

ISyE 6650 – Probabilistic Models in Operations Research

Fall 2006

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Course Objectives: Introduction to stochastic models and their applications: (a) Discrete-time and continuous-time Markov chains. (b) Application of Markov chains to queueing theory. (c) Poisson and renewal processes.

Prerequisites: I will assume that you are comfortable with probability theory at the level of chapters 1-3 of ROSS. This material will be reviewed in the first 4 lectures.

Text: ROSS, S.M. *Introduction to Probability Models*, 8th edition. Academic Press, San Diego, 2003.

The most important chapters for our purposes will be Chapters 4-8. You should already know the material in the first three chapters from an undergraduate-level course in probability. You should also be familiar with matrix algebra.

Class Times: TTh 3-4:30. It is very important that you attend all classes since the lectures will contain material that is not in the text. I will not keep extra copies of handouts after the class in which they are distributed; please do not come begging for handouts if you missed class. Further, I will not send e-mail messages for announcements made in class.

Class Policy: You are not permitted to walk out of class during lectures. If you have an important obligation, you can ask for permission prior to class. You have time to schedule appointments around classes.

Office Hours: TTh 1:30-3. I must ask that you *strictly honor* the above office hours. Further, it is required that you come *prepared*.

E-mail Communication: I cannot keep up with lengthy messages or multiple message exchanges related to a single question. I prefer that you stop by during office hours. I will use the list of your prism e-mail addresses. I will not use other unreliable e-mail services, such as “hotmail” or “yahoo”.

Old Exams: Sets of problems containing questions from old exams will be supplied. I will not provide solutions to problems with no answers.

Honor Code: I will be sensitive to violations of the Institute's Honor Code. Any violation will be handled by the office of the dean of students.

Grading:

15% Homework
40% Midterm exam Thursday, 5 October
45% Final exam Monday, 11 December, 11:30-1

Homework: I will assign homework roughly every other week. Your homeworks must be neat, organized, stapled, and handed in on time.

Make-Up Exams: I do not like to give make-up exams. Anyone requesting a make-up exam will be required to submit a written excuse with proper documentation.

Regrading: If we have made a mistake in grading something, we will be happy to fix things. If a test is submitted for a regrade, we have the right to regrade the entire test—so it is possible to *lose* additional points. Therefore, it is *strongly recommended* that you do not ask for regrading unless you have substantial reason to believe that we made a mistake when originally grading the test.

Course Outline:

Chapters 1-3 Probability Review
(we will not spend much time here)
Chapter 4 Discrete-time Markov chains
Chapter 5 The exponential distribution and Poisson processes
Chapter 6 Continuous-time Markov chains
Chapter 7 Renewal theory and its applications
Chapter 8 Introduction to queueing theory