MIE Department  
Umass Amherst Campus  
J. MacGregor Smith  
Spring 2010  
MIE 684 Course Description

TITLE: Stochastic Processes in Operations Research  
INSTRUCTOR: J. MacGregor Smith  
PURPOSE:

To provide an in-depth examination of the theory, methods, and approaches to the analysis and design of stochastic systems as they occur throughout physical, engineering, and human systems.

Some of the selected topics to be covered in the course include but are not limited to the following:

- Probability Review, Moment Generating Functions, Laplace Transforms
- Discrete-Time Markov Chains (DTMC)
- Continuous-Time Markov Chains (CTMC)
- Markov Decision Processes
- Poisson Processes
- Single-Channel Exponential Queueing Models
- Simple Markovian Birth-Death Models
- Advanced Markovian Models
- Models with General Arrival or Service Patterns
- Open & Closed Networks of Queues
- Design and Control of Queues
- Renewal Processes

All of the above will be demonstrated in class and coupled with available PC-computer programs where appropriate.

REQUIREMENTS:

Homework, 1-midterms and 1 final examination along with a term project are required by all students. Homework will account for 25% of your grade, the exams and term project will each be worth 25% to round out your total grade.

PREREQUISITES:

A basic course in Probability and Statistics (MIE 273, 520, or equivalent) plus graduate standing or consent of the instructor.

TEXT and REFERENCES: