

SYSE 4065: Discrete Systems Simulation

This course is required for all Engineering majors.

Course Coordinator:

BJ Kim

Catalog Description:

Introduction to computer simulation models, particularly with special emphasis on discrete event simulation. Covers model building, data integration, model verification and validation, statistical analysis of simulation results, and applications to engineering and management problems.

Course Structure:

Two 75-minute lectures (three credits)

Prerequisites:

MATH 3307

Required Materials:

Simulation with ARENA, 4th Edition. W. David Kelton, Randall Sadowski, and Deborah Sadowski. WCB/McGraw-Hill, 2007. (ISBN-13: 978-0-07-352341-5)

Course Objectives:

Upon completion of this course, students shall be able to:

- Specify simulation model parameters and distributions for input data
- Build simulation models using a computer software package
- Perform statistical analysis on simulation results
- Identify the issues and methods of analyzing simulation output
- Develop, structure, and analyze methods of verification and validation in simulation modeling
- Apply discrete event simulation analysis techniques to decision making and system optimization problems

Lecture Topics:

- Basics of simulation modeling concepts (2 classes)
- Simulation processes (3 classes)
- Arena basics (3 classes)
- Modeling basic operations and inputs (2 classes)
- Specifying model parameters and distributions (2 classes)
- Simulation modeling operations (3 classes)
- Serial processing (3 classes)
- Parallel processing (2 classes)
- Task time variability (3 classes)
- Resource schedules (3 classes)
- Resource failures (2 classes)
- Creating animation (2 classes)
- Finding and fixing errors (3 classes)
- Fitting input distributions and Input Analyzer (2 classes)
- Terminating or steady-state (2 classes)
- Cutoff logic (2 classes)
- Statistical analysis using Output Analyzer, Process Analyzer, and OptQuest (2 classes)

Relevant Program Outcomes:

Graduates of the BS in Engineering Program will demonstrate:

c) Graduates of the Engineering Program will demonstrate an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.

l) Graduates of the Engineering program will demonstrate an ability to apply engineering concepts to an area of concentrated study, chosen from systems engineering, engineering management, bioprocess engineering, and biomedical engineering.

Professional Component Content:

Math/Science: 0; Engineering: 3 cr; General Education: 0

Assessment Requirements:

Student Work Samples:

- Homework assignments to demonstrate the ability to develop and analyze design alternatives (Outcome c)

Student Course Survey

Last Review:

December 21, 2007 by BJ Kim