Course Handout Part II

Date: 10/1/2024

In addition to Part-I (General Handout for all courses appended to the timetable) this portion gives further specific details regarding the course.

Course No.   : ECON F354 / FIN F311

Course Title   : Derivatives & Risk Management

Instructor(s)   : Dr. Rajan Pandey & Dr. Aditya Sharma

Instructor-in-charge   : Dr. Rajan Pandey

1. Scope & Objective:

The objective of this course is to provide students an introductory level familiarity with a particular type of financial instruments known as DERIVATIVES. To achieve the stated objectives, the course provides a detailed description on the structure (read, design) and utility (read, relevance) of the most common and popular financial derivatives namely, *Options*, *Futures*, and *Swaps*. The scope of the course entails acquainting students with the mechanics of trading and settlement of derivative instruments in the financial markets and their function as insurance products for hedging financial risk.

No understanding about financial instruments or their derivatives is complete without a thorough grasp over interest rate concepts and hence the course also includes discussion on topics such as time value of money, term structure of interest rates and their role in valuation of bonds, computation of yield and forward interest rates, estimating bond-price volatility, and the role of bond duration and convexity in mitigating interest rate risks.

The topics covered in the course will, at an introductory level, enable participants to learn about common risks prevalent in the financial markets and how to manage its impact on investment exposure by using derivatives. Discussion on valuation of financial derivatives and a brief introduction to creating synthetic investment positions by combining derivatives prepares students for advanced level courses such as Financial Engineering and Financial Risk Analytics and Management. The course concludes with a survey of selective topics of contemporary interest to risk management industry such as forecasting volatility, estimating value-at-risk, etc. The topics covered in the course will also assist students in preparing for competitive professional international certifications such as Financial Risk Manager (FRM) and Chartered Financial Analyst (CFA).

2. Prerequisites: This is an elementary course on Derivatives and Risk Management and does not assume any prior knowledge of Financial Markets, Instruments and Derivatives. However, familiarity of basic economic theory such as law of supply and demand, utility maximization principle, compounding and discounting of cash flows, etc. are desirable. The course is not mathematically rigorous and a first-year course on elementary linear algebra, calculus, probability, and differential equations will be sufficient to grasp the contents of the course. It is expected that students have technical know-how of MS excel as it will be used to demonstrate required computations, wherever required, and for carrying out take-home assignments.

3. Text book:

Hull, John C., and Basu, Sankarshan (2016). *Options, Futures, and Other Derivatives,* 10th Edition. Pearson Education Inc.

4. Reference books:

➢ R1. David A. Dubrofsky and Thomos W. Miller, Jr., Deivatives Valuation and Risk Management, Oxford Unversity Press.

➢ R2. David G. Luenberger, Investment Science, Oxford University Press

5. Course Plan:

Lecture No. and Date	Learning Objectives	Topics to be Covered	Learning Outcomes	Reading Reference
1	**Orientation:** • Course introduction and discussion on the hand-out.	-NA-	Understanding of course contents and their significance	-NA-
2-4	**Time Value of Money**	Concept of interest, Calculation of interest, Time value of money, present value, and future value	• Should be able to understand application and various methods of interest, • Familiarity about application of interest rate in real world.	Class Notes
5-6	**Introduction:** • Introduction to Financial Markets and financial instruments. • Role of intermediaries in modern-day finance. • What are derivatives and their relation with traditional financial instruments? • Types of traders in financial markets.	• Exchange-traded markets vs. Over-the-counter markets. • Introduction to common financial instruments such as stocks and bonds, and their role in financial markets. • Basics of derivatives and the concept of the underlying instrument. • Distinction between investment, hedging, and speculation. • Role of arbitrageurs in financial markets.	• Basic understanding of type of markets, market participants and instruments	Ch. 1 (selective topics: follow classroom discussion) + Class notes

7-9	Basic Tenet: • Introduction to types of risks present in the financial markets. • What is return on investment and how is it calculated? • How derivatives are used in managing downside risk? • Fixed income instruments and their Derivatives	An introduction to: • What is risk? How to estimate risk? • What is return? How to estimate return on stocks? • Historical analysis of financial instruments from their risk-return profiles.	• Understand the significance of risk-return tradeoff • Role of Derivatives in risk management • Basics of fixed income securities	Ch. 4 + class notes
10-17	**Futures and Forwards** • Introduction to Futures • How Futures are traded on stock exchange? • Clearing and settlement of Futures contract. • Risk management strategies using futures. • Forwards contract • Valuation of Futures and Forwards.	• Specification of a futures contract. • Trading of futures contract on stock exchange. • Margin requirements and marking-to-market futures position. • Expiration of futures contract and rollover. • Basic trading strategies using futures contract. • Hedging stock risk using futures contract. • Law of convergence and valuation of futures contract. • Forwards vs Futures • Cost of carry and its implication on futures valuation. • Speculation using futures contract. • Forwards on non-financial assets (commodities). • Stock index futures.	• Identify futures contract on stock exchange and read and interpret online quotes on futures. • Place trading orders on Futures. • Importance and implications of margin requirements for initiating a futures contract and role of maintenance margin in sustaining the contract. • Identification of variables that affect intra-and-inter- day prices of futures contract. • Role of interest rates, transportation costs, storage costs on prices of futures. • Risk management using futures contract.	Ch. 2 and 3 + Class note

18-25	**Options: Introduction, Trading, Strategies** • Introduction to options • Difference between options and futures. • Options trading mechanism, clearing and settlement of options. • Identify important variables that impact options prices. • Options strategies for risk management and speculation.	• Types of options. • Options positions and basic pay-off diagrams • Specification of options and interpretation of options quotes • Market mechanics of options trading, clearing, and settlement. • Factors affecting options prices. • Stock position protection using options. • Creating spreads, net debit and net credit strategies, anticipation based strategies, volatility based strategies.	• Distinction between long on options and short on options. • Draw pay-off diagrams of different options based strategies. • Interpretation of price of an option as function of intrinsic value and time value. • Impact of moneyness of an option on its value and utility for hedging the underlying. • Creating hedging strategies using options.	Ch. (10, 11 ,12) + Class notes
26-33	**Option Valuation** • Put-call Parity and option valuation. • Binomial model of option pricing. • Black-Scholes-Merton (B-S-M) option pricing model.	• What is moneyness of an option and its role in option valuation and creating strategies? • Moneyness and delta hedging. • One-step binomial model and a no-arbitrage argument. • Risk-neutral valuation. • Two-step binomial trees • Binomial model: Simulation example. • Bounds for option prices. • Put-call parity and no-arbitrage condition. • Inputs to Black-Scholes-Merton option pricing model. • Estimation of call and put prices using B-S-M model.	• Differentiate between At-the-money, In-the-money, and Out-of-the-money options. • Identify mispricing of options using Put-Call parity. • Learn the theory of risk-neutral valuation and use Binomial and B-S-M model to price options using data from the stock exchange. • Learn the impact of dividends on option prices.	Ch. 11 (selective topics), 19, 13, 15 + Class notes

34-36	**Swaps and their applications** • Need for swaps in modern day finance. • Different types of swaps. • Role of financial institutions in a swap contract.	• Mechanics of swaps. • Comparative-advantage argument. • Valuation of interest rate swaps.	• Why firms undertake swaps contract for exchanging one cash-flow with another? • How swap contracts are designed and what purpose they satisfy? • Role of financial intermediaries in a swap contract. • Distinction between different types of swaps.	Ch. 7 + class notes

6. **Evaluation Scheme:**

Components	Weightage (%)	Date & Time	Nature of component (Close Book/ Open Book)
Mid-Semester Test	30%	As per time-table	Close Book
Comprehensive Examination	40%	As per time-table	Partly Open Book
Quizzes (Best 2 of 3)	20%	TBA	-
Take-home assignment	10%	TBA	-

7. **Learning outcome**

This course is designed to enable the students to understand and learn:
  I.   Basics of derivative instruments, markets, and risk management
  II.   Forward and futures contracts, pricing, and basic applications in hedging
  III.   Option contracts, trading strategies, pricing models, and basic applications in hedging
  IV.   Interest rate and currency swaps, and forward rate agreements

Make-up policy
No make-up will be given for tests without prior approval from the I/C. Only genuine cases will be considered for make-up.

Chamber Consultation Hour:
Rajan Pandey - Tuesday 3:30 to 5:00 PM.
Aditya Sharma - Thursday 3:00 to 4:00 PM

Notices: Notices concerning the course will be intimated online/displayed in Departmental notice board.

Instructor in-charge