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University of Manitoba

Department of Statistics

STAT 3400 – Introduction to Probability II

Winter Term 2020

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Course Details

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Course Number & Title:	STAT 3400, Introduction to Probability II
Section & CRN:	Section A01, CRN: 51417
Course Schedule:	Monday/Wednesday/Friday, 9:30 to 10:30 a.m. (Slot 2), in 205 Armes.
Lab Schedule:	Monday, 2:30 to 4:00 p.m, in 223 Wallace.
Prerequisites:	STAT 2400 (C), and co-requisite of MATH 2150 or MATH 2720.

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Instructor Contact Information

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Instructor:	Alexandre Leblanc
Office Location:	367 Machray Hall
Phone:	(204) 474-6273
Email:	Alex.Leblanc@umanitoba.ca
Office Hours:	Tuesday, from 9:30 to 11:00 a.m., Friday 10:30 a.m. to 12:00 p.m. (noon), or by appointment.

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General Goals for this Course

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Building on the skills you should have mastered in STAT 2400 (Introduction to Probability I), this course is meant to complete your basic training in probability theory. As such, some goals for the course are to help you further develop

- general skills related to the understanding and writing of basic mathematical proofs,

- analytical skills related to problem solving,

and, study fundamental concepts linked to continuous random variables and the more advanced concepts associated with bivariate and conditional distributions.

In this course, you will have the opportunity to expand your intuition and understanding of probabilistic ideas and develop solid skills in multivariable calculus (which will be essential to your success). The course is demanding and your success will depend heavily on your hard work and ability to solve many practice problems yourself. For instance, getting the solutions from your friends (rather than doing the problems yourself), learning the course notes by heart and cramming for exams are typically not very successful strategies. Remember that, most of the times, the work you do to get to a solution (including all the mistakes made along the way) is more important than the solution itself: you will learn more from the work and research you do to get to the answer than from copying down a solution found online or in some textbook!

Textbook and Other Materials

Textbook: The course will be based on

- Weiss, N.A. (2006), A course in Probability, Pearson.

A copy of the textbook will be available on four-hour reserve at the Science Library.

Lecture notes: Lecture notes and other materials (e.g. practice problems, sample tests and exams, solutions) will be posted on the UM Learn system regularly.

Other references: The following are other useful references that will also be available on reserve at the Science Library.

- Ross, S.M. (2006), A First Course in Probability,
- Ghahramani, S. (2005), Fundamentals of Probability with Stochastic Processes,
- Roussas, G. (2007), Introduction to Probability.

Supplementary Problems and Labs

Suppl. Problems: There are no assignments to be handed in for credit in this course. However, different lists of supplementary problems will be provided to the students. Each test/exam will ask for at least two problems taken from those lists, in original or slightly modified form. In the past, the number of problems taken from the lists has often been closer to five or six on each test/exam.

Labs: There is a ninety-minute lab every week. Attendance is not obligatory, but is very strongly suggested. Note, however, that the two tests will take place during the lab (see below). Also, the first lab will be replaced by a lecture. (See Important Dates on p. 4.)

During labs, the teaching assistant will generally be solving selected problems (taken from the list of supplementary problems) and answering other questions that you might have.

Tests and Exam

Midterm Tests: There will be two 90-minute tests, currently scheduled for Monday, February 3 and Monday, March 9, between 2:30 and 4 pm (i.e. during the lab).

Make-up tests will not be scheduled. Should you miss a test, you will be assigned a mark of zero unless you:

1. provide a valid excuse with acceptable documentation,
2. notify me within 48 hours of the scheduled test (phone or email is fine).

The other test and the final exam would then respectively count for 25% and 75% of your final mark for the course.

Should you miss both tests and

1. provide a valid excuse with acceptable documentation for both tests,
2. notify me within 48 hours of missing each test,

the final exam would then count for 100% of your final mark.

Final Exam: The Final Exam will be held on a date to be selected later by the Registrar's office and will be 3 hours in duration. The exam will be scheduled during the University-wide examination period starting on April 11.

Grading timeline: Under normal circumstances, test results should be available within two weeks of the test being written.

Course Evaluation and Grading Scheme

Final Mark: The final mark for the course will be obtained from the following rule.

Midterm Tests (2)	50%	(30% better test – 20% other)
Final Exam	50%	

Letter Grade: I normally follow the following cutoffs when assigning letter grades:

Letter Grade	Mark out of 100
A+	90-100
A	80-90
B+	75-80
B	70-75
C+	65-70
C	60-65
D	50-60
F	below 50

However, I might elect to use lower thresholds for some letter grades if I think they are more appropriate. I will not use higher thresholds.

Outline of Covered Topics and Approximate Timeline

Chapter and Title	Approx. Duration (in weeks)
1. Continuous Random Variables and their Distributions – Continuous random variables, cdf, pdf – Important families of distributions – Functions of a continuous random variable	3.5
2. Jointly Continuous Random Variables – Joint and marginal cdf and pdf – Conditional distributions and independence – Functions of many continuous random variables – Bivariate transformations	4.5
3. Expected Values of Continuous Random Variables – Basic properties: mean, variance and covariance – Conditional expectation – Laws of total expectation and variance – Moment generating functions	4

Technology in the Classroom

It is the general University of Manitoba policy that all technology resources are to be used in a responsible, efficient, ethical and legal manner. Students should restrict their use of technology to those approved by the instructor *for educational purposes only.* Electronic messaging, email, social networking, gaming, etc. should be avoided during class time. Cell phones should be turned off. If a student is on call for emergencies, their cell phone should be on vibrate mode and the student should leave the classroom before using it.

Important Dates

The following dates are important to how the course will progress throughout the term.

Date	Information
Jan 6	First lecture
	No Lab – two lectures
Jan 13	First Lab
Jan 17	Course Drop Date – last date to drop a course with no penalty
Jan 20	Course Add Date – last date to add a course
Feb 3	Tentative date for Test 1 (in lab, 223 Wallace)
Feb 17-21	Spring break - no classes or lab
Mar 9	Tentative date for Test 2 (in lab, 223 Wallace)
Mar 18	Last day to VW courses
Apr 6	Last lecture and lab
Apr 13-25	Final Examination Period

The dates for the midterm tests are tentative (and subject to change at my discretion and/or based on the learning needs of the students). Changes are subject to Section 2.8 of the ROASS Procedure.

Class Communications

The University requires all students to activate an official U of M email account, which should be used for all communications between yourself and the university (including all your instructors). All these email communications should comply with the University's policy on electronic communication with students, which can be found at: `http://umanitoba.ca/admin/governance/governing_documents/community/electronic_communication_with_students_policy.html`

Copyrights

Copyrighted Materials: We will use copyrighted content in this course. I have ensured that the content I use is appropriately acknowledged and is copied in accordance with copyright laws and University guidelines. Copyrighted works, including those created by me, are made available for private study and research and must not be distributed in any format without permission.

Lectures: No audio or video recording of lectures or presentations is allowed in any format, openly or surreptitiously, in whole or in part without my permission.

More details are available online at `http://umanitoba.ca/copyright/`.

Academic Integrity

The value of a degree from the University of Manitoba is dependent on students and faculty strictly upholding values of honesty and academic integrity in all their work. Academic dishonesty devalues the hard work and effort of students who are working honestly to achieve their degrees. For these reasons, it is important that you understand the basics of academic integrity, what constitutes academic dishonesty and what are its very serious consequences. Useful resources (esp. with respect to writing tests and exams) can be found at: `www.umanitoba.ca/student/resource/student_advocacy/academicintegrity/students/a-to-i-what-is-academic-integrity.html`

ROASS Schedule A

Schedule "A" of the *Responsibilities of Academic Staff with regards to Students* (ROASS) policies of the University of Manitoba lists resources and policies for students. It is important that you familiarize yourself with these resources and policies. This document is available from the Department of Statistics web page at: `www.sci.umanitoba.ca/statistics/courses/outlines/`.

This document is dated January 2, 2019.