

**FINA 222 (L1 &L2): Derivative Securities  
Spring 2006, HKUST**

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Lectures: Tuesday & Thursday (Room 4333)  
13:30–14:50 (L1); 15:00-16:20 (L2)

Course Website: All relevant materials and announcements will be uploaded to  
WebCT (<http://webct.ust.hk>)

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### Course Description

Derivative securities are used by individuals and by institutions to achieve a variety of purposes. This course provides an introduction to various basic derivative securities such as futures, swaps and options and the necessary skills to value and to employ them. The course is quantitatively oriented and requires some backgrounds in finance and statistics. The topics include valuation of futures contracts on stock indices and commodities, valuation of options on common stocks, trading and hedging strategies with respect to these derivatives. The celebrated Black-Scholes formula will be introduced and explained. The elegant binomial tree option pricing model will be introduced as a workhorse computational technique.

### Course Textbook

John Hull, 2006, *Fundamentals of Futures and Options Markets*, 5th Edition, Prentice Hall

### Grading

Your final grade will be based on four homework assignments, one Stock-Trak exercise, one project and two exams. Except for the two exams, other assignments are done by a team basis with the same 3-4 people in a group. The relative weightings are as follows:

Category	Weight
1. Homework assignments	10%
2. One Stock-Trak exercise and written report	10%
3. One Project (presentation and written report)	10%
4. Med-term exam	30%
5. Final exam	40%
6. Participation (bonus may be given to margin cases)	
Total	100%

**Note:** The final exam will be cumulative in that it includes the portion covered in the midterm. However, the focus will be on the material after the midterm.

Grades will be given based on the distribution suggested by University guidelines.

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

## **Course Requirements**

### **1. Lectures**

I teach two sections of this class (L1 & L2). Both lectures will cover identical topics. If for whatever reasons, a student must miss his or her registered section, he or she can make up the lecture in the other section, as long as class space permits.

Attendance is not mandatory but you are strongly recommended to attend all the lectures regularly. Students are encouraged to raise questions to the instructor and to participate actively in the class. Please do not allow problems to accumulate because it will be more difficult to solve them later.

### **2. Homework Assignments**

The homework assignments are to be done on a team basis with three to four people in each group. Your team should stay together until the end of the term. Each team needs to submit only one write-up of each homework assignment, and all team members will receive the same grade for their work. Therefore it is important that all team members contribute equally to the homework assignments. If you feel that some team members do not contribute their fair share to the assignments you should talk to us. We will treat any complaints fully confidential.

Each homework assignment must contain a cover page that lists the group number, the names and student ID numbers of the members of the group that contributed to the assignment. Only those students whose names appear on the cover page will receive credit for their homework assignment. All homework assignments should be written in an easily readable fashion. If your handwriting is difficult to decipher you may lose 5-10% of homework grade, depending on the severity of the problem.

Homework assignments have to be submitted before the start of class on the due date. For each day late you will incur a penalty of 20% of the maximum grade of the assignment.

### **3. Exams**

There are two comprehensive exams, a midterm and a cumulative final, which will consist of numerical problems and multiple-choice questions.

- Midterm: in class
- Final: time and room to be announced

Absence from the exams will not be excused except for serious medical illness. A doctor's letter must be provided within one week of the exam. Cheating will not be tolerated. Any student caught cheating during the exams will receive zero credit and may face further disciplinary action.

### **Mid-term Makeup**

There will be **NO** makeup for midterm, even for legitimate absence. Instead, the final will count for 70%, rather than 40%. I strongly encourage you to take the midterm by any means. If you miss it, you only have one shot (the final exam).

### **4. Detailed Description of Stock-Trak Simulation Exercise**

I guess that most of you have no experience in any trading, especially in trading options and futures. This is because trading options and futures is very risky and we do not want to risk our

own money. To provide you with the opportunity to trade options and futures with OPM (other people money), I believe that Stock-Trak exercise is a compromised good way for you to gain feeling and experience. This is done on a team basis with three to four people in a group, the same group as in the homework. This is a fee for each account and the fee is dependent on the level of service.

The major purpose of this trading exercise is for you to practice all trading or hedging strategies and risk management we discuss in the class. The grade will be based on how you design each trading strategies and what you learn from each trading strategies. Your trading performance has no effect on your grade. In addition, I will not dictate what strategies you need to trade. You have all freedom to design what you want to trade. Just enjoy your trading and relax.

A roughly 8-to-10-page report to summarize your strategies and the experiences you have learned is good enough. The page format: single space, Times New Roman with font 12, and a margin of one inch on each side. Please attach your trading reports from Stock-Trak in an appendix. Your initial capital will be US\$1,000,000.

### **5. Description of Project**

Due to the uncertainty and low interest rate environments in the global markets and in particular in Hong Kong since Asian financial crisis, capital guaranteed funds and equity-linked notes have become the most popular investment vehicles in Hong Kong. This project involves in collecting and in writing up a report on the current market conditions in capital guaranteed funds and equity-linked instruments offered by banks in Hong Kong. The objective is to help you to understand the market demand and supply of these popular derivative products in Hong Kong, which may prepare you in your future job hunting. Since there are real products, you can learn a real experience on how banks use the concept of derivatives to package their products to attract investors. I would like you to collect most of the product information and conduct an analysis from the bank's versus the investor's points of view in terms of risk and hedging.

The written report for the project needs to be hand in right after the presentation. The format of the report is the same as Stock-Trak exercise. Please attach all the product information you collect. The grade will be consisted of (1) how comprehensive you collect the products, (2) the quality of your analysis, and (3) the quality of presentation and writing.

### **6. Class Participation**

Active class participation is important for your learning experience and highly encouraged. It helps you to think actively rather than passively. Your class participation also provides me with feedback to gauge whether you understand the material. Often students ask me to write a letter of reference on their behalf. Please keep in mind that if you have never participated in class, I will not be able to write a letter for you.

### **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 (Feb. 2)**

- Topic 1: Introduction of Derivatives Markets (Chapter 1)
- ◇ Enjoy the first class

### **Week 2 (Feb. 7, 9)**

- Topic 2: The Basics of Options (Chapters 8 and 9)
- ◇ Homework Assignment #1 given
- ◇ Start your Stock-Trak exercise: Registration and set up an account
- ◇ Stock-Trak: Start your options trading
- ◇ Project: Start to collect the CGF and ELN information

### **Week 3 (Feb. 14, 16)**

- Topic 3: Option Trading Strategies (Chapter 10)
- ◇ Stock-Trak: Continue your options trading
- ◇ Project: Continue to collect the CGF and ELN information

### **Week 4 (Feb. 21, 23)**

- Topic 4: Introduction to the Binomial Tree (Chapter 11)
- ◇ Homework Assignment #1 is due
- ◇ Homework Assignment #2 given
- ◇ Stock-Trak: Continue your option trading and dynamic hedging
- ◇ Project: Finish up collecting the CGF and ELN information

### **Week 5 (Feb. 28, Mar. 2)**

- Topic 5: Valuing Stock Options using the Black-Scholes Model (Chapter 12)
- ◇ Stock-Trak: Continue your option trading and dynamic hedging
- ◇ Project: Start to analyze the data and to write up the report

### **Week 6 (Mar. 7, 9)**

- Topic 6: Options on Stock Indices, Currencies and Futures (Chapters 13 and 14)
- ◇ Stock-Trak: Continue your option trading and dynamic hedging
- ◇ Project: Continue to analyze the data and to write up the report

### **Week 7 (Mar. 14, 16)**

- Topic 7: Options Applications: CGF and ELN
- ◇ Homework Assignment #2 is due
- ◇ Homework Assignment #3 is given
- ◇ Stock-Trak: Continue your option trading and dynamic hedging
- ◇ Project: Continue to analyze the data and to write up the report

### **Week 8 (Mar. 21, 23)**

- Topic 8: The Greeks (Chapter 15)
- ◇ Mid-term Exam
- ◇ Stock-Trak: Continue your option trading and dynamic hedging
- ◇ Project: Continue to analyze the data and to write up the report

**Week 9 (Mar. 28, 30)**

- Topic 8: The Greeks (Chapter 15)
- Topic 9: Basics of Futures and Futures Trading Strategies (Chapters 2 and 3)
- ◇ Homework Assignment #3 is due
- ◇ Homework Assignment #4 is given
- ◇ Stock-Trak: Start to trading futures
- ◇ Project: Try to finish up the writing of the report

**Week 10 (Apr. 4, 6)**

- Topic 9: Basics of Futures and Futures Trading Strategies (Chapters 2 and 3)
- Topic 10: Determination of Forward and Futures Price (Chapter 5)
- ◇ Stock Trak: Continue to your future trading and close up your accounts
- ◇ Project: Presentation and the report is due

**Week 11 (Apr. 11, 20)**

- Topic 10: Determination of Forward and Futures Price (Chapter 5)
- Topic 11: Interest Rates and Interest Rate Futures (Chapters 4 and 6)
- ◇ Stock-Trak: Close your Stock-Trak and start to write a report

**Week 12 (Apr. 25, 27)**

- Topic 11: Interest Rate Futures (Chapter 6)
- Topic 12: Swaps (Chapter 7)
- ◇ Homework Assignment #4 is due
- ◇ Stock-Trak: The report is due

**Week 13 (May 2, 4)**

- Topic 12: Swaps (Chapter 7)
- Leftover materials

**Week 14 (May. 9, 11)**

- Leftover materials, reviews, Q&As before the Final-Exam