

STAT 2605A – Probability Models, Fall 2021

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Text: Sheldon Ross, *A First Course in Probability*,
Prentice Hall/Pearson, 9th Edition

Lecture: The lectures will be delivered online as a combination of
(i) posted short videos,
(ii) synchronous lecturing through ZOOM and/or Brightspace,
(iii) posted lecture slides.
For (ii), the scheduled meeting time is Tue and Thurs, 8:35 am – 9:55 am.
Announcements regarding (ii) will be made on Brightspace in advance.
For admission to ZOOM, you are required to indicate your name
by Given name + Family name.

Tutorial: In-person 1:35 pm – 2:25 pm starting on **Sept 23**
Section A1 Building: Azrieli Theatre Room: 302

Office Hours: Thurs 5:30 pm – 6:30 pm

Prerequisites: MATH 1007 (or MATH 1004 or MATH 1002 or MATH 1052), and
MATH 1104 (or MATH 1107 or MATH 1102 or MATH 1152).
Precludes additional credit for STAT 3502 and STAT 2655

Quizzes: During tutorials on Sept 23, October 14, November 11, November 25

Tests: During tutorials on Sept 30, October 21, November 18

Note: There will be 4 quizzes (25 minutes each) to be written at the end of tutorials of the chosen dates, and 3 50-minute term tests during tutorials. The best 3 (resp., 2) of the 4 (resp., 3) quizzes (resp., tests) will be counted if you write all of them and obtain at least 20% each. No make-up, early, or delayed tests (or quizzes) will be held. Absence is excused only for medical reasons (a doctor's note may be presented), or situations in accordance with Carleton's accommodation policies. Any missing test will be counted as zero. Due to the pandemic situation, we understand it may be difficult to obtain a doctor's note. If you miss a midterm test due to illness, you may elect to submit within 3 business days the self-declaration form https://carleton.ca/registrar/wp-content/uploads/COVID-19_Self-declaration.pdf. This excuse may be used once for quiz and once for test.

Important Dates:	First lecture	September 9
	Last day to change courses	September 22
	Last day to withdraw	September 30
	Fall break	October 25-29
	Last lecture	December 9
	Exam period	December 11 – 23

Grading Scheme:	Quizzes	20%
	Tests	27%
	Final Exam	50%

Time used in this outline: All dates and time in this outline mean the Ottawa local time; see <https://www.timeanddate.com/worldclock/canada/ottawa>.

Email communication with instructor: Please use your Carleton account **ONLY** for all course related email, and write on the **subject line** your course code STAT3506, which I will use to manage email.

Announcements: You are responsible for keeping up with information announced on Brightspace, or sent to your e-mail account.

Assignments: They will be given regularly. Practice problems are included. You are advised to solve as many problems as possible before the tutorials.

Final examination (50%): This is a three (3) hour open-book exam scheduled by the University during the final exam period from April 16–27, 2021. By open-book, it means you may consult the course materials. Collaboration with another person on the solution is prohibited. **When the exam is completed, you are given 20 minutes to upload your solution.** It is the responsibility of each student to be available at the time of the examination.

Solution submission for quizzes, tests, and final exam: For each quiz or test, or the final, you are required to submit the solution as a **single PDF file**. No other format is accepted for grading. If your solution is scanned, make sure you convert it into the PDF format. Never wait until the last minute to submit. In particular, when it seems you do not have enough time to complete your test or final solution, you must reserve time to scan and submit first. After your submission, make sure to immediately download from cuLearn to verify that your submitted PDF file is readable. No late submission or resubmission will be granted. A late submission actually submitted will **not** be counted.

Conditions to pass the course: You are required to achieve at least 30% of your overall term work (including quizzes and term tests) and 40% of the final examination to pass the course. Although the absence from some tests for medical reasons may be excused, this course requires the student's adequate workload and participation. If a student has missed too many parts of all quizzes and tests, the student cannot pass this course due to inadequate workload and participation, regardless of the performance in the final examination.

Calculators: You may use only simple non-programmable, non-graphing calculators for the tests and the final examination in this course.

Intellectual property notice: All materials created for this course (including lecture notes, posted/recorded videos, assignments and tests and posted solutions, the final exam, etc) remain the intellectual property of the instructor. These materials are intended for the personal and non-transferable use of students registered in the current offering of the course. Students registered in the course may take notes and make copies of course materials for their own educational use only. Students are not permitted to reproduce or distribute lecture notes and course materials publicly for commercial or non-commercial purposes without written consent from the instructor. A student who publicly posts or sells an instructor's work, without the instructor's expressed consent, may be charged with misconduct under Carleton's Academic Integrity Policy and/or Code of Conduct.

Academic Accommodation: You may need special arrangements to meet your academic obligations during the term because of disability, pregnancy or religious obligations. Please review the course outline promptly and write to me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. Please make sure you respect these timelines particularly for in-class tests, mid-terms and final exams.

You can visit the Equity Services website to view the policies and to obtain more detailed information on academic accommodation at <http://carleton.ca/equity/accommodation>.

Students with disabilities: The Paul Menton Centre for Students with Disabilities (PMC) provides services to students with Learning Disabilities (LD), psychiatric/mental health disabilities, Attention Deficit Hyperactivity Disorder (ADHD), Autism Spectrum Disorders (ASD), chronic medical conditions, and impairments in mobility, hearing, and vision. If you have a disability requiring academic accommodations in

this course, please contact PMC at 613-520-6608 or pmc@carleton.ca for a formal evaluation. If you are already registered with the PMC, contact your PMC coordinator to send me your Letter of Accommodation at the beginning of the term, and no later than two weeks before the first in-class scheduled test or exam requiring accommodation (if applicable). After requesting accommodation from PMC, meet with me to ensure accommodation arrangements are made. The deadline for submitting completed forms to the Paul Menton Centre for **December** Examinations is **Nov. 12, 2021**.

Academic Integrity: Any student violating the University's standards of academic integrity, including but not limited to misconduct in their coursework, tests, and final examination, will be subject to appropriate sanctions. For more details, visit the Registrar's Office website <https://carleton.ca/registrar/academic-integrity/>.

Lecture Outline

Week 1: Sept. 9-14 – Sample space, events. Set notation. Assigning probability. Axioms of probability. Sec. 2.1-2.3, 2.7.

Week 2: Sept. 16-21 – Properties of probability. Counting rules. Conditional probability. Sec. 2.3-2.5, 1.1-1.4, 3.1, 3.2.

Week 3: Sept. 23-28 – Bayes' rule. Independence. Discrete random variables (r.v.) Sec. 3.3, 3.4, 4.1, 4.2.

Week 4: Sept. 30- Oct. 5 – Functions of r.v. Expected value. Variance. Bernoulli and binomial r.v. Sec. 4.3-4.6.

Week 5: Oct. 7-12 – Poisson and other discrete distributions. Expectation of sums of r.v. Sec. 4.7-4.9.

Week 6: Oct. 14-19 – Continuous r.v., $E(X)$, $Var(X)$, $Eg(X)$. Uniform r.v. and other examples. Sec. 5.1-5.3.

Week 7: Oct. 21- Nov. 2 – Normal r.v. Exponential r.v. Distribution of a function of r.v. Simulations. Sec. 5.4, 5.5, 5.7, 10.2.1. (Fall break Oct. 22-26)

Week 8: Nov. 4-9 – Joint distribution of two r.v. Independence. Sums of independent r.v. (lecture notes only)

Week 9: Nov. 11-16 – Chebyshev's inequality. Weak law of large numbers. Central limit theorem. Sec. 8.1-8.3.

Week 10: Nov. 18-23 – Poisson process. 4.7, 5.6.1, 9.1.

Week 11: Nov. 25-30 – Markov chains. Sec. 9.2.

Week 12: Dec. 2-7 - Markov chains (continued), Review.

Week 13: Dec. 9 — Review (ctn)

Note: The above is a tentative schedule and may be subject to change depending on the progress of the course.