

Proposal

ITEC-2026

Course Name:

“Faculty Development Programme” (FDP) on “Advanced Analytical Techniques for Quality Assessments of Pharmaceuticals”

About the Course:

The Course is conducted under ITEC (Indian Technical and Economic Cooperation) funded by Ministry of External affairs, Govt of India, organized by National Institute of Pharmaceutical Education and Research (NIPER), S. A. S. Nagar (Mohali), Punjab 160062, India.

Target Audience:

Faculty members, Researchers and Professionals across different countries, including SCAAP countries.

Duration of Course: Two Weeks (14 days)

Objective of Course:

ITEC participants will receive theoretical knowledge, practical demonstration, and extensive hands-on-training in use of high-end Instruments of Chemical Sciences, Pharmaceutical Sciences and Biological Sciences. The course with training will provide the professional and research competencies of the participating faculty, researchers and professionals in their countries. The aim of this Course is to build confidence in using modern tools and advanced analytical techniques in the analysis of quality assessment of drugs biopharmaceuticals, APIs, and KSMs. Participants will have theoretical and practical understanding of how these tools and techniques are used in research.

Instruments involved:**Chemical Sciences:**

LC-HRMS (QTOF), LCMS-QQQ; NMR-600 MHz, HPLC, Preparative HPLC, FTIR with ATR Technique, UV-Visible spectrophotometer

Pharmaceutical Sciences:

XRD (Powder form), DSC, TGA, FE-SEM, AFM, HR-TEM, Dissolution Apparatus

Biological Sciences:

SPR, FACS, ITC, MST, Fluorescence, Microcentrifuge

**Advanced Analytical Techniques for hands-on-training:
Representative examples**

NMR 600 MHz: To determine the molecular structure, purity, and chemical composition of a sample

LCMS & LC_HRMS: To separate, identify, and quantify chemical compounds, structures within complex samples

X-Ray Diffraction (powder): To characterize the crystallographic structure, phase, polymorphs, and purity of materials.

FE-SEM: To capture highly magnified, three-dimensional images of a material's surface topography and microstructure at the nanoscale

FACS: To analyze, identify, and physically separate individual cells from a mixed suspension

SPR: To monitor and measure molecular interactions of biomacromolecules, proteins in real-time

FTIR WITH ATR: To identify chemical functional groups or motifs present in the compounds, samples (solids, liquids, powders, and pastes, solutions)

Methodology:

The Course is divided in two Parts:

(a) Theoretical (b) Practical/Hands-on-Training

WEEK-1

Day-1 (Monday):

Inaugural Function, welcome address, Director's address to the Participants

Lecture sessions on advanced analytical techniques for various instruments

Day -2 (Tuesday)

Lecture sessions on advanced analytical techniques for various instruments

Day- 3, Day-4 & Day-5 (Wed, Thursday, Friday):

Practical demonstration and Hand-on-Training in use of Chemical, Pharmaceutical and Biological Science Instruments

Training will be given in a small group of 3-4 participants for each instrument.

Day-6 (Saturday)

Local Area Sight Seeing and Chandigarh Visit

Day-7 (Sun):

Rest day

WEEK-2

Day-8 & Day-9 (Monday & Tuesday):

Practical demonstration and Hand-on-Training in use of Chemical, Pharmaceutical and Biological Science Instruments

Rotation of groups for training in other instruments.

Day -10 (Wednesday):

Industry visit of all ITEC Participants

Day-11 (Thursday):

- Visit to various centers for other analytical techniques in NIPER; i.e. HPTLC, HR-TEM

- Visit of NIPER Heritage Centre:

This Centre is unique of its kind in the country, showcasing development of human health care system from the ancient system to the current era of pharmaceuticals and the history of pharmacy profession in India. The Centre is actively engaged in continued enrichment of its collection of specimens, archival materials.

- Visit to Medicinal Garden in NIPER:
NIPER has garden enriched with medicinal plants to showcase and explain importance of natural products for human primary health care, chronic disease therapies, preventive medicine, and lead generation for new chemical entities in modern therapeutics.

Day-12 (Friday):

Valedictory function of All ITEC Participants / Feedback from the Participants

Day-13 & Day-14 (Sat, Sun):

Departures to their respective Countries

Outcome of the Course:

By the end of this course, the Participants (Faculty members, Researchers and Professionals) across different countries will be able to use their theoretical knowledge and hands-on-training experience skills in their professions, integrating with the use of modern analytical techniques in quality assessment of pharmaceuticals, and to execute in their research.