



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. (Chemistry) Programme

Subject Code & Name: - MS02RCHE01 & 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. Chemistry
Semester	II
Course Code	MS02RCHE01
Course Title	Research Methodology
Course Content Type (Th./Pr.)	Theory
Course Credit	2
Sessions+ Lab. Per Week	2
Total Teaching/Lab. Hours	30 Hours
* 2 Laboratory = 1 Session	

Learning Objectives

1. Understand the meaning, objectives, and significance of research in academic and professional fields.
2. Differentiate between various types of research, including basic, applied, qualitative, quantitative, exploratory, descriptive, and experimental research.
3. Explain the stages of the research process and the principles of scientific investigation.
4. Understand the concepts and sources of primary and secondary data.
5. Identify and classify different types of data, including categorical, nominal, and ordinal data.
6. Explain various methods of data collection such as observation, field investigation, direct studies, reports, records, and experimental observations.

Prerequisites (if any)





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Learning Outcomes

1. Define research and explain its objectives, characteristics, and importance in knowledge generation and problem-solving.
2. Classify and compare different types of research based on purpose, approach, and design.
3. Describe the sequential stages involved in the research process and scientific inquiry.
4. Construct clear research objectives, formulate relevant research questions, and develop testable
5. Differentiate between primary and secondary data sources and select appropriate sources for research studies.
6. Classify data into categorical, nominal, and ordinal types and determine their relevance in data analysis.
7. Apply suitable data collection methods based on research objectives and study design.
8. Select and justify appropriate probability and non-probability sampling techniques for different research contexts.

Detailed Contents

UNIT	TOPIC/SUB-TOPIC	TEACHING HOURS
I	Fundamentals of Research Methodology 1. Meaning, objectives, and significance of research 2. Types of Research A. Basic and Applied Research B. Qualitative and Quantitative Research C. Exploratory, Descriptive, and Experimental Research 3. Research process and stages of scientific investigation 4. Research objectives, questions, and hypotheses 5. Literature review and sources of scientific information 6. Research Methods and Research Methodology	15
II	Data Collection, Analysis, and Scientific Writing 1. Sources of Data: Primary and Secondary 2. Types of Data: Categorical, Nominal and Ordinary 3. Methods of Collecting Data: Observation, Field Investigation, Direct Studies, Reports, Records and Experimental Observations 4. Sampling techniques: Probability and Non-probability sampling 5. Data Processing and Analysis Strategies 6. Data organization and presentation: • Tables, Graphs, and Charts 7. Hypothesis testing (t-test, Chi-square – overview)	15



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Text Book(s)	
1.	Garg.B.L., Karadia, R., Agarwal,F. and Agarwal, U.K., 2002. An introduction to Research Methodology, RBSA Publishers.
2.	Kothari, C.R.(2008). Research Methodology: Methods and Techniques. Second Edition. New Age International Publishers, New Delhi.
Reference Books	
1.	Sinha, S.C. and Dhiman, A.K., 2002. Research Methodology, Ess Ess Publications. 2 volumes.
2.	Trochim, W.M.K., 2005. Research Methods: the concise knowledge base, Atomic Dog Publishing. 270 p.
Web Resources	
MOOC - https://shorturl.at/1ABRD	
Udemy Online Course on Research Methodology- https://shorturl.at/c4eAa	
Required Software(s) (if any)	
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.)