Course Description:

This is a survey course of probabilistic operations, research models and algorithms. Topics include Markov chains, queueing theory, inventory models, forecasting, and simulation. 3 credits

Prerequisites:

MATH 2050 with a C- or better or permission of instructor.

Anticipated audience/demand:

senior and graduate majors in mathematics

Major Topics:

1. Review of Probability Theory
   a. random variables
   b. probability distributions
   c. conditional probability and independent events
   d. expectations

2. Markov Chains
   a. Chapman-Kolmogorov equations
   b. classifications of states of a Markov chain
   c. long-run properties
   d. absorbing states

3. Queueing Models
   a. applications
   b. basic structure of queueing models
   c. birth and death process
   d. queueing networks

4. Inventory Models
   a. components of inventory methods
   b. continuous-review models
   c. periodic-review models
5. **Forecasting**
   a. applications
   b. time series
   c. methods for constant-level model
   d. incorporating seasonal effects
   e. exponential smoothing
   f. Box-Jenkins model

6. **Simulation**
   a. applications
   b. random number generation
   c. generation of random observations from a probability distribution
   d. simulation processes

**Methods:**

The class will be presented primarily in lecture form.

**Textbook:**


January 2016