Department of Mathematics & Statistics
Concordia University

STAT 280
Introduction to Statistical Programming
Fall 2024

Instructor*: _____

Office/Tel No.: _____

Office Hours: _____

*Students should get the above information from their instructor during class time. The instructor is the person to contact should there be any questions about the course.

Text: A first course in statistical programming with R, Second Edition. Braun, W. J., & Murdoch, D. J. (2016). Cambridge University Press.

The print version of the textbook will be available at: https://www.bkstr.com/concordiastore/home
Note: Students should order textbooks as early as possible, especially for print versions in case books are back ordered or there are any shipping delays.

Assignments: There will be 6 assignments. Assignments are compulsory. Students are expected to submit assignments on Moodle. **Late assignments will not be accepted.** Assignments contribute 30% to your final grade. Working regularly on the assignments is essential for success in this course.

Mid-term Break: There will be a mid-term break from October 15 to October 20.

Midterm Tests: There will be two Class tests. **Class test I** will be held on **Monday, October 7, 2024,** and **Class test II** will be held on **Monday, November 18, 2024, both in class.** These tests will be closed-book exams.

NOTE: It is the Department's policy that tests missed for any reason, **including illness,** cannot be made up. Students who are unable to write a midterm test for a valid reason, their midterm weight will be added to the

final project. Such a request will not be granted unless it is made in writing (by email), the reason is valid, and is supported by documentation or other evidence. Valid reasons for missing a midterm test include: conflicts with other exams or religious observances (must be reported to the instructor in advance); illness (Short-Term Absence form or valid medical note required); bereavement.

Final Grade:

a) Assignments (30%)
b) Mid-term tests (40%)
c) Final project (30%)

If the grading scheme for this course includes graded assignments, a reasonable and representative subset of each assignment may be graded. Students will not be told in advance which subset of the assigned problems will be marked and should therefore attempt all assigned problems.

IMPORTANT: **PLEASE NOTE THAT THERE IS NO '100% FINAL PROJECT' OPTION IN THIS COURSE.**

Week	Topics to be Covered
1	Getting started Statistical Programming, Basic features in R, Vectors in R
2	Data storage in R, Packages, Data storage in R, Packages, libraries, & repositories
3	Logical vectors and relational operators, Data frames & lists, Data input & output
4	Programming statistical graphics
5	Programming with R: Flow control, managing complexity through functions; **Class Test I**
6	Programming with R: The replicate function, programming guidelines
7	Programming with R: Debugging and maintenance, efficient programming
8	Simulation: Monte Carlo simulation, Generation of pseudorandom numbers
9	Simulation: Different random variables, multivariate random number generation, Markov chain simulation
10	Simulation: Monte Carlo integration & advanced simulation methods; **Class Test II**
11	Computational linear algebra: Vectors & matrices in R, Matrix multiplication & inversion
12	Computational linear algebra: Eigen values & Eigen vectors, Matrix décompositions & opérations & Review
12	Computational linear algebra: Eigen values & Eigen vectors, Matrix décompositions & opérations & Review

Academic Integrity and the Academic Code of Conduct

This course is governed by Concordia University's policies on Academic Integrity and the Academic Code of Conduct as set forth in the Undergraduate Calendar and the Graduate Calendar. Students are expected to familiarize themselves with these policies and conduct themselves accordingly. "Concordia University has several resources available to students to better understand and uphold academic integrity. Concordia's website on academic integrity can be found at the following address, which also includes links to each Faculty and the School of Graduate Studies: https://www.concordia.ca/conduct/academic-integrity.html" *[Undergraduate Calendar, Sec 17.10.2]*

Behaviour
All individuals participating in courses are expected to be professional and constructive throughout the course, including in their communications.

Concordia students are subject to the Code of Rights and Responsibilities which applies both when students are physically and virtually engaged in any University activity, including classes, seminars, meetings, etc. Students engaged in University activities must respect this Code when engaging with any members of the Concordia community, including faculty, staff, and students, whether such interactions are verbal or in writing, face to face or online/virtual. Failing to comply with the Code may result in charges and sanctions, as outlined in the Code.

Intellectual Property
Content belonging to instructors shared in online courses, including, but not limited to, online lectures, course notes, and video recordings of classes remain the intellectual property of the faculty member. It may not be distributed, published or broadcast, in whole or in part, without the express permission of the faculty member. Students are also forbidden to use their own means of recording any elements of an online class or lecture without express permission of the instructor. Any unauthorized sharing of course content may constitute a breach of the Academic Code of Conduct and/or the Code of Rights and Responsibilities. As specified in the Policy on Intellectual Property, the University does not claim any ownership of or interest in any student IP. All university members retain copyright over their work.

Extraordinary circumstances
In the event of extraordinary circumstances and pursuant to the Academic Regulations the University may modify the delivery, content, structure, forum, location and/or evaluation scheme. In the event of such extraordinary circumstances, students will be informed of the change.