

<b>Course Title: Research Methodology and Ethics</b>				
<b>Course code: UDS 302</b>	<b>No. of credits: 2</b>	<b>L-T-P: 24-6-0</b>	<b>Learning hours: 30</b>	
<b>Pre-requisite course code and title (if any):</b> None				
<b>Department:</b> Natural and Applied Sciences				
<b>Course coordinator:</b>		<b>Course instructor:</b>		
<b>Contact details:</b>				
<b>Course type:</b> Major		<b>Course offered in:</b> Semester 6		
<b>Course Description</b>				
<p>Research methodology is a systematic way of addressing a research problem. In contrast, ethics refers to the principles that help distinguish between right and wrong behaviour. The Research Methodology and Ethics course is designed to teach students not only the concepts and procedures of research but also the ethical standards that guide it. Undergraduate students must learn how to create and apply appropriate research techniques. However, it is equally important for them to understand which methods are relevant to their study, what these methods indicate, and why they are used. Research ethics is a critical topic. While conducting research can be exciting, it also involves several challenges that raise ethical concerns, such as bias, plagiarism, conflicts of interest, data falsification, lack of informed consent, authorship disputes, and issues in the peer review process. As part of this course, students will prepare a concept note based on their research interests and later develop a full research proposal. They will also learn about the importance of maintaining scientific integrity in academic research. In doing so, they develop essential critical thinking skills that enhance the long-term quality and credibility of their future scientific work.</p>				
<b>Course objectives</b>				
<p>The purpose of this course is to help students develop a basic understanding of research and methodology. It involves practicing and discussing the responsible code of conduct in interdisciplinary scientific research. The specific learning objectives related to research ethics include:</p> <ul style="list-style-type: none"> <li>• To know the fundamentals of research and different research methodologies.</li> <li>• To formulate research problems, questions, hypotheses, and objectives.</li> <li>• To design a research proposal and conduct basic data collection and analysis.</li> <li>• To understand and apply ethical principles in research involving human and non-human subjects.</li> <li>• To understand the purpose and value of ethical decision-making</li> <li>• To Practice academic integrity and avoid misconduct like plagiarism and data fabrication.</li> </ul>				
<b>Course Overview:</b>				
<p>This course consists of seven modules that focus on the basic concepts of research and ethics, research design and methodology, research integrity, and contemporary issues in research. The practical sessions will help participants learn how to write research proposals and reports, identify research misconduct, and recognize predatory journals. The course will also introduce data collection and analysis methods for both primary and secondary research, as well as indexing, referencing tools, research metrics, and plagiarism detection tools.</p>				
<b>Course content</b>				
<b>Module</b>	<b>Topic</b>	<b>L</b>	<b>T</b>	<b>P</b>
1	<b>Introduction to Research</b>			
	What is research; Purpose and significance of research, Characteristics of good research; Types of research: Basic vs. Applied, Quantitative vs. Qualitative; Exploratory, Descriptive, Explanatory Scientific Method; Class activities through discussion.	2	0	0
2	<b>Research Problem and Objectives</b>			
	Understanding research processes, Identifying and defining a research problem; Setting research questions and hypotheses; Formulating objectives (general and specific); Scope and limitations	4	0	0
3	<b>Literature Review</b>			
	Importance of reviewing literature; Sources of literature (journals, books, reports, internet); Book Review; Evaluating and synthesizing sources; Referencing and citation styles (APA, MLA, Chicago); Research database and metrics: Indexing, Citation, Scopus, Web of Science, SCIE, Impact Factor as per Journal Citation Report (JCR) and H-Index;	4	2	

	Reference software tools like Mendeley, Zotero; Training on plagiarism Software such as Turnitin, DrillBit and other Open source software tools Grammarly, Figshare			
4	<b>Research Design</b>			
	Research design: definition and types; Qualitative and Quantitative methods; Mixed methods research; Sampling methods (random, stratified, purposive, etc.); Tools of data collection: questionnaires, interviews, observations, focus groups discussion (FGD)	4	0	0
5	<b>Data Collection and Analysis</b>			
	Data types: primary and secondary; designing interview schedule/questionnaire; Quantitative data collection and coding; Introduction to qualitative data analysis (thematic analysis, coding)	4	2	0
6	<b>Writing a Research Report/Proposal</b>			
	Structure of a research paper, reports and thesis; Writing an abstract, introduction, methodology, results, discussion, and conclusion; Oral presentation, visual aids, and communicating research to non-experts; Referencing and avoiding plagiarism; Peer review process	2	2	0
7	<b>Research Ethics and Contemporary Issues in Research</b>			
	Introduction, Definition, and Importance of Scientific Research Misconduct; Fabrication, falsification, plagiarism/Self-plagiarism, Kinds and Remedies; Informed consent, confidentiality and handling of sensitive data; Role of Ethics of Institutional Review Board (IRB): Purpose and function; Open access and data sharing; Predatory Publishers and journals; Research in the digital age (AI, data privacy, social media), Case studies on ethical dilemmas in research, environmental science and sustainability	4	0	0
	<b>Total</b>	24	6	0

#### Evaluation criteria

Continuous assessment will be done through classroom practical exercises, assignments, quizzes or group discussions. Student evaluation will be based on the term paper and the book review, followed by the final major test to be conducted at the end of the course.

- Test 1: Term Paper [written Submission based on modules 1,2 &3] -- 25%
- Test 2: Book Review followed by presentation [Relevant to the area of Research] -- 25%
- Test 3: Major Test [Based on all modules] -- 40%
- Attendance: Class participation -- 10%

#### Learning outcomes

By the end of the course, students will be able to:

- To understand the basic principles and methods of research design, data collection, and data analysis.
- To develop the ability to differentiate between quantitative and qualitative research approaches and to select appropriate methodologies for different research questions.
- To acquire a foundational understanding of how to develop a research proposal, including defining clear objectives, conducting a literature review, outlining the methodology, and addressing ethical considerations.
- To foster a culture of fairness and integrity by identifying and addressing ethical issues in research, including informed consent, confidentiality, and the protection of vulnerable populations.
- To understand the role of ethics committees and the process of ethical review in research.
- To effectively communicate research findings in both written and oral formats.

#### Pedagogical approach

Classroom lectures will introduce and explain core concepts. Case studies will be used to analyze real-life research projects and ethical dilemmas. Group discussions will encourage peer interaction and help students critique research methods and ethical practices. The practical sessions will include reviewing literature, formulating research problems, developing research questions and objectives, preparing interview schedules, conducting small-scale research projects, and writing research proposals. Guest lectures will be organized, where practitioners and researchers will share their experiences and discuss ethical challenges in research.

Weightage will also be given for active class participation.

## **Suggested Books and References**

### **Core Textbooks:**

- Babbie, E. (2016). *The Practice of Social Research* (14th ed.). Cengage Learning
- Silverman, D. (2016). *Qualitative Research* (4th ed.). SAGE Publications.
- Creswell, J. W. (2014). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches* (4th ed.). SAGE Publications.
- Neuman, W. L. (2013). *Social Research Methods: Qualitative and Quantitative Approaches* (7th ed.). Pearson Education.
- Kothari, C. R. (2004). *Research methodology: Methods and techniques*. New Age International.

### **Reference Books:**

- Kumar, R. (2019). *Research Methodology: A Step-by-Step Guide for Beginners* (5th ed.). SAGE Publications.
- Bryman, A. (2016). *Social Research Methods* (5th ed.). Oxford University Press.
- Glesne, C. (2015). *Becoming Qualitative Researchers: An Introduction* (5th ed.). Pearson.
- Tavory, I., & Timmermans, S. (2014). *Post-Qualitative Research*. Routledge.
- Comstock, G. (2012). *Research ethics: A philosophical guide to the responsible conduct of research*. Cambridge University Press.
- Gibson, W. J., & Brown, A. (2009). *Working with Qualitative Data*. SAGE Publications.
- Israel, M., & Hay, I. (2006). *Research Ethics for Social Scientists*. SAGE Publications.

### **Additional Resources**

- Capili B, Anastasi JK. Ethical Research and the Institutional Review Board: An Introduction. *Am J Nurs*. 2024 Mar 1;124(3):50-54. doi: 10.1097/01.NAJ.0001008420.28033.e8
- Research Ethics Websites: The Belmont Report (1979), National Institutes of Health (NIH) Research Ethics Guidelines.
- Online databases: JSTOR, ScienceDirect, Wiley Online, Sage Journals, Google Scholar, ResearchGate,
- Workshops/Seminars: Guest lectures and workshops by researchers in environmental studies and social sciences.
- Ethics Education Library: <http://ethics.iit.edu/eelibrary/case-study-collection>
- Committee on Publication Ethics: <https://publicationethics.org>

### **Student Responsibilities**

Students are required to come prepared with the readings suggested in class and submit their assignments on time. They are also expected to participate in classroom discussions and case studies to strengthen their understanding of the concepts. Students must also maintain good attendance, provide feedback, and follow institutional discipline, research norms, and ethics.

### **Course Prepared By:**

- Dr Ratan Kumar Jha, Assistant Librarian, TERI School of Advanced Studies, New Delhi

### **Course Reviewers**

The course is reviewed by the following reviewers:

- Dr. Elumalai Kannan, Professor, Centre for the Study of Regional Development (CSRD), School of Social Sciences-III, Jawaharlal Nehru University, New Delhi-110 067
- Dr. Ruchika Malhotra, Associate Professor, Department of Software Engineering, Delhi Technological University, Delhi