University of Manitoba
Faculty of Science
Department of Statistics
STAT 3800 (A01) Fall 2017
Instructor: Professor Xikui Wang

Contents

1   Course Details

Course Title and Number	Mathematical Statistics, STAT 3800 (A01), CRN 11931
Number of Credit Hours	3
Class Times and Days of Week	9:30 am - 10:20 am, Mondays/Wednesdays/Fridays
Location for classes	115 Armes
Tutorial Times and Days of Week	2:30 pm - 3:45 pm, Mondays
Location for tutorials	301 Biological Sciences
Course Material	All course materials are posted on UMLearn web
Pre-Requisites	STAT 3400 (or STAT 3500) (C)

2   Instructor Contact Information

Instructor Name	Dr. Xikui Wang
Position	Associate Dean, Faculty of Graduate Studies
	Professor, Department of Statistics
Office Location	503 University Centre
Office Hours	Mondays/Wednesdays 10:30 am - 12:30 pm
	Or by appointment (call or email to confirm)
Office Phone Number	204-474-9511
Email Address	xikui.wang@umanitoba.ca
	When feasible, I normally return a call or an email within 24 hours.

3   General Course Information

(Lab Required) Multivariate distributions and transformations, order statistics, sampling distributions, convergence, introduction to statistical inference. Not to be held with the former STAT 3600 (005.360).

This is a key course in statistics (and actuarial studies) and a pre-requisite for STAT 4100 (and other important senior statistics courses). The goal is to lay a solid foundation on some probability techniques that are of paramount importance for statistical inference. The emphasis is on developing useful techniques and skills of deriving important sampling distributions. Topics include transformation techniques, the method of conditioning, the Bayes' method, useful transforms by generating and characteristic functions, distributions related to order statistics, multivariate normal distributions, asymptotic distributions by means of convergence, and possibly other topics. A solid background in discrete and continuous distributions, and conditional expectation is required.

4   Course Goals

Our goal is to assist you to develop the following skills:

- **judgement:** understand the relationship between probability and statistics, and the bridge between them, the fundamental role and importance of probability in statistical inference;

- **analytic skills:** understand and efficiently apply important methods for deriving sampling distributions (of functions of random variables);

- **comprehension and generalization:** see the forest from the trees, learn by analogy, and generalize ideas and draw methods about other cases from related examples;

- **critical thinking:** critically appraise and compare the strengths and limitations of different methods ("all that glisters is not gold!").

5 Intended Learning Outcomes

Upon completing the course, we hope you become skillful in probability techniques (particularly on deriving distribution) and more interested in the discipline of statistics.

6 Textbook, Readings, Materials

A. Gut (2009) *An Intermediate Course in Probability*, (2nd edition), Springer
N. A. Weiss (2006) *A Course in Probability*, Pearson (STAT 3400 text)
L. M. Leemis (1986) Relationships among common univariate distributions, *The American Statistician* 40, 143 146
L. M. Leemis and J. T. McQueston (2008) Univariate distribution relationships, *The American Statistician* 62, 45 53

These materials (except for the Weiss book) are available for free on Springer online through the university library. Go to http://umanitoba.ca/libraries/ and click "Sign In to My Account". Add the above titles under "One Stop Search" and download.

7 Course Evaluation Methods

Time, Date and Place	Assessment Tool	Value of Final Grade
2:30 - 4:00 pm October 16, 2017 (**room TBA**)	Midterm Test 1	25%
2:30 - 4:00 pm November 6, 2017 (**room TBA**)	Midterm Test 2	25%
Time, Date and Place **TBA** (Final exam: Dec. 11-21, 2017)	Final Examination	50%

Notes:

The midterm tests and the final exam are closed book. No formula sheet will be provided.

Make-up midterm tests will not be scheduled.

Should you miss one test, you will be given a mark of zero unless you provide a legitimate excuse with acceptable documentation and notify me within 48 hours of the scheduled test (before or after), by phone or e-mail. The other test and the final exam would then respectively count for 25% and 75% of your final mark. Should you miss both tests with legitimate excuses and proper documents, your final exam will be 100%.

Students who miss midterm tests, with or without valid documentation, will be reported to the Dean's office as having incomplete term work. This could have repercussions on their ability to write a deferred exam for the course, should such a deferral be requested.

8   Grading

Letter Grade	Percentage out of 100
A+	90-100
A	80-89
B+	75-79
B	70-74
C+	65-69
C	60-64
D	50-59
F	Less than 50

9   Expectations: I Expect You To

provide CARE and maintain academic integrity:

  (i) C: Collaboration, Consolidation, Commitment

 (ii) A: Attitude, Attendance, Attention

(iii) R: Review, Rehearsal, (Re)search

(iv) E: Exploration, Exploitation, Enjoyment

10   Academic Integrity

Links to resources that describe academic dishonesty can be found at: http://www.umanitoba.ca/faculties/science/undergrad/resources/webdisciplinedocuments.html or at: http://umanitoba.ca/faculties/science/undergrad/resources/webdisciplinedocuments.html

It is important that you understand what constitutes academic dishonesty and that you are familiar with the very serious consequences.

11   Student Accessibility Services (SAS)

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.

Student Accessibility Services, http://umanitoba.ca/student/saa/accessibility/
520 University Centre, (204) 474-7423, Student_accessibility@umanitoba.ca

12 Expectations: You Can Expect Me To

provide CARE (Courage, Attention, Resource, Enthusiasm), dispel doubts, and most importantly, **inspire** you. I love teaching and the meaning of my teaching is to help you find the meaning of learning.

13 Important Dates and Preliminary Schedule

Voluntary withdrawal deadline: November 17, 2017

This following preliminary schedule is subject to change at the discretion of the instructor and based on the learning needs of the students.

Week	Dates (2017)	Lectures (Preliminary Schedule)	Tutorial
		Preliminary Schedule of Lectures and Tutorials	
0	Sep. 7 - 8	First class (Friday, September 8)	
1	Sep. 11 - 15	Review and Chapter 1	Review
2	Sep. 18 - 22	Chapter 1	Chapter 1 Problems
3	Sep. 25 - 29	Chapter 2	Chapter 1/2 Problems
4	Oct. 2 - 6	Chapter 2 (No class on Oct. 6)	Chapter 2 Problems
5	Oct. 9 - 13	Chapter 2 (No class on Oct. 9)	No tutorial (Holiday)
6	Oct. 16 - 20	Chapter 3	**Midterm Test 1** (room TBA)
7	Oct. 23 - 27	Chapter 3	Discussion of Midterm Test 1
8	Oct. 30 - Nov. 3	Chapter 4	Chapter 3 Problems
9	Nov. 6 - 10	Chapter 4	**Midterm Test 2** (room TBA)
10	Nov. 13 - 17	Chapter 5 (No class on Nov. 13)	No tutorial (Holiday)
11	Nov. 20 - 24	Chapters 5 and 6	Chapter 4 Problems
12	Nov. 27 - Dec. 1	Chapter 6	Chapter 5 Problems
13	Dec. 4 - 8	Chapter 6, other topics, review	Chapter 6 Problems
14-15	Dec. 11-21	Final Examination Period	

14 Laboratory/Tutorial Expectations

Attendance of tutorials is not mandatory but strongly recommended. **However the two midterm tests take place during the tutorials**. During the tutorials, the TA will solve some selected problems and answer your questions. If needed, a tutorial may be replaced by a lecture.

"**Practice, Practice, Practice**" is the gold rule for learning statistics. There are no assignments to be handed in for grading. However, lists of practice problems (some taken from the textbook) will be provided. Some will be discussed in the tutorials. Furthermore, each midterm test and the final exam will ask problems taken from these lists, in original or modified forms.

15 Course Technology

The computer, overhead projector, document camera and other technology will be used in teaching. It is the general University of Manitoba policy that all technology resources are to be used

in a responsible, efficient, ethical and legal manner. The student can use all technology in classroom setting only for educational purposes approved by instructor and/or the University of Manitoba Student Accessibility Services. Student should not participate in personal direct electronic messaging / posting activities (e-mail, texting, video or voice chat, wikis, blogs, social networking (e.g. Facebook) online and offline "gaming" during scheduled class time. If student is on call (emergency) the student should switch his/her cell phone on vibrate mode and leave the classroom before using it. (© S Kondrashov. Used with permission)

16 Class Communications

The University requires all students to activate an official University email account. For full details of the Electronic Communication with Students please visit: http://umanitoba.ca/admin/governance/media/Electronic_Communication_with_Students_Policy_-_2014_06_05.pdf
 Please note that all communication between myself and you as a student must comply with the electronic communication with student policy (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.

17 Using Copyrighted Materials and Recording Class Lectures

Please respect copyright and we will use copyrighted content in this course. 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. For more information, see the University's Copyright Office website at http://umanitoba.ca/copyright/orcontactum_copyright@umanitoba.ca.
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18 Practice Problems from the Textbook

Problems from A. Gut (2009) *An Intermediate Course in Probability*, (2nd edition):

From Chapter 1: 3, 4, 5, 7, 11, 13, 17, 18, 20, 21, 23, 26, 27, 29, 33, 41, 42
From Chapter 2: 1, 2, 4, 5, 7, 11, 15, 20, 24, 29, 31, 33
From Chapter 3: 1, 2, 4, 6, 8, 18, 19, 20, 21, 22, 23, 24, 26, 28, 34
From Chapter 4: 2, 3, 5, 6, 8, 10, 12, 14, 15, 16, 17, 18, 19, 22, 27, 29
From Chapter 5: 4, 8, 10, 11, 12, 14, 19, 26, 27, 28, 30, 32, 33, 37, 38, 39
From Chapter 6: 1, 8, 10, 21, 23, 24, 26, 28, 29, 30, 32, 45