

STAT 2400 Section A01

Introduction to Probability 1

Winter 2026

Time MWF 9:30 a.m. – 10:20 a.m.
Location 237 University College
CRN 51089

Instructor Marcus Hlady (He/Him)
Email: Marcus.Hlady@umanitoba.ca

Web Pages UM Learn: <http://umanitoba.ca/umlearn>
Crowdmark: <http://www.crowdmark.com/>

Office Hours: Monday & Friday 8:30 a.m. to 9:30 a.m. in 107 Allen (Stats Help Center)
Other times by appointment (email me)

Territory Acknowledgment

The University of Manitoba campuses are located on original lands of Anishinaabeg, Cree, Oji-Cree, Dakota and Dene peoples, and on the homeland of the Métis Nation. We respect the Treaties that were made on these territories, we acknowledge the harms and mistakes of the past, and we dedicate ourselves to move forward in partnership with Indigenous communities in a spirit of reconciliation and collaboration.

Calendar Description

(Lab required) Basic probability, discrete and continuous random variables, important families of distributions, functions of a random variable, expectation and variance, introduction to joint distributions. This course is not available to students who have previously obtained credit for STAT 3500. Prerequisites: [one of STAT 1150, STAT 2000 (B), STAT 2001 (B), or STAT 2220] and [one of MATH 1232, MATH 1700 (B), MATH 1701 (B), or MATH 1710 (B)].

Course Goals

This course is meant to start your basic training in probability theory by providing a semi-formal introduction to its most important basic concepts. As such, some goals for the course are to help you build and develop

- a solid foundation in basic probability that you can rely on for your upper level courses in Statistics, Actuarial Mathematics and Data Science,
- skills related to the understanding and writing of basic mathematical proofs,
- analytical skills related to problem solving.

In this course, you will have an opportunity to develop a solid intuition and understanding of probabilistic ideas, along with solid skills in calculus and applied mathematics. All these skills will be essential to your success. The course is quite 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!

Evaluation

Tests (3)	Best 30%, Worst 10%, Other 20%
Final Examination (Cumulative)	40%

Make-up tests will not be scheduled. Should you miss a test, you will be assigned a mark of zero unless you submit a Self-Declaration form for Brief or Temporary Absence within 24 hours of the scheduled test. The Self-Declaration form can be found **here**. If you miss one test, the final exam will count for 50% of your final mark for the course, and the two other tests will be respectively worth 30% and 20% of your final mark. If you miss two tests, the final exam will count for 70% of your final mark for the course, and the test you have written will be worth 30% of your final mark. Do note the potential impact of the above caveat in these cases. **Additionally, you must pass two out of the four total assessments in order to pass the course.**

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%).

Software

Students enrolled in this course must ensure they satisfy the following minimum technological requirements:

- a computing device where one can create and edit documents,
- an internet connection capable of streaming videos and downloading software, and
- access to a web-cam and microphone.

See also the Student Technology and Connectivity Recommendations available at

centre.cc.umanitoba.ca/wp-content/uploads/2020/04/Student-Connectivity-Recommendations.pdf

Exam Information

There will be three 75-minute tests, currently scheduled for February 4, March 11, and April 8, all during the lab time slot between 2:30 p.m. and 3:45 p.m. . The midterms and final exam are closed book. For exams, you will also need a non programmable scientific calculator. Any necessary statistical tables will be provided by your instructor. The Final Exam will be scheduled by the Registrar's office during the University-wide examination period taking place between April 11 and April 25, inclusive. If you miss the final exam, you should contact a student advisor from your home Faculty within 48 hours of the scheduled exam time.

Practice Questions

There are no assignments to be handed in for credit in this course, but opportunities to practice will be provided to you. First, a list of practice problems will be provided to you. You are free (and encouraged) to work in groups on the practice problems, but remember the work you do to get to a solution is more important than the solution itself: it is all about the process needed to get to a solution, rather than the answer itself. So, getting the solutions from a classmate is not going to help you develop the skills you will be examined on.

Labs

There is a seventy-five minute lab every week on Wednesday from 2:30 p.m. to 3:45 p.m. in 207 Buller. Note, however, that three tests will take place during the lab. During the lab period the TA will solve selected practice problems on the projector. The TA for the lab is Callum Lehingrat, available by email at lehingrc@myumanitoba.ca

Textbook

The course will be based on

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

This being said, you should be able to get by without making use of the textbook if you carefully study the provided lecture materials and occasionally read from the other references. Other useful references that are downloadable in PDF through Springer Links and

the University of Manitoba Libraries are

- Pitman (1993), Probability,
- Dekking, Kraaikamp, Lopuhaa & Meester (2005), A Modern Introduction to Probability and Statistics,
- Devore & Berk (2012), Modern Mathematical Statistics with Applications.

Another very good resource is the following textbook:

- Ross (2010), A first Course in Probability, 8th edition,

or, any of the more recent editions. The book is available for online viewing through the University of Manitoba Libraries.

Course Outline

Unit 1 – Basic Concepts

- Weiss, Chap. 1 and 2
- Axioms of probability and basic probability rules

Unit 2 – Combinatorial Probability

- Weiss, Chap. 3
- Counting rules and probability calculations

Unit 3 – Conditional Probability

- Weiss, Chap. 4
- Conditional probability, Independence & the Bayes rule

Unit 4 – Discrete Random Variables

- Weiss, Chap. 5
- Discrete Random Variables and probability mass functions

Unit 5 – Continuous Random Variables

- Weiss, Chap. 8
- Continuous Random Variables, CDF, PDF

Unit 6 – Expected Values

- Weiss, Chap. 7, 10, 11
- Basic properties of expected values, mean and variance
- Moment Generating Functions

Unit 7 – Additional Optional Topics (Time Permitting)

- Joint Distributions
- Central Limit Theorem

Academic Integrity

It is important that you understand what constitutes academic dishonesty and that you are familiar with the very serious consequences. The following link describes various types of academic dishonesty (including plagiarism, cheating, inappropriate collaboration and examination impersonation), and offers several resources to help students understand and avoid academic dishonesty:

<http://umanitoba.ca/student-supports/academic-supports/academic-integrity>

The Student Discipline Bylaw, which describes the potential consequences of academic dishonesty, can be found at the following link:

http://umanitoba.ca/admin/governance/media/Student_Discipline_Bylaw_-_2018-09-01.pdf

An academic integrity and student conduct tutorial can be found at the following link. For this course, it is recommended in particular that you view the parts on Tests & Exams and Inappropriate Collaboration.

http://umanitoba.ca/student/resource/accessibility/files/AI-Student-Conduct-Tutorial/story_html5.html

Use of Artificial Intelligence

Students may not use artificial intelligence tools for taking tests in this course, but students may use generative artificial intelligence (genAI) tools for creating an outline for an assignment, but the final submitted assignment must be original work produced by the individual student alone.

Voluntary Withdrawal

The voluntary withdrawal date is **March 19** (by which time you will have received your marks for the first midterm). If you are unlikely to be successful in the course, or are not achieving the grade that you are aiming for, you should consider a VW from the course. Students enrolled in the course after the VW deadline will be assigned a final grade.

Copyrighted Material

All course notes, assignments, tests, exams, practice questions and solutions are the intellectual property of your instructor or the Department of Statistics. **The reproduction, posting or distribution of these materials is strictly forbidden without their consent.** It is **illegal** to upload any course material to any website. For more information, see the University's Copyright Office website at <http://umanitoba.ca/copyright>.

Recording of Class Lectures

Your instructor holds 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** without permission from your instructor.

Class Communication

The University requires all students to activate an official University email account. Please note that all communication between you and your instructor 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.

Professional Conduct

Students in the University community can freely express their thoughts, opinions, and beliefs; however, they must observe the Respectful Work and Learning Environment Policy (<https://umanitoba.ca/about-um/respectful-work-and-learning-environment-policy>) and treat each other, staff, and faculty with respect. Students who are alleged to have breached the Respectful Work and Learning Environment Policy will be investigated and disciplined according to the Student Non-Academic Misconduct and Concerning Behaviour Procedure.

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. Schedule A will be posted on your instructor's UMLearn page.

Academic Accommodations

Student Accessibility Services

Students who have, or think they may have, a disability (e.g., mental illness, learning, medical, hearing, injury-related, visual) are encouraged to contact Student Accessibility Services to arrange a confidential consultation. Instructors are notified by Student Accessibility Services what accommodations their registered students require, which will help the instructor determine fair, feasible and reasonable academic accommodations without compromising academic standards. This takes time and planning, so reach out at the start of term.

SAS students can write their exams and tests in spaces organized by the SAS Exam Centre; however, they must register with the SAS Exam Centre a few weeks in advance. Please be sure to do so to receive the accommodations.

Student Accessibility Services

<http://umanitoba.ca/student-supports/accessibility>

520 University Centre

204-474-7423

Student.accessibility@umanitoba.ca

Medical Notes and Other Documentation

The Self-Declaration for Brief and Temporary Absences Procedure and Policy will be effective on September 1, 2022 and therefore students will not be required to present medical or other documentation for absences due to extenuating circumstances of 72 hours or less; however, you must complete the form at the following link:

<https://umanitoba.ca/governance/sites/governance/files/2022-06/self-declaration-for-brief.pdf>

You must submit the form to your instructor in lieu of any medical or other documentation. Please note that further documentation may be requested from students who claim multiple temporary absences or absences for more than 72 hours. You only need to submit this form if you miss an assessment. You do **not** need to fill out this form if you are missing a lecture or a tutorial. Note that personal vacations or work obligations are **not** considered valid excuses to miss assessments.

Final Exams

If you have conflicting scheduled final exams, or if you miss a final exam due to illness or some other valid reason, **you must contact an academic advisor in your home faculty** (<http://umanitoba.ca/academic-advisors/>) as soon as possible to apply for a deferred exam. Deferred final exams are **not** arranged through your instructor or the department. Note that the granting of a deferred exam is not necessarily guaranteed.

Mental Health Support

For 24/7 mental health support, you can contact the Mobile Crisis Service at 204-940-1781.

Student Counselling Centre

Contact SCC if you are concerned about any aspect of your mental health, including anxiety, stress, or depression, or for help with relationships or other life concerns. SCC offers crisis services as well as individual, couple, and group counselling.

Student Counselling Centre: <http://umanitoba.ca/student/counselling/index.html>

474 University Centre or S207 Medical Services

204-474-8592

Student Support Case Management

Contact the Student Support Case Management team if you are concerned about yourself or another student and don't know where to turn. SSCM helps connect students with on- and off-campus resources, provides safety planning, and offers other supports, including consultation, educational workshops, and referral to the STATIS threat assessment team.

Student Support Intake Assistant: <http://umanitoba.ca/student/case-manager/index.html>

520 University Centre, Fort Garry Campus

204-474-7423

University Health Service

Contact UHS for any medical concerns, including mental health problems. UHS offers a full range of medical services to students, including psychiatric consultation.

University Health Service: <http://umanitoba.ca/student/health/>

104 University Centre, Fort Garry Campus

204-474-8411 (Business hours or after hours/urgent calls)

Health and Wellness

Contact the university's Health and Wellness Educator if you are interested in peer support from Healthy U or information on a broad range of health topics, including physical and mental health concerns, alcohol and substance use harms, and sexual assault.

Health and Wellness Educator:

<https://umanitoba.ca/student/health-wellness/welcome-about.html>

britt.harvey@umanitoba.ca

469 University Centre, Fort Garry Campus

204-295-9032

Live Well @ UofM

For comprehensive information about the full range of health and wellness resources available on campus, visit the Live Well @ UofM site: <http://umanitoba.ca/student/livewell/index.html>.

Your Rights and Responsibilities

As a student of the University of Manitoba, you have rights and responsibilities. It is important for you to know what you can expect from the University as a student and to understand what the University expects from you. Become familiar with the policies and procedures of the University and the regulations that are specific to your faculty, college or school.

The Academic Calendar (<https://umanitoba.ca/registrar/academic-calendar>) is one important source of information. View the sections of University Policies and Procedures and General Academic Regulations. While all of the information contained in these two sections is important, the following information is highlighted.

- If you have questions about your grades, talk to your instructor. There is a process for term work and final grade appeals. Note that you have the right to access your final examination scripts. See the Registrar's Office website for more information including appeal deadline dates and the appeal form: <http://umanitoba.ca/registrar/>.
- You are expected to view the General Academic Regulation section within the Academic Calendar, and specifically read the **Academic Integrity** regulations. Consult the course syllabus or ask your instructor for additional information about demonstrating academic integrity in your academic work. Visit the Academic Integrity Site for tools and support <http://umanitoba.ca/academicintegrity/>. View the **Student Academic Misconduct** procedure for more information.
- The University is committed to a respectful work and learning environment. You have the right to be treated with respect and you are expected to conduct yourself in an appropriate respectful manner.

For information on regulations that are specific to your academic program, read the section in the Academic Calendar and on the respective faculty/college/school web site <http://umanitoba.ca/faculties/>

Contact an Academic Advisor within **your** registered faculty/college or school for questions about your academic program and regulations.

Contact **Student Advocacy** if you want to know more about your rights and responsibilities as a student, have questions about policies and procedures, and/or want support in dealing with academic or discipline concerns.

<http://umanitoba.ca/student/advocacy/>

520 University Centre

204-474-7423

student_advocacy@umanitoba.ca