Statistics 850, Theory and Application of Regression and Analysis of Variance II

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Lectures: T, Th 1:00 – 2:15, 101 Psychology
Discussion Sections: #311: F 1:00 – 2:15; #312: F 2:25 - 3:40, 5295 MSC
Textbook: Design and Analysis of Experiments, Dean and Voss, 2000

Objectives

The primary objectives of this course are:

- The practical and theoretical understanding of linear models at the graduate level, focusing on designed experiments.
- The use of the packages R and SAS to fit linear models and interpreting the output.
- Handling “Messy data”. I.e., data that do not follow the usual assumptions or that do not have a standard design.
- Communicating conclusions drawn from a statistical analysis of data.

Prerequisites

Statistics 849 is the prerequisite for this class. If you have not completed 849 please see the instructor. A calculator will be required for exams. A scientific calculator is not necessary. Students may not share calculators during exams. Some homework assignments will require the use of the statistical packages R and SAS. You also may be asked to read and interpret R or SAS output on exams. Rather than waiting until you need them, get started now learning to use them if necessary. The course web page (see below) will include introductory information.

Discussion Sections

Discussion sections will begin meeting the second week of class.

Course Web Page

The course web page will be available later this week at http://www.stat.wisc.edu/~st850-1

It will include all homework assignments, exam dates, and other information useful for the course including a schedule that I will fill in as we go.

Academic Honesty

You are permitted to talk to other students, your teaching assistant, and me about homework. However, you may not present other people’s work as your own. If you received direct assistance with a problem please include a reference or foot note to that effect. It is not acceptable for one student to write a solution for another student to copy. You must work independently during exams. You may not share calculators during the exams.
Exams

There will be two in-class midterm exams and a final exam which will consist of an in-class component and a take-home component. Make-up exams will only be allowed under extenuating circumstances.

Homework

Homework assignments will be given out on Tuesdays and collected the following Tuesday at the beginning of class. There will be an assignment approximately every other week. Your homework solutions should be written up with a word processor, although you can handwrite sketches and mathematical notation. Graphs of data should be completed in SAS or R and can be attached as figures.

Each solution should include a brief description of the problem (that may be paraphrased from the actual problem) as well as the solution. Take care to see that your written homework solutions are clear and easy to read. Put your solutions to problems in the order that they are assigned. Late homework will be penalized.

Grading

The course grade will be determined from the midterms, (35%) homework (25%) and the final exam (40%).

Suggested Reading (on reserve at Wendt Library)

The course text does not include all of the information covered in this class. There is no one book that does. The following either are or will be on reserve at Wendt Library. You may decide to buy one or more of these in addition to the course text, especially if you feel you need more help with SAS or R.

- Cochran and Cox, Experimental Designs (2nd edition), 1992
  
  Excellent reference for various designs including fractional factorials

- Dean and Voss, Design and Analysis of Experiments, 2000
  
  Class text

- Littell, Milliken, Stroup and Wollinger, SAS System for Mixed Models, 1996
  
  SAS manual for mixed models

  
  SAS manual for linear models

  
  The standard reference on Generalized linear models

  
  SAS manual for linear models

  
  We will be using this reference for working with Mixed models in R.

- Rencher, Linear Models in Statistics, 2000
  
  Technical reference which covers both regression and ANOVA and the connection between the two.

- Snedecor and Cochran, Statistical Methods, (8th edition), 1989
  
  Old but good reference.

  
  Suggested reference for R.