Course Handout Part II

Date: 20/01/2021

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-in-charge **: ARUN KUMAR VAISH**

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

Lecture No. and Date	Learning Objectives	Topics to be Covered	Learning Outcomes	Reading Reference
0	**Orientation:** • Course introduction and discussion on the hand-out. • Brief orientation of the participants and their expectations from the course.	-NA-	• Importance of this course to the participants for gaining knowledge in this field and for fulfilling career aspirations related to this course. • Familiarity of the course instructor with course participants and their expectations from this course.	-NA-
1-4	**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? • Philosophy of asset valuation. • 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. • First principles of asset valuation i.e. Discounted Cash Flow approach to asset valuation. • Distinction between investment, hedging, and speculation. • Role of arbitrageurs in financial markets.	• Fundamental distinction between underlying instruments and derivatives of those instruments. • Different types of derivatives and how they differ from each other, e.g. Difference between Options and Futures. Difference between call option and put option. • The first principles of asset valuation, which will enable students to learn the universal convention followed for asset valuation.	Ch. 1 (selective topics: follow classroom discussion) + Class notes

7-8	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?	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 inherent relation between risk and return and importance of risk in asset valuation. • Common types of risks that investors encounter in financial markets. • Develop familiarity with risk-return characteristics of different financial assets that are traded in the domestic market. • Basic understanding of using derivatives for hedging downside risk.	Class notes
9-15	Futures and Forwards • Introduction to Futures • How Futures are traded on stock exchange? • Clearing and settlement of Futures contract. • Risk management strategies using futures. • Anticipation based 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. • Short selling and intra-day trading of futures. • 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. • The concept of Marking-to-Market (MTM) an open position in futures contract as stock prices fluctuate real-time. • 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. • Fundamental difference between futures and forwards. • Application of time value of money for valuing futures and forward contracts. • Risk management using futures contract.	Ch 2 and 3 + Class note

16-20	Options: Introduction, Trading, Strategies • Introduction to options. • Difference between options and futures. • Options trading mechanism, Clearing and settlement of options. • Difference between long and short on options. • Basic options pay-off diagrams. • 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. • Creating speculative strategies using options.	Ch 10, 11 (selective topics: follow classroom discussion) and 12 + Class notes
20-25	Option Greeks and Valuation. The Greek letters and their estimation. Moneyness of an option and option Greeks. Hedging the underlying using options Greeks. Relations between option Greeks and volatility smiles Put-call Parity and option valuation. Binomial model of option pricing. Black-Scholes-Merton (B-S-M) option pricing model.	Introduction to option Greeks: Delta, Theta, Gamma, Vega, Rho. 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.	Basics of option Greeks and their different types. Differentiate between At-the-money, In-the-money, and Out-of-the-money options. Utilize information on options Greeks to formulate hedging strategies. 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

26-32	Fixed Income Instruments and their Derivatives • Interest rate basics. • Interest rates and their role in bond valuation. • Calculate yield-to-maturity and yield-to-call on fixed income instruments. • Day count convention and calculating clean and dirty price of bond. • Market mechanics of bond trading. • Zero coupon bonds. • Estimating forward interest rates. • Duration, modified duration and bond price volatility,Convexity. • Bond portfolio immunization. • Interest rate futures. • Currency futures.	• Features of fixed income instruments. • Bond yield calculation. • Pricing plain-vanilla bond. • Yield curve analysis. • Bond price volatility. • Forward rates of interest. • Strips markets. • Overview of interest rate derivatives. • Hedging using interest rate futures. • Trading strategies using interest rate options. • Currency derivative instruments. • Determinants of foreign-exchange rate	• Role of interest rates in pricing securities. • Relate fluctuations in interest rates with macroeconomic scenario. • Factors affecting bond yields and the term structure of interest rates. • Estimating bond duration and convexity. • Bond portfolio management strategies. • Futures and options on interest bearing instruments and their use in hedging interest rate risk. • Foreign exchange rate and international risk management. • Cross-currency exchange rates and common currency derivatives.	Ch. 4 + 6 + class notes
32-42	Swaps and their applications • Need for swaps in modern day finance. • Different types of swaps. • Swaps and cash flow engineering. • Role of financial institutions in a swap contract. • Valuation of swap. • Risk management using swaps.	• Mechanics of swaps. • Comparative-advantage argument. • The nature of swap rates. • Determining the LIBOR / swap zero rates. • Valuation of interest rate swaps. • Cross-currency swaps. • Commodity 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. • Valuation of swap contracts and their role in financial risk management.	Ch. 7 + class notes

5. Course Plan:

6. Evaluation Scheme:

Component	Duration	Weightage (marks)	Date& Time	Remarks
Mid-Semester	90 Min.	30% (90)		Open Book
Compre- Exam	2 hrs.	40% (120)		Open Book
Surprise Quizzes 2 Best Out Of 3 (One Buffer, No Makeup)	20 Min.	30% (90)		Open Book

7. Learning outcome

Students who complete this course would be able to

1) Understand the various accounting methods for recording the business transactions.
2) Evaluate various financial concepts and preparation of financial statements-balance sheet, income statement, and cash flow statement.
3) Identify the financial position and performance of the companies.
4) Make better economic decisions while undertaking investments in financial assets.

Make-up policy

The application for make-up tests/exam will not be entertained without specifying any genuine reasons. Application must be submitted to instructor-in-charge of the course along with documents supporting the reason for seeking make-up before conducting the respective tests/exams.

Chamber Consultation Hour: 6165 E, Tuesday- from 3:30PM to 4:30 PM;

Notices: Notices concerning the course will be displayed on the Economics and Finance Group Notice Board only.

Instructor in-charge
Dr. Arun Kumar Vaish