



VALUE ADDED COURSE  
BROCHURE 2023-24

**COURSE**

Green Technology and  
Approaches for Waste  
Valorisation (VAS400)

## **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 worldclass 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 THE 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.

## **ABOUT COURSE**

Course: Green Technology and Approaches for Waste Valorisation (VAS400)

This value-added course is intended to provide opportunity for students to understand how waste management can be done and how it will be advantageous to human kind. The program is intended to give the participants a focused view on the approaches that are used to reuse the waste material. The pedagogy includes lectures, discussions and latest research. The value-added course will provide the opportunities to flourish the knowledge and pursue research in this area. The one-week Value Added Course will enable the participants to understand the various approaches for waste valorization.

## COURSE CONTENT

DAY	CONTENT	DURATION IN Hrs
1	Municipal waste management; Solid waste management and e-waste management. Current environmental issues of importance. Biofuels and Biogas. Q and A session	5
2	Introduction to microbial fuel cells, Electricity generation from microbial electrolysis cells.	5
3	Valorization of algal biomass for value added by-product generation. Cultivation of algal biomass. Treatment of waste water.	5
4	Application of biofilm in bioremediation process, Biofilm as virulence and AMR mechanism, Anti-biofilm and anti-persister strategies	5
5	Biodegradation of Xenobiotics, Microbial Degradation of Polychlorophenols; Degradation of Chloro-organic Pollutants by White Rot Fungi	5
6	Microbial degradation of PAHs: organisms and environmental compartments; Biodegradation of Aromatic Pollutants by Ligninolytic Fungal strains.	5

## Resource Persons

### Dr. Ashwini Kumar

Dr Ashwini Kumar is presently working as an Assistant Professor in the Department of Life Sciences at Sharda University, Greater Noida (Uttar Pradesh). Before this, he worked as an Assistant Professor in Biotechnology and Bioinformatics Area at NIIT University, Neemrana (Rajasthan) and as Assistant Professor in the Department of Biotechnology at IMS Engineering College, Ghaziabad. Previously, he also worked as Lecturer in the Department of Biotechnology, National Institute of Technology, Raipur. The central component of his research has been biomaterial science specifically in the field of novel drug delivery systems. He has authored 22 journal articles in national and international journals, 9 book chapters, and a book. He also holds a patent on his work from PhD. Dr. Kumar has participated in over 35 conferences/seminars/workshops and has presented his work in a few of them. He has been invited as a speaker and jury member on various national scientific platforms. He is a guest editor of *Frontiers in Medical Technology*, a focused journal from Frontiers Publications, Review Editor for *Frontiers in Oncology* (Section - Gastrointestinal Oncology), Associate Editor for *Frontiers in System Biology* and a reviewer of *Materials and Design* (Elsevier), *Redox Report* (Taylor & Francis), *Diabetic Medicine* (Wiley). He is a life member of Asian Polymer Association.

<b>School:</b>		<b>SBSR</b>	<b>Batch : 2023-27</b>
<b>Program:</b>		<b>UG</b>	<b>Current Academic Year: 2023-24</b>
<b>Branch:</b>			
1	Course Code	<b>VAS400</b>	
2	Course Title	<b>Green Technology and Approaches for Waste Valorization</b>	
3	Credits	<b>0</b>	
4	Contact Hours	<b>30</b>	
<b>Course Type</b>		<b>Value Added Course</b>	
5	Course Objective	<ol style="list-style-type: none"> <li>1. To introduce basic concept of waste management.</li> <li>2. To familiarize students with various processes that can be used for reuse and recycle resources and therefore waste management.</li> <li>3. To develop an understanding of micro-organisms can play an important role in waste management.</li> </ol>	
6	Course Outcomes	<p>On successful completion of the course, students will be able to:</p> <p>CO1: Understand the importance of waste management and different methods how it can be done.</p> <p>CO2: How microbial cells and algal biomass can be used for the advancement of human kinds.</p> <p>CO3: Information about biofilms and how they can be used in bioremediation.</p> <p>CO4: How different pollutants are degraded with the help of different microorganisms.</p> <p>CO5: Understand the importance of sustainable use of resources and how the resources can be recycled and reused.</p>	
7	Course Description	The course intends to aid students to understand the importance of sustainable use of resources and waste management. This will help them to understand the importance of the balance between the living organisms and the ecosystem.	
8	<b>Outline syllabus</b>		<b>CO Mapping</b>
	<b>Unit 1</b>	<b>Waste Management</b>	CO1, CO6
	A	Municipal waste management; Solid waste management and e-waste management.	CO1, CO6
	B	Current environmental issues of importance.	CO1, CO6
	C	Biofuels and Biogas	CO1, CO6
	<b>Unit 2</b>	<b>Fuel Cells</b>	CO2, CO6
	A	Introduction to microbial fuel cells	CO2, CO6
	B	Electricity generation from microbial electrolysis cells	CO2, CO6
	<b>Unit 3</b>	<b>Algal Biomass</b>	CO3, CO6
	A	Valorization of algal biomass for value added by-product generation.	CO3, CO6

	B	Cultivation of algal biomass	CO3, CO6
	C	Treatment of waste water	CO3, CO6
	<b>Unit 4</b>	<b>Biofilms and its Application</b>	CO4, CO6
	A	Application of biofilm in bioremediation process	CO4, CO6
	B	Biofilm as virulence and AMR mechanism	CO4, CO6
	C	Anti-biofilm and anti-persister strategies	CO4, CO6
	<b>Unit 5</b>	<b>Biodegradation of various waste materials</b>	CO5, CO6
	A	Biodegradation of Xenobiotics	CO5, CO6
	B	Microbial Degradation of Polychlorophenols; Degradation of Chloro-organic Pollutants by White Rot Fungi;	CO5, CO6
	C	Microbial degradation of PAHs: organisms and environmental compartments; Biodegradation of Aromatic Pollutants by Ligninolytic Fungal strains.	CO5, CO6
	Mode of examination	Quiz and practical	