

STAT 333 – Applied Probability

Spring 2018

Lecture Sections and Instructors:

Section 001: 11:30 – 12:50 MW in MC 2065
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Office hours: Wed 9:30-11:00, Thurs 1-2:30

Section 002: 2:30 – 3:50 MW in STC 1012
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Office hours: Mon 9:30-11:30, Thurs 10-12

Textbook/course notes:

The primary resource will be the notes given in class. For additional reading the optional textbook is *Introduction to Probability Models*, 11th Ed., by S. M. Ross. Copies are on reserve in the DC library. This resource is for background reading only and additional examples if you need.

Web page (D2L Learn):

<http://learn.uwaterloo.ca> (you can log in using your Quest userid and password.)

Course announcements, updates, assignments, solutions, tutorial problems, past tests/exams, and grades will be posted here. We will also be using Piazza for course discussion.

It is your responsibility to keep up-to-date with the information on the websites.

Teaching Assistants:

TAs' emails and office hours for extra help will be announced in class and posted on the website.

Course Goals:

Understand the long-term behaviour of stochastic (random) processes, both discrete (e.g. temperature on k^{th} day, winnings after k poker hands, etc) and continuous (e.g. number of people in line at Tim Horton's at time t , population growth by time t , etc)

Course Topic Outline:

- Chapters 1 & 2: review of basic probability, random variables, distributions, expectation
- Chapter 3: conditional expectation, computing probabilities and solving problems by conditioning, compound random variables
- Chapter 4: discrete-time Markov chains, including transition matrices, Chapman-Kolmogorov equations, analysis of states, recurrence and transience, equilibrium distributions, absorption times and probabilities
- Chapter 5: the exponential distribution, the Poisson process
- Chapter 6: continuous-time Markov chains, including the generator matrix, jump waiting times, birth-and-death processes, queues

Course Assessment:

Review Quiz	2%	
Tutorials	6%	(2% each)
Assignments	12%	(4% each)
Tests	20%	(10% each)
Final Exam	60%	

Review Quiz: There will be a short review quiz to make sure you are caught up on STAT 230 material (Chapters 1 & 2). This will take place in the tutorial (12:30 – 1:20) on **Friday May 11** in STC 1012.

Tutorials: Most weekly tutorials (12:30–1:20 on Fridays in STC 1012) will be used for a variety of activities, including review for tests, interactive activities to help you learn and engage with the course material, the review quiz, tests, and an optional study skills workshop. See the schedule below.

Assignments: The three Assignments will be posted on Learn, and are due at 11:59 pm on **Wednesdays May 30, June 27, and July 25**. You may work in pairs on the assignments.

Tests: There will be two tests written in tutorial time (12:30–1:20) on **Friday June 8** and **Friday July 6** in STC 1012. Exact coverage for the tests will be announced on Learn.

Optional YouTube Assignment: You will have the option of completing a video assignment in groups of up to 4, and the mark would replace your lowest assignment mark. The task would be to create a video for a course topic of your choice, explaining it to a non-technical audience in a fun, interesting way.

Final Exam: There will be a usual 2.5-hour final exam during the exam period (July 28 – Aug 11). Please do not make travel plans until the exam schedule is announced.

Planned schedule (subject to change)

Week	Monday	Wednesday	Friday (Tutorial)
1 (May 1-4)	N/A – classes start Tues	Chapter 1	Optional tutorial (SSO presentation)
2 (May 7-11)	Chapter 1	Chapter 2	Review Quiz
3 (May 14-18)	Chapter 2	Chapter 3	No tutorial
4 (May 21-25)	No class Monday, class on Tuesday instead: Chapter 3	Chapter 3	Tutorial activity 1
5 (May 28-June 1)	Chapter 3	Chapter 4 Assignment 1 due 11:59 pm	Review for Test 1
6 (June 4-8)	Chapter 4	Chapter 4	Test 1
7 (June 11-15)	Chapter 4	Chapter 4	No tutorial
8 (June 18-22)	Chapter 4	Chapter 4	Tutorial activity 2
9 (June 25-29)	Chapter 4	Chapter 5 Assignment 2 due 11:59 pm	Review for Test 2
10 (July 3-6)	No class Monday	Chapter 5	Test 2
11 (July 9-13)	Chapter 5	Chapter 6	No tutorial
12 (July 16-20)	Chapter 6	Chapter 6	Tutorial activity 3
13 (July 23-25)	Chapter 6	Last class (Monday schedule) Assignment 3 due 11:59 pm	
Exam period (July 28-Aug 11)			Final Exam (TBA)

Assessment Notes

- Solutions will be posted immediately after the deadline, so late assignments will not be eligible for marks. However, they will be graded so you can get the feedback on them.
- You may appeal the way a test/assignment was marked, by submitting it to the marker within 14 days with a written note. The entire assessment may be re-marked and your grade may go up or down.
- You must achieve a score of 45% or higher on the final exam, regardless of your mark going into the final exam, in order to pass the course.

Illness:

If you miss a test/quiz/tutorial, and provide satisfactory documentation (illness or family emergency), the weight will be shifted to the final exam. If you miss the exam for a valid reason, an INC grade will **only** be granted if you have at least 70% in the course before the exam, and have not missed any tests.

Counselling Services and the Student Success Office:

If you need some help during the term with study skills or dealing with personal issues, please make use of the resources that are available to help you. The Student Success Office's mandate is to provide and facilitate strategic student support for academic and personal success. It is located on the second floor of South Campus Hall and you can reach them by email at success@uwaterloo.ca. Counselling Services has offices in MC and many other buildings on campus, in addition to their main offices in the Needles Hall expansion and in Health Services. Find more information about their services here: <https://uwaterloo.ca/counselling-services/services>

Territorial Acknowledgement

The University of Waterloo acknowledges that we are on the traditional territory of the Neutral, Anishnawbe and Haudenosaunee peoples. The University of Waterloo is situated on the Haldimand Tract, the land promised to the Six Nations that includes six miles on each side of the Grand River.

University of Waterloo Policies

Academic integrity: In order to maintain a culture of academic integrity, members of the University of Waterloo community are expected to promote honesty, trust, fairness, respect and responsibility. [Check [the Office of Academic Integrity](#) for more information.]

Grievance: Students who believe that a decision affecting some aspect of their university life has been unfair or unreasonable may have grounds for initiating a grievance. Read [Policy 70, Student Petitions and Grievances, Section 4](#). When in doubt, please be certain to contact the department's administrative assistant who will provide further assistance.

Discipline: Students are expected to know what constitutes academic integrity to avoid committing an academic offence, and to take responsibility for their actions. [Check [the Office of Academic Integrity](#) for more information.] Students who are unsure whether an action constitutes an offence, or who needs help in learning how to avoid offences (e.g., plagiarism, cheating) or about "rules" for group work/collaboration should seek guidance from the course instructor, academic advisor, or the undergraduate associate dean. For information on categories of offences and types of penalties, students should refer to [Policy 71, Student Discipline](#). For typical penalties, check [Guidelines for the Assessment of Penalties](#).

Appeals: A decision made or penalty imposed under [Policy 70, Student Petitions and Grievances](#) (other than a petition) or [Policy 71, Student Discipline](#) may be appealed if there is a ground. Students who believe they have grounds for appeal should refer to [Policy 72, Student Appeals](#).

Note for students with disabilities: [AccessAbility Services](#), located in Needles Hall, Room 1401, collaborates with all academic departments to arrange appropriate accommodations for students with disabilities without compromising the academic integrity of the curriculum. If you require academic accommodations to lessen the impact of your disability, please register with AccessAbility Services at the beginning of each academic term.