

STA607: THEORY OF STATISTICAL INFERENCE II

Fall 2011

Instructor

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Lectures

Time: 11:00-11:50am, MWF (August 24 – December 9)
Place: Whitehall Classroom Building Room 307

Objectives and Material

Statistics is sometimes called the science of uncertainty (Evans and Rosenthal, 2009). It would be easy to make decisions if there were no uncertainty in the world; there would be no more clinical trials to test new drugs for treating cancer, no more surveys to poll peoples' opinions on the latest political debate, and no more guessing what the weather will bring a day, a week, or even a year from now. Experiments would only be run one time and you would never play the lottery again – unless you knew that you were going to win.

Luckily for statisticians. the world is not like this; almost everything we do involves some sort uncertainty and so we must make the best decisions we can with the information at hand. Uncertainty in data is described by the laws of probability, and the theory of statistics helps to apply these laws to make the best decisions that we can based on data that has been collected.

This course is designed to introduce you to some of the fundamental theory of statistical inference and to help you develop practical skills that you can apply to new statistical problems. By the end of the course you should be able to apply the methods you have learned to new problems and provide simple proofs for new statistical results.

The course will cover theory from both the classical and Bayesian paradigms of statistics, and the material will be divided roughly at the midterm. In the first half of the course, we will consider classical results on finding and evaluating point estimators, interval estimators, and hypothesis tests. In the second half of the course, we will examine the fundamental theory of Bayesian methods starting from the Bayesian interpretation of probability, specifying prior distributions, and obtaining optimal Bayesian inference. Special topics illustrating some of these methods will be discussed as time allows.

Web-Site

I will maintain a web-site for the course on Blackboard where I will post slides for the lectures, assignments, exercises, and extra reading material. I will do my best to have slides for each lecture posted by 9:00am on the day of class. Please let me know as soon as possible if you have any troubles accessing the Blackboard site.

Materials

Two texts will be required for this course:

Casella, G. and Berger, R. L. (2002) *Statistical Inference*. Second Edition, Duxbury Press.

and:

Hoff, P. D. (2009) *A First Course in Bayesian Statistical Methods*. Springer.

The second of these is available in electronic format through the UK library free of charge. Throughout the course I may refer to other printed materials. When possible, I will distribute these in class or make them available on the course web-site.

Assessment

Your progress and performance in the course will be assessed from regular assignments, a midterm examination (to be held on Friday, October 14), a final exam (to be held on Friday December 16 at 1:00pm), and your participation in class. Final percentages will be computed from to the following breakdown:

Assignments	40%
Midterm exam	20%
Final exam	30%
Participation	10%

Letter grades assigned according to the following cut-offs:

A	90%--100%
B	80%--90%
C	60%--80%
D	Less than 60%

All assignments must be submitted in hard copy at the beginning of class on the day that they are due. Late work will be accepted and make-up exams provided only with an official university excuse. Please see the UK policy on Student Rights and Responsibilities, Part II, Section 5.2.4.2 (<http://www.uky.edu/StudentAffairs/Code/part2.html>) for details on official excuses.

Course Policies

Academic accommodations:

Please see me as soon as possible if you have a documented disability that requires academic accommodations. In order to receive accommodations in this course, you must provide me with a Letter of Accommodation from the Disability Resource Center (Room 2, Alumni Gym, 257-2754, jkarnes@uky.edu) for coordination of campus disability services available to students. We can then work together to find the best solutions for you.

Attendance:

Your attendance in class will not be checked but regular attendance is the best way to learn the material. You are responsible for all material covered during the class. If you know that you will be away ahead of time then I recommend stopping by my office hours and I will do the best I can to accommodate.

Academic integrity:

Academic dishonesty of any form will not be tolerated. Minor forms of dishonesty will result in a score of zero for that component of the course work. More serious forms of dishonesty will be reported to the university. Further information on plagiarism, how to avoid plagiarism, and the university's academic offense policy are available from the web-site of the Office of Academic Ombud Services (<http://www.uky.edu/Ombud>).

Classroom behaviour:

My role as a teacher is not to deliver knowledge to you, but to guide you through your own learning process. The course will require participation from every student, and I expect you to come to class willing to participate by completing exercises to the best of your ability and by engaging in class discussions. I will work to maintain an open and respectful atmosphere in the classroom and expect you to do the same. This includes providing others with the opportunity to ask questions and express opinions. Please turn off all mobile devices before class so that they will not interrupt myself or other students.