OFFICIAL SYLLABUS
STAT 481- DESIGN AND ANALYSIS OF EXPERIMENTS

(Adopted - Summer 2004)

Catalog Description. Design for experimentation and their statistical inference. One-way, two-way classification; complete and incomplete block designs. Factorial and fractional factorial designs. Response surface designs. Prerequisite: Stat 380 or 480a, b or consent of instructor.
Textbook: Design and Analysis of Experiments, 4th edition, by Douglas C. Montgomery

Course Outline and Topics

Chapter 2 Simple Comparative Experiments
- 2.2 Basic Statistical Concepts
- 2.3 Sampling and Sampling Distributions
- 2.4 Inferences About the Difference in Means, Randomized Designs
- 2.5 Inferences About the Difference in Means, Paired Comparison Designs
- 2.6 Inferences About the Variances of Normal Distributions

Chapter 3 Experiments with a Single Factor
- 3.2 The Analysis of Variance
- 3.3 Analysis of the Fixed Effects Model
- 3.4 Model Adequacy Checking
- 3.5 Practical Interpretation of Results
- 3.6 Sample Computer Output
- 3.7 The Random Effects Model

Chapter 4 More About Single-Factor Experiments
- 4.1 Choice of Sample Size
- 4.2 Discovering Dispersion Effects
- 4.3 Fitting Response Curves in the Single-Factor Model
- 4.4 The Regression Approach to the Analysis of Variance
- 4.6 Repeated Measures
- 4.7 The Analysis of Covariance

Chapter 5 Randomized Blocks, Latin Squares, and Related Designs
- 5.1 The Randomized Complete Block Design
- 5.2 The Latin Square Design
- 5.3 The Graeco-Latin Square Design
- 5.4 Balanced Incomplete Block Designs

Chapter 6 Introduction to Factorial Designs
- 6.1 Basic Definitions and Principles
- 6.2 The Advantage of Factorials
- 6.3 The Two-Factor Factorial Design
- 6.4 The General Factorial Design
- 6.5 Fitting Response Curves and Surfaces

Chapter 7 The 2k Factorial Designs
- 7.2 The 22 Design
- 7.3 The 23 Design
- 7.4 The General 2k Design
- 7.5 A Single Replicate of the 2k Design
- 7.6 The Addition of Center Points to the 2k Design
- 7.7 Yates' Algorithm for the 2k Design

Chapter 8 Blocking and Confounding in the 2k Factorial Design
- 8.2 Blocking a Replicated 2k Factorial Design
- 8.3 Confounding in the 2k Factorial Design
- 8.4 Confounding the 2k Factorial Design in Two Blocks
- 8.5 Confounding the 2k Factorial Design in Four Blocks
- 8.7 Partial Confounding

Chapter 9 Two-Level Fractional Factorial Designs
- 9.2 The One-Half Fraction of the 2k Design
- 9.3 The One-Quarter Fraction of the 2k Design

Any instructor should cover all of the material specified; additional sections are optional.