the requirement to attend tests. Failure to show up at the tests does not automatically lead to reassessment. If a student is granted special consideration for the quiz or the mid-session test, the course mark will be based on the completed assessment items prorated accordingly. For example, a student misses the quiz because s/he is in hospital, the student's mark will be assessed as 44% from the

midsession, 56% from the final. If a student misses the midsession test because s/he is in hospital, the quiz will contribute 17% to the final mark, the final exam will account for 83%.

Test and Examination Format

The quiz, mid-session test and the final examination will focus on problem solving skills acquired throughout the session from the class lectures and from exercises done by the students themselves from the relevant chapters of the textbook. The instructors are not in a position to hand out past test/examination papers, though the quiz and mid-session test are representative of the final exam. The tests will feature multiple choice questions and short "free-format" problems.

Quiz and Midsession Marks

Marks for the quiz and midsession test will be available from the Faculty website=> Current Students tab=> Continuing Students heading=> Exam and Assignment Results bullet point. University policy stipulates that lecturers may not reveal final marks prior to their release by the University.

LECTURE TOPICS:

The chapter numbers all refer to the required textbook. Placement of assessment items within topics is only approximate.

Introduction to derivatives (Chapter 1)

Forwards and futures (Chapters 2, 3, 4)

- Mechanics of futures markets
- Pricing forwards and futures
- Hedging with futures contracts
    - Basis risk
    - Minimum variance hedge ratio

Introduction to interest rate derivatives (Chapter 5)

- Forward Rate Agreements
- Futures
- Hedging

Quiz

Swaps (Chapter 6)

- Swap rates
- Valuation of swaps in terms of bond prices

Introduction to options (Chapters 7, 8, 9, 14.1-14.4)

- What makes option-pricing work?
- Mechanics of options markets
- Trading strategies involving options
- Put-call parity
- Factors affecting option prices
    - Impact of volatility on option prices
- Price relationships between European and American options
    - Bounds on American option prices
- Hedging

Binomial Option Pricing (Chapter 10)

- Pricing European options on non-dividend paying stocks
    - By specifying ending stock price distribution
    - By using binomial model of the stock price process
- Pricing European options using risk-neutral valuation
- Incorporating dividends into binomial option pricing
- American option pricing using the binomial tree approach

Midsession Examination

Continuous time modelling (Chapters 11, 12, 13)

- Stochastic processes (preliminaries)
- Modelling behaviour of stock prices
- Ito's lemma
- A general option pricing equation and the Black-Scholes model
- Risk-neutral valuation in the continuous time framework
- Estimating the stock's volatility
- Incorporating dividends into continuous time option pricing
- Options on forward/futures contracts, stock indices, currencies

Hedging with options (Chapters 14, 18)

- the “Greeks”
- portfolio insurance
- Numerical procedures

Exotic options and alternatives to Black-Scholes option pricing. (Chapters 19, 20)

- Types of exotic options
- Path-dependent derivatives
- Barrier options and look back options
- Options on two correlated assets
- Static options replication
- Pricing biases
- Alternative models

SUGGESTED REVISION PROBLEMS

The chapter numbers all refer to the textbook (these suggestions are subject to changes and additions as announced in class and on the website):

Chapter 2: 1, 3, 10, 11, 12, 16, 19, 22, 24, 25
Chapter 3: 1a, 2, 3, 4, 6, 7, 8, 9, 11, 12, 14, 16, 17, 18, 19, 20, 21, 22
Chapter 4: 1, 2, 3, 5, 6, 7, 8, 10, 11, 12, 13, 14, 16, 18, 19, 21
Chapter 5: 1, 2, 3, 6, 7, 11, 12, 13, 15, 19, 20, 22
Chapter 6: 1, 2, 3, 5, 6, 7, 8, 11, 15, 16
Chapter 7: 1, 3, 6, 7, 8, 9, 11, 13
Chapter 8: 1, 2, 3, 4, 5, 6, 8, 9, 13, 14, 15, 17,
Chapter 9: 1-4, 7, 10, 14
Chapter 10: 1-6, 8-13
Chapter 11: 1, 2, 3, 5, 8, 9
Chapter 12: 1-6, 10, 11, 14, 16, 20
Chapter 13: 1, 2, 4, 7, 13, 15, 16, 18, 24, 34, 35
Chapter 14: 1, 2, 3, 7, 9, 10, 16, 22
Chapter 18: 1, 3, 6
Chapter 19: 1, 2, 5, 7, 12, 18