

STAT 4100  
Statistical Inference I  
Theory of Point Estimation  
Fall 2015

## Calendar Description

Introduction to methods of estimation, including asymptotic and Bayesian methods. Not to be held with the former STAT 4140.

**Prerequisite** STAT 3800 (or the former STAT 3600 or 005.360).

## Instructor

**Instructor:** Dr. Mohammad Jafari Jozani

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**Office hours:** Mondays & Wednesdays, 10:30 a.m. to 12:00 a.m. or by appointment.

## Tutorial

**Instructor:** Elaheh Torkashvand

**Office:** 316 Machray Hall,

**E-mail:** Elaheh.Torkashvand@umanitoba.ca

**Lab:** Fridays 1:00–2:15 p.m.

## Mark Breakdown

|                                                                                                              |     |
|--------------------------------------------------------------------------------------------------------------|-----|
| Homework and assignments                                                                                     | 10% |
| 2 Term Tests (October 23rd Room 316 Machray Hall,<br>and November 24th, 2015, from 3:00–5:00, Room 111 Armes | 40% |
| Final Examination (180 minutes, time and place to be announced)                                              | 50% |

## Grade cut-offs

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%).

There is an additional requirement for obtaining a C or a D in the course: to obtain a grade of C or better, you must obtain at least 50% on the final examination; to obtain a D you must obtain at least 40% on the final examination.

## Homeworks

Homeworks and Assignments are due at the start of class (time will be announced). Homeworks submitted late will be severely penalized. Homeworks submitted after the solutions are posted or after the graded assignments are returned to students will not be marked and receive a grade of 0. Obviously, exceptions can be made to the above policy if special/exceptional circumstances warrant them (e.g., serious illness).

Students are encouraged to discuss and work together on the solutions to the assignments. However, each student must hand in his or her own copy of each assignment with personalized solutions, including comments, discussions and interpretations. Note that actions will be taken against students who are found guilty of acts of academic dishonesty.

Your assignments should conform to the following standards:

- Assignments are to be done on  $8.5 \times 11$  paper, writing on one side only.
- Assignments are to be stapled.
- Write your name at the top of each page.
- Assignments that involve R programming should be accompanied with the R codes.
- Revise your assignments so they are reasonably free of grammatical and typographical errors.
- Make sure each step in your solutions is well justified: I mark what is written on paper and should not have to guess what you mean.
- Messy or unreadable assignments will be returned with a mark of zero.
- Assignments that are well presented and properly typeset in Latex will get up to a 5% bonus.

## Tests

The term tests and the final examination are closed book. Statistical tables will be provided if required. A non-programmable calculator might be necessary (graphing calculators are not permitted). However, other electronic devices, such as cell phones and MP3, are strictly prohibited.

If you miss a terms test, you will be assigned a mark of zero, unless reasons and acceptable evidence are provided. A make-up test will not be scheduled. Students who miss the term tests with legitimate reasons will have the midterm weights added to the final examination. The Final Exam will be held on a date to be selected later by the Department of Statistics and will be 3 hours in duration.

## Recommended Text Books

I will use my course own notes. However, I recommend to use the following textbooks for further reading and exercises.

- (1) **Mathematical Statistics** (Second Edition)  
by: Jun Shao  
Springer Texts in Statistics  
ISBN 0-387-95382-5  
2003.
- (2) **Probability and Statistical Inference**  
by: Nitis Mukhopadhyay  
Marcel Dekker  
ISBN 0-8247-0319-0  
2000.
- (3) **Statistical Inference** (Second Edition)  
by G. Casella and R.L. Berger  
Duxbury/Thomson Learning  
ISBN 0-534-24312-6  
2002.
- (4) **Introduction to Mathematical Inference** (Sixth Edition)  
by R.V. Hogg, J.W. McKean and A.T. Craig  
Pearson/Prentice Hall  
ISBN 0-13-008507-3  
2005.

## Voluntary Withdrawal

Note that the voluntary withdrawal date is November 18, 2014.

## 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/student/webdisciplinedocuments.html>

or through the Faculty of Science home page at:

<http://umanitoba.ca/faculties/science>.

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

<http://crscalprod1.cc.umanitoba.ca/Catalog/ViewCatalog.aspx?pageid=viewcatalog&catalogid=60&chapterid=227&topicgroupid=4056&loaduserredits=False>.

## 2014-2015 REGISTRATION ADVISORY

*Important Note from the Dean of Science:*

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 permission from the instructor to waive these prerequisites;
- 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. For example, STAT 1000 cannot be held for credit with STAT 2220.

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 in which you are registered.

EXPLORER INNOVATOR PIONEER ADVENTURER VISIONARY TRAILBLAZER

### **IN THE CASE OF A FIRE ALARM:**

- REMAIN CALM
- IF IT IS SAFE, EVACUATE THE CLASSROOM OR LAB
- GO TO THE CLOSEST FIRE EXIT
- DO NOT USE THE ELEVATORS
- IF YOU NEED ASSISTANCE TO EVACUATE THE BUILDING,  
INFORM THE INSTRUCTOR **NOW**
- IF YOU NEED TO REPORT AN INCIDENT OR A PERSON LEFT  
BEHIND DURING A BUILDING EVACUATION, CALL  
**SECURITY SERVICES 204-474-9341**
- **DO NOT REENTER THE BUILDING**  
UNTIL THE “**ALL CLEAR**” IS DECLARED BY A FIRE WARDEN,  
SECURITY SERVICES OR THE FIRE DEPARTMENT



## **Tentative Topics**

Basic concepts including parametric non-parametric and semi-parametric models; Exponential family; Location-scale family; Introduction to various approaches of statistical inference; The Sufficiency Principle (sufficiency, minimal sufficiency, completeness, ancillarity, Information); The Equivariance Principle; Moments and maximum likelihood methods; Bayesian method; Unbiasedness; Bias reduction techniques. Mean Square Error; Asymptotic evaluation; Minimum variance unbiased estimators; Loss function optimality.