



विज्ञान एवं
प्रौद्योगिकी मंत्रालय
MINISTRY OF
SCIENCE AND
TECHNOLOGY

Hands on Training Program

ADVANCED INSTRUMENTAL TECHNIQUES OF SYNTHESIS AND PHYSICO-CHEMICAL ANALYSIS

UNDER

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

January 27 – February 02, 2023

organized by

School of Physical Sciences & School of Environment and Natural Resources

Doon University, Dehradun

in association with

Sophisticated Analytical Instrumentation Facility (SAIF), Panjab University, Chandigarh



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ORGANIZERS

School of Physical Sciences and School of Environment and Natural Resources DOON UNIVERSITY

The Doon University, located in the lush green foothills of Shivalik, is dedicated to promoting excellence in teaching and research while offering a full range of multi-disciplinary academic programmes at the undergraduate, postgraduate and doctoral level. A unitary and residential university located on the outskirts of the city, it has a scenic campus with a state-of-art infrastructure, stunning architecture and a soothing environment.

Aiming at creating an autonomous and accountable institution of higher learning, the university was established by the Government of Uttarakhand by Doon University Act, 2005 (Uttaranchal Adhiniyam Sankhaya 18 of 2005) and recognized under 12 (B) of UGC Act. The spirit of the Act is to create an autonomous and accountable institution of higher learning. Accordingly, the university intends to impart socially and economically relevant education. It also aims to provide lead in frontier areas of research and pedagogy. Having a huge and challenging mandate, the university started its first academic session in August 2009 and has stood up to the challenges during such a relatively short period of time.

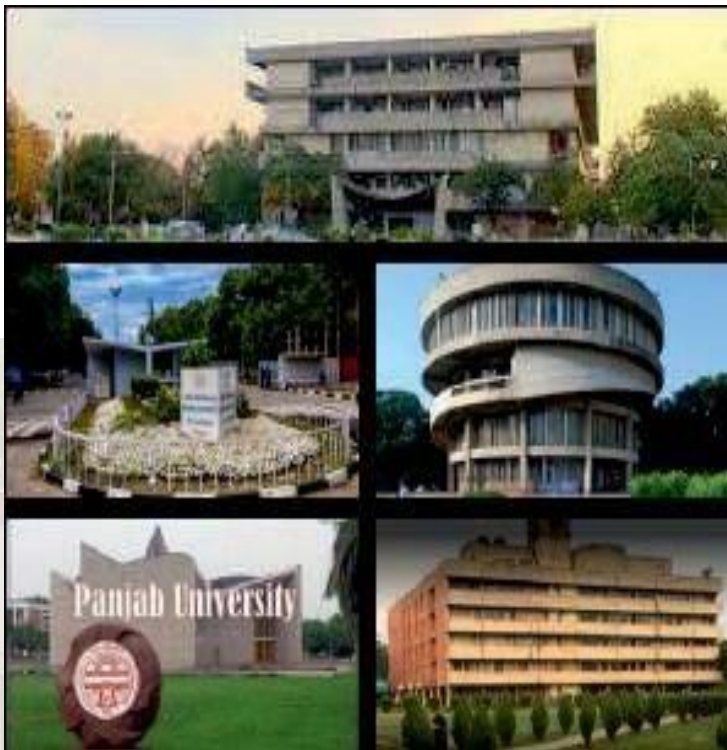
VISION AND MISSION OF DOON UNIVERSITY

In accordance with the provision in Section 5(1) of the Act, the Doon University envisions itself as a Centre of Excellence and set high standards for creation and dissemination of knowledge through teaching and research in the chosen areas of studies, both in India and around the world.

The university will be known for:

- Conducting high quality and multi-disciplinary research to push the boundaries of knowledge in the chosen areas;
- Student and learning-to-learn centered pedagogy supported by a community of eminent research-scholars;
- Leadership through collaborative educational ventures;
- Value- based learning;
- Offer state-of-the-art educational programmes in cutting-edge disciplines of regional, national and international relevance;
- Provide a challenging and conducive environment for scholar-researchers to engage in pursuit of excellence.

PANJAB UNIVERSITY



Panjab University is one of the oldest Universities in India. It has a long tradition of pursuing excellence in teaching and research in science and technology, humanities, social sciences, performing arts and sports. The Panjab University, with its 78 teaching and research departments besides 4 chairs for the research on the main campus at Chandigarh, has 188 affiliated/constituent colleges spread over Punjab and Chandigarh besides Regional Centres at Muktsar, Ludhiana, Hoshiarpur, and Kauni. In addition, there is the Vishveshwaranand Vishva Bandhu Institute of Sanskrit and Indological Studies (VVBIS&IS) at Hoshiarpur.

SAIF, formerly known as RSIC 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.

SAIF/CIL





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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 is to equip participants with the basic knowledge different state-of-the-art equipments and spectroscopy techniques. The participants will experience hands-on training on CVD tubular furnace, Thermal Evaporation, EC/OC analyzer, Aerosol spectrometer, FTIR, UV-Vis-NIR spectrophotometer and BET surface analyzer. The training program, which will also be having simultaneous lecture and discussion sessions, will be carried out at the instrumentation facility of Doon University, wherein apart from the above ones, many modern equipments are also housed. The training will revolve around different kinds of High End instruments for analysis of molecules, materials and pollutants, spectroscopic techniques and accompanying data analyses. The techniques to be covered under this program, starting from the advanced techniques for synthesis and coating of nanomaterials to the analysis of materials and pollutants are essential to have a holistic view of modern day science and its far-reaching implications.

OBJECTIVE OF TRAINING

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?

The 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 (TIER-III) train ticket or Deluxe Bus (only for outstation candidates/faculty) will be provided.**

Depending upon the availability in the Doon 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 AT DOON UNIVERSITY

EQUIPMENT 1:

CVD (Chemical Vapour Deposition) System

Make and Model: Metrex (MCVD-11/14)

LEARNING OUTCOMES

1. Understanding the theory and working principle of CVD Tubular
2. Learning the standard operating procedure to operate the CVD
3. Coating a very fine, pure and impervious layer on a substrate usually not achievable by conventional method.



EQUIPMENT 2:

Thermal Evaporation

Smart Coat 3.0 HHV

LEARNING OUTCOMES

1. Define and describe evaporation
2. Identify examples of evaporation
- 3 Explain the relationship between temperature and the rate of evaporation.



ABOUT R&D INFRASTRUCTURE AT DOON UNIVERSITY

EQUIPMENT 3:

BET Surface Analyzer

Make and Model: BelSorp (X mini)

LEARNING OUTCOMES

1. Understanding the theory and working principle of BET surface analyzer
2. Learning the standard operating procedure to operate the BET surface analyzer
3. Determination of surface area and pore structure of various types of materials
4. To calculate the pore size distribution of a material using the entire isotherm obtained via BET surface analyzer



EQUIPMENT 4:

Portable wide range Aerosol Spectrometer

Make and Model: Grimm, Aerosol-1371

LEARNING OUTCOMES

1. Measuring a complete particle size distribution in air
2. Determining Nanoparticles and PM monitoring
3. Determining outdoor/indoor Air Quality (IAQ) in buildings
4. IAQ in vehicles, airplane cabins, cockpits, busses, trains
5. Nanoparticle source identification



ABOUT R&D INFRASTRUCTURE AT DOON UNIVERSITY

EQUIPMENT 5:

Fourier Transform Infrared Spectroscopy (FTIR):

Make and Model: SHIMADZU, A224158

LEARNING OUTCOMES

1. Learning theoretical foundations of infrared spectroscopy.
2. Analyze and demonstrate spectral data from IR spectroscopy.
3. Learning about the application of FTIR in different fields of material sciences.



EQUIPMENT 6:

UV-Vis-NIR Spectrophotometer

Make and Model: Agilent Carry Series

LEARNING OUTCOMES

1. Understanding the fundamentals of UV-Vis-NIR spectroscopy.
2. Understanding the behavior of the material in UV and visible regions.
3. Knowledge to record UV/visible/NIR spectra of



liquid, solid, and powder sample

ABOUT R&D INFRASTRUCTURE AT DOON UNIVERSITY

EQUIPMENT 7:

EC/OC Analyzer

Make and Model: Sunset Laboratories,
Model-4 Semi-Continuous

LEARNING OUTCOMES

1. Understanding the theory and working principle of EC/OC analyzer.
2. Learning the standard operating procedures to operate the EC/OC analyzer.
3. Learning the application of EC/OC analyzer in different areas of hydrology.



REGISTRATION/APPLICATION

Participants are required to apply for the training program online at <https://forms.gle/koK32Dk7NfBfEqCq5> The application deadline is January 10, 2023.

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

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.

For any queries write to us at dststuti.doonuniveristy@gmail.com or call at 9882688060; 8979853808

TRAINING PROGRAM SCHEDULE

DATE	INSTRUMENT NAME
27/01/2023	CVD (Chemical Vapour Deposition) Model : Metrex (MCVD-11/14)
28/01/2023	Thermal Deposition Model: HHV Smart Coat 0.2
29/01/2023	BET Surface Analyzer Model : BelSorp (X mini)
30/01/2023	Portable wide range Aerosol Spectrometer Model : Grimm, Aerosol-1371
31/10/2022	Fourier Transform Infrared Spectroscopy Model:- SHIMADZU, A224158 UV-Vis-NIR Spectrophotometer Model:- Agilent Carry Series
01/02/2023	EC/OC Analyzer Model : Sunset Laboratories, Model-4 Semi-Continuous
02/02/2023	Field Visit/Excursion