

University of Manitoba
Faculty of Science
Department of Statistics
Fall 2016

Course Title: Introduction to Probability I	Instructor: Dr. Katherine Davies
Course: STAT 2400 – CRN 11189	Office: 330 Machray Hall
Class Time: MWF 9:30-10:20am	Telephone: (204) 480-1060
Location: 207 Buller	Email: Katherine.Davies@UManitoba.CA
Lab: W2:30-3:45pm 306 Buller	Office Hours: M2:00-3:00pm WTh.10:30-11:30am

I encourage you to contact me throughout the course whenever you feel the need. Whether you are asking a question about course material or are requesting to arrange a meeting, you can contact me by phone, email or in person. I have listed office hours above and I will do everything in my power to always be available during those times, however, sometimes important meetings are scheduled at that time without my consent. If an office hour is cancelled, I will notify you and if necessary, substitute it with a new one. These hours are not the only times I am available to you. I will always try to come to the classroom 5 minutes before class begins, and I can usually stay a few minutes after class, should you need to discuss something with me. Outside of my office hours, I welcome you to come to my office at your convenience and if I am free, I will be happy to meet with you.

Course Description

This course will introduce you to probability and discrete and continuous random variables. As the undergraduate calendar states, the course will cover basic probability, discrete distributions including binomial, hypergeometric, geometric and Poisson, joint distributions, continuous distributions, statistical inference and applications involving discrete random variables. I will do my best to cover all these topics. Below is an outline of the topics to be covered with reference to textbook chapters:

1. Basic Concepts (Chapters 1 and 2)
2. Combinatorial Probability (Chapter 3)
3. Conditional Probability and Independence (Chapter 4)
4. Discrete Random Variables (Chapter 5)
5. Jointly Discrete Random Variables (Chapter 6)
6. Expected Values of Discrete Random Variables (Chapter 7)
7. Introduction to Continuous Random Variables (Chapter 8)

A more detailed description and timetable are provided at the end of this document.

General Information

The prerequisites for this course are STAT 1000 or STAT 1001 (C) and one of MATH 1232 (C), MATH 1690 (C) or MATH 1700 (B) or MATH 1701 (B). It is your responsibility to ensure that you are entitled to be registered in this course. Early in the course, some of the material will involve topics covered in STAT 1000, and throughout the term, various mathematical skills will be required. I realize that the academic background of each student is different, as well as programs of study, and so I will do my best to teach accordingly.

On the day of tests, attendance in the labs is necessary since this is when your term tests will take place, though possibly in a different room. In the remaining labs, attendance in the lab is recommended for you in order to get the maximum value out of this course. In these labs, a qualified TA will be present to answer questions you may have and work through suggested practice problems.

Some Advice

This course is **not** one wherein you can succeed by “cramming” for the tests and final exam. You **need** to regularly attend the lectures and practice the materials. I also advise you to review the lecture material as soon as possible, preferably reading the class notes ahead of the lectures, and reviewing them after to see if you have any questions. If you have questions, you have several options including your notes and textbook, your classmates and your TA. Of course, I am a resource for you as well!

Course Materials

The **required textbook** for this course is *A Course in Probability* by N.A. Weiss (Addison-Wesley, 2006). This will be used for assigning practice problems and is also a good resource to follow along with in conjunction with your class notes. The book can be purchased at the bookstore and a copy is also on reserve in the Sciences and Technology Library.

There are no assignments to be handed in for credit in this course but you are strongly encouraged to do as many of the practice problems as you can. Each term test will ask for at least one problem taken from those lists, in original or slightly modified form. Course notes and other important information will be posted online on UM Learn.

Course Evaluation

The two components to your final grade are two term tests and a final exam. The weights are:

Term tests - 50% (33% for better test, 17% for other)
Final Exam - 50%

Notes About Tests and Final Exam

- The two term tests will take place during the lab time with tentative dates as **October 12** and **November 9**. Should one of these dates change, you will be informed in advance. The tests will be 75 minutes in length. The questions will require you to write solutions.
- Should you miss **one** test, you will be assigned a grade of zero unless you:
 1. provide a valid excuse with acceptable documentation,
 2. notify me within 48 hours of the scheduled test (phone and e-mail are fine).

The other test and final exam would then be worth 25% and 75%, respectively.

- 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 grade for the course.
- **There are no makeup tests.**

- Students who miss both tests, with or without valid documentation, will be reported to the Dean's office as having completed no term work. This will have repercussions on their ability to write a deferred exam for the course, should such a deferral be requested.
- The final exam will be 3 hours in length and will also require written solutions. The final exam will take place during the December examination period as scheduled by the Registrar's office.
- Your term test and exam questions will be similar to those worked out in class, in your practice problems, and on previous tests/exams. Information about which material will be on the test/exam will be provided to you as the dates approach.
- The final exam and term tests are closed-book and only non-programmable calculators are permitted.
- Your graded tests will be returned to you in a timely manner and have appropriate feedback.

Other Important Information

- *Voluntary Withdrawal*: It is your responsibility to be aware of the last day for voluntary withdrawal. For this term, the Registrar's office has this day as **November 18, 2016**.
- *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://umanitoba.ca/science/undergrad/resources/webdisciplinedocuments.html>
- *Student Accessibility Services*: If you are a student with a disability, please contact SAS for academic accommodation supports and services such as note-taking, interpreting, assistive technology and 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, assignments, tests, exams, practice exams and solutions are the intellectual property of your instructor or the Department of Statistics. Reproduction or distribution of these materials is strictly forbidden without their consent.
- *Recording of 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 from your instructor.
- *Use of Electronics 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. A student may use technology in the classroom setting only for educational purposes approved by the instructor and/or the University of Manitoba Student Accessibility Services.
- *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 UMLearn.

Course Timetable

A rough outline of the course timetable, including reference to material, is as follows. At times, we may be behind or ahead of this schedule, but I will do my best to follow this timetable. Also included are **tentative** term test dates and material planned to be covered on each term test.

<u>Date(s)</u>	<u>Material</u>	<u>Textbook Reference</u>
September 9	Course Outline	N/A
September 9-14	Basic Concepts: review of set theory, sample space, events, axioms of probability and basic probability rules	Chapters 1 and 2
September 16-26	Combinatorial Probability: permutations and combinations and their use in probability calculations, binomial theorem	Chapter 3
September 28- October 5	Conditional Probability and Independence: conditional probability and general multiplication rule, independence, law of total probability, Bayes' Rule	Chapter 4
October 12	Term Test #1	Chapters 1-4
October 12-26	Discrete Random Variables and Probability Distributions: discrete random variables and probability mass functions, important counting random variables, Poisson approximation to binomial, binomial approximation to hypergeometric, functions of discrete random variables	Chapter 5
October 28- November 7	Jointly Discrete Random Variables: marginal and joint probability mass functions, conditional probability mass functions, independent random variables, sums of discrete random variables	Chapter 6
November 9	Term Test #2	Chapters 5 and 6
November 9-28	Expected Values of Discrete Random Variables: basic properties of expected values, mean, variance and correlation of discrete random variables, conditional expectation	Chapter 7
November 30- December 5	Introduction to Continuous Random Variables: continuous random variables, cumulative distribution functions and probability density function, Uniform, exponential and normal random variables, mean and variance of continuous random variables	Chapter 8
December 7-9	Review of all Course Material	Chapters 1-8