

**FINA 530: Advanced Derivatives Analysis**  
Spring 2006, HKUST

L1: Time: 19:00-22:20 Tuesday; Venue: Cliftons Limited, 4/F Wheelock House, 20 Pedder Street  
L2: Time: 14:30-17:50 Saturday; Venue: Room #3008

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 WebCT  
(<http://webct.ust.hk>)

Teaching Assistant: Mr. Yuanto Kusnadi (email: [yuanto@ust.hk](mailto:yuanto@ust.hk))

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Office hours: by appointment

**Required Textbook**

John C. Hull, *Options, Futures, & Other Derivatives*, Sixth edition, Prentice-Hall, 2006.

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 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	15%
2.	One Case Study (presentation and written report)	15%
3.	One Project (presentation and written report)	20%
4.	Final Exam	50%
5.	Participation (bonus may be given for margin 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, one case, and one project. 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 and the project, 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.

### **Description of Project**

Due to the uncertainty and low interest environments in the global markets and in particular in Hong Kong since Asian financial crisis, capital guaranteed funds and/or equity-linked notes have become very popular investment vehicles in Hong Kong. This project involves in pricing a capital guaranteed fund offered by a bank in Hong Kong. The objective is how you apply what you learn from the course to price a real product. Since it is a real product, you can learn a real experience on how difficult it is in pricing a real product. I do not expect you get an exact solution. You can make reasonable assumptions to price the product. The grading criterion is the same as the Case.

**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: February 7 (L1); February 11 (L2), 2006**

- Topic 1: Binomial Option Pricing Model (Chapters 11 and 14)
- ◇ Case is given

**Week 2: February 14 (L1); February 18 (L2), 2006**

- 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 3: February 21 (L1); February 25 (L2), 2006**

- Topic 3: The Black-Scholes Option Pricing Model (Chapters 13-14)
- ◇ Case presentation
- ◇ Case is due

**Week 4: February 28 (L1); March 4 (L2), 2006**

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

**Week 5: March 7 (L1); March 11 (L2), 2006**

- Topic 5: Option applications: CGF and ELN
- Topic 6: Risk Parameters for Options (Chapter 15)

**Week 6: March 14 (L1); March 18 (L2), 2006**

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

**Week 7: March 21 (L1); March 25 (L2), 2006**

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

**Week 8: April 1, 2006 (L1 and L2): Final Exam**

- ◇ **Final Exam**
- ◇ 3 pages of cheat sheets of formulas only are allowed
- ◇ Time: 14:30 – 17:00
- ◇ Venue: at HKUST campus
- ◇ Enjoy the course