

Write up for CUJ Webpage

A One Week Training Programme on ‘**Advanced Instrumental Techniques in Water and Wastewater Treatment (AITWWT 22)**’ was organized from 27 June to 03 July 2022 by the Department of Environmental Sciences, Central University of Jharkhand, Ranchi under DST-STUTI Programme of Indian Institute of Technology (ISM), Dhanbad, funded by the Department of Science & Technology (DST), Govt. of India. The training programme was started on 27 June 2022, with a short inaugural programme that was initiated with the welcome address by Prof. Manoj Kumar, Dean (Academic affairs) and Head (DEVS) followed by deliberation from Prof. Alok Sinha, Program Coordinator, IIT (ISM); Prof. S K Gupta, IIT (ISM); Prof. A.C. Pandey, Dean (SNRM), CUJ; Prof. R.K. Dey, Director (IQAC), CUJ. Prof. Kshiti Bhusan Das, the Hon’ble Vice Chancellor of Central University of Jharkhand conveyed best wishes to the organizers and the participants for the successful completion of the program. While the valedictory session was started at the late evening hour (04.30 pm) on 03 July 2022 with a short summary of the Training Programme followed by certificate distribution to all the participants and resource persons where resource persons felicitated with a memento. Prof. Kshiti Bhusan Das, Hon’ble Vice Chancellor, Central University of Jharkhand congratulated the participants and also lauded the efforts of the program coordinator from CUJ (Prof. Manoj Kumar) and IIT (ISM) (Prof. Alok Sinha and Prof. S.K. Gupta) along with the resource persons who delivered lectures in the program. He has mentioned the importance of this kind of training program for the researchers of different backgrounds and emphasized in his deliberation on the importance of water in the present scenario of climate change and the problems of water scarcity. Lastly, he thanked DST for funding this program and also encouraged the participants to join more of such kinds of training program in the future to enhance their analytical skill to resolve the problem of water scarcity and water pollution.

The Department of Science and Technology (DST) intends to build human resources and knowledge capacity by arranging training programs through open access science and technology infrastructure across the country under the banner of ‘Synergistic Training Programme Utilizing the Scientific & Technological Infrastructure (STUTI)’. Each training session is for seven days and thirty participants are selected on the basis of nomination from the respective head of the various institutions, colleges, and

universities. This 7 day training program 'AITWWT 22' was organized in CUJ to impart knowledge on some advanced instrumentation facilities procured under DST-FIST program viz., Atomic Absorption Spectrometer, Polyhouse Mist Chamber, Trinocular Phase Contrast and Dark field Microscope, along with the existing instrumentation facilities of the DEVS procured under various R & D projects and university grants including Flame Photometer, Gas Chromatograph, and UV Visible Spectrophotometer which have been used for the characterization of various samples in different Environmental Sciences, Chemistry, Life Sciences and other related areas of research. This module was meant for the researchers actively engaged in academics, research, or consultancy work where participants went through the classroom teaching followed by the laboratory demonstration of each instrument. The procedures of practical operation, working principles, and interpretation of results of each instrumental techniques were described in detail and the participants had been allowed to bring their own samples for the hands-on analysis.

A total of 30 participants (18 outstation and 12 in-house participants from various departments of Central University of Jharkhand) including scientist, faculty, engineers, research scholars, and P.G. students from various institutions such as IIT (ISM), P.K. Roy Memorial College, and CSIR-Central Institute of Mining & Fuel Research, Dhanbad; A.N. College and Patliputra University, Patna; Durgapur Government College, National Institute of Technology-Durgapur, and Kazi Nazrul University, West Bengal; Godda District Mineral Foundation Trust; National Institute of Advanced Manufacturing Technology (formerly NIFFT) and Central University of Jharkhand, Ranchi. In these 7 days, lectures and demonstrations were delivered on '*Water Quality Parameters*' by Prof. Alok Sinha from IIT-ISM, Dhanbad, '*Waste Water Characteristics*' by Prof. S.K. Gupta from IIT-ISM, Dhanbad, '*Water quality analysis*' by Prof. R.K. Dey, '*Wastewater Analysis*' by Dr. Bhaskar Singh, '*UV-Visible Spectrophotometer*' by Dr. Kuldeep Bauddh and Dr. Sushil Kumar Shukla, '*Flame Photometer*' by Dr. Nirmali Bordoloi and Dr. Ramesh Oraon, '*Poly-house mist chamber*' by Dr. Purabi Saikia, '*Trinocular Phase Contrast and Dark field Microscope*' by Dr. Bhaskar Singh, '*Gas Chromatograph*' by Dr. Nirmali Bordoloi, and '*Atomic Absorption Spectrophotometer (AAS)*' by Dr. Ramesh Oraon.

Prof. Manoj Kumar, Head, DEVS and the Program Coordinator of the training program congratulated the faculty members of the DEVS, Dr. Bhaskar Singh, Dr. Purabi Saikia, Dr. Kuldeep Bauddh, and Dr. Nirmali Bordoloi for the successful

completion of this 7 day training programme which was organized in a very short notice.

Activity Report of the Program

On 1st day, the first lecture was by Prof. Alok Sinha from IIT (ISM), Dhanbad on '*Water Quality Parameters*' followed by the lecture on '*Wastewater Characteristics*' by Prof. S K Gupta, IIT (ISM) Dhanbad. The hands-on training emphasized on some basic water analysis techniques and instruments such as pH meter and determination of various water quality parameters *viz.*, alkalinity and acidity. While **on 2nd day** the training programme was focused on '*Water and wastewater analysis*' in the first lecture, Prof. R.K. Dey from Department of Chemistry, CUJ talked about '*Water chemistry and analysis techniques*' and he briefed on the physical, chemical, and biological processes of wastewater treatment. In the second lecture, Dr. Bhaskar Singh, from DEVS, CUJ explained '*Basic instrumentation facilities available at DEVS including Autoclave, Laminar Air Flow chamber, and Kjeldahl distillation and digestion Apparatus, and their working principles and practical applications*'. Later on, the participants were demonstrated how these instruments works along with their applications and limitations. **On 3rd day**, the first lecture was given by Dr. Kuldeep Baudh, from DEVS, CUJ, on '*Analysis of contaminants by using UV-Vis Spectrophotometer*' and explained the basics of the UV-Vis Spectrophotometer and their practical application in wastewater analysis. The second lecture was given by Dr. Sushil Kumar Shukla from Department of Transport Science and Technology, CUJ, on the '*Concepts of UV-Vis Spectrophotometer*' with detailed descriptions of instrumentation, principles of Beer's–Lambert's Law, and their applications in several fields. All the participants participated in the hands-on training on UV-Vis Spectrophotometer during the laboratory demonstration session. **On 4th day**, the first lecture was demonstrated by Dr. Nirmali Bordoloi from DEVS, CUJ on '*Flame Photometer*' where she discussed its working principle and application in wastewater analysis. The 2nd lecture was delivered by Dr. Ramesh Oraon from Department of Nano Science and Technology, CUJ and he explained about the '*Detailed instrumentation of Flame Photometer*'. With emphasis on its different components, and its role in various environmental sample analysis. All participants participated in the hands-on training on Flame Photometer during the laboratory demonstration.

On 5th day, the first lecture was delivered by Dr. Purabi Saikia, from DEVS, CUJ on '*Polyhouse Mist Chamber for Protected Cultivation*' in which she emphasized on the microclimatic control within the polyhouse mist chamber, its importance, different techniques involved in creating ideal growth environment for various commercial crops, advantages, and needs of protected crop cultivation within polyhouse, materials required for construction of polyhouse, and concluded with the quote of M. S. Swaminathan that "If conservation of natural resources goes wrong, nothing will go right". The second lecture was given by Dr. Bhaskar Singh on '*Trinocular Phase Contrast and Dark field Microscope*' where he elaborated about the optical microscope with dark field and phase contrast microscopy, and their working principles and practical applications. In the laboratory demonstration, each and every participant participated in the hands-on training on trinocular phase contrast and dark field microscope. **On 6th day**, first lecture was given by Dr. Nirmali Bordoloi on '*The Concept of Gas Chromatography*' with fundamentals of Gas Chromatography, mechanism involved, working principle, and their application in different areas of research such as food industry, natural products, agriculture, environmental pollutants, medical, forensic Lab, etc. In the laboratory demonstration, all the participants participated in the hands-on training on Gas Chromatography. **On 7th day**, there were two deliberations on '*Atomic Absorption Spectroscopy (AAS)*' delivered by Dr. Ramesh Oraon where he explained about the working principles and mechanism involved in AAS, its diverse application including in the field of wastewater treatment. He also imparted the practical demonstrations and hands on training of AAS to all the participants.