SYLLABUS

PROBABILITY AND MATHEMATICAL STATISTICS-I
M.Sc. (Mathematics)

UNIT – I

Nature of Data and Methods of Compilation : Measurement scales, Attributes and Variable, Discrete and continuous variables. Collection, Compilation and Tabulation of data.

Representation of Data : Histogram, Frequency Polygon, Frequency Curve, Ogives.

Measures of Central Tendency : Mean, Median, Mode, Geometric Mean, Harmonic Mean and their properties.

Measuring Variability of Data : Range, Quartile deviation, Deciles and Percentiles, Standard deviation, Central and Non-central moments, Sample and Population variance, Skewness and Kurtosis, Box and Whisker Plot.

Correlation and Regression Analysis : Scatter diagram. Karl Pearson's and Spearman's rank correlation coefficient. Linear Regression and its properties. Theory of attributes, independence and association.

UNIT – II

Probability : Intuitive concept of Probability, Combinatorial problems, conditional probability and independence, Bayes' theorem and its applications.

Random Variables and Distributions : Discrete and Continuous random variables. Probability mass function and Probability density function. Cumulative distribution function. Expectation of single and two dimensional random variables. Properties of random variables. Moment generating function and probability generating functions.

Distributions : Bernoulli distribution. Binomial distribution. Poisson distribution, Negative Binomial and Hypergeometric distributions. Uniform, Normal distribution. Normal approximation to Binomial and Poisson distributions. Beta, Gamma, Chi-square and Bivariate normal distributions. Sampling distribution of mean and variance (normal population).

Chebyshev's inequality, weak law of large numbers, Central limit theorems.