



SHARDA
UNIVERSITY
Beyond Boundaries



**SHARDA SCHOOL OF
BASIC SCIENCES
& RESEARCH**



COURSE

**A Comprehensive
Introduction to
Fuzzy Logic and Theory
(NV34011)**

VALUE ADDED
COURSE BROCHURE-30 HRS

2025-26

ABOUT 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.

Sharda School of Basic Sciences and Research (SSBSR) boasts of providing an interdisciplinary approach, exposure to different disciplines in science including Chemistry, Bio-Chemistry, Physics, Mathematics, Life Sciences, and Environmental Sciences.

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The Sharda School of Basic Sciences and Research is unique from other institutions of higher learning as it is committed to imparting knowledge in pure and applied sciences, which not only forms the foundation for further academic pursuits in science and technology but also acts as the foundation for students to pursue a career in multi facet directions.

The academic programs are designed to meet the requirement of the latest technological developments and envisages to become a state-of-the-art department that cater the students at Graduate, Post- Graduate and Research level along with providing high-quality education and cutting-edge interdisciplinary research in sciences. SSBSR has well-equipped laboratories for Physics, MATLAB, Microbiology, Molecular Biology, Cell Culture, Virology, Bio-Chemistry, Physical, Organic and Inorganic chemistry for Graduate and Post-Graduate Programs. In addition, there are Central Instrumentation Facility (CIF) and other advance research labs to promote research culture.

ABOUT THE COURSE

This is a course that provides an overview of the fundamentals and applications of fuzzy logic and fuzzy sets. Fuzzy theory is a branch of mathematics that deals with uncertainty and vagueness in decision-making and problem-solving.

COURSE SCHEDULE

Week	Content
1	Introduction to Fuzzy Sets
2	Fuzzy Operations
3	Fuzzy Numbers
4	Fuzzy Arithmetic
5	Applications of Fuzzy Set Theory

RESOURCE PERSON

Faculty:

Dr. Archana Chauhan, Associate Professor

Department of Mathematics, Sharda University

Dr. Archana Chauhan is an IIT Kanpur graduate and done her PhD in Mathematics from Motilal Nehru National Institute of Technology, Allahabad in 2013. Her area of research is "Fractional Differential Equation." She has published 8 research papers in SCI/Scopus journals. She has attended and presented research papers in various national and international conferences. She served more than 7 years in Galgotias College of Engineering & Technology. She has more than 10 years of teaching experience.

MODULE

School: SSBSR		Batch : 2023-26	
Program: (UG)		Current Academic Year: 2025-26	
Branch: B.Sc. Mathematics, B.Sc. Data Science &		Semester : V	
1. Course Code	Nv34011		
2. Course Title	A Comprehensive Introduction to Fuzzy Logic and Theory		
3. Credits	Audit Course		
4. Contact Hours	(30 Hours)		
Course Type	Value added course		
5. Course Objective	1. To introduce the fundamental concepts of fuzzy theory. 2. To understand the mathematical foundations of fuzzy sets and fuzzy operations. 3. To explore the principles and methods of fuzzy reasoning and inference.		
6. Course Outcomes	CO1: The student will be able to understand the basic concepts fuzzy sets. Co2: The student will be able to explain the mathematical foundations of fuzzy sets and operations, such as membership functions. CO3: The student will be able to explain fuzzy numbers. CO4: The student will be able to apply fuzzy arithmetic. CO5: The student will be able to develop fuzzy relations. CO6: The student will be able to apply fuzzy theory in real word problems.		
7. Course Description	This is an introductory course that provides an in-depth understanding of fuzzy logic, fuzzy sets, and their applications. Fuzzy theory is a mathematical framework that deals with uncertainty and imprecision, allowing for the representation and manipulation of vague or fuzzy concepts. This course explores the theoretical foundations of fuzzy theory and its practical applications in various fields, such as artificial intelligence, control systems, decision-making, and pattern recognition.		
8. Outline syllabus			CO Mapping
Unit 1	Introduction to Fuzzy Sets		
A	Introduction to Fuzzy sets , Crisp vs Fuzzy Types of Fuzzy sets		CO1, CO2
B	Membership functions ,		CO1, Co2
C	Alpha cuts		CO1, Co2
Unit 2	Fuzzy Operations		
A	Fuzzy operations: union, intersection, complement		CO2
B	t-norm, complements t-conorm,		CO2
C	combination of operations		CO2/CO3
Unit 3	Fuzzy Numbers		
A	Introduction to Fuzzy arithmetic Interval arithmetic		CO3
B	+, -, * using alpha cuts MIN and MAX fuzzy numbers		CO3, CO4
C	Fuzzy arithmetic using Alpha cuts		CO3, CO4
Unit 4	Fuzzy Arithmetic		
A	Extension principle		CO5
B	Fuzzy arithmetic using Extension Principle		CO5
C	Fuzzy Equations.		CO5, CO6
Unit 5	Applications of Fuzzy Set Theory		
A	Fuzzy sets in Decision making, Optimization in Fuzzy environment		CO5
B	Fuzzy set application in image processing		CO5/CO6
C	Fuzzy set application in pattern recognition		CO5/CO6
Mode of Examination	Assignment/Quiz/Viva		
Text Book	1. Bhargava, A.K., 2013. Fuzzy set theory fuzzy logic and their applications. S. Chand Publishing.		
Other Reference	1. Zimmermann, H.J., 2011. Fuzzy set theory—and its applications. Springer Science & Business Media.		