

Course name	Discrete-Event System Simulation
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Course ID:	40-634	Credits:	3	Program:	Graduate
Prerequisites:	Probability and Statistics OR Engineering Probability and Statistics			Co-requisites:	-
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Aim

- Providing a basic treatment of the important aspects of discrete-event simulation

Outline

- 1) Introduction
- 2) Introduction to MATLAB
- 3) General Principles and Examples
 - a) Concepts of discrete-event simulation
 - b) List processing
 - c) Some examples of simulation
- 4) Patterns of Simulation Systems
 - a) Simulation system structures
 - b) Sorted list processing (Heap)
 - c) Expressing systems for simulation
- 5) Statistical Models
 - a) Review of basic probability and statistics
 - b) Discrete distributions
 - c) Continuous distributions
 - d) Empirical distributions
- 6) Generating Random-Numbers
 - a) Properties of random numbers
 - b) Techniques for generating random numbers
 - c) Testing random number generators
- 7) Generating Random-Variates
 - a) Inverse-transform technique
 - b) Acceptance-rejection technique
 - c) Composition
 - d) Convolution
- 8) Input Modeling
 - a) Data collection
 - b) Assessing sample independence
 - c) Hypothesizing distribution family with data
 - d) Parameter estimation
 - e) Goodness-of-fit tests
 - f) Selecting input models in absence of data
 - g) Models of arrival processes
- 9) Verification and Validation of Simulation Models
- 10) Output Data Analysis
 - a) Transient and steady-state behavior of a stochastic process
 - b) Types of simulations with regard to output analysis
 - c) Statistical analysis for steady-state parameters

- 11) Experiment Design and Sensitivity Analysis (1.5 weeks)
- 12) Further Studies in Simulation
 - a) Monte-Carlo simulation
 - b) Real-world simulation

References

Discrete-Event System Simulation (Fifth Edition), Banks, Carson, Nelson, and Nicol, Prentice-Hall, 2010.