University of Manitoba
Department of Statistics

Fall Term – 2013

STAT 2400

Course Title: Introduction to Probability I (CRN: 11670)

Instructor:
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Course schedule: Monday/Wednesday/Friday from 9:30 to 10:30 am, in 205 Armes.
(See course calendar on p. 4.)

Lab schedule: Wednesday from 2:30 to 4 pm, in 205 Armes.
(See course calendar on p. 4.)

Office hours: Monday from 10:30 am to 12:00 pm (noon),
Thursday from 1:00 to 2:30 pm,
or by appointment.

Statistics Help Centre: Visit our drop-in help centre in 311 Machray Hall:
Monday from 1:30 to 4:30 pm (Jenna and Lahiru),
Tuesday from 9:30 am to 1:00 pm (Lahiru),
Wednesday from 1:30 to 4:30 pm (Jenna),
Thursday from 9:30 am to 1:00 pm (Lahiru).
Jenna and Lahiru are the only demonstrators that you should see about the course.

Textbook: Weiss, N.A. (2006), *A course in Probability*, Pearson Ed. (Addison-Wesley). (Bookstore price: around $120.)

A copy of the textbook should be available on two-hour reserve at the Science Library. Copies of

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

are also available on two-hour reserve at the Science Library.

Prerequisites: STAT 1000 (or 1001), and one of MATH 1700 (or 1701) or MATH 1690, all with a grade of C or better.

Course material available online:

Course material, including course notes and lists of supplementary problems (some taken from the textbook) will be posted on the JUMP portal. Specific information related to tests and exams will also be posted there.

Breakdown of the marks:	Tests (2)	50%	(2/3 better test – 1/3 other)
	Final Exam	50%	

Supplementary 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.

Notes regarding tests and exam:

- There will be two 90-minute tests, currently scheduled for Wednesday, October 9 and Wednesday, November 6, between 2:30 and 4 pm (i.e. during the lab) and should take place in rooms 111 and 205 Armes.
- 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.
- 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 and e-mail are 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 for the course.
- Make-up tests will not be scheduled.
- 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.

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. Also, the first lab will be replaced by a lecture. (See course calendar on p. 4-5.)

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.

Outline of the covered topics:

1. BASIC CONCEPTS (Weiss, Chap. 1 and 2)

- A review of set theory
- Sample space, events
- Axioms of probability and basic probability rules

2. COMBINATORIAL PROBABILITY (Weiss, Chap. 3)

- Counting: permutations and combinations
- The use of counting rules in probability calculations

3. CONDITIONAL PROBABILITY AND INDEPENDENCE (Weiss, Chap. 4)

- Conditional probability and the general multiplication rule
- Independence
- Bayes' rule

4. DISCRETE RANDOM VARIABLES AND PROBABILITY DISTRIBUTIONS (Weiss, Chap. 5)

- Discrete random variables and probability mass functions
- Important counting random variables
- Poisson approximation to the binomial
- Binomial approximation to the hypergeometric

5. JOINTLY DISCRETE RANDOM VARIABLES (Weiss, Chap. 6)

- Marginal and joint probability mass functions
- Conditional probability mass functions
- Independent random variables
- Sums of discrete random variables

6. EXPECTED VALUES OF DISCRETE RANDOM VARIABLES (Weiss, Chap. 7)

- Basic properties of expected values
- Mean, variance, covariance and correlation of discrete random variables
- Conditional expectation

7. ADDITIONAL OPTIONAL TOPICS

- Moment generating functions
- Cumulative distribution functions
- Introduction to continuous random variables
- The central limit theorem and normal approximations to counting random variables
- Statistical applications involving counting random variables
- Other statistical applications

Tentative calendar for the course:

Note the first lecture is on Friday, September 6 and the last one is on Wednesday, December 4. The first Lab will take place on Wednesday, September 18. The September 11 lab slot will be used for a regular lecture.

September 2013:

Monday	Tuesday	Wednesday	Thursday	Friday
2	3	4	5 **First Day of Classes**	6 Lecture
9 Lecture	10	11 Lecture + Lecture	12	13 Lecture
16 Lecture	17	18 Lecture + Lab	19	20 Lecture
23 Lecture	24	25 Lecture + Lab	26	27 Lecture
30 Lecture				12

October 2013:

Monday	Tuesday	Wednesday	Thursday	Friday
	1	2 Lecture + Lab	3	4 Lecture
7 Lecture	8	9 Lecture + Test 1	10	11 Lecture
14 **Thanksgiving Day**	15	16 Lecture + Lab	17	18 Lecture
21 Lecture	22	23 Lecture + Lab	24	25 Lecture
28 Lecture	29	30 Lecture + Lab	31	12

November 2013:

Monday	Tuesday	Wednesday	Thursday	Friday
				1 Lecture
4 Lecture	5	6 Lecture + Test 2	7	8 Lecture
11 **Remembrance Day**	12	13 Lecture + Lab **Last Day for VW's**	14	15 Lecture
18 Lecture	19	20 Lecture + Lab	21	22 Lecture
25 Lecture	26	27 Lecture + Lab	28	29 Lecture 12

December 2013:

Monday	Tuesday	Wednesday	Thursday	Friday
2 Lecture	3	4 Lecture + Lab **Last Day of Classes**	5	6 Examination Period
9 Examination Period	10 Examination Period	11 Examination Period	12 Examination Period	13 Examination Period
16 Examination Period	17 Examination Period	18 Examination Period	19	20
23	24	25	26	27
30	31			2

Other notes:

About 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) can be found at:

http://www.umanitoba.ca/faculties/science/undergrad/resources/webdisciplinedocuments.html

or through the Faculty of Science home page at:

http://www.umanitoba.ca/faculties/science

Typical penalties imposed within the Faculty of Science for academic dishonesty are also described.

Important note regarding course registration:

It is **your responsibility** to ensure that you are entitled to be registered in this course. This means that you:

- have the appropriate prerequisites, as noted in the calendar description, or have an appropriate permission from the instructor to waive these prerequisites;
- have not previously taken, or are concurrently registered in, this course and another that has been identified as "not to be held with" in the course description.

The registration system may have allowed you to register in this course, but it is **your responsibility** to check. If you are not entitled to be in this course, you will be withdrawn, or the course may not be used in your degree program. There will be no fee adjustment. This is not appealable. Please be sure to read the course description **for this and every course** for which you are registered.

Important note regarding a possible pandemic:

Should major disruptions to university activities occur as a result of a pandemic, the course content, marks breakdown, and other provisions of this document may be adjusted as the circumstances warrant.

Intellectual property of course material:

This document is dated September 4, 2013.