

Derivative Securities

FIN-ISS410

Course Description

This course provides an introduction to derivative securities; specifically, we will discuss the structure and pricing of options, futures and forward contracts, and swaps. Emphasis is placed on how the theoretical concepts and tools developed in this course can be applied in practice. The topics covered include general no-arbitrage valuation, binomial option pricing, Black-Scholes option pricing, state prices, risk-neutral probabilities, cost-of-carry relationships, and hedging concepts.

Required Texts

Fundamentals of Futures and Options Markets 9th edition, by John C Hull

Other Reading materials will be distributed during lectures

Prerequisite

FIN 302 Corporate Finance II

Course Requirements

| Component | % |
|-----------------|-----|
| Quizzes | 10% |
| Project & Cases | 10% |
| Midterm Exam | 30% |
| Final Exam | 40% |
| Participation | 10% |

Learning Outcomes

Upon the completion of the course, the students are expected to:

- Identify and define the major types of derivatives, the participants in the derivative markets, and the uses of derivatives
- Understand the basics of financial options including the characteristics, their origin, and opening and closing transactions
- Understand the use of options for speculation, hedging, and the generation of income
- Understand and create profit & loss diagrams, payoff diagrams and profit & loss tables
- Understand and evaluate option combinations and spreads, combined call writing
- Understand and apply the binomial options pricing framework to call and put options
- Understand and apply the Black-Scholes Option Pricing Model including the input factors, assumptions and important concepts and definitions
- Identify and apply the principal option pricing derivatives (the Greeks) including delta, theta, gamma, vega and rho at the security and portfolio level
- Understand the fundamentals of the futures market including futures contracts, pricing, valuation methodologies, spreads, and the use of futures in risk management (hedging).

Evaluation and Grading

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|----|--------|----|-------|----|-------|
| A | 93-100 | B- | 80-82 | D+ | 67-69 |
| A- | 90-92 | C+ | 77-79 | D | 63-66 |
| B+ | 87-89 | C | 73-76 | D- | 60-62 |
| B | 83-86 | C- | 70-72 | F | 0-59 |

Course Hours

The course has 20 class sessions in total. Each class session is 150 minutes in length, for a total of 3000 minutes of in-class time. Students are expected to spend 15-20 hours per week outside of class. The University awards **4** credits for this course. Different universities may count course credits differently. Consult officials at your own home institution.

Attendance

Occasionally, due to illness or other unavoidable circumstance, a student may need to miss a class. The University's policy requires a medical certificate to be excused. Any absence may impact on the student's grade. **Moreover, the University's policy is that a student who has more than 3 absences will fail the course. Arriving late or leaving early will count as a partial absence.**

Academic Honesty

The University expects all students to do their own work. Instructors will fail assignments that show evidence of plagiarism or other forms of cheating and will also report the student's name to the University administration. A student reported to the University for cheating is placed on disciplinary probation; a student reported twice is suspended or expelled.

Disability Accommodation

Any student who needs special accommodation due to the impact of disability should inform the University within 10 days before the program starts.

Tentative Schedule

| Period | Contents | Readings and Homework |
|--------|---|---|
| 1 | <ul style="list-style-type: none"> • Introduction and overview • Futures markets and central counterparties | <ul style="list-style-type: none"> • Chapter 1 |
| 2 | <ul style="list-style-type: none"> • Hedging strategies using futures | <ul style="list-style-type: none"> • Chapter 2 |
| 3 | <ul style="list-style-type: none"> • Interest rates • Interest rate futures | <ul style="list-style-type: none"> • Chapter 4 & 6 |
| 4 | <ul style="list-style-type: none"> • Determination of forward and futures prices | <ul style="list-style-type: none"> • Chapter 5 |
| 5 | <ul style="list-style-type: none"> • Swaps | <ul style="list-style-type: none"> • Chapter 7 |
| 6 | <ul style="list-style-type: none"> • Swaps • Securitization and the credit crisis of 2007 | <ul style="list-style-type: none"> • Chapter 7-8 |
| 7 | <ul style="list-style-type: none"> • Mechanics of options markets | <ul style="list-style-type: none"> • Chapter 9 |
| 8 | <ul style="list-style-type: none"> • Properties of stock options • Trading strategies involving options | <ul style="list-style-type: none"> • Chapter 10-11 |
| 9 | <ul style="list-style-type: none"> • Introduction to binomial trees | <ul style="list-style-type: none"> • Chapter 12 |
| 10 | <ul style="list-style-type: none"> • Introduction to binomial trees | <ul style="list-style-type: none"> • Chapter 12 |
| | Midterm | |
| 11 | <ul style="list-style-type: none"> • Valuing stock options: the Black–Scholes–Merton model | <ul style="list-style-type: none"> • Chapter 13 |
| 12 | <ul style="list-style-type: none"> • Employee stock options • Options on stock indices and currencies | <ul style="list-style-type: none"> • Chapter 14-15 |
| 13 | <ul style="list-style-type: none"> • Futures options and Black’s model | <ul style="list-style-type: none"> • Chapter 16 |
| 14 | <ul style="list-style-type: none"> • The Greek letters | <ul style="list-style-type: none"> • Chapter 17 |
| 15 | <ul style="list-style-type: none"> • Binomial trees in practice | <ul style="list-style-type: none"> • Chapter 18 |
| 16 | <ul style="list-style-type: none"> • Volatility smiles • Value at risk and expected shortfall | <ul style="list-style-type: none"> • Chapter 19-20 |
| 17 | <ul style="list-style-type: none"> • Interest rate options | <ul style="list-style-type: none"> • Chapter 21 |

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|----|---|---|
| 18 | <ul style="list-style-type: none"> • Exotic options and other nonstandard products • Credit derivatives | <ul style="list-style-type: none"> • Chapter 22-23 |
| 19 | <ul style="list-style-type: none"> • Derivatives mishaps and what we can learn from them | Chapter 25 |
| 20 | <ul style="list-style-type: none"> • Review | |
| | <ul style="list-style-type: none"> • Final Exam | |