PAPER – I Research Methodology (Sub. Code: 164RMC11)

UNIT I-Introduction to Research Methodology

Meaning of research, Objectives of research, Motivation and purpose, Types of research, steps in research (Define Research Problems, Literature Review, Formulating Hypothesis, Research Designs, Data Collection, Data Analysis & Hypothesis Testing Interpretation & Reporting), Criteria of good research, Problems encountered by researchers in India, Ethics & Misconduct in Research-Plagiarism (Direct, Mosaic, Self and Accidental)

Research Problem- Selection & Strategy, Research Design - Sampling design, observational design, statistical design & operational design; Basic principles of experimental designs (principles of replication, randomization, local control); Research Plan- Definition & components, Hypothesis Formulation (Characteristics, Null vs Alternative hypothesis, Level of significance, Confidence level, p-value, steps in hypothesis testing), Sampling Techniques – Probability sampling vs Non-probability sampling, Sampling error, sample size estimation, Types of Experimental Designs and controls, Measurement Scales & Significance.

UNIT II- Literature Survey & Data Collection

Literature types- compendia and tables of information, Articles – Thesis – Journals – Patents – General treatises – Monographs- Literature search and Review of literature, Report writing – target audience – types of reports – contents of reports – Introduction (Literature Review, Citation & Referencing), Procedure (Language Style, Figures and Diagrams), Results (Graphs & Tables), Discussion & Conclusion (Style), Abstract, Front Matter, Appendices, General Guidelines, Research Papers vs Research Reports/Thesis.

Unit-III: Data Analysis

Data types, Shape of the data (Frequency Distribution-Histogram), Central Tendency of data (Mean, Median & Mode), Measures of Positions (Quartiles, Deciles & Percentiles) and Dispersion of data (Absolute and Relative Measures), their method of computation, characteristics and applications, Outlier estimation (mild & extreme), Box and Whisker plot.

Hypothesis Testing – Null and Alternate Hypothesis, Normal Distribution and characteristics, Point and Interval Estimation, Hypothesis testing using Z, F and t-distributions (single and two-tailed) using table Values and their applications, ANOVA – computational method and application, Covariance and Correlation and Regression – Importance, computation and Suitability. Estimation of Histogram, descriptive statistics, correlation and regression using MS Excel.

Unit-IV: Resources & Publication

Methods of data collection – Primary and secondary data – observation – interview – Questionnaire-schedule methods –Collection of secondary data- criteria and sources, Case-study Method – phases, assumptions, advantages & disadvantages.

Journal writing- Research and Publication Cycles, Publication process, Journal Selection Criteria. Basic information about Science Direct and Open Access Journals, Journal Impact Factor, Database search –Scopus – Science citation index.

Unit-V: Project

Mini projects addressing the various research tools and methods: Development of research questions, Design of research methods, Literature survey and referencing, Result interpretation and drafting scientific reports.