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

Spring 2018 Room 5188, 100 Rock

BRR 2071

Monday and Wednesday 1:40 – 3:00 pm cflee@business.rutgers.edu

Office Hours: Wednesday 3:00 - 4:00 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, 3rd Edition, 2017

 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, 9th Edition, 2016

 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, studentsmust 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:

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. However, you are allowed to use laptop in the test 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 ............................... 20%

 2nd Exam .............................. 30%
 Project ....................................30%

 Homework ………………….10%

 Class Performance ………….10%

**Other grading policies:**

1. No extra credits will be given in this class.

2. Grade distribution will be used if necessary.

3. Your grades will not be posted.

4. I will try to finish my grading within 48 hours after the test.

5. I will give warning grade roster if necessary.

6. 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**

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| September 5 | Introduction (Lee et al. Chapter 1) | 1.1 Objective of security analysis1.2 Objective of portfolio management1.3 Objective of financial derivatives1.4 Basic approaches to security analysis and portfolio management, andfinancial derivatives1.5 Source of information1.6 Structure of the book1.7 Summary |
| September 10, September 12 | Futures, Options and Swap: An Overview (Supplement Chapter 3) | 3.1 Futures contracts and hedging3.2 Options3.3 Option-like securities3.4 Swap contracts and hedging3.5 Risk management |
| September 17 | Introduction to Valuation Theories (Lee et al. Chapter 4) | 4.1 Discounted cash-flow valuation theory4.2 Bond valuation4.3 Common-stock valuation4.4 M&M valuation theory4.5 Convertible bond4.6 Markowitz model4.7 Capital asset pricing model4.8 Options valuation4.9 Summary |
| September 19, September 24 | Futures Valuation and Hedging (Lee et al. 2013 Chapter 14) | 14.1 Futures versus forward markets14.2 Futures markets: Overview14.3 Components and mechanics of futures markets14.4 The valuation of futures contracts14.5 Hedging concepts and strategies14.6 Summary |
| September 26, October 1 | 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 futures15.2 Futures quotations15.3 Financial futures15.4 Stock index futures15.5 Summary |
| October 3, October 8 | Options and Option Strategies (Lee et al. Chapter 16) | 16.1 The option market and related definitions16.2 Put-call parity16.3 Risk-return characteristics of options16.4 Excel approach to analyze the option strategies16.5 Summary |
| October 10, October 15 | Option Pricing Theory and Firm Valuation (Lee et al. Chapter 17)  | 17.1 Basic concepts of options17.2 Factors affecting option value17.3 Determining the value of options17.4 Option pricing theory and capital structure17.5 Warrants17.6 Summary |
| October 17, October 22 | Decision Tree and Microsoft Excel Approach for Option Pricing Model (Lee et al. Chapter 18) | 18.1 Call and put options18.2 One-period option pricing model18.3 Two-period option pricing model18.4 Using Microsoft Excel to create the binomial option trees18.5 Black–Scholes option pricing model18.6 Relationship between the binomial option pricing model and the Black– Scholes option-pricing model18.7 Decision tree Black–Scholescalculation18.8 Decision tree approach for American options18.9 Summary |
| October 24, October 29 | Normal, Log-Normal Distribution, and Option Pricing Model (Lee et al. Chapter 19) | 19.1 The normal distribution19.2 The lognormal distribution19.3 The long-normal distribution and its relationship to the normal distribution19.4 Multivariate normal and lognormal distribution19.5 The normal distribution as an application to the binomial and Poisson distribution19.6 Applications of the lognormal distribution in option pricing19.7 The bivariate normal density function19.8 American call options19.9 Price bounds for options19.10 Summary |
| October 31 | Review |  |
| November 5 | Midterm Exam |  |
| November 7 | 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 |
| November 12, November 14 | Comparative Static Analysis of the Option Pricing Models (Lee et al. Chapter 20) | 20.1 Delta20.2 Theta20.3 Gamma20.4 Vega20.5 Rho20.6 Derivation of stock options with respect to exercise price20.7 Relationship between delta, theta, and gamma20.8 Summary |
| November 19, November 26 | 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 |
| November 28, December 3 | Portfolio Insurance and Synthetic Options (Lee et al. Chapter 24) | 24.1 Basic concepts of portfolio insurance24.2 Strategies and implementation of portfolio insurance24.3 Comparison of alternative portfolio-insurance strategies24.4 Impact of portfolio insurance on the stock market and pricing of equities24.5 Empirical studies of portfolio insurance24.6 Summary |
| December 5, December 10 | Swaps and Bond Portfolios: Management and Strategy (Lee et al. Chapter 23, Supplement Chapter 3) | 23.1 Interest rates swap23.2 Currency swap23.3 Bond strategies23.4 Duration23.5 Convexity23.6 Contingent immunization23.7 Bond portfolio: A case study23.8 Summary |
| December 12 | Chi-Square, Non-central 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 |

**Brief CV of Professor Cheng-Few Lee**

Cheng-Few Lee is a Distinguished Professor of Finance at Rutgers Business School, Rutgers University and was chairperson of the Department of Finance from 1988–1995. He has also served on the faculty of the University of Illinois (IBE Professor of Finance) and the University of Georgia. He has maintained academic and consulting ties in Taiwan, Hong Kong, China and the United States for the past three decades. He has been a consultant to many prominent groups including, the American Insurance Group, the World Bank, the United Nations, The Marmon Group Inc., Wintek Corporation, and Polaris Financial Group.

Professor Lee founded the Review of Quantitative Finance and Accounting (RQFA) in 1990 and the Review of Pacific Basin Financial Markets and Policies (RPBFMP) in 1998, and serves as managing editor for both journals. He was also a co-editor of the Financial Review (1985-1991) and the Quarterly Review of Economics and Finance (1987-1989). In the past 39 years, Dr. Lee has written numerous textbooks ranging in subject matters from financial management to corporate finance, security analysis and portfolio management to financial analysis, planning and forecasting, and business statistics. In addition, he edited two popular books, Encyclopedia of Finance (with Alice C. Lee) and Handbook of Quantitative Finance and Risk Management (with Alice C. Lee and John Lee). Dr. Lee has also published more than 220 articles in more than 20 different journals in finance, accounting, economics, statistics, and management. Professor Lee was ranked the most published finance professor worldwide during the period 1953-2008.

Professor Lee was the intellectual force behind the creation of the new Masters of Quantitative Finance program at Rutgers University. This program began in 2001 and has been ranked as one of the top ten quantitative finance programs in the United States. These top ten programs are located at Carnegie Mellon University, Columbia University, Cornell University, New York University, Princeton University, Rutgers University, Stanford University, University of California at Berkley, University of Chicago, and University of Michigan.

**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/>]