

Report on
“RSO Certification Course on Radiation Safety Aspects of Research, Radiotracer and Column Scanning Applications of Ionizing Radiation”,

Dated 5 – 13 JUNE, 2023

Organised by

Amity Institute of Nuclear Science and Technology (AINST),
Amity University Uttar Pradesh, Noida Campus-201313

The applications of radiation technology in industry, medicine, research, and agriculture and food processing sectors for societal benefits are being exploited throughout the world. Working with radioactive sources involves exposure of workers to various kinds of radiation. It is evident and necessary to be aware that if exposure levels are significantly greater than the limits prescribed by the INTERNATIONAL COMMISSION ON RADIOLOGICAL PROTECTION (ICRP) it entails health hazards, a few principles have been embedded like ALARA (As low as reasonably, achievable), optimising the time distance and shielding, . In order to have effective control on the use of radiation and to ensure the radiological safety of the radiation workers as well as the public, the Government of India has promulgated the Radiation Protection Rules, 1971 under the Atomic Energy Act, 1962. This ensures the safety of radiation workers, patients, and members of public along with the environment so that maximum benefit is derived from the use of radiation sources with minimum risk. This is possible when the radiation sources are handled by personnel who have acquired sufficient knowledge, training and skill in radiation protection and safety. Hence the certification of radiation safety professionals is an important means of promoting a safety culture and enhancing the level of competence of personnel involved in radiation protection activities. , in view of above-mentioned facts, the Radiological Physics and Advisory Division (RP&AD) of BARC conducts courses to train Radiological Safety officers. The Syllabus for such a training program is prepared by the Atomic Energy Regulatory Board (AERB) Mumbai-400094 India.

Radiological Physics & Advisory Division (RP&AD), Bhabha Atomic Research Centre (BARC) has authorized Amity Institute of Nuclear Science and Technology, Amity University Uttar Pradesh, Noida to conduct '**Radiological Safety Officer (RSO) Certification Course**, on “Research, Radiotracer and Column Scanning Applications of Ionizing Radiation” for the fulfilment of the following objectives at Amity Campus Noida from 2022 onwards.

Objectives:

- To impart knowledge of radiation and its fundamentals.
- Understanding fundamentals of radiation protection principles.
- Awareness of regulatory compliance and standards.
- Impart Skills for the safe handling of radioactive materials and monitoring their movement
- Train the workforce for personnel monitoring and dosimetry.
- Ensure Preparedness for radiological emergencies and adequate response mechanisms.
- Abilities to conduct safety audits and inspections.
- Competence in risk assessment and control measures of radiation levels.
- Expertise in developing and managing radiation safety programs and effective communication.

AINST conducted the first RSO Certification course at Amity University, Noida campus From 5-13, June 2023. In this course, thirty-eight participants (3 internal participants from AINST) from various Institutions participated. During the course, lectures and practical

sessions were conducted. The lectures were given by the AINST faculty as well as speakers from BARC, RPAD, INMAS, DRDO and AERB. The following are the guest and AINST speakers. The examination, evaluation and certification were done by the RP&AD, BARC, two of their senior scientists visited AUUP for the same. The result of the course was very encouraging, it was 81.5 %

speakers,

- Prof. R. K. Gopalakrishnan, Former Senior Scientist, BARC, Mumbai
- Dr. Aruna Kaushik, Radiation Safety Officer and Scientist 'D', INMAS, DRDO
- Dr. Tina Goel, Officer F, BRIT, Noida
- Dr. Vandana Shrivastava (Assessment and Viva), Scientific, Officer F, RP&AD, BARC
- Dr. Jayashree Biswal, Scientific Officer G, RP&AD, BARC
- Dr. R.S. Vishwakarma, Scientific Officer – F, RP&AD, BARC
- Ajeet Singh, Scientific Officer, AERB

Speakers from, Amity University Uttar Pradesh,

- Dr. Alpana Goel, Director & Head AINST,
- Dr. Unnati Gupta, Assistant Professor AINST
- Dr. Sudatta Ray, Assistant Professor AINST
- Dr. Naveen Sharma, Assistant Professor AIPS

This was a paid course, and it generated a revenue of Rs. 4,93,500/- During the valedictory, feedback from the participants was taken. They appreciated the training program and the infrastructure at AINST, AUUP. Enclosed herewith are the following.

- Tentative Program Schedule,
- Participating Institutions
- Feedback
- Glimpses

The Achieved outcomes of the course are:

- 1- Revenue generation for AINST, AUUP. This course can be conducted multiple times during the year (subject to attainment of participants around 35
- 2- Qualification of three faculties as RSP. (Three faculty Ms. Archana Yadav, Dr Arpita Datta and Dr Sutanu Bhattacharya qualified for RSO)
- 3- .To enhance the Possibility of future collaboration with the RP & AD , BARC and to explore the Possibility for approval of advanced level RSO certification course.
- 4- Increased the visibility of the Nuclear Security Education Laboratory and AINST
- 5- Possibility of collaboration with reputed organisations like IITs, Universities and Research Laboratories from where the participants had joined.

The program schedule has been attached here. Also, the list of participating institutes is appended.



Amity Institute of Nuclear Science and Technology (AINST)

RSO Certification Course on Radiation Safety Aspects of Research, Radiotracer and
Column Scanning Applications of Ionizing Radiation
June 5 - 13, 2023

Tentative Program Schedule Inaugural

Date: 5 June 2023,
Time: 9:00 AM to 10:00 AM

Venue: G-06 AINST Conference Room, B
Block (GF), Amity University Uttar Pradesh,
Noida campus

TIME	AGENDA ITEM/ ACTIVITY	Implementer
9:00 AM -9: 30 AM	Registration and Document verification	
9:30 AM-9:35 AM	The lighting of Lamp and Vandana	All Dignitaries
9:35 AM-9:40 AM	Welcome Address	Prof Alpana Goel Director & Head
9:40 AM - 9:50 AM	Address	Prof A. K. Jain Advisor, Amity Institute of Nuclear Science and Technology
9:50 AM -10:00 AM	Words of wisdom	Prof (Dr) Balvinder Shukla <i>Vice Chancellor</i> <i>Amity University Uttar Pradesh</i>
10:00 AM	Vote of thanks	

RSO Certification Course on Radiation Safety Aspects of Research, Radiotracer and Column Scanning Applications of Ionizing Radiation
June 5 - 13, 2023

Venue: Amity University, Noida, Uttar Pradesh

Course Schedule

Date / Time	10:00 – 11:00	11:00 – 12:00	12:00 – 13:00	14:30 – 15:30	15:30- 16:30
05/06/2023 Monday	Basic Radiation Physics (Dr. Alpana Goel, AINST, Amity Univ.)	Interaction of Ionizing Radiation With Matter (Dr. Unnati Gupta AINST, Amity Univ.)	Radiation Quantities & Units (Dr. Unnati Gupta AINST, Amity Univ.)	Biological Effects of Ionizing Radiation – 1 (Dr. Navneet Sharma, AIP, Amity Univ.)	Radiation Detection and Measurement – 1 (Dr. Sudatta Ray, AINST, Amity Univ.)
06/06/2023 Tuesday	Radiation Detection and Measurement – 2 (Dr. Sudatta Ray, AINST, Amity Univ.)	Biological Effects of Ionizing Radiation - 2 (Dr. Navneet Sharma, AIP, Amity Univ.)	Operational Limits (Dr. Gopalakrishan, EX-DAE)	Radiation Detection and Measurement – 3 (Dr. Sudatta Ray, AINST, Amity Univ.)	Application of Ionizing Radiation in Research, Medicine, Agricultural and Industry – 1 (Dr. Gopalakrishan, EX-DAE)
07/06/2023 Wednesday	Applications of Ionizing Radiation in Medicine – 2 (Dr. Navneet Sharma, AIP, Amity Univ.)	Radiation Hazard Evaluation & Control - 1 (Dr. Gopalakrishan, EX-DAE)	Radiation Hazard Evaluation & Control – 2 (Dr. Gopalakrishan, EX-DAE)	Radiation Hazard Evaluation & Control – 3 (Dr. Gopalakrishan, EX-DAE)	Production of Radioisotopes & Labeled Compounds (Dr. Tina Goel, BRIT, Noida)
08/06/2023 Thursday	Planning of Radioisotope Laboratories (Dr. Aruna Kaushik, INMAS, DRDO)	Regulatory Aspects of Radioisotope Laboratories (Dr. Navneet Sharma, AIP, Amity Univ.)	Disposal of Radioactive Waste (Dr. Aruna Kaushik, INMAS, DRDO).	Practical demonstration - 1 Radiation absorption characteristics and HVL/TVL measurement, calibration of survey instruments (Dr. Unnati Gupta/Dr. Sudatta Ray, AINST, Amity Univ.)	
09/06/2023 Friday	Radiation Accidents, Case Studies and Lessons Learned (Dr. Navneet Sharma, AIP, Amity Univ.)	Emergency Response Plans and Preparedness (Dr. Aruna Kaushik, INMAS, DRDO).	Transport of Radioactive Material (Dr. Navneet Sharma, AIP, Amity Univ.)	Practical demonstration - 2 Contamination measurement & decontamination procedures (Dr. Unnati Gupta/Dr. Sudatta Ray, AINST, Amity Univ.)	
12/06/2023 Monday	Radiotracer Applications in Industries – 1 (BARC)	Radiotracer Applications in Industries – 2 (BARC)	Sediment transport Investigations at Ports (BARC)	Special Lecture: e-Licensing of Radiation Applications (e-Lora) (AERB)	Practical demonstration – 3 Radiation Protection Survey of Radioisotope Laboratory (Dr. Unnati Gupta/Dr. Sudatta Ray, AINST, Amity Univ.)
13/06/2023 Tuesday	Written Examination (10.00 - 11.30 hrs)	Assessment on Practical & Result Declaration by BARC Officials			

Subject expert (External):

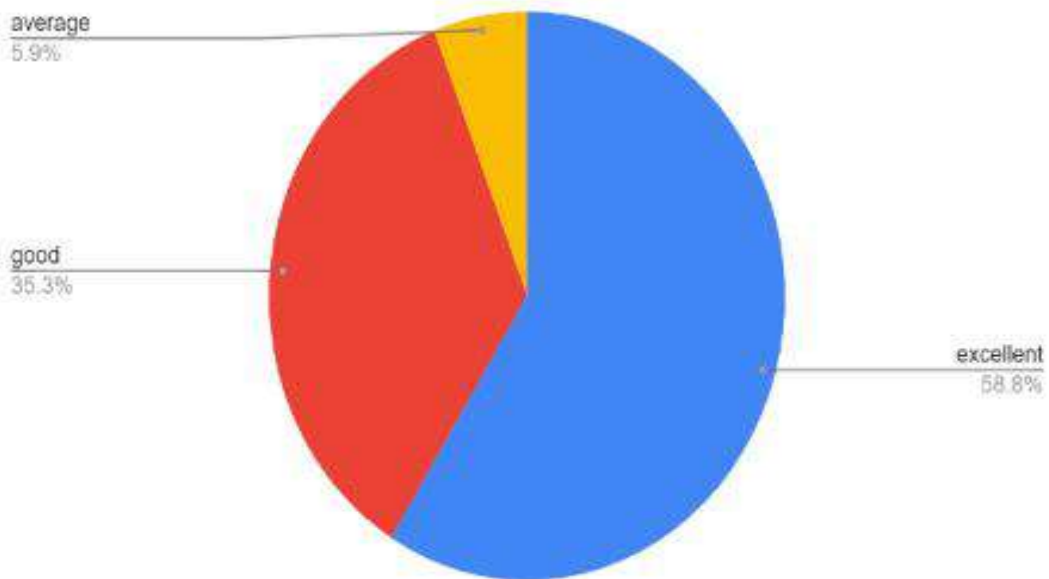
- Dr. Gopalakrishan, EX-DAE
- Dr. Aruna Kaushik, INMAS, DRDO
- Dr. Tina Goel, BRIT, Noida
- RP&AD, BARC
- AERB

List of Participating Institutions

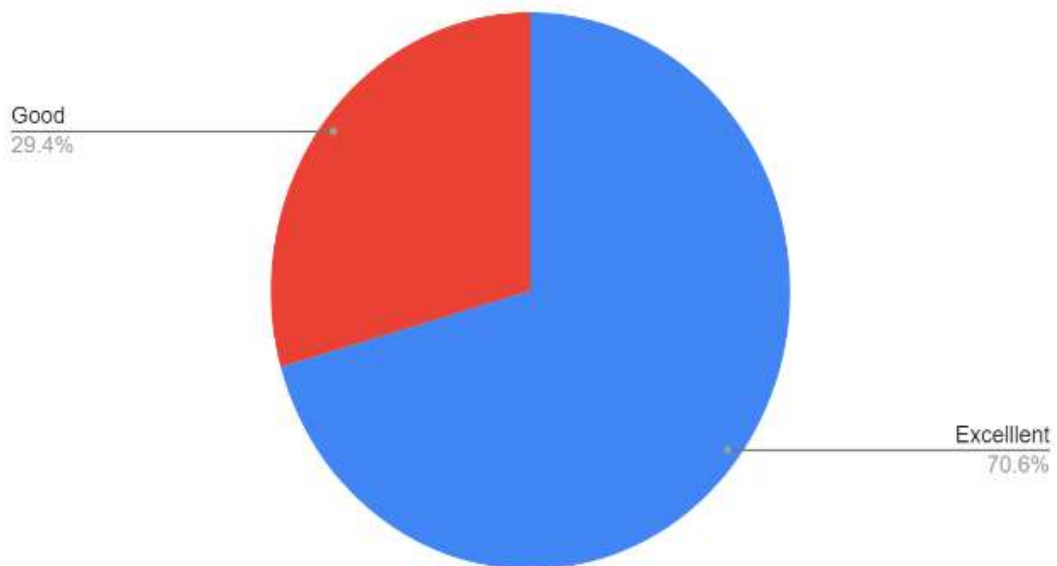
S. No.	Institution name
1.	Institute of Nuclear Medicine and Allied Sciences, DRDO
2.	Guru Gobind Singh Medical College, Faridkot, Punjab
3.	Zydu Research Centre, Zydu Lifesciences Limited
4.	Cochin University of Science and Technology, Cochin 682 022, Kerala, India.
5.	VIMTA LABS LIMITED
6.	INTERNATIONAL INSTITUTE OF BIOTECHNOLOGY AND TOXICOLOGY (IIBAT)
7.	Manipal Centre for Natural Science, Manipal Academy of Higher Education, Manipal - 576104
8.	Pandit Deendayal Energy University
9.	Lenek Technologies Private Limited
10.	Institute of Life Sciences, Bhubaneswar
11.	Curadev Pharma Pvt. Ltd
12.	Eurofins Advinus Agroservices India Pvt Ltd
13.	SG CRYSTALS INDIA PRIVATE LIMITED
14.	SDS LIFE SCIENCES PVT LTD
15.	SDS Life Sciences Pvt. Ltd.
16.	Amity University Uttar Pradesh
17.	Centre for fire, explosive, and environment safety, DRDO
18.	Gujrat University

19.	IIT Delhi
20.	CAEN spa India Private Limited
21.	JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, HYDERABAD
22.	IIT Jammu
23.	National Institute of Biomedical Genomics
24.	University of Kalyani
25.	Indian Institute of Technology Hyderabad
26.	Indian Institute of Technology Roorkee
27.	Indian Institute of Technology, Bombay
28.	Cachar Cancer Hospital & Research Centre
29.	Diamond Harbour Women's University
30.	Inter University Accelerator Center
31.	Anika Sterilis Private Limited
32.	

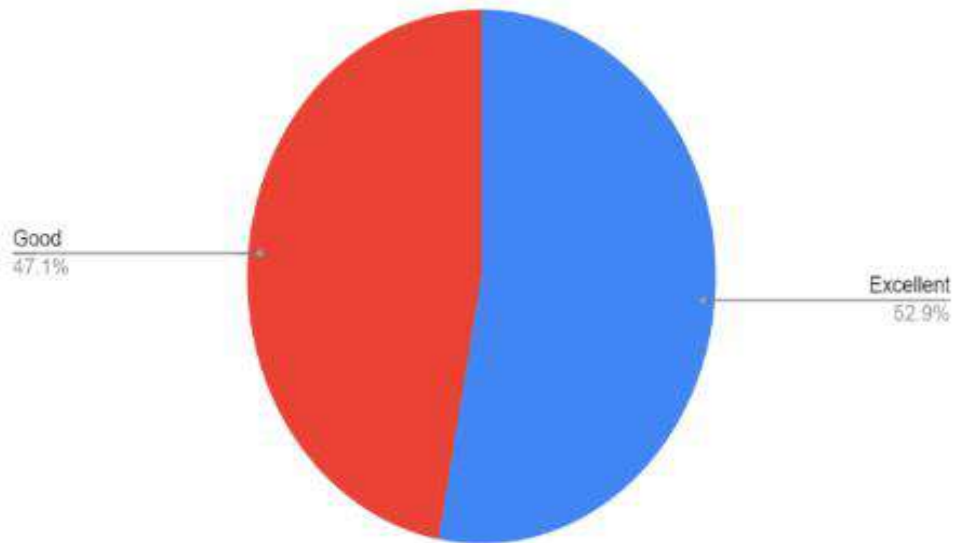
Count of Were the lectures delivered met the expectations and learning outcomes.



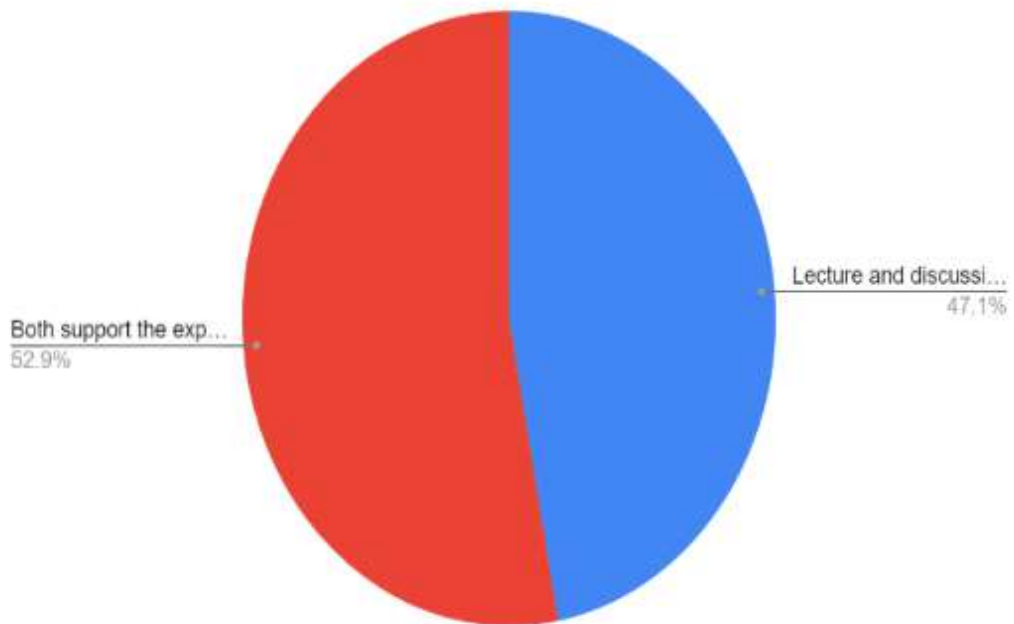
Count of Were the course content/material of appropriate level and sufficient for the expected learnings.



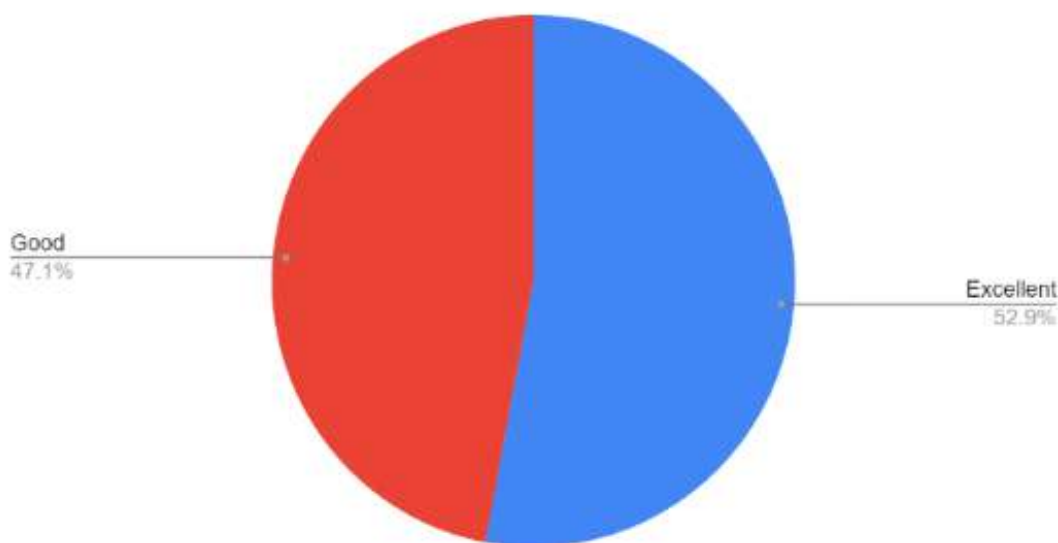
Count of Please provide your rating for local Hospitality provided at Amity University.



Count of Which approach do you like the most?



Count of Did the laboratory experiments meet your expectations and expected learnings?



Feedback sought from participants had some remarks which are listed below

S. No.	Any other suggestions/ thoughts or comments for improvement?
1.	Wi Fi connection could have been provided
2.	Before starting the course, provide the material to participants that will be helpful for non-nuclear physics people. The following teachers are excellent please continue with them Vishwa karma Gopalakrishnan Navneet Aruna
3.	A little bit on the biological component of how radiation causes DNA damage, DNA repair mechanisms, detection of chromosomal aberrations and bio dosimetry assays would make it better.
4.	Keep It up
5.	Individual practical training will help to understand more about instrumentation
6.	The lectures on nuclear physics were too fastpaced for those from a biology background like me as we had studied this long ago in Grades 11-12. This was also echoed by other participants from this field.
7.	Hostel/accommodation should be provided to the candidates
8.	Please give material before attending the course so that little idea will come and easily understand the topics
9.	Participants from Biology backgrounds initially found it hard to recapitulate the concepts of nuclear physics learnt many years ago in Grade 11-12. It would be better if a special class is conducted with a slower pace for this group before the beginning of the course.
10.	The number of lab experiments should have been increased
11.	The lectures are very good, and the environment is very friendly. Please keep it up.

12.	Lodging should be provided. If candidates are staying out, then transport should be provided
13.	Practical classes need improvement
14.	faculty and staff support are excellent during this training period.

Glimpses

Certificate
Distribution
and
Feedback



