



SKILL DEVELOPMENT COURSE ON ADVANCED ANALYTICAL TECHNIQUES AND INSTRUMENTATION @ IISER- TIRUPATI

(5-DAY HANDS-ON TRAINING PROGRAM)



ORGANIZED BY



DEPARTMENT OF CHEMISTRY

DATE : (DECEMBER 08-12,2025)

ABOUT INSTITUTE

IISER Tirupati is a premier institute excelling in science education and research across departments including Chemistry, Physics, Mathematics, Biology, Earth Sciences, and Humanities & Social Sciences. It offers rigorous BS-MS, MS, iPhD, PhD, and research programs focused on both fundamental and applied sciences.

The institute conducts advanced research in sustainable chemistry, energy materials, catalysis, quantum physics, computational biology, disease biology, and environmental sciences. With state-of-the-art instrumentation facilities and a collaborative environment, IISER Tirupati empowers students and faculty to drive innovation. Its mission is to foster scientific curiosity, nurture talent, and contribute to India's scientific and technological advancement through excellence and knowledge dissemination.

ABOUT DEPARTMENT

The Department of Chemistry at IISER Tirupati fosters a spirit of academic excellence and innovation through its committed and vibrant faculty members, who are actively contributed to inter-disciplinary research verticals across chemical sciences. Chemistry department is dedicated to advancing several key areas of cutting-edge research such as sustainable chemistry, green energy, advanced/smart materials (2D hybrids, quantum dots, perovskites, chiral, and magnetic materials, electrodes for batteries), machine learning/AI, and diagnostic tools, all in alignment with our national missions. We are committed to achieving carbon neutrality, hydrogen generation from biomass derivatives, and recycling lithium batteries as part of the circular economy to create a better future.

Department of Chemistry also explores the interface of chemistry and biology, developing innovative analytical tools for disease diagnosis and therapeutics. We emphasize fundamental sciences, including chemical biology, biometric chemistry, supramolecular chemistry, astrochemistry, natural product synthesis, electrochemistry, and the mechanistic understanding of biological systems using advanced experimental and computational tools. Major research efforts are devoted for the development of robust and selective catalytic systems for synthesizing new materials, APIs/KSMs, and life science molecules. Additionally, our theoretical chemistry team provides detailed insights into the functions of diverse molecular and extended systems.



ABOUT THE PROGRAM

This five-day comprehensive training program is designed to provide participants with both theoretical knowledge and practical expertise in advanced analytical techniques, including High-Performance Liquid Chromatography (HPLC), Liquid Chromatography-Electrospray Ionization Mass Spectrometry (LC-ESI-MS), and Gas Chromatography-Mass Spectrometry (GC-MS).

The program integrates interactive theory sessions, intensive hands-on practice, and data analysis modules to deliver a well-rounded learning experience. These high-end analytical instruments are essential in modern scientific research and industrial applications.

The training aims to bridge the gap between fundamental principles and real-world practice, empowering participants to independently handle instruments, understand analytical workflows, develop and optimize methods, analyze data, and accurately interpret results.

OBJECTIVES & SCOPE

The training provides in-depth knowledge and hands-on experience on GC, HPLC, GC-MS and LC-MS techniques. It is intended for academicians, faculty, researchers, and professionals seeking to enhance their analytical skills and practical understanding of modern instrumentation.

SALIENT FEATURES OF THE PROGRAM

- Smart Learning Mix: 30% theory and 70% hands-on practice for effective learning and application.
- Interactive Sessions: Real-time demos and discussions for deeper understanding.
- Holistic Evaluation: Balanced assessment of theory and practical skills.
- Certification: Certificate awarded upon successful completion of the program.

REGISTRATION FEES

- ₹2,500 – B.Sc. / M.Sc. / B.Tech Students
- ₹3,000 – Ph.D. / Integrated Ph.D. Students
- ₹4,000 – Faculty Members
- ₹6,000 – Industry Participants

Note: Registration fees do not include food and accommodation. Accommodation will be arranged on a payment basis, subject to availability.

INSTRUMENTS COVERED FOR TRAINING:



High Performance Liquid Chromatography (HPLC)

Model: Waters Alliance e2695

The Waters Alliance e2695 HPLC system is used for the separation, identification, and quantification of components in complex mixtures. It employs a high-precision solvent delivery system to pump a pressurized liquid sample through a packed column, where each compound interacts differently with the stationary phase, resulting in effective separation. The e2695 offers high accuracy, reproducibility, and reliability for applications in pharmaceutical, biochemical, and environmental analysis..



Gas Chromatography (GC)

Model: Agilent 8860C

The Agilent 8860C GC system separates and analyzes volatile and semi-volatile compounds by passing a vaporized sample through a capillary column using an inert carrier gas. It features a temperature range of Ambient +4 °C to 450 °C, supports FID & TCD, and uses Electronic Pneumatic Control (EPC) for precise operation. The system ensures high accuracy and reliability for environmental, petrochemical, and pharmaceutical analyses.



High-Resolution Mass Spectrometry (HRMS)

Model: Agilent 6545 Q-TOF

The Agilent 6545 Q-TOF High-Resolution Mass Spectrometer is a powerful instrument designed for precise mass measurement and molecular characterization. It accurately determines the mass-to-charge ratio (m/z) of ions, enabling identification of molecular formulas and detailed structural analysis of unknown compounds. With mass accuracy better than ± 2 ppm and resolution exceeding 40,000 FWHM, it ensures high confidence in qualitative and quantitative results. The 6545 Q-TOF offers fast acquisition speeds and superior sensitivity, making it ideal for proteomics, metabolomics, pharmaceutical research, and environmental analysis



Gas Chromatography-Mass Spectrometry (GC-MS)

Model: Agilent 6545 Q-TOF

The Agilent G7078A-5977B GC-MS system integrates the separation efficiency of gas chromatography with the molecular identification capability of mass spectrometry. Volatile compounds are first separated in the GC column and then analyzed by the MS detector, which identifies and quantifies them based on their unique mass spectra. The 5977B features a high-sensitivity EI source, mass range up to 1050 m/z , and mass resolution of 1 amu, ensuring precise and reliable results. It is widely used in forensic analysis, environmental testing, food safety, and quality control applications for accurate detection of trace-level compounds.

ELIGIBILITY CRITERIA

Open to students, researchers, faculty members, and scientific or academic professional

GENERAL INFORMATION

- Certificates will be awarded to participants upon successful completion of the program.
- The registration fee is non-refundable under any circumstances.
- On-campus accommodation and food will be available on a payable basis, subject to availability.
- All program-related information and updates will be communicated to registered participants via email.

HOW TO REACH IISER TIRUPATI CAMPUS

Air: Tirupati Airport (~16 km)

Train: Renigunta Junction (~20 km) or Tirupati Station (~30 km)

Road: Accessible via NH716; taxis and buses available from Renigunta and Tirupati.

REGISTRATION

Participants are required to apply for the training program by scanning the QR code provided below and filling out the application in the Google form.



The application deadline is November 30th, 2025.

CONTACT DETAILS

0877 2500 419

sdp_chem@labs.iisertirupati.ac.in
chemistry-office@labs.iisertirupati.ac.in

VENUE

Department Of Chemistry, IISER-Tirupati



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