FINANCIAL DERIVATIVES & RISK MANAGEMENT

PROF. J. P. SINGH
Department of Management
IIT Roorkee

TYPE OF COURSE: Rerun I Elective I PG
COURSE DURATION: 12 weeks (26 Jul'21 - 15 Oct'21)
EXAM DATE: 23 Oct 2021

PRE-REQUISITES: Basics of finance, Senior school mathematics (algebra, calculus & probability).
INTENDED AUDIENCE: The audience would comprise of those desirous of get acquainted with the intricacies of derivatives pricing, their strategizing and their applications as hedging instruments and also, appreciating the nuances that have led to the origin and extensive development of this field of knowledge.
INDUSTRIES APPLICABLE TO: This course will attract immense recognition in the entire financial services industry including banks, stock & commodity exchanges, stock & commodity brokers, portfolio managers, investment bankers, market regulators etc. Those employed in corporate finance shall also find it valuable as it would add to their versatility. Academicians will find it a gateway to further work in related areas.

COURSE OUTLINE:
Traditional courses on derivatives can be classified almost exclusively into those: (i) that provide a comprehensive coverage of the underlying mathematical models using stochastic calculus and develop the subject as an extension of probabilistic mathematics e.g. mathematical finance and (ii) that cover the theme purely at a superficial level focusing on the operating aspects like exchange trading methodologies, marking and margining aspects etc. They consciously avoid entering the mathematical/stochastic structure that forms the very basis of this course and it covers the pricing and applications of these instruments.

ABOUT INSTRUCTOR:
Jatinder Pal Singh, is a Professor at the Indian Institute of Technology Roorkee. He is a Fellow member of the Institute of Chartered Accountants of India & Institute of Company Secretaries of India, an Associate Member of Institute of Cost Accountants of India & Institution of Engineers (India). He is also a postgraduate in Physics, Mathematics and a graduate in Law & Operational Research. After about 10 years of corporate experience, he joined the Department of Management Studies, IIT Roorkee in 2001. He is presently Professor (HAG) in the said department. His research interests are in econophysics, mathematical finance, financial risk management, international finance and corporate governance.

COURSE PLAN:
Week 2: Futures: Margining & MTM, Forwards & Futures Prices, Exposure & Risk, Basics of Futures Hedging, Nuances in Futures Hedging.
Week 3: Further Aspects of Futures Hedging; Basics of Mean-Variance Portfolio Theory & CAPM; Systematic & Unsystematic Risk.
Week 4: Index Futures: Features, Hedging & Arbitrage; Basics of Interest Rates, YTM & Other Yield Measures.
Week 5: Interest Rate Risk & Its Measurement; Interest Rate Futures: Features of IRFs, Hedging of Interest Rate Risk.
Week 6: T-Bill & Eurodollar Futures, T-Bond Futures; Tailing the Hedge; Basic Theory of Options.
Week 7: Options: Price Bounds, Put-Call Parity; American Options; Trading Strategies.
Week 8: Option Spread Strategies; Stochastic Processes: Basic Theory, Brownian Motion, Diffusion Equation, Central Limit Theorem.
Week 9: Ito’s Equation; Stock Price Distribution, Fokker Planck Equation; Option Pricing: Binomial Model.
Week 10: Girsanov Theorem; Black Scholes Model; Option Greeks.
Week 12: Valuation of Swaps; Value at Risk.