

Year & Sem: E1SS	Course Code: MA2204	Course Name: Probability and Statistics	No. of Credits: 4	L 2	T&PS 2	P 0
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UNIT- I

Raw data and its classification, discrete frequency distribution, continuous frequency distribution. Graphic representation of a frequency distribution: Histogram, Frequency polygon. Measures of central tendency: Arithmetic mean, mode, median, geometric mean, harmonic mean, weighted mean.

UNIT- II

Measures of dispersion: Range, quartile deviation, mean deviation, standard deviation, mean square deviation. Moments: Raw moments for grouped and ungrouped data, moments about an arbitrary constant for a grouped and ungrouped data, central moments for grouped and ungrouped data, relations between central moments and raw moments(up to 4th order). Skewness and kurtosis.

UNIT -III

Permutations and combinations. Algebra of sets, Venn diagrams, principle of inclusion and exclusion. Random experiments, trail, sample space, events. Approaches to probability- Classical, empirical, subjective and axiomatic. Theorems on probabilities of events. Conditional probability, independence of events, law of total probability, Bayes theorem and its applications.

UNIT- IV

Definition of random variable, discrete and continuous random variables, independent random variables. Distribution function and its properties, probability mass function, probability density function and their properties. Expectation of a random variable and its properties. Variance of a random variable and its properties.

UNIT- V

Discrete distributions: Bernoulli, Binomial, Poisson, Negative Binomial, Geometric and hyper geometric. Continuous distributions: Uniform, exponential and normal distribution. Definition of bivariate random variable, discrete and continuous bivariate random variables, distribution function of a bivariate random variable, joint probability mass function, joint probability density function, marginal probability mass function, marginal probability density function, conditional probability mass function and conditional probability density function. Covariance, correlation coefficient (Karl Pearson). Functions of random variables.

UNIT- VI

Probability inequalities: Markov's inequality, Chebyshev's inequality and Cauchy-Schwartz's inequality (with proofs). Generating functions: Moment generating function (M.G.F) and its properties, characteristic function (C.F) and its properties, cumulant generating function (C.G.F) and its properties, probability generating function (P.G.F) and its properties.

Reference books:

1. V.K.Kapoor and S.C.Gupta: Fundamentals of Mathematical Statistics, Sultan Chand&Sons.
2. Sheldon Ross: A first course in probability, Pearson publications.
3. Athanasios Papoulis and S. Unnikrishnapillai: Probability, Random Variables and stochastic process, Tata Mcgrawhill publications

Lecture Plan: Unit-I & -II syllabus for MID-I, Unit-III & -IV syllabus for MID-II and Unit-V & -VI syllabus for MID-III examinations.