SHARDA UNIVERSITY
Beyond Boundaries

NAAC A+ ACCREDITED

SHARDA SCHOOL OF BIO-SCIENCE & TECHNOLOGY

Department of Life Science

COURSE

AI for BIOSCIENCES

(NVF2010)

VALUE ADDED
COURSE BROCHURE-30 HRS

2026-27

SHARDA 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 THE SCHOOL

The Sharda School of Bio-Science and Technology is one of the most dynamic and vibrant School for Life Scinces 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.

VISION OF SCHOOL

To become a global centre for higher learning in pursuit of academic excellence, innovation, and entrepreneurship in various disciplines of Bioscience and Technology Biosciences aim to create innovative solutions in various agriculture, Medical and industrial frontiers. Establish progressive growth in national and international scientific scenario.

MISSION OF SCHOOL

M1: To adapt and update students with rapidly changing technologies through self-improvement with continuous learning and professional ethics.

M2: To enable students for community-collaborative learning processes beyond classrooms in various disciplines of biotechnology.

M3: To conduct cutting-edge multi-disciplinary research in plant, animal, medical, industrial, microbial, and environmental biotechnology.

M4: To motivate and train students for industrial practices, higher studies, lifelong learning skills, and entrepreneurship

ABOUT DEPARTMENT

Life sciences are study of composition, structure and function of living forms and their interaction with environment. The scope of life sciences is wide and is one of the most promising areas of research. Life sciences enhance our understanding of nature of life, and provide new insights to diverse areas in biology such as disease pathogenesis, diagnosis, prevention and cure. The acquired knowledge in Life sciences also helps us to combat various environmental issues, finding out ways of sustainable management, and biodiversity conservation, to name a few. Department of Life sciences offers undergraduate and or postgraduate courses in various disciplines such as Biotechnology, Microbiology, Food Science and Technology, Botany and Zoology.

ABOUT THE COURSE

This course will explore the world of micro/nanotechnology for applications in biomedical engineering. Topics that will be covered are prospects of nanomedicine and its importance in medical diagnostics, pathways to molecular manufacturing, molecular transport, and nano-sensor for medical applications. This course can provide employability in medical and pharma companies, paramedic clinical centers and educational institutes.

COURSE SCHEDULE

Week	Content	Duration Hrs.
1	Definition, types and scope of AI, Difference between AI, Machine Learning, and Deep Learning	2
2	Applications of AI across various fields with focus on Life Sciences (Biotechnology, Microbiology, Zoology, Food Science)	2
3	Ethical implications and biases in AI; Algorithmic bias and fairness in biological applications, Data privacy and consent, especially in genetic and clinical data, Ethical challenges in AI-based decision-making systems (e.g., diagnostics, treatment planning), transparency and explainability in AI models	2
4	Introduction to prompting: what and why	2
5	Crafting effective prompts: clarity, conciseness	2
6	Applications of prompting in Basic Sciences For example: Reaction mechanism, Enzyme Activity, Newton's Laws, Ecosystem, Protein Folding	2
7	Variables, data types, and operators; Declaring and initializing variables, Data types: integers, floats, strings, Booleans, Type casting and type checking, Arithmetic operators, assignment operators, comparison operators, logical operators, Practical examples using biological or experimental data	2
8	Control structures: conditionals and loops; if, elif, and else statements, Looping with for and while,Nested loops and conditional logic	2
9	Basic data structures: Lists: Creation, indexing, slicing, appending, removing, iterating, Tuples: Immutable sequences, basic use cases, Dictionaries: Key-value pairs, updating, accessing, nested dictionaries, Biological use cases	2
10	Introduction to Pandas: Series and DataFrames, Reading data from CSV, Excel, and TSV files	2
11	Data selection, filtering, indexing, and slicing, Grouping, aggregation, and summarizing data,Handling missing values, merging and joining datasets,	2
12	Data Visualization Basics; Plotting with Matplotlib and Seaborn, Line plots, bar graphs, scatter plots, histograms, Customizing plots: titles, labels, legends, colors, Applications: Fitting curves to experimental data (e.g., enzyme kinetics, bacterial growth	2
13	Simple AI-based project applying basic Python skills	2
14	Domain-based example (e.g., Molecule Visualizer, Projectile Motion Simulator, DNA Sequence Analyzer, Climate Data Analysis)	2
15	Using Matplotlib and Seaborn to create visual representations	2
Total		30 hrs

RESOURCE PERSON

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. Sandhya Gupta

Dr. Sandhya Gupta has 22+ years of experience in teaching. She holds M. Tech degree in Applied Optics from IIT Delhi. She is a Gold Medallist in M.Phil. She has completed Ph.D. in Material Science in 2020. She has 7 publications in International Journal and International Conferences and two book chapters. Area of research interest is polymer electrolytes, use of polymer electrolytes in Energy storage devices and Optical Fiber Sensors. She has attended several international/national conferences/workshops/FDP/hands on training programmes and presented her research work.

Dr. Monika Shrivastava

Dr. Monika Srivastava is working as Assistant Professor in Department of Physics & Environmental Science, SSES, Sharda University. Her academic qualifications include Doctorate from Sharda University in the field of Perovskite solar cells, post graduation (M.Sc.-Physics) from Deendayal Upadhyaya Gorakhpur University, M.Tech from IIT Kanpur. Dr. Srivastava has also qualified NET-JRF and GATE in physics. She has teaching and research experience of 10 years.

Dr. Honey Mittal

Dr. Honey Mittal is an Assistant Professor of the Department of Physics at the Sharda School of Basic Sciences & Research, Sharda University, Greater Noida, India. She holds a full-time Ph.D. from the Centre for Nanoscience and Nanotechnology, Jamia Millia Islamia, New Delhi. She earned her M.Sc. in Physics from Jamia Millia Islamia, New Delhi, and her B.Sc. in Physics from Gargi College, University of Delhi. She has 20+ publications with more than 10 publications in high-impact factor Q1 international journals. Her area of interest is synthesizing and characterizing nanocomposites for energy (supercapacitors) and environment (Photocatalytic wastewater treatment) remediation.

Dr. Satish Kumar

Dr. Satish Kumar Verma is currently working as an Assistant Professor in the Department of Physics & Environmental Sciences, Sharda School of Engineering & Science, Sharda University, Greater Noida, India. His career began at the University of Lucknow, Lucknow (India), where he graduated with a bachelor's degree in 2009 and Masters degree (Renewable Energy) in 2012. He has earned his Masters degree in Physics from Dr. Shakuntala Misra National Rehabilitation University, Lucknow, India in 2017. Afterwards he joined Prof. O. N. Srivastava (Hydrogen Man of India), Banaras Hindu University, Varanasi, India for Doctoral Degree. Dr. Verma earned his Doctoral Degree in the field of 'Hydrogen Storage and Utilization in December 2022 and went on to join as a Research Scientist (postdoc) in an industry (M/s Hydrogen Horizons (Israel) Ltd.) funded project at Department of Materials Science and Engineering, Technion-Israel Institute of Technology, Haifa, Israel (from January 24, 2023 to July 31, 2023). Afterwards Dr. Verma joined as Project Scientist-I in 'DST-Bio energy and H2 Map' project at Department of Sustainable Energy Engineering, Indian Institute of Technology, Kanpur, India (from August 03, 2023 to June 25, 2024) with Prof. Shobit Omar. During this period, he was involved in the investigation, designing and advanced characterizations of novel materials for hydrogen storage and cooling/refrigeration applications. Dr. Verma joined Sharda University in 2024 as an Assistant Professor.

Dr. Yogesh Sharma

Dr. Yogesh Sharma is presently working as Assistant Professor (Sr. Grade) in the Department of Physics & Environmental Sciences, Sharda School of Engineering and Science (SSES), Sharda University, Greater Noida, U.P. since August 2025. He brings with him over seven years of academic experience in teaching and research. Prior to joining Sharda University, he worked as an Assistant Professor at SGT University, Gurugram, Haryana, for nearly six years (February 2020 – August 2025). He earned his Ph.D. in Physics (Condensed Matter Physics – Photonics) from Banaras Hindu University (BHU) in 2019, followed by postdoctoral research at the Institute for Plasma Research, Gandhinagar, Gujarat. In 2024, Dr. Sharma was awarded the Department of Science and Technology (DST) – Science and Engineering Research Board (SERB) Core Research Grant for his extramural project on Bloch Surface Mode Excitation and Nonreciprocity in Infrared and Tera/Giga-hertz Frequency Range Using Magnetophotonic Crystals, marking a significant contribution to this emerging field.

His research expertise lies in Photonic Crystals, Photonics, and Metamaterials. He is the editor of the book Photonic Materials: Emerging Research and Applications and has demonstrated extensive contributions in his domain through impactful research. To date, he has authored 40 SCI-indexed publications, 1 patent, and 4 book chapters. Dr. Sharma actively engages in international and national conferences, seminars, and workshops. Through dedicated mentorship, he has guided several postgraduate dissertations and successfully supervised doctoral candidates. He is also a member of Optica and the Raman International Optronics Society, and has played a key role in organizing academic and research events.

MODULE

School: SSBT	Department of Life Science	
Program:	B.Sc (Hons./Hons. with Research)	
Branch:	Biotechnology/Microbiology/Zoology/Food Science and Technology	
1. Course Code	**NVF2010 / Sem-3**	
2. Course Title	**AI for Biosciences**	
3. Credits	0	
4. Contact Hours	**(30 Hours)**	
Course Type	**Value added course**	
5. Course Objective	To provide students without a strong mathematical background with a comprehensive introduction to the fundamental concepts and practical skills required for artificial intelligence (AI), covering essential Python programming, prompt engineering, and basic mathematical concepts.	
6. Course Outcomes	CO1. Demonstrate proficiency in Python programming by utilizing variables, data types, control structures, functions, and basic file operations. CO2. Apply data management techniques using Python data structures such as lists, dictionaries, sets, and tuples, and leverage libraries like NumPy and Pandas for data manipulation. CO3. Apply Python programming concepts such as variables, operators, control structures, and basic data structures to solve problems and analyze data in life science applications. CO4. Implement prompt engineering techniques to craft effective prompts for AI models and apply them in practical, real-world scenarios. CO5. Create informative and visually appealing data visualizations using Python libraries such as Matplotlib and Seaborn to convey data insights clearly. CO6. Analyze and discuss the ethical implications of AI, including biases, fairness, and the societal impacts of AI applications.	
7. Course Description	This course introduces fundamental AI concepts and practical skills to students without a strong mathematical background. It covers Python programming, prompt engineering, and essential mathematical concepts, with a focus on practical applications and intuitive understanding to make AI accessible to all students.	
8. Outline syllabus		CO Mapping
Unit 1	**Foundations of AI**	
A	Definition, types and scope of AI, Difference between AI, Machine Learning, and Deep Learning	CO1/CO2
B	Applications of AI across various fields with focus on Life Sciences (Biotechnology, Microbiology, Zoology, Food Science)	CO1/CO2
C	Ethical implications and biases in AI; Algorithmic bias and fairness in biological applications, Data privacy and consent, especially in genetic and clinical data, Ethical challenges in AI-based decision-making systems (e.g., diagnostics, treatment planning), transparency and explainability in AI models	CO6
Unit 2	**Prompt Engineering Basics**	
A	Introduction to prompting: what and why	CO4
B	Crafting effective prompts: clarity, conciseness	CO4
C	Applications of prompting in Basic Sciences For example: Reaction mechanism, Enzyme Activity, Newton's Laws, Ecosystem, Protein Folding	CO4
Unit 3	**Python Fundamentals**	
A	Variables, data types, and operators; Declaring and initializing variables, Data types: integers, floats, strings, Booleans, Type casting and type checking, Arithmetic operators, assignment operators, comparison operators, logical operators, Practical examples using biological or experimental data	CO3
B	Control structures: conditionals and loops; if, elif, and else statements, Looping with for and while, Nested loops and conditional logic	CO3
C	Basic data structures: Lists: Creation, indexing, slicing, appending, removing, iterating, Tuples: Immutable sequences, basic use cases, Dictionaries: Key-value pairs, updating, accessing, nested dictionaries, Biological use cases	CO3
Unit 4	**Data Handling in Python**	
A	Introduction to Pandas: Series and DataFrames, Reading data from CSV, Excel, and TSV files	CO2
B	Data selection, filtering, indexing, and slicing, Grouping, aggregation, and summarizing data, Handling missing values, merging and joining datasets,	CO2
C	Data Visualization Basics; Plotting with Matplotlib and Seaborn, Line plots, bar graphs, scatter plots, histograms, Customizing plots: titles, labels, legends, colors, Applications: Fitting curves to experimental data (e.g., enzyme kinetics, bacterial growth	CO2, CO5
Unit 5	**Introductory Project**	
A	Simple AI-based project applying basic Python skills	CO5
B	Domain-based example (e.g., Molecule Visualizer, Projectile Motion Simulator, DNA Sequence Analyzer, Climate Data Analysis)	CO5
C	Using Matplotlib and Seaborn to create visual representations	CO6
Mode of examination	Quizzes & Viva	