

## SYSTEM MODELING AND SIMULATION

Sub Code: 10CS82  
Hrs/Week: 04  
Total Hrs: 52

IA Marks : 25  
Exam Hours : 03  
Exam Marks : 100

### PART - A

#### UNIT - 1

8 Hours

**Introduction:** When simulation is the appropriate tool and when it is not appropriate; Advantages and disadvantages of Simulation; Areas of application; Systems and system environment; Components of a system; Discrete and continuous systems; Model of a system; Types of Models; Discrete-Event System Simulation; Steps in a Simulation Study. The basics of Spreadsheet simulation, Simulation example: Simulation of queuing systems in a spreadsheet.

#### UNIT - 2

6 Hours

**General Principles, Simulation Software:** Concepts in Discrete-Event Simulation: The Event-Scheduling / Time-Advance Algorithm, World Views, Manual simulation Using Event Scheduling; List processing. Simulation in Java; Simulation in GPSS

#### UNIT - 3

6 Hours

**Statistical Models in Simulation:** Review of terminology and concepts; Useful statistical models; Discrete distributions; Continuous distributions; Poisson process; Empirical distributions.

#### UNIT - 4

6 Hours

**Queuing Models:** Characteristics of queuing systems; Queuing notation; Long-run measures of performance of queuing systems; Steady-state behavior of M/G/1 queue; Networks of queues; Rough-cut modeling: An illustration..

### PART - B

#### UNIT - 5

8 Hours

**Random-Number Generation, Random-Variate Generation:** Properties of random numbers; Generation of pseudo-random numbers; Techniques for generating random numbers; Tests for Random Numbers Random-Variate Generation: Inverse transform technique; Acceptance-Rejection technique; Special properties.



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**UNIT – 6****6 Hours**

**Input Modeling :** Data Collection; Identifying the distribution with data; Parameter estimation; Goodness of Fit Tests; Fitting a non-stationary Poisson process; Selecting input models without data; Multivariate and Time-Series input models.

**UNIT – 7****6 Hours**

**Estimation of Absolute Performance:** Types of simulations with respect to output analysis; Stochastic nature of output data; Absolute measures of performance and their estimation; Output analysis for terminating simulations; Output analysis for steady-state simulations.

**UNIT – 8****6 Hours**

**Verification, Calibration, and Validation; Optimization:** Model building, verification and validation; Verification of simulation models; Calibration and validation of models, Optimization via Simulation

**Text Books:**

1. Jerry Banks, John S. Carson II, Barry L. Nelson, David M. Nicol: Discrete-Event System Simulation, 5<sup>th</sup> Edition, Pearson Education, 2010.  
(Listed topics only from Chapters 1 to 12)

**Reference Books:**

1. Lawrence M. Leemis, Stephen K. Park: Discrete – Event Simulation: A First Course, Pearson Education, 2006.
2. Averill M. Law: Simulation Modeling and Analysis, 4<sup>th</sup> Edition, Tata McGraw-Hill, 2007.

**WIRELESS NETWORKS AND MOBILE COMPUTING**

Sub Code: 10CS831  
Hrs/Week: 04  
Total Hrs: 52

IA Marks : 25  
Exam Hours : 03  
Exam Marks : 100

**PART-A****UNIT – 1****6 Hours**

**Mobile Computing Architecture:** Types of Networks, Architecture for Mobile Computing, 3-tier Architecture, Design Considerations for Mobile Computing.



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