MCC 504: Quantitative Techniques-II (3-0-0)

Module-1 (12 hours)
Markov Chain: Stochastic Processes, Markov chains, Chapman-Kolmogorov equations, States of a Markov chain, Properties of Markov chains, Continuous time Markov chains. Markov Decision Process: Model for Markov decision Process, Linear programming and optimal policies, Policy improvement algorithm, Discounted cost criterion

Module-2 (12 hours)

Random numbers, Psedo random number generation, Using random numbers to evaluate integrals, Generation of discrete random variables: Inverse transform method, generating Poisson and Binomial random variables, the acceptance – rejection technique
Generating continuous random variable : The inverse transform algorithm, the rejection method, the polar method for generating normal random variables, generating Poisson process.
Discrete event simulation approach: Simulation via discrete event, the single server queuing system, Queuing system with two servers in series and with two parallel servers, Inventory model.

Module-3 (12 hrs)
Variance reduction technique: Use of antithetic variable, use of control variates, variance reduction by conditioning, stratifies sampling, Importance sampling.
Statistical validation techniques: Goodness of fit tests, Chi-square goodness of fit test for discrete data, Kolmogorov- Smirnov test for continuous data, Goodness of fit test when some parameters are unspecified, two sample problem.

Text Books
1. Frederick S. **Hiller**, Gerald J. **Lieberman**, "*Introduction to Operations Research*", McGraw Hill Education India Pvt. Ltd, Eighth edition, 2008, New Delhi.

2. Sheldon M. **Ross**, " *Simulation*", Academic Press(an imprint of Elsevier), Fourth edition

Reference Books:

1. Hamdy A.Taha,"*Operations research*", Pearson Education India, New Delhi
2. Jerry **Banks**, John S. **Carson II**, Barry L. **Nelson**, David M. **Nico**l, "*Discrete Event System Simulation*", 5th Edition, 2010, Pearson education Inc. New Delhi.
3. Andrew **Seila**, Vlatko **Ceric**, Pandu **Tadikamalla**, "*Applied Simulation Modeling*", 1st Edition, 2009, Cengage Learning pvt. Ltd. New Delhi.
4. Manuel D. **Rossetti**, "*Simulation, Modeling and Arena*", First Edition, 2009, Wiley India Pvt. Ltd. New Delhi.
5. Bernard P. **Zeigler**, Herbert **Praehofer**, Tag Gon **Kim**, "*Theory of Modeling and Simulation*", 2nd Edition, 2000, Academic Press/ Elsevier India Pvt. Ltd, New Delhi.