

STAT- 816 Factorial Experiments (3 Credit Hours)

1. Objectives

This course aims to introduce students to the range of advanced experiential design techniques where several factors are implemented as full or fractional design.

2. Course Contents

Basic designs, a review and analysis with unequal subclass numbers. Two-level factorial designs. Confounding in 2^n factorial designs. Partial confounding in 2^n factorial designs. Designs with factors at three levels. Analysis of 3^n experiments. Mixed factorial experiments. Fractional factorial designs. Fractional replication and alias structure. Series of experiments in time and space. Analysis of response surfaces/designs. General symmetrical factorial designs. Related applications/computations with R.

3. Recommended Books

- i. Wu, CF Jeff and Hamada, Michael S., Experiments: planning, analysis, and optimization, John Wiley Sons, 2nd Edition (2011).
- ii. Montgomery, D.C., Design and Analysis of Experiments, Wiley, 10th Edition, (2019)
- iii. Box, Hunter, and Hunter, Statistics for experimenters, Wiley, 2nd Edition, (2005).
- iv. Garcia-Diaz, Alberto, Phillips, Don T, Jr. Auth, Principles of Experimental Design and Analysis, Chapman and Hall, (1995).
- v. Cox, D.R., Reid, N. The Theory of the Design of Experiments, Chapman and Hall (2000).
- vi. Eriksson, L. Design of Experiments: Principles and Applications. MKS Umetrics AB, Publishers (2008).

4. Outcomes

On successful completion of this course, students will be able to implement advanced experiential design techniques where several factors are implemented as full or fractional design.