STA237H1-F LEC0101
Probability, Statistics and Data Analysis I, Summer 2024

Lecture:
M & W 09 AM to 12 PM | PB B250
Tutorials:
M & W 12 PM to 01 PM
MS 2173 (TUT0101) | MS 4171 (TUT0102)
MS 4279 (TUT0103) | MS 3278 (TUT0104)

Course Instructor:
Kevin Zhang (sta237@utoronto.ca)
TAs & Office Hours:
To be announced on Quercus

All times are in in Toronto time (EDT).

Course Description

This course will provide an introduction to probability using simulation and mathematical frameworks with emphasis on the probability concepts needed for more advanced study in statistical practice. Topics covered include:

- probability spaces and random variables;
- discrete and continuous probability distributions;
- probability mass, density, and distribution functions;
- expectation and variance;
- independence and conditional probability; and
- the law of large numbers, the central limit theorem, and sampling distributions.

Computer simulation in R will be taught and used **extensively** for calculations and to guide the theoretical development.

Course Structure

We will meet **in person** on Mondays and Wednesdays from 9 AM to noon in Toronto time (EDT) in PB B250, Leslie Dan Pharmacy Building. In-person tutorials will be offered in smaller groups following the lectures. Slides will be made available prior to the lectures.

Textbooks

The following textbooks are available online via the University of Toronto Library for your reference. I will refer to them for practice questions as well.

- ***Probability with applications and R*** (2021, Second Edition) by Amy S. Wagaman and Robert P. Dobrow. https://librarysearch.library.utoronto.ca/permalink/01UTORONTO_INST/14bjeso/alma991107073693606196
- ***A modern introduction to probability and statistics: Understanding why and how*** (2005, First Edition) by Frederik M. Dekking, Cornelis Kraaikamp, Hendrik P. Lopuhaä, and Ludolf E. Meester. https://librarysearch.library.utoronto.ca/permalink/01UTORONTO_INST/14bjeso/alma991106910545806196
- ***Modern mathematical statistics with applications*** (2012, Second Edition) by Jay L. Devore and Kenneth N. Berk. https://librarysearch.library.utoronto.ca/permalink/01UTORONTO_INST/14bjeso/alma991106895484906196

Grading Scheme

Item	Date	Weight
Assignment	June 7, 2024	20%
Quizzes (20%)		
Quiz 1	May 13, 2024	4%
Quiz 2	May 22, 2024	4%
Quiz 3	May 29, 2024	4%
Quiz 4	June 5, 2024	4%
Quiz 5	June 12, 2024	4%
Tests (60%)		
Term Test	May 27, 2024	20%
Final Exam	TBD	40%

All dates listed are in Toronto time (EDT).

Assignment There will be one assignment consisting of both theoretical and coding questions. It is to be submitted on Crowdmark individually.

Quizzes will take place in person during tutorial weekly (one quiz per week). Each quiz covers the materials covered in the previous week.

Term Test & Final Exam will both be in person. Term Test will take place during the lecture hours from 9 AM to 12 AM on Monday, May 27, 2024, in Toronto time (EDT). Final Exam will be 3-hours long and will be scheduled by the Faculty of Arts and Science during the final assessment period between June 19-24.

Missed Term Work

For one documented missed weekly quiz, the missing grades will be redistributed among the other weekly quizzes. Because the weekly quizzes are important to the course learning outcomes, **at most one weekly quiz** will be accommodated. For any subsequent missed weekly quizzes, you will receive a grade of 0.

For documented missed Term Test, the missing grades will be redistributed to the Final Exam.

Late Submission

No extension will be given for assignments unless otherwise stated. All late submissions for assignments will receive a grade of 0.

Missed Final Exam

Final exam conflicts and petitions for a deferred exam must be brought to the Faculty of Arts and Science, not your instructor. Information on how to request a deferred exam due to illness or another valid reason is

available at https://www.artsci.utoronto.ca/current/faculty-registrar/petitions/deferred-exams.

Computing

We will use R for simulations. You will learn to interpret simple outputs from R and write short R codes. R is freely available for download at http://cran.r-project.org for Windows, MacOS, and Linux operating systems. We strongly recommend using the University of Toronto JupyterHub https://r.datatools.utoronto.ca/ or RStudio Desktop https://www.rstudio.com/products/rstudio/.

Communication Policy

Please contact the teaching team at sta237@utoronto.ca for administrative inquiries including deadline extensions. Emails sent from addresses other than *utoronto.ca* address will be ignored.

For questions on course materials, we encourage students to attend office hours and Wednesday tutorials. Piazza for this course is also available here: https://piazza.com/utoronto.ca/summer2024/sta237h1.

Academic Integrity

The University of Toronto treats cases of academic misconduct very seriously. Academic integrity is a fundamental value of learning and scholarship at the university. Participating honestly, respectfully, responsibly, and fairly in this academic community ensures that your degree is valued and respected as a true signifier of your individual academic achievement.

The University of Toronto's Code of Behaviour on Academic Matters https://governingcouncil.utoronto.ca/secretariat/policies/code-behaviour-academic-matters-july-1-2019 outlines the behaviours that constitute academic misconduct, the processes for addressing academic offences, and the penalties that may be imposed. You are expected to be familiar with the contents of this document.

Specifically for this course, potential offences include, but are not limited to sharing or discussing your questions or answers on Assignments, Quizzes, Term Test or Final Exam with others and obtaining unauthorized assistance on Quizzes, Term Test, or Final Exam from online sources, your peers or tutoring services. You may seek assistance from your peers and the teaching team via Piazza.

All suspected cases of academic dishonesty will be investigated following the procedures outlined in the Code of Behaviour on Academic Matters. If you have any questions about what is or is not permitted in this course, please do not hesitate to contact the teaching team.

Regrading Policy

For quizzes and midterm, please fill out the *STA237 2024 Summer Regrading Request Form* no later than 1 week after receiving the grades at https://forms.office.com/r/BueUDB0L9W for each question. Any regrading requests made later or not using the form will be ignored without a notice. The course instructor may ask for a one-to-one meeting if more details are required. Keep in mind that it is possible for your assessment grade to go down if the regraded mark is lower.

Exceptions

If you face exceptional circumstances including medical, personal, family, or other unavoidable reasons, please contact the teaching team within 48 hours following the assessment deadline with the Declaration of Absence form on ACORN completed and attached. If you do not contact the teaching team within 48 hours after the deadline, you will receive a 0 grade for the assessment and any further communications regarding the assessment may be ignored. If you are experiencing exceptional circumstances that will affect your performance in the course in the long term, it is your responsibility to contact your college registrar and the teaching team as early as possible.

Religious Accommodations

As a student at the University of Toronto, you are part of a diverse community that welcomes and includes students and faculty from a wide range of cultural and religious traditions. If you anticipate being absent from class or missing a major course activity due to a religious observance, please let me know as early in the course as possible, and with sufficient notice (at least two weeks), so that we can work together to make alternate arrangements.

Accommodations for Disability

Students with diverse learning styles and needs are welcome in this course. In particular, if you have a disability/health consideration that may require accommodations, please feel free to approach the course instructor and/or Accessibility Services at (416) 978 8060; `https://studentlife.utoronto.ca/as`.

Intellectual Property Statement

Course material - including but not limited to lecture slides, assignments, test questions, and other supplementary course material available on Quercus - is the intellectual property of the teaching team and is made available to you for your personal use in this course. Sharing, posting, selling, or using this material outside of your personal use in this course is **not** permitted under any circumstances and is considered an infringement of intellectual property rights.

Course Schedule

Below is a tentative lecture schedule and weekly quizzes coverage by topic. The details may change during the term.

Date	**Topic**	**Corresponding Quiz**
May 6, 2023 (M)	Outcomes, Events, and Probability	Quiz 1
May 8, 2023 (W)	Conditional Probability and Independence	
May 13, 2023 (M)	Discrete Random Variables	Quiz 2
May 15, 2023 (W)	Continuous Random Variables	
May 22, 2023 (W)	Expectation and Variance	Quiz 3
May 27, 2023 (M)	*Term Test*	
May 29, 2023 (W)	Variable Transformation	Quiz 4
May 3, 2023 (M)	Joint Distribution	
June 5, 2023 (W)	Covariance and Correlation	Quiz 5
June 10, 2023 (M)	Law of Large Numbers	
June 12, 2023 (W)	Central Limit Theorem	Exam
June 17, 2023 (M)	Hypothesis Testing	