

Carleton University
School of Mathematics and Statistics
STAT 2507 E – *Introduction to Statistical Modeling I* – Winter 2022

Instructor: Dr. Paul Villeneuve, paul.villeneuve@carleton.ca

Lectures: Asynchronous. Lecture slides and videos will be posted on Brightspace.

Tutorials: Tutorials will be delivered via BigBlueButton or Zoom on Brightspace.

Office Hours: TBA

Textbook: *Introduction to Probability and Statistics*, 4th Canadian Edition, by Mendenhall et al.

Prerequisites: An Ontario Grade 12 university-preparation Mathematics or equivalent, or permission of the School of Mathematics and Statistics.

Grading Scheme: Assignments 20%, Tests 30%, Final Exam 50%

Assignments: There will be four assignments each worth 5% of your term grade. All assignments are due before 11:59pm according to the following tentative assignment schedule. The assignments are expected to be completed within one week, but the due dates already incorporate an automatic one-week extension should you decide to take it. As such, there will be no extensions given past the posted due date.

Assignment	Available On	Due Date	Covers
Assignment 1	Sunday, January 23	Sunday, February 6	Weeks 1-2
Assignment 2	Sunday, February 6	Sunday, February 20*	Weeks 3-4
Assignment 3	Sunday, March 6	Sunday, March 20	Weeks 5-6
Assignment 4	Sunday, March 20	Sunday, April 3	Weeks 7-8

*Submitting on the weekend before the break week is based on your choice to take an extension.

Tests: There will be two tests, each worth 15% of your term grade and each covering approximately four (4) weeks worth of material. Test #1 will take place on **Sunday, February 13** from 9:00am – 10:30am. Test #2 will take place on **Sunday, March 27** from 9:00am – 10:30am. Students who do not stop writing at 10:30am will incur a grade penalty. Each test will require you to take the time from 10:30am – 11:00am to scan and upload your work.

Final Exam: There will be a cumulative final exam worth 50% of your term grade. The exam will be scheduled by the University during the exam period from April 14 – 28. It is the responsibility of each student to be available during the exam period.

E-Proctoring: Please note that tests and examinations in this course will use a remote proctoring service provided by Scheduling and Examination Services. You can find more information at <https://carleton.ca/ses/e-proctoring/>. The minimum computing requirements for this service are as follows:

Hardware: Desktop, or Laptop

OS: Windows 10, Mac OS 10.14, Linux Ubuntu 18.04

Internet Browser: Google Chrome, Mozilla Firefox, Apple Safari, or Microsoft Edge

Internet Connection (High-Speed Internet Connection Recommended)

Webcam (HD resolution recommended)

Note: Tablets, Chromebooks and Smartphones are not supported at this time. Windows-based tablets are not supported at this time.

Academic Integrity: Students are required to be familiar with the Academic Integrity Policy at Carleton University. The complete policy is available at: <http://carleton.ca/senate/wp-content/uploads/Academic-Integrity-Policy1.pdf>. Students who violate the standards of academic integrity relating to any coursework will be required to meet with the Associate Dean of Science (Undergraduate Affairs).

Intellectual Property: All course materials are protected by copyright and remain the intellectual property of the instructor. Students registered in the course may only use course materials for their own educational use. Students are not permitted to reproduce or distribute lecture notes or any other course material publicly for commercial or non-commercial purposes without express written consent from the instructor.

Requests for Academic Accommodation

You may need special arrangements to meet your academic obligations during the term. For an accommodation request, the processes are as follows:

Pregnancy obligation

Please contact your instructor 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. For more details, visit the Equity Services website: carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf

Religious obligation

Please contact your instructor 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. For more details, visit the Equity Services website: carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf

Academic Accommodations for Students with Disabilities

If you have a documented disability requiring academic accommodations in this course, please contact the Paul Menton Centre for Students with Disabilities (PMC) at 613-520-6608 or pmc@carleton.ca for a formal evaluation or contact your PMC coordinator to send your instructor your Letter of Accommodation at the beginning of the term. You must also contact the PMC no later than two weeks before the first scheduled test or exam requiring accommodation (if applicable). After requesting accommodation from PMC, meet with your instructor as soon as possible to ensure accommodation arrangements are made. carleton.ca/pmc

Survivors of Sexual Violence

As a community, Carleton University is committed to maintaining a positive learning, working and living environment where sexual violence will not be tolerated, and is survivors are supported through academic accommodations as per Carleton's Sexual Violence Policy. For more information about the services available at the university and to obtain information about sexual violence and/or support, visit: carleton.ca/sexual-violence-support

Accommodation for Student Activities

Carleton University recognizes the substantial benefits, both to the individual student and for the university, that result from a student participating in activities beyond the classroom experience. Reasonable accommodation must be provided to students who compete or perform at the national or international level. Please contact your instructor 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.

<https://carleton.ca/senate/wp-content/uploads/Accommodation-for-Student-Activities-1.pdf>

COURSE POLICIES:

1. Concerns about grading on assignments or tests must be brought to the instructor's attention within three business days of these grades being available for review. We will not regrade individual assignment or test questions, but you may request a complete regrade of your entire assignment or test. Please note a regrade may result in an increase, decrease, or no change in your grade.
2. Students who need to miss a test for a valid reason must complete the [self-declaration form](#) within 3 business days of the test and email it to the instructor. Students who correctly follow this procedure will have the weight of the missed test added to the weight of the final exam. Failure to follow this procedure will result in a grade of 0% on the missed test.
3. Any student wishing to review their final exam must make an appointment within a two-week period following the submission of the final grades. These appointments are solely for educational purposes and are **not** to be treated as an opportunity to debate your grade.
4. **Students are required to obtain a minimum score of 50% on the final exam.** Students who fail to do so may be assigned a grade of **F** in the course at the discretion of the instructors.
5. All dates and times stated within the context of this course are local Ottawa time.
6. In assigning course letter grades, final numerical grades are viewed as continuous and grades are not automatically rounded up. A student must definitively earn the lower numerical limit of a letter grade category to receive that letter grade.
7. You must use your Carleton email account for all email communications. I am unable to respond to non-Carleton emails due to FIPPA (Freedom of Information and Protection of Privacy Act).|
8. All assignments and exams in the course will be submitted online. A document entitled *Submission Instructions* will be posted on the course page in Brightspace. Any submissions not following the *Submission Instructions* will not be accepted for credit.
9. I typically respond to emails on weekdays during business hours. While I may respond outside of those hours, please do not expect it. Please allow up to two business days for a response."

TENTATIVE LECTURE SCHEDULE

WEEK	DATES	SECTIONS	TOPICS
1	January 10 – 14	Introduction, 1.1 – 1.5	Population and sample. Variables and data. Types of variables. Graphs for categorical data and quantitative data.
2	January 17 – 21	2.1 – 2.7	Measures of centre and variability. Tchebysheff's Theorem, Empirical Rule. Percentiles, quartiles. Box plots.
3	January 24 – 28	3.1 – 3.4, 4.1 – 4.3	Bivariate data. Graphs for bivariate data. Correlation coefficient. Regression line. Probability. Sample spaces, events.
4	January 31 –Feb 4	4.4 – 4.7	Counting rules. Event relations. Additional rule. Subtraction rule. Conditional probability, independence. Multiplication rule. Bayes' rule.
5	February 7 – 11	4.8, 5.1 – 5.4	Probability distributions, expected values, and variances for discrete random variables. Binomial distribution. Hypergeometric distribution. Poisson distribution.
6	February 14 – 18	6.1 – 6.4	Probability distributions for continuous random variables. Normal distribution. Normal approximation to the binomial distribution.
N/A	February 21 – 25	NA	WINTER BREAK
7	February 28 – March 4	7.1 – 7.6	Sampling plans. Sampling distributions of statistics. Central Limit Theorem. Sampling distribution of the sample mean. Sampling distribution of the sample proportion.
8	March 7 – 11	8.1 – 8.4, 8.8	Point estimation. Interval estimation. Large sample confidence intervals for a population mean. Large sample confidence intervals for a population (binomial) proportion. Choosing the sample size.
9	March 14 – 18	8.5, 8.6	Large-sample confidence interval for the difference between two population means. Large-sample confidence interval for the difference between two population (binomial) proportions.
10	March 21 – 25	9.1 – 9.3, 9.5	Testing hypotheses about population parameters. Statistical tests of hypothesis. Large-sample test about a population mean. Large-sample test about a population (binomial) proportion.
11	March 28 – April 1	9.4, 9.6, 9.7	Large-sample test of hypothesis for the difference between two population means. Large-sample test of hypothesis for the difference between two population (binomial) proportions. The critical value method. Type I and Type II errors, power of the test.
12	April 4 – 8	10.1 – 10.5	Student's t distribution. Small-sample inference for a population mean. Small-sample inference for the difference between two populations means, independent and pair samples.
13	April 11 – 12	N/A	Final Exam Review