

**University of Regina**  
**Statistics 862–Stochastic Processes**

**Lecture:** MWF 1430–1320 in Classroom Building, room 251 (CL 251).

**Instructor:** Michael Kozdron  
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**Office Hours:** Tu 1130–1330, F 1130–1400, or by appointment.

**Required Text:**

- There will be no required texts for this class. Lecture notes, as needed, will be provided in class.

**Supplemental Text:**

- Jean Jacod and Philip Protter, *Probability Essentials*, second edition (corrected second printing), Springer 2004.

**Course Description:**

Poisson process, renewal processes, Markov processes, Brownian motion, Gaussian processes, random walks, and martingales.

**Prerequisites:**

No formal prerequisites are required, although this course is offered exclusively for graduate students. It is assumed, however, that students have studied measure theoretic probability at the level of Stat 851.

**Student Responsibilities:**

Students should be familiar with all relevant sections of the *Faculty of Graduate Studies and Research Academic Calendar, 2005–2007*. See <http://www.uregina.ca/gradstudies> for the official version.

**Grading Information:**

Your final grade will be determined by your performance in the course as follows.

Evaluation Type	Number	Percentage of Final Grade
Participation, Attendance, and Office Visits		10%
Assignments	6	30%
Midterm Exam	1	20%
Final Exam	1	40%

As noted on pages 25–27 of the *Faculty of Graduate Studies and Research Academic Calendar, 2005–2007*, graduate students must achieve a grade of 70% or more in order to receive credit for Stat 862.

**Participation, Attendance, and Office Visits:**

Although this will be primarily a lecture-based course, students are expected to attend class regularly and contribute to any in-class discussions that arise. Furthermore, each student is required to meet with me once before Spring break (February 17, 2006) and once after Spring break to discuss the course and your progress.

**Assignments:**

As is the norm in a graduate course, it is impossible to learn all of the material just by attending lecture. It is vital that each student take an active role in his or her own education by attempting to solve problems. In fact, most of what you learn in this course will be the result of working exercises that are designed to reinforce key concepts, develop skills, and test your understanding of the material. Before you try working the exercises, however, do the reading assignment. Reading the text will help you review the important concepts before you start on the exercises. Some of the exercises are straightforward, others are very complex. After each class meeting, you should work all problems assigned from the section discussed that class. Assignments will take on the average 15–20 hours. (See also the section below on Academic Integrity.)

**Midterm Exam:**

There will be an in-class midterm exam on Friday, March 3, 2006.

**Final Exam:**

There will be a take-home final exam distributed in class at the end of the semester which will be due by 17:00 on Friday, April 21, 2006.

**Email:**

Email will be a significant form of course related communication between both students and the instructor. Therefore, please check your email regularly for course updates and homework information. Feel free to email your questions to me. I will endeavour to respond within 24 hours. Should you not receive a reply within 24 hours, try sending the message again, or ask me in person if I received your mail.

**Academic Integrity:**

For a university community of scholars, academic integrity is the heart of intellectual life—both in learning and in research. Plagiarism is absolutely intolerable, and graduate students are expected to be conversant with the fundamentals of academic integrity; see pages 35–36 of the *Faculty of Graduate Studies and Research Academic Calendar, 2005–2007*. When in doubt, ask!

However, due to the nature of material in graduate level courses, it is difficult to evaluate students solely on the basis of in-class examinations with a fixed time limit. Therefore, professors typically evaluate students (at least partially) in such courses by means of homework assignments, projects, and take-home examinations. Graduate students will naturally discuss among themselves possible ways to solve homework problems. This is *NOT* plagiarism, but rather an important part of the graduate student experience. However, it should be understood that within this learning environment, a certain *honour code* exists. Namely, that each student do his or her own write-up in a such a way that it represents his or her own work.

**Course Outline:**

- (1) Basics of Stochastic Processes (1 week)
- (2) Simple Random Walk (3 weeks)
- (3) Brownian Motion (4 weeks)
- (4) Martingales (2 weeks)
- (5) Stochastic Differential Equations (2 weeks)
- (6) Optional Topics (2 weeks)