

Analysis of variance and design of experiment-I - Web course

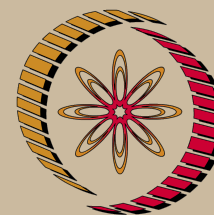
COURSE OUTLINE

The course of Analysis of Variance and Design of Experiments is developed in two parts. The course focuses on the topics of statistical design of experiments from the linear model's perspective. The emphasis will be more on the theoretical concepts and how the tests are developed. How to execute them in real life will also be detailed. This course presents various types of analysis of variance along with the description of related designs of experiment.

The Part 1 of the course starts from the basic background about the linear models. It builds up the concepts of statistical theory needed to develop the tests for general linear hypothesis and understanding the basics in analysis of variance. It first derives and relates the likelihood ratio test procedure for several different types of hypothesis and later relates it to the test procedure based on the various sum of squares in the usual analysis of variance. The course starts with the detailed development of one way and two way analysis of variance (with and without interaction) along with various multiple comparison tests in complete block designs. The fundamentals behind the experimental design will be explained and their analysis will be presented. In particular, the completely randomized, randomized block and Latin squares designs will be described. Then it explains the analysis of covariance in one way and two way classification. The analysis of variance in 2^n factorial experiments in block designs is discussed. The concept and use of confounding in 2^n factorial experiments is explained. The use and analysis of cross over designs is also discussed.

COURSE DETAIL

Module No.	Topics	No. of Lectures
1	Theory of linear models	2
2	General linear hypothesis and analysis of variance	6
3	One way analysis of variance of fixed effect model	4
4	Multiple comparison tests	2
5	One way analysis of variance of random effect model	2
6	Two way analysis of variance without interaction	2
7	Two way analysis of variance with interaction	2
8	Two way analysis of variance of non-orthogonal data	2



NP-TEL

NPTEL

<http://nptel.iitm.ac.in>

Mathematics

Pre-requisites:

Knowledge of basic statistics

Additional Reading:

1. M.D. Morris: Design of experiments- An introduction based on linear models, CRC Press, 2011.
2. G. Casella: Statistical Design, Springer, 2008.
3. D. D. Joshi: Linear estimation and design of experiments. Wiley eastern 1987
4. H. Sahai and M.I. Ageel: The analysis of variance-Fixed, random and mixed models, Springer, 2001

Coordinators:

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9	Principles of design of experiments	1
10	Experimental designs and their analysis- completely randomized design, randomized block design and Latin square design	4
11.	Analysis of covariance in one way and two way classifications	4
12.	2n Factorial experiments	4
13.	Confounding in 2n Factorial experiments	3
14	Cross over design	2
	Total	40

References:

1. H. Toutenburg and Shalabh: Statistical Analysis of designed experiments, Springer 2009
2. D. C. Montgomery: Design & Analysis of Experiments, 5th Edition, Wiley, 2001