Course Overview

The **Methyl Mercury Analysis** training course offers a detailed exploration of advanced mercury analysis methods, focusing on the techniques for identifying and quantifying methyl mercury. With growing concerns about mercury's environmental and health impacts, this course delves into key analysis systems, including **Cold Vapor Atomic Absorption Spectroscopy (CVAAS)**, **Cold Vapor Atomic Fluorescence Spectroscopy (CVAFS)**, **Inductively Coupled Plasma Optical Emission Spectroscopy (ICP OES)**, and **Inductively Coupled Plasma Mass Spectrometry (ICP MS)**. Participants will gain hands-on experience in these methods to accurately measure total and methyl mercury in various environmental and industrial samples.

Targeted Groups

This course is ideal for:

- **Environmental Scientists**
- **Analytical Chemists**
- **Chemical Engineers**
- **Environmental Health and Safety Professionals**
- **Laboratory Technicians**
- **Water Quality Analysts**
- **Regulatory Compliance Officers**
- **Environmental Consultants**
- **Industrial Hygienists**
- **Academic Researchers in Environmental Science**
- **Public Health Officials**
- **Environmental Monitoring Specialists**

Course Objectives

By the end of the course, participants will be able to:

- Understand the principles and importance of **mercury analysis**.
- Master various **mercury analysis methods**, including direct and total mercury analysis.
- Operate advanced **mercury analysis systems** such as CVAAS, CVAFS, ICP OES, ICP MS, and AAS.
- Perform **methyl mercury analysis** accurately using state-of-the-art techniques.
- Gain insights into the integration of **chemical engineering analysis** in mercury studies.

Targeted Competencies

Upon completion, participants will be able to:

- Demonstrate proficiency in **mercury analysis methods** for both total and methyl mercury.
- Operate **CVAAS**, **CVAFS**, **ICP OES**, **ICP MS**, and **AAS** systems for mercury

detection.
- Conduct **methyl mercury analysis** and apply specific sample preparation techniques.
- Apply principles of **chemical engineering analysis** to enhance mercury analysis accuracy.

Course Content

Unit 1: Introduction to Mercury Analysis

- Overview of **mercury** and its environmental impact.
- Importance of accurate **mercury analysis** for environmental and health studies.
- Introduction to various **mercury analysis methods**.
- Basics of **direct mercury analysis** and **total mercury analysis** techniques.

Unit 2: CVAAS and CVAFS Mercury Analysis

- **Cold Vapor Atomic Absorption Spectroscopy (CVAAS)**: principles, techniques, and applications.
- **Cold Vapor Atomic Fluorescence Spectroscopy (CVAFS)**: principles, techniques, and applications.
- Comparing **CVAAS** and **CVAFS** for different mercury analysis scenarios.
- Practical exercises on **CVAAS** and **CVAFS** methods.

Unit 3: ICP OES and ICP MS Mercury Analysis

- Introduction to **Inductively Coupled Plasma Optical Emission Spectroscopy (ICP OES)** for mercury analysis.
- Hands-on training with **ICP OES** mercury analysis techniques.
- Introduction to **Inductively Coupled Plasma Mass Spectrometry (ICP MS)** for advanced mercury analysis.
- Advantages, limitations, and applications of **ICP OES** and **ICP MS** systems.
- Practical sessions on using both **ICP OES** and **ICP MS** for mercury analysis.

Unit 4: Mercury Analysis by AAS

- Fundamentals of **Atomic Absorption Spectroscopy (AAS)** for mercury detection.
- Techniques and methods for **AAS mercury analysis**.
- Calibration, validation, and troubleshooting common **AAS** issues in mercury analysis.
- Practical applications and real-world examples of **AAS mercury analysis**.

Unit 5: Methyl Mercury Analysis Techniques

- Understanding **methyl mercury** and its environmental toxicity.
- Specific methods for **methyl mercury analysis**, including sample preparation and detection techniques.
- Analyzing **methyl mercury** in different matrices, such as water, soil, and biological samples.
- **Quality control** in **methyl mercury analysis** and common challenges.

- Case studies on **methyl mercury analysis** in environmental monitoring.

Unit 6: Chemical Engineering Analysis in Mercury Studies

- **What is chemical engineering analysis?**
- Introduction to principles of **chemical engineering analysis** and its application to mercury studies.
- Improving accuracy and efficiency in mercury analysis using **chemical engineering analysis** methods.
- Case studies where **chemical engineering analysis** enhances mercury detection and environmental monitoring.

Unit 7: Practical Applications and Advanced Topics

- Real-world applications of **mercury analysis** in environmental monitoring, industrial hygiene, and regulatory compliance.
- Advanced topics in **mercury analysis**, including emerging technologies and methodologies.
- Future trends in **mercury analysis** technology.
- Environmental regulations and **compliance** requirements for **mercury analysis**.
- Comprehensive review and final project on mercury analysis.

Conclusion

Upon completing the **Methyl Mercury Analysis** course, participants will have developed a robust understanding of the advanced methods and technologies used to detect and analyze mercury, particularly **methyl mercury**, in various environmental and industrial samples. The course equips participants with the skills to use state-of-the-art mercury analysis systems and integrate **chemical engineering analysis** principles into their work to improve accuracy and reliability.