

STA 257H1 F - PROBABILITY AND STATISTICS I
 Summer 2016 (May 9 to June 24)

Lectures: Mondays and Wednesdays 7-10pm in **MP 203**
Instructor: Dr. Shivon Sue-Chee (**E-mail:** shivon.sue.chee@utoronto.ca)
Office hours: Mondays and Wednesdays 5-6pm in **SS 6026**

Course website: Available through <https://portal.utoronto.ca> (UT Blackboard)

Teaching Assistants: Zihao, Xuechen, Xing
Office hours: In **SS 6026**; days and times are to be announced (TBA)

Tutorials: Students are assigned to a tutorial section according to last name.
 Each section meets on Mondays and Wednesdays 6-7pm at the specific location, listed in the table below, with their respective Teaching Assistant (TA).

Section	1	2	3
Last name	A-K	L-S	T-Z
Room	BA B024	BA 2145	BA 2195
TA	Xing	Zihao	Xuechen

Course description

This course and its sequel, STA 261H1, are mathematically quite challenging. The target audience includes anyone proceeding directly to a Specialist Degree in Statistics, as well as anyone with serious and special interest in some other of the identifiably statistical-physical sciences. Topics, although very rigorously covered, are nevertheless very standard introductory ones: abstract probability and expectation, discrete and continuous random variables and vectors, with special mathematics of distribution and density functions. These topics are realized in the special examples of ordinary statistic practice: the Binomial, Poisson and Geometric group, and the Gaussian(Normal), Gamma and Chi-square complex.

Pre-requisite

MAT135H1 and MAT136H1 (with a minimum grade of 70% in MAT136H1) or MAT137Y1 or MAT157Y1 (MAT137Y1 or MAT157Y1 is **strongly recommended**)

Co-requisite

MAT235Y1 or MAT237Y1 or MAT257Y1 (MAT237Y1 or MAT257Y1 is **strongly recommended**), MAT223H1 or MAT240H1

Required Textbook

Mathematical Statistics and Data Analysis, 3rd edition by John Rice (Brooks / Cole)
 Answers to selected problems are included in the text's Appendix.

Evaluation

	Weight	Date	Time	Location
Tutorial quizzes	15%	May 11- June 15	(10 mins)	In tutorials
Term Test	35%*	Monday, May 30	6:10-7:40pm	TBA
Final Exam	50%*	Between June 20-24	(3 hrs)	TBA

*If your final exam mark is better than your term test mark, then the exam weight will be 65% and the term test weight will be 20%. A few opportunities for course bonus points, such as web surveys and class attendance, will be given throughout the course.

Tutorial exercises and quizzes

Tutorials begin on May 11. Tutorials meet twice weekly, every Monday and Wednesday 6-7pm. Tutorial sections will be posted in this course outline or the course website prior to May 11. Tutorials are designed to discuss assigned textbook exercises (posted at the course website or the course notes) and any other relevant questions students may have. Also, short quizzes (about 10 minutes in duration) on the preceding class material will be given, beginning May 11 to June 13.

There will be a total of 6 quizzes, of which the best 5 quizzes will count towards your tutorial grade. If a tutorial is missed for any reason, there will be no 'make-up' quiz. A missed quiz may count as a dropped quiz. If you have any concerns about your tutorial such as late enrolment, illness, quiz regrade or your overall tutorial grade, please discuss the matter with your TA. TAs have full responsibility for their respective tutorial group.

Test and Exam Policy

Non-programmable calculators are permitted on the test and exam. A one-sided, handwritten 8-1/2" x 11" aid sheet is allowed in the test (two-sided on the final exam). You must bring your student identification to the term test as well as the final exam.

If the midterm test is missed for a valid reason, you must submit appropriate documentation within one week of the test. If documentation is not received in time, your test mark will be zero. If the test is missed for a valid reason, its weight will be shifted to the final exam (that is, your final exam would account for 85% of your overall grade). Requests for test remarking must be submitted at the time the test is returned back to you. The request must contain a justification and will only be considered for tests which were written in ink.

Where to get help?

Your primary source of help with difficulties is your TA in the scheduled tutorial, but additional assistance can be obtained at the Statistics Aid Centre, Room 1091, in Sidney Smith Hall from Tuesday, May 10. Your own TA will be on duty about two hours per week on average, but you may drop in on any of the TAs for our course. Schedules will be posted at the course web site.

Computing

This course requires some basic statistical computing. We will use the R computing package for all examples and provide sample code that would be sufficient for you to complete homeworks. Additional help with R will be provided during lectures, and during TA and instructor office hours. In general, R is optional but highly recommended. If you wish to use R through UofT or on campus, go to <http://www.cquest.utoronto.ca> to find out.

Course website

The course website is available through portal and will be regularly updated with lecture notes, practice problems, and readings. Blackboard will also be used for announcements and your grades. The discussion board will be available via Blackboard for short course-related questions. The instructor will moderate the discussion and will respond to questions within one business day.

Communication

In general, instructor and teaching assistants are not able to answer questions about the course material by e-mail. Students are encouraged to attend lectures and instructor and/or TA office hours.

E-mail is appropriate for personal matters. Use your utoronto.ca or mail.utoronto.ca account and write a proper email including the addressee, your name and student number. A reply will generally be given e-mail within two business days.

Accessibility Needs

The University of Toronto is committed to accessibility. If you require accommodations for a disability, or have any accessibility concerns about the course, the classroom, or course materials, please contact Accessibility Services as soon as possible at accessibility.services@utoronto.ca or <http://www.accessibility.utoronto.ca>.

Academic Integrity

You are responsible for knowing the content of the University of Toronto's Code of Behaviour on Academic Matters at <http://www.artsci.utoronto.ca/osai/students>. If you have any questions about what is or is not permitted in this course, please do not hesitate to contact me.

Your responsibility

The classroom sessions for this class are designed to actively engage you in the course material. I hope you'll find them interesting, challenging, and fun, and an excellent opportunity to truly learn the material. In order for these sessions to be effective, coming prepared, by learning about the week's concepts through the textbook, is essential.

Tentative Lecture Schedule

Week of	Topics	Text Chp.
May 9	Introduction to probability: sample space, probability measure, set notation, Venn diagrams, probability models. Basic combinatorics. Rules of probability. Conditional probability. Law of total probability. Bayes' rule. Independence.	1
May 16	Random variables (univariate). Discrete distributions: Bernoulli, Binomial, Geometric, Negative binomial, Hypergeometric, and Poisson distributions. The cumulative distribution function (cdf). Continuous distributions: Uniform, Exponential, Gamma, Beta, and Normal distributions. The density function. Poisson processes.	2
May 25	Expectation. Variance. Moment generating functions.	4
May 30	TERM TEST on May 9 to 25 materials. Functions of random variables. Indicator functions. Order statistics. Conditional probability. Joint distribution. Marginal density. More on independence of random variables. Conditional densities. Covariance. Correlation. Conditional expectation.	2-4
June 6	Markov's and Chebyshev's inequalities. Law of large numbers (LLN). Convolution. Cauchy distribution. Jacobian transformation. More on order statistics.	3-5
June 13	Convergence in distribution. Central Limit Theorem (CLT). Different types of convergence. Multivariate Normal distribution. Chi-square distribution. F and t distributions. Review for final exam.	5-6
June 20-24	FINAL EXAM (cumulative)	