The Training Leader For Nuclear Industry Professionals
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Radiation Detection and Measurement

This 5-day course was developed to provide an overview of the instruments and techniques important in the detection and spectroscopy of ionizing radiation, and to strengthen an understanding of the physical processes underlying their application. It stresses the development of a basic understanding of the principles of operation of these devices and helps develop an ability to inter-compare and select instrumentation best suited for different applications. It will provide an opportunity for those new to the field to gain a broad perspective of measurement options, and for practitioners to refresh their knowledge in areas outside their own specialties.

THIS COURSE WILL HELP YOU....

- Strengthen your understanding of the instruments and techniques important in the detection and spectroscopy of ionizing radiation.
- Evaluate and compare the latest developments in radiation instrumentation presented by leading manufacturers.
- Improve your perspective and ability to evaluate measurement systems for different applications.
- Understand the applicability and limitations of all major types of detectors.
- Gain a thorough understanding of gamma and neutron spectroscopy and the systems used in multichannel analysis.

Who Should Attend ...

This course has been developed for scientists, health physicists, technical managers, engineers, RSO's, technicians and other personnel having responsibilities relating to performing, documenting, and reviewing radiation measurements.

Onsite Training

Looking for a cost effective way to train 5 or more people?

Onsite training is a great solution for many companies.

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COURSE TOPICS

RADIATION INTERACTIONS
- Charged Particles
- Fast Electrons
- Gamma Rays and X-Rays
- Neutron Interactions
- Effects in Detector Spectra

BASIC DETECTOR PROPERTIES
- Pulse Height Spectra & Counting Curves
- Energy Resolution
- Detection Efficiency
- Dead-time

IONIZATION CHAMBERS
- Ionization in Gases
- Current Mode Ion Chambers
- Application to Radiation Dosimetry
- Pulse Mode Operation
- Gridded Ion Chambers

PROPORTIONAL COUNTERS
- Gas Multiplication
- Design Features of Proportional Tubes
- Detection Efficiency and Counter Curves
- Position Sensing Techniques

GEIGER-MUELLER COUNTERS
- The Geiger Discharge
- Counting Plateau
- Fill Gases and Quenching
- Time Behavior

SCINTILLATION DETECTORS
- Organic, Liquid and Plastic Scintillators
- Inorganic Scintillators
- Intercomparison of Scintillator Performance

PHOTOMULTIPLIER TUBES AND PHOTODIODES
- Light Collection and Coupling
- Photocathodes and Electron Multipliers
- Characteristics of PM Tubes
- Use of Photodiodes with Scintillators

SEMICONDUCTOR DIODE DETECTORS
- Basic Principles and Configurations
- Energy and Time Resolution
- Applications in Charged Particle and Electron Spectroscopy

GERMANIUM GAMMA RAY DETECTORS
- HPGe detector configurations
- Operational characteristics

OTHER SEMICONDUCTOR DETECTORS
- Si(Li) Spectrometers
- Applications in X-Ray Spectroscopy
- Candmium telluride and mercuric iodide

NEUTRON DETECTION AND SPECTROSCOPY
- Slow Neutron Conversion Reactions
- Proportional and Scintillation Detectors
- Moderation Detectors
- Proton Recoil Spectrometers

PULSE PROCESSING AND SHAPING
- Conventional and Active Reset Preamplifiers
- Pulse Shaping Methods
- Baseline Restoration
- Pile-up Rejection
- Timing and Coincidence

MULTICHANNEL ANALYSIS
- MCA Components and Operation
- ADC Characteristics and Specifications
- PC-Based Systems
- Spectrum Stabilization and Analysis

MISCELLANEOUS DETECTORS
- Cerenkov Detectors
- Liquid Ionization and Proportional Detectors
- Photographic Emulsions
- Track Etch Detectors
- Thermoluminescent Dosimeters
- Superheated Drop Detectors

DETECTOR BACKGROUND AND SHIELDING
- Sources of Background
- Effectiveness of Shielding Materials
- Active Background Suppression

INTERCOMPARISON OF DETECTOR PROPERTIES
- Detection Efficiency
- Speed of Response
- Energy Resolution
- Suitability for Various Applications