



# Short Learning Programme: Radiation Exposure and Health

## Applied training in radiation risk assessment and health protection

### WHY THIS COURSE?

Advance evidence-based radiation risk management in occupational and environmental settings. Join the University of Johannesburg's Short Learning Programme in Radiation Exposure and Health.

### PROGRAMME DETAILS:

- Duration: 5 Days
- Mode: Blended Learning
- Notional Hours: 43
- Credits: Non-credit bearing

### WHY THIS SLP?

Radiation exposure poses growing public health and occupational risks across healthcare, mining, industry, and environmental management. This programme equips professionals with applied knowledge to assess and manage radiation risks safely.

### WHO SHOULD APPLY?

- Environmental Health Practitioners
- Occupational Health & Safety Professionals
- Occupational Hygienists
- Healthcare & Regulatory Professionals
- Industry & Technical Managers

Entry Requirements: Any SAQA-recognised health qualification

### WHAT YOU'LL LEARN (KEY FOCUS AREAS)

Radiation Sources  
Exposure Pathways  
Health Effects  
Exposure Monitoring  
Risk Management & Protection

### 2026 INTAKE:

1st Intake: 15–19 June 2026

2nd Intake: 21–25 Sep 2026

### BENEFITS

- Build scarce, in-demand skills in radiation exposure assessment and health protection
- Strengthen professional competence in occupational, environmental, and public health practice
- Learn through applied case studies and real-world exposure scenarios
- Network with professionals, regulators, and technical experts
- Contribute to improved radiation safety and health protection outcomes

### CALL TO ACTION:

Gain practical, industry-relevant expertise to confidently assess, manage, and communicate radiation risks in diverse professional settings.

### PICTURES:

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### CONTENT SUMMARY

#### Module 1: Radiation Sources

This module provides a comprehensive introduction to radiation and its sources, forming the foundation for understanding radiation exposure and health impacts. Students will explore the fundamental concepts of radiation, including the distinction between ionizing and non-ionizing radiation, radiation units and applicable terminologies. The module examines natural and artificial sources of radiation, such as terrestrial radionuclides, radon, medical and industrial applications, nuclear energy, and everyday consumer technologies. Emphasis is placed on occupational and environmental exposure scenarios relevant to healthcare, mining, industry, and public health practice. By the end of the module, students will be able to identify and classify radiation sources, understand their applications and associated risks, and contextualize radiation exposure within regulatory and health protection frameworks.

## Module 2: Ionizing Radiation exposures and health outcomes

This module focuses on ionizing radiation exposures and their short- and long-term health effects in occupational and environmental contexts. Students will examine major types of ionizing radiation, including alpha, beta, gamma, X-rays, and neutron radiation, with emphasis on exposure pathways such as inhalation, ingestion, and external irradiation. The module explores biological mechanisms of radiation interaction with human tissue, dose-response relationships, and the distinction between deterministic and stochastic health effects. Health outcomes such as radiation burns, acute radiation syndrome, cancer, genetic effects, and developmental impacts are discussed using epidemiological and experimental evidence. Regulatory dose limits, radiation weighting factors, and risk assessment principles are integrated to support informed evaluation and management of ionizing radiation exposures in professional practice.

## Module 3: Non-ionizing radiation exposures and health outcomes

This module examines non-ionizing radiation exposures and their potential health effects in occupational and environmental settings. Students will study major categories of non-ionizing radiation, including ultraviolet radiation, visible light, infrared radiation, radiofrequency fields, and extremely low-frequency electromagnetic fields, with attention to common sources such as telecommunications infrastructure, medical devices, industrial equipment, and consumer technologies. The module addresses exposure pathways, biophysical interaction mechanisms, and thermal and non-thermal effects on biological systems. Evidence on established and emerging health outcomes, such as skin and eye effects, heat stress, and debated long-term risks, is critically reviewed. International exposure guidelines, safety standards, and risk communication principles are integrated to enable students to assess, manage, and communicate non-ionizing radiation risks in professional and regulatory contexts.

## Module 4: Exposure monitoring for ionizing and non-ionizing radiation

This module focuses on the principles and practice of monitoring radiation exposures in occupational and environmental settings. Students will be introduced to quantitative monitoring techniques used to assess both ionizing and non-ionizing radiation, including area and personal monitoring approaches. For ionizing radiation, the module covers dosimetry concepts, radiation detectors,

sampling methods, and interpretation of dose measurements in relation to exposure limits and health risk. For non-ionizing radiation, students will examine measurement techniques for electromagnetic fields, optical radiation, and radiofrequency exposures, as well as instrument selection and data quality considerations. Emphasis is placed on exposure assessment planning, data analysis, and the use of monitoring results to inform risk management, regulatory compliance, and protective decision-making.

## Module 5: Exposure responses in the receptor

This module examines how radiation exposures translate into biological and physiological responses in exposed individuals. Students will explore the concept of the receptor in exposure science, focusing on human tissues and organs as targets of ionizing and non-ionizing radiation. The module covers cellular and molecular response mechanisms, including DNA damage, repair processes, oxidative stress, and tissue-specific sensitivity. Individual susceptibility factors such as age, genetics, health status, and duration of exposure are discussed in relation to variability in health outcomes. By integrating exposure data with biological response pathways, the module enables students to better understand risk characterization, health impact assessment, and the basis for radiation protection and preventive interventions.

## Learning Outcomes

- Apply risk assessment principles to evaluate ionizing and non-ionizing radiation exposures, including the development of appropriate exposure monitoring strategies.
- Differentiate between types of radiation sources encountered in occupational processes and residential environments.
- Assess health outcomes associated with exposure to ionizing and non-ionizing radiation, including toxicological effects and reported subjective symptoms in applied scenarios.
- Identify radiation sources, exposure pathways, and receptors, and evaluate the intensity and route of exposure to target organs.
- Recommend and justify appropriate control mechanisms for managing ionizing and non-ionizing radiation exposures in occupational and environmental contexts.

