



**Hands on Training
Course
INSIGHTS INTO
ANALYTICAL
INSTRUMENTATION
FOR APPLIED
SCIENCES**

PROCEEDINGS

April 26th – May 03rd, 2022

ORGANIZED BY

DEPARTMENT OF CHEMISTRY

GURU NANAK DEV UNIVERSITY (GNDU), AMRITSAR

IN ASSOCIATION WITH

SOPHISTICATED ANALYTICAL INSTRUMENTATION FACILITY (SAIF)

PANJAB UNIVERSITY, CHANDIGARH



सत्यमेव जयते

Department of Science & Technology
Govt. of India

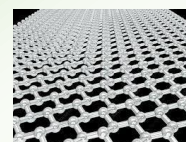
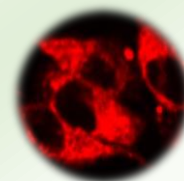
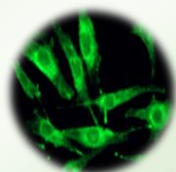
Hands on Training Course INSIGHTS INTO ANALYTICAL INSTRUMENTATION FOR APPLIED SCIENCES

To see and learn what is not possible with naked eye
(WORKSHOP ON ANALYTICAL METHODS)

UNDER

**Synergistic Training Program Utilizing the Scientific and
Technological Infrastructure (STUTI)**

Date: 26th April – 3rd May 2022



ORGANIZED BY

**DEPARTMENT OF CHEMISTRY
GURU NANAK DEV UNIVERSITY, AMRITSAR**

IN ASSOCIATION WITH

**SOPHISTICATED ANALYTICAL INSTRUMENTATION FACILITY (SAIF)
PANJAB UNIVERSITY, CHANDIGARH**

PROF. PALWINDER SINGH
Coordinator, STUTI Training Program
GNDU, AMRITSAR

PROF. SUKHPRIT SINGH
Head, Chemistry Department
GNDU, AMRITSAR

PROF. G.R. Chaudhary
Coordinator, STUTI Program-PMU
PANJAB UNIVERSITY, CHANDIGARH

DR. VIPAN KUMAR
CO-Coordinator
GNDU, AMRITSAR

DR. PRABHPREET SINGH
CO-Coordinator
GNDU, AMRITSAR

Message



I am overwhelmed with the success of this STUTI program at GNDU, Amritsar in collaboration with the SAIF, Panjab University, Chandigarh. The real motive of the Scheme 'Synergistic raining program Utilizing the Scientific and Technological Infrastructure' (STUTI) is intended to build human resource and its knowledge capacity through open access S&T Infrastructure has been thoroughly achieved through these training program.

This training program have successfully imparted practical hands-on training on sophisticated instruments. I congratulated and appreciated the efforts of the organizing team for their hard work, cooperation, support and hard work.

Prof. Jaspal Singh Sandhu
Vice-Chancellor
GNDU, Amritsar

Message



It is my privilege to congratulate you all for the successful completion of 7-day training programme on “Insights into Analytical Instrumentation for Applied Sciences” being organized by Department of Chemistry, GNDU, Amritsar under the aegis of STUTI in collaboration with SAIF/CIL, Panjab University.

Advanced instrumentation Techniques have become an indispensable prerequisite to understand the insight of most real-life problems in the present times.

I feel delighted that this training program have provided practical hands-on training to the students and researchers in multidisciplinary fields to gain a better understanding of advanced methods in applied sciences. I extend my sincere thanks and appreciation to all for their cooperation, support and hard work.

Prof. Sukhprit Singh
Head, Department of Chemistry
GNDU, Amritsar

Message



I congratulate you all for the successful organization and completion of the training program on “Insights into Analytical Instrumentation for Applied Sciences” under the aegis of STUTI in collaboration with SAIF/CIL, Panjab University.

The Training program encompasses key aspects on Analytical Instrumentations based methods that are used extensively in modern day new discovery, research and development.

We hope that this training program stimulated new ideas and approaches for promoting research and technical skills. Thank you for your participation and we wish you a good luck in the Future.

Prof. Palwinder Singh
Coordinator STUTI Training Program
GNDU, Amritsar

Message



A congratulations to the all the participants of the Training Program entitled “Insights into Analytical Instrumentation for Applied Sciences” under the “Synergistic Training program Utilizing the Science and Technological Infrastructure (STUTI)” organized at the Department of Chemistry, GNDU, Amritsar in association with Panjab University, Chandigarh. I also extend my sincere thanks and congratulations to the Department of Science and Technology (DST) for awarding the grant under the STUTI program.

I congratulate Sophisticated Analytical Instrumentation Facility (SAIF)/ Central Instrumentation Laboratory (CIL), Panjab University, Chandigarh for being selected as a Program Management Unit (PMU) and also for executing their role as a hub manager for working in an ensemble with many other educational and research institutes/universities to fulfil the aims of this program.

I applauded the efforts of the organizing team of the STUTI Training Program, GNDU, Amritsar for successfully completing the Training Program that helps the young researchers to learn the analytical & Instrumentation techniques.

Prof. Raj Kumar
Vice-Chancellor
Panjab University
Chandigarh

Message



I feel delighted to share that the STUTI Program has been a great success so far. The prestigious DST-supported STUTI program envisions hands-on Training Programs and sensitization of the state-of-the-art equipment as well as toward its sharing in various institutions while ensuring the transparent access to science & technology facilities.

Sophisticated Analytical Instrumentation Facility (SAIF), Panjab University, Chandigarh express our deepest gratitude to the Department of Science and Technology for choosing us to act as a Program Management Unit (PMU) and feel proud to be a part of this program.

The Training program on “Insights into Analytical Instrumentation for Applied Sciences” at the Department of Chemistry, GNDU, Amritsar provided practical hands-on training on high-end instruments and characterization techniques.

I also believe that this Training Program not only enhances the quality of research but also assist in optimum utilization of the instrumentation facilities at their institute.

Prof. G. R. Chaudhary
STUTI Coordinator-PMU
Panjab University
Chandigarh

DAY 1 INAUGURATION

Guru Nanak Dev University (GNDU), Amritsar in collaboration with Sophisticated Analytical Instrumentation Facility (SAIF) at Central Instrumentation Lab (CIL), Panjab University, Chandigarh, is hosted a hands-on training session on “Insights into Analytical Instrumentation for Applied Sciences” from April 26 to May 03rd. The training programme was organised by the Department of Chemistry, GNDU, Amritsar.

The scheme “Synergistic Training Programme Utilising the Scientific and Technological Infrastructure” (STUTI) is intended to build human resources and their knowledge capacity through open access infrastructure across the country. As a complement to the various schemes of Department of Science and Technology, the funding for the expansion of research and development infrastructure at academic institutions, the STUTI scheme envisions a hands-on training programme and sensitisation of the state-of-the-art equipment as well as towards sharing while ensuring transparent access to science and technology facilities.

The training program is commenced with the patronship of Honorable Prof. J.S. Sandhu, Vice-chancellor, GNDU and inaugurated by Worthy Chief Guest, Prof. S.S. Behl, Dean Academic Affairs, GNDU. Prof. Sukhprit Singh, Head, Chemistry Department, and Prof. Palwinder Singh, Coordinator training Program, are the organizers of the STUTI training program. Prof. Ganga Ram Chaudhary is the Coordinator of the STUTI Program-PMU, PU, Chandigarh and Guest of Honour in this training program. A felicitation of the Dignitaries and their address to the participants took place during the event.

Prof. Palwinder Singh highlights the key points of the training program, its schedule and emphasizes on the importance of the training program. Prof. Sukhprit Singh gives cordial welcome to the Chief Guest, Guest of Honour and all the participants of the program. Prof. Ganga Ram Chaudhary emphasized on the goals and visions of the STUTI scheme to the participants. Participants from various institutes all across the India have participated at the inauguration of the training program. Various speakers from different universities & Industries are invited to deliver a talk on different instrumentation techniques followed by the hands-on training.





DAY 1

Prof. G.R. Chaudhary emphasized on the importance of the STUTI program, its goal and learning outcomes. He further highlights the instrumentation facilities available along with their applications in the SAIF/CIL centre, Punjab University.



Prof. G.R. Chaudhary



Dr. B.S. Joshi from Bruker Pvt Ltd., presented a talk on brief introduction about Nuclear Magnetic Resonance (NMR), applications and analyzing methods. The working principle of the instrument was explained to the participants. A detailed discussions on doubts and queries were held during the lecture.

DAY 1



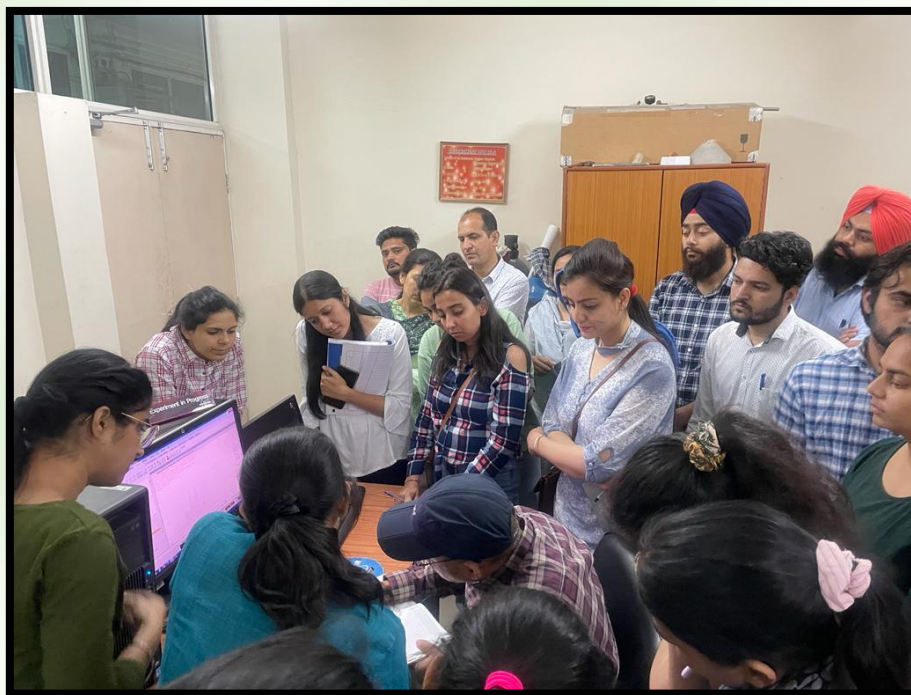
Prof. Ramakrishna V. Hosur, Department of chemical Sciences, TIFR, has received a Padmashri for his outstanding contributions toward the science and technology. He presented a talk on Biological NMR for identifying and exploring the structure of proteins. The process to identify the protein structure were discussed with the participants. An interactive session took place between the expert and participants.



Prof. Ramakrishna V. Hosur

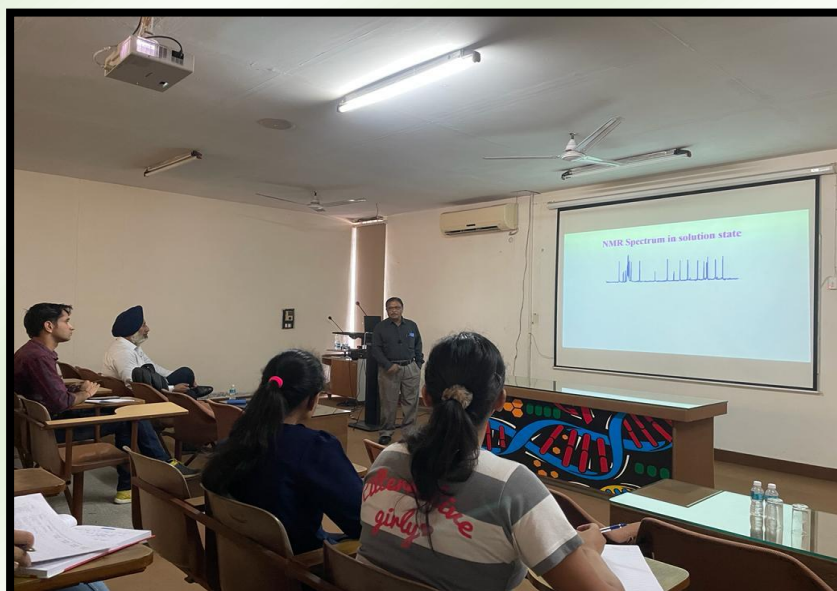
DAY 1

During the second half, hands-on training on NMR spectroscopy was provided to the participants. Participants received a practical experience of how to handle and operate the instrument. The experiments were performed by the participants on their own.



DAY 2

The day 2 of the STUTI Training Program started with the expert talk on NMR methodologies by Dr. N Suryaprakash, Indian Institute of Science Bangalore. The talk started with the basics of NMR, applications and advancement in the field of sciences. Participants get aware of its applications in applied sciences & other fields alongwith their usefulness to structure elucidation. The response of the participants was very good throughout the lecture.



DAY 2

The day 2 Prof. S.V.K. Kumar, Professor, Tata institute of fundamental research, Mumbai delivered a lecture on mass spectrometry and its application in applied sciences. A deep presentation to understand the weak molecular interaction and effect of interaction on NMR were discussed with the participants. The participants were very attentive and came up with many doubts. All the doubts in post lecture session were solved by the expert.



DAY 2

During the second half, hands-on training on NMR was imparted to the participants. Participants were engaged in practical hands-on experience with the instrument.



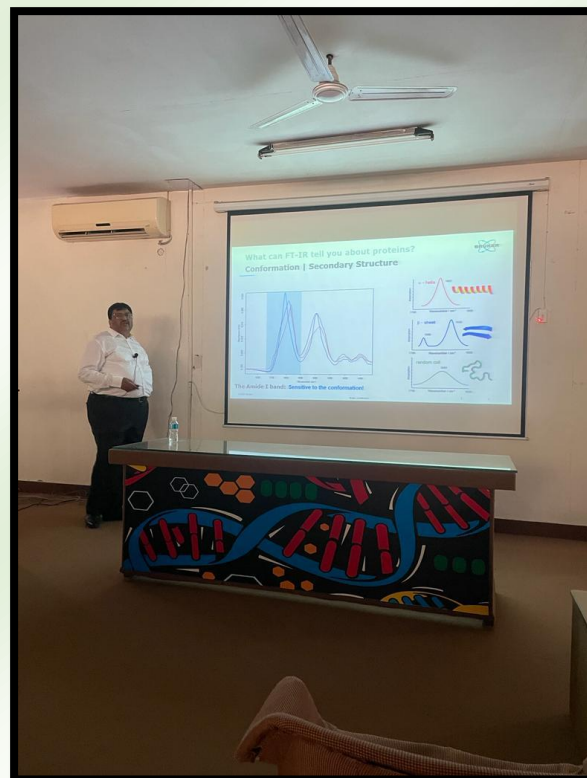
DAY 3

Day 3 started with the lecture of Dr. N. Suryaprakash on solid state NMR. A discussion on How NMR works on the solid state? Basic principle of the solid-state NMR is discussed with the participants. It is a powerful probe of the molecular-level geometric, electronic, and magnetic environment about a target nucleus. The talk on NMR continues with the expert lecture from Dr. S.V. Kumar on applications of the mass spectroscopy. After the lecture, the practical hands-on training was imparted to the participants on the instrument followed by the doubts and queries.



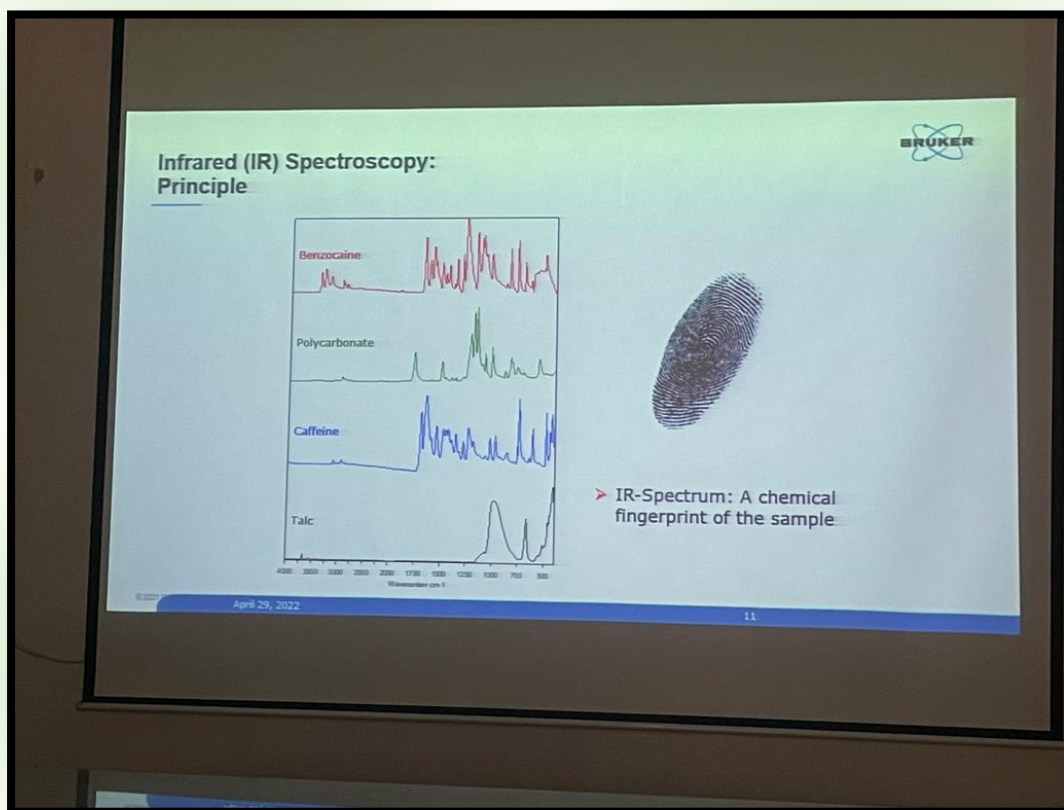
DAY 4

Day 4 started with the lecture on XRD and IR spectroscopy by Dr. A. Chaudhary, Bruker India and by Dr. S. Oak, Director, Bruker India. A comprehensive talk on XRD including basic principles, interpretation and analysis. Talk provides detailed information about the crystallographic structure, chemical composition, and physical properties of a material.



It is based on the constructive interference of monochromatic X-rays and a crystalline sample. Expertise talked about the recent advancement in the XRD technique.





During the second-half of DAY 4, a practical hands-on training on single crystal XRD were provided to the participants on XRD. A practical experience was gained by the participants including handling, operating and understanding the instrument.

DAY 5

Day 5 of the DST supported STUTI program started with the lecture on electron microscopy i.e., SEM by Dr. Anupinder Singh, GNDU, Amritsar. The basic principle of the SEM, its interpretation, analysis and applications of SEM in various fields were discussed by the expertise.

An interactive session took place between the expert and participants. Various doubts of the participants were covered by the experts.

After the lecture, the practical hands-on training was imparted to the participants on the SEM instrument about its handling, various applications in biology, and biological sample analysis followed by the doubts and queries.





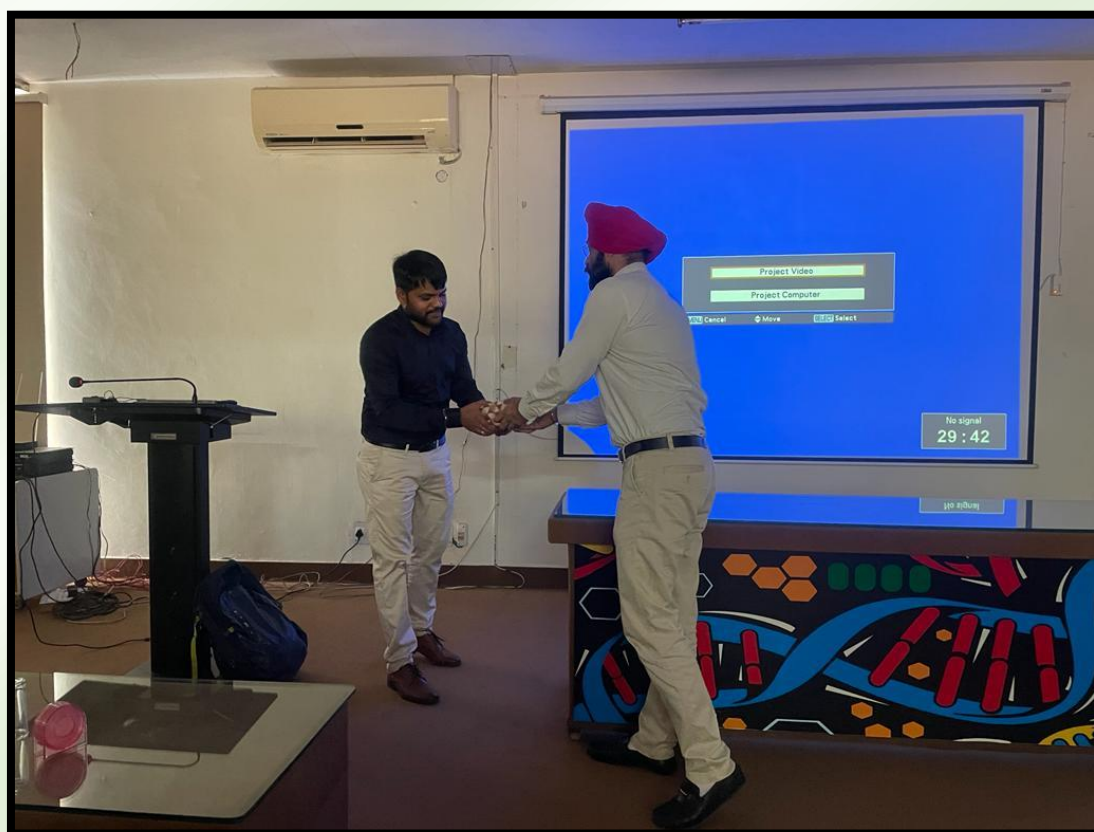
Hands on training on SEM instrument

DAY 6

An expert lecture on mass spectrometry, its application and future applications was given by the Venkatesh Sankarasetty, Application specialist, Bruker. The advancement in mass spectroscopy in the various research fields was discussed by the expert.

An interactive session on spectroscopy and its applications took place between the expert and participants. Various doubts and queries of the participants were covered by the expert.

After the lecture, the practical hands-on training on mass spectroscopy, UV and TGA was given the participants.



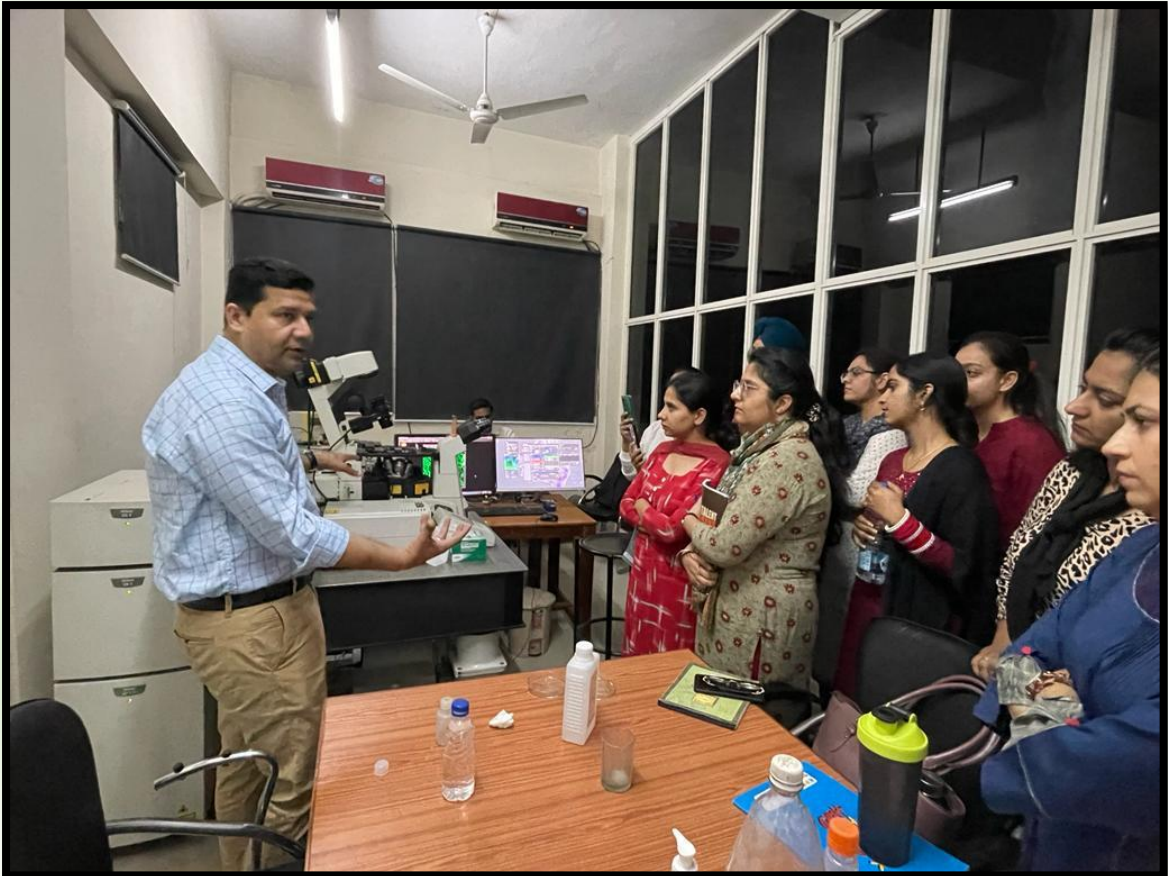


DAY 7

On the seventh day of the DST STUTI training program, the lecture on confocal microscopy was given by the Dr. Mahavir Tanwar, Nikon. A detailed discussion on working principle, interpretation and applications in different fields of research. The future advancement in a confocal microscopy was also covered during the lecture.

The doubts of the participants were covered during the practical hands-on training on microscopy. Participants gained practical experience on confocal microscopy.



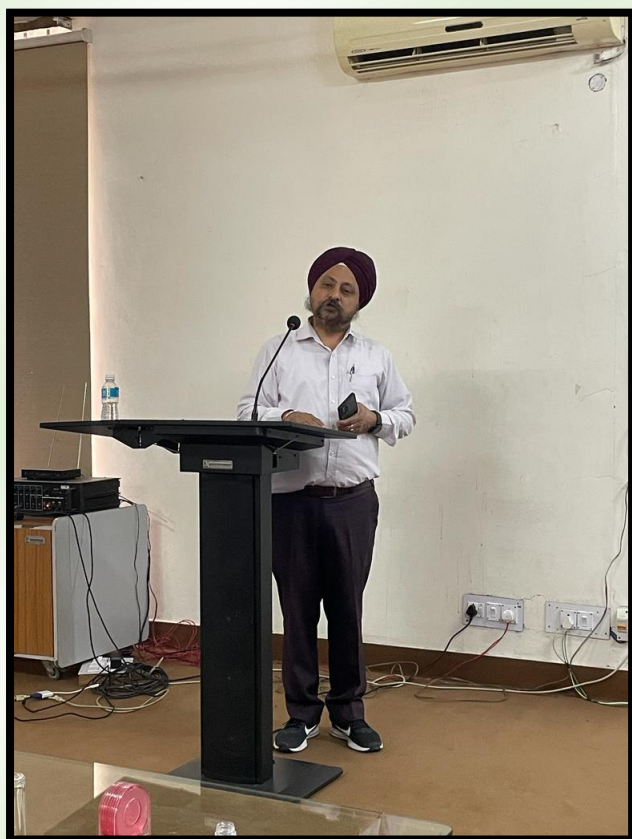


VALEDICTION

During the Valediction ceremony, the feedback of the participants, felicitation and certificate distribution took place.

Participants felt motivated and appreciated the efforts of the organizing committee of the Department of Chemistry, GNDU, Amritsar for training and hands on experience.

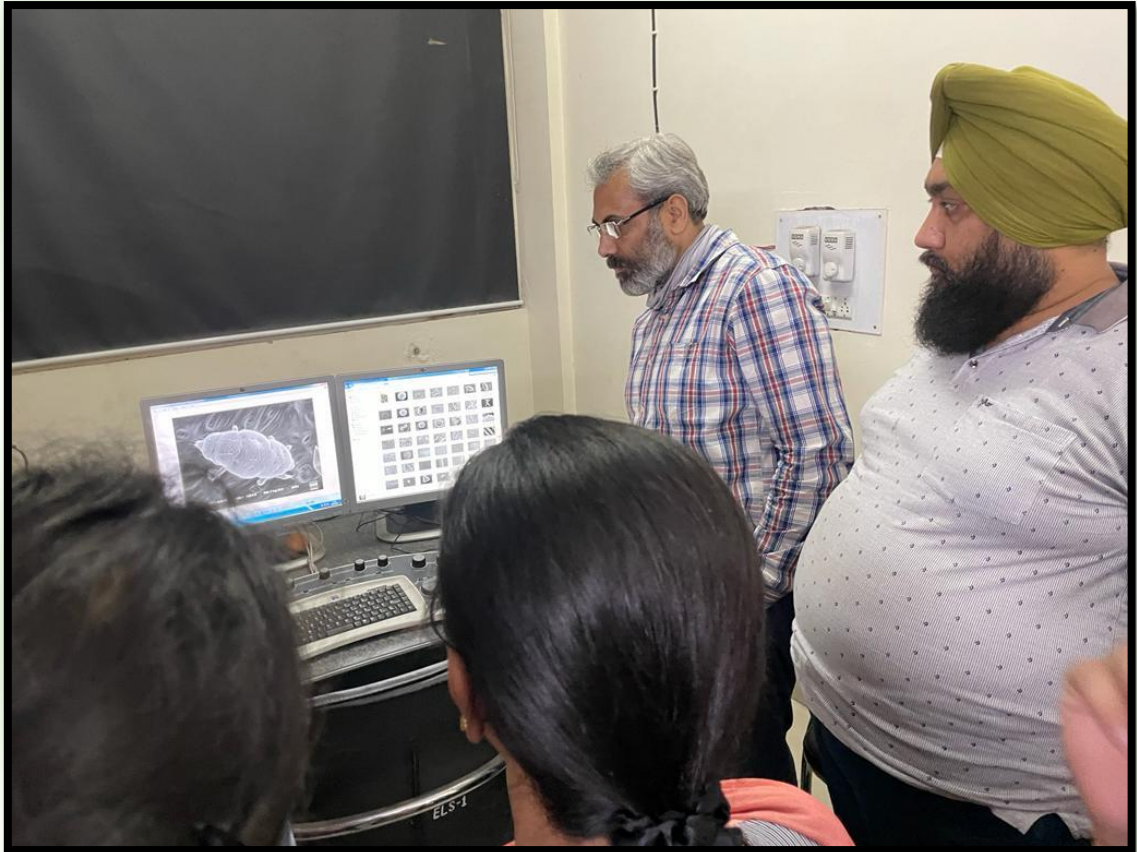
Participants were thankful to the DST, Government of India, for creating platform where scientific knowledge and hands-on training of high-end instruments can be accessed easily.

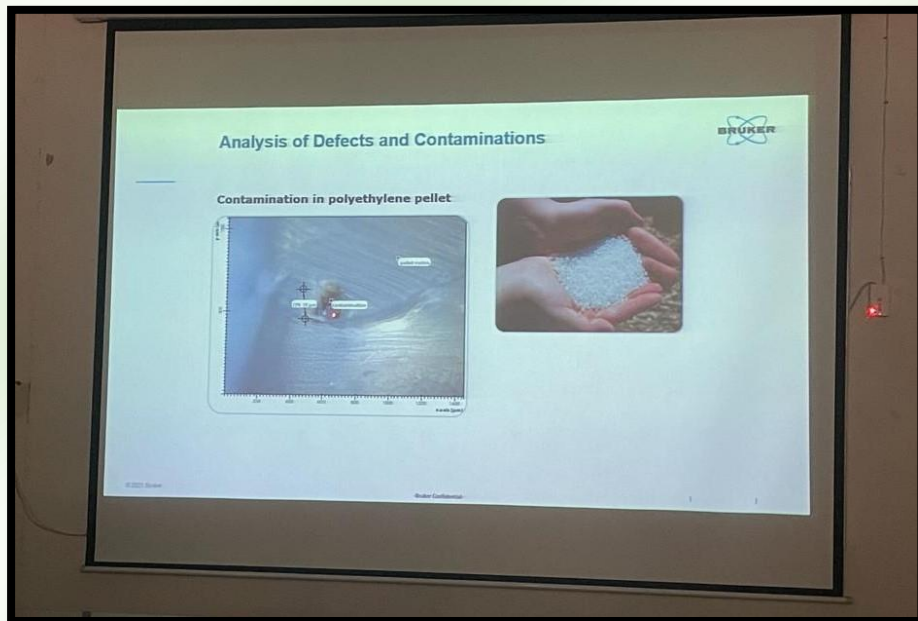




GLIMPSES OF TRAINING PROGRAM







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(Established by the State Legislature Act No. 21 of 1969)

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