



SHARDA
UNIVERSITY
Beyond Boundaries



**SHARDA SCHOOL OF
BIOSCIENCE &
TECHNOLOGY**



— COURSE —

**Natural History,
Land and
Aquascaping
NVF1004**

VALUE ADDED
COURSE BROCHURE-30 HRS
2026-27

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 imbuing competitive abilities in students. The University is approved by UGC and prides itself in being the only multidiscipline 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.

ABOUT SCHOOL

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 areas of Molecular 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 enthusiastic student community.

ABOUT DEPARTMENT

The main objective of the Department is to provide academic training and conduct research in the interdisciplinary areas of biotechnology with particular emphasis on extending the knowledge generated from these studies towards the development of technologies of commercial significance. All the basic infrastructural facilities needed for conducting teaching and research programs in different areas of Biotechnology have been developed in the department. The department is housed in a newly constructed building consisting of classrooms with audio-visual facilities well-equipped Research laboratories, a special lab for Molecular Biology, Genetic Engineering, Plant Tissue Culture, Microbial technology, Nanobiotechnology, and Bioinformatics. The students undergo project training in modern Biotechnology viz Bioinformatics, Genomics, Neurobiology, NanoBiotechnology, Water Management, Cancer Biology, Stem Cell and Regenerative Medicine, Plant and Animal Biotechnology, etc.

ABOUT COURSE

The Value Added Course (VAC) aims to bridge the gap between academic learning and industry requirements by equipping students with specialized knowledge and hands-on skills in emerging areas of biotechnology. It promotes experiential learning, interdisciplinary thinking, innovation, and career readiness while supporting the department's vision of producing competent biotechnology professionals.

PURPOSE OF VAC COURSE

- Bridge the gap between academic learning and industry expectations.
- Equip students with practical and application-oriented skills beyond the prescribed curriculum.
- Enhance professional competence, decision-making, and problem-solving abilities.
- Develop entrepreneurial mindset, leadership qualities, and managerial capabilities.
- Improve students' employability and readiness for higher studies or professional careers.
- Promote holistic personality development through specialized domain knowledge.

COURSE CONTENT

Week	Topic Covered	Subtopics / Activities
Week 1	Natural History & Ecosystem Evolution	Introduction to natural history: geological timeline, major biomes
Week 2	Principles of Landscaping	Fundamentals of land ecology: soil profiles, plant–soil interactions
Week 3	Fundamentals of Aquascaping	Types of aquascapes: Nature style, Iwagumi, Jungle, Dutch, Biotope
Week 4	Water Chemistry, Microbial Ecology & Nutrient Cycles	Water quality parameters: pH, GH, KH, ammonia, nitrite, nitrate
Week 5	Sustainable Design & Demonstration	Demonstration: basic layout for land and aquascape design

Profiles:

Dr. Arpita Roy

Assistant Professor

Dr. Arpita Roy is an Assistant Professor in the Department of Biotechnology. She obtained her B.E., M.Tech. (Industrial Biotechnology), and Ph.D. in Biotechnology from Delhi Technological University. Her research interests include Plant Biotechnology, Environmental Biotechnology, Green Nanotechnology, Medicinal Plants, and Microbiology. She has published 100+ SCI/Scopus-indexed research papers, 27 book chapters, has an h-index of 38, and has been recognized among the Top 2% Scientists Worldwide (Stanford University–Elsevier rankings).

Dr. Astha Gupta

Assistant Professor

Dr. Astha Gupta is an Assistant Professor in the Department of Biotechnology. She is actively involved in teaching, laboratory training, and student mentoring while contributing to the department's research and academic development.

School: SSBT Programme: UG. Branch: BT		Batch : 2022-26 Current Academic Year: 2026-2027 Semester : VIII	
1. Course Code	NVF1004		
2. Course Title	Natural History, Land and Aquascaping		
3. Credits	Audit Course		
4. Contact Hours (L-T-P)	30 Hours (0-0-2)		
Course Type	Value added course		
5. Course Objective	This course aims to develop a scientific understanding of natural history, ecological evolution, and the design principles behind land- and aqua-based ecosystems. Students will learn the biological, ecological, and aesthetic foundations of landscaping and aquascaping, with special reference to plant biology, microbial ecology, water chemistry, and sustainable system design. The course focuses on integrating biotechnology perspectives—such as plant selection, nutrient cycles, microbial communities, and controlled environmental conditions—into modern landscaping and aquascaping practices.		
6. Course Outcomes	CO1: Student will be able to demonstrate understanding of natural history and ecosystem evolution. CO2: Student will be able to explain ecological and biological principles used in land- and aquascaping. CO3: Student will be able to identify suitable plants, substrates, and materials for both land and aquatic scapes. CO4: Student will be able to assess water chemistry, nutrient cycles, and microbial roles in aquascapes. CO5: Student will be able to evaluate sustainable design strategies for indoor, outdoor, and aquatic environments. CO6: Student will be able to apply basic design and maintenance concepts to create stable and aesthetic scapes.		
7. Course Description	This course explores natural history as a foundation for modern landscape design and aquascaping. Students will study the development of terrestrial and aquatic ecosystems over time, understanding how geological, climatic, and biological factors shape environments. Using this knowledge, the course transitions into the study of land and aquascaping principles, focusing on plant selection, substrate dynamics, water chemistry, microbial ecology, lighting, nutrient cycles, and sustainable maintenance. While primarily theoretical, the course includes minimally required demonstrations of substrate layering, planting techniques, and aquascape layout principles. This VAC supports biotechnology students by linking ecological principles with plant physiology, algae–microbe interactions, and environmental sustainability.		
8. Outline syllabus		CO Mapping	
Unit 1	Natural History & Ecosystem Evolution		
A	Introduction to natural history: geological timeline, major biomes.		CO1
B	Plant and animal evolution; ecological succession.		CO1
C	Relevance of natural history to modern landscape and aquascape design.		CO1
Unit 2	Principles of Landscaping		
A	Fundamentals of land ecology: soil profiles, plant–soil interactions.		CO2
B	Plant selection for landscaping: ornamentals, native species, climate adaptation.		CO2
C	Landscaping components: terrain, hardscape, softscape, design layouts.		CO2
Unit 3	Fundamentals of Aquascaping		
A	Types of aquascapes: Nature style, Iwagumi, Jungle, Dutch, Biotope.		CO3
B	Aquatic plants: categories, physiological needs, biotech relevance (tissue-cultured plants).		CO3
C	Hardscape elements: rocks, driftwood, substrates, layout techniques.		CO3
Unit 4	Water Chemistry, Microbial Ecology & Nutrient Cycles		
A	Water quality parameters: pH, GH, KH, ammonia, nitrite, nitrate.		CO4
B	Nitrogen cycle and microbial communities in aquascapes.		CO4,CO6
C	Fertilization methods: macro- and micronutrients, CO ₂ supplementation.		CO4,CO6
Unit 5	Sustainable Design & Demonstration		
A	Demonstration: basic layout for land and aquascape design.		CO5
B	Sustainable practices: closed-loop systems, low-energy lighting, water conservation.		CO5
C	Maintenance fundamentals: algae control, pruning, substrate care.		CO5,CO6
Mode of Examination	Assignments/Quizzes		