

Simulation and Modeling (CSC-302)
Tribhuvan University
Institute of Science and Technology
Soch College of Information Technology

Course Title: Simulation and modeling

Course no: 302 -----Full marks: 60+ 20+20

Credit hours: 3 ----- Pass marks: 24+8+8

Nature of course: theory (3 Hrs) + Lab (3 Hrs)

Course Synopsis: This course provides the discrete and continuous system, generation of random variables, analysis of simulation output and simulation languages.

Course Contents:

Unit 1: Introduction to Simulation ----- 6 Hours

Course Contents:

Continuous and discrete systems, system simulation, real time simulation, types of simulation models, steps in simulation study, phases of a simulation study, advantages of simulation, limitations of the simulation technique, area of applications.

Unit 2: Simulation of Continuous System ----- 5 Hours

Queuing system, Markov chains, Differential partial equations

Unit 3: Random Numbers ----- 10 Hours

Random numbers, random number tables, pseudo random numbers, generation of random number, testing numbers for randomness, uniformity test, chi-square test, testing for auto correlation, poker test

Unit 4: Verification and Validation of Simulation Models ----- 6 Hours

Model building, verification and validation, verification of simulation models, calibration and validation of models

Unit 5: analysis of simulation output ----- 8 Hours

Estimation methods, simulation run statistics, replication of runs, elimination of internal bias

Unit 6: Simulation Languages ----- 10 Hours

Basic concept of simulation tool, discrete systems modeling and simulation continuous system modeling and simulation, data and control, hybrid simulation, feedback systems: typical applications.

Text books:

Jerry Banks, John S. Carson, Barry L. Nelson, David M. Nicol “ Discrete Event system simulation” , Pearson education.