



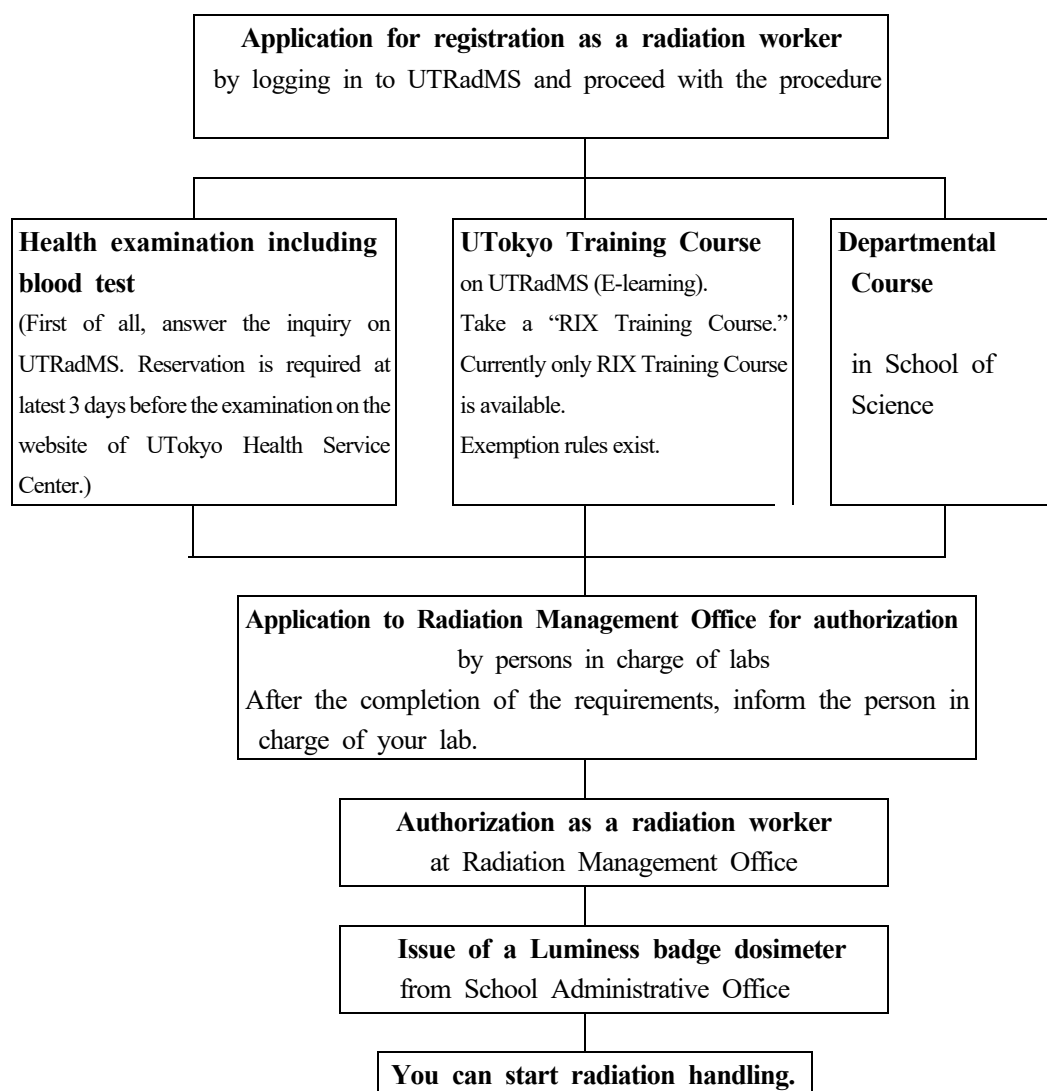
Radiation Safety Manual

April 2021

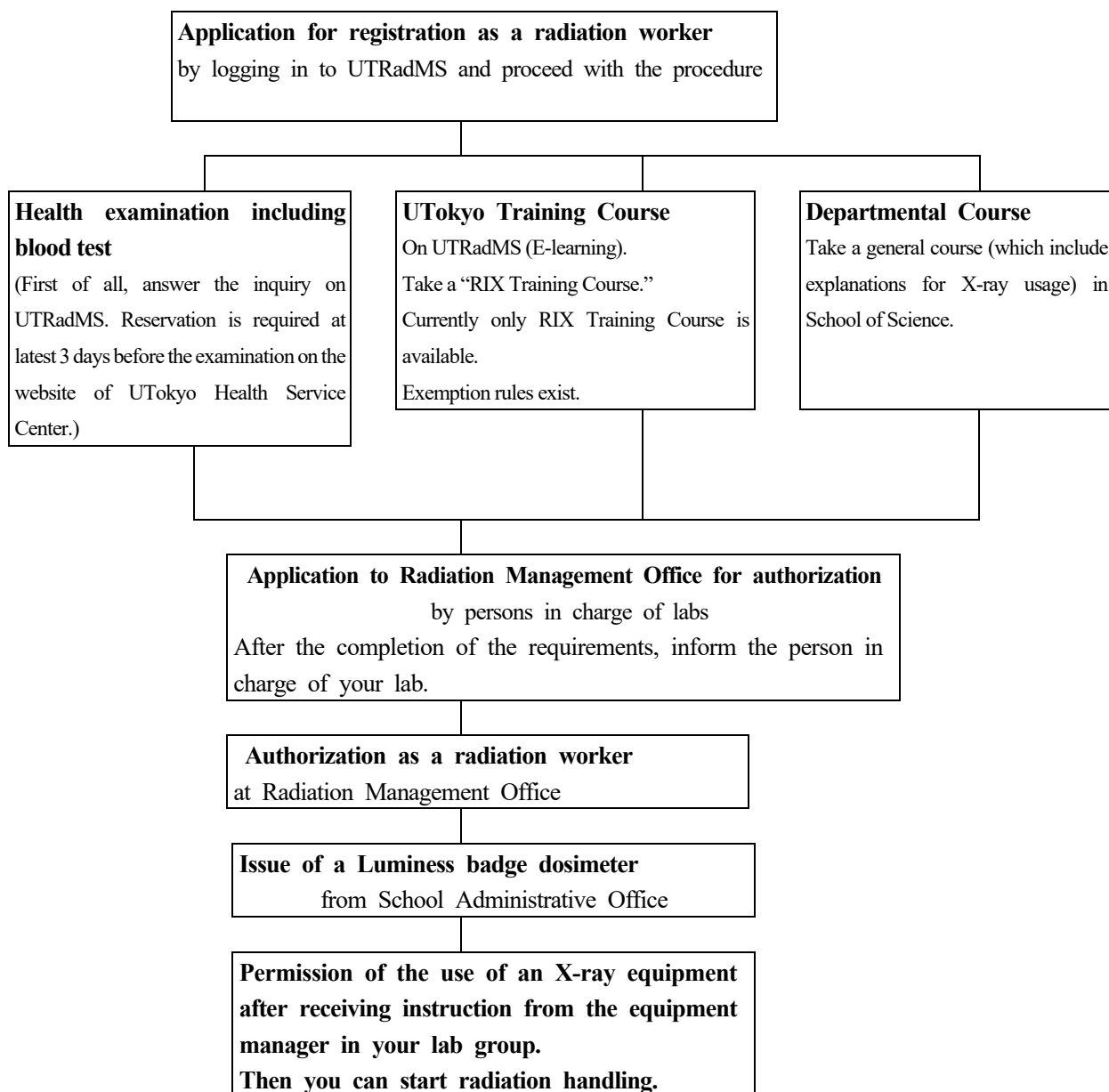
School of Science, the University of Tokyo



■ Flow Sheet for Radioisotope and Radiation Generating Equipment Users (Accelerators, SOR = Synchrotron Radiation Facilities, Nuclear Reactors etc.)



■ **Flow Sheet for X-ray Equipment (Categories C, D and E) Users**

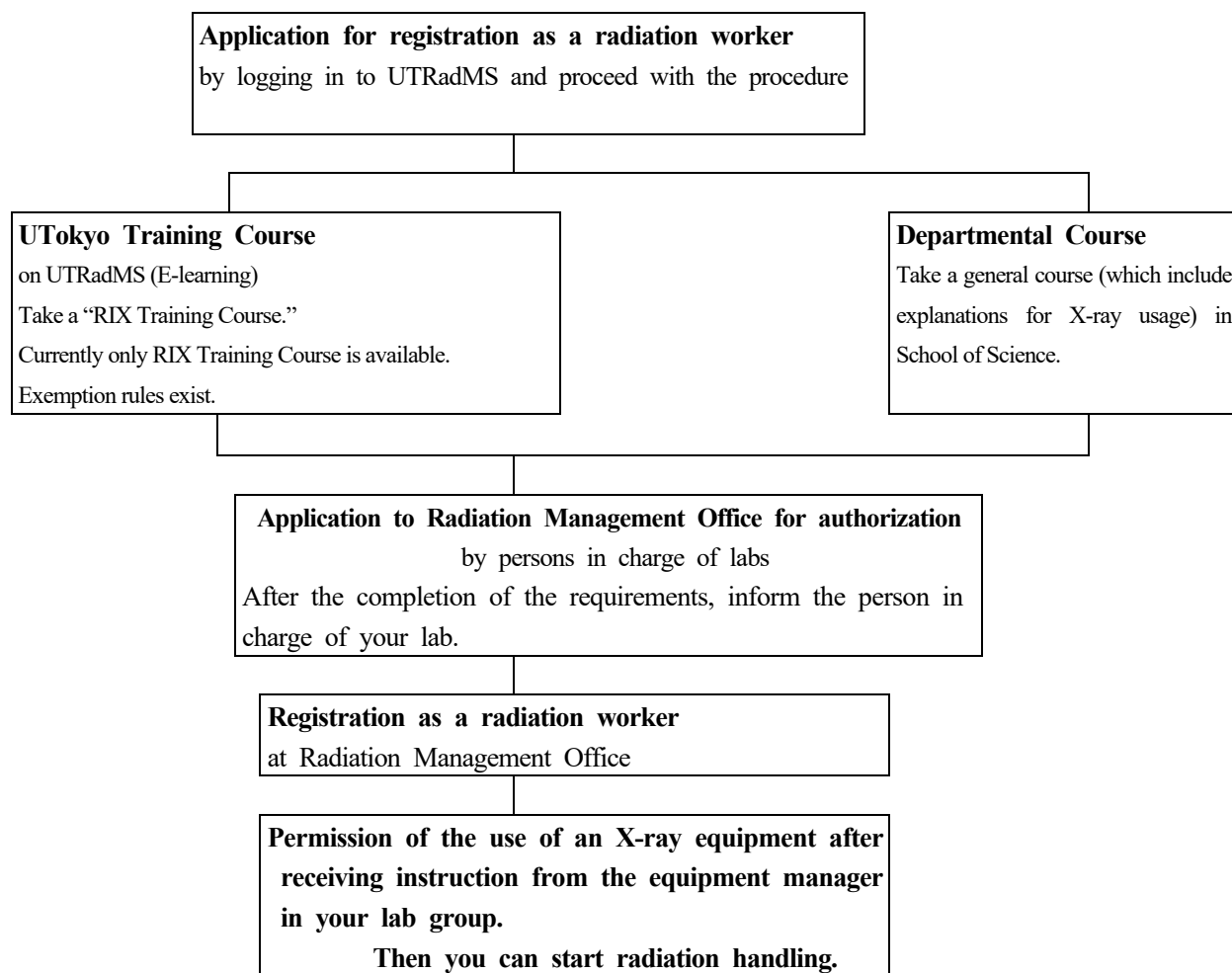


** Once you have finished a “RIX Training Course”, you do not need to take an “X-ray Training Course.”

Classification of X-ray Equipment

- Category A: X-ray equipment installed in a completely sealed box.
- Category B: X-ray equipment with a safety device used all the time.
- Category C: X-ray equipment with a safety device used appropriately.
- Category D: X-ray equipment installed in a room for their exclusive use.
- Category E: mobile X-ray equipment.

■ Flow Sheet for X-ray Equipment (Categories A and B) Users



** Once you have finished a “RIX Training Course”, you do not need to take an “X-ray Training Course.”

Procedures for Registration as a Radiation Worker

- 1) You must be registered as a radiation worker before you start radiation handling.
- 2) First of all, you need to apply for registration on UTRadMS after obtaining consent from a person in charge of your lab.
- 3) If you have already worked before as a radiation worker in the University of Tokyo, or in another university or institute, you will be exempt from UTokyo training courses by submitting necessary certificates.
- 4) Registration as a radiation worker is not automatic. After you have finished necessary courses and health examination (exemption for X-ray users of category A & B), you should inform the person in charge of your lab and he/she will ask the Radiation Management Office for authorization.
- 5) Be aware that the whole procedure can take more than a month or even a few months. You should make your plan well in advance before you can start your experiment with radiation handling.

UTokyo Training Course

UTokyo training course is offered by E-learning system. There were two courses: RIX (Radioisotope and X-ray) Training Course and X-ray Training Course, but currently only RIX Training Course is available. Regardless of the materials and equipment which you will use, take RIX Training Course.

- 1) You can choose a course in English or in Japanese.
- 2) You need to apply for the e-learning on the system.
- 3) After the approval, you will receive an e-mail from UTRadMS. Please follow the instructions and proceed with the procedure.
- 4) E-learning will be available from the next day of the application.

Departmental Courses in School of Science

- 1) You must take a departmental course in School of Science before you start radiation handling.
- 2) Two types of departmental courses are available in School of Science:
 - a) General Departmental Course,
 - b) Departmental Course at Department of Biological Sciences (Science Bldg. 3),
Those who belong to Department of Biological Sciences (Science Bldg. 3) (except for users of X-ray equipment) can take the course given at their department. Others should take a General Departmental Course.
- 3) Radiation workers must take a departmental course periodically (once a year) to retain their status as registered radiation workers.

Health Examination for New Registrants

- 1) To check the date, time and place, see the website of UTokyo Health Service Center.
<http://www.hc.u-tokyo.ac.jp/checkups/radio-isotope-use-medical-screening/>
- 2) First of all, log in to UTRadMS and answer an inquiry. After the primary judgement, you will receive an e-mail from UTRadMS. Please follow the instructions and proceed with the procedure.
- 3) You need to make a reservation at the website of UTokyo Health Service Center at latest 3 days before the examination. Confirm the details by referring to the e-mail from UTRadMS.
- 4) You should make a reservation as soon as possible because the number of people who can be examined in one day is limited. And make sure the time and the place.
- 5) You will need to have further medical checkup when the medical doctor judges it necessary.

Periodic Health Examination

The periodic health examinations will be made by questionnaire on UTRadMS.

- 1) Radiation workers must have a health examination periodically.
- 2) The periodic health examinations for radiation workers are made twice a year by using a questionnaire around July and January of the following year. If you receive an e-mail about the periodic health examination from UTRadMS, please answer inquiries on UTRadMS.
- 3) A medical doctor of Health Service Center checks your answer. You will need to have further medical checkup when the medical doctor judges it necessary.

Health Examination in Case of Extraordinary Exposure

When the following incidents should occur, contact immediately someone who is relevant to radiation management (see Communication Network for Radiation Emergency)*. The fact of your radiation exposure will be checked, and you may be sent to a medical examination in case of necessity.

- (a) You have taken any radioisotope into your body by mistake.
- (b) The radioactive contamination level of your skin exceeds the limit.
- (c) Your wound is contaminated with any radioisotope.
- (d) Your effective dose exceeds 5 mSv per year or your tissue dose equivalent exceeds 3 tenths of the limit. For example, a part of your body is directly exposed to X-ray beam from an X-ray equipment.

* In case the situation is urgent and you have no choice, contact directly University Hospital.

Emergency Room, University Hospital (at night, on weekend and on holidays)

TEL 34100
 (03)5800-8683

Luminess Badge Dosimeter

We use Luminess badge dosimeters to monitor radiation workers of School of Science, the University of Tokyo.

- 1) Wear a suitable type Luminess badge dosimeter.
 SG-type: X-ray, β -ray, and γ -ray
 KG-type: X-ray, β -ray, γ -ray, thermal neutron, and fast neutron
- 2) Wear your dosimeter when you enter controlled radiation areas.
- 3) We collect all the distributed dosimeters and send them to the Nagase-Landauer Company for the measurement of dose. Return your used dosimeter to the Laboratory Manager of your laboratory and receive your new dosimeter from him/her at the beginning of every month.
- 4) The report of the result can be checked on the monthly report sent to your lab and on UTRadMS.

Organization

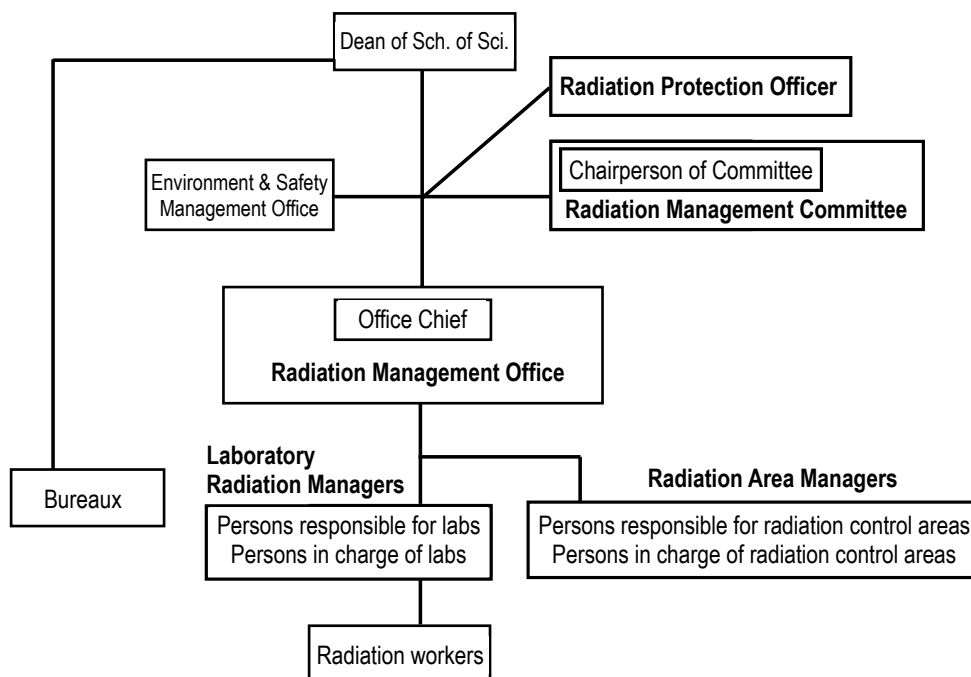


Fig.4 The diagram of the organization for general radiation workers (category RIX) in the School of Science, The University of Tokyo and personnel in radiation management and protection.

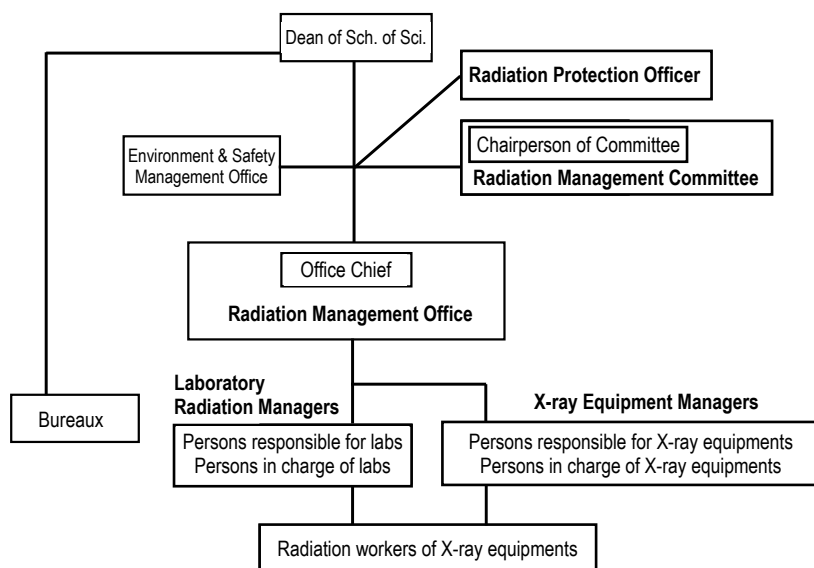
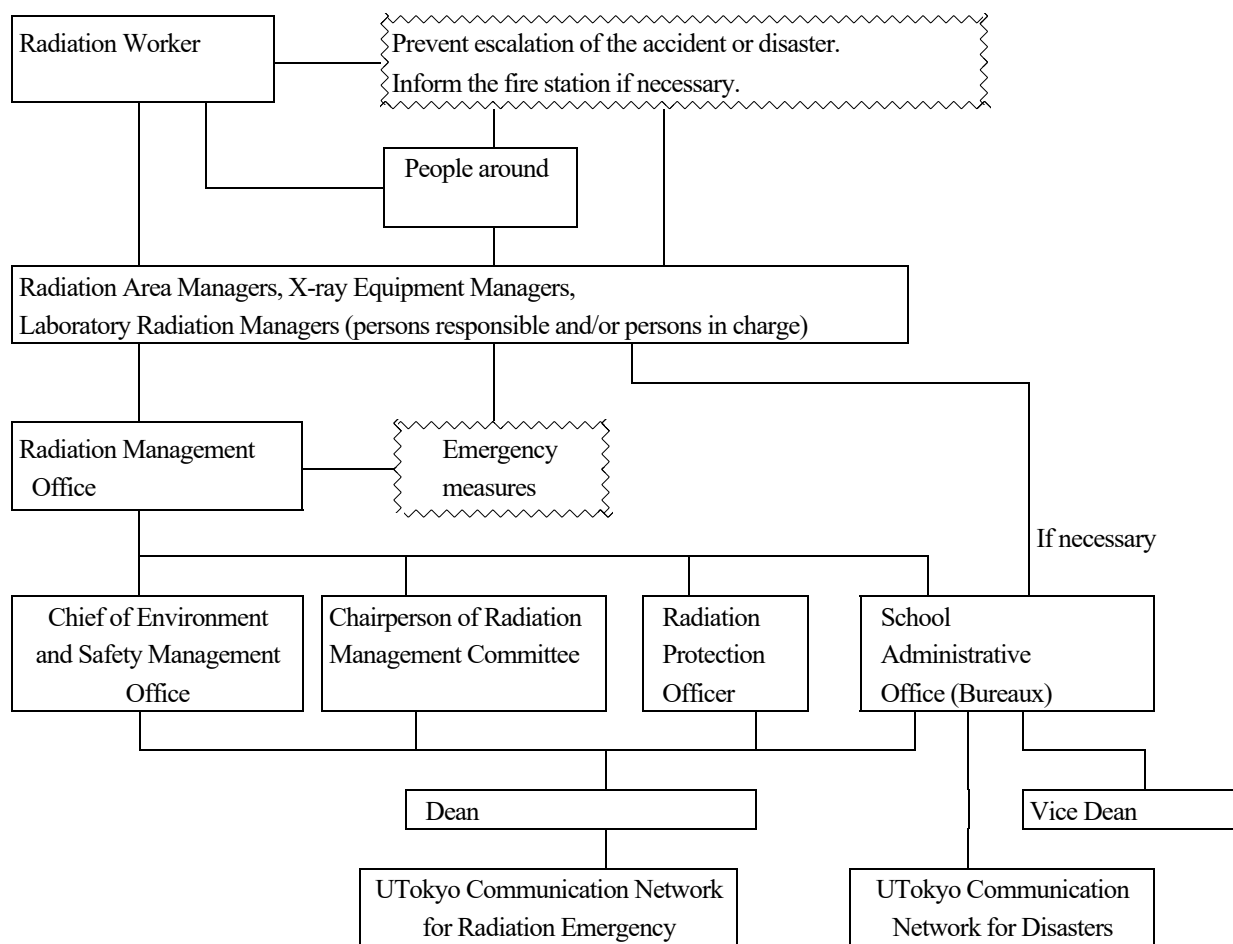


Fig. 5 The diagram of the organization for radiation workers who use X-ray equipments and personnel in radiation management and protection

Communication Network for Radiation Emergency



Contacts (April 2021)

Application for registration of radiation workers Change of registration of radiation workers Application for UTokyo training courses Answer to inquiries before the health examination for new registrants Answer to inquiries at periodic health examinations	UTRadMS Proceed with the procedure by yourself
Health examination for new registrants (Need to make a reservation at latest 3 days before the examination)	UTokyo Health Service Center http://www.hc.u-tokyo.ac.jp/checkups/ radio-isotope-use-medical-screening/
Distribution and recovery of Luminess badge dosimeters	School Administrative Office TEL <input type="text"/> 24030
Application for authorization as radiation workers, Issue of certificates, Documents for accelerator and SOR facilities Purchase, transfer, transportation, and disposal of radioisotopes Installation and change of radiation facilities Registration of X-ray equipment and electron microscopes Report of the result of tests of X-ray equipment and electron microscopes Unusual radiation incidents, accidents, and problems	Radiation Management Office

Radiation Management Office, School of Science, the University of Tokyo

locality in Room B283, School of Science Bldg. 1 East, B2F

staff H. A. Torii, M. Tanikawa, H. Tozawa and N. Hyogo

E-mail ri-jimu@chem.s.u-tokyo.ac.jp

TEL 24606 direct line/ mobile phone (03)5841-4606

FAX 21363 direct line/ mobile phone (03)5841-1363

Tips for Safe Handling of X-ray Equipment (Categories A and B)

- 1) Never invalidate the safety device.
- 2) Follow the equipment manager's directions.

Tips for Safe Handling of X-ray Equipment (Categories C, D, and E)

- 1) Never insert any parts of your body into X-ray beam.
 - 2) Shut down the generator power when exchanging your samples.
 - 3) When the above is impractical, confirm the shutter being closed.
 - 4) Improve working process and/or the equipment, make possible exposure time shorter.
 - 5) Users of equipment with exchangeable targets should check leakage of X-rays by survey meter at each time.
- It is desirable to keep record in a fixed format.

Safety in Radiation Generating Equipment Facilities (Accelerators, SOR Facilities, Reactors etc.)

- 1) Follow the rules of the facility.
- 2) Follow the directions of the radiation manager of the facility.
- 3) Wear your personal dosimeter while you work in controlled area. As a general rule, a dosimeter capable of detecting neutrons must be used.
- 4) Do not enter the accelerator zone while beams are generated from the accelerator. The radiation level in the zone is very high during the time.
- 5) Be careful of radiation from radioisotopes produced by nuclear reactions. Measure the dose rate by using a survey meter when you start your work.