Nuclear Technology Seminar JFY2025

Course Prospectus

Basic Radiation Knowledge for School Education

Nuclear Human Resource Development Center
JAPAN ATOMIC ENERGY AGENCY

1 COURSE INTRODUCTION

1.1 Description

The Basic Radiation Knowledge for School Education Course was launched in 2012 to foster capable personnel who would contribute to raising public awareness of radiation safety. The reason for launching is also that dissemination of the basic knowledge of radiation in public and education sectors has been recognized as an important issue in the aftermath of the Fukushima Daiichi Nuclear Power Station Accident occurred in 2011. The Course provides participants with both the basic knowledge and practical skills in radiation, and there are three categories in the course curriculum; lecture, exercise, facility visit. Lecture covers a wide range of necessary topics to meet course objectives such as basics of radiation, the effects of radiation on human health. Japanese experiences on radiation education and public information. The course will also address teaching methods of the basic knowledge of radiation for schools and local citizens including practical exercises, nuclear related facility visits, discussion on radiation education programs, as well as developing an implementation plan of radiation education in each country.

1.2 Objectives

- To expand knowledge on radiation and radiation effects.
- To acquire teaching skills and abilities to disseminate the basic knowledge of radiation for schools and local citizens.
- To exchange information on nuclear science educational programs in Asian countries.
- To acquire skills and methods for developing a teaching program and for meeting the educational needs.

1.3 Duration

3 July – 16 July 2025

2 COURSE SYLLABUS (Tentative)

2.1 Lectures

1) Basics of Radiation and Radiation Protection
   - Units of radiation
   - Interaction of radiation with matter
   - Internal and external exposures
   - Basics of radiation protection

2) Radiation Effects on Human Body
   - Various radiations and its effects on human cells
   - Acute and late effects of radiation

3) Introduction to Nuclear Reactor
   - History of various reactors
   - Outline and utilization of research reactor
   - Mechanisms and features of light water reactor, boiling water reactor and pressurized water reactor

4) Japanese Experiences on Radiation Education
   - Development of framework and programs/tools about radiation education for secondary school in Japan
   - Suggestion about radiation education to Asian countries

5) Outline of the Fukushima Daiichi Nuclear Power Station Accident and Environmental Impact
   - Summary of the accident progress and its cause
   - Radioactive materials released from the accident
   - Influence of the accident on residents life
   - Change in the criteria of radioactivity concentration in food
   - Environmental impact after the accident

6) Risk Governance and Dialogue between Stakeholders
   - Understanding of local residents and other stakeholders for locating and managing nuclear power plants
   - The theory and the present situation of the above

7) Radiation and Nuclear Education for the Following Generations by JAEA
   - JAEA's public relation teams and their outreach activities
   - Modification of the activities following the accidents
   - Hands-on activities for students to learn through experience
   - Voices from students and teachers

2.2 Exercises

1) Cloud Chamber; Principle and Craft
   - History and principle of cloud chamber
   - Crafting cloud chamber
   - Observing radiation

2) Discussion on Radiation Education
   - Sharing the experiences of radiation education/communication activities in Asian countries
   - Strategies to enforce radiation education

3) Radiation Measuring Experiment (with students)
   - Measuring natural radiation using radiation detectors
   - Studying properties of radiation by experiment

4) Basics of Radiation Protection and Decontamination Technique
   - Radioactive contamination and necessity of decontamination
   - Decontamination methods
   - How to put on radiation protective gears

5) Presentation on Radiation Education

2.3 Facility Visits

- Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Holdings, Inc.
- The Great East Japan Earthquake Nuclear Disaster Memorial Museum
- Ibaraki Museum of Nuclear Science
- Japan Research Reactor-3 in JAEA
- High Temperature Engineering Test Reactor in JAEA

3 ASSIGNMENT

1) Country Report
   - Self-introduction
   - Radiation Education/Outreach Activities/Public Relations in your Country

2) Group Discussion on Radiation Education and Presentation