# IAEA E&T activities in Radiation, Transport and Waste Safety

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67th Course of the Advanced Radiation Protection School ”Carlo Polvani” Milano, June 24-27, 2025

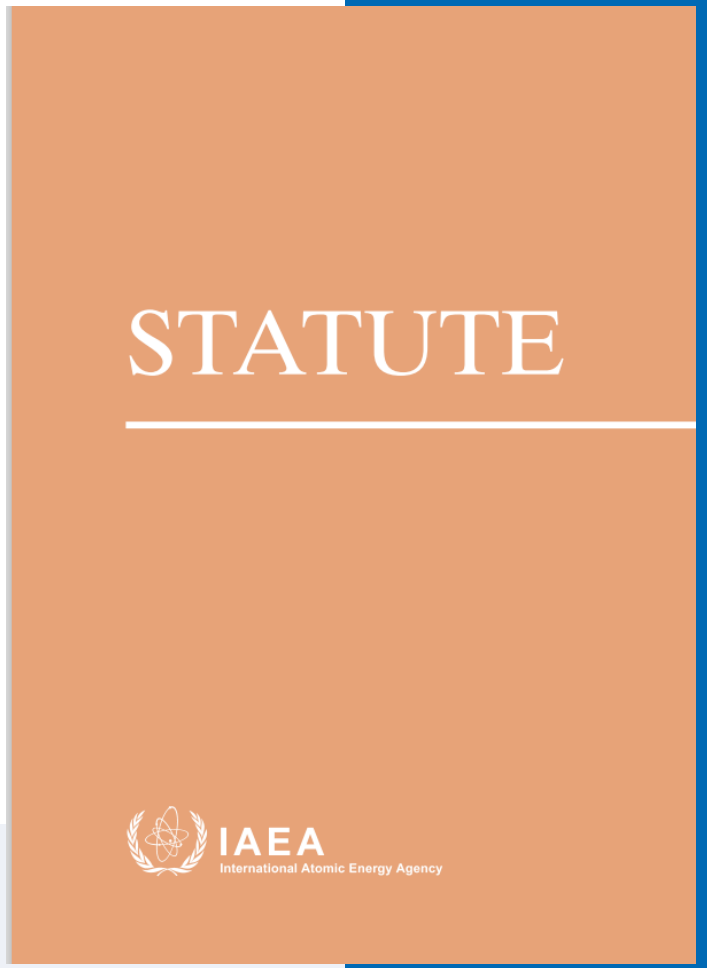
# Overview

- Bases for IAEA E&T activities
- Competence frameworks
- Overview on E&T activities
  - Postgraduate courses
  - TTT courses
  - Specialized Training courses

# Bases for IAEA E&T activities

## IAEA Safety functions

- To **establish standards of safety** for protection of health and minimization of danger to life and property (including such standards for labour conditions), and …
- To **provide for the application** of these standards




ARTICLE III Functions, A.6

# Safety Standards

The Safety Standards consists of three sets of publications:

- **Safety Fundamentals**, establish the fundamental safety objective and principles of protection and safety;
- **Safety Requirements** set out the requirements that must be met to ensure the protection of people and the environment
- **Safety Guides** provide recommendations and guidance on how to comply with the requirements.

# Safety Standards

- IAEA Safety Standards **are not legally binding** on Member States (may be adopted by them, at their own discretion)

*however...*

- IAEA Safety Standards **are binding on IAEA in relation to its own operations** and to operations assisted by the IAEA; and
- **Member States receiving IAEA assistance** are obliged to apply IAEA Safety Standards


**E&T activities** are intended to support the **implementation and dissemination of the IAEA Safety Standards**

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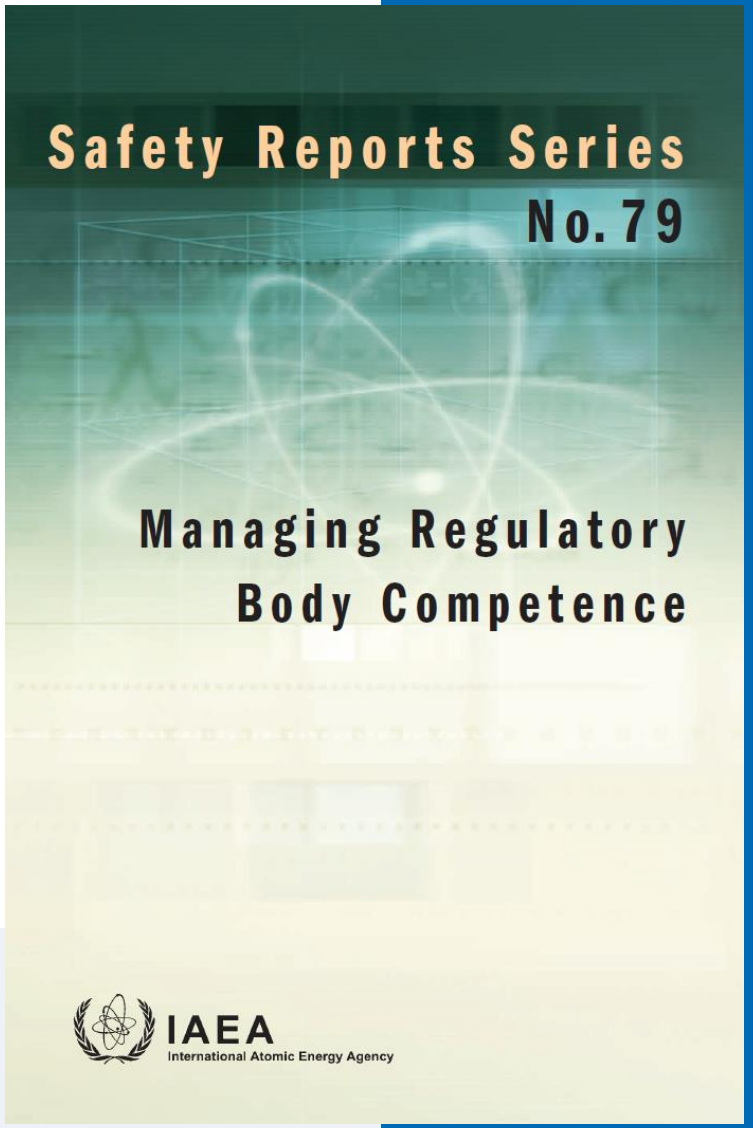
# Competence frameworks

## Publications:

- Regulators

## Planned Publications:

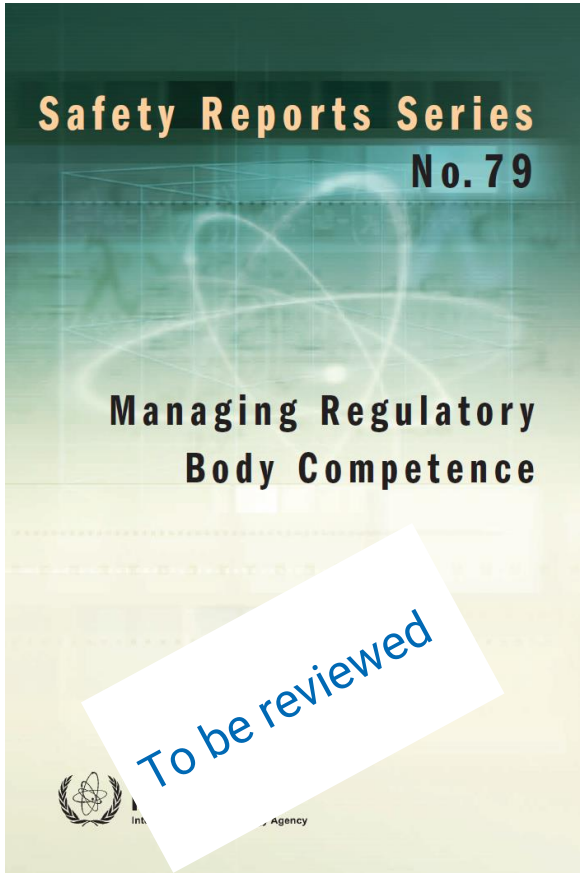
- Health Professionals
- Qualified Experts (in radiation protection) and Radiation Protection Officers



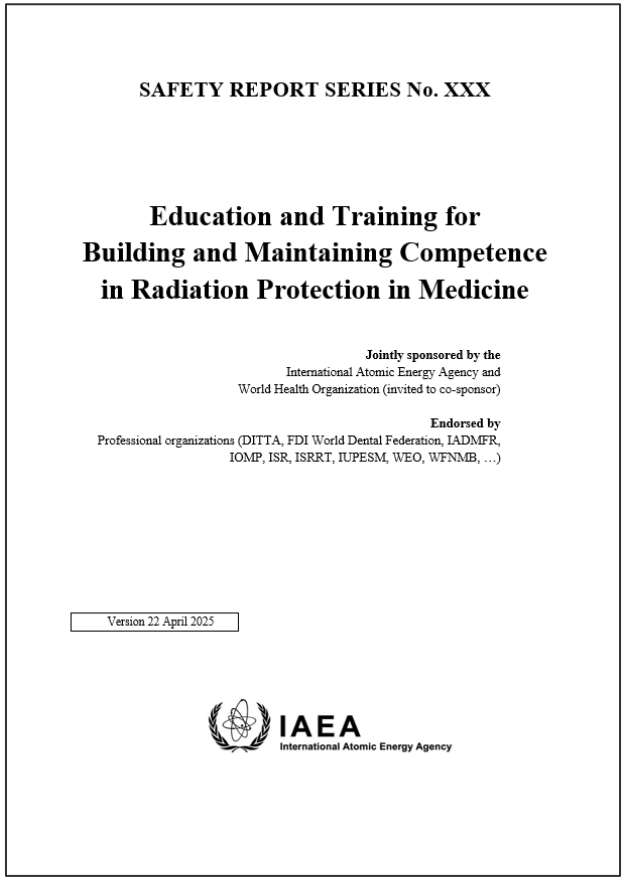

SRS.79: Competence -> Knowledge, Skills, Attitude

# Competence frameworks

## Regulators




## Health Professionals


SAFETY REPORT SERIES No. XXX

**Education and Training for Building and Maintaining Competence in Radiation Protection in Medicine**

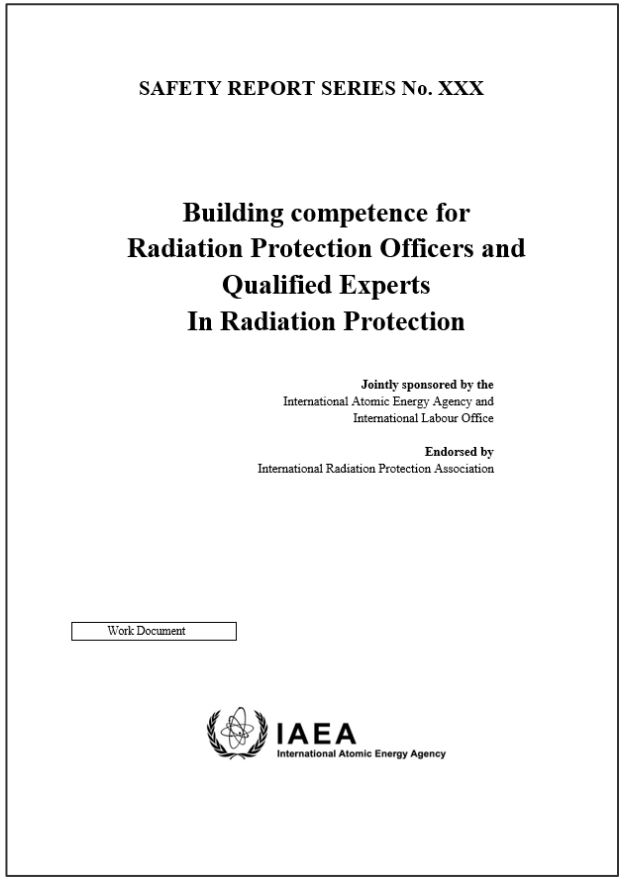
**Jointly sponsored by the**
International Atomic Energy Agency and
World Health Organization (invited to co-sponsor)

**Endorsed by**
Professional organizations (DITTA, FDI World Dental Federation, IADMFR, IOMP, ISR, ISRRT, IUPESM, WEO, WFNMB, …)

Version 22 April 2025

IAEA
International Atomic Energy Agency

## Qualified Experts and Radiation Protection Officers


SAFETY REPORT SERIES No. XXX

**Building competence for Radiation Protection Officers and Qualified Experts In Radiation Protection**

**Jointly sponsored by the**
International Atomic Energy Agency and
International Labour Office

**Endorsed by**
International Radiation Protection Association

Work Document

IAEA
International Atomic Energy Agency

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# Overview on E&T activities

# PGEC

**+110**
COURSES
TOTAL

**Endorsed**
by universities and regulatory bodies

PARTICIPANTS
**TOTAL**
**+2200**

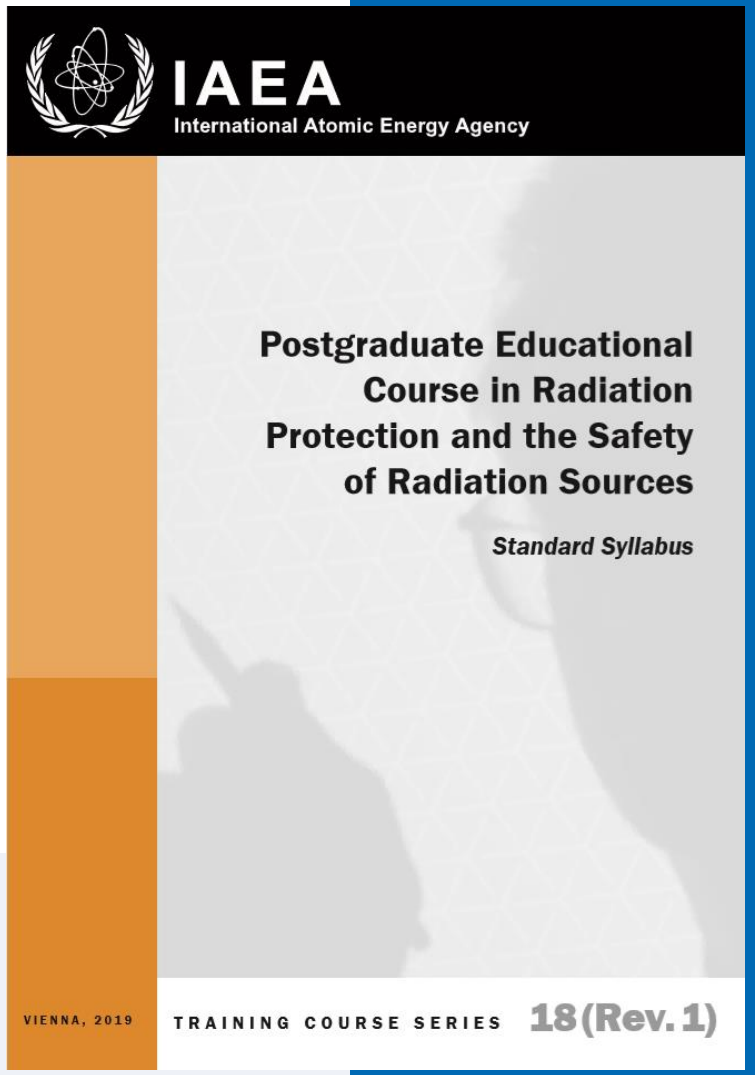
**125**
**MEMBER STATES**

**FIRST PGEC**
44 YEARS
AGO IN
ARGENTINA

**OIOS evaluation**
“Flagship event that showcases best practice
with respect to the delivery of training”

# PGEC

- Part I - Review of Fundamentals
- Part II - Quantities and Measurements
- Part III - Biological Effects of Ionizing Radiation
- Part IV - International System of Radiation protection and the Regulatory Framework
- Part V - Assessment of External and Internal Exposures (other than medical)
- Part VI - Planned Exposure Situations - Generic Requirements
- Part VII - Planned Exposure Situations – Medical Applications
- Part VIII - Planned Exposure Situations – Non-Medical Applications
- Part IX - Emergency Exposure Situations
- Part X - Existing Exposure Situations
- Part XI - Training the Trainers
- Part XII - Work project



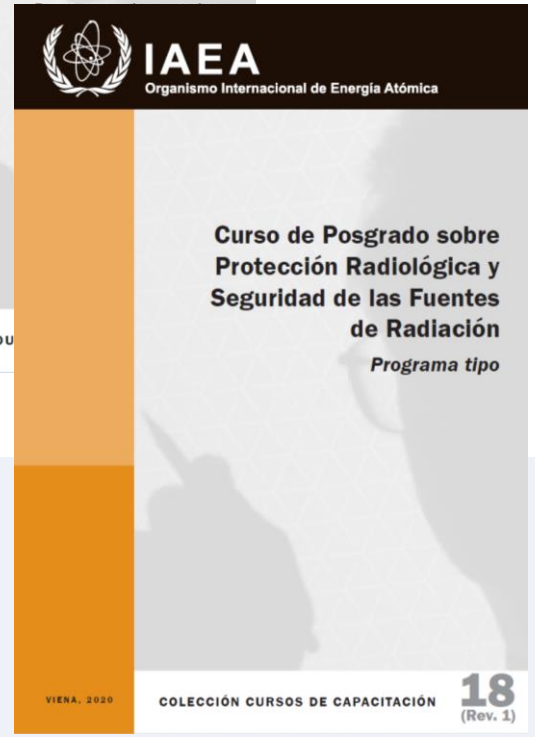
# PGEC

Arabic

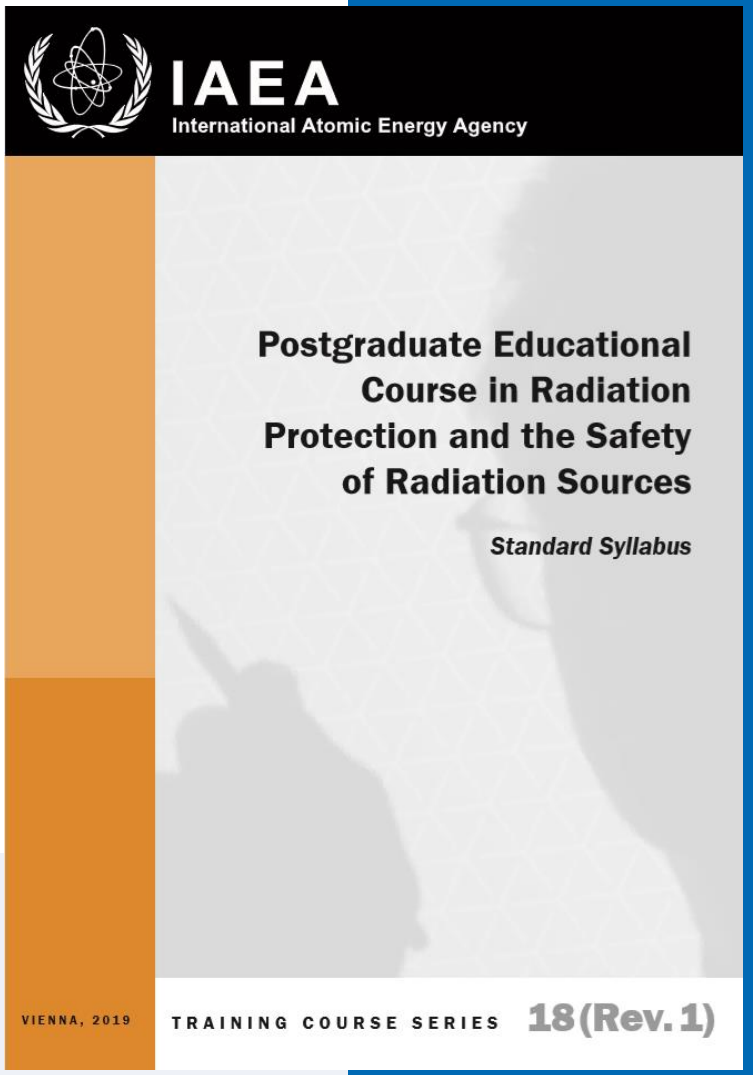

French



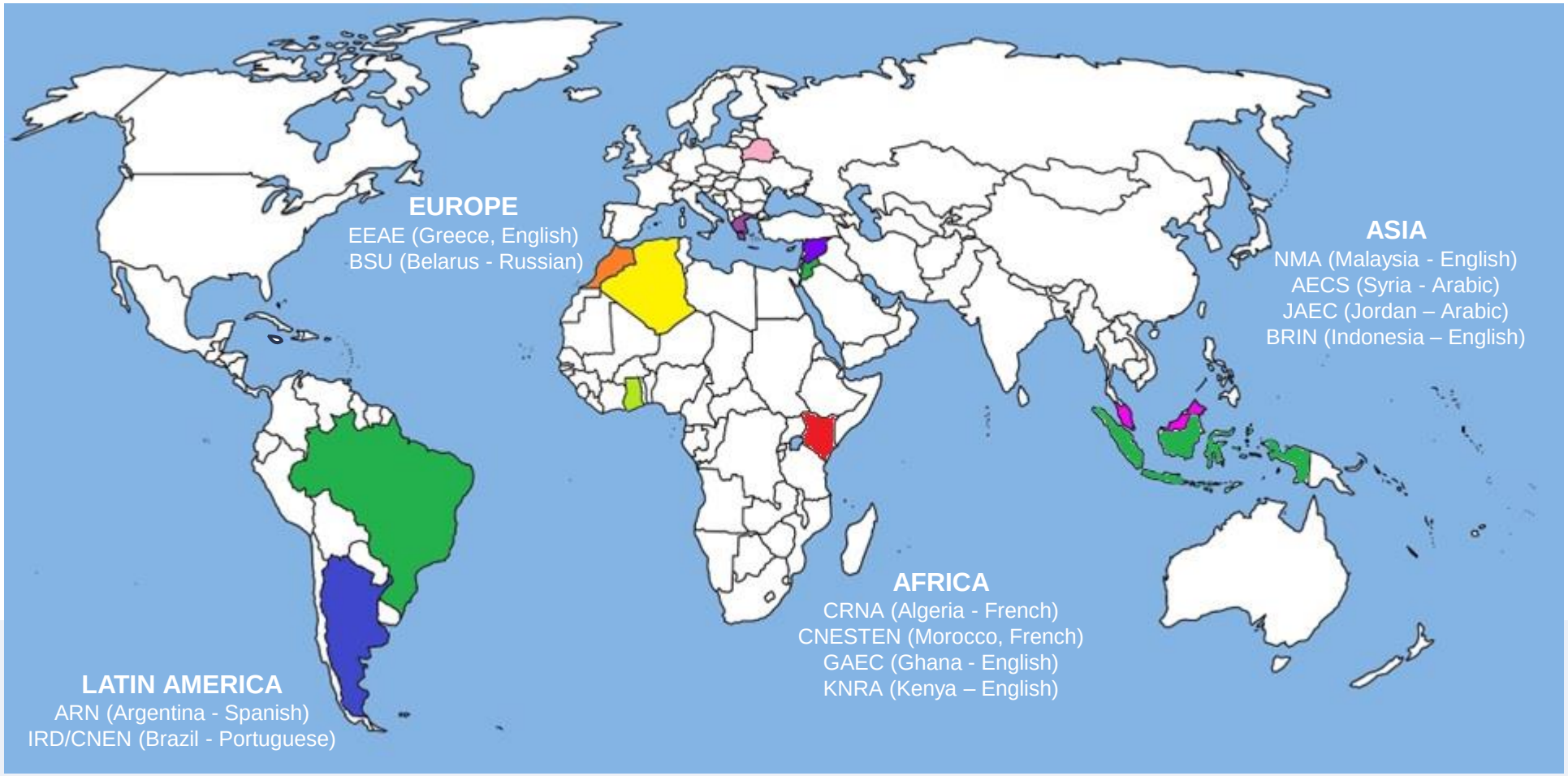
Russian




Spanish



# PGEC




**IAEA Regional Training Centre**

# PGEC

## Theoretical and Practical training

## Local examinations + Work project defense

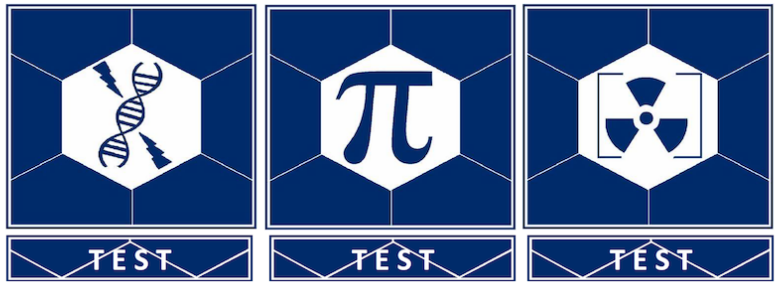
## Online activities

### Pre-training and related tests

The pre-training must be completed ***at least 1 week before*** you arrive at the Regional Training Centre. Each module is likely to take between 30 minutes and 2 hours, depending on your educational background.

When you have completed a module, select the "Test" button. You will have 45 minutes to complete the test and you may attempt each one 3 times. The pass-mark is 60% and **Badges** are awarded for the successful completion of each pre-training test (three badges are available)

**You must take and pass the 3 TESTS, no later than a week before the start of the PGEC**




### Learning Objectives Quiz - Part 1

Quiz Settings Questions Results Question bank More

10 Version 1 (latest)

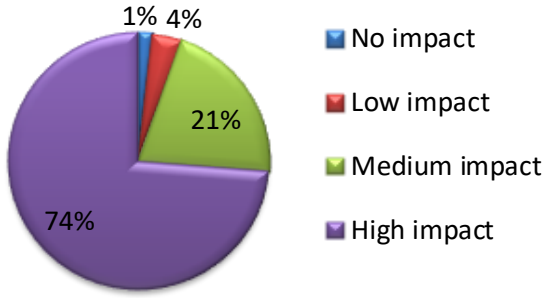
**Question 1** | Not yet answered Marked out of 1.00

The nucleus consists of

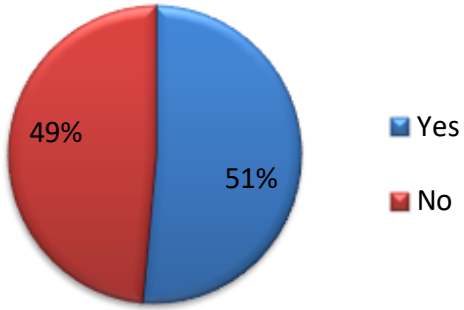
- Positive protons and neutral neutrons held together by electromagnetic force
- Positive protons and neutral neutrons held together by the strong nuclear force
- Positive protons and neutral neutrons held together by gravity
- Positive protons and neutral neutrons held together by electrostatic force

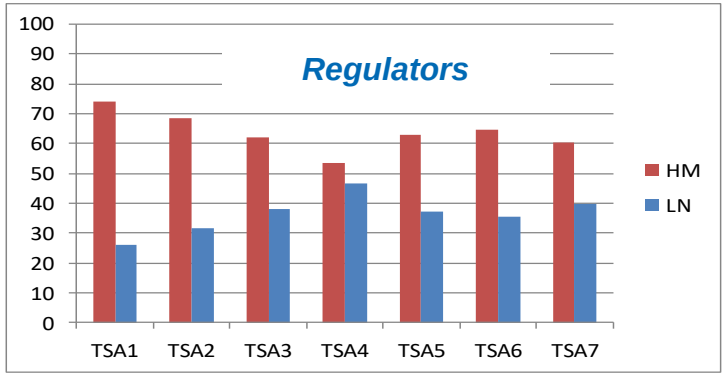
# PGEC

**Impact of PGEC on Professional Development Historic Evaluation**




**Additional Responsibilities After 1 Year**

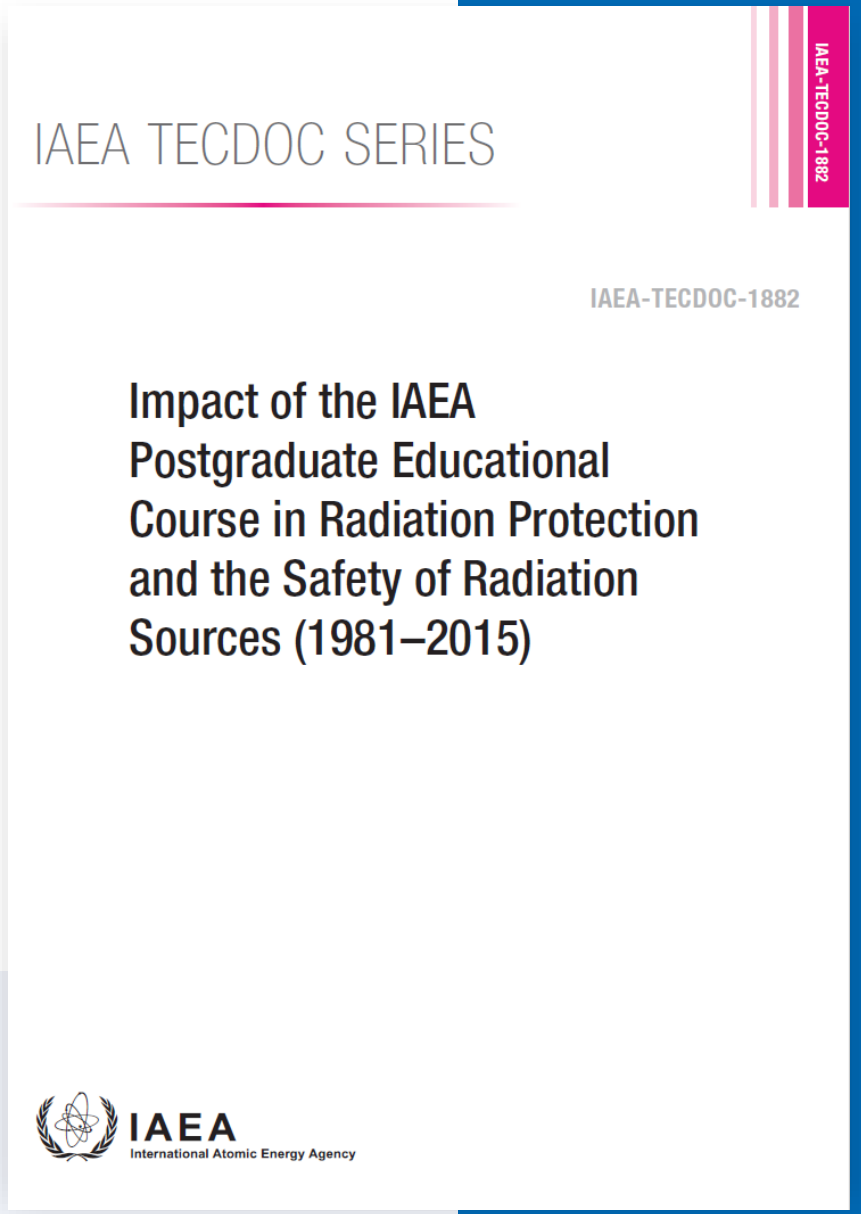



**Percentage of answers stating that the knowledge and skills gained in the PGEC had**
- **high-moderate (HM)**
- **low-no (LN) impact**

**on each TSA**
**(1 year after course completion)**

- Impact on professional development of the participants
- Use of their learning towards strengthening radiation safety infrastructure (at the organizational / national level)



# PGEC & AI

## Participants' experience

Enhancement of presentations using AI tools

AI coding assistance in the work projects

Supporting participants who are learning in a language they are not comfortable with:

- Summarizing text
- Drafting documents

Use of AI from a regulatory perspective

## Lecturers' perspective

Need of training on the use of AI:

- As a tool for teaching
- As a tool available for learning for the students (PGEC TTT module)

Beginning with basic exercises on the advantages and disadvantages of using AI:

- Fostering a critical attitude

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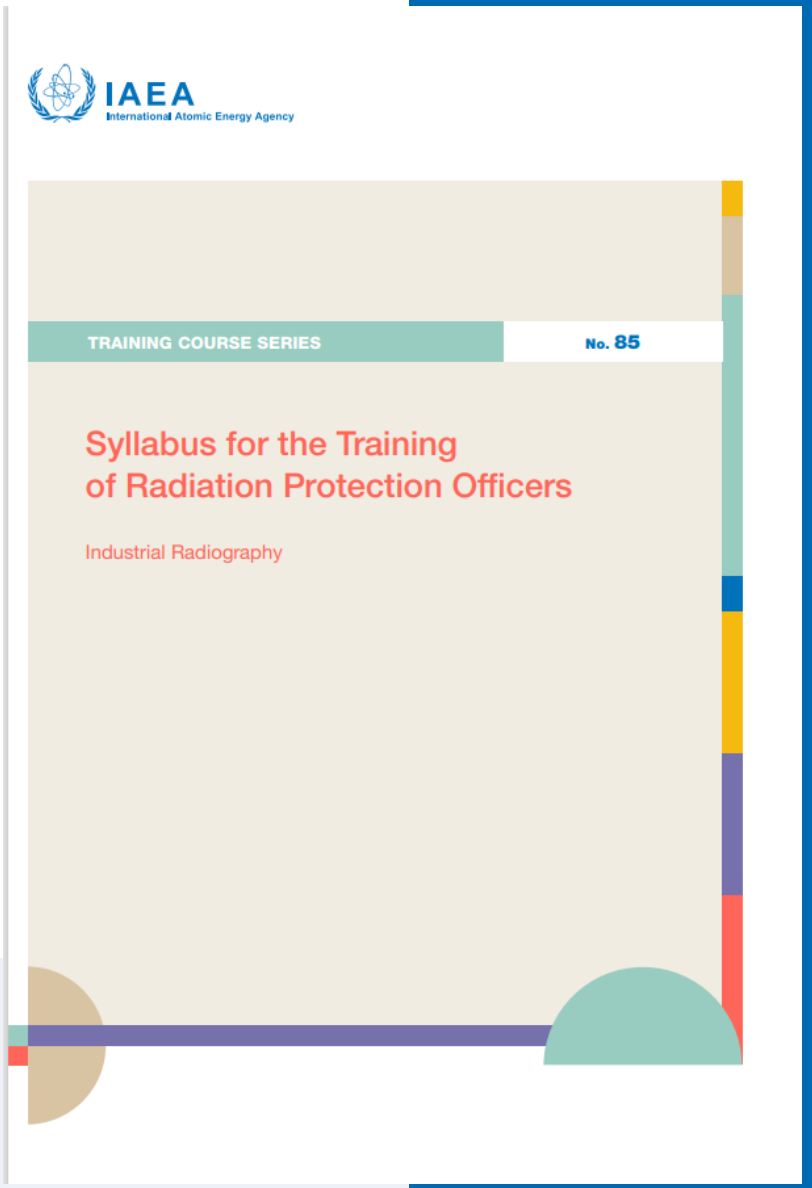
# Train-the-Trainers for RPO

- **RPO:** "*A person technically competent in radiation protection matters relevant for a given type of practice who is designated by the registrant, licensee or employer to oversee the application of regulatory requirements.*" *(IAEA GSR Part 3)*

**Syllabi:**

- Industrial radiography
- NORM
- Diagnostic radiology
- Cyclotron
- Nuclear Medicine
- Nuclear Gauges
- Radioactive Tracers
- Irradiators
- Radiotherapy




https://www.iaea.org/publications/15805/syllabus-for-the-training-of-radiation-protection-officers

# Train-the-Trainers for RPO

## Aim

To create a **pool of trainers** with

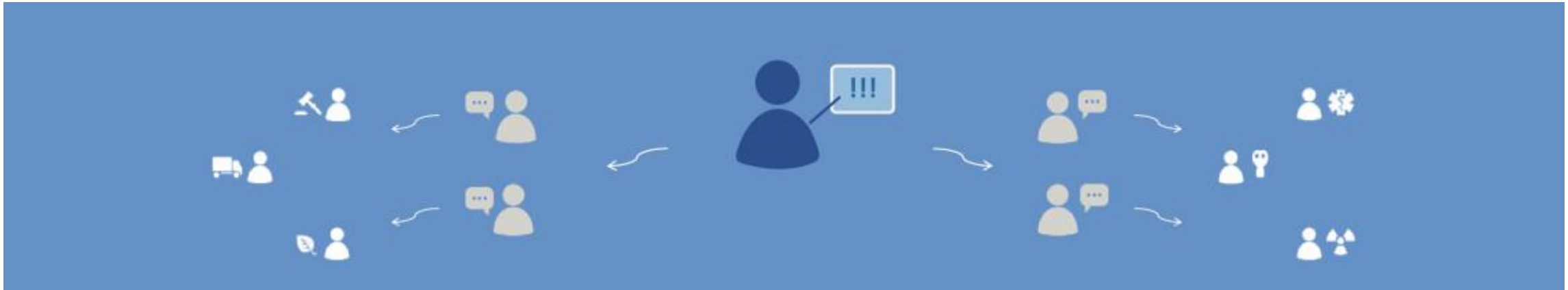
- technical competence
- practical experience
- teaching skills

to establish **a sustainable national training programme** for RPOs

PARTICIPANTS TOTAL **850**

**42** COURSES **TOTAL**

Arabic
English
French
Russian
Spanish



# Train-the-Trainers for RPO

## Objectives

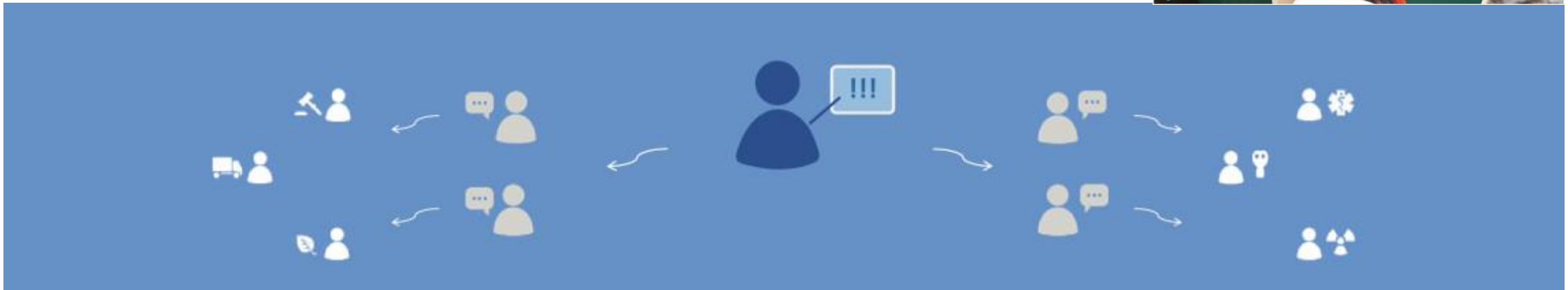
**Understand** the role and duties of an RPO

**Be familiar with** the competence of the RPO (IAEA syllabus)

**Be able to select/use** interactive training methods for adult learners

**Enhance** your presentation and communication skills

**Apply** what is learnt by presenting your own training sequences



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# Specialized Training Courses


https://www.iaea.org/services/education-and-training/training-courses/training-radiation-transport-waste-safety

# Specialized Training Courses

**Regulatory oversight**

- Authorization and Inspection of Cyc
- Authorization and Inspection of Ura
  Activities
- Effective and Sustainable Regulator
  (ESRCRS)
- Integrated Management System Tra
- Organization and Implementation c
  Programme for the Control of Radi
- Organization, Staffing and Compete
  Regulatory Body
- Orphan Source Search Training Cou
- Regulatory Enforcement
- Radiation Safety Training Course fo
- Radiation Safety Training Course fo

**Occupational radiation protection**

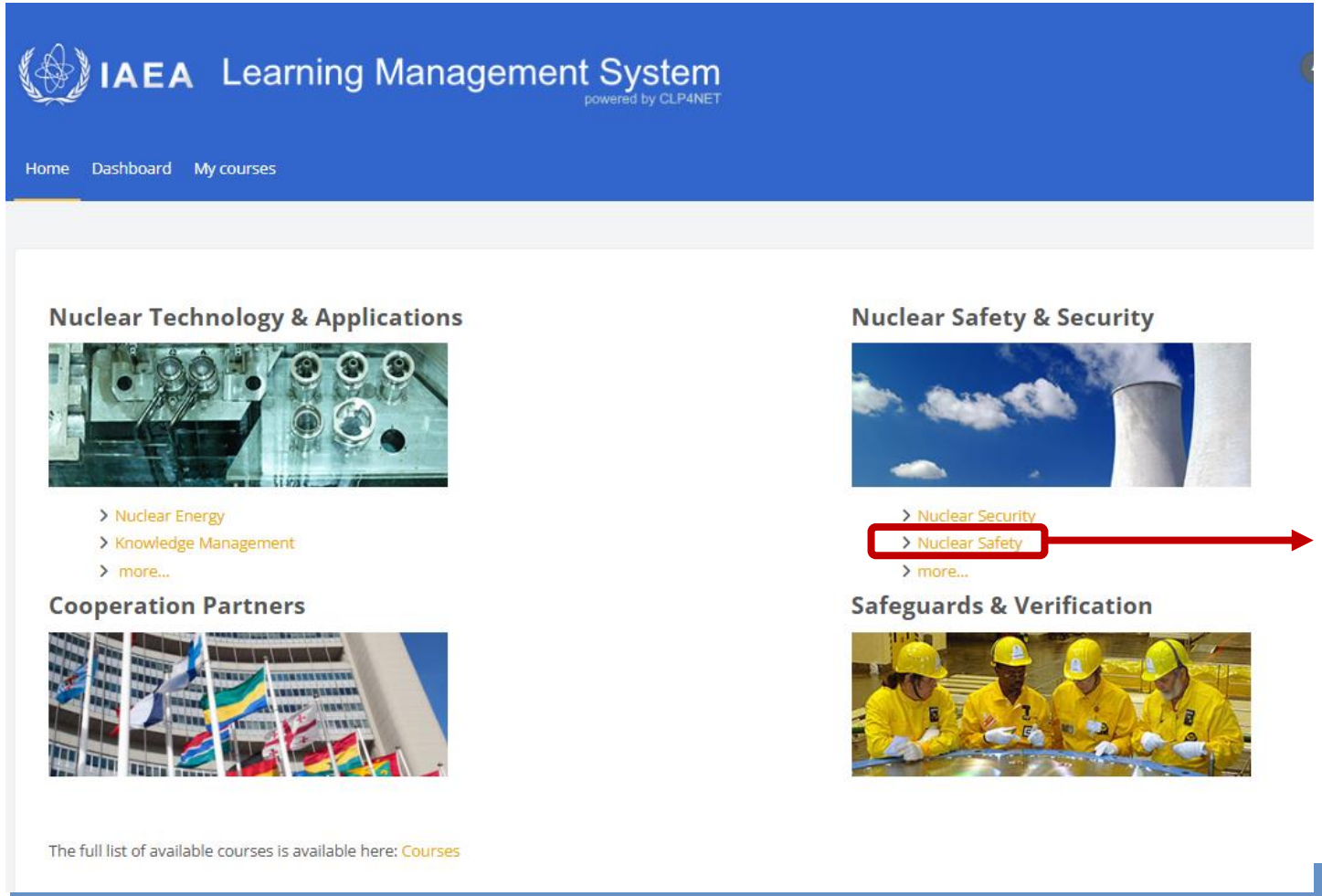
- Assessment of Occupational Exposu
  Radionuclides
- Assessment of Occupational Exposu
  Sources
- Naturally Occurring Radioactive Mat
- Neutron Monitoring
- Occupational Radiation Protection; e
- Occupational Radiation Protection D
- Occupational Radiation Protection in
  Processing Industry
- Quality Management System for Rad
  Services
- Radiation Protection and the Management of Radioactive Waste in the Oil and Gas Industry
- Safety Assessment
- Workplace Monitoring

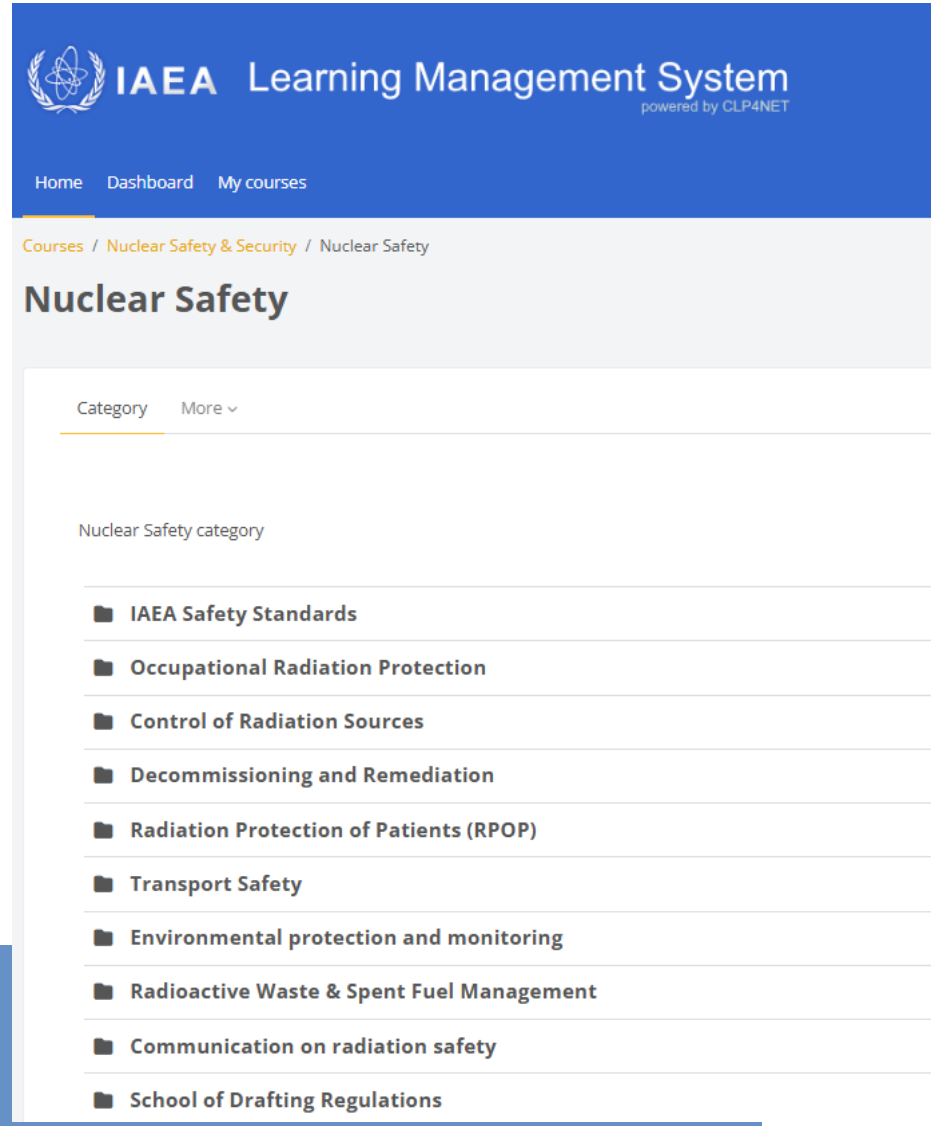
**Protection of patients**

- Doctors using fluoroscopy outside radiology (including urologists, gastroenterologists and orthopaedic surgeons)
- Prevention of Accidental Exposures in Radiotherapy
- Radiation Protection in Cardiology
- Radiation Protection in Diagnostic and Interventional Radiology
- Radiation Protection in Digital Radiology
- Radiation Protection in Nuclear Medicine
- Radiation Protection in Paediatric Radiology
- Radiation Protection in PET/CT
- Training on Radiation Protection in Radiotherapy
- Safety and Quality in Radiotherapy
- Dental Radiology
- Radiation Protection in Interventional Procedures: Practical Tutorials

https://www.iaea.org/services/education-and-training/training-courses/training-radiation-transport-waste-safety

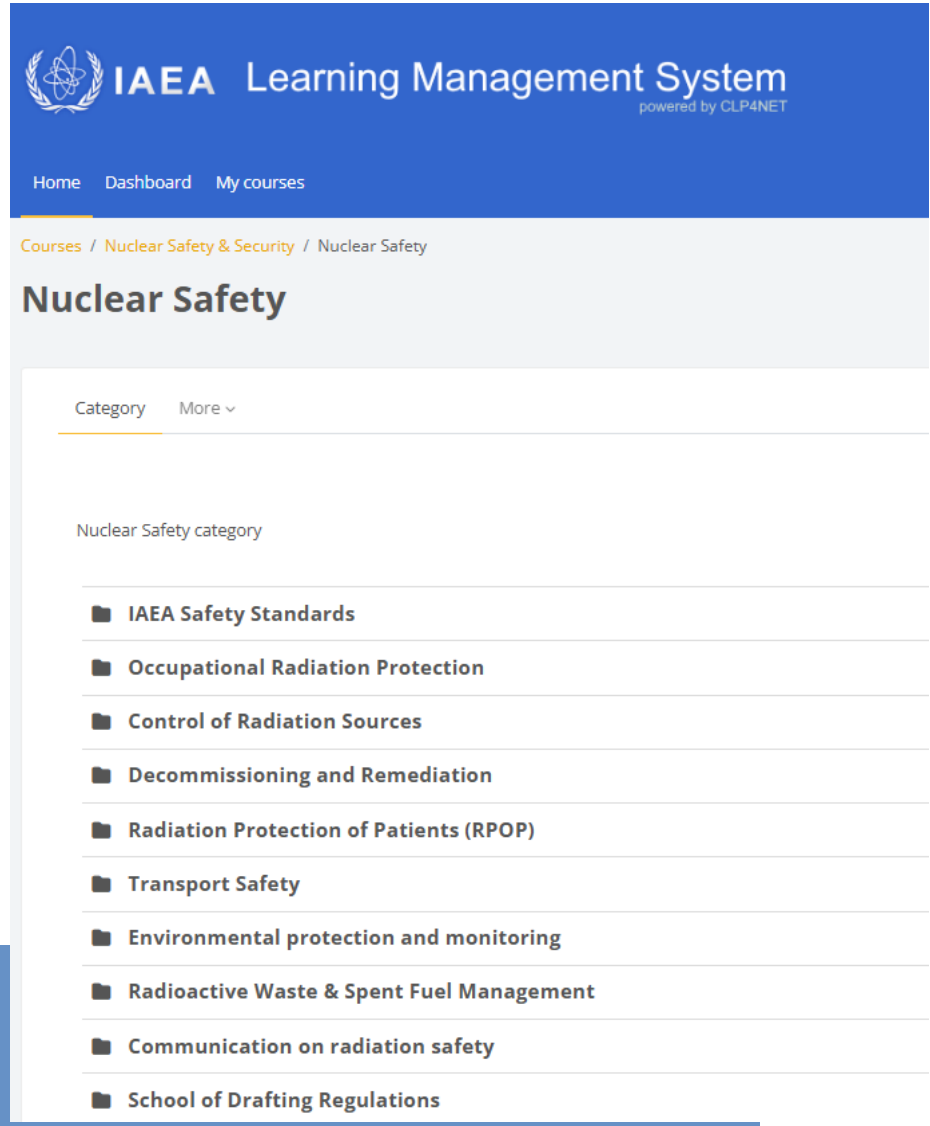
# Specialized Training Courses (eLearning)




https://elearning.iaea.org

# Specialized Training Courses (eLearning)


https://elearning.iaea.org

# Specialized Training Courses (eLearning): AI

## Develop AI Conversation Agents

Core functions:

BENEFITS

To **rehearse the content**: learners ask specific questions on the course

→ Increase **comprehension**, supports **completion** rate of the course

To **assess the knowledge** : the agent ask and provide corrections and feedback

→ Increase **memorization** and **passing rate** at the quizzes

To **orientate** : the agent can indicate learners which part of the course address their needs

→ Increase the **usability** by supporting a just-in-time access to contents

# Specialized Training Courses (eLearning): AI

## Proof of Concept: AI Conversation Agent


Agent will provide the following options:

- Discuss and answer learners' questions
- Assess knowledge and verify understanding
- Orient learners inside the course

# Specialized Training Courses (eLearning): AI

## Artificial Intelligence in Radiation Protection of Patients: Overview

rpop

- Gain insight into the general principles and capabilities of AI technology for radiation protection.
- Explore the specific applications of AI to enhance radiation protection of patients.
- Become familiar with the practical aspects and challenges of deploying AI tools for radiation protection.

Recording →

23 April 2025, 15:00 CEST (Vienna time)

**Presenters:** Mika Kortesniemi (Finland), Teemu Mäkelä (Finland)

**Moderator:** Chadia Rizk (IAEA)

## Artificial Intelligence in Radiation Protection of Patients: AI Technology

rpop

- Explore the basic architecture and model types commonly used in AI applications for radiation protection.
- Gain knowledge of the role and characteristics of data used in the development and deployment of AI tools in medical radiation contexts.
- Explore fundamental AI tasks and their relevance to improving radiation protection and safety of patients.

Register →

23 June 2025, 2:00 pm CEST (Vienna time)

**Presenters:** Stine Korreman (Denmark), Jesper Kallehauge (Denmark)

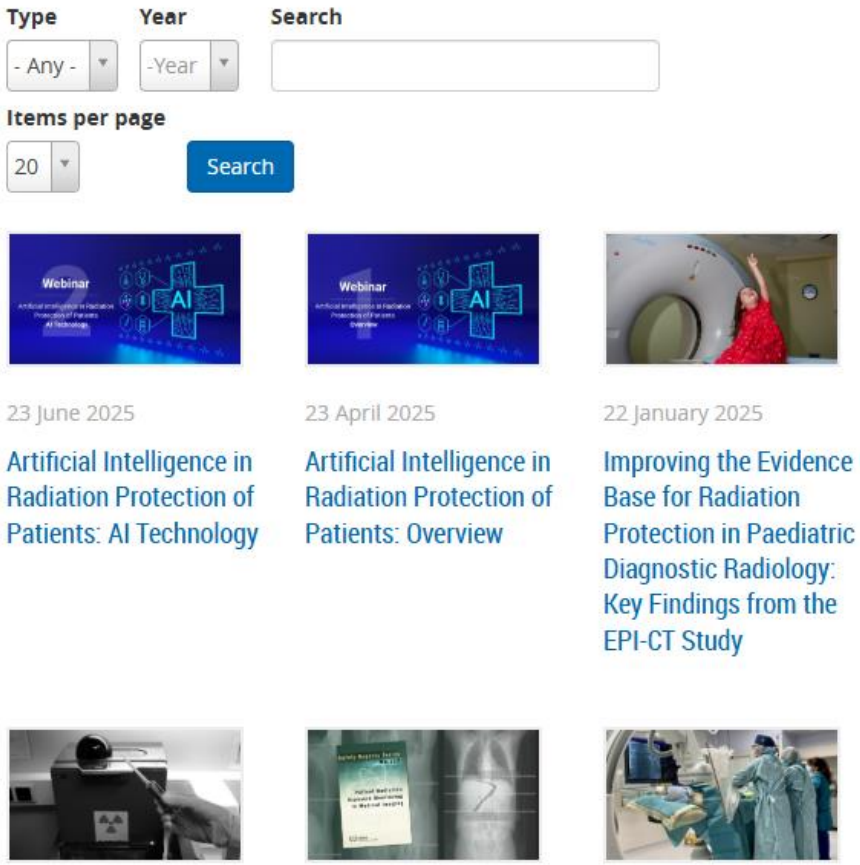
**Moderator:** Chadia Rizk (IAEA)

https://www.iaea.org/resources/rpop/resources/webinars

# Specialized Training Courses (eLearning): AI


**Planned webinars**

- AI in RP: Diagnostic and Interventional Radiology
- AI in RP: Nuclear Medicine and Theragnostic
- AI in RP: Radiation Therapy
- AI in RP: Deployment
- AI in RP: Regulatory and Ethical Considerations




https://www.iaea.org/resources/rpop/resources/webinars

# Thank you!

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