Azadi Ka Amrit Mahotsav

सत्यमेव जयते
Department of Science and Technology
Ministry of Science and Technology
Government of India

Hands on Training Program

INSIGHTS INTO ANALYTICAL INSTRUMENTATION FOR APPLIED SCIENCES

To see and learn what is not possible with naked eye

(SKILLED INDIA PROGRESSIVE INDIA)

UNDER

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

MAY 10
MAY 17

ORGANIZED BY

DEPARTMENT OF BIO & NANO TECHNOLOGY (FIST ASSISTED)
&
CENTRAL INSTRUMENTATION LABORATORY
GJUS&T (PURSE SUPPORTED), HISAR

IN ASSOCIATION WITH

SOPHISTICATED ANALYTICAL INSTRUMENTATION FACILITY
PANJAB UNIVERSITY, CHANDIGARH

DR. SANDEEP KUMAR
STUTI TRAINING PROGRAM
COORDINATOR
GJUS&T, HISAR

PROF. DEVENDER KUMAR
DIRECTOR,CIL
GJUS&T,
HISAR

PROF. G.R. CHAUDHARY
DIRECTOR,SAIF/CIL
STUTI COORDINATOR-PMU,
PU, CHANDIGARH

SHARING SESSION

INFORMATIVE TALK

TO SPREAD GOOD CONTENT

Prof. T. Pardeep

Padma Shri and Shanti Swarup Bhatnagar Prize awardee
Institute Professor, IIT Madras

Dr. Nitin Singhal

Fulbright-Nehru Fellow
Scientist E, DBT-NABI

Prof. B. D. Malhotra

INSA Fellow,
Professor, DTU

Dr. Akash Deep

Raman Research Fellow, Germany
Visiting Professor, Korea,
Principal Scientist, CSIR-CSIO

Dr. Sanjay Mandal

Ph. D. Chemistry
Professor, IISER-MOHALI

Bhawani Shankar Joshi

Ph.D., France
Application Scientist, **Bruker**

Dr. Jemy James

Ph.D., France
Support Engineer, WITec

Dr. Sandeep Kumar

Haryana Yuva Vigyan Ratna Awardee,
WARI, Fellow
Associate Prof., GJUS&T, Hisar

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ORGANIZERS

Dr. Sandeep Kumar

Haryana Yuva Vigyan Ratna Awardee,
STUTI Training Program Coordinator
Bio & Nano Technology, GJUS&T, Hisar

Prof. Devender Kumar

Best Teacher Awardee,
Director, CIL
GJUS&T, Hisar

Prof. Neeraj Dilbaghi

Institutional Coordinator (RUSA)
Dean, Research
GJUS&T, Hisar

Prof. G.R. Chaudhary

Director, SAIF/CIL
STUTI Coordinator – PMU
Panjab University, Chandigarh

"Synergistic Training program Utilizing the Scientific and Technological Infrastructure (STUTI) Program – 2021"

STUTI Program of the Department of Science & Technology (DST), Government of India, is intended to build human resource and its knowledge through open access to S & T Infrastructure across the country. This will be achieved by organizing short term courses/ workshops on the awareness, use and application of various instruments and analytical techniques. The Scheme will provide grants for organizing different training programs.

HIGHLIGHTS OF TRAINING

To review the high end characterization techniques investigating samples at nanoscale dimensions, Moreover, see the instruments in action, hands on experience, and discuss cutting edge developments in both instrumentation and research

Hands-on experience on synthesis of nanomaterials followed by some of the most relevant characterization techniques (such as XRD, FESEM, HRTEM, AFM, STM, NMR, DLS, Confocal, Raman spectroscopy, LC-MS, ICP-MS, to mention a few) for qualitative and quantitative analysis of synthesized samples

To meet and greet a myriad of researchers, industry professionals and academia experts with common interest

OUTCOMES

Academic advantage

The upgradation of knowledge and hands on expertise of students, researchers, and faculty members on the variety of characterization techniques to gain deeper understanding of laboratory techniques, develop data analysis and interpretation skills, and gain the ability to apply their theoretical knowledge to practice

Commercial benefit

The insight of advanced analytical techniques will contribute towards understanding of scienctific and industrial processes needed commercially to bring innovations among different fields catering to applied sciences, engineering, and industrial sectors.

Overall, The Training Program will benefit the graduate and post graduate students along with researchers and faculty members of research institutes, universities, and industry.

GURU JAMBHESHWAR UNIVERSITY OF SCIENCE & TECHNOLOGY, HISAR

GJUS&T, an 'A' grade National Assessment and Accreditation Council (NAAC) university was set up on October 20, 1995 at Hisar, Haryana State of India. The aim behind the foundation of the university is to impart education on the frontiers of Technology, Pharmacy, Environmental Studies, Non-conventional Energy Sources, Mass Media and Management Studies. University ranked 88th in NIRF-2021 ranking system. The h-index of the University is 100 with more than 3400 scopus indexed publication in reputed journals. This University has been admitted for the Global Initiative Academic Network (GIAN) Phase-III Scheme of MHRD. The University has received highest grants (50 Crore) in Haryana State from RUSA that has been added to their stature and infrastructure. Further, the University has been sanctioned PURSE grant of Rs. 10.25 crores for research. DST-FIST grants have been awarded to Departments of Bio & Nano Technology, Pharmaceutical Science, Chemistry and Physics. Research project includes sponsorships by DRDO, DST, DBT, UGC, HSCST, MHRD, ADAMA & many more.

Department of Bio & Nano Technology, GJUS&T

Department of Bio & Nano Technology is marked by rigorous academic and research with incredibly talented individuals. Department is equipped with ultra-modern equipments with state of the art laboratory facilities and has dedicated faculty engaged in the development of nano biosensors for healthcare and environment monitoring, synthesis of advanced functional materials, nanobiotechnology, genetic improvement of plant & microbes, metabolomics transcriptomics and bioinformatics approaches. Department has excellent Bioinformatics facility with financial assistance under BIF Program from the DBT & DST, Ministry of Science & Technology, Govt. of India, New Delhi. Department has been supported under SAP/DRS-II Program from UGC, FIST-II from DST and TEQIP III -World Bank Assisted Project.

Dr. A.P.J. Abdul Kalam CIL, GJUS&T

The CIL at GJUS&T is established to cater the needs of the students, research scholar and teachers of this university as well as other educational institute and industry engaged in R&D activities in the emerging areas of Science, Technology & Engineering. The CIL is presently having sophisticated instruments like Nuclear Magnetic Resonance (NMR) Spectrometer (400MHz), Atomic Absorption Spectrometer (AAS), Fourier Transform Infrared (FTIR) Spectrometer, Differential Scanning Calorimeter (DSC), Microwave Plasma Atomic Emission Spectrometer (MP-AES), Microwave Synthesizer, Liquid Chromatography Mass Spectrometry (LC-MS/MS QTOF), Ultra High Performance Liquid Chromatography (UHPLC), High Resolution Field Emission Scanning Electron Microscope with EDS (FE-SEM), Raman Spectrometer, and XRD System (XRD). in order to promote research activities.

SAIF/CIL, PANJAB UNIVERSITY

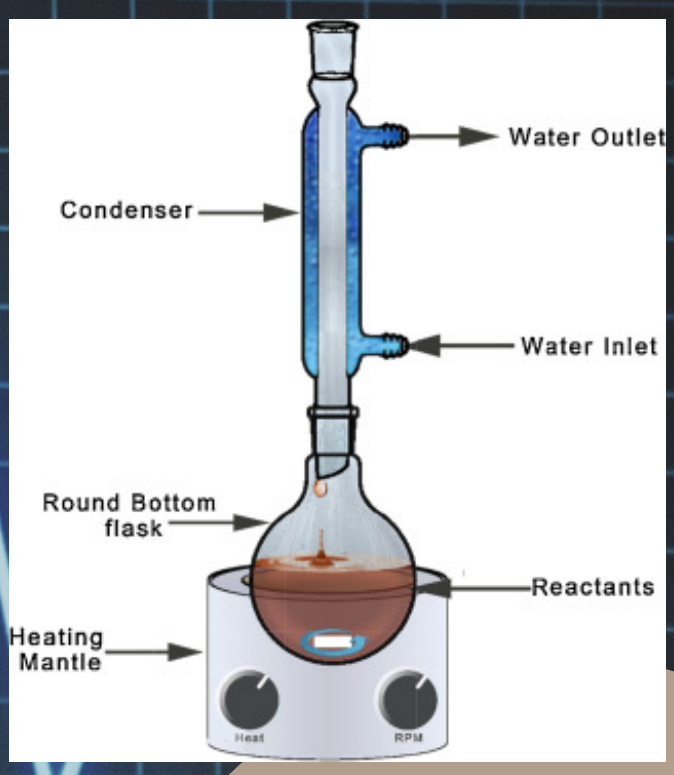
SAIF/CIL at Panjab University Chandigarh was incepted in the earlier years of the 6th plan. The complete facilities of SAIF, CIL and UCIM are working in unison in the service of research and also for imparting practical training to the students through workshops. The Centre also undertakes the design, fabrication and repair of electronic instruments required by students and teachers from the University and the colleges around. It also runs training programmes in technical skills for the benefit of scientific community and associated laboratory staff from different institutions.

Tentaive Programme

Day 1
May 10, 2022

Tuesday

8:30 – 9:30 *am*	*Inaugration & Greetings*
9:30 – 11:00 *am*	*Introduction and scope of analytical characterization techniques*
11:00 – 11:30 *pm*	*The solution session*
11:30 – 1:00 *pm*	*Synthesis strategies for materials at nanoscale*
1:00 – 1:30 *pm*	*Q & A Session to know why and what*
2:00 – 2:30 *pm*	*Let me introduce session*
2:30 – 6:00 *pm*	*Experimental synthesis of nanomaterials followed by their analysis via UV-visible and FTIR spectroscopy along with DLS for determining size and Zeta potential*



Day 2
May 11, 2022

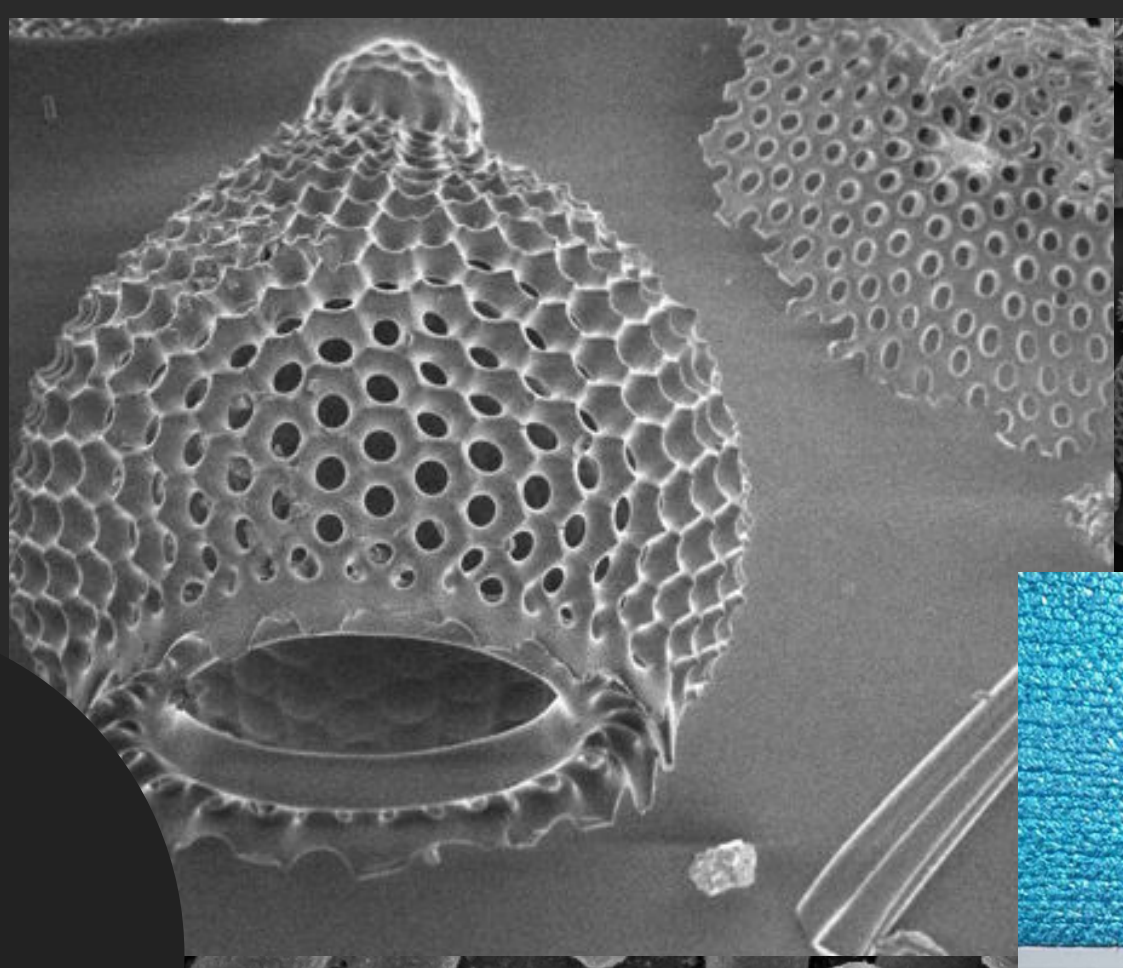
Wednesday

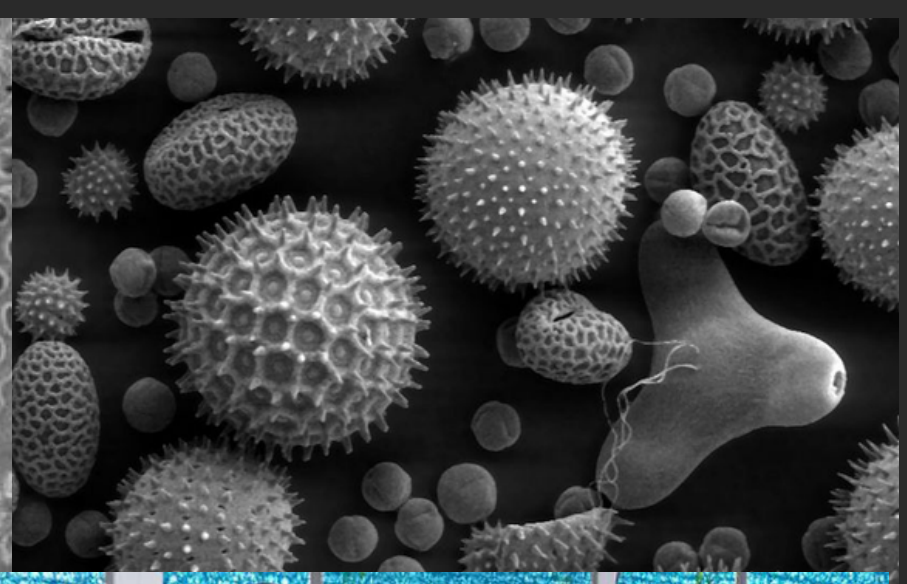
9:00 – 10:00 *am*	*Overview of electron and probe microscope*
10:00 – 11:30 *am*	*Principle, operation and workimg of AFM, MFM, EFM and STM in different modes*
11:30 – 12:00 *pm*	*Q & A session for Atomic Force Microscopy*
12:00 – 01:00 *pm*	*Overview of dynamic laser scattering (DLS) along with UV-Visible and FTIR spectrosocpy*
1:00 – 1:30 *pm*	*Discussion*
2:00 – 6:00 *pm*	*Sample preparation and imaging using AFM and STM*

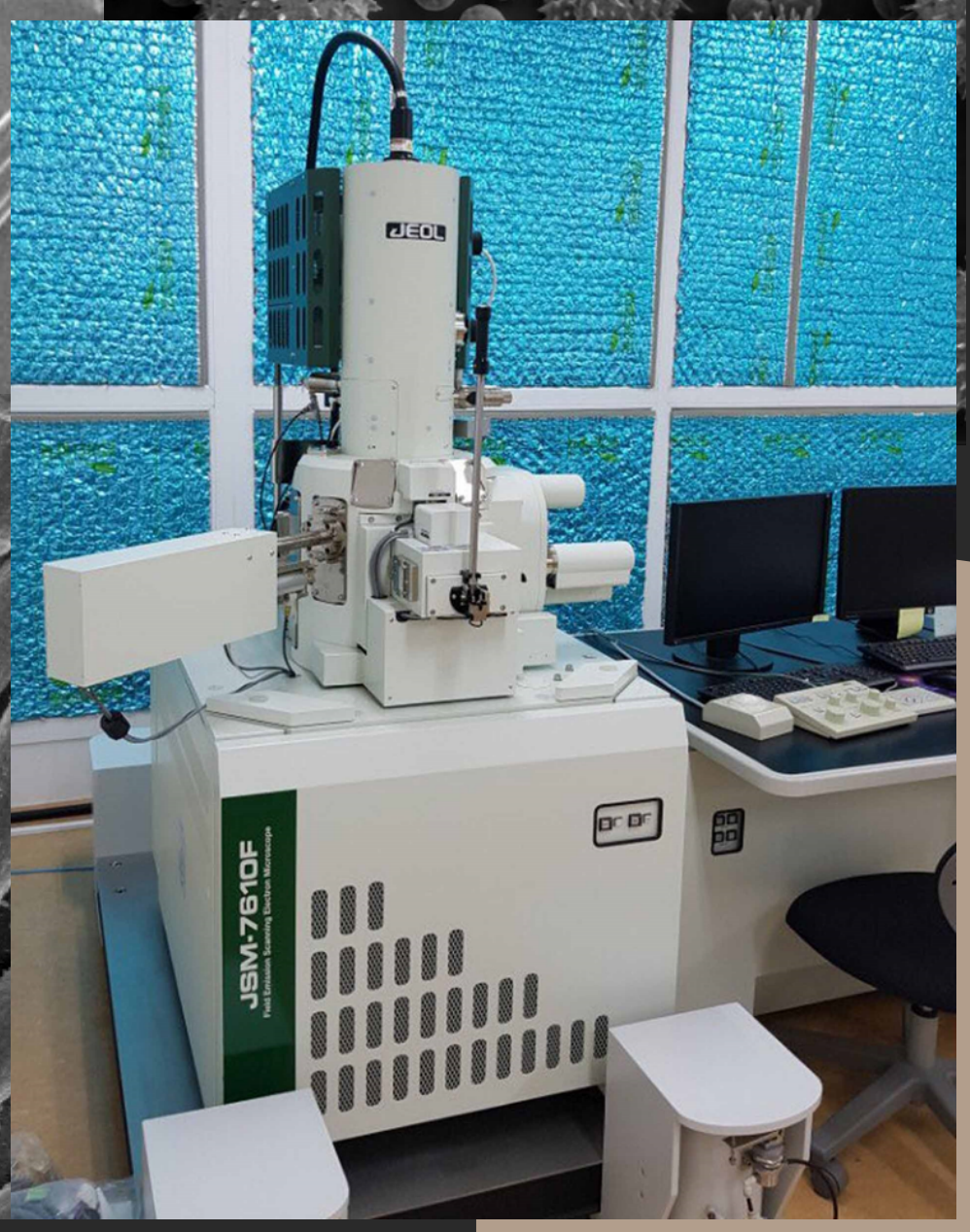
Day 3
May 12, 2022

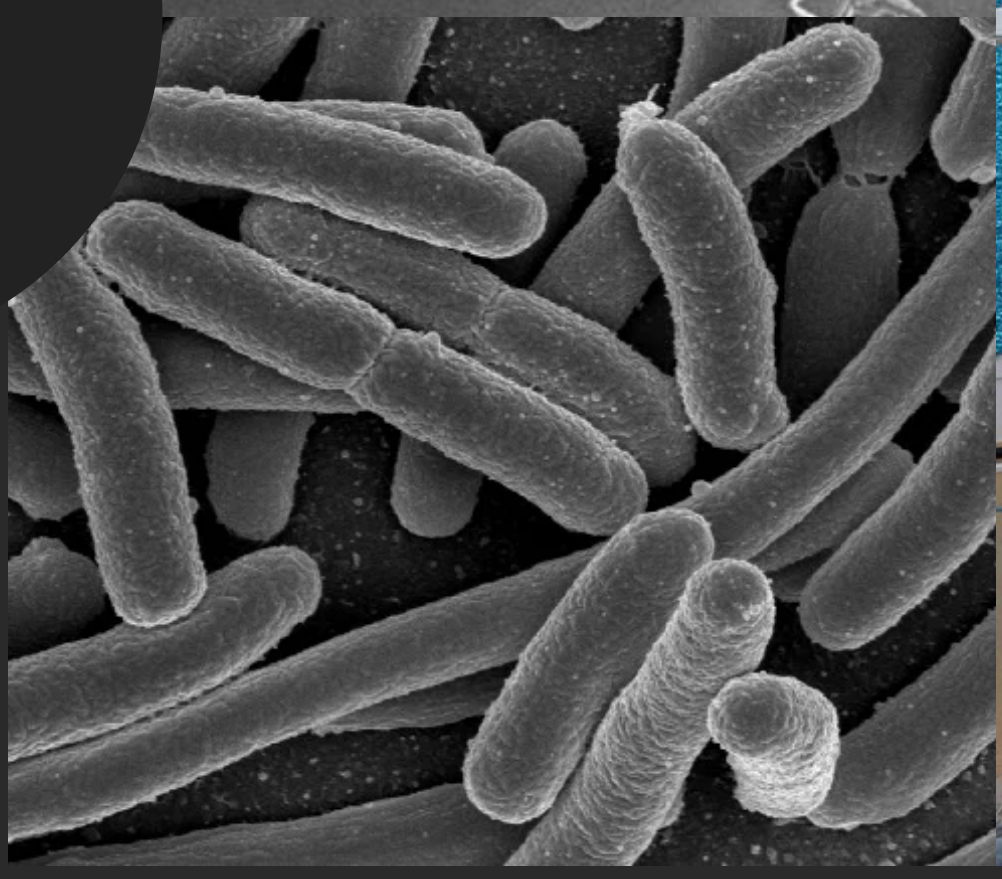
Thursday

9:00 – 10:30 *am*	*Insights into fundamentals of scanning electron microscopy (SEM) and different attachments*
10:30 – 11:00 *am*	*Trouble shooting session for SEM*
11:00 – 12:30 *pm*	*Talk on basics of transmission electron microscopy*
12:30 – 1:30 *pm*	*Bilateral discussion on TEM*
2:00 – 6:00 *pm*	*Sample preparation, analysis and interpretation of SEM micrographs for different samples*





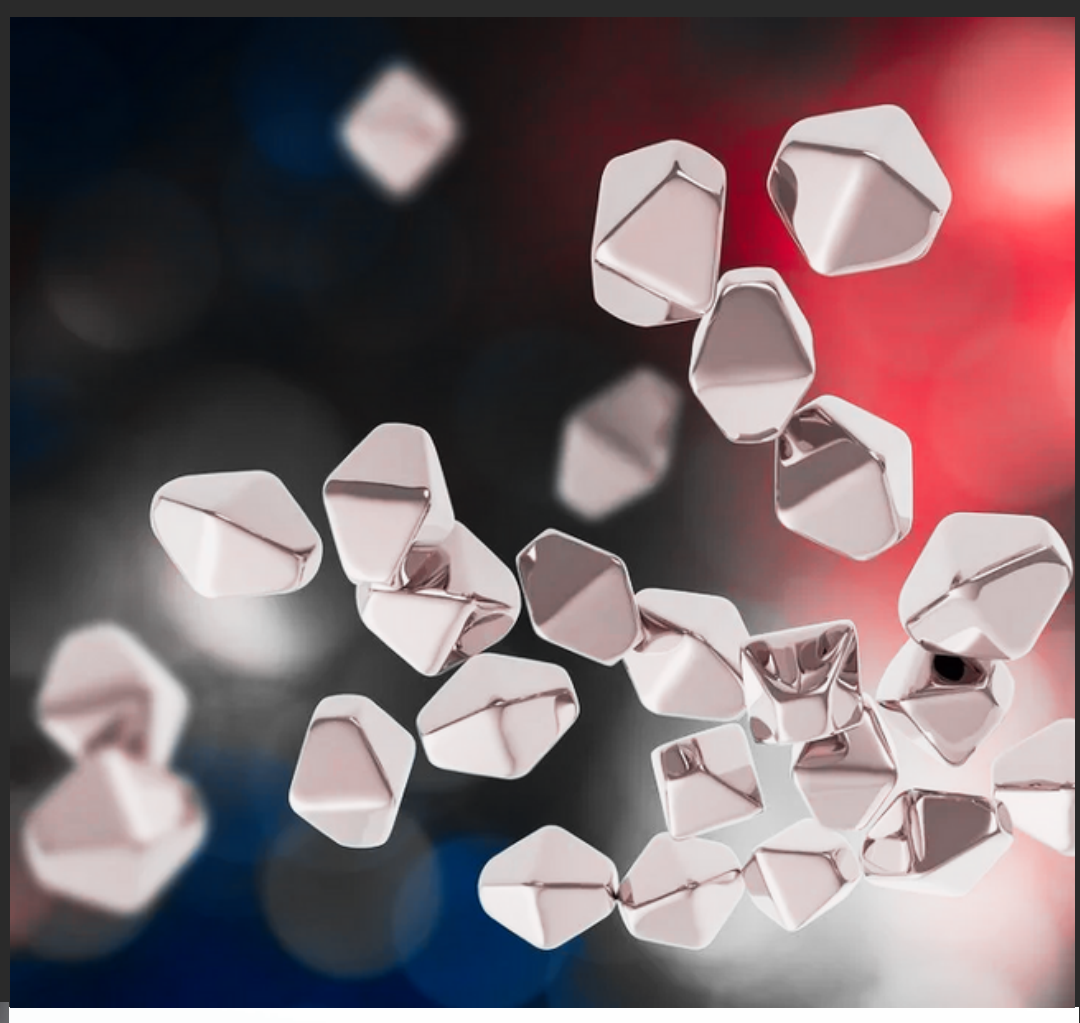


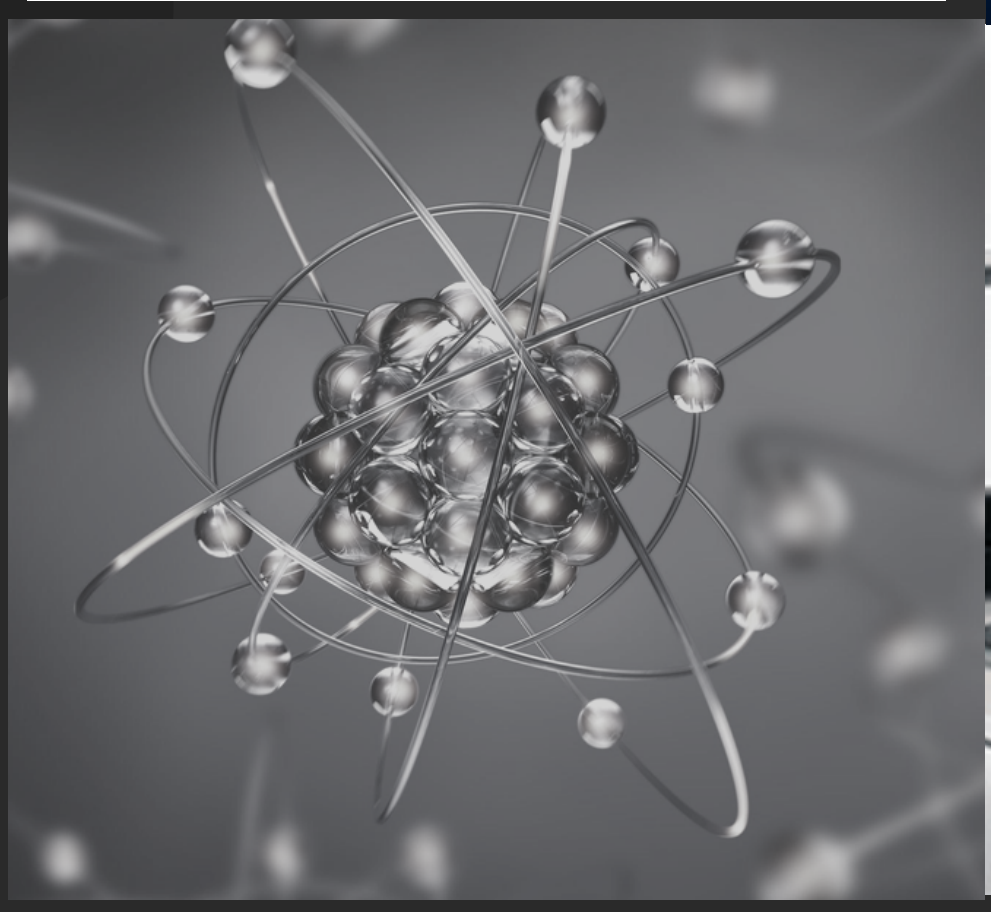


Day 4
May 13, 2022

Friday

9:00 – 10:30 *am*	*Elemental insights into X-ray Diffraction*
10:30 – 11:00 *am*	*Rectify your Queries*
11:00 – 12:30 *pm*	*Technical note on Raman Spectroscopy*
1:00 – 1:30 *pm*	*Expert Exchange Session*
2:00 – 6:00 *pm*	*Analysis and evaluation of qualitative and quantitative aspects of samples using XRD and Raman*





Day 5
May 14, 2022

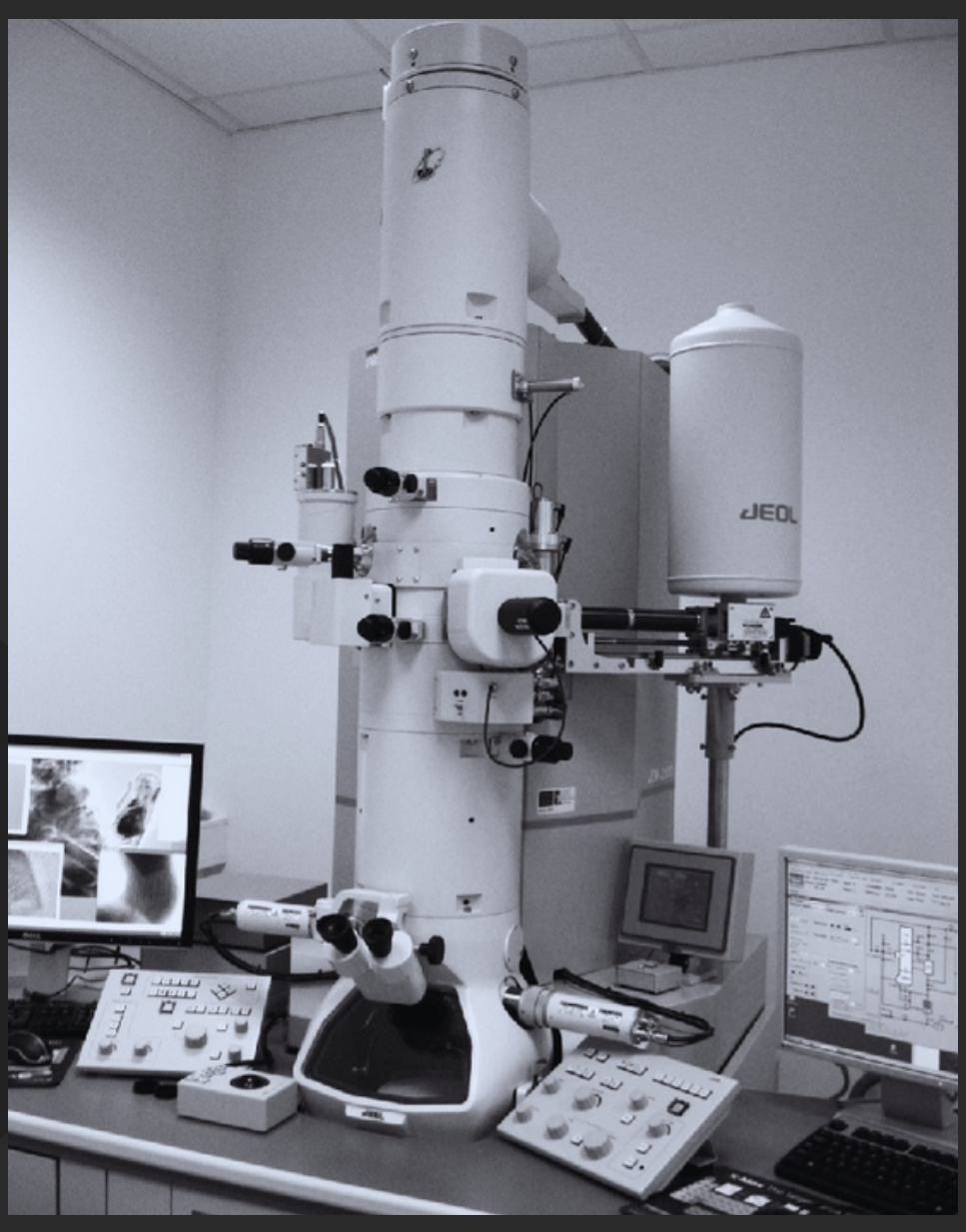
Saturday

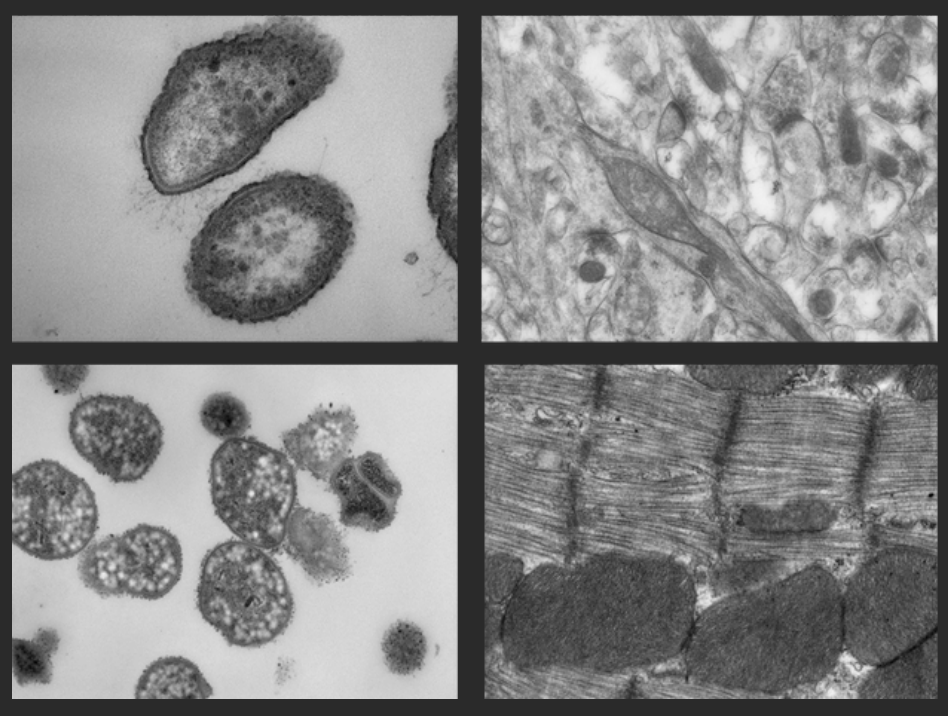
9:00 – 10:30 *am*	*Mass Spectroscopy (MS) an essential tool for characterization*
10:30 – 11:00 *am*	*Queries and troubleshooting session for MS*
11:00 – 12:30 *pm*	*Introductory Lecture on Nuclear Magnetic Resonance*
12:30 – 1:30 *pm*	*Open disquisition on NMR*
2:00 – 6:00 *pm*	*A Practical Approach towards MS and NMR: Sample preparation, analysis, and interpretation of results to determine composition of materials*

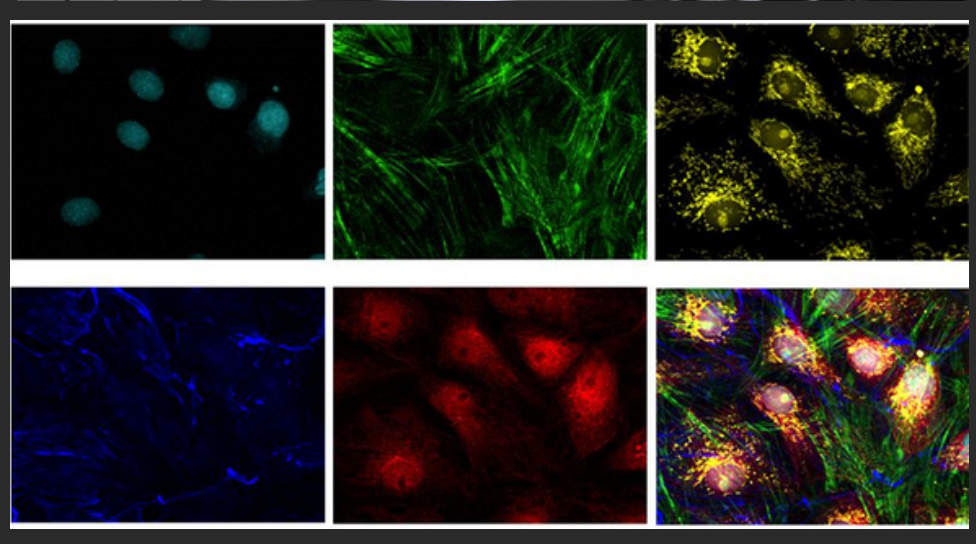
Day 6
May 16, 2022

Monday

9:00 – 10:30 *am*	*Tech talk on Principles and applications of Confocal microscopy*
10:30 – 11:00 *am*	*Get answers to all your conceptual doubts*
11:00 – 12:30 *pm*	*Discussion on the latest advancements in high fidelity HR-TEM microscopy*
12:30 – 1:30 *pm*	*Grilling session*
2:00 – 6:00 *pm*	*Sample preparation, visualization of material and image analysis using confocal and TEM microscopy*







Day 7
May 17, 2022

Tuesday

9:00 – 10:30 *am*	*Inductively coupled plasma mass spectroscopy: Introduction to analytical aspects*
10:30 – 11:00 *am*	*Explore your uncertainity*
11:00 – 1:30 *pm*	*Determination of elemental composition of your sample*
2:00 – 4:00 *pm*	*Feedback*
4:00 – 6:00 *pm*	*Valedictory function*