

## Ph. D Entrance Test Syllabus

### PAPER I: RESEARCH METHODOLOGY AND BASICS OF COMPUTER APPLICATION

1. **Foundations of Research:** Meaning, objectives, significance and types of research; research approaches; scientific method; research process; research methods versus methodology; criteria of good research; interdisciplinary and multidisciplinary research; challenges and opportunities in contemporary research.
2. **Research Problem and Literature Review:** Identification and formulation of research problems; research questions and objectives; review of literature; sources of literature; literature search techniques; identification of research gaps; preparation of research proposals and synopses.
3. **Research Design:** Meaning and importance of research design; characteristics of a good research design; exploratory, descriptive, analytical and experimental designs; validity and reliability; principles of experimental design.
4. **Data Collection and Sampling Techniques:** Methods of data collection including observation, interview, questionnaire, schedule and case study; census and sample survey; sampling design; probability and non-probability sampling methods; online and digital data collection techniques.
5. **Analysis & Interpretation of Data:** Analysis and Interpretation of Data & Measurement in Research, Measurement Scales, Sources of Error in Measurement, Tests of Sound Measurement, Technique of Developing Measurement Tools, Scaling, Meaning of Scaling, Scale Classification Bases, Important Scaling Techniques.
6. **Data Processing and Descriptive Statistics:** Editing, coding, classification and tabulation of data; measures of central tendency, dispersion and skewness; data visualization and interpretation.
7. **Hypothesis Testing and Statistical Inference:** Hypothesis formulation and testing; significance level, p-value and power of test; parametric tests including Z-test, t-test, F-test and Chi-square test; interpretation of statistical results.
8. **Analysis of Variance and Non-Parametric Tests:** One-way and two-way ANOVA; ANCOVA; Sign Test, Mann–Whitney U Test, Wilcoxon Signed Rank Test, Kruskal–Wallis Test and Friedman Test.
9. **Multivariate Analysis and Research Analytics:** Introduction to multivariate analysis; factor analysis, cluster analysis, principal component analysis and structural equation modeling; introduction to research analytics and statistical software (SPSS, R, Python).
10. **Research Ethics, Academic Integrity and Intellectual Property Rights:** Research ethics; plagiarism; academic integrity; publication ethics; UGC regulations on plagiarism; patents, copyrights, trademarks and intellectual property rights.

11. **Interpretation, Report Writing and Publication:** Interpretation of research findings; report writing; thesis and dissertation preparation; citation and referencing styles; research paper writing; peer review process; indexing databases; oral and poster presentations; viva-voce preparation.

### **STATISTICS & COMPUTER APPLICATIONS:**

**Statistics:** Data collection and classification, measures of central tendency (Mean, Median, Mode), measures of dispersion (Range, Quartile Deviation, Mean Deviation, Standard Deviation, Coefficient of Variation), skewness and kurtosis. Concept of probability, probability laws, random variables, binomial, Poisson and normal distributions, properties and applications of normal distribution. Karl Pearson's coefficient of correlation, Spearman's rank correlation, regression analysis, regression coefficients, prediction and interpretation.

**Computer Application:** Computer fundamentals, classification and components of computers, operating systems, applications of computers in research, digital literacy, data management, and cyber security basics. Word processing, spreadsheets, database management, preparation of research documents, data entry and analysis using MS Excel, graph plotting, presentation software, preparation of presentations, printing and sharing of documents. Internet fundamentals, email, World Wide Web (WWW), search engines, academic databases, e-resources, digital libraries, reference management tools, Web 2.0 tools, cloud computing, and multimedia applications in research.