पंजाब केन्द्रीय विश्वविद्यालय/ਪੰਜਾਬ ਕੇਂਦਰੀ ਯੂਨੀਵਰਸਿਟੀ

Central University of Punjab

A Central University established by an Act of Parliament

Karyashala: Hands on Training on Sophisticated Instrumentation Techniques, Spectroscopy, Chromatography & Advanced Microscopy

(29th February- 07th March 2024)

आज़ादी का अमृत महोत्सव

Organized by:- CENTRAL IINSTRUMENTATION LABORATORY
CENTRAL UNIVERSITY OF PUNJAB

G20 भारत 2023 INDIA

Register: https://forms.gle/kn74x9ruLozzLEf27

Last Date of Registration: 08 January 2024

Sponsored by

Science and Engineering Research Board (SERB), New Delhi under the Accelerate Vigyan Scheme

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Vice Chancellor
Central University of Punjab

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FRSC –Incharge CIL & Professor, Department of PSNP, Central University of Punjab

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Central University of Punjab

Karyashala Co-ordinator

Dr. J. Nagendra Babu
Assistant Professor– Department of Chemistry,
Central University of Punjab

Organizing Committee

Mr. Ashvani Kumar
Senior Technical Assistant– CIL
Central University of Punjab

Mr. Ajit Paul Singh
Senior Technical Assistant– CIL
Central University of Punjab

Mr. Haldhar Kumar
Technical Support– CIL
Central University of Punjab

Karyashala Conveners

Dr. Rabindra Kumar
Technical Officer– CIL
Central University of Punjab

Dr. Sumeer Razdan
Technical Officer– CIL
Central University of Punjab

ORGANIZER

The Central University of Punjab established via an act of Parliament in 2009, envisions transforming the minds to serve humanity through skills and innovation driven teaching and research; values and community outreach.

The mission of the University is to:

- offer a wide range of instructional and research facilities for inter-, multi- and trans-disciplinary approaches to impart holistic learning;
- promote skills and innovation in teaching-learning, evaluation, research and consultancy;
- create an ignited workforce responsive to local, regional, national and global needs in tune with the requirements of academics, industry, business and administration; and address the issues and concerns of the community.

Central University of Punjab, is established in 2009 along with other new Central Universities by Act of Parliament (No 25, of 2009). The university has completed a remarkable journey of 14-years. University is accredited with **A^+ grade** in 2023 in the second accreditation cycle by NAAC. It has secured 95^{th} , 87^{th} and 84^{th}, 81^{st} rank in the year 2019, 2020, 2021 and 2022 respectively in the University category of NRF. It has 31 departments in sciences, Technology, Education, Humanities, Social Sciences and Law disciplines where it offers PG and Ph.D. programmes. The university has a mission of providing a wide range of instructional and research facilities across integrated and cross-disciplines, promote innovation in teaching, learning and research, and cross-pollinate new ideas, new technologies and new world-views.

The Central Instrumentation Laboratory (CIL) was established in 2010 with the vision to cater hi-end research instrument requirements of various Schools/Departments of the university through a common platform. The mandate of the CIL is to ensure the optimum usage of the equipment and instruments for the basic and advanced/applied research. The CIL provides state-of-the-art facilities to a wide range of internal and external users from various institutions in our nation on nominal payment basis. The services include Analytical (NMR, XRD, ICP-MS, GC-MS, GC-MS/MS, AAS, FTIR, UV-Vis, ICP-MS, GC-TCD / FID), Bio-Analytical (DNA Sequencer, Flow Cytometer, and Bio-Analyzer), Imaging Facilities (FE-SEM, CLSM, Fluorescence Microscope) and Food Testing services (funded by Ministry of Food Processing Industries, Govt. of India). A dedicated website (http://cup.edu.in/cil_web/user/login) for online form submission, information about sample analysis charges and feedback of users was launched in the year 2018 to ease the process of sample slot booking for external users (Academic/Research Institutes/R&D/ Industries).

कार्यशाला (High - End Workshops)

KARYASHALA

'KARYASHALA' is an effort to improve research productivity of promising PG and PhD students from universities and colleges through high-end workshops on specific themes. This program aims to provide opportunities to acquire specialized research skills. The Karyashala scheme envisions a hands-on-training programme and sensitization of the state-of-the-art equipment as well as towards sharing, while ensuring transparent access to Science &Technology facilities.

HIGHLIGHTS OF THE PROGRAMME

The aim of this workshop is to equip participants with the advanced knowledge on state-of-the-art on sophisticated instrumentation techniques, spectroscopy, chromatography, & advanced microscopy. The experiential learning will include lectures by experts on a specific technique followed by discussion and demonstration sessions. The demonstration sessions will be carried out in the Central Instrumentation Laboratory Central University of Punjab housing the equipment required for various demonstration sessions. The workshop will revolve around the practices and use of different spectroscopic (FTIR, 600MHz NMR, AAS, ICP-MS, Chromatographic (UPLC, HPTLC, GC-MS), Bioanalytical (Flow Cytometer), Imaging (Confocal Microscope, Fluorescence Microscope, Field Emission Scanning Electron Microscope), High Speed Ultra-Centrifugation in life science research, radioactivity, quality control and good laboratory practices techniques. These techniques would be accompanied with data analysis, interpretation and inferences.

OBJECTIVE OF WORKSHOP

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

- Organizing short term courses/workshops.
- Enhancing awareness of use and application of state-of-the-art equipment's.
- Sharing while ensuring transparent access of Science &Technology facilities funded by SREB Karyashala.

WHO SHOULD ATTEND??

The Karyashala Workshop is organized to enhance the practical skills of Post Graduate Students and Research Scholars, who are working in multidisciplinary/ transdisciplinary and translational research in various organizations.

Eligibility:

a. Person of Indian Origin

b. Min. Qualification should be PG (Science)

c. PhD Fellow & PG Students

WHY SHOULD YOU ATTEND??

'ABHYAAS', a program of AV scheme, is an attempt to boost Research & Development in the country by enabling and grooming potential BY DEVELOPING DEDICATED RESEARCH skills in selected areas/ disciplines/field through **HIGH-END WORKSHOP ("KARYASHALA")**.

This is especially important for those researchers who have limited opportunities to access such learning capacities/facilities/infrastructure.

COST OF THE PROGRAMME

Registration Fee: Nil*

*This training is sponsored by SREB under the Karyashala Scheme 'ABHYAAS' program and registration is free.

TA and Accommodation will be provided to participants as per the SERB Accelerate Vigyan Norms.

Depending upon the availability in the hostel/guest house or nearby hotels, accommodation would be provided on sharing basis.

Accommodation request should be made at least 07 days before the commencement of the workshop programme.

How to Apply for Karyashala Workshop??

1. Please fill the online form using the link: **https://forms.gle/kn74x9ruLozzLEf27**
   (After applying through the link, intimate us at **cilcupb@gmail.com)**
2. If selected, the applicants must produce a letter of authentication form their Supervisor/HoD/ Head of Institute indicating their association with institute and "**No Objection Certificate (NOC)**" for allowing their student to undergo Karyashala.

LAST DATE TO APPLY IS 08th JANUARY 2024

Selected participants will be intimated through email

ABOUT R&D INFRASTRUCTURE

EQUIPMENT 1:

600 MHz NUCLEAR MAGNETIC RESONANCE SPECTROMETER

Make & Model:

JEOL, JMM-ECZ600R

Learning Outcomes:

Upon completion of this module the learner should be able to

- Demonstrate and elucidate the structure and structural changes during lock-key binding events.
- Analyze the suitability of pulse experiment required to decipher protein structural information

EQUIPMENT 2:

GAS CHROMATOGRAPHY MASS SPECTROMETRY

Make & Model:

SHIMADZU, QP-ULTRA GC-MS

Learning Outcomes:

Upon completion of this module the learner should be able to

- Prepare and quantitate analytes in different matrices using GC-MS.
- Understand the role of various parameters of gas

EQUIPMENT 3:

ULTRAHIGH PRESSURE LIQUID CHROMATOGRAPHY

Make & Model:

THERMOFISHER DIONEX, ULITMATE-3000

Learning Outcomes:

Upon completion of this module the learner should be able to

- Prepare and quantitate analytes using HPLC.
- Understand the role of various parameters of HPLC on sample elution

ABOUT R&D INFRASTRUCTURE

EQUIPMENT 4:

FIELD EMISSION SCANNING ELECTRON MICROSCOPY

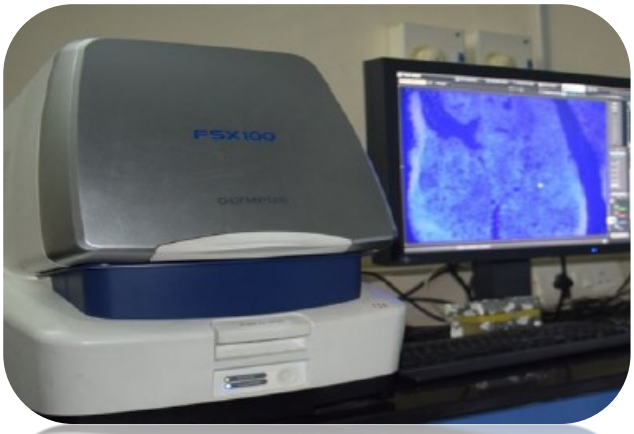
Make & Model:

CARL ZIESS, MERLIN-COMPACT

Learning Outcomes:

Upon completion of this module the learner should be able to

- Preparation of samples
- Image the topological and morphological structure of nanostructures and biological specimens morphology and functional analysis of cellular



EQUIPMENT 5:

FLUORESCENCE MICROSCOPE

Make & Model:

OLYMPUS, FSX-100

Learning Outcomes:

Upon completion of this module the learner should be able to

- Analyze the samples using dark & bright field and fluorescence microscopy.
- Understanding of phenomenon like

EQUIPMENT 6:

CONFOCAL LASER SCANNING MICROSCOPE

Make & Model:

OLYMPUS, FV1200 CLSM

Learning Outcomes:

Upon completion of this module the learner should be able to

- Analyze using multifluorescent analysis of cells, fluorescent cell imaging experiments
- Understand the requirements of live cell confocal imag-

ABOUT R&D INFRASTRUCTURE

EQUIPMENT 7:

INDUCTIVELY COUPLED PLASMA MASS SPEC-TROMETER

Make & Model:

THERMOFISHER, iCAP-QC

Learning Outcomes:

Upon completion of this module the learner should be able to

- Demonstrate and quantitate analytes in different matrices using ICP-MS.
- Understand and apply the isotope cor-

EQUIPMENT 8:

ATOMIC ABSORPTION SPECTROSCOPY

Make & Model:

SHIMADZU, AA-7000

Learning Outcomes:

Upon completion of this module the learner should be able to

- Demonstrate and quantitate metal/metalloids in different matrices using Flame, Hydride Generator and Graphite Furnace techniques.
- Understand, analyze and remove matrix interferences dur-

EQUIPMENT 9:

FLOW CYTOMETER

Make & Model:

BD DIAGNOSTICS, ACCURI C6

Learning Outcomes:

Upon completion of this module the learner should be able to

- Prepare and analyze cell samples for sorting and cellular function including detection of biomarkers.
- Detect and analyze the chemical and physical characteristics of cells including cell topography, morphology and functional analysis of cellular material.

EQUIPMENT 10:

FOURIER TRANSFORM INFRARED SPECTROSCOPY

Make & Model:

BRUKER, TENSOR-27

Learning Outcomes:

Upon completion of this module the learner should be able to

- Demonstrate and analyze spectral data obtained from IR spectroscopy.

Karyashala: Hands on Training on Sophisticated Instrumentation Techniques, Spectroscopy, Chromatography, & Advanced Microscopy

(29th February-07th March 2024)

(Under the Karyashala Scheme- A SERB Scheme)

Central Instrumentation Laboratory, Central University of Punjab, Bathinda, India

Program Schedule

Inaugural Session (Thursday, 29th February 2024)

Venue: 3rd Floor, Seminar Hall, Aryabhatt Block

09:15 am – 09:45 am	Registration
09:45 am - 09:50 am	University Anthem
09:50 am - 09:55 am	Introduction of the program by **Prof. R. Wusirika,** Chairman, CIL Committee, DIA, CUPB
09:55 am - 10:00 am	Welcome Address by **Prof. Anjana Munshi,** Director R&D Cell, CUPB
10:00 am - 10:05 am	Introduction of **Chief Guest, Prof Saranjit Singh** (Ex-Professor, NIPER Mohali) by **Prof. Raj Kumar,** Incharge, CIL
10:05 am - 11:15 am	Inaugural Address by **Prof. Saranjit Singh**
11:15 am - 11:25 am	Presidential remarks by **Prof. R. P. Tiwari**, Honourable Vice Chancellor, Central University of Punjab
11:25 am - 11:30 am	Vote of Thanks by Dr. **J. N. Babu, Convener, CIL**
11:30 am - 11:35 am	National Anthem
11:35 am - 11:50 am	High Tea

DAY 1 (THURSDAY, 29/02/2024)

11:50 am- 12:45 pm	General Spectroscopy and FTIR **by Prof. Raj Kumar, Professor,** Dept. of PSNP, CUPB
12:45 pm- 01:45 pm	Atomic Spectra and Atomic Absorption Spectroscopy by **Dr. J. Nagendra Babu,** Assistant Professor, Dept. of Chemistry, CUPB
01:45 pm – 02:30 pm	Lunch Break
02:30 pm- 05:00 pm	Demonstration of Atomic Absorption Spectrometer by **Dr. Rabindra Kumar,** TO**,** CIL, CUPB Demonstration of FTIR, UV-Visible Spectrometer by **Mr. Ashwani Kumar,** STA**,** CIL, CUPB

DAY 2 (FRIDAY 01/03/2024)

10:30 am- 11:30 am	Utilization of Confocal Microscope / Florescence Microscope in Biomedical Research by **Prof. Monisha Dhiman**, Professor, Dept. of Microbiology, CUPB
11:30 am – 11:45 am	Tea Break
11:50 am – 01:00 pm	Radioactivity By **Prof. V. K. Garg**, Dept. of Environmental Science & Technology, CUPB
01:00 pm – 02:00 pm	Lunch Break
02:00 pm – 05:00 pm	1. Demonstration of sample preparation and analysis using Field Emission Scanning Electron Microscope by **Dr. Rabindra Kumar** and **Mr. Ashwani Kumar** 2. Demonstration of Fluorescence Microscope and Confocal Laser Scanning Microscope by **Dr. Sumeer Razdan,** Technical Officer, CIL, CUPB

DAY 3 (SATURDAY, 02/03/2024)

10:30 am- 11:30 am	NMR Spectroscopy: Theory, Instrumentation and Problem session on NMR by **Prof. Vinod Kumar**, Professor, Dept. of Chemistry, CUPB
11:30 am – 11:45 am	Tea Break
11:45 am – 01:00 pm	2-D NMR Spectroscopy and Its Applications by **Prof. Inder Pal Singh,** Professor, NIPER, Mohali
01:00 pm – 02:00 pm	Lunch Break

02:00 pm – 05:00 pm	1. Demonstration of Chemical and Biological Applications by **Prof. Vinod Kumar & Prof. Raj Kumar** Hands on NMR Sample preparation by **Dr. Rabindra Kumar,** Technical Officer, CIL, CUPB

DAY 4 (SUNDAY, 03/03/2024)

09:00 pm – 05:00 pm : Site Visit / Holiday

DAY 5 (MONDAY, 04/03/2024)

09:30 am- 10:30 am	General Chromatography and GC-MS for Volatile Organic Analysis by **Dr. J. N. Babu,** Assistant Professor, Dept. of Chemistry, CUPB
10:30 am- 11:30 am	Monogenic Disorders: Focus on New Molecular Diagnostic Approaches by **Prof. Anjana Munshi,** Professor, Dept. of HGMM, CUPB
11:30 am – 11:45 am	Tea Break
11:45 am – 01:00 pm	Role of HPLC and HPTLC in Natural Products by **Dr. Vikas Jaitak,** Assistant Professor, Dept. of PSNP, CUPB
01:00 pm – 02:00 pm	Lunch Break
02:00 pm – 05:00 pm	1. Demonstration of Extraction techniques and GC-MS and HPLC Analysis by **Mr. Ajit Paul Singh,** STA, CIL, CUPB 2. Demonstration of HPTLC by **Dr. Vikas Jaitak**

DAY 6 (TUESDAY, 05/03/2024)

10:30 am- 11:30 am	Understanding Flowcytometery: Role of Flow Cytometry in Applied Science: **Dr Sunil Singh,** Associate Professor, Dept. of Biochemistry, CUPB
11:30 am – 11:45 am	Tea Break
11:45 am – 01:00 pm	Electron Microscopy Introduction and Applications by **Prof. Prashant Alegaonkar,** Professor, Dept. of Physics, CUPB
01:00 pm – 02:00 pm	Lunch Break

02:00 pm – 05:00 pm	Sample Preparation of Flow cytometry and Demonstration of Flow cytometry Equipment by**: Dr. Sunil Singh,** Associate Professor, Dept. of Biochemistry, CUPB

DAY 7 (WEDNESDAY, 06/03/2024)

10:30 am- 11:30 am	Sample Preparation for Metal Analysis in various matrix by **Industrial Expert, Anton Paar**
11:30 am – 11:45 am	Tea Break
11:45 am – 01:00 pm	Inductively Coupled Plasma Mass Spectrometer by **Industrial Expert from Thermo Fisher / Dr. Rabindra Kumar,** Technical Officer, CIL, CUPB
01:00 pm – 02:00 pm	Lunch Break
02:00 pm – 05:00 pm	**1.** Demonstration of ICP-MS analysis by **Haldhar Kumar** 2. Demonstration of Sample Preparation by **Industrial Experts, Thermo Scientific India and Anton Paar**

DAY 8 (THURSDAY, 07/03/2024)

10:00 am- 11:00 am	Principles and Applications of High Speed and Ultra-Centrifugation in Life Science Research by **Prof. A. K. Mantha**, Dept. of Zoology, CUPB
11:00 am – 11:15 am	Tea Break
11:15 am – 12:00 pm	Quality control and Good Lab Practices by **Prof. Suresh Thareja,** Professor**,** Dept. of DPSNP
12:00 am – 01:15 pm	Group Discussion and presentation by Participants
01:00 pm-02:00 pm	Lunch Break
02:00 pm-03:00 pm	Feedback, Valedictory Function and Group Photography

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For more details about the R&D facility at

Central Instrumentation Laboratory
Central University of Punjab, Bathinda

VISIT OUR WEBSITE : **https://forms.gle/kn74x9ruLozzLEf27**
Email ID: cil.edu.edu.in

For more details and Queries about the Programme Contact to Karyashala Conveners:

Dr. Rabindra Kumar
Technical Officer
Contact No.: 9855251475

Dr. Sumeer Razdan
Technical Officer
Contact No.: 8716005133

LAST DATE TO APPLY IS 08th JANUARY 2024
Selected participants will be intimated through email

One click directions to Central University of Punjab

BTI Railway station to campus https://goo.gl/maps/zKaKfrACQdLTfSG7A

Bathinda Bus stand to campus https://goo.gl/maps/QxPW4ysTiMAbxtn97

New Delhi to campus https://goo.gl/maps/pTLXiyPDvjC3BuxU7

Chandigarh to campus https://goo.gl/maps/Ajz4NSm8jcGfpCzv6

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