STAT 3506-A Stochastic Processes and Applications
School of Mathematics and Statistics
Carleton University
Winter 2013

Instructor:	Dr. Yiqiang Q. Zhao; Office: 4328HP; Tel. 520-2600 ext. 2131
E-mail:	zhao@math.carleton.ca
Coursepage:	cuLearn
Text:	Sheldon Ross, *Introduction to Probability Models*, 10th Edition, Academic Press, 2010.
Lecture:	Tory Building 215 Tuesday & Thursday 8:35am – 9:55pm
Tutorial:	Tory Building 215 Thursday 4:35pm – 5:25pm
Prerequisites:	STAT 2655; or a CGPA of 6.00 or better over the three courses: MATH 2007, MATH 2107 (or MATH 1102) and STAT 2605; or permission of the School
Office Hours: (4328HP)	Tuesday 1:30 – 3:00pm or by appointment
Marking Scheme:	Quiz (6): 12% Assignments (6): 12% Term tests (3): 26% (on best two out of three) Final exam: 50%

Important dates:

January 8 (Tuesday)	First lecture
January 17 (Thursday)	First tutorial (to be confirmed)
January 18 (Friday)	Last day for registration or to make changes
January 31 (Thursday)	Last day for withdrawal with full fee adjustment
February 15 (Friday)	April examination schedule available online
February 18 – 22	Winter break, classes suspended
March 8 (Friday)	Last day to submit to PMC final exam accommodation forms
March 28 (Thursday)	Last tutorial (to be confirmed)
April 9 (Tuesday)	Last day of classes
April 13 – 27	Exam period

Email communication with instructor: According to Carleton policy under the Freedom of Information and Protection of Privacy Act (FIPPA), please use your Carleton Connect account for all course related email.

Announcements: You are responsible for keeping up with all information announced in class, from the course web page at cuLearn and through e-mail. All terms marks will be posted on Carleton WebCT.

A total of 6 quizzes worth 2% each: There will be a 15-min quiz in the tutorial in weeks: **3, 4, 6, 7, 9, 10**.

A total of 6 assignments worth 2% each: There will be six (6) assignments due in the first lecture in the following weeks: **4, 6, 7, 9, 10, 12**.
Assignments will be returned to you in the following tutorial hour. Students should do independent work on the assignments. **Late assignments** will not be accepted unless a written request, describing the reason why you could not complete the work on time, has been submitted to the instructor before the due date, and an arrangement made by the instructor. **Due to lack of TA support, your assignments might not be graded. Instead, answers will be made available for self-grading. However, you are still required to submit your work.**

Term tests (best 2 will be counted each worth 13%): There will be three (3) 50-minute tests in the tutorial hours in weeks: **5, 8, 11**. You have to take all tests. No make up, early or late tests will be arranged, except for medical reasons (a doctor's note must be presented), or situations in accordance with Carleton's accommodation policies. Any missing test will be counted as zero. Marked tests are returned during the next lecture time. The best two tests out of three will be averaged towards the total 26%.

Final examination (50%): There is a three (3) hour closed book exam scheduled by the University during the final exam period. It is the responsibility of each student to be available at the time of the examination. In particular, no travel plans for the examination period in April should be made until the examination schedule is published.

Conditions to pass the course: You are required to achieve **at least 60% (worth 30% overall)** on your overall term work (including quizzes, assignments and tests) **AND 40% (worth 20% overall)** on the final examination to pass the course.

Calculators: You may only use non-programmable, non-graphing calculators for the tests and the final examination in this course. No other electronic device is allowed, such as cell-phones, electronic dictionary, palm pilot, etc.

Paul Menton Centre: Students with disabilities requiring academic accommodations in this course must contact a coordinator at the Paul Menton Centre (PMC) for Students with Disabilities (500 University Centre, Tel: 613-520-6608) to complete the necessary Letters of Accommodation. After registering with the PMC, make an appointment to meet and discuss your needs with the instructor in order to make the necessary arrangements as early in the term as possible. Please notice the deadline for submitting completed forms to the Paul Menton Centre for formally scheduled exam accommodations.

Religious obligations: Students requiring accommodation on the basis of religious obligations should make a formal, written request for alternate dates and/or means of satisfying academic

requirements. Such requests should be made within the first two weeks of the class or as soon as the need for accommodation is known to exist, but no later than two weeks before the compulsory event. Accommodation is to be worked out directly and on an individual basis between the student and the instructor. Accommodation is made in a way that ensures fairness and avoids academic disadvantage to the student. Please refer to the website of Equity Services for a list of holy days and Carleton's Academic Accommodation policies.

Pregnancy: Pregnant students requiring academic accommodation are encouraged to contact an Equity Advisor in Equity Services to complete a letter of accommodation. You should make an appointment with the instructor to discuss your needs at least two weeks prior to the first academic event in which it is anticipated that the accommodation will be required.

Course Outline:

Week	Sections	Topics
1	1.4, 3.2, 3.3	Conditional probability (for events, discrete r.v.s, continuous r.v.s)
2	3.4, 3.6.1	Computing expectations by conditioning; list model
3	3.5, 3.6.2	Computing probabilities by conditioning; random graph
4	4.1, 4.2, 4.3	Markov chains, classification of states
5	4.3, 4.4	Classification of states, limiting probabilities
6	4.5, 4.6	Applications of Markov chains, time spent in transient states
–	**Feb 20–24**	**Winter break**
7	4.7, 4.8	Branching processes, reversibility
8	4.9, 4.11	Markov chain Monte Carlo, hidden Markov chains
9	5.1, 5.2	The exponential distribution
10	5.2, 5.3.1	The exponential distribution, counting processes
11	5.3.2, 5.3.3, 5.3.4	The Poisson process
12	5.3.4, 5.3.5	Applications of Poisson process
13	review	

Dates of Quiz, Assignment dues and tests:

Week	Dates (Tue Lecture)	Events	Dates (Tutorial)	Details
3			January 24	Quiz 1
4	January 29	Assignment 1 due;	January 31	Quiz 2
5			February 7	Test 1
6	February 12	Assignment 2 due;	February 14	Quiz 3
–	Feb 18–22	Winter break		
7	February 26	Assignment 3 due;	February 28	Quiz 4
8			March 7	Test 2
9	March 12	Assignment 4 due;	March 14	Quiz 5
10	March 19	Assignment 5 due;	March 21	Quiz 6
11			March 28	Test 3
12	April 2	Assignment 6 due		