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**33:390:420 Derivatives Dr. Cheng-Few Lee**

Spring 2018 Room 5188, 100 Rock

BRR 5071

Tuesday and Thursday 3:20 – 4:40 cflee@business.rutgers.edu

Office Hours: Tuesday 1:30 - 3:20 pm or by appointment

**COURSE DESCRIPTION**

This course will first teach theoretical aspects of both futures and options, then the application of both futures and options in hedging will be discussed in detail. Option strategies and valuations will be both theoretically and empirically explored in detail. Real world examples will be used to enhance students understanding of both futures and options.

**COURSE MATERIALS**

* Required textbooks:

1. Security Analysis, Portfolio Management, and Financial Derivatives

by Cheng-Few Lee, Joseph Finnerty, John C. Lee, Lee, Alice C.,

and Donald Wort

2. Supplement Chapter 3 “Futures, Options, and Swaps: An Overview”

3. Intermediate Futures and Options  
 To be published by World Scientific in 2019  
 This book is based upon the lecture notes of this course.

* Reference textbooks:

1. Fundamentals of Futures and Options

by John C. Hull

Pearson, 8th Edition, 2014

2. Statistics for Business and Financial Economics

by Cheng-Few Lee, John C. Lee and Alice C. Lee

Springer, 3rd Edition, 2013

3. Encyclopedia of Finance

by Cheng-Few Lee, and Alice C. Lee

Springer, 2nd Edition, 2013

4. Essentials of Microsoft Excel, VBA, SAS, and MINITAB for Statistical and Financial Analyses

by Cheng-Few Lee, John C. Lee, Jow-Ran Chang, and Tzu Tai, 2016

5. From East to West: Memoirs of a Finance Professor on Academia, Practice, and Policy  
 By Cheng-Few Lee, World Scientific, 2017  
 Chapter 7 "Teaching Method and Educational Philosophy", Chapter 9 "Innovative and Active Approach to Teaching Finance"

These two chapters can be found here: http://www.worldscientific.com/worldscibooks/10.1142/10182

- Check Blackboard ([blackboard.rutgers.edu](https://blackboard.rutgers.edu/webapps/portal/frameset.jsp)) and your official Rutgers email account regularly.

**LEARNING GOALS AND OBJECTIVES**

- This course is designed to help students develop skills and knowledge in the following area(s):

The main purposes of this course are to teach students the subjects of theoretical aspect of futures and options and how they are applied in the real world.

- Students who complete this course will demonstrate the following:

An understanding of basic concepts, the theoretical aspect, and real world application of futures and options. The futures topics will include foreign exchange, commodity, and financial futures. The options topics will include foreign exchange, commodity, and financial options.

Students will also learn hedging, in terms of both futures and options. Students will also learn option strategies and their valuation.

- Students develop these skills and knowledge through the following course activities and assignments:

This course will have homework assignments and two tests. In addition, I will use Johnson & Johnson and other companies as examples to show how the above mentioned objectives can be achieved.

**PREQUISITES**For students to take this course, they need to complete an investment analysis course. This course will approximately spend 20 percent of the time to review their knowledge learned from Investment Analysis and it will use about 20 percent of the time to build upon their knowledge from Investment Analysis. In addition, we will spend about 60 percent of the time discussing new topics. We will discuss the valuation of futures instruments and their application in hedging and option strategy and its theoretical aspect of option.

**ACADEMIC INTEGRITY**

I do not tolerate cheating. Students are responsible for understanding the RU Academic Integrity Policy (<https://slwordpress.rutgers.edu/academicintegrity/wp-content/uploads/sites/41/2014/11/AI_Policy_2013.pdf>)

I will strongly enforce this Policy and pursue *all* violations. On all examinations and assignments, students must sign the RU Honor Pledge, which states, “On my honor, I have neither received nor given any unauthorized assistance on this examination or assignment.” Don’t let cheating destroy your hard-earned opportunity to learn. See [business.rutgers.edu/ai](http://www.business.rutgers.edu/ai) for more details.

**ATTENDANCE AND PREPARATION POLICY**

- Expect me to attend all class sessions. I expect the same of you. If I am to be absent, my department chair or I will send you notice via email and Blackboard as far in advance as possible. If you are to be absent, report your absence in advance at <https://sims.rutgers.edu/ssra/>. If your absence is due to religious observance, a Rutgers-approved activity, illness, or family emergency/death and you seek makeup work, also send me/TA an email with full details and supporting documentation within 3 days of your first absence. For job interviews students can be also be excused.

- Each student should sign in to show their attendance.

- For weather emergencies, consult the campus home page. If the campus is open, class will be held.

- Expect me to arrive on time for each class session. I expect the same of you. If you are going to be tardy, then your grade will be penalized.

- Expect me to remain for the entirety of each class session. I expect the same of you. If you are going to leave early, then you will be counted as absent, unless you have a good excuse and tell me in advance.

- Expect me to prepare properly for each class session. I expect the same of you. Complete all background reading and assignments. You cannot learn if you are not prepared. The minimum expectation is that for each 80-minute class session, you have prepared by studying for at least twice as many hours.

- Expect me to participate fully in each class session. I expect the same of you. Stay focused and involved. You cannot learn if you are not paying attention.

**CLASSROOM CONDUCT**

When you are in class you cannot use either cell phones or notebooks to perform activities that are not related to class materials.

**EXAM DATES AND POLICIES**There are 2 exams in this course.

During exams, the following rules apply:

During exams, the following rules apply:

My exams will be open book and open notes, however, you cannot talk to other students in the class during the exam. It should be noted that the amount of material covered in the exams will not allow you to talk to someone else. In addition, please note that my exams are semi-take home tests. In other words, you need to be well-prepared before you come to class. Therefore, if you don't prepare and try to find the answer from the book or your notebook you will not do well on the exams.

- If you have a disability that influences testing procedures, provide me an official letter from the Office of Disability Services at the start of the semester.

- No cell phones or other electronics are allowed in the testing room.

- You must show a valid Rutgers photo ID to enter the room and to turn in the exam.

- Alternate seating; do not sit next to another student or in your usual seat.

- Use the bathroom prior to the exam start; bathroom breaks, if essential, will be escorted.

- Your exam will not be accepted unless you sign the Honor Pledge.

**GRADING POLICY**

Course grades are determined as follows:

1st Exam ............................... 25%

2nd Exam .............................. 35%  
 Project ....................................10%

Homework ………………….20%

Class Performance ………….10%

[Nothing will give you more headaches than grading. Be thorough, precise, and consistent, else you will be overrun. List all items to be graded, how they will be graded, and how final grades are determined. Also include:

- Extra credit: If none, state so. If any, state the exact conditions for earning it.

- Grade distribution: If you have an intended grade distribution, explain it in detail.

- Grade posting: Where will you post the grades and when?

- Return of graded items: How quickly will you return grades/graded items, and how?

- Warning grade roster: You are strongly encouraged to issue warning grades; clarify if you do.

- Pregrading & regrading: How do you handle requests to review assignments before final submission (pregrading)? How do you handle requests to regrade assignments & exams?

- Grade grubbing: Consider a note along these lines: “Your final grade is not subject to negotiation. If you feel I have made an error, submit your written argument to me within one week of receiving your final grade. Clarify the precise error I made and provide all due supporting documentation. If I have made an error, I will gladly correct it. But I will adjust grades only if I have made an error. I cannot and will not adjust grades based on consequences, such as hurt pride, lost scholarships, lost tuition reimbursement, lost job opportunities, or dismissals. Do not ask me to do so. It is dishonest to attempt to influence faculty in an effort to obtain a grade that you did not earn, and it will not work.]

**COURSE SCHEDULE**

Spring Break: March 10 to March 18

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| January 16 | Introduction (Lee et al. Chapter 1) | 1.1 Objective of security analysis  1.2 Objective of portfolio management  1.3 Objective of financial derivatives  1.4 Basic approaches to security analysis and portfolio management, and  financial derivatives  1.5 Source of information  1.6 Structure of the book  1.7 Summary |
| January 18, January 23 | Futures, Options and Swap: An Overview (Supplement Chapter 3) | 3.1 Futures contracts and hedging  3.2 Options  3.3 Option-like securities  3.4 Swap contracts and hedging  3.5 Risk management |
| January 25 | Introduction to Valuation Theories (Lee et al. Chapter 4) | 4.1 Discounted cash-flow valuation theory  4.2 Bond valuation  4.3 Common-stock valuation  4.4 M&M valuation theory  4.5 Convertible bond  4.6 Markowitz model  4.7 Capital asset pricing model  4.8 Options valuation  4.9 Summary |
| January 30, February 1 | Futures Valuation and Hedging (Lee et al. 2013 Chapter 14) | 14.1 Futures versus forward markets  14.2 Futures markets: Overview  14.3 Components and mechanics of futures markets  14.4 The valuation of futures contracts  14.5 Hedging concepts and strategies  14.6 Summary |
| February 6, February 8 | Commodity Futures, Financial Futures, and Stock-Index Futures (Lee et al. Chapter 15, Appendix 2 of Chapter 19 of book entitled Statistics for Business and Financial Economics, 3rd Edition by Lee et al.) | 15.1 Commodity futures  15.2 Futures quotations  15.3 Financial futures  15.4 Stock index futures  15.5 Summary |
| February 13, February 15 | Options and Option Strategies (Lee et al. Chapter 16) | 16.1 The option market and related definitions  16.2 Put-call parity  16.3 Risk-return characteristics of options  16.4 Excel approach to analyze the option strategies  16.5 Summary |
| February 20, February 22 | Option Pricing Theory and Firm Valuation (Lee et al. Chapter 17) | 17.1 Basic concepts of options  17.2 Factors affecting option value  17.3 Determining the value of options  17.4 Option pricing theory and capital structure  17.5 Warrants  17.6 Summary |
| February 27, March 1 | Decision Tree and Microsoft Excel Approach for Option Pricing Model (Lee et al. Chapter 18) | 18.1 Call and put options  18.2 One-period option pricing model  18.3 Two-period option pricing model  18.4 Using Microsoft Excel to create the binomial option trees  18.5 Black–Scholes option pricing model  18.6 Relationship between the binomial option pricing model and the Black– Scholes option-pricing model  18.7 Decision tree Black–Scholes calculation  18.8 Decision tree approach for American options  18.9 Summary |
| March 6, March 8 | Normal, Log-Normal Distribution, and Option Pricing Model (Lee et al. Chapter 19) | 19.1 The normal distribution  19.2 The lognormal distribution  19.3 The long-normal distribution and its relationship to the normal distribution  19.4 Multivariate normal and lognormal distribution  19.5 The normal distribution as an application to the binomial and Poisson distribution  19.6 Applications of the lognormal distribution in option pricing  19.7 The bivariate normal density function  19.8 American call options  19.9 Price bounds for options  19.10 Summary |
| March 20 | Review |  |
| March 22 | Midterm Exam |  |
| March 27 | Options on Indexes, Currency and Futures (Lee et al. Chapters 22 and 27) | - Introduction  - Market indexes  - Index option  - Alternative International Parity Theory  - Currency option  - Options on futures  - Summary |
| March 29, April 3 | Comparative Static Analysis of the Option Pricing Models (Lee et al. Chapter 20) | 20.1 Delta  20.2 Theta  20.3 Gamma  20.4 Vega  20.5 Rho  20.6 Derivation of stock options with respect to exercise price  20.7 Relationship between delta, theta, and gamma  20.8 Summary |
| April 5, April 10 | Implied Variance and Volatility Smiles (Chapter 65 of Encyclopedia of Finance, 2013) | - Definition of implied variance and volatility smiles  - Alternative methods to estimate implied variance  - Examples of estimating implied variance  - Application of implied variance  - Summary |
| April 12, April 17 | Portfolio Insurance and Synthetic Options (Lee et al. Chapter 24) | 24.1 Basic concepts of portfolio insurance  24.2 Strategies and implementation of portfolio insurance  24.3 Comparison of alternative portfolio-insurance strategies  24.4 Impact of portfolio insurance on the stock market and pricing of equities  24.5 Empirical studies of portfolio insurance  24.6 Summary |
| April 19, April 24 | Swaps and Bond Portfolios: Management and Strategy (Lee et al. Chapter 23, Supplement Chapter 3) | 23.1 Interest rates swap  23.2 Currency swap  23.3 Bond strategies  23.4 Duration  23.5 Convexity  23.6 Contingent immunization  23.7 Bond portfolio: A case study  23.8 Summary |
| April 26 | Chi-Square, Noncentral Chi-Square and Option and Option Pricing Model (Chapter 9 of Statistics for Business and Financial Economics, 2013) | - Introduction  - Chi-square distribution  - Noncentral chi-square distribution  - Constant elasticity of variance option pricing model  - Empirical examples  - Summary |

**SUPPORT SERVICES**If you need accommodation for a *disability*, obtain a Letter of Accommodation from the Office of Disability Services. The Office of Disability Services at Rutgers, The State University of New Jersey, provides student-centered and student-inclusive programming in compliance with the Americans with Disabilities Act of 1990, the Americans with Disabilities Act Amendments of 2008, Section 504 of the Rehabilitation Act of 1973, Section 508 of the Rehabilitation Act of 1998, and the New Jersey Law Against Discrimination. <https://ods.rutgers.edu>

If you are a military *veteran* or are on active military duty, you can obtain support through the Office of Veteran and Military Programs and Services. <http://veterans.rutgers.edu/>

If you are in need of *mental health* services, please use our readily available services.

[Rutgers Counseling and Psychological Services – New Brunswick: <http://rhscaps.rutgers.edu/>]

If you are in need of *physical health* services, please use our readily available services.

[Rutgers Health Services – New Brunswick: <http://health.rutgers.edu/>]

If you are in need of *legal* services, please use our readily available services: <http://rusls.rutgers.edu/>

If you are in need of additional *academic assistance*, please use our readily available services.

[Rutgers University-New Brunswick Learning Center: <https://rlc.rutgers.edu/>]