

Carleton University
School of Mathematics and Statistics

STAT2507 H and BIT2000D – *Introduction to Statistical Modeling I* – Winter 2020

Instructor: Ahmed Almaskut
Office: 4348 Herzberg Laboratories
E-mail: aalmasku@math.carleton.ca

Lectures: Wednesdays and Fridays from 11:35 am – 12:55 pm in Tory Building 360.

Tutorials: All Tutorials are in 4385 Herzberg Laboratories

| Section | Time | TA's name | Ta's connect email |
|---------|---------------------------|-------------------|------------------------------------|
| H1 | Tuesday 4:35pm - 5:25pm | Olivier Chabot | olivierchabot@cmail.carleton.ca |
| H2 | Monday 10:35am - 11:25am | Richard Matzinger | richardmatzinger@cmail.carleton.ca |
| H3 | Thursday 5:35pm - 6:25pm | Martin Dimitrov | martindimitrov@cmail.carleton.ca |
| H4 | Monday 6:05pm - 6:55pm | David Kenyi | johndavid@cmail.carleton.ca |
| H5/D1 | Monday 11:35am - 12:25pm | Carley Richards | CarleyRichards@cmail.carleton.ca |
| H6/D2 | Monday 12:35pm - 1:25pm | Carley Richards | CarleyRichards@cmail.carleton.ca |
| H7/D3 | Wednesday 1:05pm - 1:55pm | Olivier Chabot | olivierchabot@cmail.carleton.ca |

Office Hours: Wednesdays and Fridays 1:30 pm – 2:30 pm in Herzberg Laboratories 4348.

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. MINITAB 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 (10%)
- Final Examination Mark (50%)

Assignments

There will be 4 assignments, each counting equally toward the term mark. Assignments are due prior to the start of class on the assigned due date unless stated otherwise. No late assignments will be accepted.

Attendance: Attendance is mandatory.

Tests

There will be two tests worth 20% each on **Friday, February 7, 6pm to 7:30pm** and **Friday, March 13, 6pm to 7:30**. The location of the tests will be posted on CuLearn. If you miss a test you will receive a zero unless you provide me with a valid documented reason (e.g., illness). In this case, the weight of the test(s) will be transferred to the final exam.

Final Exam: The final exam will be a **three-hour** closed book exam covering all of the material given during the term. It will include both multiple-choice and full solution questions. exam scheduled by the university. The exam period runs from **April 13-25**. 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.

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: <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: January 6
- Last for registration: January 17
- 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: January 31
- Statutory Holiday: February 17
- Winter Break (no classes): February 17 - 21
- April 7: Last day of classes, last day for academic withdrawal
- Final Exam period: April 13 -25

TENTATIVE LECTURE SCHEDULE

| WEEK | DATES | SECTIONS | TOPICS |
|------|--------------|----------------------------|--|
| 1 | Jan 8, 10 | Introduction, 1.1 – 1.5 | Population and sample. Variables and data. Types of variables. Graphs for categorical data and quantitative data. |
| 2 | Jan 15, 17 | 2.1 – 2.7 | Measures of centre and variability. Tchebysheff's Theorem, Empirical Rule. Percentiles, quartiles. Box plots. |
| 3 | Jan 22, 24 | 3.1 – 3.4, 4.1 – 4.3 | Bivariate data. Graphs for bivariate data. Correlation coefficient. Regression line. Probability. Sample spaces, events. |
| 4 | Jan 29, 31 | 4.4 – 4.7 | Counting rules. Event relations. Additional rule. Subtraction rule. Conditional probability, independence. Multiplication rule. Bayes' rule. |
| 5 | Feb 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 | Feb 12, 14 | 6.1 – 6.4 | Probability distributions for continuous random variables. Normal distribution. Normal approximation to the binomial distribution. |
| N/A | Feb 17 – 21 | WINTER BREAK | |
| 7 | Feb 26, 28 | 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 | Mar 4, 6 | 8.1 – 8.4 | Point estimation. Interval estimation. Large sample confidence intervals for a population mean. Large sample confidence intervals for a population (binomial) proportion. |
| 9 | Mar 11, 13 | 8.5 – 8.6, 8.8 | Choosing the sample size. Large-sample confidence interval for the difference between two population means. Large-sample confidence interval for the difference between two population (binomial) proportions. |
| 10 | Mar 18, 20 | 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 | Mar 25, 27 | 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. Type I and Type II errors, power of the test. |
| 12 | Apr 1, Apr 3 | 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. |

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.

ADDITIONAL COURSE POLICIES:

- 1.** Concerns about grading on assignments or tests must be brought to my attention within one business day of these items being available for review. Assignments and tests not collected prior to the end of the semester will be destroyed.
- 2.** Students who need to miss a test for a valid reason must inform me prior to the test and provide the original hardcopy (not an email) of the appropriate supporting documentation within one 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 50% 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.