

## 5. INFORMATION TECHNOLOGY DOMAIN SUPPORTING COURSES

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