

II Year - I Semester

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**PROBABILITY AND STATISTICS**  
**(Common to CE, CSE, IT, Chemical, PE, PCE, Civil Branches)**

**Course Objectives:** To acquaint students with the fundamental concepts of probability and statistics and to develop an understanding of the role of statistics in engineering. Also to introduce numerical techniques to solve the real world applications.

**Course Outcomes: At the end of the Course, Student will be able to:**

1. Examine, analyze, and compare various Probability distributions for both discrete and continuous random variables.
2. Describe and compute confidence intervals for the mean of a population.
3. Describe and compute confidence intervals for the proportion and the variance of a population and test the hypothesis concerning mean, proportion and variance and perform ANOVA test.
4. Fit a curve to the numerical data.

**UNIT I: Discrete Random variables and Distributions:**

Introduction-Random variables- Discrete Random variable-Distribution function- Expectation-Moment Generating function-Moments and properties.

Discrete distributions: Binomial, Poisson and Geometric distributions and their fitting to data.

**UNIT II: Continuous Random variable and distributions:**

Introduction-Continuous Random variable-Distribution function- Expectation-Moment Generating function-Moments and properties.

Continuous distribution: Uniform, Exponential and Normal distributions, Normal approximation to Binomial distribution -Weibull, Gamma distribution.

**UNIT III: Sampling Theory:**

Introduction - Population and samples- Sampling distribution of means ( $\sigma$  known)-Central limit theorem- t-distribution- Sampling distribution of means ( $\sigma$  unknown)- Sampling

distribution of variances -  $\chi^2$  and F-distributions- Point estimation- Maximum error of estimate - Interval estimation.

**UNIT IV: Tests of Hypothesis:**

Introduction -Hypothesis-Null and Alternative Hypothesis- Type I and Type II errors -Level of significance - One tail and two-tail tests- Tests concerning one mean and proportion, two means- Proportions and their differences- ANOVA for one-way and two-way classified data.

**UNIT V: Curve fitting and Correlation:**

Introduction - Fitting a straight line -Second degree curve-exponential curve-power curve by method of least squares-Goodness of fit.

Correlation and Regression - Properties.

## **UNIT VI: Statistical Quality Control Methods:**

Introduction - Methods for preparing control charts – Problems using x-bar, p, R charts and attribute charts.

### **Text Books:**

1. **Jay I.devore**, Probability and Statistics for Engineering and the Sciences.8<sup>th</sup> edition,Cengage.
2. **Richards A Johnson, Irvin Miller and Johnson E Freund**. Probability and Statistics for Engineering, 9<sup>th</sup> Edition,PHI.

### **Reference Books:**

1. **Shron L.Myers, Keying Ye, Ronald E Walpole**, Probability and Statistics Engineers and the Scientists,8<sup>th</sup> Edition, Pearson 2007.
2. **William Menden Hall, Robert J. Bever and Barbara Bever**, Introduction to probability and statistics, Cengage learning.2009
3. **Sheldon, M. Rosss**, Introduction to probability and statistics Engineers and the Scientists,  
4<sup>th</sup> edition, Academic Foundation,2011
4. **Johannes Ledolter and Robert V.Hogg**, Applied statistics for Engineers and Physical Scientists, 3<sup>rd</sup> Edition, Pearson,2010