Course Overview
This course will establish a systematic approach to research in mathematics. The students are introduced to various procedures, techniques, and ethical principles, including general problem-solving techniques; reading and writing research articles; research tools for type-setting, presentations, and literature surveys; e-resources, and ranking.

Course Outcomes
CO1: To understand several types of research, objectives for doing research, and ethics in research.
CO2: To understand the fundamentals of logical reasoning in pure mathematics, modeling aspects of applied mathematics, and meaningful interpretation of data sets in Statistics and Data Science.
CO3: Understanding various stages of research, from identifying a problem to publishing a research article.
CO4: Familiarize with various open-source research tools and mathematical software.

Course Syllabus
Unit – 1
Research: Definition, Concepts, and General introduction, Different approaches to research - Basic, Applied, Interdisciplinary, Multidisciplinary.
Ethics in research: Definition, moral philosophy, scientific conduct, intellectual honesty, and research integrity, scientific misconducts - falsification, fabrication and plagiarism, Redundant publications - duplication, overlapping publications, and salami slicing.

Unit – 2
Data collection, sampling methods, data analysis, data visualization, and statistical hypothesis testing. Statistical software (SPSS) for data analysis.

Unit – 3
Databases – Indexing databases, Citation databases: Web of Science, Scopus, etc.
Research Metrics – Impact factor, SNIP, SJR, IPP, Cite Score, h-index, g-index, i10 index, altmetrics.
Scientific writing – Latex (documentation and beamer presentation), References and citations (Medley, Jabref), plagiarism, intellectual property rights, copyrights, preprints (arXiv), open access.

Text Books

Reference Books

Evaluation Pattern
Internal (70%): Worksheets, Assignments, Quizzes
External (30%): Presentation and Viva