

**OBJECTIVE**

To impart the fundamental knowledge about various statistical techniques and basic concepts of probability.

**OUTCOME**

- To make the students acquire a sound knowledge in statistical techniques that model engineering problems.
- The Students will have a fundamental knowledge of the concepts of probability.

**UNIT I RANDOM VARIABLES**

Discrete and Continuous random variables – Moments – Moment generating functions – Binomial, Poisson, Geometric, Uniform, Exponential, Gamma, Weibull and Normal distributions - Functions of a random variable.

**UNIT II TWO-DIMENSIONAL RANDOM VARIABLES**

Joint distributions – Marginal and Conditional distributions – Covariance – Correlation and Linear regression – Transformation of random variables – Central limit theorem (for independent and identically distributed random variables).

**UNIT III TESTS OF SIGNIFICANCE**

Sampling distributions - Tests for single mean, proportion, Difference of means (large and small samples) – Tests for single variance and equality of variances –  $\chi^2$ -test for goodness of fit – Independence of attributes – Non-parametric tests: Test for Randomness and Rank-sum test (Wilcoxon test).

**UNIT IV DESIGN OF EXPERIMENTS**

Completely randomized design – Randomized block design – Latin square design -  $2^2$  - factorial design - Taguchi's robust parameter design.

**UNIT V STATISTICAL QUALITY CONTROL**

Control charts for measurements (  $\bar{X}$  and R charts) – Control charts for attributes (p, c and np charts) – Tolerance limits - Acceptance sampling.

**TEXT BOOKS**

1. Milton, J. S. and Arnold, J.C., "Introduction to Probability and Statistics", Tata McGraw Hill, New Delhi, 4<sup>th</sup> Edition, 3<sup>rd</sup> Reprint, 2008.
2. Johnson, R.A. and Gupta, C.B., "Miller and Freund's Probability and Statistics for Engineers", Pearson Education, Asia, 8<sup>th</sup> Edition, 2011.

## REFERENCES

1. Devore, J.L., "Probability and Statistics for Engineering and the Sciences", Thomson Brooks/Cole, International Student Edition, New Delhi, 7<sup>th</sup> Edition, 2008.
2. Walpole, R.E., Myers, R.H., Myers, S.L. and Ye, K., "Probability and Statistics for Engineers and Scientists", Pearson Education, Asia, 8<sup>th</sup> Edition, 2007.
3. Ross, S.M., "Introduction to Probability and Statistics for Engineers and Scientists", Elsevier, New Delhi, 3<sup>rd</sup> Edition, 2004.
4. Spiegel, M.R., Schiller, J. and Srinivasan, R.A., "Schaum's Outline of Theory and Problems of Probability and Statistics", Tata McGraw Hill, New Delhi, 2004.