Fall 2005

STAT 8310 - Data Analysis I

Course Description: Applications of linear models including regression (simple and multiple, subset selection, regression diagnostics), analysis of variance (fixed, random and mixed effects, contrasts, multiple comparisons) and analysis of covariance; alternative nonparametric methods.

Prerequisite: STAT 4710/7710 or 4760/7760 or instructor’s consent.

When: 1:00 - 1:50 MWF Where: GCB 114

Instructor: Lori A. Thombs  email: thombsl@missouri.edu

Teaching Assistant: Todd Dewees  email: tadgw3@mizzou.edu

Homepage at University of Missouri:  http://www.stat.missouri.edu/~thombsl/

Curse Homepage:  http://www.stat.missouri.edu/~thombsl/stat8310/index.html

Office: Middlebush 307B  Office Phone: 882-3844

Office Hours:  Monday, 10:00 - 12:00; Wednesday 10:00-11:55, Thursday, 2:00 - 3:00 and by appointment


Homework: Required. Due as assigned. You are permitted to discuss homework problems with your classmates, but when it comes to the “writing up” stage, I would like you to work independently. Also feel free to come see me or email me if you need help.

Grading:

  Two exams - 100 points each
  Homework - 75 points
  Comprehensive Final - 125 points

Some General Advice:

- This class covers a large amount of material. Arrive on time and attend class regularly.
- Don’t be afraid to ask questions if you do not understand an issue. There are no dumb questions!

Academic Dishonesty Statement

Academic honesty is fundamental to the activities and principles of a university. All members of the academic community must be confident that each person’s work has been responsibly and honorably required, developed, and presented. Any effort to gain an advantage not given to all students is dishonest whether or not the effort is successful. The academic community regards academic dishonesty as an extremely serious matter, with serious consequences that range from probation to expulsion. When in doubt about plagiarism, paraphrasing, quoting, or collaboration, consult the instructor.

Special Needs (ADA) Statement

If you have special needs as addressed by the Americans with Disabilities Act (ADA) and need assistance, please notify the Access Office or course instructor immediately. Reasonable effort will be made to accommodate your special needs.
Approximate Outline of Course:

1. Basic Descriptive Statistics (Notes)
   Skewness, kurtosis, assessing normality (graphical, summary statistics)

2. Basic Inference (Notes)
   One sample: Inference for the mean and variance, Type I and II errors, Power, sample size determination
   Two sample: Large sample, test, small sample tests, checking assumptions variance test, sample size determination, matched pairs experiment, nonparametric methods.
   Classification tables
   Pearson Chi-square statistic

3. Simple Linear Regression (Textbook and Notes)
   Basic regression model, least squares estimation,
   Normal error regression inference
   ANOVA in regression, measures of association
   Lack-of-fit tests,
   regression diagnostics and remedial measures
   MLE estimation

4. Multiple regression (Textbook and Notes)
   Matrix notation for regression and ANOVA
   Coefficient of multiple determination
   Partial t-test, generalize testing procedures, partial F-test, Type I and type II Sums of squares
   Multicollinearity, interaction, qualitative predictor variables, model selection methods
   Multiple regression diagnostics and remedial measures
   Model validation

5. Analysis of Designed Experiments (Textbook and Notes)
   Completely randomized designs
   One factor AOV, fixed and random effects
   Two-factor AOV, fixed and random and mixed models
   Randomized block designs
   Analysis of covariance
   Nonparametric methods
   Sample size planning