Probability and Statistics I
University of Toronto
Department of Statistical Sciences
STA257H1S Summer 2022

LEC 0101

Instructor:	Madhu Gunasingam
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Class Day/Time:	MW 6PM–9PM (BA1160)
Tutorial Day/Time:	MW 5PM–6PM (BA2165 and BA2195)
Office hours:	MW 9PM-10PM (BA1160)

COURSE OVERVIEW

A mathematically rigorous introduction to probability, with applications chosen to introduce concepts of statistical inference. Probability and expectation, discrete and continuous random variables and vectors, distribution and density functions, the law of large numbers. The binomial, geometric, Poisson, and normal distributions. The Central Limit Theorem. (Note: STA257H1 does not count as a distribution requirement course).

Prerequisites: The prerequisites are: (MAT135H1 (70%), MAT136H1(70%))/MAT137Y1/MAT157Y1 (MAT137Y1/MAT157Y1 is strongly recommended) /MATA36H3(70%)/ MATA37H3/MAT135Y5(70%) /MAT137Y5/MAT157Y5

Corequisite: MAT235Y1/MAT237Y1/MAT257Y1 (MAT237Y1/MAT257Y1 is strongly recommended) /MATB41H3/MAT232H5/ MAT233H5; MAT223H1/ MAT240H1/MATA23H3/MAT223H5/MAT240H5

Exclusion: ECO227Y1, STA237H1, STA247H1, MAT377H1, STAB52H3, STA256H5, ECO227Y5 Prerequisites are **strictly enforced by the department, not the instructor.** If you do not have the equivalent pre-requisites, you will be un-enrolled from the course.

COURSE MATERIALS

Course Content: Content, emphasis, etc. of the course is defined by means of the lecture material that is completely contained in the posted lecture notes. Despite this, it is important to attend all lectures, as there is normally no simple way to make up for missed lectures.

Textbook: There is no required course textbook – the course is completely self-contained in the provided lecture notes. However, if you'd like some additional references, the following references you may find useful:

- Sheldon Ross. *A First Course in Probability.* Pearson, 9th ed., 2012.

- Michael J. Evans and Jeffrey S. Rosenthal. *Probability and Statistics: the Science of Uncertainty.* Freeman, 2nd ed., 2010.

COURSE COMPONENTS

Office Hours: The instructor will host office hours Monday and Wednesday, at 9 pm (immediately after the lecture), in the same classroom. I will stay in the classroom after the lecture until there are no more questions, or at most 1 hour after. I will answer the questions in public, but if you have a private question, please send me an email and we will schedule a virtual appointment. TAs will hold office hours

online through Zoom as outlined in the Quercus course page. The office hour schedule will be posted on Quercus. It is recommended that you visit office hours whenever you have a question about the material and/or difficulties in attemping the suggested exercises. It is more important than ever in an accelerated class to have material clarified as quickly as possible. Don't wait until the last minute to ask your questions!

Tutorials: Monday and Wednesday 5-6pm (right before the lecture) hosted in either BA2165 or BA2195. Tutorials begin on the second week of classes and will proceed until the end of the term. Attendence of tutorials is not mandatory with the exception of the dates in which there is a tutorial test. All other tutorials will consist of the TA going over the problems in the course notes and answering any questions or concerns. You may treat this part of the tutorial as a semi-group office hour with your TA.

Piazza: You will have the option to use Piazza for class discussion. If you decide not to use Piazza it will not disadvantage you in any way, and will not affect official University outcomes (e.g., grades and learning opportunities). If you choose not to opt-into Piazza then you can ask questions or discuss course material with the instructor or TAs during office hours. Please read Piazza's Privacy Policy and Terms of Service, taking time to understand and be comfortable with them. They provide for substantial sharing and disclosure of your personal information held by Piazza, which affects 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 Service. The Piazza system is highly catered to getting you help quickly and efficiently from classmates, the TA, and the lecturers. Rather than emailing questions to the teaching staff, we encourage you to post your questions on Piazza. To sign up for the discussion forum, click on the link: `piazza.com/utoronto.ca/summer2022/sta257h1flec5101`. TAs are assigned to answer questions you have on Piazza. If you post your questions there and don't get a response in three days, please inform me as soon as possible.

EVALUATION BREAKDOWN

All students will be evaluated in the following way:

Assessment	Marks (%)
Tutorial Tests (3×10)	30%
Midterm Exam	30%
Final Examination	40%

EVALUATION BREAKDOWN

Tutorial Tests: There will be 3 tutorial tests, each worth 10% of the overall grade.

- Each of the three tutorial tests are 50 minutes long and consists of problems closely related, perhaps even identical, to those in the course notes.The tutorial tests will be cover material from the previous set of lectures excluding the lecture immediately preceding the given test.

- The tests will be written at your assigned tutorial at the given dates in the course schedule.

Midterm Examination: The midterm examination is 170 minutes hours long and will be hosted in lieu of the lecture on May 30th. The midterm examination will be based on the contents of the first six lectures and will consist of problems closely related, perhaps even identical, to those in the course notes.

Final Examination: The final exam will cover everything taught in the course, date and time will be determine by the Faculty of Arts and Science and will be announced later.

RE-GRADING POLICY
Any requests to have your work remarked must contain a detailed written justification. Remarking requests should be emailed to the instructor within one week of receiving your mark, otherwise, they won't be processed. Note that adjustments in marks could equally result in a lowering or raising of the mark. When appealing a re-evaluation decision, the student accepts this condition.

MISSED ASSESSMENT POLICY
Students are responsible for completing all of the assessments detailed in the previous section. If a student is sick and needs to request an extension or accommodation on a mini project, they must send an email to their instructor. In order for the request to be considered, the email:

- must include the course code in the subject line;

- must include your full name and student number;

- must specify for which test the accommodation is being requested;

- must include the following sentences:

    - "I affirm that I am experiencing an illness or personal emergency and I understand that to falsely claim so is an offence under the Code of Behaviour on Academic Matters."
    - "I understand that the weight of this assessment will be moved to the final exam"

COMMUNICATION

Please do not email the instructor with questions related to the content of the course. These types of questions are much easier to answer through the Piazza discussion board or during office hours. Emails that do not contain sensitive or personal information will be directed to post the questions on the discussion board. If you need to email the instructor for personal reasons, please use your official University of Toronto email address, include STA257 in the subject and also include your full name and UTORid in the body of the email (in case we need to look anything up).

INTELLECTUAL PROPERTY

Course materials provided on Quercus, such as lecture slides, assignments, tests and solutions are the intellectual property of your instructor and are for the use of students currently enrolled in this course only. **Providing course materials to any person or company outside of the course is unauthorized use**. This includes providing materials to predatory tutoring companies.

ACADEMIC INTEGRITY

The University treats cases of plagiarism and cheating very seriously. It is the students' responsibility for knowing the content of the University of Toronto's Code of Behaviour on Academic Matters. All suspected cases of academic dishonesty will be investigated following procedures outlined in the above document. If you have questions or concerns about what constitutes appropriate academic behaviour or appropriate research and citation methods, you are expected to seek out additional information on academic integrity from your instructor or from other institutional resources (see http://academicintegrity.utoronto.ca/).

ACCESSIBILITY NEEDS

The University of Toronto 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: accessibility.services@utoronto.ca or http://accessibility.utoronto.ca.

CLASS SCHEDULE – TENTATIVE

This is the tentative outline for Spring 2022. Topics may be reduced or additional topics may be added by course instructor's discretion.

Lecture	Content
1 (May 9)	Combinatorics.
2 (May 11)	Axioms of Probability.
3 (May 16)	Conditional Probability and Independence I
4 (May 18) Tutorial Test 1	Conditional Probability and Independence II
5 (May 23)	Victoria Day: No class.
6 (May 25)	Discrete Distributions
7 (May 30)	**Midterm Examination**
8 (June 1)	Continuous Distributions
9 (June 6)	Joint Distributions I
10 (June 8) Tutorial Test 2	Joint Distributions II
11 (June 13)	Conditional Distributions
12 (June 15)	Limit Theorems
13 (June 20) Tutorial Test 3	Additional Topics