STAT 2800 Introduction to Probability II (CRN 59789)

Winter Term - 2024

Instructor: Dr. Nader Nematollahi
                  Email: nader.nematollahi@umanitoba.ca

Lectures hours: 11:30am-12:20am on Mondays, Wednesdays, and Fridays in Armes 201.

Lab schedule: Mondays from 2:30pm to 3:45pm in ISBISTER 235.

Office hours: 10:00am-11:00am on Wednesdays or by appointment.

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: Two Tests - 50% (30% for best, 20% for other)
                      Final Examination - 50%   (covering all course content)

- The two 75-minute tests are tentatively scheduled for Monday, February 12, and Monday, March 11, 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 a valid reason is provided. If you miss a test for an acceptable reason, then your other test will be worth 25% and final exam will be worth 75%. Make-up tests will not be scheduled.

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 prob- lems) and answering other questions that you might have.

Important dates:

Date	Information
Jan. 19	Last date to drop a course without penalty
Jan. 22	Last date to add a course for Winter term
Feb. 12	**Test 1**
Feb. 19-23	Winter term break, no classes
Mar. 11	**Test 2**
Mar. 20	Voluntary Withdrawal (VW) deadline
Mar. 29	Good Friday, no classes
Apr. 10	Last day of classes
Apr. 12-26	Examination and test dates

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/

Copyrighted Material:

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

Recording Class Lectures

Your instructor and the University of Manitoba hold copyright over the course materials, presentations and lectures which form part of this course. No audio or video recording of lectures or presentations is allowed in any format, openly or surreptitiously, in whole or in part without permission. Course materials (both paper and digital) are for the participant's private study and research.

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:

https://umanitoba.ca/student-supports/academic-supports/academic-integrity

Outline of the covered topics:

1. JOINTLY DISCRESTE RANDOM VARIABLES (Weiss, Chapter 6)
   a. Joint and marginal probability mass functions
   b. Conditional probability mass functions
   c. Independence of discrete random variables
   d. Functions of two or more discrete random variables
   e. Sum of discrete random variables

2. JOINTLY CONTINUOUS RANDOM VARIABLES (Weiss, Chapter 9)
   a. Joint cumulative distribution functions
   b. Joint and marginal probability density functions
   c. Conditional density functions
   d. Independence of continuous random variables
   e. Functions of two or more continuous random variables
   f. Multivariate transformations
   g. F, T, and Chi-square distributions.

3. COVARIANCE AND CORRELATION OF RANDOM VARIABLES (Weiss, Chapter 7 and Chapter 10)
   a. Variance, covariance and correlation of random variables
   b. Conditional expectation
   c. Laws of total expectation and variance
   d. Bivariate normal distribution

4. GENERATING FUNCTIONS (Weiss, Chapter 11)
   a. Moment generating functions
   b. Joint moment generating functions
   c. Transformations using moment generating functions
   d. Probability generating functions (If time allows)