SHARDA UNIVERSITY
Beyond Boundaries

NAAC A+ ACCREDITED

SHARDA SCHOOL OF
BIO SCIENCE &
TECHNOLOGY

COURSE

AI Principles (NV3008)

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 imbibing 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 Bioscience and Technology (SSBT) boasts of providing exposure in molecular biology, genetic engineering, bioinformatics, biochemistry, plant biotechnology, microbiology, zoology, animal biotechnology & environmental biotechnology

ABOUT SCHOOL

Sharda School of Bioscience and Technology (SSBT) The Sharda School of Bio-Science and Technology is one of the most dynamic and vibrant School for Life Sciences and Biological Engineering in the Delhi-NCR, Greater Noida India. The school is providing excellent and quality educational opportunities in are areas of Moleuclar Biology, Biochemistry, Immunology, Microbiology, Virology, Cancer Biology, Plant Molecular Biology, Agriculture Biotechnology, Animal Biotechnology etc by training the student community for Entrepreneurship development, Research and technical skills for the student community in particular for those coming from the diverse cultural and socio-economic background of the nation. SSBT offers innovative postgraduate and PhD programmes that inculcate personal and professional enrichment leading to the formation of vivacious and enthusiaistic student community.

ABOUT THE COURSE

This course helps to deepen students' programming abilities in Python and introduce them to essential machine learning (ML) concepts, supported by foundational mathematics. This course equips students to apply advanced Python, ML, and math techniques to solve domain-specific problems.

Course Schedule

Week	Content	Duration (Hrs)
1	Functions and modular programming	**2**
2	Working with advanced data structures: sets, dictionaries	**2**
3	Libraries like Numpy for numerical analysis	**2**
4	Overview of ML types: supervised, unsupervised	**2**
5	Regression and classification basics	**2**
6	Applications in fields like predicting materials properties,	**2**
7	Text processing and tokenization	**2**
8	Sentiment analysis and its applications in various fields	**2**
9	Basic NLP tasks for specific domains (e.g., Converting units into textual data, named entity recognition, Gene Extraction, Extraction of data for environmental monitoring	**2**
10	Introduction to specialized libraries (e.g., Numerically computing, molecular visualization, computation biology, data manipulation and environmental analysis.	**2**
11	Libraries for text, image, or data analysis in analysing research paper, specific fields, extracting scientific terms, visual pattern recognition.	**2**
12	Practice exercises in each domain of Basic Sciences	**2**
13	ML and NLP-based mini-project in Basic Sciences	**2**
14	Use basic NLP techniques to summarize lengthy documents or articles, enabling faster information extraction and review.	**2**
15	Build a simple ML model to predict outcomes based on historical data in Basic Sciences and other area (e.g., predicting sales trends or user behavior).	**2**
Total		30 hrs

Resource Persons

Dr. Jaidev Sharma

Dr Jaidev Sharma is an Assistant professor of Physics at Sharda School of Basic Sciences and Research (SSBSR), Greater Noida. He earned his Ph.D. in the field of Solar Differential Rotation under the expert supervision of Prof. Hari Om Vats (Astronomy & Astrophysics Division, Physical Research Laboratory, Ahmedabad). He has about 12 years of teaching experience in various universities/engineering colleges affiliated to A.K.T.U, Lucknow.

Dr. Kapil K Sharma

Dr. Kapil K. Sharma is an Associate professor of physics at Sharda School of Basic Sciences and Research, Greater Noida. He earned his Ph.D. from NIT Allahabad in Quantum Information and Computation. After completing his Ph.D, he was a Post-Doctoral Fellow at the Indian Institute of Technology (IIT) Bombay, further, he was appointed as a Senior Research Scientist at the Laboratory of Information Technology, Joint Institute for Nuclear Research (JINR), at Dubna, Moscow Oblast. At JINR he did work with Russian Mathematician Late. Prof. Vlamidir P. Gredt (known for computer algebra).

School:		**SSBT**	
Program:		**UG** **Current Academic Year: 2025-26**	
Branch:		Biotechnology/Microbiology/Zoology/Food Science and Technology	
1	Course Code	NV3008	
2	Course Title	**Artificial Principles**	
3	Credits	**0**	
4	Contact Hours	**30**	
	Course Type	**Value Added Course**	
5	Course Objective	To deepen students' programming abilities in Python and introduce them to essential machine learning (ML) concepts, supported by foundational mathematics. This course equips students to apply advanced Python, ML, and math techniques to solve domain-specific problems.	
6	Course Outcomes	On successful completion of the course, students will be able to: CO1: Develop advanced Python programming skills, including modular functions and data structure management for AI tasks. CO2: Apply mathematical concepts (e.g., linear algebra, probability, and statistics) to support AI and machine learning applications. CO3: Understand the principles of machine learning, including supervised and unsupervised learning, and implement basic models. CO4: Utilize NLP techniques for text processing, tokenization, and sentiment analysis specific to domain-relevant data. CO5: Use Python libraries such as Numpy and Pandas for numerical and data analysis, supporting mathematical computations in AI. CO6: Complete an ML or NLP-based project that integrates Python, math, and AI skills to solve a real-world problem.	
7	Course Description	This course focuses on advancing Python programming skills and introducing core mathematical concepts that are crucial for machine learning. Students will learn to implement machine learning models and use natural language processing (NLP) techniques, applying these to practical examples within their field. The course emphasizes mathematical foundations such as linear algebra and probability to support students in understanding and building AI solutions.	
8	Outline syllabus		CO Mapping
	Unit 1	Advanced Python for AI	
	A	Functions and modular programming	CO1, CO6
	B	Working with advanced data structures: sets, dictionaries	CO1, CO6
	C	Libraries like Numpy for numerical analysis	CO1, CO6
	Unit 2	Introduction to Machine Learning	
	A	Overview of ML types: supervised, unsupervised	CO2, CO6
	B	Regression and classification basics	CO2, CO6
	C	Applications in fields like predicting materials properties, drug discovery and design, ecological data analysis	CO2, CO6
	Unit 3	**Natural Language Processing (NLP) Basics**	
	A	Text processing and tokenization	CO3, CO6
	B	Sentiment analysis and its applications in various fields	CO3, CO6
	C	Basic NLP tasks for specific domains (e.g., Converting	CO3, CO6

		units into textual data, named entity recognition, Gene Extraction, Extraction of data for environmental monitoring	
	Unit 4	**Domain-Specific Libraries**	
	A	Introduction to specialized libraries (e.g., Numerically computing, molecular visualization, computation biology, data manipulation and environmental analysis.	CO4, CO6
	B	Libraries for text, image, or data analysis in analysing research paper, specific fields, extracting scientific terms, visual pattern recognition.	CO4, CO6
	C	Practice exercises in each domain of Basic Sciences	CO4, CO6
	Unit 5	**Intermediate Project**	
	A	ML and NLP-based mini-project in Basic Sciences	CO5, CO6
	B	Use basic NLP techniques to summarize lengthy documents or articles, enabling faster information extraction and review.	CO5, CO6
	C	Build a simple ML model to predict outcomes based on historical data in Basic Sciences and other area (e.g., predicting sales trends or user behavior).	CO5, CO6
	Mode of examination	Quiz/Viva	