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Adjunct Professor
Department of Finance & Risk Engineering

NYU Tandon School of Engineering
Department of Finance and Risk Engineering
Course Outline FRE-GY 6073 Introduction to Derivative Securities
Adjunct Professor Ronald T. Slivka, Ph.D.
Tuesdays, at assigned times and classroom locations

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Tel: 215-321-3524; Cel: 215. 595. 7621
Office hours: At classroom location one hour prior to the start of any class or by appointment. Available otherwise by phone / email

Course Pre-requisites
Prerequisite: Graduate Standing

Course Description
For each of the four fundamental derivatives, futures, forwards, swaps and options, this course covers in detail associated definitions, terminology, market mechanics, theoretical fair value pricing and provides numerous practical examples of derivative strategies used in today's markets.

Prerequisites
Matriculation into MS Financial Engineering or permission of the department.

Course Objectives
Students should expect to achieve a detailed understanding of the following
- Accurate definitions for each of the four fundamental contracts of the derivatives world (futures, forwards, swaps, options)
- A clear understanding of the terminology specific to each contract
- Knowledge of how contracts are traded in their respective markets
- How to derive and compute the theoretical fair values for each of the fundamental contracts
- Practical examples of how derivatives are applied to solve business and investing problems
- An intuitive understanding of derivative behavior to complement an analytical understanding

Course Structure
In the first five lectures we focus on futures and forward contracts on equity, debt and interest rates. Definitions, terminology, users and uses are covered. Market mechanics and fair value pricing of futures and forward through arbitrage are explained. Current industry applications are illustrated in detail.

In the next three lectures the details of swaps are addressed with special attention given to interest rate swaps. The capital market interpretation of swaps is explored along with the means of determining the valuation and pricing for these important derivatives. Equity, FX, Commodity and Non-Generic swaps are also explained and application examples are provided.

Options are addressed in the final four lectures. Option basics, fair value pricing, valuation and option Greeks are explained and practical applications are emphasized. Exotic options are introduced and their uses explored. Option strategies for investing, hedging, issuing and trading are all illustrated.

A Midterm Exam will be administered on the seventh lecture date and a Final Exam on the last lecture date. Short quizzes will accompany some lectures.

Readings and Assignments

The required text for the course is: John Hull, Options, Futures and Other Derivatives, 10th edition.
Available in the NYU bookstore

For most lectures, some material supplementary to the text will be assigned for reading along with special assignments. Students will be expected to complete readings and some online educational exercises available from selected derivative websites.

Selected End of Chapter problems will be assigned along with typical employment interview questions for discussion in class. Completion of these problems, however, is mandatory. Answers will be made available from a Solutions Manual with additional assistance available from a Tutor.

Typically one special exercise will be assigned for completion each week. While these special exercises will not be formally graded they will be examined carefully for mistakes with analysis and comments returned to each student. It is mandatory for all students to return these particular assignments. Failure to do so will count against a final grade.

Midterm and Final Exams have the following requirements.
This exam will be open book, open notes. You must bring a calculator. No devices that permit texting, emailing or internet connections will be allowed. The exams typically have four or five problems covering major segments of the lecture content.

Grading
- 25% will be based on the Midterm Exam
- 35% will be based on the Final Exam
- 20% will be based on class participation and completed assigned exercises
- 20% will be based on timely completion of end of chapter problems and on quizzes

Fourteen Meeting Days

Course Days, Times and locations are assigned by the Business Office.
Course Location: NYU Tandon Campus at Metrotech Center
Students should verify the exact times and locations vary each semester.

1   Overview of Derivative Instruments
An introduction to basic derivative instruments and definitions is provided. The history of the derivative markets is described along with the primary users, uses, classification, market composition, regulation, benefits and concerns. Motivation for students to understand the place of derivatives in capital markets is emphasized.
Reading: Hull Chapter 1 + extra assigned readings

Futures and Related Markets
Definitions of futures and related securities (ADRs; ETFs) are specified and important relationships and terminology are defined. Arbitrage relationships are explored. Quotation conventions, contract specifications, margining and market mechanics are explained.
Reading: Hull Chapters 2,+ extra assigned readings
Homework: Selected Ch. 1 and 2 End of Chapter Problem, Special assigned exercise and Readings

2   Stock and Stock Index Futures
Equity futures are explored in substantial detail with an examination of the underlying equity references, contract specifications, quotation conventions, trading mechanics, theoretical fair value pricing, cash and carry trades and other current industry applications.
Reading: Hull Chapter 3 + extra assigned readings and journal articles
Homework: Selected Ch.3 End of Chapter Problem, Special assigned exercise and Readings

3   T-Bond and T-Note Futures
T-bond and T-Note futures contracts are covered in detail using the same methodical approach applied with equity futures. The fair value of these futures is derived with an arbitrage argument. Conversion factors, cheapest to deliver and strategic options are explained. The hedging of assets and liabilities are covered.
Reading: Hull Chapters 4, 6 + extra assigned readings
Homework: Selected Ch.4 and 6 End of Chapter Problem and Readings

4. Forward Contracts
The carry model pricing and trading mechanics of forward contracts are explored. Pricing and valuing investment and consumption forwards is explained.   Hedging commodity, FX and interest rate risk with forwards is illustrated.
Reading: Hull Chapter 5 + extra assigned readings
Homework: Selected Ch.5 End of Chapter Problem + special assigned exercise (Case study: Metallgesselschaft – Hedging forwards with futures).

5. FRAs and Eurodollar Contracts
The internal architecture of forward rate agreements (FRAs) is outlined and the fair value of these contracts is once again derived with an arbitrage argument common to all derivatives. The relationship of FRAs with Eurodollar futures is explained and the hedging of assets and liabilities are covered.
Reading: Hull Chapter 6 + extra assigned readings
Homework: Special assigned exercise

6   Introduction to Swaps and Vanilla Interest Rate Swaps
The definitions of equity, interest rate and currency swaps are developed. Relevant terminology is reviewed along with the swap mechanics of quotation and trading. The internal cash flows for a vanilla interest rate swap are studied in detail.
Reading: Chapter 7 + extra assigned readings
Homework: Selected Ch.7 End of Chapter Problem + special assigned exercise

7: Midterm Exam
This exam will be open book, open notes. You must bring a calculator. By University Policy "The use of cellphones, cameras, texting, emailing or any other communication with any other person (either in the exam room or not) during an exam or when reviewing the graded work at a future time is cheating. Anyone seen touching or looking at a cellphone during these times will be given a grade of zero for the exam."

8. Interest Rate Swap Pricing, Valuation and Applications
The composition of cash flows for a vanilla swap and the methodology for both swap valuation and swap pricing are treated in substantial detail to illustrate general pricing principles and valuation procedures. Interpretations of swaps are explained. The application of swaps to hedging both assets and liabilities is reviewed with specific examples. Non-vanilla swap construction is explored in detail.
Reading: Assigned Readings + Assigned Exercise (swap curve construction)

9. Non-Generic Swaps, Caps, Floors and Swaptions
Equity, FX, Commodity and Non-Generic swaps are explored. Pricing is explained. Relationships between IR swaps, caps, floors and swaptions are clarified and applications are covered.
Reading: Chapters 29 and 34
Homework: Assigned Exercise

10. Option Basics
Exchange-traded and OTC options are compared. Important definitions, quotation conventions, market mechanics, and regulations are explained. Maturity profiles for basic strategies are covered.
Reading: Hull Chapters 10, 11 + extra assigned readings
Homework: Selected Ch.10, 11 End of Chapter Problem

11. Option Pricing, Parity Relationships and Option Greeks
Factors affecting stock option prices are reviewed. Three models of option pricing are explained with examples. An introduction to the valuation of options using binomial trees is developed. One and two-step trees are applied to puts and American calls Put-Call parity is explained. The derivation and use of option "Greeks" is reviewed.
Reading: Hull Chapters 13, 14, 15,19
Homework: Selected End of Chapter Problem + special assigned exercise + Interview Questions

12. Option Applications
Strategies involving the use of single options are examined. The payoffs from spreads and combination trades are derived.   Numerous applications to investing, hedging, trading and issuing are covered.
Reading: Hull Chapter 12 + extra assigned readings
Homework: Selected Ch.12 End of Chapter Problem + special assigned exercise

13. Exotic Options and Equity-Linked Securities
The wide variety of non-standard options available for use by investors is outlined. Modeling and pricing for Barrier, Binary, Lookback and Asian options are all explained and illustrated with practical examples.
Reading: Hull Chapter 26
Homework: Selected Ch.26 End of Chapter Problem + special assigned exercise

14. Final Exam
This exam will be open book, open notes. You must bring a calculator. By University Policy "The use of cellphones, cameras, texting, emailing or any other communication with any other person (either in the exam room or not) during an exam or when reviewing the graded work at a future time is cheating. Anyone seen touching or looking at a cellphone during these times will be given a grade of zero for the exam."

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Ronald T. Slivka, Ph.D. is an Adjunct Professor at the Polytechnic Institute of New York University and a faculty member of the New York Institute of Finance. With over 35 years of practical Wall Street experience, Dr. Slivka has held equity derivative sales and management positions at Salomon Brothers, J.P. Morgan and ABN AMRO. He has written over 40 articles and book chapters on a broad range of derivative topics and holds a Ph.D. in Physics from the University of Pennsylvania. Ron presently serves on the Editorial Board of the Indian Journal of Finance and reviews for the International Journal of Emerging Markets and Journals of Investing and Index Investing (RTslivka@msn.com).

LinkedIn at http://www.linkedin.com/pub/ronald-t-slivka/21/275/316
Access my recent papers on SSRN at: http://ssrn.com/author=1530815

Moses Center Statement of Disability

If you are student with a disability who is requesting accommodations, please contact New York University's Moses Center for Students with Disabilities at 212-998-4980 or mosescsd@nyu.edu. You must be registered with CSD to receive accommodations. Information about the Moses Center can be found at www.nyu.edu/csd. The Moses Center is located at 726 Broadway on the 2nd floor.

University Grade Change Policy - 3 July 2013

"Grades on file with the Registrar at the end of the semester, with the exception of incomplete (I) and temporary grades (S or U), are considered final unless an error in calculating or recording the grade is discovered. No correctly reported final grade may be changed based upon re-taking an examination or completion of additional work. Incomplete (I) grades are handled according to the policies described under Incomplete Grades. Temporary grades (S or U), used for continuing projects, thesis or dissertation, will be converted to standard letter grades upon completion of the project, thesis or dissertation. Once recorded with the Registrar, these grades are treated as all other final grades. If an error in calculating or reporting a grade is discovered, the instructor will submit the change of grade request to the Department Head. Upon approval of the Department Head, the request will be submitted to the appropriate Associate Provost for approval. Any incorrectly assigned grade must be corrected within one semester."
Iraj Kalkhoran
Walter Zurawsky

NYU School of Engineering Policies and Procedures on Academic Misconduct

A. Introduction: The School of Engineering encourages academic excellence in an environment that promotes honesty, integrity, and fairness, and students at the School of Engineering are expected to exhibit those qualities in their academic work. It is through the process of submitting their own work and receiving honest feedback on that work that students may progress academically. Any act of academic dishonesty is seen as an attack upon the School and will not be tolerated. Furthermore, those who breach the School's rules on academic integrity will be sanctioned under this Policy. Students are responsible for familiarizing themselves with the School's Policy on Academic Misconduct.

B. Definition: Academic dishonesty may include misrepresentation, deception, dishonesty, or any act of falsification committed by a student to influence a grade or other academic evaluation. Academic dishonesty also includes intentionally damaging the academic work of others or assisting other students in

acts of dishonesty. Common examples of academically dishonest behavior include, but are not limited to, the following:

1. Cheating: intentionally using or attempting to use unauthorized notes, books, electronic media, or electronic communications in an exam; talking with fellow students or looking at another person's work during an exam; submitting work prepared in advance for an in-class examination; having someone take an exam for you or taking an exam for someone else; violating other rules governing the administration of examinations.
2. Fabrication: including but not limited to, falsifying experimental data and/or citations.
3. Plagiarism: intentionally or knowingly representing the words or ideas of another as one's own in any academic exercise; failure to attribute direct quotations, paraphrases, or borrowed facts or information.
4. Unauthorized collaboration: working together on work that was meant to be done individually.
5. Duplicating work: presenting for grading the same work for more than one project or in more than one class, unless express and prior permission has been received from the course instructor(s) or research adviser involved.
6. Forgery: altering any academic document, including, but not limited to, academic records, admissions materials, or medical excuses.