STATISTICS 6910
FALL 2012

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Text: Design and Analysis of Experiments, A.M. Dean and D. Voss, Springer.

Course Description: Statistics 6910 is a course on applied statistics. It will quickly cover material on descriptive statistics and on the basic techniques of inference (hypothesis tests and confidence intervals), including techniques appropriate for samples from normal distributions, techniques based on randomization theory, and techniques for simple, tabular data. This early material will be covered in class, and little of it appears in the formal text for the course. Extended description of the material can be found in any standard text.

Following the introductory material, we will move on to experimental design. In this part of the course, we will cover the basic principles of design and the techniques used to analyze experiments that follow standard experimental designs. Specific designs to be covered include one-way ANOVA, two-and-higher-way ANOVA, factorial designs, and block designs.

The course is intended for students working toward a PhD in Statistics or Biostatistics. It will make scant use of knowledge from the prerequisites other than a bit of basic mathematical reasoning and mathematical manipulations up through a bit of relatively straightforward calculus. We will cover properties of estimators, but the derivations of the properties are intended to be self-contained, or to parallel material in your theory course. If you are concerned about the background needed for this course, see me soon!

The goals for the course are for you to (1) grasp the basics of descriptive and inferential statistics from an applied perspective (2) appreciate the importance (and unimportance) of the assumptions that the models are based on, (3) be able to make sound decisions for an analysis, (4) understand and use appropriate statistical notation and terminology, (5) implement formal techniques flawlessly, and (6) summarize an analysis appropriately. With these goals in mind, by the end of the quarter, you should be able to design and conduct an experiment of modest size, and you should be able to analyze the data from such an experiment. We will try to accomplish these goals through homework and interactive classroom sessions.

Prerequisites: Some exposure to Mathematical Statistics and enrollment in the PhD program in Statistics or Biostatistics, or permission of the instructor.
Grading: Course grades will be assigned on the basis of performance on homework assignments, two midterm exams, and the final exam. The percentage of your final numerical score assigned to each of these four segments of work is:

- Homework: 20%
- Midterm 1: 20%
- Midterm 2: 20%
- Final: 40%

The first midterm exam will be on or about Wednesday, September 18. The final exam will take place at the regularly scheduled time, on Tuesday, Dec 11, from noon - 1:45 pm. The final exam will be held in the regular classroom, SON 0054. If you have a question about the grading of an exam or homework assignment, please write a brief note explaining your question, attach it to the front of the assignment, and turn it in to the instructor (me). We’ll quickly get back to you with a response.

Exam rules: The exams will be closed-book, closed-notes. Any tables needed for the exam will be provided. Be prepared for modest numerical calculation, choice of design and analysis, interpretation of numerical and graphical evidence, and short answers.

Homework assignments: Homework will be collected approximately weekly, making for about 13 homework assignments. Homework solutions will be made available on-line at the course web-site. Homework will be accepted late, but points will be deducted for turning the homework in late. The deduction for one day late is 10% of the possible points on the assignment; for two days late, it is 20% of the possible points. Homework will not be accepted after the solutions are available. A subset of problems from each assignment will be graded. Before computing your homework grade, your lowest score will be dropped.

Computer work: Most of the analyses for the course will be done on the computer. When you put together your homework solutions, be sure to “cut-and-paste” so that the TA can follow your work. You may lose points on the homework if the TA has trouble following the thread of your solution.

Throughout the course, we will use the R computing environment. Many resources are available on the web. For specific use with this course, handouts will be available on the course web site and/or CARMEN.

Web Site: There is a course web-site for STAT 6910. The location of the web site is:

http://www.stat.osu.edu/~snm/6910/index.html

You will find links to the course web page on the Statistics department’s web page, and also on my web page. The web page will have pdf files of the homework assignments available for downloading. A select set of course handouts will also be available, particularly those relating to computing in the R environment.

One warning on the web site. The Statistics department may adjust its web addresses during the quarter. This may have an impact on links to/from the course web page. If you run into troubles, let me know.