

“Japan is the only country in the world to have experienced nuclear bombing. The country also has experienced a severe accident at the Fukushima Daiichi Nuclear Power Plant. The IREM works to maintain skills and to promote research for radiation sciences. The knowledge gained from these experiences and from the work of the IREM must be utilized to ensure nuclear safety worldwide. Human resource development is the most important and urgent issue. The IREM offers the international training program for radiation protection. In the event of a nuclear disaster, multifaceted assistance based on biological, physical, and chemical dose assessments of exposed patients is needed for radiation medical treatment.”

### About us:

The Institute of Radiation Emergency Medicine (IREM) was established to develop unprecedented approaches for such items as health management in nuclear facilities and radiation exposure management in medical facilities throughout Japan, and to train expert human resources who can respond to emergency nuclear exposure accidents. We have been pursuing pioneering and advanced research in a wide range of natural sciences, but our main focus has been on radiation science. During the severe nuclear accident in Fukushima, Japan in 2011, we were involved in implementing countermeasures against this disaster and our members gained many experiences and obtained countless new scientific findings, skills and knowledge. From these valuable experiences we saw that scientists in the same field need to work together to make societies that are enriched and safer.

Contact us for more information  
and to register for a course

Website: <http://www.irem.hirosaki-u.ac.jp/en/index.html>  
Email: [irem\\_trainingoffice@hirosaki-u.ac.jp](mailto:irem_trainingoffice@hirosaki-u.ac.jp)

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## International Training Program For Radiation Protection



### Offering accredited courses in:

The international training program for radiation protection teaches accredited continuing education courses in radiation protection that include lectures, discussions, and hands-on activities as course participants learn about radiological and nuclear incidents, radiation exposure and dose assessment.

Training program design can be adapted to level and experience of the participant, covering undergraduate university students, to early career staff members and post-graduate scientists. Three different training courses are available. The training course is held according to the trainee's request and the contents can be arranged by request also.

- ✧ Radiation protection
- ✧ Physical measurements and dose estimation
- ✧ Chemical approach for internal dose assessment
- ✧ Biological impact assessment

See full details of course listings:  
<http://www.irem.hirosaki-u.ac.jp/en/index.html>



## Entry

The Entry course provides a short-term introduction to the facilities of the IREM and the Advanced Emergency and Disaster Medical Center which respond to a nuclear accident. Environmental monitoring in normal and emergency situations, pre- and post-Fukushima accident, is introduced in Japan and Aomori Prefecture.

## Basic

The Basic course provides basic knowledge involving principles about ionizing radiation and radionuclides, measurement skills, assessment of biological impact, and emergency response during radiological incidents. The 5-day course offers fundamental knowledge about radiation protection thorough lectures and hands-on activities.

### Radiation protection

#### Specific training fields:

- ❖ Basics of radiation protection
- ❖ Environmental monitoring
- ❖ Emergency response

#### Example 5-day Basic Course

**Objective:** Learning basic knowledge and measurement skills for protection of humans and the environment against ionizing radiation.

**Target:** Undergraduate and graduate students, early career scientists and workers in nuclear-related facilities.

**Prerequisite:** Formal education at the university or equivalent level in physics, chemistry or life science.

### Schedule of training program (Example Basic course)

Lecture contents		
Day 1		
AM	Orientation to the Training Program	
PM-1	Radiation protection - Fundamentals on ionizing radiation	Lecture
PM-2	Lab tour - IREM, Hospital	
Day 2		
AM-1	Radiation protection - Radiation physics	Lecture
AM-2	Radiation protection - Biological effects of ionizing radiation	Lecture
PM-1	Radiation protection - Measurement of radiation	Practice
PM-2	Radiation protection - Assessment of external and internal exposures	Lecture
Day 3		
AM	Radiation protection - Radiochemistry	Lecture
PM	Environmental sampling and radiation measurement - In situ measurement, car-borne measurement, sampling	Practice
Day 4		
AM	Environmental monitoring - Sample treatment, Radiation measurement	Practice
	<u>Emergency situation</u>	
PM-1	Case study I: Fukushima Daiichi Nuclear Power Plant accident - Emergency response and lessons learned	Lecture
PM-2	<u>Emergency situation</u> - Practices for surveys, zoning, wearing protective suit, decontamination, risk assessment	Practice
Day 5		
	<u>Emergency situation</u>	
AM	Case study II: JAEA Oarai facility accident - Radioactive contamination and exposure accident of workers	Lecture
PM-1	Presentation, Examination	
PM-2	Closing - Presentation of Training Completion Certificate	



## Advanced courses

**Advanced courses** are prepared for specific fields in radiation physics, chemistry and biology to respond to practical issues for various radiological incidents. Participants can choose contents and customize the course, schedule and duration on request. All courses are held according to the request of trainees.

### General Subjects:

#### ★ Physical measurements and dose evaluations

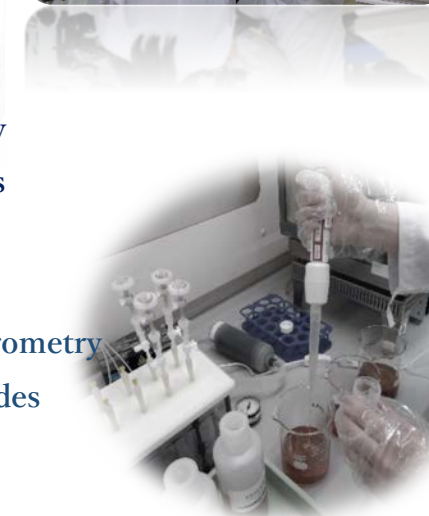
- Measurements of environmental radiation and radioactivity
- Simulation of the environmental behaviors of radionuclides and dose assessment

#### ✓ Analytical chemistry

- Radionuclide and heavy metal analyses by ICP mass spectrometry
- Radiochemical analysis of low concentrations of radionuclides in environmental samples

#### ➤ Biological impact assessment

- ✧ Radiation effect evaluation using peripheral blood
- ✧ Cytotoxicity evaluation using cell lines



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