

|           |                                                        |                   |
|-----------|--------------------------------------------------------|-------------------|
| Hard Core | <b>STH 452: DESIGN AND ANALYSIS<br/>OF EXPERIMENTS</b> | No. of credits: 4 |
|-----------|--------------------------------------------------------|-------------------|

#### Course Outcomes:

CO1: Construct and analyze incomplete block designs, Latin square designs and Youden square designs.

CO2: Identify the effects of different factors and their interactions and analysis of factorial experiments.

CO3: Construct complete and partially confounded factorial designs and their analysis.

CO4: Able to analyze the experimental designs with missing values.

#### Unit I

Gauss-Markov set-up, normal equations and least squares estimators, error and estimation spaces, Variances and Covariances of least squares estimates, estimation of error variance, least squares estimators, simultaneous estimates of linear parametric functions.

Tests of hypothesis for one and more than one linear parametric functions, Confidence intervals and regions, multiple comparison tests, simultaneous confidence intervals. (13 hrs)

#### Unit II

Introduction to designed experiments, General block design information matrix (C-matrix) and its properties; connectedness, balance and orthogonality, Intra block analysis (contrast estimators, multiple comparisons and testing of linear hypothesis). (13 hrs)

#### Unit III

Balanced incomplete block design (BIBD) – Definition and relations among the parameters, Intrablock analysis. Youden square design (YSD). Intra Block Analysis of YSD (13 hrs)

#### Unit-IV

General factorial experiments, factorial effects - best estimators and testing the significance of factorial effects, study of 2 and 3 level factorial experiments in randomized blocks; complete and partial confounding of 2 and 3 level symmetric factorial experiments; notion of fractional factorial experiments for factors with 2 levels. (10 hrs)

  
Chairman  
P.G. BOS in Statistics  
Mangalore University  
Mangalagangothri - 574 199

## Unit V

Analysis of covariance for CRD and RBD designs. Missing plot techniques for RBD.  
(07 hrs)

### References:

- 1) Aloke Dey (1986): Theory of Block Designs, Wiley Eastern.
- 2) Angela Dean and Daniel VOSS (2017): Design and Analysis of Experiments, 2<sup>nd</sup> edition. Springer.
- 3) Das M.N. and Giri N.C. (1979): Design and Analysis of Experiments, 2<sup>nd</sup> Ed., Wiley.
- 4) Giri N.C. (1986): Analysis of Variance. South Asian Publishers.
- 5) Hinkleman and Kempthorne C. (1994): Design and Analysis of Experiments, Vol.I, John Wiley.
- 6) Joshi D.D. (1987): Linear Estimation and Design of Experiments, Wiley Eastern.
- 7) Montgomery D.C. (2001): Design and Analysis of Experiments, John Wiley.
- 8) Rao C.R. (1973) Linear Statistical Inference and its Applications. Wiley Eastern.
- 9) R B Bapat (2011), "Linear Algebra and Linear Models", Hindustan Book Agency.
- 10) Parimal Mukhopadhyay (1999) "Applied Statistics", Books and Applied.

