



STAT 2507E: INTRODUCTION TO STATISTICAL MODELLING I

Winter 2021

Instructor: Dr. Fares Said	Lecture: Posted weekly to CuLearn, available anytime
Email: fares.said@carleton.ca	Place: Online via CuLearn
Office: Zoom, Facetime or other medium	Office Hours: Online Appointment request by email or call 6138751206 after 4pm

Course Pages: <https://www.carleton.ca/culearn/>

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

Prerequisites: BIT 2000/2100, ECON 2200/2201, GEOG 2006, STAT 2606/3502. STAT 2507 may not be counted for credit in any program, if taken after successful completion of STAT 2559.

Prerequisites: an Ontario Grade 12 university-preparation Mathematics (after Summer 2002) or an OAC in Mathematics or equivalent, or permission of the School of Mathematics and Statistics.

Textbook: *Introduction to Probability and Statistics, 4th Canadian Edition*, by Mendenhall, Beaver, and Ahmed. **Publisher:** Nelson.

Tutorials: Weekly tutorials via BigBlueButton (BBB) will be held on Mondays or Wednesdays. Tutorials will start on **Monday January 25, 2021**. The following table gives more details:

Lab	TA name	TA email	Time	Room
E1	Nicole Chassin	nicolechassin@cmail.carleton.ca	Mon: 19:35 - 20:25	BBB1
E2	Nicole Chassin	nicolechassin@cmail.carleton.ca	Mon: 20:35 - 21:25	BBB2
E3	Melissa Van Bussel	melissavanbussel@cmail.carleton.ca	Wed: 19:35 - 20:25	BBB3
E4	Melissa Van Bussel	melissavanbussel@cmail.carleton.ca	Wed: 21:35 - 21:25	BBB4
E5	David Kenyi	johndavid@cmail.carleton.ca	Mon: 17:05 - 17:55	BBB5
E6	Raphael Deketele	RaphaelDeketele@cmail.carleton.ca	Mon: 16:05 - 16:55	BBB6
E7	David Kenyi	johndavid@cmail.carleton.ca	Wed: 17:05 - 17:55	BBB7
E8	Raphael Deketele	RaphaelDeketele@cmail.carleton.ca	Wed: 16:05 - 16:55	BBB8

Assignments: There will be **four** assignments, each counting equally toward the term mark. Assignment due dates and times will be posted on CuLearn. No late assignments will be accepted.

Assignment	Available Date	Due Date
Assignment 1	Sunday, January 24	Sunday, February 7
Assignment 2	Sunday, February 7	Sunday, February 21
Assignment 3	Sunday, February 28	Sunday, March 14
Assignment 4	Sunday, March 21	Sunday, April 4

Note: The assignment schedule could change depending on course progress.

Tests: There will be two tests worth 15% each on **Saturday, February 27, 10:00am to 11:30am** and **Saturday, March 20, 10:00am to 11:30am**.

Final: 3-hour final exam is a closed-book exam of the whole course covered during the term, to be held during the exam period (**April 16-27**). Ensure that you **DO NOT** schedule flights or other departures during the exam period. The format includes both multiple-choice and full solution questions. **Please note, your tests and final exam will be proctored using e-proctoring.**

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.

Calculator: You may use non-programmable, non-graphing calculators for the tests and the final exam. I reserve the right to disallow any calculator.

Grading Scheme:

- *Term Work (50%)*
 - Assignments (20%)
 - Tests (30%)
- *Final Examination (50%).*

Additional Course Policies:

- For any issues with grading of assignments or tests, please notify me within 3 business days of receiving your grade.
- Students who need to miss a test or an assignment submission for a valid reason must complete the self-declaration form (available on CuLearn) within 3 business days of the test or assignment submission. The weight of the missed assessment will be shifted to the final exam, otherwise a grade of 0% will be given for the missed assessment.
- Students 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 for educational purposes and are not an opportunity to debate your grade.
- If your final exam mark is less than 40%, you will receive an **F**, regardless of your term mark.
- All dates and times are in Eastern Daylight Zone ETD (Time zone in Ottawa). This includes, but is not limited to time for: lectures, tutorials, office hours, assignments, tests, and the final exam date and time.
- In assigning course letter grades, 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.

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

Pregnancy obligation: 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. For more details visit the Equity Services website <http://www2.carleton.ca/equity/accommodation/>

Religious obligation: 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. For more details visit the Equity Services website <http://www2.carleton.ca/equity/accommodation/>

Academic Accommodations for 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 +1613-520-6608 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 scheduled test or exam requiring accommodation. Please consult the PMC website for the deadline to request accommodations for the formally-scheduled exam.

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>

Tentative Course Outline: The weekly coverage might change as it depends on the progress of the class. However, you must keep up with the reading assignments.

Week	Content	Chapter and Section
Week 1 Jan 11, 13	<ul style="list-style-type: none"> What is Statistics? Population and sample. Elements of Statistical problems. Describing the Shape of a Distribution, Graphs for Quantitative and Qualitative Data Data sets, describing data sets by graphs, histograms, stem and leaf plots 	Ch.1 s.1.1 to 1.5
Week 2 Jan 18, 20	<ul style="list-style-type: none"> Measures of Central Tendency e.g. Mean, median, mode. Measures of Variation e.g. Variance, Standard deviation, Range. Tchebysheff's theorem, empirical rule. Percentiles, Quartiles, Box plots. z-scores. 	Ch.2 s. 2.1 to 2.7
Week 3 Jan 25, 27	<ul style="list-style-type: none"> Bivariate data. Events, sample space, combination of events, probability of an event. Addition rule, multiplicative rule. Venn Diagrams. Conditional probability and independence 	Ch.3 & 4 s 3.1 to 3.4 & s. 4.1 to 4.3
Week 4 Feb 1, 3	<ul style="list-style-type: none"> Bayes' rule. Probability distribution of a discrete random variable Expectation and variance of a discrete random variable. 	Ch.4 s. 4.4 to 4.7
Week 5 Feb 8, 10	<ul style="list-style-type: none"> Binomial, hypergeometric, and Poisson distributions Poisson approximation to the binomial 	Ch.4 & 5 s 4.8 & s. 5.1 to 5.4
Week 6 Feb 15, 17	<ul style="list-style-type: none"> WINTER BREAK WEEK 	NA
Week 7 Feb 22, 24	<ul style="list-style-type: none"> Continuous distributions, normal distribution Normal approximation to the binomial distribution. 	Ch.6 s. 6.1 to 6.4
Week 8 Mar 1, 3	<ul style="list-style-type: none"> Random sampling. Sampling distributions. Central Limit Theorem. Sample mean and sample proportion. Sum and difference of independent random variables 	Ch.7 s. 7.1 to 7.6
Week 9 Mar 8, 10	<ul style="list-style-type: none"> Large Sample Estimation. Population Mean. The t-distribution Confidence intervals for the population mean Confidence intervals for the binomial proportion 	Ch.8 & 10 s. 8.1 to 8.4 & 10.1 to 10.3
Week 10 Mar 15, 17	<ul style="list-style-type: none"> Choosing sample size Confidence intervals for difference between means Confidence intervals for difference between two binomial proportions 	Ch.8 & Ch.10 s. 8.5, 8.6 & 10.4
Week 11 Mar 22,24	<ul style="list-style-type: none"> Introduction to Hypothesis Testing. Type I and Type II Errors. p-values. Hypothesis tests about a Population Mean and Population Proportion. 	Ch.9 & Ch. 10 s. 9.1 to 9.3, 9.5 & 10.3
Week 12 Mar 29, 31	<ul style="list-style-type: none"> Large-sample tests for difference between two means Large-sample tests for difference between two proportions. 	Ch.9 & Ch.10 s. 9.4, 9.6, 9.7 & 10.4
Week 13 Apr 5, 7	<ul style="list-style-type: none"> The t-distribution Small-sample confidence intervals Small-sample inference for difference between two means 	Ch.9 & Ch.10 s. 9.6 & 10.5
Week 14 Apr 12, 14	<ul style="list-style-type: none"> Review and Exam Prep 	NA

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 the student to keep up to date with any such modifications.

Important Dates:

January 11	.....	First class
January 25	.....	Last for registration
January 31	.....	Last day to withdraw from winter term with full fee adjustment
February 15	.....	Statutory holiday
February 15-19	.....	Winter break. Classes are suspended
February 27	.....	Test 1
March 19	.....	Last day for exam accommodation request
March 20	.....	Test 2
April 14	.....	Last day to withdraw from the course
April 14	.....	Last day of classes
April 16-27	.....	Final Exam

For more information please visit

<http://carleton.ca/registrar/registration/dates-and-deadlines/>