



One-Week Hands-On Training workshop on “Advanced Instrumental Techniques for Chemists” (18th July – 24th July, 2022)

The Department of Science and Technology, Government of India, has given the responsibility to IIT (ISM) Dhanbad to build human resources and its knowledge capacity using open access science and technology infrastructure through the scheme "*Synergistic Training Program Utilizing the Scientific and Technological Infrastructure (STUTI)*". Thus, under DST-STUTI programme of IIT (ISM) Dhanbad, a one-week hands-on training workshop on "*Advanced Instrumental Techniques for Chemists*" was organized from 18th July to 24th July, 2022 at Department of Chemistry, IEST Shibpur, West Bengal.

This training program was coordinated by Dr. Jhuma Ganguly, Department of Chemistry, IEST Shibpur and Dr. Somnath Yadav, Department of Chemistry and Chemical Biology, IIT (ISM) Dhanbad. This program includes thirty participants (Faculty/Research Scholar) from various Universities/Colleges/Institute in India, with no more than three from the same Universities/Colleges/Institute.

Highlights of the Day-1 (Dated: 18th July, 2022)

The first day of the training program began with a brief introduction to the program's purpose and significance by Dean (R & C), Dean (Planning and Development), Dean (Academics), IEST Shibpur. The introduction energized the participants' interest in science and engineering. Next, the training program was inaugurated by Prof. Binay Krishna Ghorai, Acting Director, IEST Shibpur. Then, an overview of the DST-STUTI program was given by Dr. Somnath Yadav, Program Coordinator, IIT (ISM) Dhanbad. The participants were then given a welcome kit that included a note pad, a power kit (pen, pencil, eraser, and sharpener), and a program pamphlet.

Following that, two consecutive lectures were scheduled, with a relatively short tea break in between. Advance Spectral analysis was the basis for these two lectures. The first lecture (from 10:00 AM to 11:30 AM) was delivered by Prof. Shyamal Kr. Chattopadhyay, Department of Chemistry, IEST Shibpur, and the second lecture (from 11:45 AM to 01:15 PM) was delivered by Prof. Sujoy Baitalik, Department of Chemistry, Jadavpur University.



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Next, after the lunch break, a practical demonstration (from 02:15 PM to 05:15 PM) on FT-IR spectroscopy was provided by Dr. Mrinal K. Bera.

Highlights of the Day-2 (Dated: 19th July, 2022)

On the second day, two lectures were given based on Chemical characterization of organic and inorganic moieties along with theoretical predictions. The first lecture (from 10:00 AM to 11:30 AM) was delivered by Dr. Mrinal K. Bera, Department of Chemistry, IEST Shibpur, and the second lecture (from 11:45 AM to 01:15 PM) was delivered by Prof. Ayan Datta, School of Chemical Science, IACS Kolkata.

Next, after the lunch break, a practical demonstration (from 02:15 PM to 05:15 PM) on HRMS was provided by Dr. Papu Biswas, Department of Chemistry, IEST Shibpur.

Highlights of the Day-3 (Dated: 20th July, 2022)

Similarly, on the third day, two lectures were conducted. Nuclear magnetic resonance (NMR) spectroscopy was the prime focus of these lectures. The first lecture (from 10:00 AM to 11:30 AM) was delivered by Prof. Somnath Yadav, Department of Chemistry, IIT (ISM) Dhanbad, and the second lecture (from 11:45 AM to 01:15 PM) was delivered by Prof. Balaram Mukhopadhyay, Department of Chemical Science, IISER Kolkata.

Following the lunch break, a practical demonstration (from 02:15 PM to 05:15 PM) on NMR spectroscopy was provided by Prof. Somnath Yadav and Dr. Papu Biswas, Department of Chemistry, IEST Shibpur.

Highlights of the Day-4 (Dated: 21st July, 2022)

On the fourth day, two lectures were given based on Fluorescence spectroscopy and time-correlated single photon counting (TCSPC). The first lecture (from 10:00 AM to 11:30 AM) was delivered by Prof. A. K. Mahapatra, Department of Chemistry, IEST Shibpur, and the second lecture (from 11:45 AM to 01:15 PM) was delivered by Dr. U. Bhattacharjee, Department of Chemistry, IEST Shibpur.

Next, after the lunch break, a practical demonstration (from 02:15 PM to 05:15 PM) on the TCSPC was provided by Prof. A. K. Mahapatra and Dr. U. Bhattacharjee.

Highlights of the Day-5 (Dated: 22nd July, 2022)

Similarly, on the fifth day, two lectures were conducted. The theoretical calculations and powder X-ray diffraction (PXRD) were the prime focus of these lectures. The first lecture (from 10:00 AM to 11:30 AM) was delivered by Prof. Prasant Kumar Nandi, Department of Chemistry, IEST Shibpur, and the second lecture (from 11:45 AM to 01:15 PM) was delivered by Dr. Manish Pal Chowdhury, Department of Physics, IEST Shibpur.

Next, after the lunch break, a practical demonstration (from 02:15 PM to 05:15 PM) on PXRD was provided by Dr. Manish Pal Chowdhury.

Highlights of the Day-6 (Dated: 23th July, 2022)

On the sixth day, two lectures were given based Metal Ion Templated Interlocked Molecules and Role of Microscopy in Chemical and Interdisciplinary Science. The first lecture (from 10:00 AM to 11:30 AM) was delivered by Prof. Pradyut Ghosh, School of Chemical Science, IACS Kolkata, and the second lecture (from 11:45 AM to 01:15 PM) was delivered by Prof. Nikhil Ranjan Jana, School of Materials, IACS Kolkata.

Next, after the lunch break, a laboratory demonstration (from 02:15 PM to 05:15 PM) on electrochemistry was provided by Dr. C. Bhattacharya, Department of Chemistry, IEST Shibpur.

Highlights of the Day-7 (Dated: 24th July, 2022)

Similarly, on the seventh day (the last day of the training program), two lectures were conducted. The characterization strategies of hydrogels and gas chromatography (GC) were the prime focus of these lectures. The first lecture (from 10:00 AM to 11:30 AM) was delivered by Dr. Jhuma Ganguly, Department of Chemistry, IEST Shibpur, and the second lecture (from 11:45 AM to 01:15 PM) was delivered by Dr. Laksmikanta Adak, Department of Chemistry, IEST Shibpur.

Next, after the lunch break, a practical demonstration (from 02:15 PM to 05:15 PM) on GC was provided by Dr. Laksmikanta Adak.



Following that, the certificate distribution took place, followed by a closing speech. Throughout the training programme, a formal discussion environment was established for the exchange of scientific and technological knowledge.

This training program aimed to provide a flavour of different state-of-the-art analytical and spectroscopic instrumentations, frequently used for cutting-edge chemical research, to the participants. The basics of different sophisticated instrumentation and spectroscopic techniques were discussed in detail. Hands-on experience of recording data with the samples from the participants and analysis of the spectral data were also arranged in a systematic manner. The participants got the opportunity to interact with eminent scientists from academia and industry.

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