STA247H1 F LEC0101 – Probability with Computer Applications
Summer 2019

Instructor: Michaël Lalancette (michael.lalancette@mail.utoronto.ca)

TA's: Ying Zhou, Emad Zadegan

Office hours: To be determined during the first lecture.

Lectures: Tuesday & Thursday, 9:10am - 12pm, room LM 161

Course description: Introduction to the theory of probability, with emphasis on applications in computer science. The topics covered include the axioms of probability, counting and sets, random variables, discrete and continuous probability distributions, expectation and variance, independence, conditional probability, normal, exponential, binomial, and Poisson distributions, the central limit theorem, sampling distributions. If time allows it, we may discuss random number generation and/or Monte Carlo sampling as bonus material.

Course material: My lecture slides, the assignments and any relevant course material will be posted to Quercus. The lecture slides by themselves are not complete lecture notes. Most mathematical developments will be done on the board. Remember that everything provided on Quercus is for the use of students currently enrolled in this course only. Providing course materials to anyone outside of the course is unauthorized use.

Book: The book on which the course is based is "Introduction to Probability and its Applications" (3rd edition), by Scheaffer and Young. Suggested problems from this book will be posted weekly on Quercus.

Computing: There may be computing demonstrations during lectures. I will use the programming language R, which can be downloaded for free here. There may (or may not) be a few computing exercises in the assignments. These should be solved using R. Please ask the instructor' permission if you wish to use another programming language in your assignments.

Prerequisites: (MAT135H1,MAT136H1)/MAT137Y1/MAT157Y1, CSC108H1/CSC148H1
Exclusions: ECO227Y1/STA255H1/STA257H1

Grading scheme:

Quizzes (4)	Available at the end of each week, from week 2 to week 5	$4 \times 1.25\% = 5\%$
Assignments (2)	Due dates: May 17 and June 7, 11:59pm	$2 \times 7.5\% = 15\%$
Midterm test	May 28, 10:10am - 12pm	35%
Final exam	Date to be determined	45%

Weekly quizzes: These will be available at the end of each week (Friday or Saturday), and will be done directly through Quercus. You have one week to solve the quizzes, and can attempt them an unlimited number of times. Only your highest mark on each of the 5 quizzes will be recorded. A quiz that has not been attempted at the end of its due date will receive the mark 0.

Late assignment policy: The two assignments will be submitted through Crowdmark directly. The

penalty for late assignments will be 5% for every *hour* after the due date. For example, an assignment submitted n hours and 15 minutes late will receive a penalty of $(n+1)\times$ 5%. If you require an extension for an assignment with valid reasons and documentation, please notify me prior to the due date to have something arranged.

A word on the marking policy: Any answers on assignments, midterm and final exam without justification and showing your work will not receive any credit, regardless of the correctness of the answer. If after reviewing posted marking schemes you believe you have earned more credit than what was awarded, send me an email with a brief explanation no later than 1 week after the assessments have been released back to you.

Missed test: There will be no make-up test. Any missed test that is a result of illness requires a U of T Student Medical Certificate to be completed by you and your doctor within one week of the test (found here). Midterm tests that are missed for a *valid* reason will have their weight shifted to the final exam.

Accessibility services: The University of Toronto provides accommodations through accessibility services to students with diverse learning styles and needs. If you have a disability or health consideration that may require accommodations, please feel free to reach out to me and/or Accessibility Services at 416-978-8060 or through email accessibility.services@utoronto.ca. You can find out more information here.

Some important dates: First lecture: May 7
Last day to drop the course: June 4
Last lecture: June 13
Final exams period : June 19 - 26

Academic integrity: Participating honestly, respectfully, responsibly, and fairly in this academic community ensures that the U of T 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 the University of Torontos Code of Behaviour on Academic Matter, found here. The University of Toronto treats cases of academic misconduct very seriously. All suspected cases of academic dishonesty will be investigated following the procedures outlined in the Code. The consequences for academic misconduct can be severe, including a failure in the course and a notation on your transcript. If you have any questions about what is or is not permitted in this course, please do not hesitate to contact the instructor. If you are experiencing personal challenges that are having an impact on your academic work, please speak to the instructor or seek the advice of your college registrar.

Communication with the instructor: All questions about course material, the practice questions, the assignments, the exams or the schedule of the class/office hours should be posted on the course forum on Quercus (in the "Discussions" section). Emails to the instructor should only be about questions of a more private matter (e.g. missed test, request of an extension, ...).

Tentative schedule: The following is a rough plan. We will probably go slower or faster than expected and deviate from it.

Week	Topics
1: May 7 - 9	Introduction, Axioms, Sets and events, Independence, Counting.
2: May 14 - 16	Conditional probability, Bayes' theorem, Random variables (RV), Discrete RV's.
3: May 21 - 23	Discrete distributions, Continuous RV's, Continuous distributions.
4: May 28 - 30	**Midterm**, Distributions, Moment generating functions.
5: June 4 - 6	Bivariate distributions (discrete and continuous).
6: June 11 - 13	Transformations of RV's, Sampling, Central limit theorem, Bonus material.