



One-Week Hands-On Training Program on “Advanced Analytical and Simulation Techniques in Chemical Engineering Applications” (21<sup>st</sup> November – 27<sup>th</sup> November, 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 the DST-STUTI program of IIT (ISM) Dhanbad, a one-week hands-on training program on "*Advanced Analytical and Simulation Techniques in Chemical Engineering Applications*" was organized from 21<sup>st</sup> November to 27<sup>th</sup> November, 2022 at Department of Chemical Engineering, BIT Mesra, Ranchi, Jharkhand.

This training program was coordinated by Prof. Gautam Sarkhel from BIT Mesra and Prof. Sagar Pal from IIT (ISM) Dhanbad. This program includes thirty participants (Faculties/Research Scholars/Industry Personnel) from various universities/Industries in India.

**Highlights of the Day-1 (Dated: 21<sup>st</sup> November, 2022)**

Before the formal inauguration of the program the participants were provided a welcome kit that included a bag, a notepad, a power kit (pen, pencil, eraser, and sharpener), and a program pamphlet. Then the training program was inaugurated by Prof. Kunal Mukhopadhyay, Dean Faculty Affairs, Prof. A. K. Sen (Head, Department of Chemical Engineering, BIT Mesra). Prof. Gautam Sarkhel, the local programme coordinator, welcomed all participants and explored the program's significance. The introduction energized the participants' interest in science and engineering. Following that, two consecutive lectures were scheduled. The first lecture (from 10:30 AM to 11:45 AM) was based on characterization of polymeric materials and the second lecture (from 12:00 PM to 01:15 PM) was based on microscopical techniques to study the nanomaterials. These lectures were delivered by Dr. D. S. Bag, Joint Director & Head, DRDO.

Next, after the lunch break, laboratory demonstrations (from 02:30 PM to 05:30 PM) on AFM and SEM was provided.

**Highlights of the Day-2 (Dated: 22<sup>nd</sup> November, 2022)**

Similarly, on the second day, two lectures were scheduled. The first lecture (from 09:30 AM to 10:45 AM) was based on the numerical two-phase flow understanding and applications. This lecture was taught by Dr. Sumana Ghosh from IIT Roorkee. The second lecture (from 11:00 AM to 12:15 PM)

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*Dr. S. Bag*



was based on application of phase change material for energy storage and was taught by Dr. Debasree Ghosh.

Next, after the lunch break, a laboratory demonstration (from 02:30 PM to 05:30 PM) on ANSYS was provided.

### Highlights of the Day-3 (Dated: 23<sup>rd</sup> November, 2022)

On the third day, two lectures were delivered. The first lecture (from 09:30 AM to 10:45 AM) was based on good practices in BET surface area calculation and was taught by Dr. Y. N. Prajapati. The second lecture (from 11:00 AM to 12:15 PM) was focused on the basics and applications of BET surface area analyzer. The second lecture was taught by Dr. Anup Choudhury.

Following the lunch break, a laboratory demonstration (from 02:30 PM to 05:00 PM) on BET surface area was provided.

### Highlights of the Day-4 (Dated: 24<sup>th</sup> November, 2022)

On the fourth day, two lectures were given. The first lecture (from 09:30 AM to 10:45 AM) was focused on the rheology theory and applications. This lecture was delivered by Prof. Gautam Sarkhel. The second lecture (from 11:00 AM to 12:15 PM) was focused on the viscoelasticity of polymers in linear viscoelastic region and was delivered by Dr. Pulak Dutta.

Next, after the lunch break, a laboratory demonstration (from 02:30 PM to 05:00 PM) on rheometer was provided.

### Highlights of the Day-5 (Dated: 25<sup>th</sup> November, 2022)

Similarly, on the fifth day, two lectures were given. The first lecture (from 09:30 AM to 10:45 AM) entitled “Chemical Adsorption Analytical Techniques for Catalyst Characterization-Introduction and Application” was delivered by Dr. Rohit Kumar from IIT BHU. The second lecture (from 11:00 AM to 12:15 PM) was based on the heterogeneous catalysis characterization by chemisorption technique. This lecture was taught by Dr. A. K. Sen.

Next, after the lunch break, a laboratory demonstration (from 02:30 PM to 05:00 PM) on chemisorption was provided.

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### Highlights of the Day-6 (Dated: 26<sup>th</sup> November, 2022)

On the sixth day, two lectures were given. The first lecture (from 09:30 AM to 10:45 AM) was focused on the basic understanding of ICP-OES and was delivered by Prof. R. K. Dey, Central University Jharkhand. The second lecture (from 11:00 AM to 12:15 PM) was focused on the application of the ICP-OES in environmental engineering and was delivered by Dr. R. Naresh Kumar.

Next, after the lunch break, a laboratory demonstration (from 02:30 PM to 05:00 PM) on ICP-OES was provided.

### Highlights of the Day-7 (Dated: 27<sup>th</sup> November, 2022)

Similarly, on the seventh day (the last day of the training program), two lectures were given. The first lecture (from 09:30 AM to 10:45 AM) was focused on introduction to molecular simulation and was delivered by Dr. Anand Bharti. The second lecture (from 11:00 AM to 12:15 PM) was focused on the gromacs simulation suit and was delivered by Dr. Alok Jain.

Next, after the lunch break, a laboratory demonstration (from 02:30 PM to 05:00 PM) on computational lab was provided. Then, the valediction program was conducted. Following that, the certificate distribution ceremony took place. In general participants enjoyed the accommodation and food during their stay at BIT Mesra, Ranchi.

Throughout the training program, a formal and healthy discussion environment was established for the exchange of scientific and technological knowledge.

Prof. Sagar Pal  
Coordinator  
(DST-STUTI)

Prof. Ravi Kumar Gangwar  
Co-Coordinator  
(DST-STUTI)

Prof. Gautam Sarkhel  
Program Coordinator  
BIT Mesra, Ranchi

