

# Introduction to Probability and Statistics I

## Department of Mathematics and Statistics

### STAT 2060/MATH 2060 Winter 2025

*Dalhousie University is located in Mi'kma'ki, the ancestral and unceded territory of the Mi'kmaq. We are all Treaty people.*

*We acknowledge the histories, contributions, and legacies of the African Nova Scotian people and communities who have been here for over 400 years.*

**Instructor:** Dr. Ammar Sarhan  
**Email:** [ammar.sarhan@dal.ca](mailto:ammar.sarhan@dal.ca)  
**Office hours:** TR:12-12:50, W: 13:00-13:55, Chase 105  
**Lectures:** MWF 1435-1525 DUNN 117  
**Tutorials:** 10 2hrs each

#### Tutorial Tas and CAPA assistant information:

Tutorial		Time	First name	Last name	email
T01	W	1535-1725	Claire	Cui	claire.cui@dal.ca
T02	M	1535-1725	Zirui	Dong	zr289568@dal.ca
T03	M	1535-1725	Fatemeh	Tofighi	Ft898255@dal.ca
T04	W	1735-1925	Yurunyun	Wang	yr943634@dal.ca
T05	R	0935-1125	Joseph	Barss	js845528@dal.ca
CAPA			Xinyue	Zhang	xn770547@dal.ca

**Course delivery:** The course is mainly in-person. However, I may switch to online delivery after the winter break. For the online delivery, all lectures will be recorded and will be available on the Brightspace.

#### Course Description

Rigorous introduction to probability and statistical theory. Topics covered include elementary probability, random variables, distributions, estimation and hypothesis testing.

#### Course Prerequisites

MATH 1000

#### Learning Objectives

Generally, students understand basic concepts of statistics and probability, comprehend methods needed to analyze and critically evaluate statistical arguments, and recognize the importance of statistical ideas.

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

1. Demonstrate an understanding of the basic concepts of probability and random variables
2. Understand the concept of the sampling distribution of a statistic, and in particular describe the behaviour of the sample mean
3. Identify the foundations for classical inference involving confidence intervals and hypothesis testing.
4. Identify the foundations for classical inference involving confidence intervals and hypothesis testing.

### Course Materials

- Textbook: Probability and Statistics for Engineering and the Sciences, 9th edition, by J. Devore. [Any old edition will work]
- A scientific calculator with natural log and exponential functions.
- Course website: Brightspace (course materials) and LON-CAPA (homework)

### How to Login to LON-CAPA:

1. In your web browser, go to <http://capa.mathstat.dal.ca>.
2. You will be prompted to enter a username and password. By default, your username is your Dalhousie NetID and your password is your banner number (your Dalhousie student number that starts with B00). Your full banner number must be entered, that is: the upper-case letter B, followed by two zeros, then followed by 6 digits.
3. You then have to select a role for the course you wish to enter. Most likely, you will have only one choice: a student user role for the course titled "Stat 2060". Click on the Select button next to that choice.
4. You will be directed to the home page of the course. Navigation is easiest by using the tabs in the top blue bar. The Contents tab is where the assignments will be posted.
5. For increased security and convenience, you should change the default password to the one you use for all other Dalhousie-related activities. Click on the Main Menu tab in the top blue bar, then click on Set my user preferences and then click on Password. Enter the current (default) password and enter (twice) your new password.
6. **For technical support, please contact the CAPA assistant.**

### For online/blended course delivery:

- The midterm and final exam will be in-person and require on-campus attendance.
- If I switch to online delivery, all lectures will be delivered synchronously and recorded as well.
- For online delivery, students will need a laptop or lpad or a surface tablet.

### Course Assessment

**Assignments:** 25% (Online on CAPA)

Assignment	Due date	Assignment	Due date
1	Jan 26	6	March 9
2	Feb 2	7	March 16
3	Feb 9	8	March 23
4	Feb 16	9	April 7
5	March 2		

**Tutorial Quizzes:** 10% (in-person during the tutorials, require on-campus attendance)

Quiz	Due date	Assignment	Due date
1	Jan 20-24	6	March 3-7
2	Jan 27 - 31	7	March 10-14
3	Feb 3 - 6	8	March 17-21
4	Feb 10-14	9	March 24-28
5	Feb 24 -28		

**Exams:** There will be a total of 2 exams: 1 midterm (25%) and 1 final exam (45%). The exams will be closed-book with one page (double sided) of notes allowed.

The schedules for the exams are:

- **Midterm (25%):** Thursday, February 27<sup>th</sup> from 7:00-9:00 pm
- **Final exam (40%):** it is 3 hours exam (*Scheduled during exam period*).

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

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

### **Course Policies on Missed or Late Academic Requirements**

- *Each assignment will be available for an entire week. Therefore, students can have access to it for during that week and I will not accept any late assignment. In the case if a student is sick during that week, they MUST contact me before the closing date and I will give a day or two extensions, depending on the situation.*
- *Quizzes will take place during the tutorials and if a student misses it due to illness, they can write a makeup quiz.*
- *Students **cannot** use the Student Declaration of Absence form for this course.*
- *Make-up exams can only be arranged in exceptional circumstances such as illness (with medical certificate). In such circumstances, the student must inform the instructor as soon as possible and provide proof before the exam's time.*

### **Course Policies related to Academic Integrity**

*I encourage students to work together on the assignments but not to copy the solutions from each other. I will not use any plagiarism software in this course.*

### **Course Content**

1. Descriptive statistics
2. Probability
3. Discrete random variables and distributions
4. Continuous random variables and distributions
5. Joint probability distributions
6. Point estimation
7. Confidence intervals based on a single sample
8. Hypothesis tests based on a single sample
9. Inference based on two samples

### **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](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](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](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.

# 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](mailto:elders@dal.ca). Additional information regarding the Indigenous Student Centre can be found at:  
[https://www.dal.ca/campus\\_life/communities/indigenous.html](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**

At Dalhousie University, we are guided in all our work by the values of academic integrity: honesty, trust, fairness, responsibility, and respect. As a student, you are required to demonstrate these values in all 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. Additional academic integrity information can be found at: [https://www.dal.ca/dept/university\\_secretariat/academic-integrity.html](https://www.dal.ca/dept/university_secretariat/academic-integrity.html)

## **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](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](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](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](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.

# Student Resources and Support University Policies and Programs

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

[http://www.dal.ca/academics/important\\_dates.html](http://www.dal.ca/academics/important_dates.html)

**Classroom Recording Protocol:**

[Class Recording Protocol - 2021](#)

**Dalhousie Grading Practices Policies:**

<https://www.dal.ca/content/dam/www/about/leadership-and-governance/university-policies/grading-practices-policy.pdf>

**Grade Appeal Process:**

[https://www.dal.ca/campus\\_life/academic-support/grades-and-student-records/appealing-a-grade.html](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](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](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](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](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](https://www.dal.ca/campus_life/academic-support/On-track.html)

**Indigenous Student Centre:**

[https://www.dal.ca/campus\\_life/communities/indigenous.html](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](mailto: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](https://www.dal.ca/campus_life/communities/black-student-advising.html)

**International Centre:**

[https://www.dal.ca/campus\\_life/international-centre.html](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](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](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](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](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.htm>