Course Description

Simulation is one of the most widely used tools for analyzing complex processes and systems. Its use in manufacturing and service industries has increased dramatically in recent years, in part because of the increased computing power of personal computers. The uses of simulation in a business environment include evaluating alternative operational policies, viewing the impact of changes in personnel or equipment on business performance, performing risk analysis of a proposed business plan, and understanding complicated systems, etc.

The course will focus on two themes. The first is to understand basic concepts of simulation. This includes building creditable simulation models and output analysis. In the second part, we will explore some advanced models, such as queuing and inventory systems. We will use simulation to evaluate different policies.

Software Packages

ARENA, C (or C++).

Text Book


In addition, I may distribute some related book chapters and papers in class.
**Student's Responsibilities**

You are required to submit several individual assignments and a final project. Also, you may lead the discussion for the assigned papers. For the final project, you are expected to simulate an advanced model and evaluate different policies.

**Course Outline**

- Class 1 (1/16)  Introduction to Simulation Modeling [Ch 1 & 2]
- Class 2 (1/23)  Simulation with Software & Arena [Ch 3 & KSS]
- Class 3 (1/30)  Review of Basic Probability and Statistics [Ch 4]
- Class 4 (2/6)   Building Simulation Models [Ch 5]
- Class 5 (2/13)  Selecting Input Probability Distributions [Ch 6]
- Class 6 (2/20)  Random Number Generators [Ch 7]
- Class 7 (2/27)  Generating Random Variates [Ch 8]
- Class 8 (3/6)   Output Data Analysis [Ch 9]
- Class 9 (3/20)  Comparing Alternative System Configurations [Ch 10]
- Class 10 (3/27) Variance-Reduction Technique [Ch 11]
- Class 11 (4/3)  Gradient Estimation and Optimization [Book chapters distributed in class]
- Class 12 (4/10) Paper Discussion [Papers distributed in class]
- Class 13 (4/17) Final Project Presentation

**Grading Policy**

Your final grade will depend on individual assignments, final project, and the class discussion.