

FINC-UB.0043 Futures and Options
Fall 2015

Professor Stephen Figlewski
Phone: 212-998-0712
E-mail: sfiglews@stern.nyu.edu
Office: MEC 9-64

Video: [Professor Figlewski introduces the course](#)

SYLLABUS

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 40 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 many students will find it quite challenging.

FINC-UB.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: There are two possible textbook choices for the course. **You should get one of them.** Take a look at them both in the bookstore and pick the one that appeals to you most. It's your choice--this is a course on options, after all.

(H) Hull. Options, Futures, and Derivative Securities, 9th ed. Prentice-Hall, 2014.

This textbook, now in its 9th edition, has been used for the course through many editions. It is the industry standard reference, that contains "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. If you are short on cash, it is not necessary to get the 9th edition. The 8th or even 7th edition would be OK, but in that case you will have to find out the appropriate correspondence for the chapter numbers.

ALTERNATIVE TEXTBOOK: Sundaram and Das have a recent textbook on derivatives. Its coverage is broad, almost as broad as Hull though not as deep, and it does a very good job of presenting the concepts, with both math and intuition, and connecting them to events in the real world. It is an excellent alternative to Hull.

(SD) Sundaram and Das. Derivatives Principles and Practice. 2nd edition. McGraw-Hill Irwin, 2015. (Note that the chapter numbers are the same for the first and second editions.)

Other required materials:

All class materials, including class notes, homework assignments, spreadsheets, sample problems and exams, and class videos 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, **computers, Blackberries, smartphones, etc., are NOT permitted during class.** They are too distracting, both for the user and for others, especially the professor.

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 can be purchased for as little as \$3.

Course structure: There are three segments to the course

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

Grading:

- Instead of a midterm, 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. However, 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%).

At NYU Stern, we strive to create courses that challenge students intellectually and that meet the Stern standards of academic excellence. To ensure fairness and clarity of grading, the Stern faculty have agreed that for elective courses the individual instructor or department is responsible for determining reasonable grading guidelines.

The Finance Department has elected to use the following grading guidelines for this course and all other elective courses. Instructors should award grades of "A" or "A-" to approximately 35% of students in elective courses with enrollments of more than 25 students. In elective classes of less than 25 students, the instructor is at liberty to give whatever grades they think the students deserve, while maintaining rigorous academic standards.

TA / Tutor / Grader: The TA for the course will be Julia Mo. She will hold regular office hours. Times and place will be announced.

COURSE OUTLINE

H denotes chapters in the Hull textbook.

SD denotes chapters in Sundaram and Das.

Session / Date	Topics	Reading / Homework
1: Weds, Sep 2	Course overview; Introduction to derivatives Fundamental derivatives concepts	H1, H4 SD1
Mon., Sep 7	NO CLASS – LABOR DAY	
2: Weds, Sep 9	Fundamental derivatives concepts and math, continued Value at Risk (VaR) Forward contracts	Math Review for Derivatives SD3Appendixes (H22, SD20 for VaR fanciers)
3. Mon, Sep 14	Hedging with forwards and with futures Futures contracts and futures markets	H2 SD2
4. Weds, Sep 16	Hedging in the absence of basis risk Two key interest rate contracts "Dollar Equivalence"	H6 SD5-6
5. Mon, Sep 21	"Statistical" hedging Risk and return in a real world futures hedge Finding the minimum risk hedge using regression	H3 Homework #1 due
6. Weds, Sep 23	Futures pricing: Expectations vs the Cost of Carry Arbitrage, the key to derivatives pricing	H5 SD3-4
7. Mon, Sep 28	Doing cash-futures arbitrage, both long and short In-class market-making exercise-Part 1 Bring your calculator to class!	
8. Weds, Sep 30	In-class market-making exercise-Part 2 Arbitrage trades in practice	Homework #2-3 due

Session / Date	Topics	Reading /Homework
9. Mon, Oct 5	Hedging and risk management with stock index futures Important stock index futures strategies	review H3
10. Weds, Oct 7	T-bond futures pricing; the cheapest to deliver bond Interest rate futures	H9
Mon, Oct 12	NO CLASS (Columbus Day)—CLASS HELD ON TUESDAY	
11. <u>TUES</u> , Oct 13	Introduction to swaps	H7 Homework #4 due
12. Weds, Oct 14	Introduction to Options	H10, H12 SD7-8, incl. appendix
13 Mon, Oct 19	Analyzing option positions The covered call and the protective put Put-call parity	H11 SD9-10 Homework #5 due
14. Weds, Oct 21	Option price relationships from portfolio dominance	
15 Mon, Oct 26	Option pricing: The Binomial Model	H13 SD11, SD12(1st half)
16. Weds, Oct 28	The Binomial Model, continued	SD12(2nd half), SD13
17 Mon, Nov 2	Option pricing: The Black-Scholes Model	H14-15 SD14.1-14.6, SD15
18 Weds, Nov 4	Delta hedging and other Greek letters In-class option hedging problems Bring your calculator to class!	H19 SD17 Homework #6 due

Session / Date	Topics	Reading /Homework
19. Mon, Nov 9	Volatility The implied volatility smile and surface VIX Index	H20 SD14.7-14.9, 14A (H23, SD16 for quants)
20 Weds, Nov 11 21 Mon, Nov 16	Variations on a theme: early exercise; Options on futures, FX, and interest rates Stock index options Strategies for portfolio protection	H17-18 Homework #7 due
22 Weds, Nov 18 23 Mon, Nov 23	Swaps, Caps, floors and other interest rate options Models for interest rate processes	Homework #8 due H29, H31 first part SD23, SD29 (H33, SD24-25, for swap fans)
Weds. Nov. 25	Thanksgiving Break – No Class	
24 Mon, Nov 30 25. Weds, Dec 2	Mortgages and mortgage-backed securities Monte Carlo solution techniques Securitization	H8, H9 (H21, for quants) SD27-30 (medium depth)
26. Mon, Dec 7 27. Weds, Dec 9	Credit risk and credit derivatives	Homework #9 due H24, H25 SD31-32 SD33 (SD34 for quants)
28 Mon, Dec 14	Structured products Real options Exotic options	H35 SD22 H26 SD18-19 (H26-27, for quants) excerpt from F.I.A.S.C.O.