

Carleton University
School of Mathematics and Statistics
STAT2507 A – *Introduction to Statistical Modeling I* – Fall 2022

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Lectures: Wednesdays and Fridays from 2:35 pm – 3:55 pm in Mackenzie Building 3380.

Tutorials: Tutorial days and times differ. Please ensure you attend your own tutorial.

Office Hours: Tuesdays and Thursdays 5:30 pm – 6:30 pm in 4348HP

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 (40%)
 - Assignments (5%)
 - Tutorials (5%)
- Final Examination Mark (50%)

Assignments and tutorials

There will be 5 assignments and 5 tutorials, each counting equally toward the term mark. The following is the tentative schedule for the assignments and tutorials.

Assignment	Available	Due
Tutorial 1	Week of Monday Sept 12th	In tutorial
Assignment 1	Sunday, Sept 11 th	1 st class of week of Monday Sept 19 th
Tutorial 2	Week of Monday Sept 26th	In tutorial
Assignment 2	Sunday, Sept 25 th	1 st class of week of Monday Oct 3 rd
Tutorial 3	Week of Monday Oct 17th	In tutorial
Assignment 3	Sunday, Oct 16th	1 st class of week of Monday Oct 31 st
Tutorial 4	Week of Monday Nov 7th	In tutorial
Assignment 4	Sunday, November 6 th	1 st class of week of Monday Nov 14 th
Tutorial 5	Week of Monday Nov 28th	In tutorial
Assignment 5	Sunday, November 27th	1st class of week of Monday Dec 5 th

Please note that assignments will be handed in in-person. Tutorials will be completed during the tutorial and submitted online through Brightspace.

Tests

There will be two tests on **Friday, October 14th, 6pm to 7:30pm** and **Friday, November 25th 6pm to 7:30pm**. The higher of the two tests will be worth 25% and the lower of the two tests will be worth 15%.

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 10-22**. 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.

Note: The two tests and final exam are in-person.

Allowed Material:

The following applies to assignments, tutorials, tests, and final exam.

- **Calculators:** Only non-programmable, non-graphing calculators are allowed.
- **Statistical Tables:** You are only permitted to use the statistical tables provided by the instructor. You can not use any other tables.
- **Statistical Software/Applications:** You will be using SPSS in the tutorials. The use of any other applications including Excel is not permitted

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 also 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 its 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 [Academic-Integrity-Policy-2021.pdf \(carleton.ca\)](#). 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 7
- Last for registration: September 20
- 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 10
- Fall Break (no classes): October 24 – 28
- November 15: Last day for academic withdrawal
- December 9: Last day of classes
- Final Exam period: December 10 -22

ADDITIONAL COURSE POLICIES:

1. Concerns about grading on assignments or tests must be brought to my attention within three business day of these items being available for review.

2. Missed Assignments and Tutorials: You may miss up to 3 of these 10 assessments for legitimate reasons (e.g. illness, death of a family member, etc.). The weight of these missed assessments will automatically be shifted to the final exam, and so there is no need to contact the instructor. **DO NOT MISS AN ASSESSMENT UNLESS YOU ABSOLUTELY HAVE TO**, as any assessments missed past 3 will be an automatic zero.

3. Missed Test: Students who need to miss a test for a legitimate reason must complete [self-declaration](#) form within 3 business days of the test. Students who correctly follow this procedure will have the weight of the missed test shifted to the final exam. Failure to follow this procedure will result in a grade of 0% on the missed test.

4. 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.

5. 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.

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 the Freedom of Information and Protection of Privacy Act.

TENTATIVE LECTURE SCHEDULE

WEEK	DATES	SECTIONS	TOPICS
1	Sept 7, 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, 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 24 – 28	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.
11	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.
12	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.
13	Dec 7	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).

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