



SHARDA
UNIVERSITY
Beyond Boundaries



**SHARDA SCHOOL OF
ENGINEERING &
SCIENCES**



— COURSE —

**Fundamentals of
Research Methods
and Design
(NV34106)**

VALUE ADDED
COURSE BROCHURE-30 HRS
2025-26

ABOUT THE UNIVERSITY

Sharda University is a leading Educational institution based out of Greater Noida, Delhi NCR. A venture of the renowned Sharda Group of Institutions (SGI), The University has established itself as a high quality education provider with prime focus on holistic learning and imbining competitive abilities in students.

The University is approved by UGC and prides itself in being the only multi-discipline campus in the NCR, spread over 63 acres and equipped with world class facilities.

Sharda University promises to become one of the India's leading universities with an acknowledged reputation for excellence in research and teaching. With its outstanding faculty, world class teaching standards, and innovative academic programs, Sharda intends to set a new benchmark in the Indian education system.

SSES combines the strengths of engineering and basic sciences to create a dynamic environment that fosters innovation and technical excellence along with a sense of social responsibility. With high-ranked programmes in engineering and robust offerings in pure and applied sciences, the school provides a comprehensive and future-ready education. The school has a legacy of excellence in the fields of Physics, Chemistry, Biochemistry, Mathematics, Data Science and Environmental Sciences.

ABOUT SCHOOL

The Sharda School of Engineering and Sciences (SSES) provides a vibrant academic ecosystem that integrates engineering and scientific education with real-world relevance, research excellence and interdisciplinary learning. It serves as a platform where students are empowered to explore, innovate and build impactful careers across a wide spectrum of disciplines.

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The academic programmes at SSES span undergraduate, postgraduate and doctoral levels and are aligned with the latest technology and scientific advancements in alliance with the NEP 2020. The school is deeply involved in academic research, industry collaboration, and consultancy projects—providing students with an exposure to both theoretical knowledge and practical applications.

ABOUT COURSE

This course introduces students to the fundamental principles of research, including research design, data collection, analysis, interpretation, and reporting. Students learn to formulate research problems, develop hypotheses, select appropriate methodologies, and apply ethical standards in research.

Course Schedule

Week	Content
1.	Introduction to Research
2.	Research Problem and Literature Review
3.	Research Design
4.	Data Collection Methods and Analysis
5.	Research Report and Presentation

RESOURCE PERSON

Faculty Name: Dr. Neha Bhardwaj

Department: Department of Mathematics and Data Science, SSES Sharda University

Dr. Neha Bhardwaj is awarded with PhD degree in Mathematics from Delhi Technological University in 2015. She has completed MSc Applied Mathematics from IIT Roorkee in 2006. Her graduation is from CCS University in 2003. Her area of research is Approximation Theory. She has more than 13 years of teaching experience. She has published 14 research papers in reputed national/international journals, as of now. She has attended and presented research papers in various national and international conferences.

During her research, she has been awarded international travel grant from DST under ITS. In 2018, she received TARE fellowship funded by SERB(DST) and currently working on the project under the fellowship.

School: SSBSR Programme: PG. Branch: MSc Mathematics, Data Science & Analytics		Batch : 2025-27 Current Academic Year: 2025-2026 Semester : II	
1. Course Code	NV34106		
2. Course Title	Fundamentals of Research Methods and Design		
3. Credits	Audit Course		
4. Mode of Examination	Practical		
5. Contact Hours	30 Hours		
Course Type	Value added course		
5. Course Objective	The objective of this course is to equip students with the foundational knowledge and practical skills necessary to conduct systematic and ethical research. Also Familiarize students with various research designs and methodologies, both qualitative and quantitative. Guide students in preparing well-structured research proposals and reports that effectively communicate findings.		
6. Course Outcomes	CO1: The student will be able to explain fundamental concepts and types of research and their applications. CO2: The student will be able develop a clear and testable research problem or question. CO3: The student will be able to formulate a clear research problem and develop relevant research questions or hypotheses. CO4: The student will be able to design appropriate research methodologies and sampling strategies for different research contexts. CO5: The student will be able to collect, analyze, and interpret qualitative and quantitative data using appropriate tools. CO6: The student will be able to apply ethical considerations in conducting research.		
7. Course Description	This course introduces students to the fundamental principles of research, including research design, data collection, analysis, interpretation, and reporting. Students learn to formulate research problems, develop hypotheses, select appropriate methodologies, and apply ethical standards in research.		
8. Outline syllabus			CO Mapping
Unit 1	Introduction to Research		
A	Meaning, purpose, and importance of research		CO1, CO2
B	Types of research: basic vs. applied, qualitative vs. quantitative		CO1, CO2
C	Characteristics of good research.		CO1, CO2
Unit 2	Research Problem and Literature Review		
A	Identifying and defining research problems		CO2
B	Reviewing and synthesizing literature		CO2
C	Developing research questions and hypotheses		CO2,CO3
Unit 3	Research Design		
A	Types of research designs: experimental, descriptive, correlational, case study, etc.		CO3
B	Sampling methods: probability and non-probability		CO3,CO4
C	Variables and operational definitions		CO3,CO4
Unit 4	Data Collection Methods and Analysis		
A	Qualitative methods: interviews, observations, focus groups		CO5
B	Quantitative methods: surveys, experiments, measurements		CO5
C	Descriptive and inferential statistics.		CO5,CO6
Unit 5	Research Report and Presentation		
A	Structure and components of a research report		CO5
B	Writing style and citation (APA/MLA/other formats)		CO5,CO6
C	Plagiarism and ethical writing		CO5,CO6
Mode of Examination	Assignment/Quiz/Viva		
	1. Creswell, J. W., & Creswell, J. D. (2018). <i>Research Design: Qualitative, Quantitative, and Mixed Methods Approaches (5th ed.)</i> . SAGE Publications. 2. Kothari, C. R., & Garg, G. (2019). <i>Research Methodology: Methods and Techniques (4th ed.)</i> . New Age International Publishers.		