STAT 2800 Introduction to Probability II (CRN 19996)

Fall Term - 2021

Instructor: Dr. Po Yang
Email: Po.Yang@umanitoba.ca
Office: 334 Machray Hall

Lectures hours: 9:30am-10:20am on Mondays, Wednesdays, and Fridays on Zoom. Lecture videos will be posted on UM Learn system regularly.

Lab schedule: Mondays from 2:30pm to 3:45pm on Zoom.

Virtual office hours: 1:30pm-2:30pm on Wednesdays, or by appointment. Live virtual meetings will be on Zoom.

Course web: All course materials will be posted on UM Learn system regularly.

Calendar description: (Lab Required) Joint and conditional distributions, distributions of functions of random variables, laws of total expectation and variance, moments and generating functions. May not be held with the former STAT 3400 or the former STAT 3500.

Prerequisites: STAT 2400. Pre- or Corequisite: one of MATH 2150, MATH 2151, MATH 2720, MATH 2721, or the former MATH 2750.

Textbook: Weiss, N.A. (2006), *A course in Probability*, Pearson Ed. (Addison-Wesley).

Mark breakdown: Tests - 50% (30% for best, 20% for other)
Final Examination - 50%

- The two 75-minute tests are tentatively scheduled for Monday, October 18 and Monday, November 15, during the lab times. The graded tests will be returned to students within one week after the tests.

- The final exam will be held on a date to be determined later by the Registrar's office and will be three hours in duration.

- If you miss a test, you will be assigned a mark of zero, unless reasons and acceptable evidence are provided. If you miss a test for an acceptable evidence, your final exam will be worth 75%. Make-up tests will not be scheduled.

- The exams will be online (on Crowdmark). A calculator might be necessary. During the exams, you are only allowed to see the instructor's lecture notes, lab notes, textbook, and your assignments solutions. No other resources (including online resources), are allowed.

- Students will be expected to submit pdf and/or picture files to Crowdmark during exams. It is your responsibility to ensure that your submissions are readable. It is also your responsibility to make sure that your solutions are submitted to the correct place. Solutions that are submitted in the wrong places will not be marked.

Grade Cut-offs

The following are the minimum percentage grades required to receive each of the various letter grades: A+ (90%), A (80%), B+ (75%), B (70%), C+ (65%), C (60%), D (50%).

Practice problems:

There are no assignments to be handed in for credit in this course. However, lists of practice problems will be provided to the students. *It is very important* to do the practice problems on a regular basis to help you learn the course material and prepare for exams.

Labs:

There is a 75 minute lab every week. Attendance is not obligatory, but is very strongly suggested. During labs, the teaching assistant will generally be solving selected problems (taken from the list of practice problems) and answering other questions that you might have. The labs will be conducted on Zoom.

Important dates:

Date	Information
Sep. 21	Last date to drop without penalty
Sept. 30	no class
Oct. 11	Thanksgiving Day, no class
Oct. 18	**Midterm 1**
Nov. 8-12	Fall term break, no classes
Nov. 15	**Midterm 2**
Nov. 23	Last day to withdraw the course
Dec. 10	Last lecture

Academic Dishonesty:

It is important that you understand what constitutes academic dishonesty and that you are familiar with the very serious consequences. Links to resources that describe academic dishonesty (including plagiarism, cheating, inappropriate collaboration and examination impersonation, as well as typical penalties) can be found at:

http://www.umanitoba.ca/student/resource/student_advocacy/academicintegrity/students/a-to-i-what-is-academic-integrity.html

http://www.umanitoba.ca/student/resource/student_advocacy/academicintegrity/students/student-academic-misconduct-faq.html

Copyrighted Material:

All course notes, videos, practice problems, quizzes, and solutions are the intellectual property of your instructor. Reproduction or distribution of these materials is strictly forbidden without my consent and may be a violation of Canadian copyright law and UM policies.

Class Communication

The University requires all students to activate an official University email account. Please note that all communication between your instructor and you as a student must comply with the Electronic Communication with Students Policy. Please see:

http://umanitoba.ca/admin/governance/governing_documents/community/electronic_communication_with_students_policy.html

You are required to obtain and use your U of M email account for all communication between yourself and the university.

Student Accessibility Services

If you are a student with a disability, please contact SAS for academic accommodation supports and services such as exam accommodations. Students who have, or think they may have, a disability (e.g. mental illness, learning, medical, hearing, injury-related, visual) are invited to contact SAS to arrange a confidential consultation.

http://umanitoba.ca/student/saa/accessibility/

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:

https://www.sci.umanitoba.ca/statistics/wp-content/uploads/sites/4/2019/11/Schedule-A-ROASS-Statistics.pdf

Outline of the covered topics:

1. JOINTLY DISCRESTE RANDOM VARIABLES (Weiss, Chap. 6)

   - Joint and marginal probability mass functions

   - Conditional probability mass functions

   - Independence of discrete random variables

   - Functions of two or more discrete random variables

   - Sum of discrete random variables

2. JOINTLY CONTINUOUS RANDOM VARIABLES (Weiss, Chap. 9)

   - Joint cumulative distribution functions

   - Joint and marginal probability density functions

   - Conditional density functions

   - Independence of continuous random variables

   - Functions of two or more continuous random variables

   - Multivariate transformations

   - F, T, and Chi-square distributions.

3. COVARIANCE AND CORRELATION OF RANDOM VARIABLES (Weiss, Chap. 7 and Chap. 10)

   - Variance, covariance and correlation of random variables

   - Conditional expectation

   - Laws of total expectation and variance

- Bivariate normal distribution

4. GENERATING FUNCTIONS (Weiss, Chap. 7 and Chap. 11)

   - Moment generating functions

   - Joint moment generating functions

   - Transformations using moment generating functions

   - Probability generating functions (If time allows)