

Vivekanand College Kolhapur (Empowered Autonomous)

Department of Statistics


P.G. Entrance Examination Syllabus 2024-25

Courses: M.Sc. Statistics / M.Sc. Applied Statistics

Sr. No	Class	Semester	Name of the Paper	Chapters Covered
1	B.Sc. I	I	Descriptive Statistics I	i. Introduction to Statistics ii. Basics in Sampling iii. Data & data types iv. Measures of central tendency v. Measures of Dispersion vi. Moments, Skewness & Kurtosis
			Elementary Probability Theory	i. Sample space, Event & its types, Algebra of events, Power set ii. Probability iii. Conditional Probability iv. Independence of event v. Univariate Probability distribution vi. Mathematical Expectation
		II	Descriptive Statistics II	i. Correlation ii. Regression iii. Theory of Attributes iv. Demography
			Discrete Probability Distributions	i. one point, two-point, Bernoulli, binomial, discrete uniform distribution ii. Hypergeometric, Poisson, geometric, negative binomial distribution
2	B.Sc. II	III	Probability distributions I	i. Continuous univariate distribution ii. Transformation of random variable iii. Continuous bivariate distribution
			Statistical Methods I	i. Time series analysis ii. Demography iii. Index Number iv. Tests of index number
		IV	Probability Distributions II	i. Uniform distribution, exponential distribution, gamma distribution, Normal distribution Beta distribution of first kind, beta distribution of second kind ii. Exact sampling distribution- t, F, Chi-square distribution
			Statistical Methods II	i. Time series ii. Statistical quality control iii. Testing of hypothesis I iv. Testing of hypothesis II
			Probability Distributions	i. Laplace, Lognormal, Cauchy, Weibull, Logistic, pareto, power series, Multinomial, Bivariate normal distributions ii. Truncated distribution: Binomial, Poisson, Normal

3	B.Sc. III	V	Statistical Inference I	i. Point Estimator Properties of estimator: Unbiased estimator, consistent estimator, efficient estimator ii. Likelihood function, sufficiency iii. Cramer Rao Inequality iv. Methods of estimation
			Sampling Theory	i. Simple Random Sampling ii. Stratified Random Sampling iii. Systematic sampling iv. Cluster sampling v. Two stage and multi stage sampling vi. Ratio method & Regression method
			Operations Research	i. Linear Programming Problem, Basic concepts ii. Graphical Method, Simplex method, Big M Method iii. Transportation Problem iv. Assignment Problem v. Assignment Problem vi. Decision Theory vii. Simulation Techniques
		VI	Probability Theory	Order Statistics, Chebychev's Inequality, Reliability theory Convergence and Limit Theorem, WLLN, CLT, Queuing Theory
			Statistical Inference II	i. Interval Estimation: Basic Terminology, Interval estimation for the following cases: a) Mean μ of normal distribution (σ known and unknown) b) Variance of normal distribution c) Difference between two means ($\mu_1 - \mu_2$) d) Ratio of variances for samples from two independent normal populations. e) Mean of exponential distribution f) Population proportion and difference of two population proportions g) Population median ii. Parametric Tests: MP, UMP, LRT iii. Sequential Probability Ratio Test iv. Non parametric tests: Run test, sign test, Wilcoxon signed rank test, Mann whitney U test, Median test, Kolmogorov Smirnov test
			Design of Experiments	i. Basic concepts in DOE, CRD, RBD, LSD ii. Efficiency of Design Analysis of Non normal data iii. Efficiency of design iv. Factorial experiment : 2^2 & 2^3 factorial experiments v. Confounding in factorial experiments

			<p>Quality control & R programming</p> <p>i. Quality tools: Magnificent tools of quality</p> <p>ii. Process Control: CUSUM Chart, Moving average & exponentially weighted moving average charts, Six sigma methodology, DMAIC cycle</p> <p>iii. Product control: Sampling Inspection Plan for attribute, AQL, LTPD, consumers risk, Producers risk, AOQ, AOQL, OC, ASN & ATI, Single & double sampling plan</p> <p>iv) R programming: Data Types, Operators, Data Structure: vector, matrix, data frame. Indexing and slicing of data structure. Input / output function, R-packages, R-datasets, Data Import and Export, Basic built-in functions (Mathematical and Statistical). Functions for diagrammatic and graphical representations of data. Programming: Conditional Statements: If, if else, Loops: for, while.</p>
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(Mrs Shinde V.C.)

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