

## STAT 518, Nonparametric Statistical Methods-- Fall 2013

### **Instructor:**

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Course Web Page: <http://www.stat.sc.edu/~hitchcock/stat518.html>

(Also accessible via Blackboard – go to course page in Blackboard

And then click on “Course Web Page” link on left of page)

### **Classes:**

Meeting Times: MWF 12:00 - 12:50 p.m., LeConte College 210A

### **Office Hours:**

MWF 10:45-11:45 a.m., Tues 11:00-12:00, Thur 10:00-11:00 a.m., or **please feel free** to make an appointment to see me at other times.

### **Textbook:**

*Practical Nonparametric Statistics* (3rd Edition), by W.J. Conover, Wiley, 1999.

**Prerequisite:** STAT 515 (or equivalent) with a grade of C or higher.

**Course Outline:** Chapters 2-6 of the Conover textbook. Topics covered include: Statistical Inference: properties of estimators, properties of hypothesis tests; Tests Based on the Binomial Distribution: the binomial and quantile test, the sign test, McNemar's test; Methods Based on Ranks: Mann-Whitney test, Kruskal-Wallis test, squared rank test, measures of rank correlation, nonparametric linear regression, Wilcoxon signed ranks test, Friedman test; Goodness of Fit Tests: Kolmogorov goodness of fit test, Kolmogorov test for two samples; Categorical Data: chi-squared goodness of fit, chi-square test for  $r$  by  $c$  contingency tables, Mantel-Haenszel test, Cochran's test for related observations, measures of dependence, loglinear models.

**Learning Outcomes:** By the end of the term successful students should be able to do the following:

- Understand the principles and applications of commonly used nonparametric methods
- Compare these methods to their parametric counterparts
- Use the basic methods for analyzing contingency tables

### **Exams:**

There will be two in-class exams (September 27 and November 1) and a final exam on December 13.

Exams may not normally be made up, except in extreme circumstances, for which written documentation of excuse (doctor's note, funeral notice, etc.) is required. If you suspect you may miss an exam day, it is important to contact me well in advance of the test date.

**Homework:** Homework will be assigned on the course web page. Due dates will be posted given on the course web page. Late homework will be penalized. You must do each homework problem independently. You may not look at another student's work while doing the homework. You may ask me for help on the homework problems. If homework is found to have been copied, all students involved will receive a 0. [To be clearer, students can ask each other informal ORAL questions about homework, but **cannot look at or copy each other's homework papers**. All submitted homework must be the student's **own work** and **NOT come from any other person or external source**.]

**Project:** All students must do a data-analysis project. This project will be completed in two parts, one part midway through the semester and another part near the end of the semester. The project will contain the analysis of a real data set of interest using both parametric and nonparametric methods, and a simulation study to compare the two procedures used. The outline of all required programs will be provided. The details about the project will be announced about a month into the course.

**Graduate Students:** Any students enrolling in the course for graduate credit will do some extra homework problems during the semester. In addition, graduate students have a slightly more rigorous grading scale (see below).

**Grading:**

The course grade will be based on homework average (15%), project grade (10%), the two midterm exams (25% each), and a final exam (25%). The overall course average will result in the following grades: 90-100 = A, 87-89 = B+, 80-86 = B, 77-79 = C+, 70-76 = C, 67-69 = D+, 60-66 = D, 59 and below = F. **For graduate students only:** 91-100 = A, 88-90 = B+, 81-87 = B, 78-80 = C+, 71-77 = C, 68-70 = D+, 61-67 = D, 60 and below = F.

**Computing:** Some problems in this course involve significant computations, and for these, we will learn to use the free software package R. This is available in the labs and also as a free download for your home computer (see course web page for details). It is not assumed that you have much/any previous experience with R. You also may use the commercial software package SAS to do homework problems, but the class examples will be done in R. Example code in R (and some in SAS) is given on the course web page.

**During Class:** No cell phones may be on during class. Laptop computers must be put away during class time. Tablets (e.g., i-pads) may be used *only for note-taking*, only if flat on the desk like a traditional notebook. Students may not use tablets to look at web pages, play games, etc.

**Course Schedule:** MWF, August 22 through December 6, except:

No class (Labor Day): September 2 (Monday)

Last day to withdraw without "WF" grade: October 11 (Friday)

No class (Fall Break): October 18 (Friday)

No class (Thanksgiving Break): November 27, 29 (Wednesday, Friday)

Friday, September 27: Exam 1

Friday, November 1: Exam 2

Friday, December 13 (9:00 a.m.): final exam