

I Year II Semester
Code: 17CC201

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MODELLING & SIMULATION OF MANUFACTURING SYSTEMS

UNIT-I

Introduction to System and simulation: Concept of system and elements of system, Discrete and continuous system, Models of system and Principles of modeling and simulation, Monte carlo simulation, Types of simulation, Steps in simulation model, Advantages, limitations and applications of simulation, Applications of simulation in manufacturing system

UNIT-II

Review of statistics and probability: Types of discrete and continuous probability distributions such as Geometric, Poisson, Uniform, Geometric distribution with examples, Normal, Exponential distribution with examples.

UNIT-III

Random numbers: Need for RNs, Technique for Random number generation such as Midproduct method, Mid square method, and Linear congruential method with examples
Test for Random numbers: Uniformity - Chi square test or Kolmogorov Smirnov test, Independency- Auto correlation test
Random Variate generation: Technique for Random variate generation such as Inverse transforms technique or Rejection method

UNIT-IV

Analysis of simulation data: Input data analysis, Verification and validation of simulation models, Output data analysis
Simulation languages: History of simulation languages, Comparison and selection of simulation languages
Design and evaluation of simulation experiments: Development and analysis of simulation models using simulation language with different manufacturing systems

UNIT-V

Queueing models: An introduction, M/M/1 and M/M/m Models with examples, Open Queueing and Closed queueing network with examples
Markov chain models and others: Discrete time markov chain with examples, Continuous time markov chain with examples, stochastic process in manufacturing, Game theory

TEXT BOOKS:

1. J.Banks, J.S. Carson, B. L. Nelson and D.M. Nicol, "Discrete Event System Simulation", PHI, New Delhi, 2009.
2. A.M. Law and W.D. Kelton, "Simulation Modeling and Analysis", Tata McGraw Hill Ltd, New Delhi, 2008.
3. N. Viswanadham and Y. Narahari, "Performance Modeling of Automated Manufacturing Systems", PHI, New Delhi, 2007