

# STA 447/2006S: Stochastic Processes (Winter 2017)

STA 447/2006S is a course about random (stochastic) processes, designed for graduate and senior undergraduate students in statistics and related disciplines. [See also the evolving [lecture notes](#).]

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**Lectures:** Thursdays, 6:10 - 9:00 p.m., in room 2170 of the Medical Sciences Building (building "MS" on [campus map](#)). First class Jan 5. Last class March 30. No class Feb 23 (Reading Week). During lectures, please **put away your laptops and cell phones** (unless you are using them specifically for a class-related purpose with prior permission), and **pay attention** to the material being presented.

**Course Web Page:** Visit [www.probability.ca/sta447](http://www.probability.ca/sta447) for course information and announcements.

**Prerequisite:** [STA347](#). **NOTE:** This prerequisite will be **strictly enforced** for undergraduate students: undergraduate students without STA347 will **not** be permitted to remain in STA447 except in **very special circumstances**. (It does **not** suffice to simply have taken some other advanced statistics courses.) For graduate students, it suffices to have taken a course equivalent to STA347 at another university; if you are unsure about the equivalence then please ask me.

## Evaluation for STA447:

10% [Homework #1](#) (assigned by Jan 19, due Feb 2 at 6:10 pm sharp);

25% [Midterm test \[sol\]](#) (two hours; 6-9pm on Thurs Feb 16; in the usual MS 2170 classroom);

10% [Homework #2](#) (assigned by Mar 2, due Mar 16 at 6:10 pm sharp);

10% Homework #3 (assigned by Mar 16, due Mar 30 at 6:10 pm sharp);

45% Final Exam (three hours; some time during April 10-28; date and location T.B.A.).

**Note:** On the midterm and exam, **BRING YOUR STUDENT CARD**, and **DO NOT SIT NEXT TO ANYONE THAT YOU KNOW**.

**Evaluation for STA2006:** Identical to the evaluation for STA447 (above), except that each homework counts for only 9%, and the remaining 3% is for a [short writing assignment](#) (due Mar 23 at 6:10 pm sharp).

**Instructor Office Hours:** You are welcome to talk to the instructor after class, or any time you find him in his office, or you can e-mail him to arrange another time to meet.

**TA Office Hours:** The TAs will hold office hours for STA447/2006 in **Sidney Smith Hall room 1091** at the following times: Mon Jan 30 at 6-8 pm; Tues Jan 31 at 11:30-12:30; Mon Feb 13 at 6-8 pm; Tues Feb 14 at 11:30-1:30; and more (later).

**Tentative list of topics to be covered:** Markov chains in discrete and continuous time, martingales,

Poisson processes, renewal theory, and Brownian motion, with applications (as time permits) to Monte Carlo algorithms, random walks on graphs, branching processes, option pricing, queueing networks, and more.

**Readings:** There is no required textbook. The instructor will post his point-form lecture notes on this course web page. In addition, the following books (among others) may be useful for further reading:

- R. Durrett (1999), Essentials of stochastic processes. Springer, New York. [See [free online version of second edition](#), 2011.]
- G.R. Grimmett and D.R. Stirzaker (1992), Probability and random processes, second edition. Oxford University Press. [Or: third edition, 2001.]
- S. Resnick (1992), Adventures in stochastic processes. Birkhauser, Boston.
- G.E. Lawler (1995, or 2nd ed. 2006), Introduction to stochastic processes. Chapman & Hall.
- O. Häggström (2002), Finite Markov chains and algorithmic applications. Cambridge University Press.
- J.S. Rosenthal (2006), A first look at rigorous probability theory, 2nd ed. World Scientific Publishing Company, Singapore. [Especially chapters 7,8,14,15.]

**Lateness policy:** Homeworks are due at 6:10pm **sharp**. Lateness penalties are: 1-10 mins = 1 point; 11-30 mins = 2 points; 31 mins - 24 hours = 10% of total points; longer = (10% of total points) x (number of days late, rounded **UP**).

**Regrading policy:** Regrading requests should only be made for **genuine grading errors**, and should be initiated by writing or typing a complete explanation of your concern (together with your full name, student number, e-mail address, and telephone number) on a **separate piece of paper**, and giving this together with your original **unaltered** homework/test paper to the instructor **within one week** of when the graded homework or test was first available. **Warning: your mark may end up going down rather than up.** (Note: for final exams, a different Faculty-wide process is followed.)

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This document is available at [www.probability.ca/sta447](http://www.probability.ca/sta447) or [www.probability.ca/sta2006](http://www.probability.ca/sta2006), or permanently at [www.probability.ca/jeff/teaching/1617/sta447/](http://www.probability.ca/jeff/teaching/1617/sta447/)