

University of Manitoba
Department of Statistics

Winter Term – 2013

STAT 3400

Course Title: Introduction to Probability II (CRN: 22795)

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Course schedule: Monday/Wednesday/Friday from 9:30 to 10:30 am, in 315 Buller.
(See course calendar on p. 4.)

Lab schedule: Monday from 2:30 to 4 pm, in 527 Buller.
(See course calendar on p. 4.)

Office hours: Tuesday from 9:30 to 11:00 am,
Friday from 10:30 am to 12:00 pm (noon),
or by appointment.

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 four-hour reserve at the Science Library.
Also, 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 available on two-hour reserve at the Science Library.

Prerequisites: STAT 2400 (with a grade of C or better), and a co-requisite of MATH 2720 (or 2721) or MATH 2730 (or 2731).

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 Monday, February 4 and Monday, March 11, between 2:30 and 4 pm (i.e. during the lab). These are scheduled to take place in 221 Wallace.
- 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.
- If you miss a test, you will be assigned a mark of zero, unless reasons and acceptable evidence are provided. Make-up tests will not be scheduled.
- Should you miss a test and provide acceptable evidence, 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 provide acceptable evidence, the final exam would then count for 100% of your final mark for the course.

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. CONTINUOUS RANDOM VARIABLES AND THEIR DISTRIBUTIONS (Weiss, Chap. 8)

- Continuous random variables, cumulative distribution functions and probability density functions
- Uniform, exponential and normal random variables
- Other continuous random variables
- Functions of a continuous random variable

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 many continuous random variables
- Bivariate transformations

3. EXPECTED VALUES OF CONTINUOUS RANDOM VARIABLES (Weiss, Chap. 10-11)

- Basic properties
- Mean, variance, covariance and correlation of continuous random variables
- Conditional expectation
- Laws of total expectation and variance
- Link with the discrete case
- Moment generating functions

4. ADDITIONAL OPTIONAL TOPICS

- The law of larger numbers
- The central limit theorem
- Normal approximation of binomial probabilities
- Sums of random variables
- Bivariate/multivariate normal distributions
- Multivariate transformations
- Joint moment generating functions
- Poisson Processes
- Other statistical applications

Tentative calendar for the course:

Note the first lecture is on Monday, January 7 and the last one is on Wednesday, April 10. The first Lab will take place on Monday, January 14. The January 7 lab slot will be used for a regular lecture.

January 2013:

Monday	Tuesday	Wednesday	Thursday	Friday
7 Lecture + Lecture	8	9 Lecture	10	11 Lecture
14 Lecture + Lab	15	16 Lecture	17	18 Lecture
21 Lecture + Lab	22	23 Lecture	24	25 Lecture
28 Lecture + Lab	29	30 Lecture	31	
				12

February 2013:

Monday	Tuesday	Wednesday	Thursday	Friday
				1 Lecture
4 Lecture + Test 1	5	6 Lecture	7	8 Lecture
11 Lecture + Lab	12	13 Lecture	14	15 Lecture
18 Mid-Term Break NO CLASSES	19 Mid-Term Break NO CLASSES	20 Mid-Term Break NO CLASSES	21 Mid-Term Break NO CLASSES	22 Mid-Term Break NO CLASSES
25 Lecture + Lab	26	27 Lecture	28	
				9

March 2013:

Monday	Tuesday	Wednesday	Thursday	Friday
				1 Lecture
4 Lecture + Lab	5	6 Lecture + Test 2	7	8 Lecture
11 Lecture + Test 2	12	13 Lecture	14	15 Lecture
18 Lecture + Lab	19	20 Lecture Last Day for VW's	21	22 Lecture
25 Lecture + Lab	26	27 Lecture	28	29 Good Friday NO CLASSES 12

April 2013:

Monday	Tuesday	Wednesday	Thursday	Friday
1 Lecture + Lab	2	3 Lecture	4	5 Lecture
8 Lecture + Lab	9	10 Lecture Last Day of Classes	11	12 Examination Period
15 Examination Period	16 Examination Period	17 Examination Period	18 Examination Period	19 Examination Period
22 Examination Period	23 Examination Period	24 Examination Period	25 Examination Period	26 Examination Period
29	30			

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:

All course notes, lists of problems, tests, exams, practice exams and solutions are the intellectual property of your instructor. Reproduction or distribution of these materials is strictly forbidden without the consent of the Department of Statistics.