

**FIN 6537 Derivative Securities**  
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**Course Description**

The course will deal with (a) the structure and operation of derivative markets (options, forward contracts, futures, swaps and other derivatives), (b) the valuation of derivatives, (c) the hedging of derivatives, and (d) applications of derivatives in the areas of risk management, portfolio insurance, and financial engineering. The models that will be studied include the Black-Scholes model, binomial trees, and Monte-Carlo simulation. Specific topics include simple no-arbitrage pricing relations for futures/forward contracts and the put-call parity relationship; delta, gamma, and vega hedging; implied standard deviation and its statistical properties; portfolio insurance and dynamic replication strategies. 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. On Wall Street, individuals who are skilled at analyzing derivatives are in great demand and command very high salaries.

**Class Format**

This course will use both the lecture and the case 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. Careful quantitative analysis is essential, but not sufficient, for decision making in a multi-faceted and changing business environment. This is where the cases come in. They not only require the application of basic concepts and quantitative skills, but also require consideration of the competitive environment, the myriad of alternative securities that may be available to the decision-maker, and other management and marketing issues. The cases will be used to illustrate the application of derivatives for portfolio insurance and financial engineering.

**Pre-requisites**

A core-course in finance and preferably an investment course. 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 or LOTUS is essential. A knowledge of calculus is not required, but this would be helpful.

## **Assessment**

Problem Sets/Assignments 50% (Two problem sets 20%, one computer assignment 20%, two case assignments 10%)

Class Participation and Attendance 10% Includes non-graded problems and attendance

Final Exam 40%

## **Grades**

A  $\geq$  90; 80  $\leq$  B, B+ < 90; 70  $\leq$  C, C+ < 80; D < 70

## **Assignments**

The assignments will consist of either several end-of-chapter problems (problem sets), cases 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 reports for these should be typed. Late reports will not be accepted.

## **Group work**

Students will be required to work in groups of four or five, in order to complete the cases and computer assignments, as well as problems to be presented at the beginning of each class. Although all students should attempt to solve these problems before class, only one group will be required to present a solution each time, where all group members should be present. Punctuality will be noted.

## **Final Exam**

The final exam will be closed book. Roughly half the exam will consist of numerical questions and half will consist of qualitative conceptual questions. The questions will be very similar to the problems discussed in class and the assignments submitted. The final exam will be held on the regular scheduled day. There will be no make-up exam.

## **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.

## **Preparations for the First Week of Class**

Read Chapter 1, and come prepared to discuss Questions 1.8-1.23. Not all the questions will be discussed, but individuals will be called on to give their answers. Work in groups to solve the problems.

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

**Course Packet** Lecture notes (overheads) and cases – purchase from

**Software**

Target Copy

Software for derivative pricing is part of the text

Computer spreadsheets (Excel) discussed in class will be made available on the class web site.