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Two weeks Advanced Skill Development Workshop on
“Operation and Applications of LC-MS/MS”
September 09, 2024 to September 22, 2024

Organized by
Integral Laboratory for Chemical Analysis & Research (IL-CAR)
Central Instrumentation Facility (CIF)
Integral Centre of Excellence for Interdisciplinary Research (ICEIR)
In collaboration with
Department of Chemistry



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REPORT

Dear All,

Integral Laboratory for Chemical Analysis and Research (IL-CAR), Central Instrumentation Facility, Integral Centre of Excellence for Interdisciplinary Research (ICEIR) in collaboration of Department of Chemistry organized the **2 weeks Advanced Skill Development Workshop on “Operation and Applications of LC-MS/MS”**, from September 09, 2024 to September 22, 2024. The program aimed to educate participants on the basic theory, principles, and application of LCMS/MS techniques, as well as provide hands-on instrument operation experience. The specific skill development workshop was attended by five participants, two Research scholars, from faculty of Pharmacy, two Research scholars from Department of Chemistry, Integral University and one Senior Analyst from Eurofins Scientific.

The 2 weeks workshop was successfully completed under the guidance of **Prof. Wahajul Haq**, Dean of Research & Development, and **Prof. Syed Misbahul Hasan**, Director of ICEIR, **Prof. Abdul Rahman Khan**, Dean Faculty of Science, with the support of **Dr. Snobar S. Mir**, Deputy Director of ICEIR. The overall, program was coordinated by **Dr. Jamal Akhtar**, workshop coordinator.

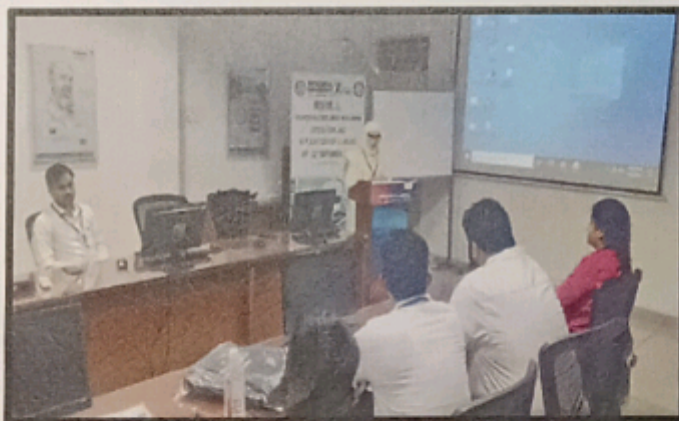
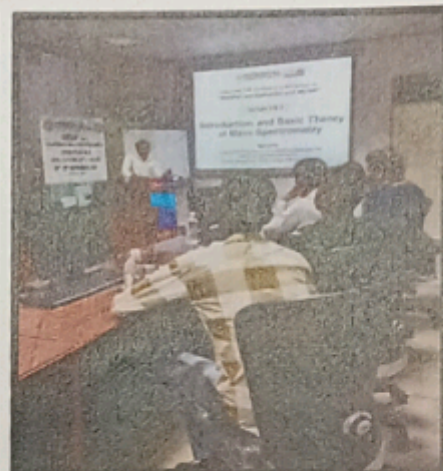
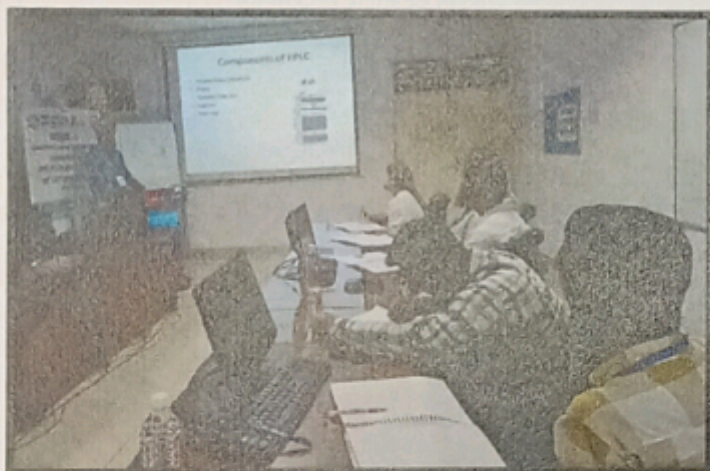
Theory sessions

September 09, 2024 to September 12, 2024

The theory sessions of the workshop provided participants with a broad understanding of the fundamental principles and instrumentation of Liquid Chromatography-Triple Quadrupole Mass Spectrometry. The first day, September 9th, featured a detailed PowerPoint presentation

on the **Introduction and Basic Principles of High-Performance Liquid Chromatography (HPLC)**, by Dr. Zainab Feroz, Technical Officer, CIF, covered the essential topics such as separation mechanisms, stationary and mobile phases, and key parameters influencing chromatographic performance. On September 10th, the session focused on the **Instrumentation of HPLC**, by Dr. Mohammad Shariq, Assistant Professor, Department of Pharmacy, Integral University, Lucknow, providing insights into the configuration of pumps, columns, detectors, and the role of system components in optimizing chromatographic resolution.

The subsequent presentations by Dr. Jamal Akhtar, Faculty In-Charge IL-CAR, Assistant Professor, Department of Chemistry, Integral University, delivered the lecture on Mass Spectrometry (MS). On September 11th, the participants were introduced to the **Basic Theory of Mass Spectrometry**, which included discussions on ionization methods, mass analyzers, and the fundamentals of mass-to-charge ratio determination. The theoretical concepts were further solidified on September 12th, through a presentation on the **Mass Spectrometer and its Components**, where participants learned about the functionality and integration of various components such as ion sources, mass analyzers (quadrupole, time-of-flight), and detectors. These theory sessions established a strong foundation for understanding the intricacies of the LC-MS/MS system and served as a prelude to the hands-on training sessions that followed, equipping participants with both theoretical knowledge and practical expertise.

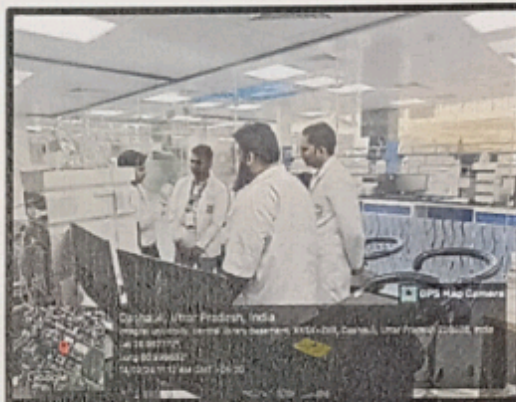


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Practical session

September 13, 2024 to September, 22, 2024

The practical sessions of the workshop were focused on in-depth demonstrations and hands-on training, providing participants with the essential skills required for proficient handling and operation of the LC-MS/MS system. Started from September 14th, the workshop commenced with a detailed demonstration of the **LC Hardware Components**, followed by an overview of the **MS Hardware Components** on September 17th. Participants were acquainted with the configuration, setup, and maintenance of both LC and MS components, helping them understand their roles in ensuring optimal system performance. The sessions on September 17th further advanced into practical training on **Method Optimization for Mass Spectrometry**, covering modes such as SCAN, SIM, Precursor Ion, Daughter Ion, and MRM, enabling participants to tailor the mass spectrometric parameters based on specific analytical requirements.

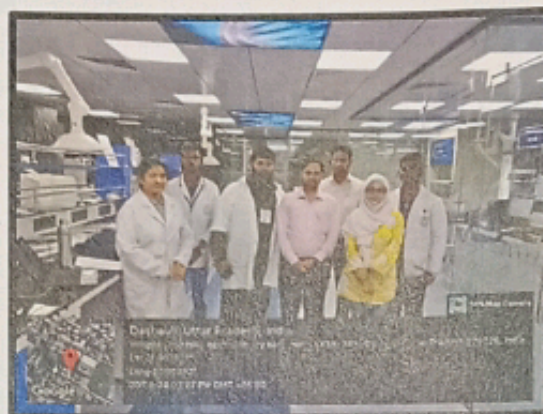
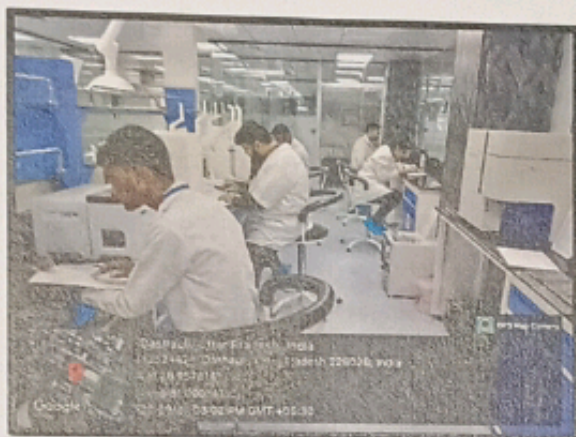


On September 18th & 19th, the practical hands-on sessions were conducted for Standard, Sample, and Mobile Phase Preparation, where trainees prepared different mobile phases and samples for injection, followed by Method Development, Batch Creation, and Data Analysis. These sessions emphasized the importance of precision and accuracy in sample preparation and method optimization. On September 20th, participants were trained in Worklist Creation and underwent an assessment through a structured questionnaire to evaluate their understanding of the techniques covered. The final day, September 21st, involved a thorough Optimization of LC Parameters and a comprehensive review of all the sessions. This

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concluding session served to reinforce the theoretical and practical knowledge acquired, providing participants with a holistic understanding of LC-MS/MS and its applications in analytical research. The overall, practical sessions were conducted by Dr. Jamal Akhtar with the support Dr. Zainab Feroz and Ms. Shahzadi Bano, Research Scholar, Department of Chemistry, Integral University.

The participants successfully cleared the Workshop Completion Test and were awarded certificate of completion. Additionally, certificates of appreciation were presented to the organizing committee by **Prof. Wahajul Haq**, Dean of Research and Development, Integral University.




Dr. Jamal Akhtar
Workshop coordinator


Prof. Wahajul Haq
Dean, Research & development