C15.0043 Futures and Options
Fall 2009
Mon and Weds 9:30 A.M. - 10:45 A.M.
Tisch UC-21

Website: http://sternclasses.nyu.edu/

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SYLLABUS

(as of June 29, 2009)

Course description: This course is designed to introduce Finance students to the theoretical and practical aspects of financial futures, options, and other derivatives. Over the last 35 years, the markets for these versatile instruments have grown enormously and have generated a profusion of innovative products and ideas, not to mention periodic crises. Derivatives have become one of the most important tools of modern finance, from both the academic and the practical standpoint. However, the subject matter requires relatively greater use of quantitative methods and theoretical reasoning than many other courses, and most students will find it quite challenging.

***C15.0002 Foundations of Financial Markets* is a prerequisite for this course.**

Reading:
The material in this course is conceptually difficult, the pace is rapid and advanced concepts build quickly upon each other. Students should make sure they master the basics as they are presented, by reading the textbook, doing exercises, working with the TA, etc.--i.e., whatever it takes. It is very helpful to do the reading before the class in which it will be discussed.

Textbook:
(**H**) Hull. Options, Futures, and Derivative Securities, 7th ed. Prentice-Hall, 2008.

This textbook is the industry standard reference. It is "everything you might ever want to know about derivatives." It is hard reading, especially for non-mathematicians, but worth the effort. Learn everything in Hull, and you will have an outstanding grasp of the subject.

ALTERNATIVE TEXTBOOK: Hull has a lower level version of his textbook, often known as "Baby Hull." It covers most of the same material, but with less mathematical rigor. You can use the lower level book, if you prefer.

(**bh**) Hull. Fundamentals of Futures and Options Markets, 6th ed. Prentice-Hall, 2007.

Other required materials:
All class materials, including class notes, homework assignments, spreadsheets, sample problems and exams, will be available for downloading from the course website. Lecture notes and assignments will also be distributed in class.

Computer:
A working knowledge of Excel is a requirement for the course. Much of the homework will require use of a spreadsheet program. However, following Stern School standard policy, **no computers, Blackberries, smartphones, etc., are permitted in class**. They are too distractive, for the user and for others.

Calculator:
You will need a calculator for quizzes. It should be a "scientific" calculator, with x^y and *log* functions, but nothing fancier than that is required. A calculator with more functionality than is needed costs less than $20.

Course structure: There are three segments to the course

I. Forwards and Futures
II. Options
III. Derivatives Advanced Topics

Grading:

- There will be regular short quizzes throughout the course. Combined, these will be 25% of the grade. There will be no "make-ups" for missed quizzes. The two ~~worst~~ least excellent quiz scores will not be counted.

- Homework (50% in aggregate). About half of the homeworks will be building blocks of a term-long hands-on risk management project using Excel.

- There will be a written final exam given on the final exam date (25%).

The typical grade distribution is: A, A- 25-30% ; B+, B, B- 55-65% ; C+ and below 5-15% This generally conforms to the Finance Department norm. The course grade will be based on demonstrated mastery of the material, not on how hard the student has worked.

Homework answers will be posted on the course website one week after an assignment is due. Late homework will not be accepted once the answers have been posted.

TA / Tutor / Grader: The TA for the course, <***to be named later***>, will hold regular office hours. Times and place will be announced.

COURSE OUTLINE

H denotes chapters in the Hull textbook. **bh** denotes chapters in "Baby Hull."

Session / Date	Topics	Reading / Homework
1: Weds, Sep 9	Course overview; Introduction to derivatives Fundamental derivatives concepts	H1, H4 bh1, bh4
2: Mon, Sep 14	Forward contracts Hedging with forwards and with futures Futures contracts and futures markets	H2 bh2
3. Weds, Sep 16	Hedging in the absence of basis risk Two key interest rate contracts "Dollar Equivalence"	H3, H6 bh3, bh6 Homework #1 due
4. Mon, Sep 21	"Statistical" hedging Risk and return in a real world futures hedge Finding the minimum risk hedge using regression	
5. Weds, Sep 23	Futures pricing: Expectations vs the Cost of Carry Arbitrage, the key to derivatives pricing	H5 bh5
6. Mon, Sep 28	Doing cash-futures arbitrage, both long and short In-class market-making exercise-Part 1	**Bring your calculator to class!** Homework #2-3 due
7. Weds, Sep 30	In-class market-making exercise-Part 2	**Bring your calculator to class!**
8. Mon, Oct 5	Stock index futures arbitrage Important stock index futures strategies	
9. Weds, Oct 7	T-bond futures pricing; the cheapest to deliver bond Using interest rate futures	Homework #4 due
10.Mon, Oct 12	Introduction to Swaps	H7 bh7

Session / Date	Topics	Reading /Homework
11. Weds, Oct 14	Introduction to Options	H8, bh8 Homework #5 due
12 Mon, Oct 19	Analyzing option positions The covered call	H10 bh10
13. Weds, Oct 21	Put-call parity Option price relationships from portfolio dominance	H9 bh9
14 Mon, Oct 26	Extending put-call parity Option pricing: The Binomial Model	H11 bh11
15. Weds, Oct 28	The Binomial Model, continued	H19.1 - H19.5 bh16
16 Mon, Nov 2	Option pricing: The Black-Scholes Model	H12, H13 bh12
17. Weds, Nov 4	Delta hedging and other Greek letters In-class option hedging problems	H17 bh15 **Bring your calculator to class!** Homework #6 due
18 Mon, Nov 9	Volatility The implied volatility smile and term structure	H18, H21 bh17
19 Weds, Nov 11	Variations on a theme: Options on futures, FX, and interest rates	H15, H16 bh13, bh14 Homework #7 due
20. Mon, Nov16	Stock index options Strategies for portfolio protection	

Session / Date	Topics	Reading /Homework
21 Weds, Nov 18	Caps, floors and other interest rate options Models for interest rate processes	H28, H30 bh19
22 Mon, Nov 23	Caps, floors and other interest rate options Models for interest rate processes, continued	H31 Homework #8 due
23 Weds, Nov 25	Mortgages and mortgage-backed securities Monte Carlo solution techniques	H19.6-19.7
24 Mon, Nov 30	Credit risk and credit derivatives	H22, H23 bh21
25. Weds, Dec 2	Credit risk and credit derivatives, continued	Homework #9 due
26. Mon, Dec 7	Value at Risk Real options	H20, H33 bh18, bh20
27. Weds, Dec 9	Exotic options Structured products Derivatives disasters	H24, H34 bh20, bh23; excerpt from F.I.A.S.C.O.
28. Mon, Dec14	Overflow / Review	