

**SYLLABUS for Ph.D. ENTRANCE TEST**  
**in**  
**STATISTICS , DAVV, Indore (2021-22)**

**PART-B**

Part-B shall also consist of 50 objective type compulsory questions of 1 mark each based on the syllabus of the subject at Masters Level as follows:

**(i) Statistical Methods**

Measures of location, Dispersion, Skewness and Kurtosis, Raw and central moments, Correlation, Regression: Simple linear, Regression, curvilinear regression, multiple linear regression, partial and multiple correlation coefficients.

**Discrete Distributions:** Bernoulli, Binomial, Poisson, Geometric, Negative Binomial, Hypergeometric, Multinomial Distribution

**Continuous Distributions:** Normal, Uniform, Lognormal, Exponential, Beta, Gamma.

**(ii) Probability and Distribution Theory**

**Definitions,** Limitations and constraints of various definitions, Theorems, Additive, Multiplicative laws, conditional probability, Bayes Theorem with Applications.

**Distribution Theory :** Distribution function, continuous and discrete

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distributions, cdf, pdf, pmf, properties thereof, obtaining cdf from pdf/pmf and vice versa. Joint, marginal and conditional distribution, Expectation, Independence of random variables, Distributions of sums of iid random variables. Chi-square, t, F and Z distribution and tests based on them.

### (iii) Statistical Inference:

**Properties of good estimators:** unbiasedness, efficiency, sufficiency, consistency ;  
**Estimation:** Method of least squares, Method of Maximum Likelihood, Method of moments, Interval Estimation, Confidence Intervals .  
**Tests of Statistical Hypothesis:**  
**Basic definitions:** Statistic, parameter, test statistic, sampling distribution, Types of hypotheses: null and alternative, simple and composite, one sided and two-sided tests.

**Parametric Tests:** Types of errors, size of test, power of test and their calculation: .  
Neymann-Pearson tests for simple and composite alternative hypotheses,  
Distribution with monotone likelihood ratio property. Likelihood ratio tests.

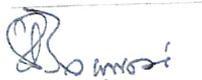
**Nonparametric Tests:** Sign test, Run tests, Rank tests, median test, Chi-square tests  
Kolmogorov Smirnov Tests

### (iv) Design of Experiments:

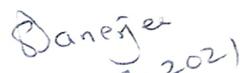
Linear models and complete designs (CRD, RBD, LSD) under fixed, mixed and random effects model, factorial experiments, confounding in  $2^n$  factorial experiments, Incomplete Block designs, BIBD, ~~BBBD~~, Properties and applications.

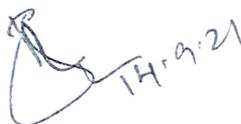
### (v) Operations Research:

Scope and limitations, general OR model linear Programming Problems and their solutions under different conditions, simplex method. Artificial basis technique Non-Linear Programming problems, Deterministic and stochastic Inventory models.

  
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