

## Course Outline

The objective of the course is two-fold: (a) to teach the basic theory and techniques of elementary stochastic processes and related probability models, and (b) to introduce the many applications of the theory and techniques. The emphasis is on modeling, probabilistic thinking, and problem solving. Topics to be covered include the following (subject to changes):

- Conditional probability and conditional expectation (Lectures 1,2)
- Exponential distributions, Poisson processes (Lectures 3,4)
- Discrete-time Markov chains (Lectures 4,5)
- Continuous-time Markov chains, birth-death processes (Lectures 5,6)
- Elementary queueing models (Lectures 7,8)
- Random walk, Brownian motion (Lecture 8,9)
- Martingales, Wald's lemma (Lectures 10,11)
- Renewal processes (Lectures 11,12)

Text: S.M. Ross, *Introduction to Probability Models*, Academic Press, newest edition.

Reference: S.M. Ross, *Stochastic Processes*, Wiley (2nd edition), 1996.

Preliminaries: S.M. Ross, *A First Course in Probability*, Macmillan (newest edition).

Evaluation:

- Homework 20% (due 2 weeks after assigned; full credit for any set returned on time).
- Midterm 40%; October 24 (class hours); closed book, with "aid sheet".
- Final 40%; tentative: December 19 (class hours); same format as the midterm.

Office Hours: Monday, 1:30-3:30p, or by appointment.

302 Mudd; 212-854-2934 (Fax: -8103); yao@columbia.edu