



NEW YORK UNIVERSITY
Leonard N. Stern School of Business

B40.3340.10
Advanced Futures and Options

Professor Georges Courtadon
Fall 2008

Course Description:

This course will build on the knowledge obtained through the introductory options and futures course and help the student build a better understanding of the valuation and use of derivatives across equity, fixed income and credit markets.

Required Textbook:

John C. Hull, Options, Futures and other Derivative Securities, 7th edition, Pearson/Prentice-Hall, 2008.

Other Materials:

PowerPoint slides, problem sets and links to other articles will be posted on Blackboard.

Prerequisite:

Futures and Options (B40.3335)

Students who have not taken the prerequisite must obtain the permission of the instructor before taking the course.

Instructions and Grading:

Students are expected to have read the reading assignments given in the syllabus before class. Grading will be done on the basis of:

Problem sets:	40%
Mid term exam:	30%
Group project:	30%

The problem sets will be posted on Blackboard. The group project will be done in groups of 2 to 3 individuals. The project should be relevant to pricing and hedging a complex derivative instrument, or a contract traded on an exchange. A list of potential projects will be posted on Blackboard. Students will be allowed to propose their own project for approval by the instructor. This should be done before the midterm. The project must include a review of existing literature (academic and professional) as well as a critical examination of the advantages and shortcomings of the pricing methodology used. Finally, the project must be tested empirically or by simulation using Excel or another package like R (S) or Matlab.

Office hours:

By appointment.
Email: gcourtad@stern.nyu.edu

COURSE OUTLINE

Date	Subject	Chapter
09/18	I. Review of Option and Futures Contracts * Contract definitions * No arbitrage restrictions * Put call parity * Interest rate parity * Forward vs. futures Problem Set 1 posted	Ch.1, 2, 4, 5 and 9
09/25	II. The Binomial Model * Risk neutral probability * Single stage binomial * Multi stage binomial * Dynamic Option Duplication * Portfolio Insurance, CPPI * Implying the risk neutral probability distribution	Ch. 10 and 11
10/02	III. The Black Scholes Model * Basic distributional assumptions * Black Scholes formula * Extension to futures options * Extension to dividend paying stock * Extension to foreign currency options * Option to exchange two assets Problem Set 1 due Problem Set 2 posted	Ch.12, 13, 15 and 16
10/16	IV. Using Black Scholes * Definition of the Greeks (Delta, Gamma, Theta) * Other Greeks: Rho and Vega * P&L explanation of an option position * Volatility estimation * Stochastic volatility model	Ch. 17, 18 and 21
10/23	V. Basic Numerical Methods * Single asset binomial lattice * Multi asset lattice * Trinomial * Monte Carlo simulation * Finite difference methods Problem Set 2 due Problem Set 3 posted	Ch. 19
10/30	VI. Exotic Options and Their Use * Average price options * Barrier options * Binary options * Forward start options and cliquet structures * Volatility swaps	Ch 24 and 26
11/06	VII. Review and Midterm Examination	

Date	COURSE OUTLINE Subject	Chapter
11/13	VIII. Interest Rate Derivatives * Interest rate futures * Interest rate forwards and FRAs * Interest rate swaps * Interest rate caps and floors * Interest rate swaptions Problem Set 3 due Problem Set 4 distributed	Ch. 4, 6, 7 and 28
11/20	IX. Interest Rate Models * Hull and White one factor model * Linear Market Model (or BGM) * Convexity, timing and quanto adjustments	Ch. 29, 30 and 31
12/04	X. Credit Derivatives * Credit ratings and historical default probabilities * Binomial expansion technique * CDO rating agency models * Credit default swaps * Credit spreads and implied default probabilities Problem Set 4 due	Ch. 22 and 23
12/11	XI. Credit Derivatives * CDS on Indices (CDX, ITraxx, ABX) * CDS on CDO tranches (CDX, ITraxx, ABX) * Modeling default correlation (Gaussian Copula) * Synthetic CDO tranche valuation model * Nth to default basket CDS	Ch. 22 and 23
12/18	XII Derivatives and Portfolio Risk * VaR-Linear model * VaR-Historical simulation * VaR-Monte Carlo simulation * Liquidity and credit risks in a marked to market approach: The example of credit derivatives Group project due	Ch. 20