

DESIGN AND ANALYSIS OF EXPERIMENTS

STAT 8710

Course Description:

Introduction to design and analysis of controlled experiments. The goal of experimental design is to be able to construct an experiment to identify which factors most impact the response and do so in an efficient manner. Statistical software will be used. Types of designs studied include: Randomized Block Designs, Latin Square Designs, Incomplete Block Designs, Factorial Designs, and Nested Designs. **3 credits**

Prerequisites:

MATH 4750/8756 or permission of instructor.

Overview of Content and Purpose of the Course:

Experimental Design and Analysis is one of the 4 core pillars of graduate level statistics (along with a two course mathematical probability and statistics sequency, and a course in linear models).

The purpose of this course is to examine ways to design and analyze controlled experiments, in which treatments are assigned to observational units. Various designs are used so that investigators can maximize their available resources yet still allow for meaningful analysis of the data.

Anticipated Audience/Demand:

Graduate students in Mathematics, Engineering, Business, and Computer Science who are interested in designing experiments and performing appropriate data analysis.

Major Topics:

- 1) Experiments with a Single Factor: The Analysis of Variance
- 2) Randomized Blocks, Latin Squares, and Related Designs
- 3) Introduction to Factorial Design
- 4) The 2^k Factorial Design
- 5) Two-Level Fractional Factorial Designs
- 6) Additional Design and Analysis Topics for Factorial and Fractional Factorial Designs
- 7) Nested and Split-Plot Designs

Methods:

The class will be presented primarily in lecture form with student discussion encouraged. Questions are encouraged in class and out.

Student Role:

Students must attend and participate in class in addition to completing course requirements. Students are expected to do reading and assignments as they are assigned.

Textbook:

Montgomery, D.C. (2012). Design and Analysis of Experiments. Hoboken, NJ, Wiley.

July 2016