IT 704 Elective –I (IT- 711- Simulation and Modeling)

Unit I: PHYSICAL MODELING: Concept of system and environment, continuous and discrete system, linear and nonlinear system, stochastic activities, static and dynamic models, principles used in modeling, Basic simulation modeling, Role of simulation in model evaluation and studies, Advantages and Disadvantages of simulation. Modeling of systems, Iconic, analog and Mathematical Modeling.

Unit II: COMPUTER BASED SYSTM SIMULATION: Technique of simulation, Monte Carlo method, experimental nature of simulation, numerical computation techniques, calumnious system models, analog and hybrid simulation, feedback systems, Buildings simulation models- Financial Model for an office Building, Sensitivity analysis for office building Model.

Unit III: SYSTEM DYNAMICS MODELING: Identification of problem situation, Exponential Growth Model and Decay Model, Logistic Curve, System Dynamic Diagrams, Simulation of System Dynamics- Waiting Times in Single Server Queuing System.

Unit IV: PROBABILITY CONCEPTS IN SIMULATION: Stochastic variables, discrete and continuous probability functions, Distributed Random numbers, generation of random numbers-Uniform and Non Uniform Random numbers, variance reduction techniques-Introduction, Common Random numbers- Rationale, Applicability and Synchronization.

Unit V: SIMULATION SOFTWARE: Introduction, Comparison of Simulation Package with Programming Languages, Classification of Simulation Software, Desirable Software features, General Purpose Simulation Package-ARENA, EXTEND, Study of SIMULA, DYNAMO,

References:-

- Gorden G., “System simulation”, Printice Hall.
- Averill M Law “ Simulation Modeling and Analysis”, TMH
- Seila,Ceric and Tadikamalla “ Applied Simulation Modeling”, Cengage Learning.
- Severance” System Modelling & Simulation : An Introduction”,John Wiley
- Payer T., “Introduction to system simulation”, McGraw Hill.
- Allan Carrie, "Simulation and Modeling", McGraw Hill.