**Derivatives - B7309-001-20153**

**FALL 2015**

**Warren 310**

**PROFESSOR MARK ZURACK**

**Office Location:** 211 Uris Hall

**Office Phone:** 212-854-6100

**Fax:** 212-932-8614

**E-mail:** mz2015@columbia.edu

**Office Hours:** (Email Julie Adams at ja2403@columbia.edu to schedule an appointment)

**TEACHING ASSISTANT:** Lee Farber: lfarber16@gsb.columbia.edu

**REQUIRED COURSE MATERIAL**

The Practical Guide to Wall Street: Equities and Derivatives

*Matthew Tagliani, 2009*

Selected Readings Bound as a Casebook (Assignments to be handed out)

**REQUIRED PREREQUISITES AND CONNECTION TO THE CORE**

Capital Markets and Investments

**CONNECTION WITH THE CORE**

This course builds on knowledge from the Capital Markets and Statistics courses (B8306). Specifically, statistical techniques are used to estimate parameters of option pricing models, data are used to develop scenarios for risk analysis; and are used to understand simulation output when pricing and hedging derivative securities.

**COURSE DESCRIPTION AND OBJECTIVES**

Successful investing requires more than just picking stocks and bonds given the wide array of products at a portfolio manager's disposal. Through a combination of lectures, guest speakers and a final project, this course is intended to provide firsthand experience on how products like Options, Futures, Swaps, ETFs, Structured Notes, and Convertible Bonds are structured, valued, and used by all types of investors globally.

The course is designed from both the perspective of a practitioner who has to account for the real costs of trading derivatives and how the derivative can improve the return and/or reduce the risk of his/her portfolio.

The course is broken into the following sections:

**Products** - The course starts with a discussion of ”Delta 1” Derivatives like Exchange Traded Funds, Futures, and Swaps. These products trade dollar for dollar with the underlying security. We then explore options based Equity, Fixed Income and Commodity products, like Options, Structured Notes, Credit Default Swaps, Callable and Convertible Bonds.

**Strategies** – A component of this course will revolve around how investors use these products through the combination of class discussions, guest speakers and project work.

Toward the end of the course, we will try to identify future trends that may affect the market. We also look at historical events that shaped the markets.

**ASSIGNMENTS, EXAM AND FINAL PROJECT**

All assignments must be completed in writing. Some assignments will be Type A, some Type B.

For Type A assignments, each student must participate in a group discussion regarding the assignment before submission and review and if needed edit the final submission. **Collaboration across groups is not allowed.**

For Type B Assignments, each student should attempt to answer the questions on their own before collaborating with other students.

The Exam will be handed out after class seven and you have two weeks (untimed) to complete it. For the Final Project, each group has the choice of working with an industry practitioner on a project they created or completing a case study I created. In either case, the Final Project will be presented to the class and every group member (without exceptions) must attend the presentation.

**METHOD OF EVALUATION**

|  |  |
| --- | --- |
| Participation and Assignments | 40% |
| Take-Home Exam | 35% |
| Final Project | 25% |

An important component of Class Participation is attendance which will be tracked. I reserve the right to downgrade (including failing) any student who misses a significant number of classes, or does not complete all of the assignments. I will try to avoid cold calling, with the exception being case discussions. During class, please do not use laptops, tablet computers, and smartphones. Exceptions will be made with my prior approval.

If you were a student in my Capital Markets class, please do not use any material from that course to help you complete the assignments for this course.

1. Course Introduction/Indices and Exchange Traded Funds (09/08)

After a quick overview of the class, we introduce the measurement of trading costs, a concept that will be used throughout the course. This is followed by a discussion of Indices, focusing on the ways they are constructed and traded. If there is time, I will introduce Exchange Traded Funds.

Readings:

* + - * Chapter 4
			* MSCI: Developed, Emerging, Frontier Markets
			* Not All Commodity Indexes Are Alike
1. Exchange Traded Funds and Futures (09/15)

This class reviews products investors use to obtain broad market exposure, starting with Exchange Traded Funds. The class addresses how they are created, what forces impact the way they trade and how they compare to other index products. ETFs have expanded into new markets like Fixed Income, Commodities and Currencies, providing individual investors choices that have historically been only available to institutions.

After ETFs the class moves onto Futures, starting with Stock Index Futures. We review how the markets operate and how futures are valued, and compare the cost, return, and risk of futures vs. ETFs.

Readings:

* + - * Chapter 6
			* ETFs for the Single Stock Manager: Correlations, Myths & Realities
1. Futures and Swap Markets (09/22)

After completing our discussion on futures, this class completes our discussion on indexation by introducing Equity Index Swaps. We then review how investors leverage long positions and establish short positions in the cash markets. We end by exploring how Single Stock Swaps are used to accomplish similar objectives.

Readings:

* + - * Chapters 7 & 8
			* The Relationship between MSCI EAFE, Mini MSCI EAFE Index Futures and the iShares MSCI EAFE ETF
			* Making Alpha Portable
			* Mechanics of the Equity Lending Market
1. Options Introduction and Valuation (10/06)

This class introduces options trading and valuation. We start with a discussion on how the market operates and liquidity is provided using the ISE case study as background. Please read the case and be prepared to discuss it.

We then move on to Valuation, a topic that can get fairly complex. Although options pricing cannot be explained without any formulas, I start by providing intuition on what drives pricing leaving out the higher mathematics.

Readings:

* + - * Chapter 9 – p. 299-326; 337-341
			* The International Securities Exchange: New Ground in Options Markets
			* The New CBOE Volatility Index – VIX

Assignments:

Assignment (1) – Futures, ETFs, Swaps and ISE Questions (Type A)

1. Options Models/Practical Considerations in Pricing Options (10/13)

We start this class by reviewing the commonly used Options Models like the Binomial and Black-Scholes Models.

We then discuss how the cost of trading stock influences the price of an equity option and why the interest rate used to price a particular option depends on how the trader hedges that option.

In the index options market there are historical relationships between implied and historical volatility, implied volatility for options with different strike prices (skew) and terms (term structure), as well as stock versus index options (dispersion). Relying on historical data, this class discusses those relationships.

Readings:

* + - * Chapter 10 – p. 343-383
			* Introduction to Binomial Trees
			* Valuing Stock Options: The Black-Scholes Model

Assignments:

Assignment (2) – Options Pricing Questions (Type A and Type B)

1. Options Strategies for Active Managers and Pension Funds (10/20)

In this class we will discuss how Active Asset Managers tie their knowledge of the underlying company to develop options strategies on individual stocks. We go into mathematical detail on the most popular Equity Options strategies, writing covered calls and puts.

Pension Funds use Index Options and Interest Rates Futures and Options to control the risk of both their Assets and Liabilities. We next explore the strategies they follow and how to arrive at an appropriate hedge.

Readings:

* + - * Tutorial on Using Options in Active Strategies
			* Ten Ways Fundamental Investors Use Options
			* Covered Call Strategies: One Fact and Eight Myths

Assignments:

Assignment (3) – Practical Considerations Questions (Type B)

1. Fixed Income Derivatives (10/27)

For the next few classes we move away from Equities into Fixed Income and Commodities.

Jack Hattem from Blackrock provides an overview of Fixed Income Derivatives products and describes how Blackrock uses them.

Guest Speaker: Jack Hattem, Blackrock

Assignments:

Assignment (4) – Options Strategy Questions (Type A)

**Exam Handed Out**

1. Commodity Income Derivatives (11/10)

A guest speaker will start by leading a discussion on strategies used to hedge oil.

Guest Speaker: TBD

Readings:

* + - * Commodity Investments: The Missing Piece of the Portfolio Puzzle?
			* PIMCO, the Quiet Giant Among Commodity Investors: Kemp

**Exam Due**

1. Fixed Income Securities With Embedded Options (11/17)

Structured Notes are fixed income securities that combine bonds issued by an investment bank with options to provide equity exposure with different risk than conventional equities. During the first half of the class we review how structured notes are created, what factors determine their pricing and how they are used by institutional and individual investors.

The class then explores Callable and Convertible Bonds which combine "vanilla" bonds with Equity and Credit Derivatives.

Readings:

* + - * Equity Linked Notes
			* Convertible Securities
1. Exotic Options and Volatility Derivatives (11/24)

Exotic Equity Derivatives becomes the focus of this class, concentrating on Path Dependent Options, Correlation Options and Volatility Derivatives. We start by explaining each product and comparing its benefits and risks to more conventional derivatives. We then discuss how investors use Exotic Equity Derivatives in their portfolios.

This class also includes a presentation by Rocky Fishman from Deutsche Bank, who will share current research he has done on strategies using the VIX.

Guest Speaker: Rocky Fishman, Deutsche Bank

Readings:

* + - * Applications of OTC Options and Other Structured Products
			* Volatility as an Asset

Assignments:

Assignment (5) – Structured Notes/Convertible Bonds (Type A)

1. Tax Considerations in Trading Derivatives/Learning From History (12/01)

Individuals and corporations, before using derivatives need to be well versed in tax issues related to their overall strategy. In this class we cover the tax laws most relevant to Equity Derivatives transactions and introduce strategies to enhance After-Tax returns.

We then discuss situations in history where Equity Derivatives have been misused. Three cases stand out in particular, Portfolio Insurance and the 1987 crash, Long-Term Capital Management and Barings (Nick Lesson). Today Bud Kroll and I will lead a discussion on Portfolio Insurance and the crash of 1987 and LTCM.

Guest Speakers: Bud Kroll, formerly of J.P. Morgan

Readings:

* + - * Using Equity Derivatives to Enhance After-Tax Returns
			* Bank of Volatility
			* The Demons of ‘87
			* Leland O’Brien Rubenstein
			* Long-Term Capital Management, L.P. (A, C, D)

Assignments:

Assignment (6) – LOR/LTCM Questions (Type A)

1. Final Project (12/08)

To end the course each group will present their final project to the entire class. Each practitioner/advisor will also speak to the class, providing an overview of their business and how it relates to the project their group completed.