



**IAEA**

International Atomic Energy Agency  
*Atoms for Peace and Development*

# **Technical Cooperation in Asia and the Pacific Region**

**RAS0091**

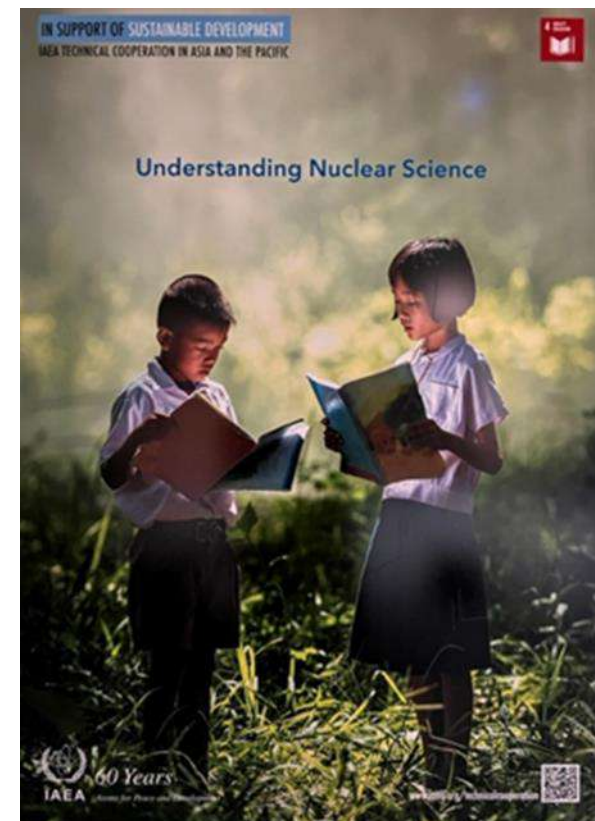
## **Supporting Nuclear Science and Technology Education at the Secondary and Tertiary Level**

**Marina Mishar**

Section Head 2, Division of Asia and the Pacific  
Department of Technical Cooperation

9 October 2023

# Focus on FUTURE GENERATION for SUSTAINABILITY



# Human Resources Development: the strategic enabler



- ✓ Focused according to the priorities of the MS
- ✓ Ensuring local application of knowledge to national development
- ✓ Ensuring sustainability
  
- ❑ Increasing need for HR to correspond to technological progress
- ❑ Developing the minimum level of capabilities for some
- ❑ Limited resources, candidate and funds



# NST Secondary Education TC Projects



2012-2015 extended to 2017

RAS0065 Supporting Sustainability and Networking of National Nuclear Institutions in Asia and the Pacific Region

2018-2021 extended 2022

RAS0079 Educating Secondary Students and Science Teachers on Nuclear Science and Technology

2022-2025

TCP Cycle 2022-2023 –  
**Comprehensive Education Project**

RAS2020008  
RAS0091



# IAEA TC Project RAS/0/079 Educating Secondary Students and Science Teachers on Nuclear Science and Technology (NST)



Objective : to expand and sustain NST information, education and communication among secondary school students and teachers in Asia and the Pacific region.



# Way Forward : Adequate, competent Workforce

## Teachers



- interest in science and engineering among the population (Outreach).
- Awareness – nuclear-aware
- Development of effective and innovative learning methods

## Universities & Nuclear Institutions



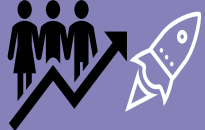
- greater range of courses, greater flexibility for attendance
- Access to instruments & facilities suitable for E&T purposes
- Collection and preparation of pedagogical materials (books, software) in support of lab/simulation sessions.

## Ministry of Education/ Higher Education



- support educational institutions and nuclear technology students at technical colleges
- strongly encourage and support international initiatives and programmes

## Global, Regional Collaboration



- Coordinate efforts for promotion/ preservation of nuclear education program
- Networks for educational programmes include technical training
- Global partnerships committed to enhancing international education and leadership in the peaceful application of NST



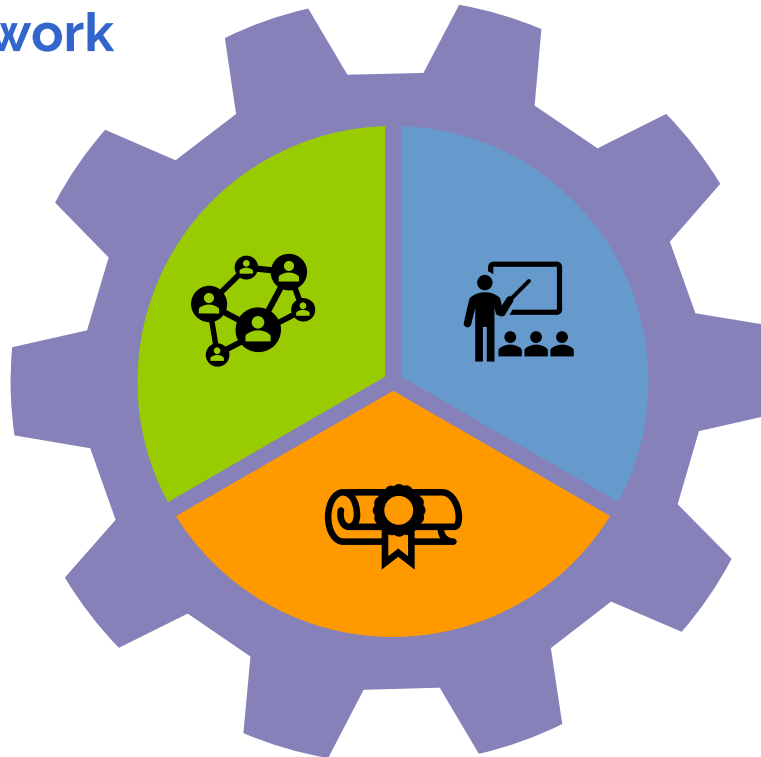
## WAY FORWARD

# RAS0091 - Supporting Nuclear Science and Technology Education at the Secondary and Tertiary Level 2022-2025

### NST Education Network (ANENT)



### NST Tertiary Education (INSTA)



### NST Secondary Education

### Expand to more Member States



## **RAS0091 Supporting Nuclear Science and Technology Education at the Secondary and Tertiary Level**



**Objective:** To strengthen and sustain regional cooperation in NST education at the tertiary and secondary levels to ensure the training of the next generation of human resources in harnessing the power of NST.



**Target Outcome:** Enhanced cooperation in the area of nuclear education in the region.



# Outputs

1. Regional collaboration for secondary, tertiary, and higher learning education on NST established.
2. Capacity for teaching NST topics, online teaching, and creating teaching and outreach media enhanced.
3. Understanding of NST for SDGs among students at secondary and tertiary level improved.
4. Knowledge and material sharing optimized and further enabled through the promotion and broader utilization of a regional network.

# Progress and Activities Forward : Secondary Education



- Successful Completion of 2022/2023 NST Education Exhibition
  - Over 5,000 virtual visitors

## Virtual Booths

Learn more about NST in various fields and how it contributes to the UN SDGs



### **NST EDUCATION COMPETITION**

**AUDITORIUM ALPHA**

View the video submissions by finalists and vote for your favorite videos



### **EDUCATION & CAREER FAIR**

**AUDITORIUM BETA**

Learn about education programme, career in nuclear/related fields and visit nuclear facilities virtually



### **NST RESOURCES FOR EDUCATORS**

**AUDITORIUM GAMMA**

Find out about the various resources in NST for education



### **NST FOR THE SDGs**

**AUDITORIUM DELTA**

Find out more how NST contributes to the UN SDGs and IAEA work in supporting MSs to meet the UN SDGs

*NST Education Exhibition 24 January – 10 February 2023  
(virtual exhibition opened until end June 2023)*

[2022/2023 NST Education Competition - NST Education Competition 2022/2023](#)

# Progress and Activities Forward : Secondary Education



- 2023 Video Competition Winners to join Study Tour to VIC in Oct 2023



## Highlights of 2023 Study Tour

- Visits to IAEA SEIB Laboratories, Dosimetry Laboratory, Atom Institute, University of Vienna (Triga Research Reactor), Medical University of Vienna / AKH Wien,
- Virtual tour of IAEA SG NM laboratory
- Hands on workshop on nuclear detection and monitoring at the CTBTO
- Educational workshop on student and teacher views on NST and its communication
- NST career talk sessions & Career opportunities at the IAEA



# Study Tour to VIC in Oct 2023





# Progress and Activities Forward : Secondary Education

- Working Document for the NST Guidebook Series for Introducing NST into Secondary-Level Education launched during TCAP 2023 NLO Meeting in March 2023



Rafael Mariano Grossi   
@rafaelmgrossi

Delighted to launch the “Guidebook Series for Introducing Nuclear Science and Technology in Secondary Education” for countries in the Asia Pacific during the meeting of our liaison officers. This will strengthen education in the [#nuclear](#) field in this dynamic region.



3:13 PM · Mar 20, 2023 · 9,915 Views



# Progress and Activities Forward : Secondary Education



- Capacity Building activities for Teachers, Curriculum Developers, MoE



- Update the Basic/Model Curriculum for Linking NST to Secondary Education
- Structured Trainings for Educators and the Supporting Partners
  - Decision Makers
  - Curriculum Developer
  - Science and Non-Science Teachers
  - Guidance Counsellor
  - Exhibition, National Science Centers, Nuclear Research Centers
- Draft strategy for building teacher's skills towards facilitating learning on NST topics in a sustained manner.

Join ANSTO's  
*Free & Online*  
**Teacher Professional Development**  
Training course



## Attention

### Secondary school science teachers

Complete the same training as thousands of Australian teachers – our program is formally accredited by the NSW Education Standards Authority (NESA) and Teacher Quality Institute (TQI) of the ACT

#### You will learn:

##### PART 1 | Benefits and responsibilities of nuclear science

Teachers will hear from experts and scientists about:

- Current nuclear medicines: Properties and uses
- Other applications of nuclear science
- The responsibilities of nuclear; Environmental monitoring in Japan



##### PART 2 | Virtual tour of ANSTO

Teachers will participate in a tour of ANSTO's scientific facilities and learn how they are used to make nuclear medicines and manage waste from this process.

- Tour of OPAL research reactor
- Australian Centre for Neutron Scattering
- ANSTO Nuclear Medicine facility
- Waste management



##### PART 3 | Teaching about isotopes and radioactivity

Julie Mulholland and Bridget Murphy (ANSTO) and Prof. Takeshi Iimoto (University of Tokyo) will model teaching activities and resources that help students understand the basics of radioactivity.

- Using real data to understand isotopes
- Radiation in everyday life



*Book Now!*

**REGISTER**

RSVP BY

**30 May 2023**



All participants will receive  
a certificate of completion  
from ANSTO



##### PART 1

Wednesday

**31 May 2023**

7.00pm - 8.30pm\*

##### PART 2

Wednesday

**7 June 2023**


7.00pm - 9.00pm\*

##### PART 3

Wednesday

**14 June 2023**

7.00pm - 8.30pm\*

\* Sydney (AEST) time 



SULTANATE OF OMAN  
MINISTRY OF EDUCATION



**IAEA**  
International Atomic Energy Agency

## Regional Seminar

Good Practices in Linking  
**Nuclear Science Technology (NST)**  
into **Secondary Education**

29 Oct - 2 Nov 2023

Muscat, Oman





# INTERNATIONAL NUCLEAR SCIENCE OLYMPIAD

Meeting in Feb 2023  
VIC  
Experts from the region  
With experience in  
Olympiads





# INSO Roadmap

Co-Organize with IAEA  
Supported by ANENT & INSTA





# Progress and Activities Forward : Secondary Education



- Preparation to pilot first International Nuclear Science Olympiad in Summer 2024 in the Philippines

**INTERNATIONAL  
NUCLEAR SCIENCE  
OLYMPIAD  
LOGO DESIGN  
COMPETITION**

UNDER THE FRAMEWORK OF IAEA TC PROJECT RAS/0/091

**CLOSING DATE: 15 MAY 2023**  
**ANNOUNCEMENT OF WINNING LOGO: 10 JUNE 2023**

ELIGIBILITY	GUIDELINES	PRIZE
 <ul style="list-style-type: none"><li>• Students ages 15-20 who are enrolled in school from the Asia and the Pacific region.</li><li>• Only individual submission.</li></ul>	 <ul style="list-style-type: none"><li>• Original Design to be submitted online at <a href="https://ins0.nsteducationcompetition.com">https://ins0.nsteducationcompetition.com</a></li><li>• Detailed guidelines provided at the web-page above</li></ul>	 <ul style="list-style-type: none"><li>• Winning logo will be used on all merchandise, outreach platforms, brochures, medals etc.</li><li>• Winner will be invited to the opening ceremony of the pilot International Nuclear Science Olympiad in August 2024.</li></ul>

The newly established International Nuclear Science Olympiad (INSO) is an annual international science competition for secondary school students less than 20 years old. It aims to increase awareness of the peaceful applications of Nuclear Science and Technology (NST).



INSO Team Observe the  
International Biology Olympiad  
July 2023

Logo Competition

# Education Initiatives via TC Projects



**INSO**

International Nuclear  
Science Olympiad

Piloting International Nuclear Science Olympiad –  
competition for secondary students



<https://inso.science/>



# INSO Roadmap

Co-Organize with IAEA  
Supported by ANENT & INSTA



## 1<sup>st</sup> NSO & IJ Meeting Feb 2023

- ToRs of SC & IJ
- Regulations of Olympiad
- Syllabus & Assessment Method

## Announcement of 1<sup>st</sup> INSO Sept 2023

- Final Registration  
May 2024

## Establishment of NSO Steering Committee Oct 2022

## Website, Accounts July 2023

- Logo Competition – May 2023
- Dev of Website – July 2023
- Organization Account and Bank Account – July 2023

## 1<sup>st</sup> INSO PHI, Aug 2024

# Collaborators



Nuclear-based science benefiting all Australians



東京大学環境安全本部  
EHS Environment, Health and Safety, UTokyo



産学官連携

原子力人材育成ネットワーク

Japan Nuclear Human Resource Development Network

Cost Free Experts

US : Bridget Carter

Japan : Koichi Watanabe



Japan's Contribution toward  
“Atoms for Peace and Development”



Ministry of Foreign Affairs of Japan

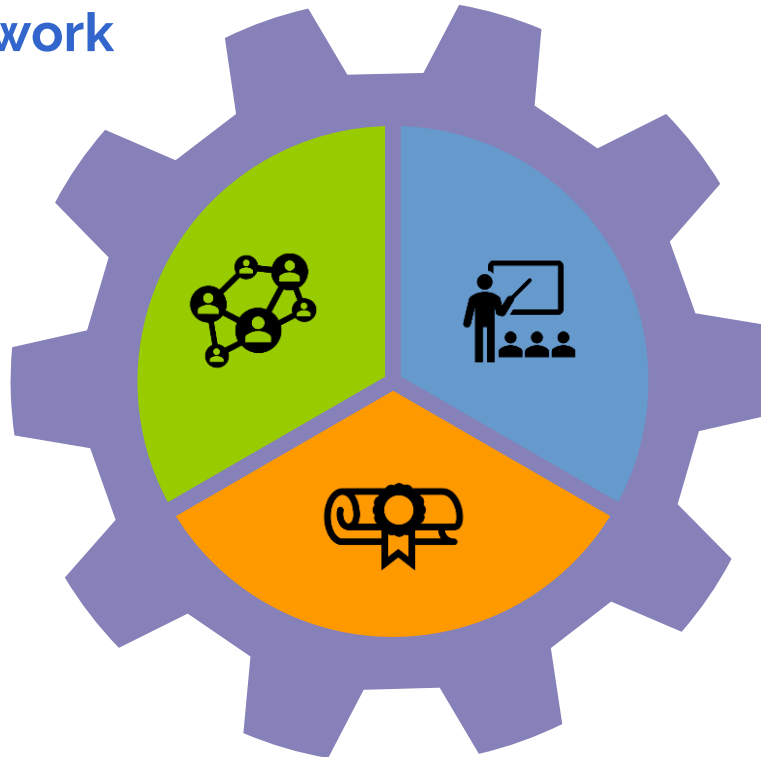
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# Education Initiatives via TC Projects



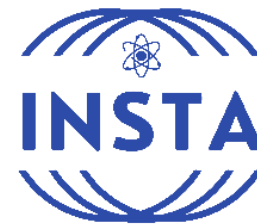
Celebrating 20 years in collaboration with Asian Network for Education in Nuclear Technology – sharing educational materials and latest technology for the practitioners



<https://anentweb.net/Home>

## Supporting International Nuclear Science Academy Executive Education Programme

- Empowering Educators in the region on NST role in meeting the UN SDGs



[//insta-network.org](https://insta-network.org)

# ANENT - Timeline of Activities

Select a period to highlight at right. A legend describing the charting follows.



ACTIVITY	PERSON RESPONSIBLE	DEADLINES						
		March	April	May	June	July	August	September
Launch New Web Portal	Sunrise, Raven, Lea	Mar-17						
Launch New LMS	Youngmi, Bob, PH	Mar-17						
ANENT LMS Learning Material Developed	Material in June 2023; Event in Sept/Oct 2023 - Youngmi, Rod							September
ANENT LMS Utilization - <a href="https://pnridostgovph-my.sharepoint.com/:p/g/persona/IMGcervantes_pnri_dost_gov_ph/EdJ-t-dSVBNHmdvx1NFhC2MBUnq4kEztRwICxqV6RPbXxA?e=fCLFOF">https://pnridostgovph-my.sharepoint.com/:p/g/persona/IMGcervantes_pnri_dost_gov_ph/EdJ-t-dSVBNHmdvx1NFhC2MBUnq4kEztRwICxqV6RPbXxA?e=fCLFOF</a>	Hosting of INSTA-organized Step 1 (Virtual Mode) Executive Education Programme for Educators (partner with INSTA) - Marina Q3 2023							
	Partnership with Universities in MS (activity to utilize LMS e.g., co-organized activity) - THA, PHI, INS, AUS Ready by Jan 2023							
	Finalization of Guidance for ANENT's LMS and a Framework for its Governance - Sudi							



## ANENT Special SC Meeting March 2023

# IAEA GC 2023





## Past Webinar Series

1. Computer Security in NPP; 30 May 2023; Tsinghua University
2. The Invisible Revealed; 3 August 2023; ANSTO
3. Celebrating 20 years of Learning and Sharing Nuclear Knowledge; 27 September 2023; ANENT

### ANENT Webinar Series for 2023. No. 4

Organized jointly by ANENT and IAEA #IAEA TC Project RAS/0/091

## Electron Beam Irradiation for Wastewater Treatment

**Dr. Shizong Wang**

Associate professor and Senior researcher

Institute of Nuclear and New Energy Technology (INET), Tsinghua University



**Date:** Wed, October 25, 2023

**Time:** 15:00-16:30 Beijing time, 09:00-10:30 Vienna time

**Free registration:** <https://shorturl.at/myW35>

Asian Network for  
Education in Nuclear Technology  
(since 30 June 2003)

**A<sup>20</sup>NENT**  
Where We Learn and Share  
Nuclear Knowledge

[www.anentweb.net](http://www.anentweb.net) | [anentweb@gmail.com](mailto:anentweb@gmail.com) | [@anentweb](https://twitter.com/anentweb)



## ABOUT US

A REGIONAL EDUCATIONAL INITIATIVE  
SUPPORTED BY THE INTERNATIONAL ATOMIC  
ENERGY AGENCY

We envision strong, growing, and empowered nuclear science and technology educators that advance the safe, secure, peaceful and beneficial use of nuclear science and technology globally.





# Progress and Activities Forward : Tertiary Education



- Working closely with INSTA – International Nuclear Science and Technology Academy



## Vision

- INSTA envisions strong, growing, and empowered NST educators that advances the safe, secure, peaceful and beneficial use of nuclear science and technology globally

## Mission

- INSTA contributes to the global nuclear manpower development through regional and inter-regional collaborations for empowering educators and advancing nuclear science and technology education programs in the tertiary level.

INSTA Executive Education Programme

# INSTA Steering Committee



**Chair : Prof Tong**



**Secretary: A/Prof  
Irman**



**WG 1: Dr Arcilla**

Responsible for coordinating between academic institutions and nuclear stakeholders and optimizing the use of existing resources in the region to advance R&D in support of Nuclear Education



**WG 2: A/Prof Pengvanich**

Responsible for developing education programmes and platforms to address current and growing needs for qualified educators (curriculum development, education material, education platform etc



**WG 3: Prof Iimoto**

Responsible in planning and organizing special events and proposing TC projects with the goal of increasing involvement of educators in NST education programme



**"A PROFESSOR OF NUCLEAR  
ENGINEERING MAY NOT QUALIFY AS  
A TEACHER, WHO KNOWS HOW TO  
MAKE STUDENTS LOVE THIS SUBJECT  
AND INVOLVED IN THIS FIELD AS  
THEIR FUTURE CAREER. "**

**MS JIEJUAN TONG**

*Vice Director of INET, Tsinghua University,  
Chair of INSTA*



# FRAMEWORK OF INSTA EXECUTIVE PROGRAMME FOR EDUCATORS



## ADVISORY COMMITTEE - WORKING GROUP 2 & 3

### DESCRIPTION

- Designed for experienced professionals and educators
- Focus on a simple, WOW factor and state of the art education approach
- Incorporates case study and research-based presentations, discussions and exercises led by INSTA faculties/members
- Step 1= 3 modules conducted virtually while Step 2= face to face in one of the INSTA education hub
- Format maximises organisational and personal impact while minimising disruption to work and family life

### OBJECTIVE

- To develop deeper understanding of the global agenda, legislation, and treaties and on Nuclear Science and Technology (NST) contribution and relation to them
- To promote growth, research, development, and innovation of NST in one own's field
- To improve competency of imparting knowledge on NST through effective learning and facilitation
- To strengthen collaboration towards improving NST education and optimize nuclear knowledge management collectively
- To inspire new generation of educators on benefits and potential of NST for socio-economic development

### ENTRANCE CRITERIA

- Educators and academician
- Staff of research and training institutes
- Officials from relevant ministries (eg: Education, Regulators, Science & Technology, Health)

### Step 1

#### MODULE 1 LEARNING APPROACHES & STRATEGIES FOR THE 21ST CENTURY

- ✓ Educator paradigm as Life-long learners
- ✓ Concept of Learning & Facilitation
- ✓ Innovative learning Approaches
- The "GROW" model
- Creative environmental learning to NST
- Internet Revolution Learning
- Education, research & career opportunities
- Monitoring & Evaluation
- Competencies of Educator
- Ethics in NST

#### MODULE 2 GLOBAL AGENDA, LAWS AND TREATIES

- ✓ United Nation Sustainable Development Goals
- ✓ International Convention and Treaties
- ✓ International Atomic Energy Agency and partners
- Nuclear safety and radiation protection
- Nuclear Security
- Nuclear Safeguards
- International Cooperation
- Education Networking
- Contribution of NST in Achieving SDGs

#### MODULE 3 ROLES OF NST IN DEVELOPMENT

- ✓ Principles of Nuclear Science & Technology
- ✓ Nuclear Knowledge Management
- ✓ Educators role in NST
- Radiation and Realism
- Artistic, Archaeology and heritage
- Nuclear Forensic
- Human Health
- Food and Agriculture
- Nuclear Power Plant for Energy and non-electrical applications
- Water Management
- Environmental preservation
- Industrial application of nuclear technology

### Step 2

#### MODULE 4 EDUCATION HUB SUMMER/ WINTER SCHOOL

- Advanced technical literacy
- Site visit/attachment
- Discussion/presentation/report
- From 1 week to several months depending on the INSTA education Hub
- TBD & prepared by hosting MS with specific NST area

✓ Compulsory • Elective

- Module 1-3: a total of 42 hours with 14 hours per module
- Virtual (synchronous & asynchronous)
- Each module has:
  - 10 hours lecture: 3 compulsory topics & 2 elective topics (live stream/recorded)
  - 2 hours participants' presentation
  - 2 hours group discussion

\*Upon completion of each module, a certificate will also be given.

To be completed  
within 6 months  
(≈ 7 hours/month)

Screening

Selection

Option to enroll in Module 4 (Step 2)

- ✓ Successful completion of Step 1
- ✓ Fast track eligibility through Formal assessment (TBC)



# Programme Features



- Step 1 : Virtual
  - 3 thematic modules
    - Module 1: Learning Approaches & Strategies for the 21<sup>st</sup> Century
    - Module 2: Global agenda, laws and treaties
    - Module 3: Role of NST in development
  - 30 compulsory and Elective Lessons
  - Instructed by experts from each field from INSTA Member
- Step 2: Face to Face/Hybrid
  - Participants who completed the Phase 1 will be eligible for the INSTA School
  - Advanced technical literacy

## **Step 2: INSTA Schools in pipeline (based on members' identified needs)**

- Nuclear Engineering and Nuclear Safety – CPR (spring & autumn 2024)
- Nuclear Research Reactors Utilization– Iran (summer 2024)
- Comprehensive Radiation Medicine and Public Health Education and Clinical Training- Malaysia (autumn 2024)
- Advanced Radiation Protection under the concept of Risk Management– Japan (Spring 2025)



**"BY EQUIPPING EDUCATORS WITH  
THE KNOWLEDGE AND TOOLS THEY  
NEED, YOU ARE NOT ONLY SHAPING  
THE FUTURE OF NUCLEAR SCIENCE  
BUT ALSO ENSURING THAT THE NEXT  
GENERATION OF LEARNERS  
RECEIVES THE HIGHEST QUALITY OF  
EDUCATION."**

**RAFAEL MARIANO GROSSI:**  
*IAEA Director General*

