



**STANLEY**  
**COLLEGE OF ENGINEERING & TECHNOLOGY FOR WOMEN**  
( Approved by AICTE , New Delhi | Affiliated to Osmania University ,Hyderabad)  
Address : Chapel Road, Abids ,Hyderabad

**SE-576**

## **SIMULATION AND MODELING**

### **UNIT-I**

**Introduction to simulation:** Advantages & Dis-advantages of simulation – Areas of applications, Systems and Systems Environment, Concept of a system, Discrete & Continuous system – Models, types of models, Steps in a simulation study – Examples, Discrete – Event System simulation.

### **UNIT-II**

**Overview of Statistical Models and Queuing Systems, Programming languages for Simulation:** Continuous and Discrete Simulation Languages – FORTAN, GPSS, SIMAN, SIMSCRIPT, SLAM and MODSIM.

### **UNIT-III**

**Random Numbers:** Generation, Properties of Random Numbers, Generation of Pseudo Random Numbers, Tests for Random Numbers. **Random Variate:** Generation, Inverse Transformation Technique, Uniform Distribution, Exponential Distribution, Weibul's Distribution, Triangular Distribution, Empirical Continuous Distribution, Discrete Distributions, Direct Transformation for the Normal Distribution, Convolution Method of Erlang Distribution, Acceptance Rejection Techniques: Poisson Distribution, Gamma Distribution.

### **UNIT-IV**

**Input Data Analysis:** Data Collection: Identify the Distribution, Parameter and Estimation. **Goodness of fit tests:** Chi-Square Test – KS Test; Multivariate and time series input models, Verification and Validations of Simulation Models, Model Building, Verification and Validation: Verification of Simulation Models, Calibration and Validation of Models, face validity, Validation of Model Assumptions. Validation Input/output Transformations, Input/output Validation using Historical Input Data, Input/output Validation Sing Turning Test.

### **UNIT-V**

Output Data Analysis, Stochastic, Nature of output data, Types of Simulation with respect to output Analysis, Measures of Performance and their Estimation, output Analysis for Terminating Simulations, Output Analysis for steady – State Simulations.

**Comparison and Evaluation of Alternative System Designs:** Comparison of several system Designs, Statistical Models for Estimating the Effect of Design Alternatives

**Suggested Reading:**

1. Jabey Banks, John S. Cansen and Barry L. Nelson, "*Discrete – Event System Simulation*", Prentice Hall of India, 2001.
2. Nursing Deo, "*System Simulation with Digital computer*", Prentice Hall of India, 1979.
3. Anerill M. Law and W. David Kelton, "*Simulation Modelling and Analysis*", McGraw Hill. 200

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