

SRI A.S.N.M GOVERNEMENT COLLEGE (A), PALAKOL

B.Sc (STATISTICS)

(For M.S.Ds)

Syllabus

Employability



Entrepreneurship



Skill Development



SRI.A.S.N.M GOVERNMENT COLLEGE (A), PALAKOL, W.G.DT.
B.Sc., STATISTICS (WITH MATHEMATICS)
CBCS/SEMESTER SYSTEM (W.E.F 2020-21 ADMITTED BATCH)

SEMESTER - I
PAPER - I: DESCRIPTIVE STATISTICS

UNIT-I

Introduction to Statistics: Importance of Statistics. Scope of Statistics in different fields. Concepts of primary and secondary data. **Measures of Central Tendency:** Mean, Median, Mode, Geometric Mean and Harmonic Mean

UNIT-II

Measures of Dispersion: Range, Quartile Deviation, Mean Deviation and Standard Deviation, Variance. Central and Non-Central moments and their interrelationship. Sheppard's correction for moments. Skewness and kurtosis.

UNIT-III

Curve fitting: Bi-variate data, Principle of least squares, fitting of n^{th} degree polynomial. Fitting of straight line, Fitting of Second degree polynomial or parabola, fitting of power curve and exponential curves.

Correlation: Meaning, Types of Correlation, Measures of Correlation: Scatter diagram, Karl Pearson's Coefficient of Correlation, Rank Correlation Coefficient (with and without ties). Concept of multiple and partial correlation coefficients

UNIT-IV

Regression: Concept of Regression, Linear Regression: Regression lines, Regression coefficients and its properties, Regressions lines for bi-variate data and simple problems. Correlation vs regression.

UNIT-V

Attributes : Notations, Class, Order of class frequencies, Ultimate class frequencies, Consistency of data, Conditions for consistency of data for 2 and 3 attributes only , Independence of attributes , Association of attributes and its measures, Relationship between association and colligation of attributes,

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SEMESTER - II

PAPER - II: PROBABILITY THEORY AND DISTRIBUTIONS

UNIT-I

Introduction to Probability: Basic Concepts of Probability, random experiments, trial, outcome, sample space, event, mutually exclusive and exhaustive events, equally likely and favourable outcomes. Mathematical, Statistical, axiomatic definitions of probability. Conditional Probability and independence of events, Addition and multiplication theorems of probability for 2 and for n events. Boole's inequality and Baye's theorem

UNIT-II

Random variable: Definition of random variable, discrete and continuous random variables, functions of random variable. Probability mass function. Probability density function, Distribution function and its properties. For a given pmf, pdf calculation of Mean and Variance. Bivariate random variable - meaning, joint, marginal and conditional Distributions, independence of random variables

UNIT- III

Mathematical expectation : Mathematical expectation of a random variable and function of a random variable. Moments and covariance using mathematical expectation with examples. Addition and Multiplication theorems on expectation. Definitions of M.G.F, C.G.F, P.G.F, C.F and their properties (Derivations not required).

Chebyshev and Cauchy - Schwartz inequalities.

UNIT-IV

Discrete Distributions: Binomial, Poisson, Negative Binomial, Geometric distributions: Definitions, means, variances, M.G.F, C.F, additive property if exists. Poisson approximation to Binomial distribution. Hyper-geometric distribution: Definition, mean.

UNIT - V

Continuous Distributions: Rectangular, Exponential, Gamma, Beta Distributions: mean, variance, M.G.F, C.F. Normal Distribution: Definition, Importance, Properties, M.G.F, CF, additive property.

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B.Sc DEGREE EXAMINATION

STATISTICS (WM)

(W.E.F 2020-21 ADMITTED BATCH)

II B.Sc. Statistics – Semester - III

Paper III - STATISTICAL INFERENCE

(w. e. f 2021-2022)

UNIT-I : (Shorts -2, Essays- 2)

Concepts: Population, Sample, Parameter, statistic, Sampling distribution, Standard error. Convergence in probability and convergence in distribution, law of large numbers, and central limit theorem (statements only). Student's t- distribution, F – Distribution, χ^2 -Distribution: Definitions, properties and their applications.

UNIT-II : (Shorts -2, Essays- 2)

Theory of estimation : Estimation of a parameter, criteria of a good estimator – unbiasedness, consistency, efficiency, & sufficiency and. Statement of Neyman's factorization theorem. Estimation of parameters by the method of moments and maximum likelihood (M.L), properties of MLE's. Binomial, Poisson & Normal Population parameters estimate by MLE method. Confidence Intervals.

UNIT-III : (Shorts -1, Essays- 1)

Testing of Hypothesis : Concepts of statistical hypotheses, null and alternative hypothesis, critical region, two types of errors, level of significance and power of a test. One and two tailed tests. Neyman-Pearson's lemma. Examples in case of Binomial, Poisson, Exponential and Normal distributions.

UNIT - IV : (Shorts -2, Essays- 2)

Large sample Tests: large sample test for single mean and difference of two means, confidence intervals for mean(s). Large sample test for single proportion, difference of proportions. Standard deviation and correlation coefficient(s).

Small Sample tests: t-test for single mean, difference of means and paired t-test. χ^2 -test for goodness of fit and independence of attributes. F-test for equality of variances.

UNIT - V : (Shorts -1, Essays- 1)

Non-parametric tests - their advantages and disadvantages, comparison with parametric tests. Measurement scale- nominal, ordinal, interval and ratio. One sample runs test, sign test and Wilcoxon-signed rank tests (single and paired samples). Two independent sample tests: Median test, Wilcoxon –Mann-Whitney U test, Wald Wolfowitz's runs test.

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B.Sc DEGREE EXAMINATION

STATISTICS(WM)

(W.E.F 2020-21 ADMITTED BATCH)

II B.Sc. Statistics – Semester - IV

Paper IV: Sampling Techniques and Designs of Experiments

(w. e. f 2021-2022)

UNIT-I: (Shorts -2, Essays– 2)

Simple Random Sampling (with and without replacement): Notations and terminology, various probabilities of selection. Random numbers tables and its uses. Methods of selecting simple random sample, lottery method, method based on random numbers. Estimates of population total, mean and their variances and standard errors, determination of sample size, simple random sampling of attributes.

UNIT II: (Shorts -2, Essays– 2)

Stratified Random Sampling: Stratified random sampling, Advantages and Disadvantages of Stratified Random sampling, Estimation of population mean, and its variance. Stratified random sampling with proportional and optimum allocations. Comparison between proportional and optimum allocations with SRSWOR.

Systematic sampling: Systematic sampling definition when $N = nk$ and merits and demerits of systematic sampling - estimate of mean and its variance. Comparison of systematic sampling with Stratified and SRSWOR.

UNIT III : (Shorts -2, Essays– 2)

Analysis of variance : Analysis of variance(ANOVA) –Definition and assumptions. One-way with equal and unequal classification, Two way classification.

Design of Experiments: Definition, Principles of design of experiments, CRD: Layout, advantages and disadvantage and Statistical analysis of Completely Randomized Design(C.R.D).

UNIT IV : (Shorts -1, Essays– 1)

Randomized Block Design (R.B.D) and Latin Square Design (L.S.D) with their layouts and Analysis.

Missing plot technique in RBD and LSD. Efficiency RBD over CRD, Efficiency of LSD over RBD and CRD.

UNIT V : (Shorts -1, Essays– 1)

Factorial experiments – Main effects and interaction effects of 2^2 and 2^3 factorial experiments and their Statistical analysis. Yates procedure to find factorial effect totals.

II B.Sc. Statistics – Paper V
Paper V: APPLIED STATISTICS
(for 2020-23 batch w. e. f 2021-2022)

UNIT I: (Shorts -2, Essays– 2)

Time Series : Time Series and its components with illustrations, additive, multiplicative models. Trend: Estimation of trend by free hand curve method, method of semi averages. Determination of trend by least squares (Linear trend, parabolic trend only), moving averages method.

UNIT II: (Shorts -2, Essays– 1)

Seasonal Component: **Determination of seasonal indices** by simple averages method, ratio to moving average, Ratio to trend and Link relative methods, Deseasonalization.

UNIT III: (Shorts -2, Essays– 1)

Growth curves: Modified exponential curve, Logistic curve and Gompertz curve, fitting of growth curves by the method of three selected points and partial sums. Detrending. Effect of elimination of trend on other components of the time series

UNIT IV: (Shorts -2, Essays– 2)

Index numbers: Concept, construction, problems involved in the construction of index numbers, uses and limitations. Simple and weighted index numbers. Laspeyres's, Paasche's and Fisher's index numbers, Criterion of a good index number, Fisher's ideal index numbers. Cost of living index number and wholesale price index number.

UNIT V: (Shorts -2, Essays– 2)

Vital Statistics: Introduction, definition and uses of vital statistics, sources of vital statistics. Measures of different Mortality and Fertility rates, Measurement of population growth. Life tables: construction and uses of life tables.