

FINA 530: Advanced Derivatives Analysis
Spring 2010, HKUST

L1: Time: 19:00-22:20 Saturdays, February 4 – March 25, 2010; HK Club (No class on Feb 18)
L2: Time: 14:30-17:50 Saturdays, February 6 – April 10, 2010; Venue: Room # 4619

Instructor: Prof. K.C. John Wei, Ph.D.

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Office Hours: by appointment

Course Website: All relevant materials and announcements will be uploaded to LMES website
(<http://lmes2.ust.hk/portal>)

Teaching Assistant: Mr. Lei Sun (email: sunlfin@ust.hk)

Office hours: by appointment

Prerequisites

FINA529

Required Textbook

John C. Hull, *Options, Futures, & Other Derivatives*, Seventh edition, Prentice-Hall, 2009.

Students are urged to read chapters before each class. Further readings will be assigned from time to time. Students are also urged to learn a spreadsheet program such as Microsoft Excel.

Course Objectives

This course will cover advanced techniques in option pricing and derivatives risk management. The primary objective of the course is to understand the pricing theories and the use of options in risk management. Topics include the binomial model, risk-neutral valuation, extension of the Black-Scholes pricing model and option Greeks. The course will also include discussion and analysis of options on futures and some popular OTC products such as equity linked notes (ELNs) and principal guaranteed funds. Though this course does not require sophisticated skills, the materials do tend to be somewhat rigorous.

Evaluation

Category	Weight
1. Two Homework Assignments	20%
2. One Case Study (presentation and written report)	20%
4. Final Exam	60%
5. Participation (bonus may be given for marginal cases)	
Total	100%

The time and venue for the final exam will be announced later. Any conflicts with other final exams must be reported immediately.

Assignments: General

There will be two homework assignments, and one case. Groups of no more than four members are allowed for all assignments. Each member of the group will receive the same grade. Due to the threat of viruses, email submissions of assignments are not allowed. But you can use fax to submit the assignments, if it is necessary. Late hand-in assignments will be subject to penalty. The penalty for homework assignments for each passing day is 10 points (with a full mark of 100 points). Once the solutions for homework assignments are provided, a zero score will be assigned. For the case, no late

hand-in is allowed. Participation and attendance are highly encouraged. Students with borderline cases with very active participation may be upgraded to the next higher letter grade.

Homework Assignments and Final Exam

The homework assignments are designed to help you prepare your final exam. Final may be consisted of (1) calculation questions related to homework assignments, (2) non-calculation essay questions, and (3) multiple-choice questions.

Description of Case

The case is related to an application to option pricing. The grade will be consisted of (1) the approach or the logic you use to price the option is reasonable, (2) the quality of your case written (which is independent of whether or not the answer or the approach is in the right direction), (3) the quality of presentation. The written report for case needs to be handed in right after the discussions. The page format: single space, Times New Roman with font 12, and a margin of one inch on each side. Please attach all you calculations from your spreadsheets in an appendix.

Comments and suggestions: I would like you to enjoy the class as much as possible. If you have any comments and suggestions that can improve the quality of the class and your enjoyment, please feel free to let me know.

Schedule (Tentative and is subject to changes)

Week 1: L1: Feb 4; L2 Feb 6, 2010

- Topic 0: Review on Options Basics
- Topic 1: Binomial Option Pricing Model (Chapters 11 and 14)
- ◇ Case is given

Week 2-3: L1: Feb 11; L2: Feb 20, 2010 (No class on Feb 13 for L2 and on Feb 18 for L1)

- Topic 1: Binomial Option Pricing Model (Chapters 11 and 14)
- Topic 2: Wiener Processes and Itô's Lemma (Chapter 12)
- ◇ Homework Assignment #1 is given

Week 4: L1: Feb 25; L2 Feb 27, 2010

- Topic 3: The Black-Scholes Option Pricing Model (Chapters 13-14)
- ◇ Supplemental readings:
 - Fisher Black, 1989, "How do we come up with the option formula," *Journal of Portfolio Management* 15.
 - Robert C. Merton, 1998, "Applications of option-pricing theory: twenty-five years later," *American Economic Review* 88, 323-334.
 - Myron Scholes, 1998, "Derivatives in a dynamic environment," *American Economic Review* 88, 350-370.

Week 5: L1: March 4; L2 March 6, 2010

- Topic 4: Dynamic Hedging Strategies
- Topic 5: Option applications: CGF and ELN
- ◇ Homework Assignment #1 is due
- ◇ Homework Assignment #2 is given
- ◇ Supplemental reading: Leland O'Brien Rubinstein Associates Incorporated: Portfolio Insurance

Week 6: L1: March 11; L2: March 13, 2010

- Topic 5: Option applications: CGF and ELN
- Topic 6: Risk Parameters for Options (Chapter 15)
- ◇ Case presentation
- ◇ Case is due

Week 7: L1: March 18; L2: March 20, 2010

- Topic 6: Risk Parameters for Options (Chapter 15)
- Topic 7: Volatility Smile and Volatility Estimation (Chapters 16 and 19)

Week 8: L1: March 25; L2: March 27, 2010

- Topic 7: Volatility Smile and Volatility Estimation (Chapters 16 and 19)
- Review
- ◇ Homework Assignment #2 is due

Week 9: L1 & L2: April 10, 2010

- ◇ Final Exam
- ◇ 3 pages of cheat sheets of formulas-only are allowed (no numbers, no words, no workout procedures, etc.).
- ◇ Time: 14:30-17:30
- ◇ Venue: to be announced later
- ◇ Enjoy the course