16SC724 STATISTICAL AND PROBABILISTIC MODELING IN CIVIL ENGINEERING 3-0-0-3

The Role of Statistics and Probability in Civil Engineering, Elements of Probability theory: random variables, random events, Bayes theorem, Common Probabilistic models: models for Simple discrete random trails, Random occurrences and Limiting cases; Modeling of Observed data and Estimation of model parameters- Maximum likely hood, K-means; Probabilistic Models for Civil Engineering problems.

Numerical Modeling and Descriptive statistics, Hypothesis testing for civil engineering studies-Significance level, Tests Concerning the Mean of a Normal Population, Variance of a Normal Population, Equality of Means of Two Normal Populations, Case of Unknown and Unequal Variances, Hypothesis Tests, The Paired t-Test, Normal Population, Null and Alternate Hypothesis, Interval Estimation and Selection of Training data.

Sample size estimation and Field data training for civil engineering studies, Sampling distribution and Point estimation of parameter, Regression models- simple linear and multiple linear models, Parameter Estimation, Least Squares Estimators of the Regression Parameters, Statistical Inferences, Distribution of the Estimators, Coefficient of Determination, NSE and MSE, Real time Case studies and Applications.

TEXT BOOKS/ REFERENCES:

1. Ang A. H-S. and W. H. Tang, “Probability Concepts in Engineering Planning and Design”, John Wiley & Sons, Inc., USA, 2010.
2. Papoulis, A, and S. U. Pillai, “Probability, Random Variables and Stochastic Processes”, McGraw-Hill, New York, USA, 2002.
3. Richard A. Jonson and C. B. Gupta, “Miller and Freund’s Probability and Statistics for Engineers”, Pearson Education, Inc., USA, 2005.
4. Sheldon Ross, “Introduction to Probability and Statistics for Engineers and Scientists”, Elsevier, USA, 2004.