Course Outline
AM166
Spring Semester 2003

Instructor: D.E. McClure

Course Text: *Mathematical Statistics with Applications*, Sixth Edition, by Wackerly, Mendenhall and Scheaffer, Duxbury Press, 2002. Plus notes for S-Plus and handouts for specific applications.

1) Systematic methods for hypothesis testing (Ch. 10 WSM)

3 weeks. Focus on generic approaches to designing tests, optimality, and how the most familiar tests used for linear models fit into the framework of (generalized) likelihood ratio tests. The pivotal role of the Neyman-Pearson Lemma.

2) Nonparametric Statistics (Ch. 14 §1-3, Ch. 15 §1-6, §10-11)

2 weeks. "Distribution-free" methods. Categorical data. Goodness of fit. Sign test. Methods based on ranks.

3) Introduction to S-Plus (Notes)

1 week. Options will be considered for this part, depending on the backgrounds and preferences of the class. Base introduction on tutorial notes and examples drawn from students' recent experience in AM166 and AM165. Goal is to make students feel comfortable with a state-of-the-art statistics package, not to teach programming.

4) Linear Models (Ch. 11 WSM)

4 to 5 weeks. Simple linear regression and multiple regression. Goal is to convey an understanding of the foundations of standard methods from regression. Lots of applications from daily life: relative safety of SUVs, payback period for insulating a home, hospice data, …

5) Analysis of Variance (Ch. 12-13 WSM)

2 weeks. Emphasize unified framework of linear models as mathematical foundation for methodology. Relate ANOVA to simple tests such as chi square. Applications, such as employment statistics by sex for PhD mathematical scientists.