

Statistics 503: Design of Experiments

Course Syllabus

Fall 2007

Location: 215 Thomas Building Time: Monday and Wednesday 9:05 - 9:55am
Location: 004 Life Sciences Bldg Time: Friday 9:05 - 9:55am.

Professor: James L Rosenberger Email: JLR@psu.edu
Phone: (814) 865-1340 Course materials will be distributed through ANGEL at <cms.psu.edu>
Office Hours: Thursday 2:00-3:00am, and by appointment at 323F Thomas Building .

Teaching Assistant: Isaac Dialsingh
Email: IUD101@psu.edu Office Hours: Monday 1-3pm 301 Thomas Bldg

Course Requirements:

8-10 Homework assignments graded. 40% (10% penalty for late assignments)
Experiment design and analysis Project. 10% (due last week of class)
Two preliminary examinations. 15% each.
Comprehensive final examination. 20%
Final exam date: during Dec. 17-21, 2007

Text: Design and Analysis of Experiments by Douglas C. Montgomery, 6th edition. 2005, Wiley.

Coverage: The course will cover most of the material in the text, chapters 1-15. The students will be required to use statistical computer software to complete many homework assignments and the project. For most assignments the Minitab GLM or SAS Proc GLM and Proc Mixed commands will satisfy the computing requirements. Minitab DOE commands are also utilized.

Syllabus: Preliminary order of material.

1. Introduction - Design Principles
2. Simple Comparative Experiments
3. Single Factor experiments
4. Randomized Blocks, Latin Square Designs and extensions
5. Introduction to Factorial Designs
6. Two level, 2^k , Designs
7. Confounding and Blocking in 2^k Designs
8. 2-level Fractional Factorial Designs
9. 3-level and Mixed-level Factorials and Fractional Factorials
10. Regression models
11. Response Surface Methodology
12. Robust Parameter Designs
13. Random and Mixed Effects Models
14. Nested and Split Plot and Strip Plot Designs
15. Repeated Measures Designs, unbalanced AOV and ANCOVA

References (partial list):

1. Box, GEP, Hunter, WG, and Hunter, JS, 1978, Statistics for Experimenters, Wiley.

2. Box, GEP and Draper, NR 1987, Empirical Model-Building and Response Surfaces, Wiley.
3. Cochran, WG and Cox, GM, 1957, Experimental Designs, Wiley.
4. Fisher, RA, 1966, The Design of Experiments, 8th edit., Hafner.
5. Hinkelmann, K and Kempthorne, O, 1994, Design and Analysis of Experiments (Vol I), Wiley.
6. Pukelsheim, F, 1993, Optimal Design of Experiments, Wiley.
7. Winer, BJ, 1962, Statistical Principles in Experimental Design, 2nd edit., McGraw-Hill.
8. Wu, C.F. Jeff and Michael Hamada, 2000, Experiments: Planning, Analysis, and Parameter Design Optimization, Wiley.

Integrity Policy Notice:

All Penn State and Eberly College of Science policies regarding academic integrity apply to this course. See:
<http://www.science.psu.edu/academic/Integrity/index.html>
for details.

Note to students with disabilities: It is Penn State's policy to not discriminate against qualified students with documented disabilities in its educational programs. If you have a disability related need for modifications in this course, contact your instructor and the Office for Disability Services (located in 116 Boucke Building).