

**DEPARTMENT OF STATISTICS FORMAN CHRISTIAN COLLEGE, LAHORE**

**(A Chartered University)**

**Instructor Information:**

Consultation: S –423

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**Course Information:**

Title: Experimental Design – I (Prerequisite: STAT-202)

Code: STAT-302

Credits: 3

Room: S- 420

Section: A

Timings: Monday, Wednesday, and Friday (12 to 12: 50)

**Recommended Books:**

Choudhry, S.M. and Kamal S.,”Introduction To Statistical Theory Part-II”, Caravan Publisher

• Montgomery, D. C. Larry J. Stephens, “Design & Analysis of Experiments” John Wiley, New York (1997)

• Paul D. Berger. Robert E. Maurer, “Experimental Design with Applications in Management Engineering, and the Sciences” Thomson Asia, Singapore (2002)

**Course Objectives:**

This course is intended to enhance students, the principles and techniques of experimental design transcend the area of their application; Estimation of the missing observations in the basic designs.

The use of experimental design in developing products that are robust to environmental factors and other source of variability.

**Learning outcomes:**

At the end of the course the student will:

- 1.Be able to explain the strategy of experimentation,
- 2.Identify the applications of experimental design,
- 3.Be able to distinguish between CR, RCB and Latin Square Designs,
- 4.Be able to calculate fixed and random effect models.

5. Be able to understand and calculate Covariance model.

**Course Requirements:**

Statistical thinking will be helpful. Basic mathematical skills are also helpful. Students know the use of computer skills. Students are required to apply themselves diligently to the course of study and to prepare class and homework assignments as given. Class tests and quizzes will be announced in the class. The assignments and project will have to be completed on time. Regularity and punctuality in the class is essential.

**Course Contents:**

Principles of Design of experiments, ANOVA, covariance and underlying assumptions. Model and analysis of CR, RCB and Latin Square designs. Fixed, random and mixed effect models. Practice with soft wares SPSS or R

Course Evaluation: Course grading is based on the following criteria:

- At least 2 Quizzes (worth 10% of the final grade)
- At least 2 Assignments (worth 10% of the final grade)
- 1 Case Study/Project (worth 10% of the final grade)
- Midterm exam (worth 25% of the final grade)
- Final exam (worth 40% of the final grade)
- Class Participation (worth 05% of the final grade)

Note:

- Late submission of the assignments will result in deduction of marks.
- Students are expected to do their own work on all assignments.
- Academic dishonesty and / or plagiarism will result in the assignment of ‘F’ for the course grade and other university sanctions as they may apply.

**Class Attendance and missed-exam Policy:**

Students are required to attend all the class sessions in the course. Irregular are far likely to meet the requirements of the course. Frequent absentees from classes may cause zero credit from class participation marks. Student shall not be permitted to sit in the final examination in case of attendance below 67%. Students are advised strictly to not to miss any exam under any circumstances. A make-up exam will be allowed only under very special circumstances and subject to the approval of the head of the department.

**The Grading Criteria:**

As per Baccalaureate Student Handbook page number 31

**Course Schedule:**

Week #	Topics
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<b>1</b>	Principles of Design of experiments,
<b>2</b>	ANOVA, Multiple Comparison tests.
<b>3</b>	Layout analysis and related efficiency of CRD. Quiz -1 , Assignment 1
<b>4</b>	Layout analysis and related efficiency of RCBD.
<b>5</b>	Layout analysis and related efficiency of LSD.
<b>6</b>	Estimation of missing observations in CRD. Estimation of missing observations in RCBD Quiz -2
<b>7</b>	Estimation of missing observations in LSD.
<b>8</b>	Applications of CR, in different fields. Assignments 2.
<b>9</b>	Applications of RCBD and LSD in different fields.
<b>10</b>	Introduction to fixed effect models. Mid Semester Exam.
<b>11</b>	Applications of CR, RCBD and LSD in different fields. Assignments 2.
<b>12</b>	Uses of all models in real life examples.
<b>13</b>	Estimation of Missing observations through Covariance method. Assignments 3.
<b>14</b>	Effect of violation of assumptions underlying ANOVA.
<b>15</b>	Project Presentations. Quiz -4
<b>16</b>	Final Exams
<b>17</b>	Grading break