

Quantitative Finance Course by IGIDR, INDIA, IIT Kanpur, INDIA and RPI, USA

December 17-20, 2009

Date/Day	Timing	Session No.	Title	Detail description
Date (17/12/2009) (1 st Day)	0900-1030 hours	1/1	Quantitative Financial Models	Introduction to quantitative models typically used by finance practitioners - Beta estimation for capital asset pricing; GARCH models for returns, variances and covariance estimation; models for derivative pricing
	1100-1230 hours	2/1	Variables in Quantitative Financial Models	Prices of securities; Financial market risk; Credit variables; Portfolio performance measures
	1400-1530 hours	3/1	Quantitative Methods-I (Probability and Statistics)	Introduction to random variables; Summary statistics; Probability distributions; Testing and inference; Ordinary Least Squares estimation; Maximum Likelihood estimation; Properties of estimates; Forecasting.
	1600-1730 hours	4/1	Quantitative Methods-II (Optimization and Stochastic Processes)	Basics of Optimization (LP, NLP, QP, 0-1, MIP, etc.), Stochastic Processes and Calculus
Take home work assignment for day 1				
Date (18/12/2009) (2 nd day)	0900-1030 hours	1/2	Quantitative Methods-III (Time Series Analysis)	Times series models for stationary processes; Forecasting (conditional and unconditional) ; Non-stationary process (both in mean and variance leading to conditional heteroscedasticity models); Applications.
	1100-1230 hours	2/2	Quantitative Method –IV (Simulation)	Concepts of simulation, Input distribution selection, Random number generator, random variables generation, Output analysis, Variance reduction
	1400-1530 hours	3/2	Intro to Estimation/Computing Environment	Introduction to the public domain statistical software - R
	1600-1730 hours	4/2	Intro to Estimation/Computing Environment	Using R for financial computing and estimation
Take home work assignment for day 2				
Date (19/12/2009) (3 rd Day)	0900-1030 hours	1/3	Portfolio Basics	Introduction to Portfolio analysis, CAPM, APT, Equilibrium Models
	1100-1230 hours	2/3	Mutual Funds	General characteristics of Mutual Funds, Open and Closed ended funds, Calculation of NAV, Concepts of redemption fees, Deferred sales loads, Concepts of index funds, Stock funds, Bond funds, Money market funds
	1400-1530 hours	3/3	Investment Analysis	Investment methods, Economic analysis, Industry analysis, Efficient Markets, Valuation Process, Pricing of bonds, Evaluation of portfolio performance and security analysis
	1600-1730 hours	4/3	General Performance and its Measures	Performance measurement and tracking of portfolios and different investment measures (risk, return, combination of risk and return)
Take home work assignment for day 3				
Date (20/12/2009) (4 th Day)	0900-1030 hours	1/4	Risk Measurement and Modeling Risk – I	Univariate volatility models (ARCH,GARCH,EGARCH,GJR-GARCH); Stochastic volatility models (M-GARCH Models -BEKK, CCC, DCC, PC-GARCH); Applications
	1100-1230 hours	2/4	Risk Measurement and Modeling Risk - II	Value at Risk (VaR) models; Extreme value theory; Applications
	1400-1530 hours	3/4	Derivative Pricing	Introduction Derivative Pricing, Binomial Tree, Weiner Process, Ito's Lemma, Black-Scholes Model, Equity Derivative, Interest rate Derivative
	1600-1730 hours	4/4	Risk Management	Risk Management Framework, Tools for risk management, Hedging strategies, Derivatives for Market risk, Credit derivatives, Asset Liability Management