

GIAN course on “Conventional and Emerging Bioprocesses for Waste and Wastewater treatment”

March 17 - 21, 2025

Motilal Nehru National Institute of Technology Allahabad, Prayagraj

Overview

Our daily activities generate a tremendous amount of waste and wastewater. These waste and wastewater contain a wide variety of organic and inorganic pollutants, nutrients (nitrogen and phosphorus), and other biological contaminants. If untreated waste and wastewater are disposed to the environment, these pollutants can adversely impact the ecosystem and public health. Microorganisms are harnessed in engineered bioprocesses involving the biological treatment of waste and wastewater to eliminate these contaminants. These microorganisms utilize various organic substances present in the waste and wastewater as a source of energy and produce new biomass and other by-products. Thus, the treatment of waste and wastewater can be achieved. However, the effective design of bioprocesses and optimizing process parameters are crucial to accelerate the degradation rate of contaminants, enabling faster treatment. While conventional waste/wastewater bioprocesses focus on removing pollutants, the notion of emerging bioprocesses for waste and wastewater treatment extends beyond removing contaminants. There is a growing emphasis on extracting value-added resources during the treatment process.

This course focuses deeply on the domain of environmental bioprocesses for waste and wastewater treatment. Participants will explore a spectrum of both established and emerging bioprocesses, such as the aerobic activated sludge process, anaerobic digestion, composting, microbial electrochemical technologies, direct interspecies electron transfer, and so on. The course will cover the fundamental principles, engineering aspects, and practical applications that underpin these processes. Through a blend of theoretical understanding and hands-on calculation, participants will cultivate a holistic perspective of how bioprocesses can effectively treat waste or wastewater, mitigate environmental risks, and contribute substantively to sustainable and innovative waste/wastewater management practices.

Program duration	March 17 - 21, 2025
Modules	<p>Module 1: Introduction to Environmental Bioprocesses; Module 2: Introduction to Wastewater Treatment; Module 3: Introduction to Waste Management; Module 4: Conventional Biological Wastewater Treatment; Module 5: Biological Waste Treatment Processes; Module 6: Bioelectrochemical Systems for Waste and Wastewater Treatment; Module 7: Engineering Direct Interspecies Electron Transfer for Waste and Wastewater Treatment</p> <p>Tutorials: Hands-on calculations related to the characterization of wastewater and discussion on their implications in design and operation of wastewater bioprocesses; Design calculations for conventional wastewater bioprocesses; Engineering calculations relevant to biological waste treatment processes and bioelectrochemical systems design and operation; On-site visit of municipal wastewater treatment plants</p>
You Should Attend If...	<ul style="list-style-type: none"> Anyone with a degree in Biotechnology, Civil, Environmental, Chemical, Biochemical or relevant branches of Engineering and Science. Student at all levels (B.Tech./B.Eng./B.Sc./M.Sc./MTech./Ph.D.) and faculty members/academic staff from universities and institutions. Engineers, Scientists and Professionals working in companies, industries and R&D institutions.
Fees	<p>The participation fees for taking the course is as follows:</p> <p>Students (B.Tech/M.Tech/PhD.): Rs 1000 + 18%= Rs 1180</p> <p>Faculty/Scientist from academic organization: Rs 2500 + 18% = Rs 2950</p> <p>Industry/ Research Organizations: Rs 4500 + 18% = Rs 5310</p> <p>Foreign participants: US\$ 200</p> <p>The above fee includes all instructional materials, laboratory equipment usage charges. The participants will be provided with accommodation on payment basis.</p> <p>Registration link: https://forms.gle/2Gr5NjZFrocA5d9LA</p> <p>Registration fee (after receiving email confirmation) can be directly deposited to Account No.: 10424975574, Account Name: SNFCE MNNIT Allahabad, Bank Name: State Bank of India (SBI), IFSC No: SBIN0002580, Branch: MNNIT Allahabad, Prayagraj – 211004, Uttar Pradesh, India</p>

The Faculty



Dr. Bipro Dhar is an Associate Professor of Environmental Engineering at the University of Alberta, Canada, where he holds the Canada Research Chair (Tier 2) in Microbial Electrocatalysis for Energy and Environment and the University of Alberta Engineering Research Chair in Environmental Biotechnology. His expertise includes environmental biotechnology, bioelectrochemistry, and physicochemical processes to develop advanced bioenergy, waste/wastewater treatment, bioresource recovery, and biosensing technologies for the waste and water/wastewater sectors. Dr. Dhar has collaborated extensively with industry partners and secured over \$4 million in research funding, with more than \$3.3 million as the Principal Investigator. Several of his research projects are currently being piloted for scale-up. Since 2017, he supervised/co-supervised around 50 graduate and undergraduate students, postdoctoral fellows, research assistants, visiting students, and visiting professors. His research has resulted in 100+ peer-reviewed journal articles, 10 book chapters, and 70+ conferences, cumulatively receiving 4900+ citations as of October 2024 (h-index: 39; i10-index: 85). Currently, Dr. Dhar serves as a Vice-President (Western Canada), of Canadian Association on Water Quality (CAWQ).



Dr. Joyabrata Mal is an Assistant Professor at Department of Biotechnology, MNNIT Allahabad. His research primarily focuses on biological treatment of wastewater using various reactors (e.g. UASB, SBR), bioremediation and resource recovery, environmental nanotechnology and its implication in wastewater treatment, sustainable agriculture and eco-toxicity. He is currently running two projects: one from DAE-BRNS and another from DST, both focusing on development of various (Aerobic granular sludge, microalgae) -based bioreactors (SBR, UASB, PBR,) for different wastewater treatment, resource recovery and sustainable development.



Dr. Rupika Sinha is an Assistant Professor at Department of Biotechnology, MNNIT Allahabad. Her research interest lies in the area of Bioprocess Technology, Fermentation and Biochemical Engineering. She has been awarded extramural research grant under the category of Start-up Research Grant (2021) by SERB, DST, New Delhi. She is also a Co-PI in a project related to bioremediation funded by SERB-POWER Grant. She is also mentoring one DST WOSA Project on 'Metabolic Engineering of Lactic Acid Bacteria' for the high yield of lactic acid' in collaboration with CRDC, Bharat Petroleum Corporation Limited (BPCL), Greater Noida.

Course Coordinator(s)

Host faculty & coordinator

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