STAT 529 Data Analysis II
Winter 2005

Lecture: MWF 12:30 -1:18PM in CH 312

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Text: *The Statistical Sleuth – A course in methods of data analysis*, 2^{nd}ed., Ramsey and Schafer

Course web page: `http://www.stat.ohio-state.edu/~yklee/st529/`
You will find links to the course web page on the Statistics department's web page, and also on my web page. Please, check the web site on a regular basis to keep yourself informed on class activities. Homework assignments, solutions, and handouts will be available.

Prerequisites: Statistics 528 or permission of the instructor.

Course Description: Statistics 529 is the second course in a three quarter sequence in Data Analysis. We assume that students are familiar with organizing and summarizing data, the nature of relationships between variables, sampling distributions and the underlying rationale for hypothesis tests and confidence intervals. Statistics 529 and 530 will cover many of the common statistical methods that you will encounter when reading journal articles in your field, or that you will need to analyze data that you have collected. When covering any statistical method, our goal is for you to (1) understand the assumptions of the method and be able to check them, (2) be able to carry out the necessary computations on the computer, (3) be able to describe your results using correct statistical "jargon", and (4) be able to interpret the results in a way that is meaningful to others in your field. We will try to accomplish these goals through homework and interactive classroom sessions.

Topics: The material in the course can be broken down into three units. There are several common concepts which underlie the three units. These commonalities will be a recurring theme of the class and should help you begin to build a perspective on data analysis.

   Unit I: (Ch.1–Ch.4) The first unit covers what statisticians call the two-sample problem. In this unit, you will learn how to compare the locations of two populations. The data that enable us to make this comparison are two samples, one from each of the two populations. Comparisons are made by means of the pooled t-test, the non-pooled t-test, the paired t-test and the Mann-Whitney (or rank sum) test. Comparison of the locations will be accomplished not only with hypothesis tests, but also with confidence intervals. There will be a strong emphasis on the reasoning that underlies these procedures.

Unit II: (Ch.5–Ch.6) The second unit concentrates on comparison of the locations of more than two populations (say k populations) on the basis of samples collected from each of the populations. The jargon for this type of technique is ANOVA (for ANalysis Of VAriance). We'll cover the basic F-test and the general F-test for comparing a larger model to a smaller model, how to make adjustments for multiple comparisons and how to form contrasts. Again, discussion will focus on the reasoning behind the techniques as well as on formal calculation for hypothesis tests and confidence intervals.

Unit III: (Ch.7–Ch.8) The third unit focuses on the relationship between an explanatory variable and a response variable. Formally, the technique we will investigate is called "simple linear regression". This technique has strong connections to fitting a least squares line. Again, we will cover hypothesis tests about parameters in the model, will go over how to form confidence intervals for a point on the regression line and how to form confidence bands for the entire regression line, and we will learn how to form a prediction interval for a future observation.

Grading: Course grades will be assigned on the basis of performance on homework assignments (20%), the midterm exam (35%), and the final exam (45%).
Midterm exam (in class): on or about *Monday, February 7*.
Final exam: 11:30-1:18PM on *Wednesday, March 16* in CH 312 as regularly scheduled.

Exam rules: You will be permitted to bring along one standard sized sheet of notes for the midterm exam. For the final exam, you may bring along two sheets. You may write on both the front and back of the sheets.

Homework assignments: Homework will be collected approximately weekly, making for about 8 homework assignments. Homework assignments and solutions will be posted on the course web page. Points will be deducted for late homework. Homework will not be accepted after the solutions are available on the web. A subset of problems from each assignment will be graded. Many of the analyses for the course will be done on the computer using MINITAB. When you put together your homework solutions, be sure to cut-and-paste so that the grader can follow your work. You may lose points on the homework if the grader has trouble following the thread of your solution.

Academic Misconduct: Please help us to maintain an academic environment of mutual respect, fair treatment, and personal growth. You are expected to produce original and independent work for exams. Although students are often encouraged to work together on homework assignments, each student is to submit her/his own written work in her/his own words. Academic misconduct will not be tolerated and will be dealt with procedurally in accordance with University Rule 3335-31-02.

Special Accommodations: Any student who feels that she/he may need an accommodation based on the impact of a disability should contact the instructor privately to discuss your specific needs. We will work with you and the Office of Disability Services at 292-3307 in 150 Pomerene Hall to coordinate reasonable accommodations.