STA 312: EXPERIMENTAL DESIGNS I (3 Credit hours)

**Pre-requisite:** STA 221

**Purpose**   
To guide the learner in planning and designing of experiments in real life situations.

**Expected learning outcome**   
By the end of the course, students should be able to:   
 i. State and explain the principles of experimentation. ii. Plan, design and investigate an experimental procedure.

**Content**   
Principles of experimentation: randomization, replication and local control; Technique error control; Analysis of variance, pure random and mixed models; Applications to simple experimental designs like completely randomized, Latin squares, randomized blocks and Graeco-Latin squares; Analysis of three-way classification model; Missing plot technique; Construction of orthogonal (DIB) designs; Simple factorial designs.

**Mode of delivery**

Lectures, class demonstrations, oral presentations by the students, group discussions and Tutorials:

practical exercises.

**Instructional materials**   
Black and white board, chalk, white-board marker, duster, computer and projector.

**Core References**   
Dean, A. and Voss D. (1998). *Design and Analysis of Experiments*. Springer: New York: John Wiley & Sons, Inc.

Gupta S.C. and Kapoor, V. K. (1978). *Fundamentals of mathematical Statistics*. New Delhi: Sultan Chand and Sons.

Kuehl, R. O. (1994). *Statistical Principles of Research Design and Analysis*. California: Belmont,.

Montgomey C. D. and Runger C. G. (2003). *Applied Statistics and probability for*  *Engineers*. New York: John Wiley & Sons, Inc..

Rao, P. S.R.S. (2000). *Sampling Methodologies with Applications*, New York: Chapman & Hall/CRC.

Soong, T.T. (2004). *Fundamentals of Probability and Statistics for Engineers*. New York: John Wiley & Sons, Inc..

Spiegel, M. R., John S. and Srinivasan, R. A. (2001). Probability and Statistics, Third Edition; Schaum’s Outline Series. New York: McGraw-Hill.