



CRCL-ITEC PROGRAMME (FEBRUARY, 2027)

15th Feb to 26th Feb, 2027 (02-Week)

Training Programme on Chemical Testing of Customs Samples: Principles, Techniques & Harmonized System (HS) Classification with Regulatory Insight

(i) Background

Customs laboratories play a pivotal role in ensuring compliance with international trade regulations, facilitating correct classification under the Harmonized System (HS), and verifying the composition and safety of imported/exported materials. This programme provides structured training in chemical testing of diverse customs samples including petroleum products, solid fuels, minerals, gold, textiles, plastics, and polymers, with emphasis on hands-on experimentation, analytical techniques, and regulatory compliance.

Participants will gain exposure to state-of-the-art instrumentation and internationally recognized analytical practices to support accurate classification, regulatory enforcement, and quality assurance.

(ii) Objectives

The programme aims to:

- Develop technical expertise in chemical testing of customs and regulated samples
 - Build competency in Harmonized System (HS) classification and regulatory compliance
 - Provide hands-on training on modern laboratory instruments and analytical techniques
 - Strengthen laboratory capacity for accurate reporting and regulatory enforcement
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(iii) Target Participants

- Chemists, Scientific Officers, Customs and Revenue Laboratory Officers
 - Regulatory and Enforcement Personnel involved in chemical testing
 - Technical staff from narcotics, hazardous waste, mineral, textile, and polymer laboratories
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(iv) Duration

Two (02) Weeks

- Theory & Practical sessions
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(v) Course Structure

MODULE I - THEORETICAL COMPONENT

Day 1: Welcome and Overview

- Inaugural Session & Introduction
- Overview of CRCL & Its Laboratories
- Laboratory Tour & Introduction to State-of-the-Art Instruments
- Role of Customs Laboratories in Regulatory Compliance
- Harmonized System (HS) Classification: General Principles (Ch. 27)
- Open Discussion & Q&A

Day 2: Analytical Principles & Petroleum Products

- Determination of Flash Point (COC, PMCC, ABEL)
- Sulphur Quantification in Petroleum Products (ED-XRF)
- Distillation of Petroleum Products (Diesel & ATF)
- Physico-Chemical Properties: Refractive Index, Density, Viscosity, Carbon Chain

Day 3: Solid Fuels, Chemical Weapons & QA Principles

- Chemical Weapons Convention: Declaration & Verification
- Thermo-Gravimetric Analysis (Moisture, Ash, Volatile Matter in Coal, Coke, Petroleum Coke)
- Quality Assurance & Laboratory Best Practices

Day 4: Hazardous Waste Analysis & Regulatory Compliance

- Quantification of PCBs, PAHs, Heavy Metals in Waste and Transformer Oil
- Hands-on Training with Hazardous Waste Samples

Day 5: Mineral Analysis & Metals

- HS Ch. 25 & 26 Overview
- Identification of Calcium Carbonate (Natural & Synthetic) – ED-XRF, XRD, SEM-EDX
- Iron Ore Analysis for Iron Content (ED-XRF)



Day 6: Study Visit

- Heritage / Scientific Visit to Agra, Uttar Pradesh
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Day 7: Holiday

Day 8: Gold & Precious Metals Analysis

- Analysis of Gold, Platinum, & Associated Impurities
 - Fire-Assay & Gravimetric Methods for Gold Purity in Gold Dore Bars
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Day 9: Harmonized System & Textiles

- Quality Assurance in Chemical Testing
 - Harmonized System of Nomenclature (HSN) & General Rules of Interpretation (GIR)
 - Textiles & Articles: HS Classification (Ch. 50-63)
 - Quantification of 24 Banned Amines in Textile Products (HPLC)
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Day 10: Textile Sample Characterization

- Physico-Chemical & Instrumental Identification of Textiles (Polarizing Microscope, FTIR, SEM-EDX)
 - Coating Analysis on Textile Samples
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Day 11: Banned Amines / Azo-Dyes Analysis

- Extraction, Identification & Quantification of 24 Banned Amines / Azo-Dyes (HPLC & LCMS/MS)

Day 12: Plastics & Polymers Analysis and Evaluation

- HS Classification & Analysis of Plastics (Ch. 39), Rubber (Ch. 40) & Articles
- Identification & Characterization of Polymers (Mono, Binary & Tertiary) by Pyrolysis GCMS



- Evaluation, Feedback, Certificate Distribution & Closing Ceremony
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Expected Learning Outcomes

Participants will be able to:

- Perform chemical testing on diverse customs samples including petroleum products, minerals, textiles, plastics, and metals
 - Classify goods accurately under the Harmonized System (HS)
 - Apply hands-on analytical techniques using modern instrumentation (ED-XRF, SEM-EDX, HPLC, GC, GC-MS, Pyrolysis GCMS)
 - Prepare accurate, defensible laboratory reports for regulatory and enforcement purposes
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- **Working Hours:** 09:30 – 18:00 hrs
Morning Tea Break: 11:00 – 11:15 hrs
Lunch Break: 13:30 – 14:30 hrs
Afternoon Tea Break: 16:00 – 16:15 hrs
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