**SYLLABUS FOR THE SUBJECT OF STATISTICS**

**PAPER– I**

**Total Marks: 100**

**Descriptive Statistics: (15%)**

Nature and scope of Statistics. Organizing and classification of data. Population and

sample. Variables, Measurement scales. Descriptive and Inferential Statistics.

Description of data by frequency tables and graphs. Stem and leaf plot and Box and

whisker plot. Arithmetic Mean, Geometric Mean, Harmonic Mean, Mode, Median,

Quartiles. Properties of Mean with proofs. Relative Merits and Demerits of various

averages. Weighted Arithmetic Mean. Empirical Relation between Mean, Median and

Mode. Absolute and Relative Measures of dispersion: Range, Semi-Inter Quartile

Range, Mean Deviation, Variance, Standard Deviation, Coefficient of Variation,

Coefficient of Mean Deviation, Coefficient of quartile Deviation. Properties of Variance

and Standard Deviation with proofs. Standardized Variables. Moments, Moments

Ratios, Sheppard’s Correction, Skewness and Kurtosis. Chebechev’s theorem and its

application.

**Concepts of Probability: (05%)**

Operation in sets. Cartesian product set. Random experiment. Sample space and

events. Rules of counting. Introduction to probability and axioms of probability,

emphasising to concepts, facts, interpretation and illustrating examples. Basic laws of

probability. Conditional and marginal probabilities. Independence of events. Baye’s

theorem and its application.

**Random Variable: (15%)**

Discrete random variable. Probability function, probability distribution function.

Mathematical expectation and its properties. Joint distribution of two discrete random

variables. Marginal and conditional distributions. Mean, variance, moments, covariance

and correlation of two discrete random variables. Moment generating function and its

properties.

Continuous random variable. Probability distribution of a continuous random variable.

Probability density function and probability distribution function. Joint distribution of two

continuous random variables. Marginal and conditional distributions. Mathematical

expectation and its properties. Moment generating function. Covariance and correlation

of two random variables. Mean, Median, Mode, Geometric mean, Harmonic mean,

Mean deviation, variance and moments of simple continuous functions.

**Discrete Probability Distributions: (15%)**

Uniform Bernoulli, Binomial, Multinomial, Hypergeometric, Poisson, Negative Binomial

and Geometric distributions with their derivations, applications and fitting to statistical

data. Poisson approximation to the binomial distribution.

**Continuous Probability Distributions: (15%)**

Uniform, Exponential and Normal distributions. Their properties, applications and fitting

to statistical data. Normal approximation to the Binomial and Poisson distributions.

**Bivariate Normal Distribution (10%):**

Derivation, conditional density function, conditional expectation and moment generating

function μ20, μ02 and μ11.

**Method of Least Squares: (15%)**

Scatter diagram, Principle of least square. Deduction and solution of normal equations

of general linear model. Curve fitting. Equations of approximating curves by the method

of least squares up to third degree polynomials. Fitting of exponential of the type

(1)y=aebx (2) y = abx (3) y = axb . Graphic representation of the curves.

Interpolation and Extrapolation graphically. Criteria for fitting a suitable curve.

**Regression and Correlation Analysis: (10%)**

Logic of regression and correlation, scatter diagram. Regression models. Simple linear

regression, least square estimates and their properties. Properties of Least Square

regression line, standard error of estimate, co-efficient of determination. Multiple linear

regression with two regressors, co-efficient of multiple determination. Partial and

multiple correlation up to three variables. Linear correlation . Correlation co-efficient and

its properties. Correlation of bivariate frequency distribution. Partial and multiple

correlation for three variables. Rank correlation. Tied ranks.