STA237H1-F LEC0101
Probability, Statistics and Data Analysis I, Summer 2023

Lecture:
M & W 09 AM to 12 PM | BA 1160
Tutorials:
M & W 12 PM to 01 PM
BA 2165 (TUT0101) | BA 2195 (TUT0102)
BA 1230 (TUT0103) | BA 1240 (TUT0104)

Course Instructor:
Michael J. Moon (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 BA 1160, Bahen Centre. 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	Available From	Due	Weight
	Homework (40%)		
Syllabus Scavenger Hunt	May 8, 2023	May 14, 2023	3%
Activity 1	May 10, 2023	May 14, 2023	5%
Activity 2	May 17, 2023	May 21, 2023	8%
Activity 3	May 31, 2023	June 4, 2023	8%
Activity 4	June 7, 2023	June 11, 2023	8%
Activity 5	June 14, 2023	June 18, 2023	8%
	Tests (60%)		
Term Test	May 24, 2023		20%
Final Exam	TBD		40%

All dates listed are in Toronto time (EDT).

Syllabus Scavenger Hunt will be available on Quercus during the first week of the class. It will be a timed quiz on Quercus based on this syllabus. You will have unlimited number of trials for the quiz and the latest trial will be used for your grade. Please ensure you have a clear understanding of this syllabus for the quiz.

Weekly Activities will become available on Wednesdays and cover materials up to the Wednesday's lecture. All Weekly Activities will be completed in groups of no more than 4 members and submitted by midnight on the due dates listed above. Sample solutions will be shared during tutorials on Mondays.

Term Test & Final Exam will both be in person. Term Test will take place during the lecture hours from 9 AM to 11 AM on Wednesday, May 24, 2023, 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 in June.

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 use Piazza. You can find our class signup link at: `https://piazza.com/utoronto.ca/summer2023/STA237H1FLEC0101`.

If you decide not to use Piazza, it will not disadvantage you in any way, and will not affect official University outcomes. If you choose not to opt-into Piazza then you can ask questions or discuss course materials with the teaching team during office hours and tutorials.

Be sure to read Piazz's Privacy Policy at `https://piazza.com/legal/privacy` and Terms of Use at `https://piazza.com/legal/terms` carefully. Take time to understand and be comfortable with what they say. They provide permissions for substantial sharing and disclosure of your personal information held by Piazza, which affect your privacy. If you decide to participate in Piazza, only provide content that you are comfortable sharing under the terms of the Privacy Policy and Terms of Use.

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 Weekly Activities with anyone other than your group members, sharing or discussing your questions or answers on Term Test or Final Exam with others and obtaining unauthorized assistance on Weekly Activities, 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

There will be no regrading for Syllabus Scavenger Hunt and Weekly Activities. For Term Test, please fill out the *STA237 2023 Summer Regrading Request Form* no later than 1 week after receiving the grades at `https://forms.office.com/r/FndrrjrNeb` 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.

Extension, Late Submission, and Missed Work

No extension will be given for Syllabus Scavenger Hunt and Weekly Activities. All late submissions for Syllabus Scavenger Hunt and Weekly Activities will receive a grade of 0. 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`.

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.

For documented missed Syllabus Scavenger Hunt, the missing grades will be replaced by Weekly Activity 1 grades. For one documented missed Weekly Activity, the missing grades will be redistributed among the other Weekly Activities. Because the Weekly Activities are important to the course learning outcomes, **at most one Weekly Activity** will be accommodated. For any subsequent missed Weekly Activities, you will receive a grade of 0.

For documented missed Term Test, the missing grades will be redistributed among Final Exam and a make-up assignment. The make-up assignment will be available online between 10 AM and 10 PM, June 2, 2023 in Toronto time (EDT). You will have 3 hours to complete and upload your make-up assignment. If you miss the make-up assignment, you will receive a grade of 0 for Term Test. If you complete the make-up assignment, it will be worth 10% of your total grade and Final Exam will be worth 50% of your total grade.

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 activity coverage by topic. The details may change during the term.

Date	Topic	Weekly Activity
May 8, 2023 (M)	Outcomes, Events, and Probability	Activity 1
May 10, 2023 (W)	Conditional Probability and Independence	
May 15, 2023 (M)	Discrete Random Variables	Activity 2
May 17, 2023 (W)	Continuous Random Variables	
May 24, 2023 (W)	*Term Test*	
May 29, 2023 (M)	Expectation and Variance	Activity 3
May 31, 2023 (W)	Variable Transformation	
June 5, 2023 (M)	Joint Distribution	Activity 4
June 7, 2023 (W)	Covariance and Correlation	
June 12, 2023 (M)	Computation with Random Variables	Activity 5
June 14, 2023 (W)	Law of Large Numbers	
June 19, 2023 (M)	Central Limit Theorem	