FINN 6210 / BPHD 8240
Derivatives 1: Financial Elements of Derivatives
FALL, 2018

Instructor: Renren Dong
Email: rdong@uncc.edu
Office Hours: After Class or By Appointment
Classroom: Center City 606, 5:30 pm – 8:15 pm
Course Website: Canvas
Text: Options, Futures, and Other Derivatives, by John C. Hull.

Course Description:
This course provides students with the opportunity to examine the nature and functions of futures and options markets. Topics include hedging for risk reduction and the role of derivative instruments in the capital markets; however, the course focuses on basic pricing techniques which are derived from no arbitrage relations.

Course Objectives:
• To develop an understanding of the role derivatives and options play in the economy and their importance in completing financial markets.
• To understand the economics of derivatives pricing.
• To understand how derivatives/options are used in practice and their limitations.

Statement on Academic Integrity:
All students are required to read and abide by the Code of Student Academic Integrity. Violations of the Code of Student Academic Integrity, including plagiarism, will result in disciplinary action as provided in the Code. Definitions and examples of plagiarism are set forth in the Code. The Code is available from the Dean of Students Office or online at: http://www.legal.uncc.edu/policies/ps-105.html

Statement on Diversity:
The Belk College of Business strives to create an inclusive academic climate in which the dignity of all individuals is respected and maintained. Therefore, we celebrate diversity that includes, but is not limited
to ability/disability, age, culture, ethnicity, gender, language, race, religion, sexual orientation, and socio-economic status.

Exams and Assignments:

There will be 2-3 graded assignments, 1 midterm exams, and a final exam. The graded assignments will be somewhat involved, and you are allowed (and encouraged!) to work in groups of 2 - 4. The exams will be closed book, but you will be allowed to bring in a “cheat sheet”, filled with whatever formulas you wish. The final exam is comprehensive (covers whole semester) of the course material. Each midterm exam has duration of 70 minutes. The grade breakdown: the assignments together will count for 30%; each of the midterm exams will count for 25% of your grade; and the final exam will count for 45%.

Missed Exams:

The midterm exams will be administered in class on Oct 2nd. The final exam is between Dec 7th – Dec 13th. Please do not miss any of the exams. If you miss an exam and I don’t hear from you beforehand then you will need to provide me with appropriate documentation for your absence that explains your emergency (emergencies include accidents, severe sickness, or life-or-death situations, not laziness or lack of preparation!), and we will make alternate arrangements.
Part 1 Introduction / Future, Forward and option

1. Introduction (Cp1, Cp2)
   - What is derivative
   - Exchange vs OTC
   - Basic instruments - Spot/forward/future/option
   - Major Players - hedger/speculator/arbitrageurs
   - Margin - broker dealer margin/OTC margin/CCP margin

2. Forward & Future Pricing (CP 2, CP4, CP5)
   - Contract specification
   - Law of one price (no arbitrage principle)
   - Forward/future pricing
   - Real world example
   - Hedging using forward/future
   - *FX forward/Swap

3. Option basics (CP10, CP11, CP12)
   - Option (call/put) specification and payoff
   - Type of the option
   - Factors affecting option value
   - Lower bounds for option price
   - Put-call parity
   - *option strategy

4. Option Valuation / risk (CP15, CP13, CP19)
   - Risk natural pricing
   - Binomial tree
   - Replication
   - B-S formula from terminal distribution
   - Greek: Delta/Gamma/Vega/Rho
   - *Exotic/Structures products

5. Volatility smile (CP 20, CP23)
   - What is implied Vol smile
   - Level/Vol correlation
   - Vol decay and mean reversion
   - *Local volatility vs implied Vol
   - *Vol implied probability and Vol surface interpolation
   - *implied Vol lattices
   - *Stochastic volatility and SABR
Part 2 Interest rate derivative / hedging

6. Interest rate derivative basic (Cp 4, Cp 5, Cp 6, Cp 7)
   - Basic instruments – zero coupon bond, fix coupon bond
   - Measure of interest rate (compounding, day count)
   - Type of rates
   - How CB decision impact market rate (ioer, rrp, discount window)
   - forward rate / Implied forward from spot
   - basic instruments – FRA, Eurdollar future, floating bond, swap
   - *Trading Economics

7. Interest rate derivative valuation / risk / attribution (Cp 4, Cp 5, Cp 6, Cp 7, +)
   - Duration
   - *Yield curve construction
   - Fra, ED valuation / risk
   - Bond value / risk / attribution
   - Swap valuation / risk / attribution
   - Convexity
   - A general framework for risk / attribution
   - Hedging interest rate risk

8. Introduction to other derivatives
   - *Credit
   - *Mortgage

Part 3 Advanced Topic

9. Advanced Topic
   - *Statistic Arbitrages Strategy
   - *Machine learning and its application