

Modules for Tracer Techniques

	Qualified expert	Radiation Protection Officer	Worker occupationally exposed	Qualified Operator
	This person has an education of tertiary level, corresponding to education up to and including a university degree or diploma.	This person has an education of secondary level, corresponding to 10–12 years of schooling	This person has an education of basic level, corresponding to 6–10 years of schooling	This person has an education of secondary level, corresponding to 10–12 years of schooling
Personal attributes The person need to have	1, communication skills; 2, leadership skills; 3, analytical skills;	1, communication skills; 2, leadership skills; 3, analytical skills; 4, human–machine interface skills; 5, multitask management skills.	1, communication skills; 3, analytical skills; 4, human–machine interface skills;	1, communication skills; 2, leadership skills; (for supervisors) 3, analytical skills; 4, human–machine interface skills
	I–VI; VII.1–10; IX–XI	I–VI; VII.1–5,9; IX–XI	I–V; VII.1–5,9; IX.1–3; X.1, 2, 5, 7	I–V; VII.1–5,9; IX.1–3; X.1, 2, 5, 7
PART I. REVIEW OF FUNDAMENTALS I.1. Introduction. I.2. Basic physics and mathematics used in radiation protection. I.3. Interaction of radiation with matter.				



I.4. Sources of radiation.

PART II. QUANTITIES AND MEASUREMENTS

II.1. Quantities and units.

II.2. Dosimetric calculations and measurements.

II.3. Principles of radiation detection and measurement.

PART III. BIOLOGICAL EFFECTS OF IONIZING RADIATION

III.1. Effects of radiation at the molecular and the cellular level.

III.2. Deterministic effects.

III.3. Stochastic somatic effects.

III.4. Stochastic hereditary effects.

III.5. Effects on the embryo and foetus.

III.6. Epidemiological studies and issues.

III.7. The concept of radiation detriment.

PART IV. PRINCIPLES OF RADIATION PROTECTION AND THE INTERNATIONAL FRAMEWORK

IV.1. Conceptual framework.

IV.2. The role of international organizations in radiation protection.

IV.3. The development of safety culture.

PART V. REGULATORY CONTROL

V.1. Legal framework for radiation protection and the safe use of radiation sources.

V.2. Regulatory system.

V.3. Assessment of the effectiveness of the regulatory programmes.

	<p>PART VI. ASSESSMENT OF EXTERNAL AND INTERNAL EXPOSURES</p> <p>VI.1. Assessment of occupational exposure due to external sources of radiation.</p> <p>VI.2. Assessment of occupational exposure due to intakes of radionuclides.</p>	<p>PART VI. ASSESSMENT OF EXTERNAL AND INTERNAL EXPOSURES</p> <p>VI.1. Assessment of occupational exposure due to external sources of radiation.</p> <p>VI.2. Assessment of occupational exposure due to intakes of radionuclides.</p>		
	<p>PART VII. PROTECTION AGAINST OCCUPATIONAL EXPOSURE</p> <p>VII.1. Organization and management.</p> <p>VII.2. Methods of protection and the safe use of radiation sources; optimization.</p> <p>VII.3. Individual and workplace monitoring.</p> <p>VII.4. Health surveillance.</p> <p>VII.5. Potential exposures.</p>	<p>PART VII. PROTECTION AGAINST OCCUPATIONAL EXPOSURE</p> <p>VII.1. Organization and management.</p> <p>VII.2. Methods of protection and the safe use of radiation sources; optimization.</p> <p>VII.3. Individual and workplace monitoring.</p> <p>VII.4. Health surveillance.</p> <p>VII.5. Potential exposures.</p>	<p>PART VII. PROTECTION AGAINST OCCUPATIONAL EXPOSURE</p> <p>VII.1. Organization and management.</p> <p>VII.2. Methods of protection and the safe use of radiation sources; optimization.</p> <p>VII.3. Individual and workplace monitoring.</p> <p>VII.4. Health surveillance.</p> <p>VII.5. Potential exposures.</p>	<p>PART VII. PROTECTION AGAINST OCCUPATIONAL EXPOSURE</p> <p>VII.1. Organization and management.</p> <p>VII.2. Methods of protection and the safe use of radiation sources; optimization.</p> <p>VII.3. Individual and workplace monitoring.</p> <p>VII.4. Health surveillance.</p> <p>VII.5. Potential exposures.</p>



	<p>VII.6. Protection against occupational exposure in industrial radiography.</p> <p>VII.7. Protection against occupational exposure in industrial irradiators and accelerators.</p> <p>VII.8. Protection against occupational exposure in the use of nuclear gauges.</p> <p>VII.9. Protection against occupational exposure in the use of tracers.</p>	<p>VII.9. Protection against occupational exposure in the use of tracers.</p>	<p>VII.9. Protection against occupational exposure in the use of tracers.</p>	<p>VII.9. Protection against occupational exposure in the use of tracers.</p>
<p>VII.10. Protection against occupational exposure in well logging devices.</p>				
<p>PART IX. EXPOSURE OF THE PUBLIC OWING TO PRACTICES</p> <p>IX.1. Sources of exposure of the public.</p> <p>IX.2. Responsibilities and organization.</p> <p>IX.3. Safe transport of radioactive material.</p>	<p>PART IX. EXPOSURE OF THE PUBLIC OWING TO PRACTICES</p> <p>IX.1. Sources of exposure of the public.</p> <p>IX.2. Responsibilities and organization.</p> <p>IX.3. Safe transport of radioactive material.</p>	<p>PART IX. EXPOSURE OF THE PUBLIC OWING TO PRACTICES</p> <p>IX.1. Sources of exposure of the public.</p> <p>IX.2. Responsibilities and organization.</p> <p>IX.3. Safe transport of radioactive material.</p>	<p>PART IX. EXPOSURE OF THE PUBLIC OWING TO PRACTICES</p> <p>IX.1. Sources of exposure of the public.</p> <p>IX.2. Responsibilities and organization.</p> <p>IX.3. Safe transport of radioactive material.</p>	



<p>IX.4. Safety of radioactive waste.</p> <p>IX.5. Environmental dose assessment.</p> <p>IX.6. Source and environmental monitoring.</p> <p>IX.7. Consumer products.</p> <p>IX.8. Dose assessment.</p> <p>IX.9. Monitoring of public exposures.</p>	<p>IX.4. Safety of radioactive waste.</p> <p>IX.5. Environmental dose assessment.</p> <p>IX.6. Source and environmental monitoring.</p> <p>IX.7. Consumer products.</p> <p>IX.8. Dose assessment.</p> <p>IX.9. Monitoring of public exposures.</p>		
<p>PART X. INTERVENTION IN SITUATIONS OF CHRONIC AND EMERGENCY EXPOSURE</p> <p>X.1. General principles and types of events.</p> <p>X.2. Basic concepts for emergency response.</p> <p>X.3. Basic concepts for emergency preparedness for a nuclear accident or radiological emergency.</p> <p>X.4. Developing a national capability for response to a nuclear accident or radiological emergency.</p>	<p>PART X. INTERVENTION IN SITUATIONS OF CHRONIC AND EMERGENCY EXPOSURE</p> <p>X.1. General principles and types of events.</p> <p>X.2. Basic concepts for emergency response.</p> <p>X.3. Basic concepts for emergency preparedness for a nuclear accident or radiological emergency.</p> <p>X.4. Developing a national capability for response to a nuclear accident or radiological emergency.</p>	<p>PART X. INTERVENTION IN SITUATIONS OF CHRONIC AND EMERGENCY EXPOSURE</p> <p>X.1. General principles and types of events.</p> <p>X.2. Basic concepts for emergency response.</p> <p>X.5. Overview of assessment and response in a radiological emergency.</p> <p>X.7. Monitoring in a nuclear accident or radiological emergency.</p>	<p>PART X. INTERVENTION IN SITUATIONS OF CHRONIC AND EMERGENCY EXPOSURE</p> <p>X.1. General principles and types of events.</p> <p>X.2. Basic concepts for emergency response.</p> <p>X.5. Overview of assessment and response in a radiological emergency.</p> <p>X.7. Monitoring in a nuclear accident or radiological emergency.</p>



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	<p>PART XI. TRAINING THE TRAINERS</p> <p>XI.1. Training needs.</p> <p>XI.2. Being a lecturer.</p> <p>XI.3. Setting up a training course</p>	<p>PART XI. TRAINING THE TRAINERS</p> <p>XI.1. Training needs.</p> <p>XI.2. Being a lecturer.</p> <p>XI.3. Setting up a training course</p>		