Course Objectives:

The course is designed to expose students to the following fields in experimental design:

1. Review basic principles of experimental statistics.
2. Overview of advanced experimental designs and their analysis.
3. Topics of current interest in experimental statistics not covered in other courses such as: multivariate analysis of variance, nonparametric statistics, categorical data analysis, and related topics in statistical genetics

Learning Outcomes:

(i) knowledge and understanding:

1- Basic concepts of statistical models and use of samples
2- Review analysis of variances and experimental designs
3- Apply advanced methods of statistical analysis

(ii) Intellectual skills (cognitive and analytical):

a. **Achieve maximum power and benefits from designing experiments.**
b. **Ability to interpret results efficiently**

(iii) Subject specific skills:

a. Design wide range of experiments
b. Computer software applications

(iv) Transferable skills

a. Ability to emphasis on laboratory-oriented sciences research problems
b. Using scientific software
c. Internet use and data mining

Course Contents:

1. Fundamental Definitions and Concepts of Design
2. Formulating Design Models
3. Fundamentals of Mixed Model Analyses
4. Analysis of Variances and Simple Experimental Designs
5. Analysis of Covariance
6. PowerCalculations
7. Repeated Measures Designs
8. Incomplete Block Designs
9. Incomplete Block Designs with Confounding
10. Fractional Factorial Designs
11. Response Surface Designs
12. Designs for Mixtures
13. Multivariate Analysis of Variance
14. Nonparametric Statistics
15. Categorical Data Analysis
16. Related Topics in Statistical Genetics
17. Computer Software Applications (SAS Software).

Textbook

Cochran, W. G. and G. M. Cox. 1992 reprint. Experimental Design. John Wiley and Sons Inc.

SAS Links:

SAS Institute: http://www.sas.com/
SAS Institute Technical Support: http://support.sas.com/
SAS 8.x online documentation: http://v8doc.sas.com/sashtml/
SAS 9.0 online documentation:
http://support.sas.com/documentation/onlinedoc/sas9doc.html
SAS 9.1.2 online documentation:
http://support.sas.com/onlinedoc/912/docMainpage.jsp