Water Analysis & Quality Control

Course Description:

This program presents an overview of the need for analysis of water, how analytical methods are developed and quality control is applied and how the results of analysis are used. It will describe the physical, chemical and other relevant properties of water components and will also cover sampling, cleanup, extraction and derivatization procedures. Older techniques that are still in use will be compared to recently developed techniques and participants will be directed to future trends. A similar strategy will be followed for discussion of detection methods. In addition, the applications of analysis of water types (potable water, tap water, wastewater, seawater) will be reviewed.

Because water is an excellent solvent, it dissolves many substances. To get correct results and values, analysts have to follow sample strategies. Sampling has become a quality-determining step. If samples can't be analyzed directly they have to be stored and preserved. Physical, chemical or biological activities in a water sample can distort the chemical composition in water. Statistical treatment of data ensures the reliability of the results. Statistical methods will also be reviewed in this course.

The course will deal with the water characteristics (physical, chemical and organoleptical) and their analysis methods. Physical characteristics of water, such as temperature, color, turbidity, etc., will

be discussed, in addition to hardness, acidity, alkalinity, antioxidant demand and how dissolved oxygen is detected.

Humans both consume and pollute large quantities of water. The course will deal with injurious or toxic substances of domestic, agricultural and industrial sources: sulfuric compounds, ammonia, nitrites, nitrates, organic nitrogen, phosphates, organic acids, phenolic compounds, cyanides, metals, pesticides, PCBs, dioxins, PAHs, BTEX compounds, oils, greases, petroleum hydrocarbons, asbestos, silicates and surfactants. The course will also discuss new technologies on radionuclides and their possible health hazards in water and the whole environment.

Water is a living element housing a lot of organisms, wanted or unwanted, harmful or harmless. Some of these organisms produce toxic substances. The course will discuss bacteriological and algal analysis. It will give participants detailed information on most of the cited techniques, sample preparation, separation and detection methods.

Training Methodology:

This interactive training course includes the following training methodologies as a percentage of the total tuition hours:

- 30%   Lectures
- 30%   Workshops & Work Presentations
- 20%   Case Studies & Practical Exercises
- 20%   Videos, Software & General Discussions

The course instructor may modify the above training methodology before or during the course for technical reasons with no prior notice to participants.

Course Certificate:

BTS certificate will be issued to all attendees completing all of the total tuition hours of the course.

Who Should Attend?

This program is intended for regulators and water industry professionals who plan and use the results of water monitoring programmers and those who are carrying out water analysis. It is particularly aimed at young professionals and those who want to update their knowledge of water analysis

Course Objectives:

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

- Apply an up-to-date knowledge and skills on water analysis and quality control techniques
- Select proper water samples from different sources including seawater, MSF, boiler feed water, boiler blow down water, boiler water, produced steam, condensate water and drain effluent water
- Practice the latest water analysis methods and use the correct analytical equipment to achieve the required results of pH value, conductivity, P&M alkalinity, chlorides, total hardness, NH3 content, total dissolved salts, free chlorine & combined chlorine, dissolved oxygen, biological oxygen demand (BOD), chemical oxygen demand (COD), silica content, iron content, phosphate, hydrazine, turbidity, sulphate content, copper content, nitrates & nitrites content, color scale, oils & hydrocarbons
- Implement the various laboratory methods and technology in water analysis including qualitative/quantitative analysis, titrimetric, potentiometry, volammetry, polarography, colorimetry, spectrophotometry, chromatography, spectrofluroimetry, infrared spectrophotometry, atomic absorption and flame emission spectroscopy, electronic emission spectroscopy
- Calculate errors, limitation and accuracy of the various analytical methods and calibrate the analytical equipment
- Employ a proper water quality monitoring program and carry out a quality assessment of water