Unit - II   Design of Experiments

1. Introduction

2. Completely radomized design (CRD)

3. Randomized block design. (RBD)

4. Latin square design (LSD)

5. 2^2 Factorial design (Assignment)

Introduction:

Design of experiment is the logical construction of experiment in which the degree of uncertainity with which the inference is drawn may be well defined.

The design of experiments includes

1. Planning of experiment

2. Obtaining relevant information from the experiment

3. Making the statistical analysis of data.

Basic principles of experimental design:

The basic principles are

1. Replication - Repeatation of treatment

2. Randomization - Randomly assigned the treatment to experimental units

3. Local control - Process of making experimental units homogeneous & reducing the experimental error.

Analysis of Variance (ANOVA)

It is a powerful statistical tool for test of significance. The test of significance using t-distribution is an adequate procedure only for testing the significance of the difference between 2 sample means.

In a situation where we have more than 3 samples to consider at a time an alternate procedure is needed for testing the hypothesis that all samples are drawn from same population. Here we use the technique of ANOVA & the purpose of this analysis is to test the homogenity of several means.

Assumptions for ANOVA test:

* The observation are independent
* Parent population from which observation are taken is normal.
* The samples have been randomly selected from the population

Under the null hypothesis H_0 all population means are equal. We use the variance ratio or F-ratio, which is

$$F = \frac{\text{Variance b/w the samples}}{\text{Variance within the samples}}.$$

There are 3 important design of experiments.

1. Completely Radonized design (1 way classification)
2. Randomized Hock design (2 way classification)
3. Latin square design (3 way classification)