

Carleton University
School of Mathematics and Statistics
 STAT2507 Section D – *Introduction to Statistical Modeling I* – Fall 2020

Instructor: Paul Villeneuve
 Office: 5413 Herzberg Laboratories
 E-mail: paul.villeneuve@carleton.ca

Lectures: Mondays and Wednesdays from 1:05 pm – 2:25 pm through ZOOM. Lectures will be recorded, and additional recorded material may also be provided.

Tutorials: All Tutorials will be delivered through BigBlueButton (BBB)

| Section | Time | TA's name | Ta's connect email |
|---------|--------------------------|-------------------|--|
| A1 | Fridays 14:35 – 15:25 | Marissa Barzo | marissabarzo@cmail.carleton.ca |
| A2 | Thursdays 10:35 – 11:25 | Andrey Kirillov | andreykirillov@cmail.carleton.ca |
| A3 | Tuesdays 10:35 -11:25 | Andrew Schwan | andrewschwan@cmail.carleton.ca |
| A4 | Fridays 11:35 – 12:25 | Ria Verma | riaverma@cmail.carleton.ca |
| A5 | Fridays 08:35 – 09:25 | Radha Verma | radhaverma@cmail.carleton.ca |
| A6 | Wednesdays 16:35 – 17:25 | Richard Matzinger | richardmatzinger@cmail.carleton.ca |
| A7 | Wednesdays 10:35 – 11:25 | Marissa Barzo | marissabarzo@cmail.carleton.ca |
| A8 | Wednesdays 09:35 – 10:25 | Marissa Barzo | marissabarzo@cmail.carleton.ca |

Office Hours: Online, by appointment. Monday evenings 8:00 pm – 10:00 pm, and Thursday morning 10:00 am – 12:00pm.

Textbook: Introduction to Probability and Statistics (4th Canadian Edition by Mendenhall, Beaver, Beaver, and Ahmed).

Course description: A data-driven introduction to statistics. Basic descriptive statistics, introduction to probability theory, random variables, discrete and continuous distributions, contingency tables, sampling distributions, distribution of sample mean, Central Limit Theorem, interval estimation and hypothesis testing. SPSS will be the statistical software package used.

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

Evaluation: Your final grade will be calculated as:

- Term Mark (50%)
 - Tests (30%)
 - Assignments (20%)
- Final Examination Mark (50%)

Assignments

There will be 4 assignments, each counting equally toward the term mark. Assignments due dates and times will be posted on CULearn. No late assignments will be accepted.

Tests

There will be two tests worth 15% each on **Saturday, October 17, 7:00pm to 8:30pm** and **Saturday, November 21, 7:00pm to 8:30pm**. Students who need to miss a test submission for a valid reason must complete the [self-declaration form](#) and the weight of their missed assessment will be added to their final exam.

Final Exam: The final exam will cover all of the material given during the term and it will be scheduled by the university. The exam period runs from **December 12-23**. It is the responsibility of each student to be available during the exam period. In particular, no travel plans should be made until the examination schedule is released.

Calculators: Only non-programmable, non-graphing calculators are allowed on the tests and the final.

Intellectual property notice

Classroom teaching and learning activities, including lectures, discussions, presentations, tests, exams, by instructors, guest presenters, and students, are copy protected and remain the intellectual property of the instructor or respective author(s). All course materials, including PowerPoint/pdf presentations, outlines, and other materials, are protected by copyright and remain the intellectual property of their respective author(s).

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 express written consent from the copyright holder(s). A student who publicly posts or sells an instructor's work, without the instructor's express consent, may be charged with misconduct under Carleton's Academic Integrity Policy and/or Code of Conduct, and may also face adverse legal consequences for infringement of intellectual property rights.

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 in-class 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>

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.

Important Dates

- First day of classes: September 9
- Last for registration: September 23
- Last day to withdraw from fall term and fall/winter courses with a full fee adjustment. Withdrawals after this date will result in a permanent notation of WDN on the official transcript: September 30
- Statutory Holiday: October 12
- Fall Break (no classes): October 26 - 30
- December 11: Last day of classes, last day for academic withdrawal
- Final Exam period: December 12 -23

TENTATIVE LECTURE SCHEDULE

| WEEK | DATES | SECTIONS | TOPICS |
|------|-----------------|----------------------------|--|
| 1 | Sept 9 | Introduction, 1.1 – 1.5 | Population and sample. Variables and data. Types of variables. Graphs for categorical data and quantitative data. |
| 2 | Sept 14, 16 | 2.1 – 2.7 | Measures of centre and variability. Tchebysheff's Theorem, Empirical Rule. Percentiles, quartiles. Box plots. |
| 3 | Sept 21, 23 | 3.1 – 3.4, 4.1 – 4.3 | Bivariate data. Graphs for bivariate data. Correlation coefficient. Regression line. Probability. Sample spaces, events. |
| 4 | Sept 28, Oct 30 | 4.4 – 4.7 | Counting rules. Event relations. Additional rule. Subtraction rule. Conditional probability, independence. Multiplication rule. Bayes' rule. |
| 5 | Oct 5, 7 | 4.8, 5.1 – 5.4 | Probability distributions, expected values, and variances for discrete random variables. Binomial distribution. Hypergeometric distribution. Poisson distribution. |
| 6 | Oct 12, 14 | 6.1 – 6.4 | Probability distributions for continuous random variables. Normal distribution. Normal approximation to the binomial distribution. |
| 7 | Oct 19, 21 | 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. |
| N/A | Oct 26 – 30 | FALL BREAK | |
| 8 | Nov 2, 4 | 8.1 – 8.4 | Point estimation. Interval estimation. Large sample confidence intervals for a population mean. |
| 9 | Nov 9, 11 | 10.1 – 10.3, 8.4, 8.8 | Student's t distribution. Small sample confidence intervals for a population mean. Large sample confidence intervals for a population (binomial) proportion. Choosing the sample size. |
| 10 | Nov 16, 18 | 8.5 – 8.6, 10.4 | Large-sample confidence interval for the difference between two population means. Small-sample confidence interval for the difference between two population means (independent samples). Large-sample confidence interval for the difference between two population (binomial) proportions. |
| 10 | Nov 23, 25 | 9.1 – 9.3, 9.5, 10.3 | Testing hypotheses about population parameters. Statistical tests of hypothesis. Large-sample test about a population mean. Small-sample test about a population mean. Large-sample test about a population (binomial) proportion. |
| 11 | Nov 30, Dec 2 | 9.4, 9.6, 9.7, 10.4 | Large-sample test of hypothesis for the difference between two population means. Sample-sample test of hypothesis for the difference between two population means (independent samples). Type I and Type II errors, power of the test. |
| 12 | Dec 7, 9 | 9.6, 10.5 | Large-sample test of hypothesis for the difference between two population (binomial) proportions. Small-sample inference for the difference between two populations means (paired samples). Review |

This outline is subject to change depending on the progress of the course. All necessary changes will be announced in class and on CULearn. It is the responsibility of each student to keep up to date with any such modifications.

ADDITIONAL COURSE POLICIES:

- 1.** Concerns about grading on assignments or tests must be brought to my attention within 3 business days of these items being available for review.
- 2.** Students who need to miss a test for a valid reason must inform me prior to the test and must complete [self-declaration form](#) within 3 business day of the test. 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 40% on the final exam.** Students who fail to do so will automatically be assigned a grade of **F** in the course. Exceptions to this rule may be made at the discretion of the instructors.
- 5.** All dates and times are in Eastern Daylight Zone ETD (Time zone in Ottawa). This includes, but not limited to, lecture times, tutorial times, office hours times, assignment due dates and times, test dates and times, and final exam date and time.