SPECTROS ASSOCIATES

TRUSTED EXPERTISE IN CHEMISTRY AND FORENSICS

COURSE OUTLINE: PRINCIPLES OF ANALYTICAL CHEMISTRY

I. What Is Analytical Chemistry?

Optimizing Analyses

Becoming a Problem Solver

Sampling

Significant Figures

II. Quantifying Measurement Error I

Random Error and Its Sources

Signal-to-Noise Ratios

Getting Rid of Noise

Systematic Error

Precision and Accuracy

III. Quantifying Measurement Error II

Calibrations

- Calibration Checks
- Calibration Applicability

IV. Statistics for Chemical Measurement

Mode, Median, Mean

The Standard Deviation

Confidence Limits

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V. Introduction to Chromatography

Basic Theory

Modeling a Separation

Peak Widths

Resolution

Optimizing Separations

Gas Chromatography (GC)

High Pressure Liquid Chromatography (HPLC)

VI. Principles of Spectroscopy

The Properties of Light

Fourier Transform Infrared Spectroscopy (FTIR) Spectroscopy

- Instrumentation
- Sample Preparation: ATR
- Intro to IR Spectral Interpretation

Ultraviolet-Visible (UV-Vis) Spectroscopy

- Theory
- Instrumentation

VII. Mass Spectrometry

Overview

Sample Preparation

Instrument Design

Data Interpretation

Applications