SEC-4	BCS-S602	MODELING AND SIMULATION	L	C	CIA	ESE	Time for ESE
			2	2	30	70	3Hrs.
PREREQUISITES		:	Knowledge of programming and basics of mathematics				
COURSE OBJECTIVES/ LEARNING OUTCOMES		:	Upon completion of the subject, students will be able to: • Develop the theoretical skills necessary to design and analyze Continuous-time and Discrete-time systems • Cover the basic theory of random numbers and their generation				
NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). **Sec.-A** shall contain 10 objective type questions of one mark each and student shall be required to attempt all questions. **Sec.-B** shall contain 10 short answer type questions of four marks each and student shall be required to attempt any five questions. **Sec.-C** shall contain 8 descriptive type questions of ten marks each and student shall be required to attempt any four questions. Questions shall be uniformly distributed from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.								

Systems and environment: Concept of model and model building, model classification and representation, Use of simulation as a tool, steps in simulation study. **8L**

Continuous-time and Discrete-time systems: Laplace transform, transfer functions, state space models, order of systems, z-transform, feedback systems, stability, observability, controllability. Statistical Models in Simulation: Common discrete and continuous distributions, Poisson process, empirical distributions. **12L**

Random Numbers: Properties of random numbers, generation of pseudo random numbers, techniques of random number generation, tests for randomness, random variate generation using inverse transformation, direct transformation, convolution method, acceptance-rejection. **10L**

BOOKS RECOMMENDED :

1. Narsingh Deo, System Simulation with Digital Computer, Prentice Hall of India, 1999.
2. Averill Law, Simulation Modeling and Analysis, 3rd Ed., Tata McGraw-Hill, 2007.
3. G. Gordan, System Simulation, 2nd Ed., Pearson Education, 2007.
4. A.F. Seila, V. Ceric and P. Tadikamalla, Applied Simulation Modeling (International Student Edition), Thomson Learning, 2004.
5. Jerry Banks, Handbook of Simulation: Principles, Methodology, Advances, Applications and Practice, Wiley Inter Science, 1998.
6. J. Banks, J.S. Carson, B.L. Nelson, Discrete Event System Simulation, 4th Ed., Prentice Hall of India, 2004.
7. N.A. Kheir, Systems Modeling and Computer Simulation, Marcel Dekker, 1988.
8. B.P. Zeigler, T.G. Kim, and H. Praehofer, Theory of Modeling and Simulation, 2nd Ed., Academic Press, 2000.

****