

University of Manitoba
Department of Statistics

Winter Term 2014

STAT 7080

Course Title: Advanced Statistical Inference (CRN: 20930)

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Outline of Covered Topics:

The course will be mainly focused on asymptotic (*i.e.* large sample) methods and approximations for both parametric and nonparametric statistical inference from the frequentist perspective. Specific topics should include (not necessarily in this order):

- modes of convergence and consistency,
- asymptotic distributions (univariate and multivariate),
- non-i.i.d. samples,
- asymptotic relative efficiency and deficiency,
- the specific case of the empirical distribution function (with application to density estimation),
- the specific case of order statistics and sample quantiles,
- the accuracy of some normal approximations and Edgeworth expansions.

Time permitting, some Bayesian large sample methods and approximations will also be considered.

Course Schedule: Tuesday/Thursday from 1:00 to 2:30 pm in 316 Machray Hall.

Office Hours: Tuesday from 9:30 to 11:00 a.m. and Friday from 10:30 a.m. to 12 p.m. (noon), or by appointment.

Textbook: You are not expected to buy a textbook. Copies of the following textbooks have been placed on four-hour reserve at the Science Library.

- *Elements of Large Sample Theory* (Lehman, 2004).
- *A course in Large Sample Theory* (Ferguson, 1996).
- *Approximation Theorems of Mathematical Statistics* (Serfling, 2002).

Jump Portal: Any course material to be posted will be available on the Jump Portal.

Breakdown of the Marks:	Assignments (6 to 10)	30%
	Midterm Test	30%
	Final Exam	40%

The Test and Exam:

The Midterm Test will be scheduled for mid to late February, the exact date to be determined later. However, it will be scheduled outside of regular class time (probably in the afternoon) and will be 2 hours in duration. If you miss the midterm test, you will be assigned a mark of zero, unless reasons and acceptable evidence are provided. A make-up test will not be scheduled.

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.

Assignments:

Assignments will be handed out at a rate of about one assignment per one/two weeks of class. 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.

Assignments will be due in class on the day assigned. Late assignments will NOT be accepted.

Your assignments should conform to the following standards:

- Assignments are to be done on 8.5×11 paper, writing on one side only.
- Assignments are to be stapled.
- Write your name at the top of each page.
- 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 typesetted in L^AT_EX will get up to a 10% bonus.

Homework Problems:

You will be provided with homework (supplementary) problems that are not to be turned in for credit. However, given the difficulty of the material covered in the course, it is very strongly suggested you take the time to solve these problems very carefully.

Some guarantees regarding final grades:

If your final mark exceeds 90%, you are guaranteed an A+ in the course. Similarly, final marks above 80%, 75%, 70% and 65% will lead to a final grade of no less than, respectively, A, B+, B and C+. Recall that a final grade of C or below is considered a failing grade in this course.