

EBGN561 - Stochastic Models

Spring 2012

Lectures	Monday, Wednesday	9:30am - 10:45am	211 Engineering Hall
Instructor	A. M. Newman		
	Office:	319 Engineering Hall	
	Office Hours:	Monday	12:30pm-2:30pm
		Tuesday	5:00pm-8:00pm
	email:	newman@mines.edu	
Teaching Assistants	Gerry Gonzalez, Kris Pruitt		
	Office:	215 Engineering Hall	
(TAs)	Office Hours:	Wednesday	8:00am-9:00am

GENERAL INFORMATION

- **Textbooks:**

- ★ W. Winston. *Operations Research: Applications and Algorithms*, Thompson, fourth edition, 2004 (optional).

- ★ Ross, S. *An Introduction to Probability Models*, Elsevier, tenth edition, 2010 (optional).

- **Assignments:** There will be a weekly assignment due on Wednesday in class the following week. Please direct any homework grading questions to the TAs, who will be grading the homework assignments. *Do not send email to the TAs!!*

- **Project:** There will be a project involving formulating, solving and analyzing a challenging problem, writing code, and/or performing a literature review. The project group may consist of between one and four students. The project will be due during finals week and should relate to your thesis work, if applicable.

- **Exams:** There will be a midterm and a final examination. Both are open book. You must wait 48 hours after the exam has been handed back to ask (me) any grading questions.

- **Grading:**

- ★ Class Participation: 5%
- ★ Homework Assignments: 20%
- ★ Project: 25%
- ★ Midterm: 20%
- ★ Final: 30%

Grading is done on a curve where 90% is sufficient but not necessarily necessary for an A-, 80% is sufficient but not necessarily necessary for a B-, etc.

COURSE OUTLINE

- **I. Introduction and Review of Probability Models**

- ★ Sample spaces, events, basic rules
- ★ Conditional probabilities
- ★ Bayes' Formula

- **II. Random Variables**

- ★ Discrete random variables
- ★ Continuous random variables

- **III. Conditional Probabilities**

- ★ The discrete case
- ★ The continuous case

- **IV. Markov Chains**

- ★ Discrete Markov Chains
- ★ Continuous-time Markov chains

- **V. Queuing Theory**

- ★ Birth and death processes
- ★ M/M/s-type systems
- ★ M/G/*-type systems
- ★ Queuing networks

- **VI. Reliability Theory**

- ★ Systems with independent components

- ★ System life

- **VII. Brownian Motion**

- ★ Gambler's Ruin

- ★ Pricing stock options

- **VIII. Simulation**

RULES

- Please do not send email regarding homework problems; come to office hours instead.
- Statute of limitations for questions about grading is one week from the student's receipt of the graded work.
- Do not harass the TAs.
- I do not want to see or hear your cell phone. Ever. This includes during office hours.
- No rudeness of any kind towards anyone in the class will be tolerated.
- Do not talk to your neighbor during class.
- You may confer with others regarding the homework and project, but the work you hand in must be your own. Please ensure it is done neatly.
- Attendance in class is required. Be on time.
- Any alternate arrangements for exams must be submitted in writing at least one week in advance of the exam. Any additional arrangements regarding disabilities must be *formally* and *legally* documented and approved.

A minor infraction of the above rules will result in a warning. A major infraction will result in expulsion from the class.