

FINA 690U: Advanced Derivative Applications
Department of Finance
Hong Kong University of Science and Technology

Course Overview
Spring 2007

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Teaching Assistant: TBD
Time: Every Tuesday, 19:00-22:20 from 30 Jan'07 – 3 Apr'07
(no class on 13 Feb and 20 Feb)
Venue: 33/F, 9 Queen's Road Central, Central, Hong Kong
Course Website: TBD

Recommended Textbooks

John Hull, *Options, Futures and Other Derivatives*, Fifth Edition, Prentice-Hall, 2003

Mary Jackson and Mike Staunton ("J&S"), *Advanced Modeling in Finance using Excel and VBA*, Wiley, 2001

Nassim Taleb, *Dynamic Hedging*, Wiley, 1997

Additional readings will be provided as required, including textbooks, articles, industry research reports and presentations.

Course Objectives

The course will cover practical applications of derivative pricing and hedging, focusing on equity-linked structures. The emphasis of the course will be on building intuition with regard to option pricing and hedging, using Excel-based pricing models and real world applications. A solid foundation in option pricing theory as provided by the prerequisite courses is assumed, as is familiarity with Excel and VBA.

Class work will involve lectures as well as pricing workshops; students are advised to bring Excel/VBA-equipped laptops to class.

Prerequisites

Students are assumed to have taken FINA529 (Derivatives Analysis) and FINA530 (Advanced Derivatives Analysis). As the course will focus on derivative applications, familiarity with Excel and rudimentary VBA knowledge are also essential.

Grading

1. Assignments (two)	20%
2. Project (presentation plus written report)	20%
3. Final examination	60%

Attendance and participation will have bonus value in cases where grades are border-line.

Assignments

Homework assignments will be distributed in weeks one and three, respectively; assignments will be due two weeks after distribution.

Students can and should feel free to work together in groups to complete the assignments. Groups should comprise no more than four students. All students in a given group should turn in one assignment with all names attached; each student in that group will receive the same grade.

Project

Project assignments will be distributed in week three. Students will be divided into groups to work on their respective projects, with each group giving a presentation to the class in week seven on their results. In addition, each group should turn in a written report.

All students in a given group will receive the same grade. Grades will depend on the quality of the presentation and the report; input from the rest of the class will be solicited after the presentations and will comprise part of the project grade.

The project topics will differ for each group. Each topic will focus on a particular type of structured product. The group will be expected to present a detailed analysis of the product from the point-of-view of a structuring and trading desk looking to offer and trade the structure – the analysis could include discussions on pricing sensitivities, hedging sensitivities, hedging strategies and trading strategies, as well as investor benefits.

Tentative Schedule

<p><i>Week 1 – Pricing vanilla options</i></p> <ul style="list-style-type: none"> • Introduction and course overview • Black-Scholes model • Binomial pricing • Monte Carlo simulation 	<ul style="list-style-type: none"> • Distribution of Assignment #1 • Hull, Chapters 10-13, 18 • J&S, Chapters 9-12
<p><i>Week 2 – Pricing exotic options</i></p> <ul style="list-style-type: none"> • Cross-currency (composite, quanto) options • Asian, barrier, digital options • More complicated exotic combinations 	<ul style="list-style-type: none"> • Hull, Chapters 19-20 • Taleb, Part III
<p><i>Week 3 – Delta hedging, risk neutral valuation</i></p> <ul style="list-style-type: none"> • Delta hedging example • Relaxation of model assumptions • Risk neutral valuation example 	<ul style="list-style-type: none"> • Assignment #1 due • Distribution of Assignment #2 • Distribution of Projects • Hull, Chapter 14
<p><i>Week 4 – Hedging other exposures</i></p> <ul style="list-style-type: none"> • Vega • Gamma • Other Greeks 	<ul style="list-style-type: none"> • Hull, Chapter 14 • Taleb, Part II
<p><i>Week 5 – Volatility estimation</i></p> <ul style="list-style-type: none"> • Skew and term structure • Implied volatility • Forecasting volatility 	<ul style="list-style-type: none"> • Assignment #2 due • Hull, Chapters 15, 17 • J&S, Chapter 13
<p><i>Week 6 – Structured products market overview</i></p> <ul style="list-style-type: none"> • Review of Asian markets • Common structures • Uses by investors 	
<p><i>Week 7 – Pricing and hedging specific structures</i></p> <ul style="list-style-type: none"> • Focus on specific structures 	<ul style="list-style-type: none"> • Project presentations and report due
<p><i>Week 8 – Final examination</i></p>	