

DISTRIBUTION OF PRACTICAL MARK

Experiments 30 Viva - Voice 10 Record 10 = Total 50

OPTION (K). MATHEMATICS OF FINANCE AND INSURANCE

(Questions will be set from each unit/section)

Units	Topics
I	<p>Prerequisite - Application of Mathematics and Finance and Insurance. Financial Derivatives - An Introduction; Types of Financial Derivatives - Forwards and Futures; Options and its kinds; and SWAPS.</p> <p>The Arbitrage Theorem and Introduction to Portfolio Selection and Capital market theory static and Continuous - Time Model.</p> <p>Pricing by Arbitrage - A Single - Period option Pricing Model; Multi-Period Pricing Model-Cox - Ross - Rubinstein Model; Bounds on Option Prices.</p>
II	<p>The Ito's Lemma and the Ito's Integral.</p> <p>The Dynamics of Derivative Prices - Stochastic Differential Equations (SDEs) - Major Models, of SDEs; Linear Constant Coefficient SDEs; Geometric SDEs; Square Root process; mean Reverting Process and Ornstein-Uhlenbeck Process.</p>
III	<p>Martingale Measures and Risk-Neutral Probabilities: Pricing of Binomial Options with equivalent martingale measures.</p> <p>The Black-Scholes Option Pricing Model-using no arbitrage approach, limiting case of Binomial Option Pricing and Risk-Neutral probabilities.</p> <p>The American Option Pricing - Extended Trading Strategies; Analysis of American put Options; early exercise premium and relation to free boundary problems.</p>
IV	<p>Concepts from Insurance: The Claim Number Process; The Claim Size Process; Solvability of the Portfolio; Reinsurance and Ruin Problem.</p> <p>Premium and Ordering of Risks - Premium Calculation Principles and Ordering Distributions.</p> <p>Distribution of Aggregate Claim Amount - Individual and Collective Model; Compound Distributions; Claim Number of Distributions; Recursive Computation Methods; Lundberg Bounds and Approximation by Compound Distributions.</p>
V	<p>Risk Processes - Time Dependent Risk Models; Poisson Arrival Processes; Ruin Probabilities and Bounds Asymptotics and Approximation.</p> <p>Time Dependent Risk Models - Ruin Problems and Computations of Ruin Functions; Dual Queuing Model; Risk Models in Continuous Time and Numerical Evaluation of Ruin Functions.</p>