Course Code and Name: FRE-GY Introduction to Derivative Securities
Fall 2024

Professor: Dr. William Segal

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Office/Hours: By Appointment

Class Schedule: Friday, 3:00-5:30
Rogers Hall Room 214

Course Pre-requisites:

Matriculation in the Financial Engineering MS Program or permission of the FRE Department

Course Description:

For each of the four fundamental derivatives, futures, forwards, swaps and options, this course covers in detail associated definitions, terminology, market mechanics, theoretical fair value pricing and provides numerous practical examples of derivative strategies used in today's markets.

Course Objective:

Students should expect to achieve a detailed understanding of the following

- Accurate definitions for each of the four fundamental contracts of the derivatives world (futures, forwards, swaps, options)
- A clear understanding of the terminology specific to each contract
- Knowledge of how contracts are traded in their respective markets
- How to derive and compute the theoretical fair values for each of the fundamental contracts
- Practical examples of how derivatives are applied to solve business and investing problems
- An intuitive understanding of derivative behavior to complement an analytical understanding

Course Structure:

In the first six lectures we focus on futures and forward contracts with an emphasis on interest rates. Definitions, terminology, users and uses are covered. Market mechanics and fair value pricing of futures and forward through arbitrage are explained. Current industry applications are illustrated in detail.

In the next lecture, the details of swaps are addressed with special attention given again to interest rate. The capital market interpretation of swaps is explored along with the means of determining the valuation and pricing for these important derivatives. Currency and credit default swaps are also explained and application examples are provided.

Options are addressed in the final six lectures. Option basics, fair value pricing, valuation and option Greeks are explained and practical applications are emphasized. The Black-Scholes option pricing model is introduced. Option strategies for investing, hedging, issuing and trading are all illustrated.

A Midterm Exam will be administered on the seventh lecture date and a Final Exam on the last lecture date. Short quizzes will accompany some lectures.

Course Assignments and Grading:

The required text for the course is: John Hull, Options, Futures and Other Derivatives, 11th edition. Available in the NYU bookstore

Selected End of Chapter problems will be assigned along with typical employment interview questions for discussion in class. Completion of these problems, however, is mandatory. Answers will be made available from a Solutions Manual with additional assistance available from a Tutor.

Typically one special exercise will be assigned for completion each week. While these special exercises will not be formally graded they will be examined carefully for mistakes with analysis and comments returned to each student. It is mandatory for all students to return these particular assignments. Failure to do so will count against a final grade.

Midterm and Final Exams have the following requirements.
This exam will be open book, open notes. You must bring a calculator. No devices that permit texting, emailing or internet connections will be allowed. The exams typically have four or five problems covering major segments of the lecture content.

Grading

- 25% will be based on the Midterm Exam
- 35% will be based on the Final Exam
- 20% will be based on class participation and completed assigned exercises
- 20% will be based on timely completion of end of chapter problems and on quizzes

Course Topic Outline:

Appendix A
Schedule of Course Topics

Wk	Class meeting	Topic
1	Sep-06	Introduction and Mechanics of Futures Markets; Chapters 1 and 2
2	Sep-13	Hedging Strategies Using Futures; Chapter 3
3	Sep-20	Interest Rates; Chapter 4
4	Sep-27	Determination of Forward and Futures Prices; Chapter 5
5	Oct-04	Interest Rate Futures; Chapter 6
6	Oct-11	Swaps; Chapter 7
7	Oct-18	**Midterm Exam**
8	Oct-25	Mechanics of Option Markets and Properties of Options; Chapters 10 and 11
	Nov-01	Trading Strategies Involving Options and Binomial Trees; Chapters 12 and 13
9	Nov-08	Wiener Processes and Itô's Lemma, Chapter 14
10	Nov-15	The Black–Scholes–Merton Model; Chapter 15
11	Nov-22	Options on Stock Indices, Currencies and Futures; Chapters 17 and 18
12	Nov-29	**No class-Thanksgiving break**
13	Dec-06	The Greeks; Chapter 19
14	Dec-13	**No class-Reading Day**
15	Dec-20	**Final Exam**