STAT 742: Design and Analysis of Experiments II
Fall Semester 2019

Instructor: Dr. David J. Edwards, Professor

Contact Information:
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Office Hours: 11-12am Monday-Thursday, and by appointment

Course Time and Place: 9:30-10:45am, MW, Harris Hall 2127

Course Prerequisite: STAT 642 or equivalent

Catalog Description: Advanced study of the design and analysis of experiments. Topics include the design and analysis of incomplete block designs, factorial designs, fractional factorial designs, asymmetric factorial designs, blocking in fractional factorial designs, nested designs and response surface designs. Applications involve the use of a statistical software package.

Website: We will be using the Blackboard system at blackboard.vcu.edu for course notes, announcements, assignments, etc. If you are not using your VCU email address, please be sure to have it rerouted to your current email provider.

Textbooks:
2) *A Comprehensive Guide to Factorial Two-Level Experimentation*, 2009, by Robert W. Mee
3) *Optimal Design of Experiments*, 2011, by Peter Goos and Bradley Jones

Other recommended references:
1) *A Modern Theory of Factorial Designs*, 2006, by Rahul Mukerjee and CFJ Wu
2) *Design and Analysis of Experiments, Volume II: Advanced Experimental Design*, 2006, by K. Hinkelmann

Software: We will make use of JMP, SAS, R, and/or MATLAB

Course grade determination:
• Homework: 40%
• Literature Study: 10%
• Midterm Exam: 25%
• Final Exam: 25%
Course Topics:
I. Two-Level Designs
   A. Regular Fractional Factorial Designs/Minimum Aberration
   B. Nonregular Designs and Orthogonal Arrays
   C. Sequential Experimentation
   D. Supersaturated Designs and Analysis

II. Designs with More Levels and Response Surface Designs
   A. Definitive Screening Designs
   B. Response Surface Designs (orbits) and Ridge Analysis
   C. One-Step RSM
   D. Multiple Response Optimization
   E. Mixture Experiments

III. Additional Topics
   A. Robust Parameter Design
   B. Optimal Experimental Design
   C. Partial Replication
   D. Computer Experiments
   E. Other topics of interest to the class

Journal Article Reading/Summary/Discussion:
10% of your grade will be determined based on article summaries and discussion for 4 recent articles in the design and analysis of experiments.

Conditions on source of articles and your report:
1. You are free to select any journal article or case study on design or analysis of experiments from 2010-2019.
2. You should read and report on at least one article from two of the following journals: Quality and Reliability Engineering International, Quality Engineering, Journal of Quality Technology, Technometrics
3. Submit each choice to me for approval at least one week before the discussion date. I’ll let you know if the article is acceptable.

Your report (maximum of two typed pages) must contain: 1) Article title and authors, 2) Journal name, date, and page numbers, 3) Your summary, and 4) Your name

Due Dates with topics:
1) Sept. 11 – something on two-level designs
2) Oct. 9 – something on follow-up experimentation or nonregular designs
3) Nov. 6 – something on optimal design of experiments
4) Dec. 4 - something on response surface methodology or definitive screening designs

Students should visit http://go.vcu.edu/syllabus and review all syllabus statement information. The full university syllabus statement includes information on safety, registration, the VCU Honor Code, student conduct, withdrawal and more.