

# Experimental Design

Steve Kachman

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## 1 Objective

Both as a consumer and a producer of science it is important to understand the process of conducting research. In this course we will examine the process from the "question stage" to the "report stage" and back again. Along the lines we will examine the statistical tools we have for formulating models, efficiently collecting data, analyzing and interpreting data. By the end the course it is hoped that you will have developed the skills needed to design and analyze simple experiments. It is also important that you understand the underlying concepts. It is the underlying concepts which will allow you to handle situations not specifically covered in the course.

## 2 Topics

1. Completely Randomized Design – ANOVA
2. Planning an experiment
3. Treatment design
  - Factorial
  - Regression (Response Surfaces)
4. Experimental Design
  - Blocking
  - One-way (RCBD ...)
  - Two-way (Latin Square ...)
  - Split Plot (Repeated measures and multi-location)

### 3 Course Information

- Course:** Biometry 802, Experimental Design
- Instructor:** Steve Kachman
- Office:** 104 D Miller Hall
- E-mail:** skachman@unl.edu
- Phone:** 472-2903
- Office Hours:** MWF 11:00-12:00 and by appointment
- Text Book:** *Design of Experiments: Statistical Principles of Research Design and Analysis*, Robert Kuehl
- Prerequisites:** Biometry 801  
Estimation including confidence intervals  
Hypothesis testing  
Analysis of variance  
Regression  
SAS
- Computer Labs:** SAS, details of carrying out the analysis
- 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:** Monday, April 30 7:30–9:30 am  
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  
Quizzes and Homework 100 pts  
Grading will be on a straight 90, 80, 70, 60 percent basis.
- Web Page:** <http://biometry.unl.edu/faculty/steve/802/2001/>