

**The University of Western Ontario  
Management and Organization Studies  
MOS4497b: Derivatives**

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**Course Objectives**

The goal of this course is to provide students with a framework for understanding the design and valuation of derivative securities and their use in managing corporate financial risk. This course is designed to familiarize students with the instruments and institutions of international financial markets, focusing particularly on "derivatives" markets (forwards, futures, options, swaps, etc.). Students will also be exposed to various computational models of option risk analysis via a series of simulation exercises in excel spreadsheet.

**Excel Spreadsheet Exercises:**

This course attempts to familiarize students with real world applications of derivatives. There will be three excel spreadsheet exercises designed to train students to apply theory to real world data. Each exercise will be based on the related topic we cover in class. Students will be required to work in groups of four (4) outside the class. The required data and detailed instructions on how to complete each exercise will be provided before each exercise is assigned. Each group will hand in SOFT and HARD copies of their Excel spreadsheet, a two page written summary and recommendations based on their spreadsheet computations.

**Examinations:**

There will be two close book exams - midterm and final. The exams will comprise of short essay questions and short computational exercises.

**Text Books:**

**Required:**

John C. Hull, "Fundamentals of Futures and Options Markets", Sixth Edition, Pearson Canada Education Inc. 2006 and "Solutions Manual and Study Guide for Fundamentals of Futures and Options Market", Sixth Edition by John Hull

**Recommended:**

Daily issues of the Globe and Mail/The Wall Street Journal

**Pre-requisite:** MOS 3310 a/b

**Anti-requisite:** MOS 3312 a/b

**Evaluation:**

Midterm	30% (After Week 6; exact date to be announced)
Final (Exam Period)	40% (To be scheduled by the Registrar's Office)
Excel Spreadsheet Exercises	20%
Class Contribution/Participation	10%

**COURSE OUTLINE****Week 1**

Introduction / the Rationale for Risk Management

- Futures Contracts
- Forward Contracts
- Options Contracts
- Hedgers, Speculators and Arbitrageurs

Required Readings

Hull: Ch. 1

Froot et al., Framework for Risk Management, Harvard Bus. Review, Nov. 1994.

**Week 2 & 3**

Futures: Mechanics and Hedging Strategies

- Mechanics of Futures Markets
- Convergence of Futures Price to Spot Price
- The Margin Requirements
- Stock Index Futures
- Basis Risk
- Cross Hedging

Required Readings

Hull: Ch. 2 & 3

**Weeks 4 & 5**

Interest Rates and the pricing of Forwards and Futures

- Bond Pricing
- Determining Treasury Zero Rates
- Forward Rate Agreements
- Futures Prices of Stock Indices
- Futures on Commodities, and Currencies
- The Value at Risk (VaR)
- Simulation, Stress Testing and Back Testing
- Estimating Volatilities and Correlations

Required Readings

Hull: Ch. 4, 5 & 18

Spreadsheet Exercise #1, Value at Risk (VaR)

## **Week 5 & 6**

Swaps – Introduction and Mechanics

- Interest Rate Swaps
- Swap Rates
- Determining LIBOR/Swap Zero Rates
- Valuation of Interest Rate Swaps
- Valuation of Currency Swaps

Required Readings

Hull: Ch. 7

Spreadsheet Exercise #2, Valuing Swaps

## **Week7**

Options – introduction and mechanics

- Stock Options
- Options Positions and other Mechanics
- Warrants, Executive Stock Options, and Convertibles
- Factors Affecting Options Prices
- Put-Call Parity Relations
- Early Exercise on Calls and Puts
- Effects of Dividends

Required Readings

Hull: Ch. 8 & 9

## **Week 8**

Trading Strategies Involving Options

- Single Option and a Stock
- Spreads
- Combinations

Required Readings

Hull: Ch. 10

## **Week 9 &10**

Valuation of Nonlinear Payoffs: the Binomial Trees

- Introduction Binomial Trees
- Risk Neutral Valuation
- Two Step Binomial Trees
- American Options

Required Readings

Hull: Ch. 11

Spreadsheet Exercise #3, Topic: Binomial pricing.

## **Week 11**

Valuation of Nonlinear Payoffs: The Black-Scholes Analysis

- Assumptions Underlying Black and Scholes Model
- The Black and Scholes / Merton Model
- Calculating Volatilities
- Risk Neutral Valuation
- Impact of Dividend
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Required Readings

Hull: Ch. 12

### **Week 12**

The Mechanics of Risk Management: Static Strategies

- Hedging, Basic Principles
- Basis Risk, revisited

Required Readings

Hull: Ch. 3

Case Study: Metallgesellschaft

### **Week 13**

Derivative Mishaps and What We Can Learn From Them

Required Readings

Hull: Ch. 23