STAT 4100

Statistical Inference 1 (A01)

Fall Term 2012

Class Time Monday / Wednesday 1:00 p.m. - 2:15 p.m.
Tutorial Time Friday 1:00 p.m. - 2:15 p.m.
Location 316 Machray Hall
CRN 12986

Instructor Dr. Saman Muthukumarana
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Office Hours Monday 9:00–10:30 a.m.
Thursday 1:00–2:30 p.m.
(Or by appointment.)

Calendar Description Introduction to methods of estimation, including asymptotic and Bayesian methods. Not to be held with the former STAT 4140 (005.414).

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

Recommended Texts The following textbooks are recommended for reading and extra exercises and these are on 3 hours reserve in the Science Library.

- *Introduction to the Theory of Statistics* (Third Edition), A. M. Mood, F. A. Graybill, D. C. Boes, McGraw-Hill (1974).
- *Theory of Point Estimation* (Second Edition), Lehmann and Casella, Springer Texts in Statistics (1998).
- *Probability and Statistical Inference* (First Edition), Nitis Mukhopadhyay, Marcel Dekker (2000).
- *Statistical Inference* (Second Edition), Casella and Berger, Duxbury/Thompson Learning (2002).

Assignments Assignments are due at the beginning of class on the due date. Late assignments will not be accepted. You are encouraged to discuss your difficulties with your classmates and TA during tutorials, but final submission must be written independently. Do not copy any part of another student's work. There will be zero tolerance on such incidences.

Midterm Tests The tentative date for mid-term tests are **October 12 and November 16, 2012**. These tests will be two hours in length and there will be no makeup midterms for any reason. If you miss a exam due to a legitimate reason, your exam weight will transfer to the final exam.

Final Exam The final exam covers all course materials and will be 3 hours in length. The exams (including mid terms) are closed book.

Grading Scheme The final grade will be determined as follows.

Assignments	10%
Mid-term Test 1	20%
Mid-term Test 2	20%
Final Examination	50%

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

Class Attendance Lecture notes presented in class itself will make up the course material for the course. In addition, there will be in-class activities that will help you to understand the material. Assignments and extra problems will be discussed by TA during tutorial sessions (starting from September 14). So you must attend classes and tutorials regularly to avoid falling behind. The final exam will also resemble in part on problems discussed during classes.

Voluntary Withdrawal The voluntary withdrawal deadline is **November 14, 2012**.

Course Outline The course aims to provide a solid understanding of theory of point estimation including following areas.

- Preparations: Probability Spaces, Random Variables, Distribution Functions, Notations
- Point Estimation: Location-scale Family, Exponential Family, Parametric Inference Concepts, Methods of Moments, Maximum Likelihood and Other Methods, Unbiasedness
- Sufficiency: Sufficient Statistics, Factorization Criterion, Minimal Sufficient Statistics, Rao-Blackwell Theorem, Ancillary and Complete Statistics, Basu's Theorem, Lehmann-Scheffé theorem
- Properties of Point Estimators: UMVUE, Closeness, Mean-squared Error, Consistency and BAN, Lower Bound for Variance, Loss and Risk Functions, Reduction of Bias
- The property of Invariance: Location and Scale Invariance
- Large Sample Approximations: Convergence, Asymptotic Results, Optimum Properties of Maximum Likelihood Estimation
- Bayes Estimators: Posterior Distribution, Predictive Distributions, Loss-function Approach

Academic Dishonesty You are expected to be familiar with what constitutes academic dishonesty and it's consequences. Academic dishonesty is a serious offence and can be severe as suspension or expulsion from the University. More details of these terms and related issues are available at:
www.umanitoba.ca/science/undergrad/resources/webdisciplinedocuments.html.

Pandemic Advisory 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.

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 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.