

## ISyE 6650 RSH Probabilistic Models

Fall 2009

**Instructors:** Xiaoming Huo, **Email:** xiaoming@isye.gatech.edu

**Phone:** will be announced in class. **Class time and venue:** to be determined in class.

**Office Hours:** contact me for appointments.

---

### Content:

1. Introduction (Chap 1 - 3)
  - Probability Review
  - Conditional Probability
  - Conditional Expectation
2. Discrete Time Markov Chains (Chap 4)
  - Introduction to Markov Chains
  - Classification of States of a Markov Chain
  - Limiting Probability Distribution
  - Markov Decision Processes
3. Exponential Distribution & Poisson Processes (Chap 5)
  - Properties of Exponential Random Variable
  - Poisson Process
  - Generalizations of Poisson Process
4. Continuous Time Markov Chains (Chap 6)
  - Generators and Modeling
  - Birth Death Processes
  - Time Dependent Probability Distribution
  - Limiting Probability Distribution
  - M/M/c Queue
5. Renewal Theory (Chap 7)
  - Renewal Reward Processes
  - Regenerative Processes
6. Queueing Theory (Chap 8)
  - M/G/1 Queue
  - G/M/1 Queue
  - Queueing Networks

### Textbook:

- Required: "Introduction to Probability Models," 8th Ed, by Sheldon M. Ross.

**Prerequisites:** "Graduate Semester level ISYE 2027 Minimum Grade of D."

### Grading:

- There are biweekly *homework* assignments.

Late Homework will not be accepted. You are allowed (and encouraged) to work together with other students on homeworks, as long as you write up and turn in your own solutions. You are also allowed (and encouraged) to ask me questions, although you should try to think about the problems before asking. I strongly encourage you to work on extra problems from the book on your own.

- *Exams* include two midterms and a final. They are close book. For the midterms I, II and final, students are allowed to bring four, eight, and twelve pages notes respectively.

On the notes, you can write down anything you like. But they have to be self-made. Do not copy from others.

- A *make-up exam* requires a written excuse with proper documentation. Please keep in mind that it does take time to prepare a make-up exam. In general, I will not allow makeup exam unless the excuse is extremely compelling.

- We will determine the schedule of *final* in class.

- Distribution of points:

1. Class Attendance 5 %
2. Homeworks 15 %
3. Midterm 25 % + 25 %
4. Final 30 %

**Academic Honor Code:** It is your responsibility to get familiar with the Georgia Tech Honor Code. Use of any previous semester course materials is allowed for this course; however, I remind you that while they may serve as examples, they are not guidelines for any tests, quizzes, homework, projects, or any other coursework that may be assigned during the semester.

For any questions involving these or any other Academic Honor Code issues, please consult me, or visit [.honor.gatech.edu](http://honor.gatech.edu).

*Xiaoming Huo*  
07/14/2009