IE 603
DESIGN AND ANALYSIS OF INDUSTRIAL EXPERIMENTS

I. GENERAL INFORMATION

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II. TEXTBOOK & ADDITIONAL MATERIAL (AVAILABLE IN BLACKBOARD)

1. **PRINCIPLES OF EXPERIMENTAL DESIGN AND ANALYSIS**

   Alberto Garcia-Diaz and D.T. Phillips

   Chapman & Hall, New York, 1995

2. **READING GUIDE**

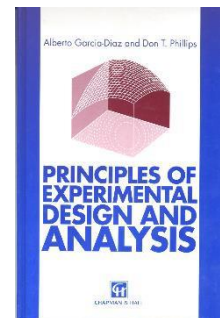   To accompany *PRINCIPLES OF EXPERIMENTAL DESIGN AND ANALYSIS*

   Alberto Garcia-Diaz

3. **AN INTRODUCTION TO LINEAR MODELS**

   Adapted from *An Introduction to Linear Statistical Models*, Graybill, F.A., McGraw-Hill, 1961

4. **POWER POINT PRESENTATION**

   Alberto Garcia-Diaz

III. RECOMMENDED BOOKS

1. **Statistics for Experimenters**

   Box, Hunter and Hunter; John Wiley & Sons.

2. **The Design and Analysis of Industrial Experiments**

   Edited by O.L. Davies; Hafner Publishing Company.

3. **An Introduction to Linear Statistical Models**

Graybill, F.A., McGraw-Hill, 1961

4. **Orthogonal Arrays: Theory and Practice**

Hedayat, A.S., Sloane, N.J.A., Stufken, John, *Springer Series in Statistics*, 1999

IV. OFFICE HOURS

TBA

V. GRADE DISTRIBUTION

Homeworks   35%

Project   35%

Exam   30%

V. COURSE CONTENT

1. After-ANOVA Tests (Chapter 4)

   A. Orthogonal Contrasts (Section 4.1)

   B. Scheffe's Method (Section 4.2)

2. Blocking in Factorial Designs

   - Introduction, Block Size and Blocking Variables for Two-Level Designs (Section 9.2)

   - Partial Confounding and Total Confounding for Two-Level Designs (Section 9.3)

   A. ANOVA for Partial Confounding

   B. Recovery of Inter-Block Information

3. Replication of Latin Square, Graeco-Latin Square, Balanced Incomplete Block and Youden Square Designs (Section 6.1.2)

4. Fundamental Theory of Linear Statistical Models

   - Theoretical Results (Reading Guide provided through Blackboard)

   - Least-Squares Significance Test with Linear Models (Section 5.6)

   A. One-Factor Experiments without Restriction on Randomization (Section 3.5)

   B. Complete Block Designs without Interaction (Section 5.6.1)

   C. Balanced Incomplete Blocks (Section 5.6.2)

   D. Block Designs with Interaction (Section 5.6.3) E. Missing Values (Section 5.7)

5. Introduction to Orthogonal Arrays (Reading Guide)
   - Full and Fractional Symmetric and Mixed Designs
   - Blocking in General Factorial Designs (Mixed Orthogonal Arrays)
   - Linear Models: Mixed designs with different sample sizes for the experimental conditions
6. Orthogonal Main-Effect Plans (Reading Guide)

VI. PRE-REQUISITES

1. EM 542 (DOE for Engineering Managers)
2. Linear Algebra