McGill

Course Syllabus
Department of Mathematics and Statistics
MATH 324: Statistics
Winter 2023

Instructor:	Dr. Tharshanna Nadarajah
Email:	tharshanna.nadarajah@mcgill.ca
Course Website:	https://mycourses2.mcgill.ca

1 Course Information

Prerequisites:

MATH 323 or equivalent. Intended for students in Science, Engineering and related disciplines, who have had differential and integral calculus. Not open to students who have taken or are taking MATH 357.

Course Outline:

Sampling distributions including the Normal, chi-squared, Student and F distributions. The sampling properties of the sample mean and sample variance. Point estimation. The concepts of bias, minimum variance, mean square error, consistency and sufficiency. Uniformly minimum variance unbiased estimators. Method of moments and maximum likelihood estimation. One- and-two-sample inference. Confidence intervals. Sample size calculations. Hypothesis testing. Time permitting: The notions of type 1 and type 2 errors, power, and p-value. Neyman-Pearson theory and uniformly most powerful tests. Likelihood ratio tests. The matched pairs design. Simple linear regression.

Textbook:

Mathematical Statistics with Applications
by Wackerly, Mendenhall, and Scheaffer,
7th edition. North American edition.

The course will not slavishly follow the textbook. If you have access to an earlier edition you can use it.

2 Course Assessment

Grading			
Component	**Method I**	**Method II**	**Date**
Assignments	20%	20%	given below
Midterm Exam	25%	0%	Feb. 22nd
Final Exam	55%	80%	TBA

Assessment	Due Dates
Assignment 1	Jan. 27th at 11.59 pm ET
Assignment 2	Feb. 17th at 11.59 pm ET
Midterm Exam (Week 1-6)	Feb. 22nd at 10.00 am ET
Assignment 3	Mar. 10th at 11.59 pm ET
Assignment 4	Mar. 24th at 11.59 pm ET

***We will assign each student the highest letter grade of the two grades calculated via the methods above.*

Assignments:

There will be 4 assignments throughout the term. We will take the best 3 assignments marks and drop the worst assignment to calculate your overall assignment mark. Because only the best 3 assignments marks will be counted, we will not be making any accommodations for the missed assignments. These will receive a mark of 0, but we will drop one assignment as part of the worst assignment marks. Therefore, you may miss one assignment without penalty.

- Your assignments and exams may be handwritten or typed. Please make sure that whatever you submit is legible. If they are not legible then they will not be marked. You can use whatever means you wish to prepare and upload your documents, for example, from a tablet, scanned and uploaded etc.

- Whatever means you use, we must see a single pdf document on myCourses. Please make sure that your submissions have been successfully uploaded and that you have included all the pages.
- You must submit your assignments and exams as a single pdf document to myCourses. Any assignments and exams not submitted in pdf format as a single document will not be marked.
- You will be allowed multiple submissions of your assignments and exams, although only the last submission before the deadline will be marked.

Please carefully read the rules related to the submission of your assignments as they will be strictly enforced in order to be fair to all students.

- Assignments must be submitted online through myCourses no later than 11:59 pm on the due date. Assignments that are submitted after the deadline will not be marked. There will be no exceptions.
- In order to obtain part marks either for assignment or exam questions it is crucial that you show your reasoning. A bald numerical or algebraic stand-alone answer is rarely sufficient.
- There will be no grace period. So please make sure that you know how to upload your assignments well in advance of the deadline. You are strongly advised not to leave submission of your assignments and exams until the last moment in case you have a problem.

Midterm Exam:

The midterm exam will be set so that it could be answered in roughly 2 hours. It will be an open-resource, take-home exam. You may consult any online resource as well as your notes and lectures. You will not be permitted to consult any resource (or person) that responds to questions that you may ask them about the exam. The exam will be posted on myCourses at 10 am on Wednesday, February 22nd, and you will be given 72 hours to upload your completed exams to myCourses, from the time of posting. You must upload your exams in exactly the same way that you will have to submit your assignments.

- If you miss the Midterm Exam for any reason, you will automatically be evaluated according to Method II. There will be no make-up Midterm Examination.
- Your final mark will be calculated according to the formula above unless circumstance arise beyond the control of the University.
- There will be no opportunity to improve your mark by doing extra work.
- Exception: If you miss the Midterm exam for a medical reason, your final mark will be based on the formula: 20% Assignments and 80% Final Exam.

Final Exam:

The final exam will be scheduled by the university during the final assessment period (April 14-28). The final assessment (worth 55%) will be an in-person assessment covering all material throughout the term. Details of the format of this assessment will be communicated later.

3 Course Policies

1. I will hold office hours in-person. The office hour schedule will be posted on MyCourses. It is recommended that you visit during office hours whenever you have a question about the material. The days and timings are TBA.

2. MyCourses: It is your responsibility to check MyCourses regularly for assignment postings, assignment and midterm exam solutions, and other announcements.

3. Use your ***mcgill.ca** account. You will not get a response if you email from other email addresses. Write a proper email, including the course number MATH 324 in the subject line. The email should contain the addressee, and your official name for identification purposes. If you send an e-mail after 5 pm, you should not expect to see an e-mail until the following day (around 10 am). I am also willing to meet at other times, but in such cases, please e-mail me in advance to set up a mutually convenient time.

4. You must not copy mathematical derivations, computer output and input, or written descriptions from anyone or anywhere else, without reporting the source within your work. This includes copying from solutions provided to previous semesters of this course.

5. This course follows McGill University's Policies on missed finals. It requires students to complete the form on Minerva (found under your Personal menu) if the final is missed due to illness.

6. Any requests to have marked assignment/test re-evaluated must be made in writing by email to your instructor within 48 hours after the grades are released. The request must contain a justification for consideration. Be sure to include your official name and student number for identification purposes. I should process regrading requests within two weeks of the requested date. Please note that I reserve the right to review a part of the whole of your assignment. Hence, your marks may go down, up or remain the same.

4 Teaching Assistants and Tutorials

4.1 Teaching Assistants

The TAs for the course are Jiajun Mai, Tianyu Wang and Zayd Omar. They will hold in-person office hours at times that they will post on MyCourses.

4.2 Tutorials

The times of the tutorials and the office hours of the TAs will be announced on MyCourses as soon as the TAs have determined their schedules.

5 Academic Integrity

Academic integrity is fundamental to learning and scholarship at McGill University. Participating honestly, respectfully, responsibly, and fairly in this academic community ensures that McGill University degree that you earn will be valued as a true indication of your individual academic achievement, and will continue to receive the respect and recognition it deserves. Familiarize yourself with McGill University's Code of Behaviour on Academic Matters available at Academic Integrity.

Sharing ideas is educationally beneficial, and you are encouraged to discuss assignments with your fellow classmates. However, plagiarism of any kind is destructive, fraudulent, and unacceptable. You are strictly forbidden to copy another student's written work, whole or in part, and submit that work under your name. You are also strictly prohibited from making trivial or mechanical changes to another student's written work and submitting that work under your name. Plagiarized work will receive no credit, and repeat offences will result in more severe action. Please stay away from this type of behaviours. A sure way to avoid this issue is to discuss the assignments with fellow classmates, writing your solutions individually and independently.

6 Shortlist of Resources

The Department of Mathematics and Statistics, as well as the University at large, have many resources to help you succeed in this course and throughout your degree. A more extensive list of resources can be found in the MyCourses Webpage for this Course (under "Content"), as well as the Department's EOSW webpage.

- The Wellness Hub is a centralized website for student physical and mental health resources.
- The Math Help Desk is staffed by knowledgeable math students who can help answer your questions related to your courses.
- Statistics Online for Students (SOS) Help Desk is staffed by graduate students in math and psych ready to answer your stats questions.
- SUMS is the Society of Undergraduate Mathematics Students. Join their Facebook group to get on their listserv, connect with other students in the department, and participate in some of their activities/social events.

- Advising is an important resource to guide you throughout the duration of your degree, and advisors can help with answering questions related to your degree program. Check out the Department's Advising Website to find out how to get in touch with a Departmental Advisor, should you need to do so.
- McGill's Coronavirus Website is a centralized website with the most up-to-date information concerning policies and resources related to the COVID-19 pandemic.

7 Accessibility Needs

McGill University offers academic accommodations for students with disabilities. If you require accommodations, or have any accessibility concerns about the course, the classroom, or course materials, please contact Accessibility Services as soon as possible: `https://www.mcgill.ca/osd/`.

All information in the course outline are approximate and subject to change. All the announcements about the changes will be made via MyCourses which students are expected to check regularly.