MTHE/STAT 353 - Probability II

Winter 2021

Instructor:	Glen Takahara - Jeffery Hall 407 Email: takahara@queensu.ca
Course Web Site:	https://www.mast.queensu.ca/~stat353 **All lectures, assignments, solutions, important announcements and resources will be posted here.**
Lectures:	For the Winter 2021 term the course will be offered remotely. Lectures will be delivered asynchronously and will be posted to the course web site (see previous item) as videos (streaming) and as lecture notes (.pdf format) on a weekly basis.
Online Resources:	The main online portal to the course is the course web site (see above). The course will use **crowdmark** for submission of homework assignments and **zoom** to conduct office hours and scheduled meetings. Instructions on the use of crowdmark and zoom will be posted to the course web page. There is also an **onQ** page for the course (link here) which has a discussion forum for the course.
Office Hours:	Mondays, 10:30-11:30 via zoom
Text (recommended):	*Fundamentals of Probability with Stochastic Processes, 4th Ed.* by Saeed Ghahramani, Chapman Hall/CRC, 2018.
Assignments:	There will be 9 homework assignments. These will be posted on the class web site, on the assignments page. Assignment 1 is due on Friday, Jan. 29. Solutions to the assignments will be posted on the course web page. Solutions are to be submitted to crowdmark.
Grading:	30% homeworks, 20% midterm exam, 50% final exam.
Midterm and Final	The midterm is scheduled for Friday, Feb. 26, 8:30-9:30. The final exam will be scheduled by the exams office. Tentatively, the midterm exam and the final exam will be administered through **onQ** and use **Proctortrack**, and you will submit your solutions to **crowdmark**.
Prerequisites:	STAT 269 or 351; MATH 110 or 111 or 112; MATH 281.

Proctortrack: The midterm and final exams in this course will use remote proctoring provided by a third-party, cloud-based service that enables the completion of a proctored exam or test from an off-campus location, through onQ. This online proctoring solution was chosen as part of the approach to maintaining academic integrity in online assessment. Precise details about how remote proctoring will be used in this course will be provided by the instructor. When writing exams using remote proctoring, you are connecting to the third-party service. Queens has conducted a privacy and security review of the service in accordance with Ontarios privacy legislation. You should also

take measures yourself to protect your information by keeping your NetID password and challenge questions private, closing all applications prior to starting an exam, and ensuring your device is updated and safeguarded against malware. For more information about remote proctoring, see the registrar's page on remote proctoring.

Copyright: Course materials created by the course instructor, including all slides, presentations, synchronous and asynchronous course recordings, handouts, tests, exams, and other similar course materials, are the intellectual property of the instructor. It is a departure from academic integrity to distribute, publicly post, sell or otherwise disseminate an instructors course materials or to provide an instructors course materials to anyone else for distribution, posting, sale or other means of dissemination, without the instructors express consent. A student who engages in such conduct may be subject to penalty for a departure from academic integrity and may also face adverse legal consequences for infringement of intellectual property rights and, with respect to recordings, potentially privacy violations of other students.

Academic Integrity: Information on policies concerning academic integrity is available in the Queens University Code of Conduct, in the Senate Academic Integrity Policy Statement, on the Faculty of Engineering and Applied Science website, and from your instructor. Departures from academic integrity include plagiarism, use of unauthorized materials or services, facilitation, forgery, falsification, unauthorized use of intellectual property, and collaboration, and are antithetical to the development of an academic community at Queens. Given the seriousness of these matters, actions which contravene the regulation on academic integrity carry sanctions that can range from a warning or the loss of grades on an assignment to the failure of a course to a requirement to withdraw from the University. In the case of online exams, impersonating another student, copying from another student, making information available to another student about the exam questions or possible answers, communicating with another person during an exam or about an exam during the exam window, or accessing unauthorized materials, including smart devices, are actions in contravention of academic integrity.

Course Outline

- *Multiple Random Variables*: multivariate distributions; joint probability, density, and distribution functions; marginal distributions; independent random variables; order statistics; multinomial distribution; transformations of n random variables; beta, gamma, χ^2, t and F distributions (Chapter 9 of text and lectures).
- *Expectations Involving Multiple Random Variables*: expectation of a sum of random variables; covariance and correlation; calculating expectations by conditioning; multivariate normal distributions (Chapter 10 of text and lectures).
- *Limit Theorems*: moment generating functions; sums of independent random variables; markov and chebyshev inequalities; modes of convergence; laws of large numbers; chernoff bounds; central limit theorem (Chapter 11 of text and lectures).