

Course Code	Course Name	Credits
26ZY555	RESEARCH METHODOLOGY IN ZOOLOGY	04

Course Objectives

- To understand the fundamental concepts and principles of research methodology in zoology.
- To explain various methods of scientific research, data collection, and experimental design.
- To develop knowledge on literature survey, hypothesis formulation, and research ethics.
- To analyze biological data using appropriate research tools and statistical techniques.
- To enhance scientific writing, analytical thinking, and research skills in zoological studies.

Learning Outcomes

- Explain the basic concepts and importance of research methodology in zoology.
- Differentiate various research methods, experimental designs, and data collection techniques.
- Examine the significance of research ethics, literature review, and hypothesis formulation.
- Analyze biological data using suitable statistical and research tools.
- Apply scientific writing and research skills in zoological investigations and projects.

Unit 1 – Research Design (12 Hrs.)

Concept and importance of research design, features of a good research design. Exploratory research design: concept, types and uses. Descriptive research designs: concept, types and uses. Experimental research design: Concept of independent & dependent variables. Ethics pertaining to human and animal experimentation. Bio-safety guidelines.

Unit 2 – Data Collection & Sampling (12 Hrs.)

Execution of the research - observation and collection of data - methods of data collection, concepts of statistical population, sample, sampling frame, sampling error, sample size, non-response. Characteristics of a good sample. Probability sample –simple random sampling, systematic sampling, convenience sampling, stratified random sampling & multi-stage sampling. Determining size of the sample – practical considerations in sampling and sample size.

Unit 3 - Use of Literature and Tools (12 Hrs.)

Research articles, reviews, encyclopedias, handbooks, and biological databases. Use of Tools / Techniques for Research: Methods to search required information effectively, reference management software like Zotero/Mendeley/Endnote, Software for paper formatting like LaTeX /MS Office, software for detection of plagiarism.

Unit 4 – Reporting and Thesis Writing (12 Hrs.)

Structure and components of scientific reports, types of report, technical report and thesis, different steps in the preparation, layout, structure and language of typical reports, illustrations and tables, bibliography, referencing and footnotes. Oral presentation, planning, preparation, practice, making presentation, use of visual aids, importance of effective communications

Unit 5 - Application of Results and Ethics (12 Hrs.)

Environmental impacts, ethical issues, ethical committee, commercialization. Copy right, royalty, intellectual property rights and patents law, trade related aspects of intellectual property rights, reproduction of published material, citation and acknowledgement, reproducibility and accountability.

Reference Books:

1. Anthony, M, Graziano, A.M. and Raulin, M.L. (2009) Research Methods: A Process of. Inquiry, Allyn and Bacon.
2. Walliman, N. (2011) Research Methods- The Basics. Taylor and Francis, London, NewYork, USA.
3. Garg, B. L.Karadia R. Agrawal, F. and Agrawal U. K., 2002. An Introduction to Research Methodology, RBSA Publishers
4. Kothati C. R.,1990. Research Methodology: Methods and Techniques New Age International 418p.
5. Wadehra B. L., 2000. Law Relating to Patents, Trade Marks, Copyright Design and Geographical Indications, Universal Law Publishing.

Websites and eLearning Sources:

- <https://open.umn.edu/opentextbooks/textbooks/research-methods-in-psychology>
- <https://www.biologydiscussion.com/research-methodology>
- <https://www.easybiologyclass.com/category/biostatistics/>