


CMR Institute of Technology, Bangalore			
Department(s): Information Science & Engineering			
Semester: 08	Section(s): A & B	Lectures/week: 04	
Subject: System Modelling and Simulation		Code: 17CS834	
Course Instructor(s): Swathi.Y			
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Course Site: https://sites.google.com/a/cmrit.ac.in/sms/			

Module-1:

1. What is simulation? When simulation is appropriate tool and when it is not appropriate?
2. Explain the advantages and disadvantages of simulation
3. Explain about the applications of simulation
4. Define system and explain the components of system with examples.
5. Define model. Explain the types of models with examples.
6. Explain steps in simulation study with a flowchart.(Not in Syllabus but important, can see the diagram)
7. Explain about the simulation of queuing systems.
8. Explain the concepts in discrete event simulation.
9. Explain the time advance/event scheduling algorithm with a neat snapshot.
10. Explain manual simulation using event scheduling with flowcharts.
11. Problems :
 - i) The Grocery Store Problem
 - ii) Able-Baker Call Center Problem
 - iii) Time advance algorithm problem
 - iv) Checkout Counter Simulation
 - v) The Dump truck Problem

Module-3:

1. What are Pseudo random numbers? What are the problems occur while generating pseudo random numbers? Also list the important considerations while generating pseudo random numbers.
2. Explain the techniques used for random number generation .
3. Explain the combined linear congruential method in detail.
4. Explain the different tests for random number generation.
5. Explain inverse transform technique for random variate generation for i) exponential distribution ii) Uniform distribution.
6. Explain acceptance rejection technique for poisson distribution.
7. Problems :
 - i) Problems on linear congruential method, mixed and multiplicative methods and finding period.
 - ii) Problems on tests for random number generation

- Kolmogorav-Smirnov test
 - Chi-Square Test
 - Auto correlation test
- iii) Problems on acceptance-rejection technique

MODULE-4:

1. Explain the different steps in the useful model of input data.
2. Explain the data collection in detail
3. Explain the importance of data distribution using histograms
4. Explain Goodness of Fit tests in detail
5. Explain multi-variate and time series input models
6. List and briefly explain the different ways to obtain the information about process even if data are not available
7. Explain the suggested estimators for distribution often used in simulation.
8. Explain the types of simulation w.r.t output analysis
9. Explain the stochastic nature of output data
10. Problems on Chi-Square Test :
 - i) Chi-Square test for discrete data
 - ii) Chi-Square test for continuous data

MODULE-5:

1. Explain the measures of performance and their estimation. (or) Explain i) Point estimation and ii) Confidence interval estimation.
2. Explain the output analysis for terminating simulations.
3. Explain the output analysis for steady state simulations.
4. Explain the components of verification and validation process. Explain with neat diagram model building, verification and validation process.
5. Describe the three steps approach to validate by Naylor & Finger in the validation process (or) Explain the calibration of simulation models.
6. Explain verification of simulation models in detail.

MODULE-2:

1. Explain Discrete and continuous random variable with an example.
2. Explain the following distributions.
 - i) Binomial distribution ii) Bernoulli iii) Uniform distribution iv) Weibull
 - v) Triangular
3. What is poisson process? Explain its properties in detail.
4. Explain the characteristics of queuing systems in detail. Also explain queuing notation.
5. Explain the steady state behaviour of M/G/1 queue.