TAMILNADU PUBLIC SERVICE COMMISSION
SYLLABUS
STATISTICS (UG DEGREE STANDARD)

CODE:418

UNIT I: Descriptive Statistics

Uses, scope and limitations of Statistics - Collection, Classification and Tabulation of data - Diagrammatic and Graphical representations - Measures of location, dispersion, skewness and kurtosis – Correlation and regression – Curve fitting – Linear and quadratic equations by the method of least squares.

UNIT II: Probability Theory

Probability - Addition, Multiplication and Baye's Theorems and their applications. Tchebychev's inequality - Random variables – Univariate and Bivariate – Probability distributions – Marginal and conditional distributions – Mathematical expectations – Moments - Moment generating functions – Characteristic function and cumulant generating functions.

UNIT III: Probability Distributions

Discrete distributions – Binomial, Poisson, Geometric and Hypergeometric Continuous distributions – Uniform, exponential, normal, Gamma and Beta - Sampling distributions and standard error - student's 't', Chi-square and F statistic – Distributions and their applications.

UNIT IV: Estimation Theory

Estimation – Point estimation – properties of estimators - Neyman Fisher Factorization theorem, Cramer–Rao inequality, Rao–Blackwell theorem, Lehmann-Scheffe theorem (without proof) –MLE and method of moments estimation – Minimum Chi-square – Interval estimation for population mean and variance based on small and large samples.

UNIT V: Tests of Hypotheses

Hypothesis testing – Null and Alternative – Types of errors – Level of Significance - Power of test, Neyman Pearson lemma, UMP and Likelihood ratio tests, Test procedures for large and small samples – Independence of attributes, Chi-square test – Goodnessof fit.

UNIT VI: Sampling Theory and Design of Experiments

Simple random sampling – Stratified, systematic, cluster (Single stage) - Estimation of mean and variance in SRS – Sample Survey Organisation – CSO and NSO – Sampling and non-sampling errors.

Analysis of Variance – Principles of design - CRD, RBD and LSD – Factorial experiments 2^2, 2^3 and 3^2 (without confounding) - Missing plot techniques.

UNIT VII: Statistical Quality Control and Operations Research

Concept of SQC – Control charts – $\bar{X}$, R, p and np charts - Acceptance sampling plan – Single and double – OC curves, ASN, ATI and AOQ - Attributes and Variables plan.

OR Models – Linear Programming problems – Simplex method - Primal and dual – Transportation and Assignment problems – Network, CPM and PERT.

UNIT VIII: Time Series and Index Numbers

Time series – Components of time series – Trend and Seasonal Variations – Determination and elimination.

Index Numbers – Construction and uses – Simple and weighted index numbers – Reversal tests – Construction and uses of cost of living index numbers.

UNIT IX: Vital Statistics

Vital Statistics – Importance-Collection - Mortality and its measurements - Life table construction and uses – Fertility and its measurements.

UNIT X: Statistical Computing using MS-Excel and SPSS

Introduction to MS-Excel – MS-Excel Options using Excel Shortcuts - Link the Data in Rows, Columns and Sheet - Functions: Logical Functions -Math and Statistical Functions – Charts-Plotting Density Function and Distribution Function. Understanding on the usage of Statistical Package SPSS.

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