



FIN 4XXX Derivatives

Undergraduate Elective Course
8 Weeks (2 credits)

Course Instructor Information:

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Course Description and Objectives

This course presents and analyzes derivatives, such as forwards, futures, and options. These instruments have become extremely popular investment tools over the past several decades, as they allow one to tailor the amount and kind of risk one takes, be it risk associated with changes in interest rates, exchange rates, stock prices, commodity prices, inflation, weather, etc. They are used by institutions as well as investors, sometimes to hedge (reduce) unwanted risks, sometimes to take on additional risk motivated by views regarding future market movements.

The course defines the main kind of derivatives, shows how they are used to achieve various hedging and speculating objectives, introduces a framework for pricing derivatives, and studies several applications of derivative-pricing techniques outside derivative markets.

By its very nature a course like this involves some advanced mathematics and statistics. However, in this course the math will be kept to the minimum that is required (the higher level math will be relegated to Appendices and will be optional). The goals are to (a) understand the characteristics of various derivatives, (b) take a look at the “black box” so as to understand the pros and cons of various models that are widely used, and (c) gain some experience in applying these instruments and models for valuation, risk management and financial engineering.

Course Pre-requisites

Required class pre-requisite is EITHER FIN 4504 OR FIN 4243

Students should have a good knowledge of basic finance concepts, including risk, return, arbitrage, efficient markets, and the time value of money. In addition, a course in basic statistics and probability theory would be useful. The course will involve a significant amount of numerical calculation and modeling using a computer; therefore, fluency in the use of a spreadsheet package such as EXCEL is essential. Knowledge of calculus is not required, but this would be helpful.

Required material

Text: John C. Hull, "*Fundamentals of Futures and Options Markets*," *Seventh Edition*, Prentice Hall.

Software: Software for derivative pricing (DERIVAGEM) is part of the text. Spreadsheets discussed in class will be made available on the class website.

Lecture Notes: Will be made available on the class website.

Class Format

This course will mainly use the lecture method of instruction. The lectures, supplemented by notes, examples and assignments are intended to familiarize students with the basic concepts, quantitative techniques, pricing, and institutional details necessary for making decisions involving derivatives.

Assessment

Class Participation and Attendance	10%	Includes non-graded problems and attendance
Assignment	20%	Individual
Midterm Exam	30%	In - Class
Final Exam	40%	Assigned exam date in 8 th week
Grades	A & A- \geq 90; 80 \leq B-, B & B+ < 90; 70 \leq C-, C & C+ < 80; D-, D, D+ < 70	

Note UF grading policy and GPA:

A = 4.0 ; A- = 3.67 ; B+ = 3.33 ; B = 3.0 ; B- = 2.67 ; C+ = 2.33 ; C = 2.0, C- = 1.67, D+ = 1.67 ; D = 1.0 ; D- = 0.67

Assignment

The assignment will consist of either several end-of-chapter problems (problem sets), case or computer assignments (computer assignments will involve Monte Carlo

simulation and option valuation using EXCEL. These assignments should be treated as equivalent to take-home exams. The report should be typed. **Late report will incur a significant penalty and any assignment that is more than two days late will not be accepted.**

Midterm and Final Exam

The exams will be closed book, but you will be allowed to bring one 8.5in by 11in sheet with formulas and other useful information. You can use both sides and you can handwrite or type. The exam will consist of numerical and qualitative conceptual questions. The questions will be very similar to the problems discussed in class, assignments submitted, and the sample exams.

Make-up exams

There will be no make-up exams except in the case of a legitimate excuse such as a death in the family or an unexpected illness with documentation.

Class Participation and Attendance

For each class, students should read the assigned chapters and also attempt the problem(s) that are given. Working in groups to solve the assigned problems is encouraged. It is highly recommended that students ask questions and actively participate in the class. Class participation as well as attendance will be used for the class participation grade. Hence, non-attendance in class will impact that component of the grade.

Note Regarding In-Class Distractions

Out of respect for fellow students, it is requested that all cell-phones, pagers, beepers, alarms, etc. be switched off or silenced before the beginning of each class. Also, you should not use your computer unless we are working on a problem or project that requires the use of the computer. You should bring your lap top to class.

Students with Disabilities

Students requesting testing accommodations must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the instructor when requesting accommodations.

Course Outline

1. Introduction (Week 1)
 - a. What are derivatives?
 - b. The main types of derivatives
 - c. Derivatives markets
 - d. Reasons for trading derivatives
 - e. Derivative pricing
2. Forwards and Futures (Week 2)
 - a. The market for forward and futures
 - b. Marking to market and margins
 - c. Valuing forward contracts and the forward price
 - d. The futures price
3. Options (Week 3)
 - a. The market for options
 - b. Option payoffs
 - c. Factors affecting option prices
 - d. No-arbitrage restrictions; the put-call parity
 - e. Early exercise of American options
 - f. Trading strategies involving options

MIDTERM EXAM (Week 4)

4. Valuing Options (Weeks 4 & 5)
 - a. The binomial model
 - b. The Black-Scholes model
 - c. Monte-Carlo simulation
 - d. Volatility estimation and implied volatility
5. Hedging and the “Greeks” (Week 6)
 - a. “Greeks” – delta, gamma, vega, theta & rho
 - b. The basic principle: delta-hedging
 - c. Delta-hedging
 - d. Asset mismatch, maturity mismatch, basis risk, and minimum-variance hedging
 - e. Delta-Gamma hedging using options
6. Special topics (Week 7)
 - a. Financial engineering
 - b. Exotic options

FINAL EXAM – Scheduled time – week 8
