Stat-321 Stochastic Process

100 Marks: 03 Credits

Number of Class: 35-40

Stochastic Process: Concept, definition, state space, parameter space, classification of stochastic process.

Markov Chain: Concept, definition, conditional probability, transition probability function, one and n-step transition probability, Higher transition probabilities, classification of states and chains, properties of communication of states, Chapman Kolmogorov equations, first entrance decomposition formula.

Counting Process: Counting process, Poisson process, stationary and independent increment, arrival and waiting time distribution, conditional distribution of inter-arrival time, compound poison process.

Random Walk and Ruin Problem: The classical ruin problem, probability of ruin, affect of change of state, expected duration of the game, expected game.

Markov Process: Pure birth process, pure death process, birth and death Proces.

Renewal Theory: Renewal event, recurrent event, delayed recurrent event, Renewal Process, Distribution of N(t), Limit Theorems and its application, Renewal reward process, Regenerative Process, Cyclic Renewal, alternative renewal process, branching process.

Queuing theory: Concept of queue, characteristics of queuing system, steady state probabilities, exponential queuing models, tandem or sequential system, M/G/I system, Erlang's loss system, M/M/K queue system, distribution of queuing and waiting time.

Text

1. Mehedi, J, (1994): *Stochastic Process*, 2nd Ed, Wiley Eastern Ltd, New Delhi.
2. Ross, S. M.: *Introduction to Probability Models*, 9th edition, Academic Press.

3. Feller, W. (1988): An *introduction to the Probability and its* Application, Vols. I & II. 3rd Edition, Wiley, New York.

References

1. A.K. Basu : *An Introduction to Stochastic Process,* Narosa Publishing House Pvt Ltd.
2. Bailey, N.T.J (1964): *The Elements of Stochastic Processes*, Wiley, New York.
3. Barlett, M.S: *An Introduction To Stochastic Process*,5th Ed.
4. Bhat, U.N. (1981): *Elements of Applied Stochastic Processes*, 2nd Edition, Wiley, New York.
5. Cox and Miller (1985): *The Theory of Stochastic Process*, 2nd edition, Chapman and Hall, London.
6. Cox, D.R. and Miller, H.D: *Theory of Stochastic Process, Vol. I and II*, Wiley Easter, New Delhi.
7. Hoel, P. G., Port, S. C., Stone, C. J. (1986): *Introduction to Stochastic Process*, Waveland Pr Inc.
8. K.L. Chung*: Elementary Probability Theory with Stochastic Processes*, 3rd Ed ,Narosa Publishing House Pvt Ltd.
9. Srinivasan, S.K. and Mahata, K.M, *Stochastic Process*, 2nd Ed, Wiley Easter, New Delhi.