

Name of Faculty: Gaurav Gambhir

Discipline: Computer Science

Semester: 8th

Subject: CSE 474 - Simulation and Modeling

Lesson Plan Duration: 15 Weeks (from January, 2018 to April, 2018)

** Work Load (Lecture) per week (in hours): Lectures -03

Week	Theory	
	Lecture day	Topic (including assignment/test)
1 st	1 st	Introduction to Module
	2 nd	The Concepts of a System, Static vs. Dynamic System System Environment
	3 rd	Types of System, Open vs. Closed System, Deterministic vs. Probabilistic, Stochastic Activities, Continuous and Discrete Systems, System representation as Continuous or Discrete
2 nd	4 th	System Modeling, Modeling vs. Simulation
	5 th	Types of Models, Physical , Mathematical, Static, Dynamic, Numerical, Analytical
	6 th	Numerical vs. Analytical Model Model Validation, Principles Used In Modeling
3 rd	7 th	Revision of Unit 1
	8 th	Introduction to Simulation, Simulation of a pure pursuit problem, Simulation conditions of a pure pursuit problem, Flowchart and Program of pursuit problem
	9 th	A System and its Model, Simulation of an Inventory problem, Conditions of simulation of an Inventory problem, Flowchart for cost of Inventory policy
4 th	10 th	Fortran Program of an Inventory problem, The basic nature of simulation
	11 th	When to simulate, Applications of Simulation, Simulation in science and engineering research, Simulation in soft sciences, Simulation for business executive
	12 th	Continuous vs. Discrete Systems, Analog vs. digital simulation, Continuous Dynamic Systems, Simulation of a Chemical Reactor
5 th	13 th	Flowchart of Chemical Reaction Simulator, Numerical integration vs. Continuous system simulation
	14 th	Selection of an integration formula

	15 th	Runge Kutta Integration Formula, An R C Amplifying Circuit and its algorithm
6 th	16 th	Simulation of Servo System , Simulation of water reservoir system, Analog vs. digital simulation
	17 th	Introduction : Discrete System Simulation, Discrete Event Simulation Users, Discrete System Simulation Examples
	18 th	Fixed time-step vs. event-to-event model, Fixed time-step vs. event-to-event model - which one to prefer & when
7 th	19 th	On Simulating randomness - Stochastic Systems, Use of random numbers: an example
	20 th	Generation of Random numbers Multiplicative Congruential Generator
	21 st	Tests for randomness, Generation of non-uniformly distributed random numbers, Probability Distribution Function
8 th	22 nd	Continuous Random Variables & Continuous Probability Distribution, Generation of non-uniformly distributed random numbers using The inverse transformation method
	23 rd	Generation of non-uniformly distributed random numbers using rejection method, Generation of non-uniformly distributed random numbers using other methods, Normal Distribution, Monte Carlo computation vs. Stochastic simulation
	24 th	Revision of Unit 2
9 th	25 th	Sessional Test 1
	26 th	Basic concepts of queuing theory , Queuing Problem, Important Parameters in Queuing System, Rudiments of queuing theory
	27 th	Rudiments of queuing theory continued.., More complex queuing models
10 th	28 th	Simulating a Queuing System, Simulation of a Single-Server Queue
	29 th	Simulation of a two-server queue, One-Server Queue vs. Two-Server Queue, Simulation of more general queues
	30 th	Elements of inventory theory
11 th	31 st	Simulation of Inventory Control, Economic order quantity,
	32 nd	Simulation of Inventory Control with backordering
	33 rd	More Complex Inventory Models

12th	34th	Complex Inventory Model Example 1
	35th	Generation of Poisson and Erlang variates , Simulation Example-2
	36th	Forecasting and regression analysis
13th	37th	Forecasting and regression analysis continued....
	38th	Length of simulation runs
	39th	Revision of Unit 3
14th	40th	Design and Evaluation of Simulation Experiments introduction
	41st	Variance reduction techniques
	42nd	Experimental Layout
15th	43rd	Validation
	44th	Revision of Unit 4
	45th	Sessional Test 2