

# Syllabus

Spring 2006

- Course:** Statistics 970, Linear Models  
**Instructor:** Steve Kachman  
**Office:** 355B Hardin Hall  
**Phone:** 472-7302  
**Office Hours:** MWF 10:00-11:00 and by appointment  
**Text Book:** *A First Course in Linear Model Theory*,  
Nalini Ravishanker and Dipak Dey  
**Prerequisites:** Matrix Algebra (Chapters 1 and 2)  
Distributions  
Experimental Design  
Basics of Theory and Inference  
**Homework:** Approximately once a week  
20% will be deducted for each day late.  
**Exams:** Two exams, will be announced at least one week in advance  
**Final Exam:** 10:00 to 12 noon, Wednesday, May 3  
Revise travel plans accordingly.  
**Conflicts:** Expected to take exams at the scheduled time  
If an exam conflicts with an activity vital to your program,  
please have your major advisor contact me well in advance.  
I should be notified as soon as possible of any potential conflicts.  
**Grading:** Exams 200 pts  
Final 150 pts  
Homework and Quizes 100 pts

	Average	Grade
Grading:	at least 90	at least A-
	at least 80	at least B-
	at least 70	at least C-

Web Page <http://statistics.unl.edu/faculty/steve/970/2006/>

The objective of this course is to extend our understanding of the standard linear model based approaches. We will make extensive use of matrix algebra. You will therefore need to become comfortable working with matrices. We will also examine the theory behind these methods. You will therefore need to become comfortable with the distributions of linear and quadratic forms. Because this course does not exist in a vacuum, you will need to be able to relate the theory to the application and the application to the theory.

### Outline

Week	Topics	Book
1	Introduction and Generalized Inverses	3
2	Multivariate Normal Distribution	5.1–5.2
3	Distribution of Quadratic Forms	5.3–5.4
4	Least squares and Estimable Functions	4.1–4.3
5	Gauss-Markov and Generalized Least Squares	4.4–4.6
6	Review & Exam I	
7	Maximum Likelihood	7.5
8	Hypothesis Testing	7.1–7.3
9	Restricted and Reduced Models	7.4
10	SPRING BREAK	
11	Multiple Regression	8.1–8.5
12	Robust and Nonparametric Regression	8.7–8.8
13	Review & Exam II	
14	ANOVA	9.1–9.3
15	Type I and III Hypotheses	
16	Review	