

Report

RSO Certification Course

on

Radiation Safety Aspects of Research, Radiotracer and Column Scanning Applications of Ionizing Radiation

January 15 - 23, 2024

**Venue: Amity University Uttar Pradesh, Noida Campus, India
(G06, B Block, Amity Institute of Nuclear Science and Technology)**

Radioisotopes have wide spectrum of applications in various fields such as agriculture, health care, industry and research. Unsealed radiation sources of different strength and physical forms are handled in such studies in open field as well as in laboratories. This could cause radiation incidents/accidents like surface contamination and air-borne contamination. Hence handling of radiation sources in such applications necessitates supervision from radiological safety standpoint. The competent authority of the country has regulated the research applications using radiation sources by enforcing that the supervision of Radiological Safety Officer is mandatory in such institutions. Training course on radiation safety aspects in the research applications of ionizing radiation caters to the need of imparting training to personnel for enhancing their knowledge to function as Radiological Safety Officers.

2nd batch of 'Radiological Safety Officer (RSO) Certification Course' on "Research, Radiotracer and Column Scanning Applications of Ionizing Radiation" was conducted in collaboration with Radiological Physics & Advisory Division (RP&AD), Bhabha Atomic Research Centre (BARC) at Amity University Uttar Pradesh, Noida campus during 15-23 January 2024 after successful completion of 1st batch of RSO at Amity university campus. The RSO certification course is a paid course. A total of 23 candidates registered for the above mentioned RSO certification course. Participants were from industries, research institutions and academia who are handling sealed and unsealed radioactive sources as well as who will be establishing radioisotope laboratory. Three candidates were from Amity University Uttar Pradesh, Noida

Objective of RSO certification course

- Imparting training to personnel for enhancing their knowledge to function as Radiological Safety Officers.

Invited Experts:

- ✓ Dr. Aruna Kaushik, INMAS, DRDO
- ✓ Prof. Suresh Kumar, Delhi University
- ✓ Mr. Ajeet Singh, AERB
- ✓ Dr. Sunil Goswami, Isotope and Radiation Application Division, BARC

The RSO certification course commenced on 15th Jan 2024 with the lighting of lamp along with Saraswati-Vandana by Director & Head and faculty members of Amity Institute of Nuclear Science and

Technology, Amity University Uttar Pradesh. Director & Head, AINST welcomed all the participants of RSO certification course. Before starting the technical program, all participants introduced themselves.

This 7 days course was comprised of lectures and laboratory demonstration followed by written examination and viva. Lecture topics were starting from basics of radiation physics, radiation detection measurement, and radiation protection to planning of radioisotope laboratory, various regulatory aspects and application of radioisotope and radiotracers in industrial applications. Following laboratory experiments were demonstrated for the participants to make them aware about various radiation protection measures during the handling of radioactivity and radiations in the laboratory.

- Radiation absorption characteristics and HVL/TVL measurement.
- Verification of variation of intensity of radiation with the inverse of the square of distance.
- Contamination measurement & decontamination procedures
- Radiation protection survey of radioisotope laboratory

Written examination and viva was conducted by officials from RP&AD, BARC on the last day (23rd Jan 2024) of the RSO certification course. Two candidates from 1st batch of RSO course were also appeared for written examination and viva. A total of 23 candidates out of 25 (92%) qualified for the RSO course certificate.

RSO certificates were distributed to the successful candidates during concluding ceremony and name of highest marks scores of the RSO certification course was announced. Later on, a google form was circulated among the participants, and they provided their feedback.

Registration fees collected: Rs. 2,52,000/-

Achieved Outcomes of RSO certification course:-

- Imparted training to participants for enhancing their knowledge to work as Radiological Safety Officers.
- 92% participants of the RSO certification course received the certificate
- All three candidates from Amity University received RSO certificates after successful completion.

Other achieved outcomes could be

- Revenue generation for AINST, AUUP.
- Enhanced the possibility of future collaboration with the RP & AD , BARC
- Possibility for approval of advanced level RSO certification course.
- Increased the visibility of the Nuclear Security Education Laboratory and AINST
- Possibility of collaboration with reputed organisations and Research Laboratories from where the participants had joined.

Program Schedule

Date / Time	10:00 – 11:00	11:00 – 12:00	12:00 – 13:00	14:30 – 15:30	15:30- 16:30
15/01/2024 Monday	Basic Radiation Physics (Dr. Alpana Goel, AINST, Amity Univ)	Interaction of Ionizing Radiation With Matter (Ms. Archana Yadav AINST, Amity Univ)	Radiation Quantities & Units (Dr. Unnati Gupta AINST, Amity Univ)	Radiation Detection and Measurement – 1 (Prof. Suresh Kumar, Delhi Univ.)	Radiation Detection and Measurement – 2 (Prof. Suresh Kumar, Delhi Univ.)
16/01/2024 Tuesday	Biological Effects of Ionizing Radiation – 1 (Dr. Arpita Datta AINST, Amity Univ)	Operational Limits (Dr. Unnati Gupta AINST, Amity Univ)	Biological Effects of Ionizing Radiation - 2 (Dr. Arpita Datta AINST, Amity Univ)	Radiation Detection and Measurement – 3 (Prof. Suresh Kumar, Delhi Univ.)	Application of Ionizing Radiation in Research, Medicine, Agricultural and Industry – 1 (Dr. Arpita Datta AINST, Amity Univ)
17/01/2024 Wednesday	Radiation Hazard Evaluation & Control - 1 (Ms. Archana Yadav AINST, Amity Univ)	Applications of Ionizing Radiation in Medicine – 2 (Dr. Arpita Datta AINST, Amity Univ)	Radiation Hazard Evaluation & Control – 2 (Ms. Archana Yadav AINST, Amity Univ)	Radiation Hazard Evaluation & Control – 3 (Ms. Archana Yadav AINST, Amity Univ)	Production of Radioisotopes & Labeled Compounds (Dr. Arpita Datta AINST, Amity Univ)
18/01/2024 Thursday	Planning of Radioisotope Laboratories (Dr. Aruna Kaushik, INMAS, DRDO).	Regulatory Aspects of Radioisotope Laboratories (Mr. Ajeet Singh, AERB)	Disposal of Radioactive Waste (Dr. Aruna Kaushik, INMAS, DRDO).	Practical demonstration - 1 Radiation absorption characteristics and HVL/TVL Measurement, calibration of survey instruments (Dr. Sudatta Ray, AINST, Amity Univ.)	
19/01/2024 Friday	Radiation Accidents, Case Studies and Lessons Learned (Dr. Sudatta Ray, AINST, Amity Univ.)	Emergency Response Plans and Preparedness (Prof. Suresh Kumar, Delhi Univ.)	Transport of Radioactive Material (Prof. Suresh Kumar, Delhi Univ.)	Practical demonstration - 2 Contamination measurement & decontamination procedures (Dr. Arpita Datta AINST, Amity Univ)	
22/01/2024 Monday	Radiotracer Applications in Industries – 1 (BARC)	Radiotracer Applications in Industries – 2 (BARC)	Sediment transport Investigations at Ports (BARC)	Special Lecture: e-Licencing of Radiation Applications (e-Lora) (Mr. Ajeet Singh, AERB)	Practical demonstration – 3 Radiation Protection Survey of Radioisotope Laboratory (Dr. Unnati Gupta, AINST, Amity Univ.)
23/01/2024 Tuesday	Written Examination (10.00 - 11.30 hrs)	Assessment on Practical & Result Declaration by BARC officials			

Pic





Feedback:

2. Were the lectures delivered met the expectations and learning outcomes.

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 Insights

● poor	0
● average	0
● good	6
● excellent	12



3. Were the course content/material of appropriate level and sufficient for the expected learning.

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● Poor	0
● Average	1
● Good	2
● Excellent	15



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

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 Insights

 Poor	0
 Average	0
 Good	4
 Excellent	14



5. Which approach do you like the most?

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 Lecture and discussions	7
 Experimentation in Laboratory	0
 Both support the expected Lear...	10
 change of methodology required	0
 Others	1



6. Did the laboratory experiments meet your expectations and expected learning?

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 Insights

 Poor	0
 Average	2
 Good	9
 Excellent	7



7. Any other suggestions/ thoughts or comments for improvement.

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 Insights

ID ↑	Name	Responses
1	anonymous	Only one suggestion i have which is regarding experiment. There was too much people in single batch so i will be graet if it is further divided in smaller batches.
2	anonymous	Overall experience is good
3	anonymous	Practice of numerical should be done more and more so as to remove the fear of candidates
4	anonymous	If possible question paper should be in Hindi language also
5	anonymous	Overall it was very good, just if the lab experiments could be done in smaller groups it would be more interactive.
6	anonymous	<p>1. The campus was so beautiful and clean, I can't even compare that with our IISc campus. 2. The hospitality was so good, even we central institutes can't do that. 3. Lab experiments need to be improved, so that we can get some time to understand the basics about the experiments, many of them not from physics background. 4. Class of Prof. Alpna Goel - It was concise and delivered with the basics what we needed. 5. Prof. Arpita Datta - She knows what exactly we need, delivered excellent lecture which we understood. 6. Prof. Unnati - She also delivered the basics what we exactly need, her expressions was attractive, but need to improve in lab experiment. 7. Prof. Archana - Her knowledge was so good, but couldn't able to catch her classes. 8. Dr. Aruna - It was an excellent lectures, she knows how to convey the people, and her lecture simplicity is more than enough. 9. Prof. Sudatta - Her innocence was making us to listen to her words. 10. Prof. Suresh - He had very well experience, but the lecture was bouncing above my head. I couldn't able to understand anything except Mayapuri incident. 11. Over all things are more than what we expected. 12. Please get into the level of the people while</p>
		delivering the lectures, thinks empathetically in the listeners place. (ex: While I was giving training for security, I use to call cylinder for extinguisher, so that they can easily catch that thing) 13. Ultimately I don't forget the experience in AINST in my life, I will take that as example.
7	anonymous	Overall great
8	anonymous	Having an additional heater during the cold days, would help.
9	anonymous	Everything was perfect
10	anonymous	interaction with student is best. Please take a short revision of student time to time at the end of day

11	anonymous	Lectures were very good and the effort of teachers make us to prepare so nicely that the exam paper was looking very easy.
12	anonymous	Overall the experience was good. We have learnt a lot and thank you Amity University for arranging this course for us.
13	anonymous	-
14	anonymous	No further suggestions every thing is excellent
15	anonymous	For upcoming batches, kindly make arrangement of industrial expertise who have hands on experience in the same field of the course content for easy understanding of students (As students are from different educational background)..
16	anonymous	While explaining the experiments in the lab relevant aspects should also be explained. for example, while demonstrating the cleaning of radioactive waste it should have been told that for which (ex. Iodine) isotope which filter paper (charcoal) is used and why.
17	anonymous	More focus should be given to laboratory experiments and practical exposures. Number of days of training may be extended to 2 weeks.
18	anonymous	Everything proceeded smoothly.