

## Advanced Radiation Protection Training Course

### Course general description:

This **Advanced Radiation Protection Training** course is designed for professionals who work with or around ionizing radiation sources in industries such as **nuclear power, medical imaging, industrial radiography, oil & gas, research laboratories, and emergency response teams**. It provides an in-depth understanding of **radiation hazards, exposure control, shielding techniques, compliance requirements, and emergency response planning** based on international standards, including **IAEA, ICRP, ANSI, NRC, and OSHA**.

### Audience:

This course is intended for:

- **Radiation Safety Officers (RSOs)**
- **Radiation Protection Officers (RPOs)**
- **Nuclear Power Plant Engineers & Technicians**
- **Industrial Radiographers & NDT Specialists**
- **Medical Physicists & Healthcare Workers**
- **Oil & Gas Professionals Handling Radioactive Materials**

### Course objectives:

By the end of this course, participants will be able to:

- **Understand the principles of radiation protection and health effects.**
- **Apply the ALARA principle (As Low As Reasonably Achievable) for radiation exposure control.**
- **Perform radiation dose and shielding calculations for workplace safety.**
- **Operate and calibrate radiation detection instruments.**
- **Develop radiation protection programs in compliance with international regulations.**
- **Assess radiation risks in various industrial applications.**
- **Respond effectively to radiation emergencies and contamination incidents.**

### Course duration:

5 days

### Course location:

Dubai

### Course contents:

#### **Day 1: Radiation Fundamentals & Regulatory Compliance**

- **Pretest**
- **Types & Properties of Radiation**
  - Ionizing vs. Non-Ionizing Radiation
  - Alpha, Beta, Gamma, Neutron Radiation
  - Radiation Interactions with Matter
- **Radiation Measurement Units & Exposure Limits**
  - Activity (Bq, Ci), Dose (Sv, Rem, Gy, Rad)
  - Occupational Dose Limits (ICRP, IAEA, NRC, OSHA)
  - Radiation Protection Standards & Guidelines
- **Workshop: Basic Radiation Dose Calculations**

## ✦ Day 2: Radiation Shielding & Control Measures

- Principles of Radiation Protection (Time, Distance, Shielding)
- Shielding Materials & Design
  - Half-Value Layer (HVL) & Tenth-Value Layer (TVL)
  - Shielding Calculations for Different Radiation Types
- Personal Protective Equipment (PPE) for Radiation Workers
- Workshop: HVL & Shielding Calculations for Various Materials

## ✦ Day 3: Radiation Detection, Monitoring & Workplace Safety

- Radiation Detection & Monitoring Equipment
  - Geiger-Muller Counters, Ionization Chambers, Scintillation Detectors
  - Dosimeters (TLDs, OSLs, Electronic Dosimeters)
- Workplace Radiation Surveys & Risk Assessments
- Decontamination & Radioactive Waste Handling
  - Contaminated Site Cleanup & Storage Procedures
- NORM (Naturally Occurring Radioactive Materials) & TENORM
- Sources of NORM & TENORM (Technologically Enhanced NORM)
  - Oil & Gas Industry (Scale Deposits, Produced Water)
  - Mining & Rare Earth Processing
  - Building Materials & Phosphate Fertilizers
- Health Hazards & Exposure Pathways
  - Inhalation, Ingestion, External Exposure
- Regulatory Guidelines for NORM Management (ICRP, IAEA, OSHA, EPA)
- Best Practices for Monitoring, Handling & Disposal of NORM Waste
- Workshop: Radiation Survey Practical Exercise Including NORM Assessments

## ✦ Day 4: Industry-Specific Radiation Protection Practices

- Medical Radiation Safety (X-ray, CT, Radiotherapy, Nuclear Medicine)
- Industrial Radiation Applications (NDT, Well Logging, Tracers, Reactors)
- Nuclear Power Plant Safety & Reactor Operations
- Transportation & Storage of Radioactive Materials
- Case Studies: Chernobyl, Fukushima, Goiania, Industrial Radiography Accidents

## ✦ Day 5: Emergency Response & Crisis Management

- Radiation Emergency Preparedness & Response
  - Types of Radiation Emergencies & Classifications
  - Radiation Contamination & Exposure Treatment
- First Responder & Incident Command System (ICS) Procedures
- Regulatory Compliance Auditing & Documentation
- Final Exam & Practical Exercise: Radiation Incident Simulation

### **Methodology:**

- 50% lectures & concepts
- 10% Videos
- 10% Case studies
- 10% Exercises
- 10% Discussions

### **Assessment and Certification:**

Upon completion, participants receive a **Certificate in Advanced Radiation Protection**, certifying their ability to implement radiation safety best practices in compliance with international standards.

**Course code: (THSE004)**