SR University,Warangal

PhD Entrance Syllabus

Structure of the PhD Entrance Test (100 Marks)
Section A: Aptitude and Reasoning – Common to all candidates (50 Marks)
Section B: Subject-Specific (Statistics) (50 Marks)

Section A: APTITUDE & REASONING (Common to ALL)

Unit–1: Verbal Reasoning

Navigating Directions and Mastering Distances, Blood Relations, Logical Puzzles and Problem Solving- Floor Based, Month and Year Based. Seating Arrangements - Circular, Linear, Decoding the Code- Letter Coding, Number Coding, Letter and Number Coding.

Unit-2: Number System

Mastering Quick Calculations, BODMAS Simplified, Exploring Numbers and Division Rule, Unit Digits Decoded, Unlocking Divisibility and Counting Zeroes, "Mastering LCM and HCF: Foundations of Factorization, Uncovering Factors, Exploring Remainders.

Unit-3: Arithmetic Ability-1

Percentages - Fraction, Decimal, Percentage Change, Concept of 'By' and 'To', Product Constancy, All About Averages, Profit & Loss Essentials, Articles, False Weight, and Discount Insights - Discount, Simple Interest: Calculations and Applications, Compound Interest: Calculations and Applications, Relationship between SI and CI.

Unit–4: Arithmetic Ability-2

Ratio, Proportion, Partnership, Problems on Ages, Time and Work - Concept of Efficiency, Smart Work with Time and work, Negative Work, Chain Rule, Pipes and Cisterns, Time, Speed & Distance, Problems based on Trains, Problems based on Boats and Streams.

Unit-5: Critical Reasoning

Analogy and Classification, Sequence and Series Logic, Syllogisms - Types of statements, Venn diagrams using statements, Method to solve problems Two Statements and Two Conclusions, EITHER-OR Conclusions, Four Statements and Two Conclusions.

Department of Mathematics, School of CS&AI
SRUniversity,Warangal

Section: B **Statistics Syllabus for Ph.D. Admission Test**

UNIT 1: Basic Probability and Distribution Theory:
Random experiments, Sample space, Events and their types, axiomatic approach of probability, Conditional probability, Bayes theorem, Continuous & discrete random variable, Probability mass function, probability density function, Distribution function and its properties, Two dimensional random variables, conditional distribution, Univariate and bivariate transformation, Expectation and variance, Moment generating function and its properties. Continuous distributions- Uniform, Exponential, Normal, Gamma, Cauchy, Laplace, Chi-square; Discrete distributions- Bernoulli, Binomial, Geometric, Poisson, Hyper-geometric, Negative binomial**.**

UNIT2: SampleSurveys: Objectives of sample survey, planning for sample survey, biased and unbiased estimator, mean square error, confidence interval, Sampling and non-sampling errors, Simple random sampling with and without replacement, Systematic sampling, Stratified sampling, Formation of strata and number of strata, Allocation problems and estimation problems, Inclusionprobabilities,Horwitz-Thompsonestimatoranditsproperties,PPSWR, PPSWOR methods, Midzuno sampling design, Regression estimators based on SRSWOR methodofsampling,Clustersampling,Estimatorofpopulation mean and its properties, Two-stage sampling with equal number of second stage units, Double sampling.

UNIT3: StatisticalInference: Unbiasedness, consistency, sufficiency of estimators. Neyman factorization criterion, completeness, Minimum variance bound estimator, C-R inequality, Rao-Blackwell Theorem, Lehmann-Scheffe theorem, Uniformly minimum variance unbiased estimators, Method of Maximum Likelihood, Method of moment, Interval estimation, Tests of hypothesis, concepts of critical regions, test functions, two kinds of errors, size function, power function, levels, MP and UMP test, non-parametric tests.

UNIT4: Stochastic Processes : Types of the Stochastic Processes, Markov chain, transition probabilities matrix, Chapman-Kolmogrove equation, n-step transition probabilities matrix, stationary distribution, classification of the states, Poisson process, pure birth process, pure death process, pure birth-death process, branching process.

UNIT5: Design of Experiments: Analysis of Variance- Introduction, assumptions for ANOVA, One-way ANOVA, Two-way ANOVA, estimation of parameters, expectations of various sum of squares, Role, historical perspective, terminology, experimental error, basic principles, uniformity trials, Basic designs- Completely Randomized Design (CRD), Randomized Block Design (RBD),Latin Square Design (LSD) layout, model and statistical analysis, relative efficiency. Factorial design, Confounding in factorial designs, complete and partial confounding, 2nfactorial design conducted in 2kblocks. Fractional factorial designs: One-half fraction and One-quarter fraction of 2ndesigns, Alias structure of designs, resolution of designs.