



बिरसा मुंडा ट्रायबल युनिवर्सिटी Birsa Munda Tribal University

राजपिपला, जि० नर्मदा Rajpipla, Dist. Narmda

Established by Tribal Development Department, Govt. of Gujarat

School of Science

M.Sc. (Zoology) Programme

Subject Code& Name: - MS02RZOO01 – Research Methodology

Teaching and Evaluation Scheme:

Teaching Scheme				Examination Scheme			
Credits				Component Weightage			
				Internal		External	
L	T	P	Total	TH	PWE	TH	PWE
2	--	--	2	25%	--	25%	--

Programme Name	M.Sc. Zoology
Semester	II
Course Code	MS02RZOO01
Course Title	Research Methodology
Course Content Type (Th./Pr.)	Theory
Course Credit	2
Sessions	2
Total Teaching/Lab. Hours	30 Hours

Learning Objectives

Upon completion of the course, students will be able to:

- Understand the principles, processes, and ethical foundations of scientific research.
- Develop research questions, experimental designs, and scientific proposals in biological sciences.
- Acquire skills in scientific writing, literature review, data interpretation, and research communication.

Prerequisites (if any)

- Basic knowledge of biological sciences and scientific concepts.
- Familiarity with undergraduate laboratory and field-based studies.
- Basic understanding of computer applications and internet-based literature search.

Learning Outcomes

Upon successful completion of the course, students will be able to:

- Explain the concepts, types, and methodologies of scientific research in biological sciences.
- Design research proposals and experimental protocols using appropriate scientific methods.
- Demonstrate competency in scientific writing, publication ethics, literature management, and intellectual property rights.



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Detailed Contents		
UNIT	TOPIC/SUB-TOPIC	TEACHING HOURS
I	Foundations of Scientific Research • Meaning, objectives and significance of research Types of research: • Basic research, Applied research, Experimental research, Descriptive research and Exploratory research • Characteristics of scientific methods • Identification and formulation of research problems • Research questions and hypothesis formulation • Variables and their types • Review of literature and gap analysis • Sources of scientific information Research Design and Experimental Planning • Research design: concept and importance • Experimental design in biological sciences • Sampling methods and sample size determination • Data collection techniques: Field studies, Laboratory experiments, Surveys and questionnaires • Controls and replication • Accuracy, precision, reliability and validity • Preparation of research proposals and project planning	15



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II	Scientific Communication and Publication (7 Hours) • Structure of scientific papers (IMRAD format) • Scientific writing and technical reporting • Preparation of abstracts, research articles, reviews and dissertations • Citation styles and referencing methods • Literature management tools: Mendeley, Zotero and EndNote • Oral and poster presentations • Peer review process • Journal selection and publication strategies Research Ethics, IPR and Emerging Trends (8 Hours) • Research ethics and responsible conduct of research • Plagiarism: concepts, detection, and prevention • UGC guidelines on academic integrity • Authorship and publication ethics • Intellectual Property Rights (IPR): Patents, Copyrights, Trademarks and Geographical Indications • Biosafety and biosecurity • Data management and open-access resources • Emerging trends: Artificial Intelligence in research, Big data and bioinformatics and Open science and reproducible research	15
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Text Book(s)

1. Research Methodology: Methods and Techniques by C.R. Kothari & Gaurav Garg, New Age International Publishers, New Delhi.
2. Research Methodology: A Step-by-Step Guide for Beginners by Ranjit Kumar, Sage Publications India Pvt. Ltd., New Delhi.
3. Scientific Research Methodology by P. Ramakrishnan, MJP Publishers, Chennai.
4. Research Methodology in Biological Sciences by S. Nageswara Rao & K. Venkata Reddy, CBS Publishers & Distributors, New Delhi.
5. Methodology and Techniques of Social Research by Wilkinson & Bhandarkar, Himalaya Publishing House, Mumbai.
6. Fundamentals of Research Methodology and Statistics by Yogesh Kumar Singh, New Age International Publishers, New Delhi.
7. Biostatistics and Research Methodology by P. Ramakrishnan, Saras Publication, Nagercoil.



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Required Software(s) (if any)

Mendeley Reference Manager: <https://www.mendeley.com>

Zotero Reference Manager: <https://www.zotero.org>

EndNote: <https://endnote.com>

Grammarly Academic Writing Tool: <https://www.grammarly.com>

Turnitin Plagiarism Checker: <https://www.turnitin.com>

ORCID Researcher ID: <https://orcid.org>

ResearchGate: <https://www.researchgate.net>

Google Scholar: <https://scholar.google.com>

Practical(s) (if any)

L:: Lecture, T:: Tutorial, P::Practical

PWE::Practical Work Examination

(PWE includes Laboratory practical work, project work, viva simulation exercise work etc.)