

Course Title:	Experimental Design
Course Code:	STAT-301
Semester:	V
Credit Hours:	3 Credit Hours
Pre-requisites:	N / A

Learning Outcomes

By the end of this course, students will be able:

1. To have sound understanding of basic principles of experimental design.
2. To learn about applications of basic experimental designs.
3. To learn the layout and covariance analysis of different experimental designs.
4. To estimate the missing observations.
5. Learn the concept of Factorial experiments and its various dimensions.
6. Ascertain the knowledge of split-plot designs and its applications.
7. Identify the different types of Incomplete Block designs.

Course Outline

Unit 1

Basic Designs of Experiment

Introduction. Basic Principles of Experimental Design. Basic Designs of Experiment (CRD, RCB, LSD): Theory and Applications, Estimation of Missing Observations, Relative Efficiency. Basic concepts of Fixed, Random and Mixed effect models.

Unit 2

Incomplete Block Designs

Incomplete Block Design. Balanced incomplete block design. Youden Square Design.

Unit 3

Covariance Analysis of Experimental Designs

Covariance analysis for Completely Randomized and Randomized Complete Block designs – Theory and Applications.

Unit 4

Factorial Designs

Factorial Design with Applications. Yates Technique for Computing Contrast. Single Replicate Factorial Design. Split Plot Design and Applications.

- **Teaching-learning Strategies:**

Class Lecture method, which includes seminars, discussions, assignments and projects. (Audio-visual tools are used where necessary)

- **Assignments-Types and Number with calendar:**

According to the choice of respective teacher.

- **Assessment and Examinations:**

According to the University's Semester Rules.

Sr. No.	Elements	Weightage	Details
1	Midterm Assessment	35%	It takes place at the mid-point of the semester.
2	Formative Assessment	25%	It is continuous assessment. It includes: Classroom participation, attendance, assignments, and presentations, homework, attitude and behavior, hands-on-activities, short tests, quizzes etc.
3	Final Assessment	40%	It takes place at the end of the semester. It is mostly in the form of a test, but owing to the nature of the course the teacher may assess their students based on term paper, research proposal development, field work and report writing etc.

Text Books

1. Cochran, W.C., & Cox, G.M. (1992). *Experimental Design* (2nd ed.). John Wiley and Sons, New York.
2. Montgomery, D.C. (2012). *Design and Analysis of Experiments*, John Wiley & Sons, New York.

Suggested Readings

1. Clewer, A. G. (2001). *Practical Statistics and Experimental Design for Plant and Crop Science*. John Wiley and Sons, New York.
2. Jeff Wu, C.F. (2002). *Experimental: Planning Analysis*. John Wiley and Sons, New York.
3. Kuehl, R.O. (2000). *Design of Experiments: Statistical principles of research design and analysis*. Duxbury, Boston.
4. Quinn Gerry, P. (2002). *Exp. Design and Data Analysis for Biologists*. Cambridge Press, Cambridge.
5. Steel, R.G.D., Torrie, J.H., & Dickey, D.A. (2008). *Principles and Procedures of Statistics: A Biometrical Approach*. McGraw-Hill, Michigan, USA.