PUNJABI UNIVERSITY PATIALA

AMITY UNIVERSITY

Emerging Materials: Synthesis and Characterization Techniques

Organized by: Department of Physics, Punjabi University, Patiala, Punjab (India)

14 December – 20 December 2022

REGISTER: https://bit.ly/3ruKdwc

Last date for Registration: 30 November 2022

SPONSORED By

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DEPARTMENT OF
SCIENCE & TECHNOLOGY

Under

SYNERGISTIC TRAINING PROGRAM UTILIZING THE SCIENTIFIC AND TECHNOLOGICAL INFRASTRUCTURE (STUTI)

Registration QR | For More Information

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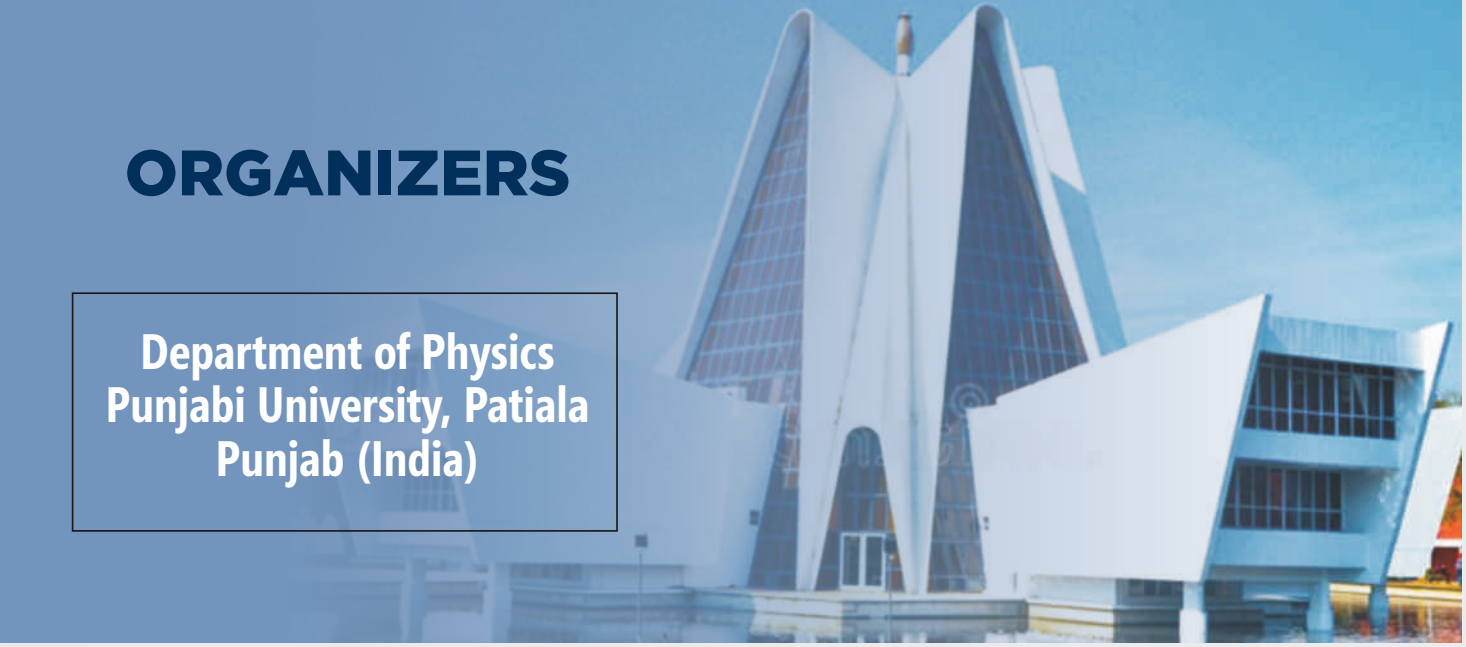

Department of Physics
Punjabi University, Patiala
Punjab (India)

Punjabi University, Patiala was established on April 30, 1962 in the erstwhile princely state of Patiala under the Punjab Act No. 35 of 1961 with the main objective of furthering the cause of Punjabi language, art and literature. Punjabi University has since evolved into the largest University in the state. This is the second University in the world to be named after a language, the first being Hebrew University of Israel. The University started working from its present lush green and pollution free 316 acres campus since 1965.

Now the University caters to the educational needs of nine districts of Punjab. Over the time since its inception, the University has evolved into a multi-faceted and multi-faculty educational institution for the promotion of higher education and research in Humanities, Arts, Languages, Sciences, Engineering Technology and many more. University is imparting instruction and guidance to nearly 14,000+ students in a multi-faceted, multi-pronged and multi-faculty environment comprising 70+ Teaching and Research Departments/Chairs on its Campus, 27 Regional Centre/ Neighbourhood Campuses/ Constituent Colleges and 274 Colleges affiliated to it.

The department of Physics was established in 1963, being one of the first departments to get functional in the University. The first batch of postgraduate students passed out in 1965. The aim of the department throughout its existence for six decades has been to provide up to date instruction to students to meet the requirement of trained manpower in Physics for teaching, research, engineering and other vocations. It has established itself as a centre of excellence with well-qualified faculty and modern teaching, computer and research laboratories. All teachers have been actively involved in emerging R & D activities and many of them have been trained abroad. The department also has well-established programs for research leading to Ph.D. degrees in specialisation with Material Science, Radiation Physics, Theoretical Physics, Astrophysics, etc. It has been recognized as a department for special assistance (DRS and DSA-I, DSA-II, DSA-III and now under CAS-II) since 1986 by the UGC under SAP and COSIST programs and DST under FIST program for strengthening of infrastructure. Material Science, Radiation Physics and Theoretical Physics form major thrust areas of research in the department, and grants have also been received by individual faculty members for several research projects from different funding agencies such asDST, UGC, CSIR,ISRO, IUAC, IAEA, DAE and state Government.

Research & Innovation Driven University

AMITY UNIVERSITY

Project Management Unit

Amity University Uttar Pradesh (AUUP) has been awarded the STUTI program as a Project Management Unit (PMU) by the Department of Science & Technology (DST) to conduct 07 days of residential hands-on training on the state-of-the-art equipment, fully sponsored by DST.

Amity Education Group is India's largest education group having 12 Indian Universities and 14 international campuses with a strong focus on research & innovation in the diverse areas of Science & Technology. Amity University aims to become the ideal platform for scientists, researchers, and academicians to transform their ideas into success and develop their potential. Bringing together this vast community of scholars for cutting-edge research, Amity University is committed to impacting the development and global image of India in research and innovation.

Amity education group has more than 3000 strong distinguished faculty members trained in reputed National & International research Institutes. We have more than 30 brilliant Scientists from diverse places across the globe who have received various prestigious fellowships like DBT/India Alliance Wellcome Trust Early Career Fellowship, DBT Ramalingaswami Fellowship, SERB-Ramanujan Fellowship, DST-Inspire Faculty Fellowship to name a few. These highly qualified Bright Brains are mentoring more than 100 blooming brains who are pursuing their Ph.D. with prestigious fellowships.

Amity research ecosystem includes world-class research infrastructures with high computing facilities and Scanning Electron Microscope, FT-IR, High-Performance Liquid Chromatograph, Gas Chromatograph, Fermenter, etc. funded by various national and international grants. Centres of Excellence have been established in niche areas of Science & Technology. In addition, more than 12 research clusters in areas of great national and international importance are effectively functioning to act as a force multiplier in the Amity Group.

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सत्यमेव जयते

DST – STUTI SCHEME

The Scheme 'Synergistic Training program Utilizing the Scientific and Technological Infrastructure' (STUTI) is intended to build human resource and knowledge capacity through open access to S&T Infrastructure across the country. As a complement to the various schemes of DST funding for expansion of R&D Infrastructure at academic institutions, the STUTI scheme envisions a hands-on training program and sensitization of the state-of-the-art equipment as well as towards sharing, while ensuring transparent access to S&T facilities.

HIGHLIGHTS OF THE PROGRAMME

The aim of this 7-day training programme is to equip participants with the basic knowledge of different state-of-the-art synthesis and material characterization techniques. The training will revolve around different kinds of synthesis, crystallographic, imaging, spectroscopic techniques and accompanying data analyses. With increased focus on understanding of the techniques to be covered under this programme starting from the basics of material synthesis, diffraction methods, microscopy, absorption and luminescence and their applications are essential to have a holistic view of modern-day science and its far-reaching implications.

The participants will experience hands-on training on numerous material synthesis set-ups and characterization tools, such as Thermal Evaporation Deposition System, Electron-Beam Physical Vapour Deposition,X-ray Diffractometer (XRD), Scanning Electron Microscope (SEM), Scanning Tunnelling Microscope (STM), Spectrofluorometer, Thermoluminescent Dosimeter Reader, UV-visible Spectrophotometer, Fourier Transform Infrared Spectrometer, PE Loop Tracer, Dielectric Measurement Set-up, Particle Size Analyzer and X-ray Fluorescence.

OBJECTIVE OF PROGRAMME

To build human resource and its knowledge capacity through open access to S & T Infrastructure across the country through hands-on training programs by:

- Organising short term courses.
- Enhancing awareness of use and application of state-of-the-art equipment's.
- Sharing while ensuring transparent access of S&T facilities funded by DST

WHO SHOULD ATTEND?

TThe training is organized to enhance the practical skills of Post Graduate Students, Research Scholars, Faculty Members from Universities/Colleges, Scientists, and Post-Doctoral Researchers who are working in multidisciplinary/ transdisciplinary and translational research in various organizations.

Eligibility:

a. Person of Indian Origin

b. Min. Qualification should be Post Graduate (Science) or B.Tech.(Technology)

c. Professor /Scientist / Post-Doctoral Fellows / PhD Fellow / Industry person who are actively involved in R&D

WHY SHOULD YOU ATTEND?

Discover state of the art R&D infrastructure and facilities funded by DST and held by various R&D institutions / Universities in the country.

- Gain hands-on experience of research through latest S&T equipment and facilities.
- Design experiments by selecting appropriate/ alternate equipment for the various experiments.
- Connect with the R&D Organisations / Universities / Private Sector facilities / Start-ups/ MSMEs involved in research & development

COST OF THE PROGRAM

This training is sponsored by DST STUTI program and registration is free.

For domestic travel of participants and faculty, the reimbursement **for A/C train ticket or Deluxe Bus (only for outstation candidates/faculty) will be provided.**

Depending upon the availability in the Punjabi University, accommodation would be provided on single/double occupancy basis.

Accommodation request should be made at least 10 days before the commencement of the training program.

ABOUT
R&D INFRASTRUCTURE

Equipment 1:
X-ray Diffractometer (XRD)

Make and Model:
Rigaku Miniflex-600

LEARNING OUTCOMES:

- To understand the basic handling of the Powder X-ray Diffractometer.
- Sample preparation and collection of the good quality diffraction data for determination of crystallographic characteristics.

Equipment 2:
Scanning Electron Microscope (SEM)

Make and Model:
JEOL JSM 6510 V

LEARNING OUTCOMES:

- Morphological and topographic characterization of materials.
- Probing the nanostructures, locating and identifying the type of defects and studying structural phase transitions in solids.

ABOUT
R&D INFRASTRUCTURE

Equipment 3:
Scanning Tunnelling Microscope (STM)

Make and Model:
QuazarTechnologies nanoRev STM

LEARNING OUTCOMES:

- To understand basic handling of STM.
- Topographic analyses of conducting samples

Equipment 4:
Particle Size Analyzer

Make and Model:
Anton Paar LITESIZER-500

LEARNING OUTCOMES:

- Particle characterization from the nano- to the micrometer range.
- Particle size measurements via dynamic light scattering and determination of zeta potential.

ABOUT
R&D INFRASTRUCTURE

Equipment 5:
Fourier Transform Infrared Spectrometer (FTIR)

Make and Model: **Bruker Alpha-II**

LEARNING OUTCOMES:

- Handling of FTIR spectrometer and sample preparation.
- Chemical analysis as well as quality control, quantifications and verification of raw materials.

Equipment 6:
UV-Visible Spectrophotometer

Make and Model:
Labtronics LT-2900

LEARNING OUTCOMES:

- Handling of UV-Visible spectrometer for spectral measurements.
- Extraction of optical parameters from recorded spectra.

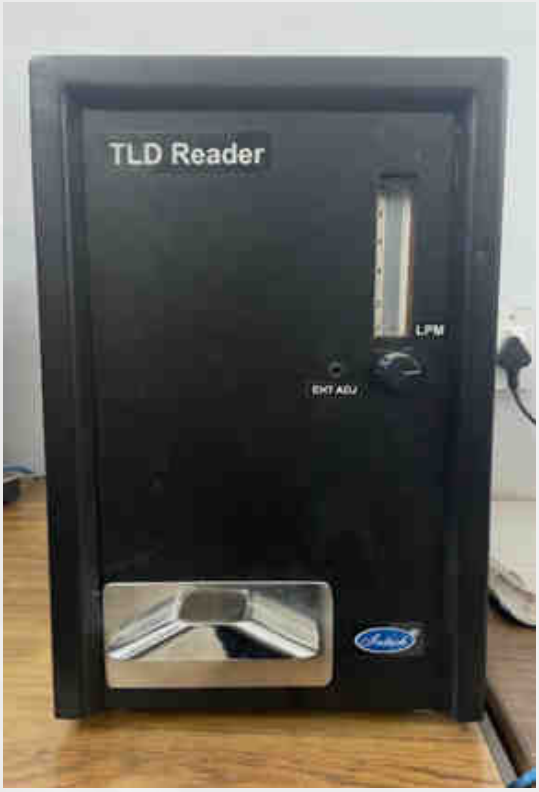
ABOUT
R&D INFRASTRUCTURE

Equipment 7: **Spectrofluorometer**

Make and Model: **Perkin Elmer LS 55**

LEARNING OUTCOMES:

- Handling of spectro-fluorometer for spectral measurements.
- Analyses of recorded energy resolved spectra for qualitative measurements.



Equipment 8:
Thermo-luminescent Dosimeter (TLD) Reader

Make and Model:
Intech Dosimeters TLD Reader

LEARNING OUTCOMES:

- Handling of TLD reader for radiation dose measurements.
- Analyses of recorded results for applications.

ABOUT
R&D INFRASTRUCTURE

Equipment 9: **PE Loop Tracer**

Make and Model:
Marine India High End PE loop Ferroelectric Test system

LEARNING OUTCOME:

- Measurement of Polarization versus Electric field (PE) hysteresis loop to calculate the remnant polarization, saturation polarization, coercivity and leakage current with variation of magnetic field and temperature

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Equipment 10:
Dielectric Measurement Set-up

Make and Model:
HIOKI LCR meter (HIOKI IM 3536)

LEARNING OUTCOME:

- Measurement of dielectric properties (Tanδ, impedance, phase, Cp, Cs etc.) variation with frequency, temperature and magnetic field.

ABOUT
R&D INFRASTRUCTURE

Equipment 11:
Thermal Evaporation Deposition System

Make and Model:
Hind High Vacuum BC-300

LEARNING OUTCOME:

- Handling of thermal evaporation deposition system for deposition of thin films

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Equipment 12: **Electron Beam Physical Vapour Deposition (EBPVD)**

Make and Model: **Hind High Vacuum 12A4D**

LEARNING OUTCOME:

- Handling of EBPVD for deposition of low dimensional materials.

REGISTRATION/ APPLICATION

Participants are required to apply for the training program online at https://bit.ly/3ruKdwcor scan the QR code provided at the end. The application deadline is November 30, 2022.

SELECTION OF THE PARTICIPANTS

The applications will be scrutinized by the STUTI training program selection committee and the decision of the committee will be final. Selected candidates will be informed through e-mail. The seats in the training program are limited.

TRAINING PROGRAM SCHEDULE

DATE	Programme
14-12-2022	Registration Inauguration and Introduction of Participants /Resource Persons Technical Session on Material Synthesis Techniques-I Introduction to material synthesis techniques Hands-on: Synthesis of Nanomaterials/Thin films
15-12-2022	Technical Session on Material Synthesis Techniques-II Advanced material synthesis techniques Technical Session on Particle Size Analyzer Fundamentals and Applications Hands on: Particle size measurements
16-12-2022	Technical Session on X-ray Diffraction and Rietveld Refinement Diffraction methods, Basic of X-ray diffraction Structural refinement of Powder XRD data Hands-on: Diffraction data analyses
17-12-2022	Technical Session on Electron Microscopy Fundamental and Applications of Scanning Electron Microscope (SEM) Advances in SEM Technical Session on Scanning Probe Microscopy (SPM) Fundamental and Application of Scanning Tunnelling Microscope (STM) Advances in SPM Hands-on: Sample analysis by SEM and STM
18-12-2022	Technical Session on UV-Vis and FTIR Spectroscopy Fundamentals, advances and Applications of Spectroscopy Hands on: Analyses of samples by UV-Vis and FTIR spectrophotometers
19-12-2022	Technical Session on Photoluminescence (PL) and Thermoluminescence (TL) Fundamentals and Applications of PL and TL Technical Session on X-ray Fluorescence (XRF) Fundamentals and Applications of XRF Hands-on: Sample analysis by Spectrofluorometer, Thermoluminescent Dosimeter Reader and XRF
20-12-2022	Technical Session: Dielectric Measurements Fundamentals and advances in dielectric measurements Hands-on: Dielectric Measurements of Sample Valedictory

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For More details about the R&D facility at Punjabi University, Patiala

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Registration QR

For More Information