



香港科技大學

THE HONG KONG UNIVERSITY OF
SCIENCE AND TECHNOLOGY

School of Business and Management

FINA 530 Advanced Derivatives Analysis

Second Half, Fall Term 2005

About the course

Timetable

Week beginning	Week Number	Topic	Readings	Assessment
29 October	1	Binomial Trees	Hull, Chapter 11	In class team exercise – topic commitment
5 November	2	Weiner Processes and Ito's Lemma	Hull, Chapter 12	Weekly Assignment
12 November	3	Black-Scholes-Merton Model	Hull, Chapters 13	Weekly Assignment
19 November	4	Options on Stock Indices, Currencies, and Futures	Hull, Chapter 14	Weekly Assignment
26 November	5	The Greek Letters	Hull, Chapter 15	Weekly Assignment
3 December	6	Volatility Smile	Hull, Chapter 16	Weekly Assignment
10 December	7	Derivatives Mishaps	Hull, Chapter 32	In-class Presentation Project Due
17 December	8	Examination		

Course overview

This class develops a basic conceptual framework to understand modern derivative securities. Our emphasis is on options and option valuation. Both pricing and hedging applications will be reviewed. Students are assessed through a variety of means; including weekly assignments, exams, computer exercises, and a research project.

Assumed Knowledge

Modern investment theory, by necessity, can be quite mathematical. A solid mathematics background, including elementary probability theory and statistical methods, is expected. The prerequisite for the course is FINA 529, which in turn requires one of FINA 521, FINA 522, or FINA 527. Individuals having taken FINA 551 are excluded from this class.

It is assumed that students can use standard word processing and spreadsheet packages (e.g. Word and Excel) and have easy access to the Internet.

Course aims

Our learning objectives are to:

- Learn how to price options contracts with a range of models for a range of assets
- Be able to model movements in asset prices with sophisticated statistical models
- Use options pricing models in dynamic settings
- Understand the key role that volatility plays in options pricing and risk management
- Build your confidence in discussing a range of risk management issues
- Build links between the theory covered in class and the professional practice of investments
- Appreciate the lessons learned from real-world examples of options misuse
- Serve as a gateway to finance electives

Format and teaching approach

This course consists of weekly three-hour sessions delivered through a combination of lecture and discussion. These sessions include periodic applications where student teams are expected to take the lead in promoting informed discussion of key concepts.

The high levels of interaction and preparation required for this class are intended to provide the necessary foundation for success in subsequent elective courses and in the workplace.

Students are given continuous feedback about their progress throughout the term. There is at least one piece of assessment due every week.

Workload Expectations

It is expected that you will spend at least ten hours per week studying this course. This time should be made up of reading, research, working on exercises and problems, performing computer tasks and attending classes. In periods where you need to complete assignments or prepare for examinations the workload may be greater.

Over commitment has been a cause of failure for many students. You should take the required workload into account when planning how to balance study with employment and other activities.

Staff and contacts

Course Coordinator

Teaching Staff: Professor F. Douglas Foster
Email address: Through WebCT (“FINA 529 Instructor”) or at fdfooster@ust.hk
Location: Room 2381 (use lifts 17-18)
Consultation: After class (Saturdays) or by appointment

TA

Tutor: Eric Lam
Email address: Through WebCT or at efylam@ust.hk
Consultation: From 12h30 through 13h50 before class (Saturdays)

Resources

The textbook

The prescribed textbook for this course is:

Options, Futures, and Other Derivatives, by John C. Hull (Hull), 6th International Edition, Prentice Hall, 2005 (ISBN 0-13-197705-9).

Other useful resources

Reference Books

Student Solutions Guide for Options, Futures, and Other Derivatives, by John C. Hull, 6th Edition, Prentice Hall, 2005 (ISBN 0-13-149906-8).

Software

Microsoft Excel and Microsoft Word.

For those who are not familiar with Excel and its use in finance you may find the following helpful:

- Spreadsheet Applications to Securities Valuation and Investment Theories, by Henry Yip, 1st Ed., John Wiley, 2005 (ISBN 0-470-80796-2).

Other

Some general interest finance readings are:

Against the Gods: The Remarkable Story of Risk, by Peter L. Bernstein, John Wiley & Son, 1996. *Reviews the development of probability theory and its applications to risk management.*

Capital Ideas: The Improbable Origins of Modern Wall Street, by Peter L. Bernstein, Free Press, 1992. *The development of modern finance theory and how it has changed Wall Street.*

Leo Melamed: Escape to the Futures, Leo Melamed, Wiley, 1996. *Very interesting autobiography from a key derivatives market pioneer.*

Leo Melamed on the Markets: Twenty Years of Financial History as Seen By the Man Who Revolutionized the Markets, Leo Melamed, Wiley, 1992. *Great insights into trading strategies and contract design.*

A Random Walk Down Wall Street, by Burton Gordon Malkiel, 7th Ed., W. W. Norton & Company, 1999. *A classic book that has educated many investors.*

WebCT

This course makes extensive use of WebCT. The WebCT course site includes the following:

- Suggested preparation and review strategies
- Lecture notes (in .ppt format that can be printed or viewed as a slideshow)
- Copies of any spreadsheets developed in class
- Public discussion, chat, and bulletin board areas
- Private team discussion board areas
- A variety of finance links
- A personal log of your use of the website
- Your assessment results as well as summary statistics for the class
- Feedback surveys
- On-line technical support

The WebCT site for this course can be accessed from the WebCT login page at:

<http://.webct.ust.hk>

Assessment

Assessment in this course is a combination of individual and group assignments. In the case of individual assignments, all submitted work must be your own. In the case of group assignments all work must be from the team. Copying or not acknowledging the work of others is considered plagiarism. Students are responsible for becoming familiar with the rules about academic misconduct, including plagiarism.

The assessment has been designed to promote and reinforce our stated learning objectives. In particular,

- Learn how to price options contracts with a range of models for a range of assets
 - Weekly assignments, project, and the examination assess this
- Be able to model movements in asset prices with sophisticated statistical models
 - Weekly assignments, project, and the examination assess this
- Use options pricing models in dynamic settings
 - Weekly assignments, project, and the examination assess this
- Understand the key role that volatility plays in options pricing and risk management
 - Weekly assignments, project, and the examination assess this
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- Build your confidence in discussing a range of risk management issues
 - Weekly assignments, project, presentation, class discussions, and the examination assess this
- Build links between the theory covered in class and the professional practice of investments
 - Weekly assignments, project, presentation, class discussions, and the examination assess this
- Appreciate the lessons learned from real-world examples of options misuse
 - Term project and presentation assess this
- Serve as a gateway to finance electives
 - Weekly assignments, project, and the examination assess this

Summary of requirements

The summary table below provides an overview of the assessment tasks, due dates and relative weighting.

Assignment Name	Due date	Weight
6 Weekly Assignments	In-class each Saturday	30%
Team project write-up and presentation	Report due in class, Week 7	30%
Examination	During class time in Week 8	40%

Weekly assignments

Due: Weekly

Weight: 30% of the Final Grade

Details: Made available through WebCT

In weeks one through five there will be a problem set made available that is due the subsequent class (I will collect the completed assignments at the start of class). The assignment is a review of the material covered each week and is a combination of computation and discussion. Also, you will be given assignment credit for forming your team and settling on a project topic.

Be sure to write your assignment as a professional correspondence; ***do not simply return a series of calculations without interpreting them.*** One third of your weekly grade will be based on presentation quality and grammar; two thirds of the grade will be based on technical accuracy.

We will take a portion of each class to review parts of each assignment. Hence, late submissions cannot be accepted.

Project

Due: In-class during Week 7 (October 15) and post on WebCT. In-class presentation during Week 7

Weight: 30% of the Final Grade

Details: Made available through WebCT

I would like each team to become investigate a specific derivatives mishap. A discussion of some of these events can be found in Chapter 32 of our text, Hull (2006). I would like each group to:

- Describe what happened. If possible build a chronology of events;
- Describe who was involved, what are their backgrounds and the circumstances surrounding their actions;

- Use your case analysis to critically evaluate the “*Lessons For All Users of Derivatives*” section of the text (section 32.1 on pages 729-733). Are these “lessons” apt? Are there any “lessons” missing from the list? Are some “lessons” more important than others? Which, if any, of these “lessons” are unique to derivatives markets?

You will be assigned to a team just before the break in the middle of class in Week 1. In the latter part of class in Week 1 we will be completing an exercise designed to help you choose a case to examine. Your team’s official choice of a case needs to be declared before the start of class in Week 2 for you to receive a completed assignment grade for Week 1.

Your team may be called on during class for their expertise on particular market, or market segment.

The completed project is due in class on Week 7. You are required to submit a hard copy of your report in class for grading, and provide an electronic version to the class via WebCT so that all students are able to learn from your expertise. Late submissions will not be accepted.

In addition 5 of the 30 points of your project will be based on a short presentation to the class in Week 7.

Examination

Due: Held in-class during Week 8 (December 17)
Weight: 40% of the Final Grade

The final examination will test material covered either in the text or in the lecture notes. It will be comprised of short-answer and computation questions. The examination is closed book – you will only be allowed to bring a calculator and writing materials. HKUST has specific rules for handling cases where students have not / cannot take the examination at the scheduled time. Please acquaint yourself with these requirements.

Grading and feedback

Feedback, both graded and ungraded, comes in a variety of modes:

- Solutions to every question and problem in the textbook are available through the student solutions manual available in the bookstore
- We will work through a number of practice examples in class
- Projects are designed to promote teamwork and in-class discussion
- The final examination provides a thorough review of the course material
- Weekly surveys of students are used by instructors to adjust class delivery and provide information to students about overall progress

Students with questions about course administration or content are encouraged to:

- Check the WebCT site
- E-mail the class tutor
- Contact the instructor after class
- E-mail the instructor
- Contact the instructor to arrange an appointment

Unless otherwise indicated, feedback for all assessment (except final examination) will be provided within one week of submission.

Final grade distribution

The final course grades will be given in accordance with Department of Finance guidelines:

Grade	% Awarded
A	0 – 40
B	35 - 60
C	0 - 20
F	0 - 5

Weekly Instructor Feedback

Each week you will be asked to complete a short 10- to 15-question survey on class activities. The survey will be administered through WebCT. The questions will ask about student activities, material covered, and classroom experience. I will collate these data and review the prior week's feedback at the start of the subsequent week.

While the core content of the course must be covered to prepare students for subsequent electives, I will try to adjust the class during the term to meet the needs of as many students as possible. These regular surveys facilitate this dialogue. *These surveys are anonymous and are not related to any assessment in the class. Please do not identify yourself in any way when filling out a survey.*

Student responsibilities

Review of website materials

Students are expected to consult the class WebCT site regularly. All lecture materials, detailed reading lists, study plans, and announcements are on-line. Every student must be aware of this material and ensure that they are well prepared for class and lodge all assessment in a timely fashion.

Attendance and participation

Students are expected to be regular and punctual in attendance at all classes in the courses in which they are enrolled. Students must bring to **every** class a “name tent” prominently displaying their name and team number. Materials for creating a name sign will be provided at the first class. Students may be asked to participate in class discussions at any time. The instructor may take attendance to confirm participation.

Students are expected to be active contributors to their team, and to sit with and support their team during discussion sessions.

Academic honesty

Students are bound by the rules of HKUST on academic honesty and plagiarism (for more information please refer to the HKUST Academic Programs Manual, Section AD20). Or you can check Sections 11 and 12 of the *Academic Regulations* printed in the Academic Calendar

<http://publish.ust.hk/univ/cal0506/calendar/regu/gen/index.html>

In particular:

- Do not rely on the work of other students when preparing cases
- While you are welcome to discuss minor aspects of the weekly assignments with other members of the class, it is expected that the contents of every weekly assignment is your own work.

More information as available at the HKUST Academic Integrity site:

<http://www.ust.hk/vpao/integrity/>

Frequently asked questions

How are project teams formed?

I form the teams randomly at the start of term using the names of persons enrolled in the class. When you visit the discussion section of WebCT you will see a discussion board for your team that lists all of the members. In week 1 you will be introduced to your tentative team members. At that time you must ensure that you are able to contact all other team members with ease, and that they know how to contact you. By week 2 the team rosters will be binding. I am unable to accommodate requests to change teams.

If you have a strong preference to work with a specific team please let me know as soon as possible and not later than the mid-class break in week 1, and I will endeavour to meet your request. Each team can have no more than 4 members.

Why does my case grade depend on someone else?

Teams make most important financial decisions, and the ability to contribute to (and manage) a team is one of the most important skills that you can acquire while in school. In my experience a team component to the curriculum, *with assessment consequences*, is one of the key attributes demanded from people in industry hiring Masters students in finance. It is important that you work towards a well functioning team and remember that you are responsible, in part, for the learning of others in the class.

What happens if a team member drops the class?

If a team member drops the class, your team will continue to work with its reduced number. No prior grades will be affected (you are assessed as a team, based on the members at the time the work was completed).

I could not login to WebCT; can I be relieved from my class responsibilities due to a computer problem?

No. One of your key responsibilities is to be prepared for each lecture and to be working with your peers. If you experience difficulties with WebCT or the computer you use to connect to WebCT be sure to take advantage of the many support options provided by HKUST. Be sure to allow extra time, especially early in the term, to ensure that you are on-line and fully informed about all aspects of assessment. Note that you will not have WebCT access until you are properly enrolled in the class.

Do we get to use formula sheets for the examinations?

No. Basically there are three reasons. First, when you are working (say in a meeting) you are often asked a question when a text is not handy. By getting you to learn (rather than memorize) how key formulae work you will be much better able to develop intuition for problems and comment intelligently on implications, without having to rely on texts and other support materials. Second, upon graduation you may want to sit for a range of industry-related certifications. Typically these examinations do not allow any support materials, so I am using an examination regimen that you will be asked to abide by when working in industry. Finally, remember that the complexity of the examination is related to the resources allowed. If I allowed more detailed support in the examination I would simply ask more difficult questions.

You may need certain support materials (such as normal distribution tables). If required these will be supplied with the examination materials.

Should I use a financial calculator for the examination?

For computational questions I require you to show your work to get credit for any answer, so simply using a fancy calculator will not ensure you a passing grade. The examination strategy is to test for a significant understanding of the material, and the questions (and grading) reflect this view. Use a calculator that you are comfortable with.

The required text is from the US and it covers a lot of US institutional detail. Are we getting too much exposure to the US markets in this class?

The text is probably the best-known and most-adopted masters-level futures and options text among top business schools. I am very comfortable with the topics covered and the technical aspects of the text's content. Further, most available texts will have a US focus for one simple reason – American capital markets are by far the largest in the world, attracting investors from all over the globe, and influencing regulations in all markets. So even if you plan on basing your career in Asia you will need a strong working knowledge of the world's largest and most influential capital market. If you would like more background, you can find a lot of references covering various finance centres. For example, see:

<http://www.bis.org/publ/regpubl.htm>

Of course I am keen for you to learn about a variety of markets. Asia-Pacific capital markets are likely to be of heightened interest to the class. So we are relying on class discussion, projects, web pages, background materials, and work experiences to broaden our coverage over the term. Be sure to bring your experiences and questions to class!

Faculty background

F. Douglas Foster

F. Douglas Foster is a Professor of Finance at the School of Banking and Finance at the University of New South Wales in Sydney, Australia. He has taught classes in asset management, corporate valuation (public and private equity), futures and options, international finance, investments, and investment banking. While his teaching schedule is largely concentrated at venues throughout the Asia-Pacific region, he has held faculty positions at the Australian Graduate School of Management, the Tippie College of Business, and the Fuqua School of Business. He has also taught in public enrolment short-courses, and tailored in-house programs for financial institutions.

He was awarded the Ph.D. degree from Cornell University in 1987. His research interests include the use of information-based techniques to solve problems in market design, trading systems, investment banking, corporate finance, and risk management.