

# Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur

## STUTI REPORT

Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur held the synergistic training program utilizing the scientific technological infrastructure (STUTI) which was supported by department of science and technology, ministry of science and technology, government of India, New Delhi, In collaboration with Shivaji university, Kolhapur, Maharashtra from 28 November to 04 December 2022. The program. Intended to build human resource and its knowledge capacity through Open Access. Set infrastructure across the country and was funded by DST. It envisioned a hand on training program and sensitization of the state-of-the-art equipment as well as towards the sharing while ensuring the transparent access of the s and t facilities

The program was held in RTM Nagpur University. A total of 60 participants were selected the among the many applicants based on their eligibility. The participants included research scholars, faculty members, post Doc. Fellows, graduates and post graduates' students, industry professionals from various institutions and universities.

The very first day started with inaugural function of the DST STUTI training at R.T.M. Nagpur University, in collaboration with Shivaji University, Kolhapur. Hon'ble pro vice chancellor, Sanjay dudhe sir, Chief guest Dr. Atul Vaidya, Director, CSIR NEERI, Dean of Sci and tech Dr. Prashant Maheshwari, Director of LIT, Dr. R. B. Mankar, and our beloved convenor Dr. B. A. Bhanvase sir were present for the function. It wasn't just the diya lighting ceremony but the words of the dignitaries that enlightened us that day.









Our very **first** lecture was excellently delivered by Dr. Dadasaheb Kokare Sir, Professor of department of pharmaceutical sciences, Nagpur University. He touched upon the process and

phases of drug development w.r.t. Neuroscience domain. He told that the pre-clinical studies involve in vitro, in vivo, artificial intelligence and alternative to animal models, and that their Neuroscience Research lab conducted various assays and tests. We were fascinated by how their lab performed so well in building a cheap cannula and electrode fabrication device.

second session of the day Dr. Rajesh Ugale from the same department of Nagpur University, proceeded with neuronal cell culture. They started with basic terminologies and equipments involved in maintaining cell cultures like Boyden chamber, microfluidic chip, spheroids and staining techniques.

On **29<sup>th</sup> November** day first session was beginning with Dr. Sanjay Dhoble sir, Professor of Department of Physics, RTM Nagpur University, Nagpur, he has delivered valuable speech on Spectrofluorometer and their application in luminescence”.

Second session was started with valuable speech on Surface Morphology and Topography of Nanomaterials using Scanning Electron Microscope, which was delivered by Dr. Subhash Kondawar Professor at Department of Physics, RTM Nagpur University, Nagpur. To get more understanding on spectrofluorometer and surface methodology, hands on training was arranged on Scanning Electron Microscope and Spectrofluorometer at Department of Physics, Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur.

On **day 3** first session was beginning with Dr. Vijay Tangde, Assistant Professor of Department of Chemistry, RTM Nagpur University, Nagpur. He has delivered valuable lecture on “Fundamentals of Thermogravimetric Analysis and Surface Analysis”. Then visit was organized by the faculty for the industrial visit. In this visit, Siva Kumar Kovvuri, HORIBA India Private Limited, Hingna, Nagpur has delivered valuable lecture on “Medical Technology - hematology analysers, Medical Technology - biochemistry analyzers”. The Company manufactures and sells automotive emission measurement systems, environmental measuring instruments, wide range of scientific analyzers, and medical diagnostic analyzers, and measuring equipment used in the semi-conductor industry. This Industrial visit was very helpful in our future practical Life & bring a positive change in our thinking & practical behavior regarding Education & specializing our technical skills. Got practical knowledge about the advancement in technology of developed instruments and software’s, Use of programming in field of engineering. It was a knowledgeable session for the participants also to get more chances further to have such an informative & wonderful experiences of visiting different industries.

On **day 4, 1<sup>st</sup> of December** the first lecture first session was delivered by Prof. R. G. Sonkawade STUTI PMU Coordinator, SAIF, Shivaji University, Kolhapur on Operational Parameters of X-

Ray diffractometry (Powder and Thin Films)”, sir has brief about the XRD which is rapid analytical technique primarily used for phase identification of a crystalline material and can provide information on unit cell dimensions. The analyzed material is finely ground, homogenized, and average bulk composition is determined.





Another session was presented by Dr. Amol Gawande, Founder & Trainer, Peaks Analytical & Training Centre focusing "Fundamentals of High-Performance Liquid Chromatography (HPLC) and its operational Theory". He made an insight into the role of each component of HPLC, demonstrating the system suitable parameter for the separation, identification, and quantification of complex organic samples.

Also, after the wonderful session hands on training were provided by Anita Shekhawat Mam, Sneha Bankar, Pranali Umredkar, Dr. Amol Gawande of TGA, BET, Viscosity & Sound Velocity Meter, HPLC resp. It has a direct /indirect relation between various fields of science such as Physics, Chemistry, Biotechnology as well as Life Sciences and we had to hold on to that thread for making a smooth path.

On **day 5** first session was delivered by Prof. R. G. Sonkawade sir, STUTI PMU Coordinator, SAIF, Shivaji University, Kolhapur on Operational Parameters of Transmission electron microscopy and use of I-STEM. He covers the topics of resolution, electron optics, image recording systems and image distortions and how they can be handled by hardware (Cs-correctors) and software. The interaction of electrons with matter starts with the individual atom

and the atomic scattering factor. Special emphasis is placed on elastically scattered electrons, since those are the ones used for forming images of the atomic structure.

Second session was delivered by Mr. Amol Ramiste Application manager at, Toshvin, Analytical Pvt. Ltd., Mumbai on Fundamentals of Gas Chromatography and Atomic Absorption Spectroscopy” also to make it more interesting and understandable hands on traing was given Gas Chromatography and Atomic Absorption Spectroscopy Spectroscopy” he makes us understand all GC and AAS unit, Light source, Atomizer, Monochromators, Detector, Amplifier, Read out device etc.

On **day 6** first session was delivered by Dr. Anjali Ganjare, Assistant Professor, UDPS, RTM Nagpur University, on Fundamentals of Gas Chromatography–Mass Spectrometry where she has covered How GC-MS can be used to study liquid, gaseous or solid samples. Analysis begins with the gas chromatograph, where the sample is effectively vaporized into the gas phase and separated into its various components using a capillary column coated with a stationary (liquid or solid) phase.

Second session was delivered by Dr. Umesh Palikundwar, Associate Professor, Department of Physics, RTM Nagpur University, Nagpur on Fundamentals of X-ray Diffraction, where sir has covered how XRD finds the geometry or shape of a molecule using X-rays. How X-rays get diffracted by a crystal? etc i, it was very knowledgeable session.

In the afternoon session, we got the opportunity to explore GC MS and XRD instruments and understood how it works really in front of our eyes. We understood the importance of sample preparation for XRD and how it affects the XRD results and their interpretation. With the help of XRD software and database, we were able to find the crystal structure of the unknown powder sample. XRD is a good tool for the phase identification and crystalline study of our powder sample material.

In GC MS instrumentation we had a creative experience with how a liquid sample is to be analyzed. We got a chance to see how the temperature program is loading to the system, sample injection, the 'NISST' database library, etc. After getting the chromatogram how the compounds are identified with the help of MS all are well understood.

On **day 7** as it was the last day of the programme we had visited Dadasaheb Balpande College of Pharmacy, Nagpur. Where Dr. Nilesh Mahajan Professor and Head, Dept of Pharmaceutics had delivered speech on Fundamentals of Particle Size Analysis and Zeta Potential. Dr. Amol Warokar Associate Professor, Dadasaheb Balpande College of Pharmacy, Nagpur delivered speech on Fundamentals of Fourier Transform Infrared Spectroscopy. Also, to make it more



understandable we had hands on training on Malvern Zetasizer and Fourier Transform Infrared Spectrometer.

The Lessons were simple and easy to understand. Hands on Training session was indeed a great experience to all the participants. The theory sessions were handled by experts from respected departments.

The valedictory function was graced by the presence of Honourable vice chancellor, Dr. Subhash Chaudhari, R.T.M. Nagpur University, Nagpur.

The conveyor of the program was Dr. Bharat A Bhanvase, Head and Professor Laxminarayan Institute of Technology, who worked very hard to make it a success. Also Dr.S.J.Dhobe, Prof. Department of Physics RTMNU Nagpur; Dr. Prakash Itankar, Prof. UDPS and Director of Technology & Energy Park RTMNU Nagpur; Dr. Dadasaheb Kokare, Prof. UDPS ,RTMNU ,Nagpur; Dr. Nishikant Raut, Professor, UDPS and Director, Department of Life Long Learning and Extension, RTMNU, Nagpur; Dr. Jayant Modak, Professor, LIT, RTMNU, Nagpur were the co-conveners of the program who made great efforts to ensure smooth functioning of the program