

**Course Outline, Winter 2008**  
**Mathematics 303: Introduction to Stochastic Processes**

*Instructor:* Robert Israel.

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If you email me, please put “Math 303” in the Subject line so I can tell that your email is not spam.

*Office hours:* Monday 3:00-4:00, Tuesday 11:00-12:00, Friday 10:00-11:00.

*Prerequisite:* Math 302 or Stat 302.

*Textbook:* Sheldon M. Ross, *Introduction to Probability Models, 9th edition*, Academic Press, ISBN 978-0-12-598062-3.

*Alternate references:*

J.G. Kemeny and L. Snell, *Finite Markov Chains*.

K.L. Chung, *Elementary Probability Theory with Stochastic Processes*.

R. Syski, *Random Processes: A First Look*.

D.R. Cox and H.D. Miller, *The Theory of Stochastic Processes*.

W. Feller, *An Introduction to Probability Theory and its Applications*.

*Grading:* Final exam 50%, two midterms 20% each, homework 10%. Marks may be scaled. Homework will be assigned weekly, generally Wednesdays, due the following Wednesday, mostly (but not exclusively) from the textbook. Solutions will be provided.

Midterms will be on February 11 and March 11.

There will be no “make-up” midterms, but if you miss one for a good reason (illness, documented with a doctor’s note) I will use your final exam mark and any later midterm, appropriately scaled, to make up for it.

One (two-sided) sheet of notes will be allowed on midterms and the final; no calculators.

*Outline of Topics*

- 0. Review of conditional probability. Sec. 3.2 — 3.4.
- 1. Markov chains. Sec. 4.1 — 4.8 (omit 4.5.2).
- 2. Exponential distribution and Poisson process. Sec. 5.1 — 5.4.1.
- 3. Continuous-time Markov chains. Sec. 6.1 — 6.8.
- 4. Renewal theory. Sec. 7.1 — 7.3 (time permitting).

R. Israel, Jan. 1, 2009