TRAINING PROGRAM

Water and Wastewater Chemical Analysis

Introduction:

This training course covers water analysis issues and starts with a review of standard natural water analysis, which is de-constructed in order to demonstrate how it is built up from first principles; starting with rain (pure water) falling through the atmosphere, soaking into/onto the ground etc.

The course builds from these essential components and goes on to cover the units of analysis, which are explained, as is the significance of the various components for industrial and commercial users.

Who Should Attend?

This course is suitable for biologists, microbiologists, water services, supervisors chemists, team leader - water & power, physics analysts and technicians as well as professionals who want a better understanding of the subject matter.

Course Objectives:

Upon successful completion of this course, the delegates will be able to:

- Know the essential analysis tests which should be carried on water and wastewater samples
- Know the best required analysis techniques for both chemical and biological analysis of water and wastewater samples
- Know the various ways of chemical and instrumental analysis techniques used in analytical laboratory
- Demonstrate understanding of properly techniques of potentiometric, spectrometric and
- colorimetric analysis techniques
- Know the best water and wastewater quality required for drinking, domestic and general used water
- Know and explain the standard microbiological tests and analysis carried on water and wastewater samples as total coliform, COD, BOD, DO and TOC
- Heavy metal analysis as Mercury, Lead, Copper, Tin and others
- Interpret the important of membrane filtration test and solid analysis
- Interpret and discus the analysis result reports

Course Outline:

Module 1: Potentiometric Analysis

Explain the concept of potentiometric analysis. Demonstrate an understanding of the techniques required to properly use electronic potentiometric laboratory instrumentation by using the proper methodology in the use of various potentiometric instruments for the Examination of water and/or wastewater according to Standard Methods for the Examination of Water and Wastewater and/or EPA approved methods. Demonstrate proper sampling scheduling, collection, and preservation techniques.

Module 2: Spectroscopic & Colorimetric Analysis Explain the concept of spectroscopic Analysis

Demonstrate an understanding of the techniques required to properly use spectrophotometers and/or colorimeters by using the proper methodology in the use of various spectroscopic instruments and colorimeters for the examination of water and/or wastewater according to Standard Methods for the Examination of Water and Wastewater and/or EPA approved methods. Demonstrate proper sampling scheduling, collection, and preservation techniques.

Module 3:

Microbiological Analysis Explain the concept of microbiological analysis. Demonstrate an understanding of the techniques required to properly use microbiological equipment and supplies by conducting analysis of water samples. Demonstrate aseptic technique and proper sterilization procedures.

Demonstrate the proper methodology for membrane filtration, confirmation tests, and/or other applicable techniques for the examination of water and/or wastewater according to Standard Methods for the Examination of Water and Wastewater and/or EPA approved methods. Demonstrate proper sampling scheduling, collection, and preservation.

Module 4: Solids Analysis Explain the concept of solids analysis

Demonstrate an understanding of the techniques required to properly analyze solids by using the proper methodology in the use of various solids analysis equipment set-ups for the examination of water and/or wastewater according to Standard Methods for the Examination of Water and Wastewater and/or EPA approved methods. Demonstrate proper sampling scheduling, collection, and preservation.

Module 5: Water & Wastewater Analysis (Water Quality)

Sampling:

- Equipment

- Collection
- Preservation & Handling

Physic Chemical Analysis:

- **Analytical Procedure:**
- **Quantitative Analysis (Gravimetric/Volumetric/Coulometric)**

Types of analysis:

- Mineral Analysis: Physical Parameters & significant anions & cations
- Demand analysis: COD/TOC/BOD/DO/Permanganate Value
- Nutrient Analysis: Nitrogen (Total/ammonia/nitrite/nitrate)/ Phosphorous).
- Heavy Metal Analysis: Covering of heavy metals analysis by different methods along with sample pretreatment.

Module 6:

Case Study Analyze one or more set of water samples, using proper sampling and analysis techniques. Analyze water samples and interpret the results of the analysis using critical thinking skills. Communicate the results of each investigation in a written report and/or presentation.

Minimal standards minimal standards of performance for receiving 1 hour of semester credit from York Technical College are indicated by achieving a 60 percent average on all evaluation instruments used in the course performance evaluation strategy. Students must achieve 70% average for this course to transfer to other programs, such as the Environmental Science or Analytical Chemistry program.