

**I. K. Gujral Punjab Technical University Jalandhar, Kapurthala.**  
**Department of Research & Development**

**Ph.D. Entrance Test**

**Syllabus of Research Methodology**

**Research:** Meaning, definition and scope,

**Steps in Research:** defining the research problem, review of literature, hypothesis formulation, panel study, data collection, presentation, analysis and interpretation of data and presentation of results.

**Data Interpretation:** Sources, acquisition and classification of Data, Quantitative and Qualitative Data, Graphical representation (Bar-chart, Histograms, Pie-chart, Table-chart and Line-chart) and mapping of Data, Data Interpretation, Data and Governance.

**Research Design:** Meaning, Types - Descriptive, Diagnostic, Exploratory, and Experimental.  
Data Interpretation: Sources, acquisition and interpretation of data; quantitative and qualitative data; graphical representation and mapping of data, classification, tabulation, depiction of data. Introduction to LaTeX.

**Statistics in Research:** Percentages, Frequency distribution, Averages, Measures of Central tendency, Arithmetic mean, Median, Mode, Geometric Mean, Harmonic Mean, Dispersion, Range, Mean Deviation, Standard deviation, Root mean square deviation, Variance, Moments.