COURSE 3: DESIGN AND ANALYSIS OF EXPERIMENTS

Theory	Credits: 3	3 hrs/week

I.   Learning Outcomes

After successful completion of the course students will be able to:
1. To acquaint with the role of statistics in different fields with special reference to agriculture.
2. Learn to apply the one of the design of experiment to agricultural fields.
3. Learn to apply the randomization to the blocks of various fields in agriculture.
4. To get the familiarity about applications of three principles.
5. Learn to deal the agricultural fields with different factors and levels.
6. To use appropriate experimental designs to analyze the experimental data.

II.   Syllabus

Unit – 1: Analysis of variance (ANOVA)
Concept, Definition and assumptions.   ANOVA one way classification – mathematical model, analysis – with equal and unequal classification. ANOVA two way classification – mathematical model, analysis and problems.

Unit – 2: Completely Randomised Design (CRD)
Definition, terminology, Principles of design of experiments, CRD – Concept, advantages and disadvantages, applications, Layout, Statistical analysis. Critical Differences when hypothesis is significant.

Unit – 3: Randomised Block Design (RBD)
Concept, advantages and disadvantages, applications, Layout, Statistical analysis and Critical Differences. Efficiency of RBD relative to CRD. RBD with one missing value and its analysis, problems.

Unit – 4: Latin Square Design
Concept, advantages and disadvantages, applications, Layout, Statistical analysis and Critical Differences. Efficiency of LSD over RBD and CRD. Estimation of one missing value in LSD and its analysis, problems.

Unit – 5: Factorial experiments
Main effects and interaction effects of 2^2 and 2^3 factorial experiments and their Statistical analysis. Yates procedure to find factorial effect totals.

Practical   Credits: 1   2 hrs/week

Practical Syllabus

1. ANOVA - one - way classification with equal number of observations.
2. ANOVA - one - way classification with unequal number of observations.
3. ANOVA Two-way classification.
4. Analysis of CRD and critical differences.
5. Analysis of RBD and critical differences. Relative efficiency of CRD with RBD.
6. Estimation of single missing observation in RBD and its analysis.
7. Analysis of LSD and efficiency of LSD over CRD and RBD.
8. Estimation of single missing observation in LSD and its analysis.
9. Analysis of 2^2 with RBD layout.
10. Analysis of 2^3 with RBD layout.

Note: Training shall be on establishing formulae in Excel cells and derive the results. The excel output shall be exported to MS word for writing inference.

I. References
1. S. C. Gupta & V. K. Kapoor: Fundamentals of Applied Statistics, Sultan Chand&Sons, New Delhi.
2. K.V.S. Sarma: Statistics Made Simple: Do it yourself on PC. PHI.
3. M. R. Saluja: Indian Official Statistics. ISI publications.

II. Suggested Co-curricular Activities:
1. Training of students by related industrial experts
2. Assignments including technical assignments if any.
3. Seminars, Group Discussions, Quiz, Debates etc on related topics.
4. Preparation of audio and videos on tools of diagrammatic and graphical representations.
5. Collection of material/figures/photos/author photoes of related topics.
6. Invited lectures and presentations of stalwarts to those topics.
7. Visits/field trips of firms, research organizations etc.