

Course: Linear Statistical Models
Instructor: Joshua M. Tebbs, Department of Statistics
Class Time: 12.20-1.10pm MWF in 201A LeConte
Prerequisite: STAT 712 or STAT 513/MATH 544
Office: 209G LeConte (tel: 777-5163)
Office Hours: 10.00-11.00 MWF (or by appointment)
email: tebbs@stat.sc.edu
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Required text:

- Monahan, J. (2008). *A Primer on Linear Models*. CRC Press.

Supplementary texts:

- Searle, S. (1971). *Linear Models*. Wiley.
- Searle, S. (1982). *Matrix Algebra Useful for Statistics*. Wiley.
- Rencher, A. (2000). *Linear Models in Statistics*. Wiley.
- Christensen, R. (2002). *Plane Answers to Complex Questions*. Springer.

Overview: The purpose of this course is to provide an introduction to the theory of linear models. STAT 714 has prerequisites of a standard sequence in mathematical statistics and an undergraduate course in linear algebra. This is a theoretical course involving rigorous proofs and derivations. Discussion of results from linear algebra will be incorporated into lectures as needed; however, you are expected to have a strong mastery of this material already.

Objectives: We will cover most of the material in Chapters 1-8 of Monahan. In particular, we will discuss least squares, reparameterization, estimability, the Gauss-Markov model, BLUEs, the Aitken model (and GLS), distributional theory (e.g., multivariate normal, noncentral distributions, independence of quadratic forms, etc.), inference in linear models (e.g., general linear hypothesis, LRT, confidence intervals, multiple comparisons, etc.), sequential SS, orthogonal contrasts, lack-of-fit, and mixed-effects models.

Exam Schedule: We will have two midterm exams (September 26 and November 7). A cumulative final exam is on Thursday, December 11 at 9.00am.

Homework Assignments: There will be 8-12 assignments during the semester. Working together on homework problems is permitted and encouraged, but each student should write up his/her solutions independently of others. Late homework will not be accepted.

Grade Breakdown: Your course grade will be determined by your performance on homework (20 percent), midterm examinations (20 percent each), classroom participation (10 percent), and the final examination (30 percent). Final course grades will be assigned according to a 90-80-70-60 protocol unless suitable adjustment is strongly warranted.