

Random Variable and Distributions: Probability – random variable – discrete and continuous distribution functions – marginal and joint distributions – functions and transformation of random variables - mathematical expectations – moment generating functions and characteristic functions – standard distribution functions and applications.

Multivariate Random Variables: Bivariate and multivariate random variables and distributions- variance and covariance matrix – correlation - regression lines and curves - confidence interval for regression – tests for simple correlation and regression coefficients – rank correlation test.

Theory of Estimation: Population and – sampling distributions – central limit theorem – determination of sample size – t, F and Chi-square distributions – theory of estimation – point and interval estimation methods – Bayesian methods of estimation.

Hypothesis Testing and Statistical Quality Control: Testing of hypothesis – type-I and type-II errors and critical region – Normal, t, F and Chi-square based tests – p-value - nonparametric tests – sign test, signed rank test and run test. Analysis of variance – one-way and two-way ANOVA – multiple comparison tests - statistical quality control – control charts for variables and control charts for attributes.

TEXT BOOKS / REFERENCES:

1. Douglas C. Montgomery and George C. Runger, “*Applied Statistics and Probability for Engineers*”, Third Edition, John Wiley, 2008.
2. J Ravichandran, “*Probability and Statistics for Engineers*”, First edition, Wiley, 2012.
3. Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers and Keying Ye, “*Probability and Statistics for Engineers and Scientists*”, Eighth Edition, Pearson Education, 2007.