Math 445 – Statistical Theory

Spring Term 2016, Lawrence University

Professor:	Adam Loy
Office:	410 Briggs Hall, x6894
Office hours:	MR 8:30–9:30 am, T 2:30–3:45 pm, W 3:00–4:15 pm
e-mail:	adam.m.loy@lawrence.edu
Class time:	MWF 1:50–3:00 pm, 422 Briggs Hall
Course webpage:	http://math445-lu.github.io/

Overview

> "Math is music, statistics is literature."
> – Richard D. De Veaux and Paul F. Velleman

This course will help you develop an understanding of statistical inference and the mathematical theory that underlies it. While the name of this course refers only to the theoretical aspect of statistics, this course will balance this theory with applications that show how inference can be implemented in practice. This term we will explore estimation and testing using nonparametric, frequentist, and Bayesian methods.

Required Textbook

Mathematical Statistics with Resampling and R, Laura M. Chihara and Tim C. Hesterberg, 2011, Wiley, ISBN 978-1-118-02985-5.

Other Useful References

You may also find the following texts to provide useful alternative coverage of the topics we will examine. The following texts are on reserve at the library.

1. *Foundations and Applications of Statistics: An Introduction Using R* by Randall Pruim
2. *Modern Mathematical Statistics with Applications* by Devore and Berk
3. *Mathematical Statistics with Applications* by Wackerly, Mendenhall, and Schaeffer
4. *Probability and Statistics* by DeGroot and Schervish

While these texts are mainly intended to be supplemental, there are a few topics that are not covered in our textbook that will be discussed in class. In this situation, at least one of these books will cover this topic.

Homework

Homework will be due on (most) Wednesdays by 4:30 pm, allowing you to submit your homework and enjoy some treats at Math Tea!

I will allow you to discuss homework problems with your fellow classmates, but I insist that you write up and submit your own solutions. I am allowing you to discuss problems so that you can share problem solving strategies, not so that you can avoid doing the problems yourself. Remember that copying another

student's work is a violation of the honor code.

You will be graded on the correctness of your solutions and how easy they are to read and understand. You will receive full credit for a solution to a problem if and only if a randomly selected student in the class would understand how to do the problem after having read your solution. No late homework will be accepted without a valid excuse.

Exams

We will have one midterm and a final exam. Each exam will consist of both an in class and take home portion. The take home portion of the exam will emphasize the application of the concepts that we have covered, and will require the use of R.

Below is the tentative exam schedule for this course:

Date	Time	Exam
5/4	In class & Take home	Midterm
6/6	3:00 pm – 5:30 pm	Final

The date and time of the final exam is set by the registrar, and under no circumstances will you be allowed to take the final at a different time due to early travel plans.

Grading

Homework assignments will be worth a total of 50% of your final grade, and each exam (a midterm and a final) will be worth 25%.

Honor Code

No Lawrence student will unfairly advance his or her own academic performance or in any way limit or impede the academic pursuits of other students of the Lawrence community.

All students are expected to uphold Lawrence University's Honor Code. All work on exams must be your own. You are encouraged to discuss homework problems with other students (and me, of course), but you must write your final answers yourself, in your own words. Please indicate on your assignments the names of the students with whom you worked. Solutions prepared "in committee" or by copying or paraphrasing someone else's will be considered a violation of the honor code; your assignments must represent your own thoughts. To check if your homework meets this standard, imagine I asked you to explain your reasoning for each problem—you should be able to do so with ease. All written work must be accompanied by a signed reaffirmation of the Honor Code.

Disability Policy

If you have a documented disability that will impact your work in this class, please contact me to discuss your needs as soon as possible. Additionally, you will need to formally request these accommodations through Student Academic Services. Retroactive requests for accommodations will not be honored.

Healthy Balance

All members of the Lawrence community—students, staff, and faculty—have the responsibility to promote balance in their lives by making thoughtful choices. Balance results from two skills: avoiding imbalance through careful planning, and managing and contain- ing imbalance when it occurs. This course will be demanding, but should not overwhelm your academic (let alone whole) life. If it threatens to, come talk to me, a tutor, friend, counselor, or advisor.