

**FINA 558: Advanced Derivative Applications
Department of Finance
Hong Kong University of Science and Technology**

**Spring 2010
Course Overview**

Instructor: Harold Y. Kim, Ph.D.
Office: Citigroup Global Markets Asia
50/f, Citibank Tower
3 Garden Road
Hong Kong
Telephone: +852 2501 2317
Email: harold.y.kim@citi.com

Teaching Assistant: TBD
Email: [TBD](#)

Date and Time: Every Tuesday, 19:00-22:20 from 2 Feb – 30 Mar 2010
Venue: 33/F, 9 Queen’s Road Central, Central, Hong Kong

Required Textbooks

John Hull, *Options, Futures and Other Derivatives*, Sixth Edition, Prentice-Hall, 2006

Recommended Textbooks

Andreas Blumke, *How to Invest in Structured Products, A Guide for Investors and Asset Managers*, Wiley, 2009

Mary Jackson and Mike Staunton, *Advanced Modeling in Finance using Excel and VBA (“AMF”)*, Wiley, 2001

Nassim Taleb, *Dynamic Hedging*, Wiley, 1997

Additional readings will be provided, including 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 and pricing workshops; students are advised to bring 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 classes after distribution. Students 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. Each group should also 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 and 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 • Binomial pricing • Black-Scholes model • Monte Carlo simulation 	<ul style="list-style-type: none"> • Distribution of Assignment #1 • Hull, Chapters 10-13, 18 • AMF, Chapters 9-12
<p><i>Week 2 – Pricing exotic options</i></p> <ul style="list-style-type: none"> • 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 • Real world pricing • 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 and 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 • Real world environment 	<ul style="list-style-type: none"> • Assignment #2 due • Hull, Chapters 15, 17 • AMF, Chapter 13
<p><i>Week 6 – Structured products market – current topics</i></p> <ul style="list-style-type: none"> • Trading and hedging structured products • Uses by investors • Current topics 	
<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>	