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

Instructor: Dr. Paul Villeneuve, paul.villeneuve@carleton.ca **Office :** Herzberg Building, Rm 5413

Lectures: Synchronous (in person). Lecture slides and previous lecture videos will also be posted on Brightspace.

Class times: Monday and Wednesday: 18:05 to 19:25

Tutorials: Tutorials will be delivered in person (Herzberg Labs for Physics Room). Please consult times in Brightspace as there are six lab sections. Tutorials will take place during the following weeks: May 16th June 13th, July 11th, and August 8th.

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: Quizzes 15% (4 Online), Tutorials (5%), Test #1: 15%, Test #2: 15%, Final Exam 50%

Assignments: There are no assignments.

Quizzes: There will be four online quizzes over the course of the term and each quiz will cover approximately 3 weeks of material. Each quiz will take approximately 15 minutes to complete. The scores from your best three quizzes will count towards the grade allocated for this component. These multiple choice quizzes will occur online on Brightspace on the following dates and times: Tuesday May 24th: 7:00 pm, Tuesday June 14th: 7:00 pm; Tuesday July 12, 7:00 pm and Tuesday August 9 at 7:00 pm. It is the responsibility of each student to be available for these quizzes.

Tests: There will be two **in person** tests, each worth 15% of your term grade and each covering approximately four (5) weeks worth of material. Test #1 will take place during scheduled class times on Monday, **June 20th** from 18:05 to 19:25. Test #2 will take place on **Monday July 25** from 18:05 to 19:25. It is the responsibility of each student to be available for these tests.

Tutorials: Grade will be based on attendance, and participation in lab exercises.

Final Exam: There will be a cumulative **in person** final exam worth 50% of your term grade. The exam will be scheduled by the University during the exam period from August 19 to 25. It is the responsibility of each student to be available during the exam period.

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.

Integrity statement: All students must submit an academic integrity statement at the beginning of the course.

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 day 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	May 9 - 13	Introduction, 1.1 – 1.5	Population and sample. Variables and data. Types of variables. Graphs for categorical data and quantitative data.
2	May 16 - 20	2.1 – 2.7	Measures of centre and variability. Tchebysheff's Theorem, Empirical Rule. Percentiles, quartiles. Box plots.
3	May 23 - 26	3.1 – 3.4, 4.1 – 4.3	Bivariate data. Graphs for bivariate data. Correlation coefficient. Regression line. Probability. Sample spaces, events.
4	May 30 – June 3	4.4 – 4.7	Counting rules. Event relations. Additional rule. Subtraction rule. Conditional probability, independence. Multiplication rule. Bayes' rule.
5	June 6 – 9	4.8, 5.1 – 5.4	Probability distributions, expected values, and variances for discrete random variables. Binomial distribution. Hypergeometric distribution. Poisson distribution.
6	June 13 - 16	6.1 – 6.4	Probability distributions for continuous random variables. Normal distribution. Normal approximation to the binomial distribution.
	June 20	Test #1	Test 1 (based on Weeks 1 to 5) during scheduled class time
	June 22		No class (as midterm week)
7	June 27 – 31		Reading week
8	July 4 – 8	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.
9	July 11 – 15	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.
10	July 18 – 22	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.
	July 25	Test #2	Test 2 (in class) based on weeks 5 – 10.
11	July 27	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.
14	August 1		Statutory holiday, no class

15	August 3	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.
16	August 8 – 12	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.
11	August 15		Review