CMP 381.3 Simulation and Modeling (3-1-3)

	Theory	Practical	Total
Sessional	30	20	50
Final	50	-	50
Total	80	20	100

Course Objective :

To Provide the knowledge of discrete and continuous system, generation of random variables, analysis of simulation output and simulation languages.

Course Contents:

1. **Introduction to Modeling and Simulation** **(5hrs)**

System concept, System modeling, Mathematical models: nature and assumptions, Calibration and validation , Monte Carlo simulation method.

2. **Continuous System** **(8hrs)**

Continuous system model, Differential equation, Analog method, Hybrid computers, Digital-analog simulators, Continuous System Simulation Languages (CSSLS), CSMP III, Hybrid simulation, Feedback systems, examples.

3. **Discrete System Simulation** **(10hrs)**

Discrete events, Representation of time, Generation of arrival patterns, Simulation of a telephone system, Delay calls, Simulation of programming tasks, Gathering statistics, Counters and summary statistics, Measuring utilization and occupancy, Recording distribution and transit times, Discrete simulation languages.

4. **Analysis of Simulation Output** **(10hrs)**

Estimation methods, Simulation run statistics, replication of runs, Elimination of internal bias.

5. **Simulation Languages** **(12hrs)**

Types of simulation languages, Discrete systems modeling and simulation with GPSS, GPSS programs applications, Structural, data and control statements, hybrid simulation, Feedback systems: typical applications, SIMSCRIPT programs.

Laboratory :
Develop a simulation model, The topic could be either initiated by the student or selected from a list provided by the instructor. An oral presentation with a demonstration should be part of the laboratory project report.

Reference Books:

1. J.A. Spriest and G.C. Vansteenkiste, *Computer-Aided Modeling and Simulation,* Academic Press.
2. G. Gorden, *System Simulation,* Prentice Hall of India.
3. A.M Law and R.F. Parry, *Simulation* : A *Problem-solving approach*, Addison Wesley Publishing Company .
4. A.M. Law and W.D. Kelton, *Simulation Modeling and Analysis*, McGraw Hill, 1991