University of Regina
Statistics 862–Stochastic Processes

Lecture: MWF 1330–1420 in Classroom Building, room 251 (CL 251).

Instructor:	Michael Kozdron
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Office Hours:	Tu 1130–1330, F 1130–1300, or by appointment

Required Text:

- Gregory F. Lawler, *Introduction to Stochastic Processes*, second edition, Chapman & Hall/CRC, 2006.

Course Description:
Markov chains, optimal stopping, martingales, Poisson process, renewal processes, Brownian motion, stochastic integration.

Prerequisites:
No formal prerequisites are required, although this course is offered exclusively for graduate students. It is assumed, however, that students have taken a good calculus-based undergraduate course in probability, and a course in linear algebra including eigenvalues and eigenvectors.

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	12	72%
Final Exam	1	18%

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.

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.)

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 16, 2007) and once after Spring break to discuss the course and your progress.

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 18, 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) Finite Markov Chains (7 lectures)

(2) Countable Markov Chains (5 lectures)

(3) Continuous-Time Markov Chains (4 lectures)

(4) Optimal Stopping (3 lectures)

(5) Martingales (4 lectures)

(6) Renewal Processes (3 lectures)

(7) Reversible Markov Chains (3 lectures)

(8) Brownian Motion (4 lectures)

(9) Stochastic Integration (4 lectures)