**COURSE CODE COURSE TITLE L T P E C**

IMA1276

**PROBABILITY AND STATISTICAL**

**TECHNIQUES**

**3 1 0 0 4**

**OBJECTIVES**

To identify the standard distributions and apply them in solving problems.

To understand the concept of two-dimensional random variables and solve problems in

finding the joint probabilities and correlation between them.

To understand estimation theory and apply the principle of least squares.

To use testing of hypothesis for parameter estimation.

To understand and perform various non-parametric tests

**UNIT I ONE DIMENSIONAL RANDOM VARIABLES** 12

Discrete and continuous random variables – Moments – Moment generating function –Binomial,

Poisson, Geometric, Uniform, Exponential, and Normal distributions - Functions of random variable

**UNIT II TWO DIMENSIONAL RANDOM VARIABLES** 12

Joint distributions – Marginal and conditional distributions – Covariance – Correlation and Linear

regression – Transformation of random variables – Applications of Central Limit Theorem.

**UNIT III ESTIMATION THEORY** 12

Estimation: Point Estimation, Interval Estimation - Unbiased estimators – Maximum likelihood

estimation – Curve fitting by principle of least squares – Regression Curves – Applications in data

science

**UNIT IV TESTING OF HYPOTHESIS** 12

Sampling Distributions - Type I and Type II errors - Large sample test : Test based on Normal

distribution (Single, difference of mean and proportions) – Small Sample Test : Test based on t -

distribution for testing of single mean and difference of means – F-test for variance -

χ2 \_2

-test: Independence of attributes and goodness of fit.

**UNIT V NON-PARAMETRIC TESTS** 12

Introduction to Non- parametric test - Sign test - Wilcoxon signed rank test - Mann-Whitney test -

Run test - Kolmogorov-Smirnov test - Spearman’s and Kendall’s test.

**TOTAL PERIODS (THEORY): 60**

**COURSE OUTCOMES**

On successful completion of this course, the student will be able to:

CO1: Identify standard distributions and apply them.

CO2: Solve problems in two-dimension random variables and find the correlation between them.

CO3: Evaluate the unbiasedness of estimators and apply for problems in data science

CO4: Identify and apply the suitable testing of hypothesis under normal, t , F and

χ2\_2 - tests.

CO5: Use the concepts of Non-Parametric Testing in solving problems