

IV Year I Semester

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## MT 425 SIMULATION OF MANUFACTURING SYSTEMS

### Course Description & Objectives:

The objective of this course is to teach students methods for modeling of systems using discrete event simulation

### Course Outcomes:

On completion of this course, students would be able to:

1. understand the basic concepts of computer modeling and simulation.
2. learn various random number and random variable generation techniques.
3. learn basic concepts of discrete event simulation and apply them to practical problems.

### UNIT I: COMPUTER Modeling and Simulation Systems:

Monte Carlo simulation, Nature of computer modeling and simulation, Limitations of simulation, areas of application, Components of discrete and continuous systems. Models of a system, A variety of modeling approaches

### UNIT II: Random Number Generation:

Techniques for generating random numbers , mid square method, the mid product method, constant multiplier technique, additive congruential method, linear congruential method, tests for random numbers, the Kolmogorov, Smirnov test, the Chi-Square test.

### UNIT III: Random Variable Generation:

Inverse transform technique, exponential distribution, uniform distribution,

Weibull distribution, Empirical continuous distribution, Generating approximate normal variants, Erlang distribution.

### UNIT IV: Distribution and Evaluation of Experiments:

Discrete uniform distribution, Poisson distribution, geometric distribution, acceptance-rejection techniques for Poisson distribution, gamma distribution, Simulation Experiments, Variance reduction techniques, antithetic variables, verification and validation of simulation models.

**UNIT V: Discrete Event Simulation:**

Concepts in discrete-event simulation, manual simulation using event scheduling, single channel queue, two server queue, simulation of inventory problems, Programming for discrete event systems in GPSS, Case studies.

**TEXT BOOKS:**

1. Jerry Banks and John S. Carson, II, "Discrete Event System Simulation", Prentice Hall Inc, 1984.
2. Gordon G, " Systems Simulation", Pentice Hall of India Ltd., 1991.

**REFERENCES:**

1. Narsing Deo, "System Simulation with Digital Computer", Prentice Hall of India, 1979.
2. Francis Neelamkovil, "Computer Simulation and Modelling", John Wiley& Sons, 1987.
3. Ruth M. Davis and Robert M.O' Keefe, " Simulation Modelling with Pascal", Prentice Hall India.