

Faculty of Science Course Syllabus
Department of Mathematics and Statistics

Stat 1060

Introductory Statistics for Science and Health Sciences

Fall 2023

Dalhousie University acknowledges that we are in Mi'kma'ki, the ancestral and unceded territory of the Mi'kmaq People and pays respect to the Indigenous knowledges held by the Mi'kmaq People, and to the wisdom of their Elders past and present. The Mi'kmaq People signed Peace and Friendship Treaties with the Crown, and section 35 of the Constitution Act, 1982 recognizes and affirms Aboriginal and Treaty rights. We are all Treaty people.

Dalhousie University also acknowledges the histories, contributions, and legacies of African Nova Scotians, who have been here for over 400 years.

Instructor(s): Dr. Ammar Sarhan *e-mail: ammar.sarhan@dal.ca*

Lectures: Section 01: TR 13:05-14:25 McCain Aud-1
Section 02: MWF 11:35-12:25 McCain Aud-1

Tutorials: 10/ 1hr each

Course delivery: The course is mainly in-person. However, I may be away for some extended periods and will shift to online delivery at those times. For the online delivery, all lectures are recorded and will be available on the course website.

Course Description

This course introduces the basic concepts of statistics through extensive use of examples. The topics include experimental design, descriptive statistics, simple linear regression and the basics of statistical inference. Students will learn to use the statistical software R and RStudio.

Course Prerequisites

Academic or advanced Grade 12 Mathematics (or pre-calculus) or equivalent

Course Exclusion

NONE

Learning Objectives

At the end of this course, students should be able to:

1. Discuss basic statistical vocabulary and concepts
2. Identify and distinguish the contexts that can be analyzed using the statistical methods
3. Distinguish contexts that call for techniques beyond the scope of the course
4. Write clear statements (inference) supporting interpretations of data analysis.
5. Test if two or more populations have the same mean.

Course Materials

- *Textbook:* Stats: Data and Models, 4th Canadian Edition DeVeaux, Velleman, Bock, Vukov and Wong. (Pearson Canada). Any other edition would work.
- R and RStudio
- A scientific calculator with natural log and exponential functions.
- Course websites: Brightspace and LON-CAPA.

For online/blended course delivery:

- *The exams are in-person and require on-campus attendance.*
- *Outline exam is not an option*
- *The lecture will be recorded and posted on the Brightspace.*
- *R and RStudio software are required.*
- *There will be on-campus weekly tutorials, but the attendance is not mandatory. However, the tutorials are recorded and will be available on the Brightspace.*
- *Weekly assignments and tutorial assessments are online on LON-CAPA platform.*

Course Assessment

| Component | Weight (% of final grade) | Date |
|------------------------------|---------------------------|--|
| Exam 1, (on-campus) | 35%, | November 1 st , 7:00-9:00 pm (length: 2 hours) |
| Exam 2, (on-campus) | 35% | (Final exam period - Scheduled by Registrar) (length: 2 hours) |
| Assignments: (online) | 15% | |

| Assignment | Due date | Assignment | Due date |
|------------|----------|------------|-----------------|
| 1 | Sept 24 | 6 | Oct 29 |
| 2 | Oct 1 | 7 | Nov 5 |
| 3 | Oct 8 | 8 | Nov 12 |
| 4 | Oct 15 | 9 | Dec 5 (Tuesday) |
| 5 | Oct 22 | | |

Tutorial Assessments: (online) 15%

| Assessment | Due date | Assignment | Due date |
|------------|----------|------------|-----------------|
| 1 | Sept 24 | 6 | Oct 29 |
| 2 | Oct 1 | 7 | Nov 5 |
| 3 | Oct 8 | 8 | Nov 12 |
| 4 | Oct 15 | 9 | Dec 5 (Tuesday) |
| 5 | Oct 22 | | |

Conversion of numerical grades to Final Letter Grades follows the Dalhousie Common Grade Scale

| | | | |
|-------------|------------|------------|-----------|
| A+ (90-100) | B+ (77-79) | C+ (65-69) | D (50-54) |
| A (85-89) | B (73-76) | C (60-64) | F (<50) |
| A- (80-84) | B- (70-72) | C- (55-59) | |

Course Policies on Missed or Late Academic Requirements

- Late work with a good, documented excuse may be accepted, provided the solutions have not yet been posted and/or discussed in class. This can be accepted for only one week of the weekly homework (it is one time excuse policy).
- Non-attendance at the exams 1 and 2, without a valid documented excuse as determined by the professor, will result in a mark of 0.
- Students cannot miss both two exams 1 and 2. If a student missed exam 1 and wrote a makeup, I will not allow them to write a makeup for exam 2.
- I will use the Student Declaration of Absence in this course ONLY for exams.

Course Policies related to Academic Integrity

At Dalhousie University, we are guided in all of our work by the values of academic integrity: honesty, trust, fairness, responsibility and respect (The Center for Academic Integrity, Duke University, 1999). As a student, you are required to demonstrate these values in all of the work you do. The University provides policies and procedures that every member of the university community is required to follow to ensure academic integrity.

Information: https://www.dal.ca/dept/university_secretariat/academic-integrity.html

Course Content

| <i>Week</i> | <i>Date</i> | <i>Topic</i> |
|-------------|---------------|--|
| 1 | Sept 5-8 | <i>Displaying and Summarizing Quantitative Data</i> |
| 2 | Sept 11-15 | <i>Understanding and Comparing Distributions</i> |
| 3 | Sept 18-22 | <i>The standard deviation as a ruler</i> <i>Understanding Randomness</i> |
| 4 | Sept 25- 29 | <i>Sample Surveys</i> <i>Experiments and Observational Studies</i> |
| 5 | Oct 2 | National Day for Truth and Reconciliation, University closed |
| 5 | Oct 3-6 | <i>From Randomness to Probability</i> <i>Probability Rules</i> |
| 6 | Oct 9 | Thanksgiving Day, University closed |
| 6 | Oct 10-13 | <i>Random Variables</i> <i>Probability Model (Normal and Binomial)</i> |
| 7 | Oct 16-20 | <i>Sampling Distribution Models</i> <i>Confidence intervals for proportions</i> |
| 8 | Oct 23-27 | <i>Testing Hypotheses about proportions</i> |
| 9 | Oct 30- Nov 3 | <i>Inferences About Means</i> |
| 10 | Nov 6-10 | <i>Comparing Means</i> <i>Paired Samples</i> |
| 11 | Nov 13-17 | Fall Study Break – No classes |
| 12 | Nov 20-24 | <i>Scatterplots, Association, and Correlation</i> <i>Linear Regression</i> |
| 13, 14 | Nov 27-Dec 5 | <i>Regression Wisdom</i> <i>Inferences for Regression</i> |

University Policies and Statements

Recognition of Mi'kmaq Territory

Dalhousie University would like to acknowledge that the University is on Traditional Mi'kmaq Territory. The Elders in Residence program provides students with access to First Nations elders for guidance, counsel, and support. Visit or e-mail the Indigenous Student Centre at 1321 Edward St or elders@dal.ca. Additional information regarding the Indigenous Student Centre can be found at: https://www.dal.ca/campus_life/communities/indigenous.html

Internationalization

At Dalhousie, 'thinking and acting globally' enhances the quality and impact of education, supporting learning that is "interdisciplinary, cross-cultural, global in reach, and orientated toward solving problems that extend across national borders." Additional internationalization information can be found at: <https://www.dal.ca/about-dal/internationalization.html>

Academic Integrity

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Accessibility

The Student Accessibility Centre is Dalhousie's centre of expertise for matters related to student accessibility and accommodation. If there are aspects of the design, instruction, and/or experiences within this course (online or in-person) that result in barriers to your inclusion, please contact the Student Accessibility Centre (https://www.dal.ca/campus_life/academic-support/accessibility.html) for all courses offered by Dalhousie with the exception of Truro. For courses offered by the Faculty of Agriculture, please contact the Student Success Centre in Truro (<https://www.dal.ca/about-dal/agricultural-campus/student-success-centre.html>)

Conduct in the Classroom – Culture of Respect

Substantial and constructive dialogue on challenging issues is an important part of academic inquiry and exchange. It requires willingness to listen and tolerance of opposing points of view. Consideration of individual differences and alternative viewpoints is required of all class members, towards each other, towards instructors, and towards guest speakers. While expressions of differing perspectives are welcome and encouraged, the words and language used should remain within acceptable bounds of civility and respect.

Diversity and Inclusion – Culture of Respect

Every person at Dalhousie has a right to be respected and safe. We believe inclusiveness is fundamental to education. We stand for equality. Dalhousie is strengthened in our diversity. We are a respectful and inclusive community. We are committed to being a place where everyone feels welcome and supported,

which is why our Strategic Direction prioritizes fostering a culture of diversity and inclusiveness (Strategic Priority 5.2). Additional diversity and inclusion information can be found at:
<http://www.dal.ca/cultureofrespect.html>

Student Code of Conduct

Everyone at Dalhousie is expected to treat others with dignity and respect. The Code of Student Conduct allows Dalhousie to take disciplinary action if students don't follow this community expectation. When appropriate, violations of the code can be resolved in a reasonable and informal manner - perhaps through a restorative justice process. If an informal resolution can't be reached, or would be inappropriate, procedures exist for formal dispute resolution. The full Code of Student Conduct can be found at:
https://www.dal.ca/dept/university_secretariat/policies/student-life/code-of-student-conduct.html

Fair Dealing Policy

The Dalhousie University Fair Dealing Policy provides guidance for the limited use of copyright protected material without the risk of infringement and without having to seek the permission of copyright owners. It is intended to provide a balance between the rights of creators and the rights of users at Dalhousie. Additional information regarding the Fair Dealing Policy can be found at:
https://www.dal.ca/dept/university_secretariat/policies/academic/fair-dealing-policy-.html

Originality Checking Software

The course instructor may use Dalhousie's approved originality checking software and Google to check the originality of any work submitted for credit, in accordance with the Student Submission of Assignments and Use of Originality Checking Software Policy. Students are free, without penalty of grade, to choose an alternative method of attesting to the authenticity of their work and must inform the instructor no later than the last day to add/drop classes of their intent to choose an alternate method. Additional information regarding Originality Checking Software can be found at:
https://www.dal.ca/dept/university_secretariat/policies/academic/student-submission-of-assignments-and-use-of-originality-checking-software-policy-.html

Student Use of Course Materials

Course materials are designed for use as part of this course at Dalhousie University and are the property of the instructor unless otherwise stated. Third party copyrighted materials (such as books, journal articles, music, videos, etc.) have either been licensed for use in this course or fall under an exception or limitation in Canadian Copyright law. Copying this course material for distribution (e.g. uploading to a commercial third-party website) may lead to a violation of Copyright law.

Faculty of Science

Student Resources and Support

University Policies and Programs

Important Dates in the Academic Year (including add/drop dates):

https://www.dal.ca/academics/important_dates.html Classroom Recording Protocol:

https://www.dal.ca/dept/university_secretariat/policies/academic/classroom-recording-protocol.html

Dalhousie Grading Practices Policies:

https://www.dal.ca/dept/university_secretariat/policies/academic/grading-practices-policy.html Grade

Appeal Process: https://www.dal.ca/campus_life/academic-support/grades-and-student-records/appealing-a-grade.html Sexualized Violence Policy: https://www.dal.ca/dept/university_secretariat/policies/health-and-safety/sexualized-violence-policy.html Scent-Free Program: <https://www.dal.ca/dept/safety/programs-services/occupational-safety/scent-free.html>

Learning and Support Resources General Academic Support – Advising (Halifax):

https://www.dal.ca/campus_life/academic-support/advising.html General Academic Support – Advising

(Truro): <https://www.dal.ca/about-dal/agricultural-campus/ssc/academic-support/advising.html> Student

Health & Wellness Centre: https://www.dal.ca/campus_life/health-and-wellness.html

On Track (helps you transition into university, and supports you through your first year at Dalhousie and beyond): https://www.dal.ca/campus_life/academic-support/On-track.html Indigenous Student Centre:

https://www.dal.ca/campus_life/communities/indigenous.html Indigenous Connection:

<https://www.dal.ca/about-dal/indigenous-connection.html>

Elders-in-Residence (The Elders in Residence program provides students with access to First Nations elders for guidance, counsel, and support. Visit the office in the Indigenous Student Centre or contact the program at elders@dal.ca or 902-494-6803: <https://cdn.dal.ca/content/dam/dalhousie/pdf/academics/UG/indigenous-studies/Elder-Protocol-July2018.pdf> Black Student Advising Centre:

https://www.dal.ca/campus_life/communities/black-student-advising.html International Centre:

https://www.dal.ca/campus_life/international-centre.html South House Sexual and Gender Resource Centre:

<https://southhousehalifax.ca/about/> LGBTQ2SIA+ Collaborative:

<https://www.dal.ca/dept/vpei/edia/education/community-specific-spaces/LGBTQ2SIA-collaborative.html>

Dalhousie Libraries: <http://libraries.dal.ca/> Copyright Office: <https://libraries.dal.ca/services/copyright-office.html> Dalhousie Student Advocacy Services: <https://www.dsu.ca/dsas?rq=student%20advocacy>

Dalhousie Ombudsperson: https://www.dal.ca/campus_life/safety-respect/student-rights-and-responsibilities/where-to-get-help/ombudsperson.html Human Rights and Equity Services:

<https://www.dal.ca/dept/hres.html> Writing Centre: https://www.dal.ca/campus_life/academic-support/writing-and-study-skills.html Study Skills/Tutoring: http://www.dal.ca/campus_life/academic-support/study-skills-and-tutoring.html Faculty of Science Advising Support:

<https://www.dal.ca/faculty/science/current-students/undergrad-students/degree-planning.html>

Safety Biosafety: <http://www.dal.ca/dept/safety/programs-services/biosafety.html> Chemical Safety:

<https://www.dal.ca/dept/safety/programs-services/chemical-safety.html> Radiation Safety:

<http://www.dal.ca/dept/safety/programs-services/radiation-safety.html> Laser Safety:

<https://www.dal.ca/dept/safety/programs-services/radiation-safety/laser-safety.html>