School of Applied Science and Technology
University of Kashmir

Syllabus

Course Title: Research Methodology **Course Code: PhD-AST-RM-2023**
Credits: (5L+ 1P) **Maximum Marks:** 150 (Theory - 125 + Practical – 25)
Examination Duration: Theory: 3 Hours, Practical: 1 Hour

Notes: 1. To pass, a candidate has to secure a minimum of 50% marks separately in theory and practical examinations.
2. For theory examination, two questions shall be asked from each unit. A candidate has to attempt one question form each unit. Each question shall carry 25 marks.

Unit I: Research Methodology and Design

- Research methodology and statistical reasoning, population and sample.
- Research problem and hypothesis, variables, basic concepts and importance of statistics.
- Introduction to construction of questioners, validity, quantitative and qualitative research methodologies.
- Experimental designs: between subjects or independent groups design, repeated measures or within subjects design, complex/factorial design.
- Non-experimental designs: quasi-experimental or natural groups design, observational methods: types, data analyses of observational and descriptive data, case study, survey research.

Unit II: Basic Statistics

- Introduction to methods of data collection. Steven's levels of measurement: nominal, ordinal, interval, and ratio scale.
- Descriptive statistics: mean, median, mode, range, quartile deviation, variance, standard deviation.
- Correlation and Regression: Pearson's product moment correlation, Spearman's rank order correlation, simple and multiple regression, outliers.
- Sampling methods: simple random, stratified, systematic, cluster, and multistage. sampling errors. Sample size determination.

Unit III: Parametric Tests

- The normal curve and its properties (area, skewness, kurtosis, etc.). Tests of normality.
- Inferential statistics: null hypothesis testing, statistical significance testing, one-tailed and two-tailed tests, degrees of freedom, confidence interval, p value.
- Parametric tests: Z-tests, t-tests, analysis of variance (ANOVA).

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1. Prof. Mehboob Hussain Hasan
2. Dr. Javaid Iqbal
3.
4. Dr. Adil Gani
5. Dr. Humaira Azmi
6.

Unit IV: Non-parametric Tests

- Non-parametric tests: descriptions and assumptions, chi-square test, sign test, Wilcoxon's sign rank test, median test, Mann-Whitney U test.

Unit V: Scientific Writing and Research Ethics

- Critical analysis of scientific articles in terms of their importance, consistency, and justifications.
- Journal indexing and research metrics: journal impact factor, h-index, g-index, Eigen factor score, Altmetrics, etc. Publication models for scholarly communications.
- submissions.
- Ethical considerations in research, types of ethical issues, examples of ethical failures. University of Kashmir research policy.

Unit VI: Laboratory Work

- Use of spreadsheets or other software tools (Excel, etc.) for preliminary data analysis and graphical representations.
- Use of software for statistical computations (SPSS, R, etc.) for inferential statistics, parametric and non-parametric tests.
- Use of word processors (Word, Latex, etc.), typing assistant software (Grammarly, etc.) and reference formatting software (Mendeley, Endnote, Zotero, etc.) for manuscript writing.
- Use of plagiarism detection software (iThenticate, Turnitin, URKUND, Plagiarism Checker X, etc) for checking plagiarism of manuscripts.

Books

1. Umesh Kumar B Dubey, D P Kothari. (2022). Research methodology: techniques and trends. CRC Press,.
2. Mongomery, D. C. (2017). Montgomery: design and analysis of experiments. John Willy & Sons.
1. Stewart Jr, C. N. (2023). Research ethics for scientists: A companion for students. John Wiley & Sons.
2. Laake, P., Benestad, H. B., & Olsen, B. R. (Eds.). (2007). Research methodology in the medical and biological sciences. Academic Press.
3. Louis C, Lawrence M, and Keith M. (2007). Research methods in education. 6th ed.. Routledge, London.
4. John W. Creswell. (2014). Research design: Qualitative, Quantitative, and mixed method approaches, Sage Publications.