

**Course objectives:**

CO1: Have basic knowledge on qualitative research techniques.

CO2: To impart knowledge to develop skills for meaningful interpretation to the data sets so as to solve the Research problem.

CO3: Have basic awareness of data analysis-and hypothesis testing procedures.

CO4: Understand various stages of preparing publishing a research articles and ethical issues

**Syllabus**

Unit 1: Problem formulation, Understanding modeling & simulation, Experimental research: Cause effect relationship, Development of hypothesis, Measurement systems analysis, Error propagation, Validity of experiments, Statistical design of experiments, Field experiments, Data/Variable types & classification, Data collection, Numerical and graphical data analysis: Sampling, Observation, Surveys, Inferential Statistics, and Interpretation of Results; Hands-on training on R-software for statistical analysis.

Unit 2: Databases and research metrics: Databases – Indexing databases, Citation databases: Web of Science, Scopus, etc. Research Metrics, Impact factor of journal as per journal citation report, SNIP, SJR, IPP, Cite Score. Metrics: h-index, g-index, i10 index, altmetrics.

Unit 3: Preparation of thesis and research papers, Tables and illustrations, Guidelines for writing the abstract, introduction, methodology, results and discussion, conclusion sections of a manuscript. References (including hands-on training on End-Note /Mendeley), Citation and listing system of documents, Intellectual property rights, patents, copyrights, Trademarks, Industrial design, geographical indication.

Unit 4: Open access publishing, Online resource to check publisher copyright and self-archiving policies. Software tool to identify predatory publications. Use of plagiarism software.

**REFERENCES:**

1. Bordens, K. S. and Abbott, B. B., "Research Design and Methods – A Process Approach", 8th Edition, McGraw-Hill, 2011
2. C. R. Kothari, "Research Methodology – Methods and Techniques", 2nd Edition, New Age International Publishers
3. Davis, M., Davis K., and Dunagan M., "Scientific Papers and Presentations", 3rd Edition, Elsevier Inc.
4. Michael P. Marder, "Research Methods for Science", Cambridge University Press, 2011

5. C. George Thomas: "Research Methodology and Scientific Writing", Springer Nature, 2015.

**Modes of Evaluation:**

<b>Components</b>	<b>Assignment</b>	<b>Presentation</b>	<b>Written Examination at the end of the semester</b>
Weightage %	40	30	30