

<b>7<sup>th</sup> Semester</b>	<b>RPR7D003</b>	<b>Design of Experiments</b>	<b>L-T-P 3-0-0</b>	<b>3 Credits</b>
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**Module-I:****(10 hours)**

Simple Comparative Experiments

Basic Statistical Concepts, Hypothesis Testing, Choice of Sample Size, the Paired Comparison Problem, Hypothesis testing, confidence intervals, choice of sample size, Interferences about the differences in means, randomized designs.

Experiments with a Single Factor: The Analysis of Variance.

The analysis of variance, Analysis of the fixed effects model, Model Adequacy Checking, Single Factor Experiment, Application of a Designed Experiment, Discovering Dispersion Effects, practical interpretation of results. Sample computer output, Determining sample size.

**Module-II:****(10 hours)**

Randomized Blocks, Latin Squares, and Related Designs.

The randomized complete block design, The latin square design, The graeco - Latin square design, Balanced incomplete block designs, statistical analysis of the BIBD, Least squares of estimation of the parameters.

**Module-III:****(10 hours)**

Introduction to Factorial Designs.

Basic definitions and principle, The advantage of factorials, The two factor factorial design,

The general factorial design, Fitting response curves and surfaces, Blocking in a factorial design,

The  $2^k$  Factorial Design

The  $2^2$  design, The  $2^3$  Design, The general  $2^k$  Design, A Single Replicate of the  $2^k$  Design, Data Transformation in a Factorial Design, Duplicate Measurements on the Response, Credit Card Marketing.

**Module IV:(10 hours)**

Two-Level Fractional Factorial Designs

The One-Half Fraction of the  $2^k$  Design, The one quarter fraction of the  $2^k$  design. The general  $2^{k-p}$  fractional factorial design, Resolution III designs, Resolution IV and V Designs. Three-Level and Mixed-Level Factorial and Fractional Factorial Designs

The  $3^k$  Design, Confounding in the  $3^k$  factorial design, The Spin Coating Experiment, An Experiment with Unusual Blocking Requirements

**Books:**

[1] Design & Analysis of Experiments- D.C. Montgomery, John Wiley & Sons.

[2] Design and Analysis of Experiments- J. Antony, Butterworth-Heinemann.

***Digital Learning Resources:***

Course Name: Design and Analysis of Experiments

Course Link: <https://nptel.ac.in/courses/110/105/110105087/>

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