

**NEW YORK UNIVERSITY
Stern School of Business
FALL 2010**

Futures and Options

Class B40.3335, S 1:00-4:00pm, Room KMEC 3-80

1. Contact Information:

Instructor: Antonios Sangvinatsos
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Course website: on [Blackboard](#)
Office Hours: Saturday 4:00pm-5:00pm (or by appointment)

TA: Udit Agrawal
Office: KMEC 7-100 Teaching Assistance Center
Office Hours: Saturday 11:30pm-1:00pm

2. Course Objectives:

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. The emphasis will be on pricing and hedging issues, but some institutional aspects and uses of these instruments will also be covered.

This course consists of two parts. The first part of the course deals with the structure of futures markets, pricing of futures contracts and hedging with such contracts. The second part of the course deals with options markets; strategies, pricing and position analysis. The course will consist of lectures, discussions and problem solving.

3. Prerequisites and Expectations:

- Finance: 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.

This is a quantitative class and a good background in finance (basic features and valuation of stocks and bonds, etc), calculus (derivatives, etc) and statistics is necessary.

B01.2311 Foundations of Finance is a prerequisite for this course.

These topics are covered in **B01.2311** (a prerequisite course).

- Computer: Many of the examples in lectures and problem sets will also require the use of Microsoft Excel (or a similar product) and I will assume that you know how to use spreadsheets. However, following Stern School standard policy, **no computers, Blackberries, smartphones, etc., are allowed in class**. They are too distracting, for the user and for others.

- Calculator: You will need a calculator for the quizzes, exams, and homework. 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.

4. Course Material:

- Required Textbook: Hull, **Options, Futures and Other Derivatives, 7th Edition, Pearson-Prentice-Hall** (referred to as **HULL** hereafter – 6th edition also fine, but different chapter numbers)

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 rigor. You can use the lower level book, if you prefer.

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 on Blackboard as Word or Pdf documents. Lecture notes will also be distributed in class.

- Suggested: Regular reading of Wall Street Journal (or the Financial Times) and of The Economist

It is always beneficial to do the required reading before class. Also, lecture notes are not a complete record of what I say in class, so attending lectures, taking notes and asking questions will be required to successfully complete the course.

5. Grading Criteria, Exams and Course Policy:

Grades will be assigned based on the following weights according to 2 schemes. Your overall course score will be calculated using the maximum of the two schemes presented bellow. These are:

	<u>Scheme 1</u>	<u>Scheme 2</u>
Mid-Term Exam	30%	0%
Final Exam	40%	70%
Homework Assignments	15%	15%
Class Participation	15%	15%

Exam Dates:

Mid-Term Exam	November 6 (Saturday), in class 1.00-4.00p.m.
Final Exam	December 18 (Saturday), in class 1.00-4.00p.m.

- Exam dates are in line with the university schedule. Rooms are to be determined.
- There is no alternate midterm date.
- Problem Sets: Because the material is analytical and new concepts build on old ones, it will be essential to do the problem sets in order to follow the lectures and succeed on the exams. To facilitate learning, I encourage students to work together on these problem sets. On the day they are due, **assignments must be turned in at the beginning of the class**. Homework answers will be posted on the course website after an assignment is due. Late homework will not be accepted once the answers have been posted. Everyone is expected to be able to discuss each problem set in class. To get full marks you do not need to get the correct answers. I am more interested in your analysis and the process you follow to get your answer. The homework will be graded in a two checks scale. A homework will get two checks if the student attacked all problems and made meaningful effort to address all issues. Will get zero checks if not all problems were attacked, or if the presentation is very sloppy, or if the presentation can hardly make sense. A homework will earn one check if it falls in-between the previous two cases. All homeworks will be handed in class. No homeworks will be accepted after the due date and especially after the upload of the solutions on Blackboard. All homework sets will be available on Blackboard before we start covering the material that is needed in order to be solved. Hence, you'll have plenty of time to think about the questions. Similar questions will appear in the midterm and final.

These problem sets count for borderline cases, of which 20% of the class found themselves in, for example, in the past years.

Even though performance on those assignments will not contribute much to the final grade, failing to do them will cost in understanding the material and performing well in the midterm and final.

- Exams: **Tests are closed book**. You may bring one piece of paper with handwritten notes (double-sided, 8.5"x11"). You will need a calculator that can raise numbers to arbitrary powers. Laptop computers and calculators with word processing features are not permitted. **There will be no make-up exams**. By enrolling in the course you are committing to take the tests on the scheduled dates.

- Regrades: Regrades must be requested within one week of the day the item was returned to the class. The student must submit a written and precise explanation of why he/she thinks the grade should be modified. The entire assignment will be regraded and the final mark may go up or down.

- Returned paperwork, unclaimed by a student, will be discarded after 4 weeks and hence, will not be available should a grade appeal be pursued by a student following receipt of his/her course grade.

- Grade Distribution: 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.

- TA / Tutor / Grader: The TA for the course, (Name TBA), will hold regular office hours. Times and place will be announced.

6. Office Hours:

If you have any questions about the material covered in class please do not hesitate to see me or the TA. I have an open door policy; you can ask me questions anytime you find me at the office.

If you have problems keeping up with the material, do not wait hoping that things will get better. They will probably get much worse. You are strongly encouraged to study and discuss the material with your classmates. I also strongly encourage you to raise questions in class.

7. Other Policies:

- Academic Integrity: I will strictly enforce the university rules on academic integrity "... *The use of unauthorized material, communication with fellow students during an exam, attempting to benefit from the work of another student, and similar behavior that defeats the intent of an examination or other class work is unacceptable to the University. It is often difficult to distinguish between a culpable act and inadvertent behavior resulting from the nervous tensions*

accompanying examinations. Where a clear violation occurs, however, the instructor may disqualify the student's work as unacceptable and assign a failing mark on the paper."

- Punctuality: I do not like people being late or leaving early or getting in and out at random times. There will be a break where you'll have time to refresh yourselves.

8. Course Outline (*subject to change*):

(Chapters are based on Hull, *Options, Futures and Other Derivatives*, 7th Edition)

0. Introduction.

- Course overview and syllabus
- Financial Risk and Derivatives.

PART I - FUTURES

1.1 Introduction.

- Forward and future contracts
- Marking to market
- Institutional aspects
- **HULL: 2**

1.2. Pricing and Hedging of Futures.

- Determination of forward price
- Normal backwardation and contango
- Index arbitrage
- Cross-hedging and hedging ratios
- Some futures contracts
- **HULL: 3, 5**

1.3. Interest Rate futures

- Forward rate agreements
- Interest rate futures
- **HULL: 4, 6**

PART II - SWAPS

2.1. Interest Rate Swaps.

- “Plain vanilla” swaps
- Empirical issues
- Swap valuation
- *HULL: 7*

PART III - OPTIONS

3.1. Introduction.

- Different options.
- Institutional aspects: margins.
- Payoff diagrams.
- *HULL: 8*

3.2. Arbitrage Pricing.

- Determinants of prices.
- Put-call parity.
- Price boundaries.
- *HULL: 9*

3.3. Trading Strategies.

- One stock and one option.
- Spreads.
- Combinations.
- *HULL: 10*

3.4. Binomial Pricing Model.

- Single-period.
- Multi-period.
- Pricing of American options.
- *HULL: 11*

3.5. Black and Scholes Model

- Uncertainty.
- Continuous Time processes.
- Assumptions of the BS formula.
- Implicit volatilities.
- *HULL: 13*

3.6. Hedging options.

- Concept
- Delta-hedging
- Greeks
- Hedging portfolios
- Portfolio insurance
- *HULL: 15*

3.7. “Non-Vanilla” Options.

- Dividend-paying stock options
- Options on Stock Indices
- Currency options
- Exotic Options: Compound, Barrier, Lookback options
- *HULL*: **15, 24** [HULL 6th edition: 14, 22]

3.8. Interest Rate Derivatives.

- Bond options
- Interest rate models
- Valuation issues
- *HULL*: **28** [HULL 6th edition: 26]

PART IV – CORPORATE USE OF DERIVATIVES

4.1. Risk Management

- Why firms should manage risk
- The practice of hedging
- Derivatives mishaps
- *HULL*: **34** [HULL 6th edition: 32], Meulbroek, Lisa “A Senior Manager’s Guide to Risk Management”, Journal of Applied Corporate Finance, vol. 14 nr. 4, Winter 2002

4.2. Options in Corporate Finance (*time permitting*)

- Equity and debt as options
- Real options: assessing projects
- *HULL*: **33** [HULL 6th edition: 31], Ross, Westerfield and Jaffe - Chapters 22.9 and 23

4.2. Other Options (*time permitting*)

- Credit Derivatives
- Advanced Swaps
- *HULL*: **22, 32**