PROBABILITY AND STATISTICS SYLLABUS

Module 1: Introduction to Statistics

- Statistics and Data Analysis
- Measures of Central Tendency
- Measure of Dispersion
- Moments, Skewness, and Kurtosis (Concepts only)

Module 2: Random Variables

- Random Variables
    - Probability Mass Function
    - Distribution and Density Functions
- Joint Probability Distribution and Joint Density Functions
- Marginal and Conditional Distribution and Density Functions
- Mathematical Expectation and Its Properties
- Covariance
- Moment Generating Function

Module 3: Correlation and Regression

- Correlation and Regression
- Rank Correlation
- Partial and Multiple Correlation
- Multiple Regression

Module 4: Probability Distributions

- Binomial Distribution
- Poisson Distribution
- Normal Distribution

- Gamma Distribution
- Exponential Distribution
- Weibull Distribution

Module 5: Hypothesis Testing - I

- Testing of Hypothesis
- Types of Errors
- Critical Region
- Procedure for Testing Hypothesis
- Large Sample Tests
    - Z-Test for Single Proportion
    - Z-Test for Difference of Proportion
    - Z-Test for Mean and Difference of Means

Module 6: Hypothesis Testing - II

- Small Sample Tests
    - Student's t-Test
    - F-Test
    - Chi-Square Test
        - Goodness of Fit
        - Independence of Attributes
- Design of Experiments
    - Analysis of Variance (ANOVA)
        - One-Way Classification
        - Two-Way Classification
        - Three-Way Classification
    - Completely Randomized Design (CRD)
    - Randomized Block Design (RBD)
    - Latin Square Design (LSD)

Module 7: Reliability

- Basic Concepts of Reliability
- Hazard Function
- Reliabilities of Series and Parallel Systems
- System Reliability
- Maintainability
- Preventive and Repair Maintenance
- Availability