



TRAINING PROGRAM



# Laboratory Analytical Equipment Maintenance & Troubleshooting

## Introduction:

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The growth of modern technology has confronted the analytical chemist with a host of new and increasingly complex materials, and has posed more stringent demands for greater sensitivity, reliability, and speed. On the other hand, developments in instrumentation have provided the analyst with new techniques, instruments, procedures, and reagents for dealing with these equipment, reagents, and methodology has, however greatly complicated the task of the chemist searching for the best way of attacking a new or unfamiliar sample.

This course is intended to provide analytical chemists and their colleagues in related sciences with concise and convenient summaries of the fundamental data and the practical procedures that are most important and useful among the instrumental methods in analytical chemistry. With an appreciation of the limitations imposed by instrument design, leading to the interplay of the validation and qualification processes within quality assurance systems. It includes a unique framework of topics covers the major instrumental techniques of spectrophotometers, chromatography, capillary electrophoresis, and atomic emission spectroscopy.

## Who Should Attend?

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Lab Managers, Supervisors, Team Leaders, Chemists and Technicians, Health & Safety and Environmental Professionals, Laboratory Seniors, Technologists, Analytical Laboratory Professionals, Laboratory Staff, Superintendents, Supervisors, Engineers, Chemists and Analysts, Auditors, Research Directors, Chemical Engineers, Health & Safety Professionals Instrument Engineers, Research and Development Scientists, and Quality Assurance/Control Managers

## Course Objectives:

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**By the end of this course delegates will be able to:**

- Understand the various techniques of analytical measurements
- Give the principles of reliable laboratory measurements
- Outline key laboratory safety issues and safety measures
- Estimate uncertainties in instrument
- Be aware of the instrument performance characteristics which include types and interaction between different characteristics
- Prepare and handle sample for different Analytical Instrumentations
- Understand, use, maintain and troubleshoot key laboratory equipment

## Course Outline:

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- Introduction
- The laboratory and its purpose
- The laboratory environment
- Laboratory layout and construction
- Out-of-laboratory services, electricity, ventilation, water, drains etc.
- Benches, hoods, sink
- Glassware
- Plastic ware
- Techniques of analytical measurements

- Instrumental chemistry
- Principles of instrumental chemistry
- Balances
- Titration
- Colorimetry
- Atomic absorption
- Chromatography
- Petroleum laboratory equipment
- Calibration
- Correlations
- Reference materials
- Correct laboratory techniques
- Statistical principles for laboratory measurements
- Reporting of analytical results
- Why is safety important?
- Safety policy
- Laboratory safety
- Handling of toxic and hazardous materials
- Spills and spill control
- Good laboratory practice
- Material safety data sheets
- Emergency planning
- Handling of compressed gases (cylinders)
- Destruction of hazardous chemicals in the laboratory
- Maintenance and troubleshoot of key laboratory equipment