AG. STAT. 512 EXPERIMENTAL DESIGNS 2+1

Objective

This course is meant for students of agricultural and animal sciences other than Statistics. Designing an experiment is an integrated component of research in almost all sciences. The students would be exposed to concepts of Design of Experiments so as to enable them to understand the concepts involved in planning, designing their experiments and analysis of experimental data.

Theory

UNIT I

Need for designing of experiments, characteristics of a good design. Basic principles of designs- randomization, replication and local control.

UNIT II

Uniformity trials, size and shape of plots and blocks; Analysis of variance; Completely randomized design, randomized block design and Latin square design.

UNIT III

Factorial experiments, (symmetrical as well as asymmetrical). orthogonality and partitioning of degrees of freedom, Confounding in symmetrical factorial experiments, Factorial experiments with control treatment.

UNIT IV

Split plot and strip plot designs; Analysis of covariance and missing plot techniques in randomized block and Latin square designs; Transformations, crossover designs, balanced incomplete block design, resolvable designs and their applications ~ Lattice design, alpha design - concepts, randomisation procedure, analysis and interpretation of results. Response surfaces. Experiments with mixtures.

UNIT V

Bioassays- direct and indirect, indirect assays based on quantal dose response, parallel line and slope ratio assays potency estimation.

Practical

Uniformity trial data analysis, formation of plots and blocks, Fairfield Smith Law; Analysis of data obtained from CRD, RBD, LSD; Analysis of factorial experiments without and with confounding; Analysis with missing data; Split plot and strip plot designs; Transformation of data; Analysis of resolvable designs; Fitting of response surfaces.

Suggested Readings

Cochran WG & Cox GM. 1957. *Experimental Designs* . 2nd Ed. John Wiley.

Dean AM & Voss D. 1999. *Design and Analysis of Experiments* . Springer.

Federer WT. 1985. *Experimental Designs* . MacMillan.

Fisher RA. 1953. *Design and Analysis of Experiments* . Oliver & Boyd.

Nigam AK & Gupta VK. 1979. *Handbook on Analysis of Agricultural Experiments* . IASRI Publ.

Pearce SC. 1983. *The Agricultural Field Experiment: A Statistical Examination of Theory and Practice* . John Wiley.

Design Resources Server: www.iasri.res.in/design.