

5. INFORMATION TECHNOLOGY DOMAIN SUPPORTING COURSES

Course Title	Modeling and Simulation
Course Code	SI-241
Credit Hours	3
Category	IT Supporting
Prerequisite	None
Co-Requisite	None
Follow-up	None
Course Description	Introduction to modeling and simulation: System analysis, Classification of systems, System theory basics and its relation to simulation. Classification of models: Model classification at various levels including conceptual, abstract, and simulation. Model building: Methodology of model building, Means for model and experiment description, Principles of simulation system design, Simulation systems and languages. Widely used modeling systems: Models of queuing systems, Discrete simulation models, Simulation experiment control, Overview of numerical methods used for continuous simulation. Models of heterogeneous systems: Simulation using automata, Verification and validation of models: Requirements verification, Design Verification, Code verification, Predictive validation, Parameter Variability/ Sensitivity analysis, analysis of simulation results, visualization of simulation results, Model optimization. Pseudorandom numbers: generation and transformation of random numbers with overview of commonly used simulation systems.
Text Book(s)	<ol style="list-style-type: none"> 1. Modeling and Simulation, Bungartz, H.-J., Zimmer, S., Buchholz, M., Pflüger, D., Springer-Verlag, 2014. 2. Simulation Modeling Handbook, A Practical Approach, Christopher A. Chung, CRC Press, 2004. 3. System design, modeling and simulation using Ptolemy II, Claudius Ptolemaeus, , Ver 2.0, Creative Commons Attribution-ShareAlike 3.0 Unported, 2014.
Reference Material	<ol style="list-style-type: none"> 1. Applied Simulation Modeling, Andrew F. Seila, Vlatko Ceric, Pandu Tadikamalla, Thomson Learning Inc., 2003.