Course Name: Probability and Random Process
Course Code: CS 601
Credit: 2-1-0-3
Students intended for: B.Tech, MS/Ph.D.
Prerequisites:
Elective or Compulsory: Elective
Semester:

Course description:

Probability, Set operations, Axioms, Properties, Finite sample space, Combinatorics, Union of events, Conditional Probability, Independence of events, Bayes' formula, PDF, CDF, Marginal distributions, Multivariate distributions;

Random Variables, Functions of random variables, Linear transformation of Random Variables, Random Processes, Generating functions, Expectations, Chebyshev's inequality, Properties of Expectation, Variance, Standard deviation, Law of large numbers, Covariance and Correlation, Cauchy-Schwartz inequality;

Poisson distribution, Approx. of Binomial distribution, Exponential & Normal distributions, Central limit theorem, Weak law of large numbers, Heavy-tail distributions, Estimation theory, Chi-square & t-distributions, Confidence intervals, Test of Independence;

Renewal theory, Random walk, Markov processes, Markov chains, Birth-death processes, Introduction to queueing theory.

Text Books:

1. Sheldon M. Ross, "*Introduction to Probability Models"*, Academic Press, (2009).
2. Kishor S. Trivedi, "*Probability and Statistics with Reliability Queuing and Computer Science Applications"*, Second Edition, Wiley-Interscience, (2001).
3. Athanasios Papoulis, "*Probability Random Variables and Stochastic Processes*", 4th edition, McGraw-Hill, (2002).

Reference Books

1. William Feller, *"An Introduction To Probability: Theory And Its Applications, Vol 1"*, Wiley.
2. William Feller, *"An Introduction To Probability: Theory And Its Applications, Vol 2"*, Wiley.
3. Wilbur B. Davenport, *"Probability and Random Processes"*, McGraw-Hill (Out of print).
4. Randolph Nelson, *"Probability, stochastic processes", and queueing theory: the mathematics of computer performance modeling"*, Springer-Verlag.
5. JyotiprasadMedhi, *"Stochastic Models in Queueing Theory"*, Academic Press.