RADIATION SAFETY

Introduction

The following sections provide general safety guidelines and procedures for radiation safety. This chapter covers the following topics:

Radiological Safety at UT Arlington

UT Arlington maintains strict requirements for working with sources of radiation. The Radiation Safety Program at UT Arlington protects employees, students, and visitors as well as the public and the environment from the harmful effects of exposure to ionizing and non-ionizing radiation. The UT Arlington Radiation Safety Committee (RSC) governs the protocol and use of radioactive materials on campus, assisted by the Radiation Safety Officer (RSO) and other radiation safety staff of the Environmental Health & Safety Office (EH&S).

Any faculty or staff member who desires to work with radioisotopes must submit an application to the RSC for a radioactive material sublicense. In addition, anyone who works with sources of radiation must receive formal Radiation Safety Training.

The Radiation Safety Manual has been distributed to users of radioactive materials on campus and is available on the EH&S website.

Radioactive Materials

The purpose of the Radiation Safety Manual is to establish the policies of UT Arlington with regard to the use of licensed radioactive materials. These policies apply to sealed sources as well as to open isotopes regardless of physical or chemical form.

- Radioactive materials may only be possessed by or under the supervision of individuals who have received an approved sublicense from the RSC.
- A Principal Investigators (PI) or their designee shall obtain approval from the Radiation Safety Officer (RSO) before placing an order for radioactive materials.
- Approval is also required before a PI may receive radioactive materials via transfer from another licensee, via donations, etc.
- All sources of radiation shall be secured from unauthorized access or removal.
- All radioactive wastes shall be disposed through the RSO.
- All persons are responsible for safe working practices and for maintaining their own exposures to ionizing radiations As Low As Reasonably Achievable (ALARA).
- Each user is responsible for reporting unsafe practices and/or rules violations to the PI and the RSO.
- PIs and users of radioactive materials shall comply with all aspects of the Radiation Safety Manual.

Radiation-Producing Devices

Radiation-producing devices such as x-ray machines are regulated by the Texas Department of State Health Services (DSHS), Radiation Control Program. All radiation-producing devices must be registered with EH&S and approved by the RSO prior to the device being used at UT Arlington. For each new device the PI should fill out and submit a Radiation Producing Machine Registration (RPMR) form to EH&S via email, fax, or hard copy to Box 19257.

The Radiation Producing Machine Safety Manual has been distributed to users of radioactive materials on campus and is available on the EH&S website.

Lasers

The State of Texas regulates the use of lasers through the (DSHS), Radiation Control Program. EH& registers, and is responsible for, the safe use of all lasers on campus.

Lasers present many safety threats, but the most common threat is damage to the eyes. Other common laser concerns include skin damage, electrical hazards from high-energy power sources, chemical exposure, fire/explosion hazards, and exposure to cryogenic materials such as hydrogen and oxygen. Many lasers emit invisible ultraviolet or infrared radiation.

Lasers are classified into four basic categories as indicated below:

Class 1:	Lowest power lasers that do not emit hazardous levels.
Class 2:	Low-power lasers that pose a hazard only if viewed directly for extended periods.
Class 3:	Medium-power lasers that pose moderate risk and can cause injury.
Class 4:	High-energy, high-risk lasers that can cause injury to the eyes and skin from direct or diffused reflection.

NOTE:
If you work with a class 3 or 4 laser, there are a few steps that must be completed before work begins.

- Submit a completed Laser Device Registration (LDR) form.
- A Laser Safety Officer (LSO) approved Standard Operating Procedure (SOP), must be on file with EH&S for each laser registered.
- Complete the EH&S On-line Laser Safety Training.
- PI's and users of laser devices shall comply with all aspects of the Laser Safety Manual.

Follow these guidelines when working with Class 3 and 4 lasers:

- Never aim a laser at a person.
- Be very careful when working with hand-held laser pointers. Do not allow children access to laser pointers.
- Wear protective clothing such as eyewear and skin protection as appropriate. Post warning signs at entrances where lasers are present.
- When working with power supplies, remove jewelry, stand on a dry surface, and work with only one hand at a time.
- Observe high voltage precautions (see Electrical Safety chapter). Control access to areas where lasers are used (i.e., no spectators). If possible, enclose the entire laser beam path on Class 4 lasers.

Magnets

The information in this section pertains only to large magnets at UT Arlington such as those used for magnetic resonance imaging.

Because the magnetic flux lines (or pull) from the main magnetic field can extend well beyond the actual magnet, the greatest hazard associated with large magnets is the missile effect. Ferromagnetic objects such as pens, scissors, screwdrivers, gas cylinders, and other metallic devices can be pulled into the magnet with enough force to cause a serious injury or accident. In addition, magnetic fields may also disrupt pacemakers or cause injury to individuals with surgically implanted metal pins or plates. Credit cards and watches may also be adversely affected.

IMPORTANT:
To protect bystanders and prevent the accidental introduction of ferromagnetic materials within the proximity of a magnet, establish a security zone around any large magnet.

Microwaves

Microwaves are part of the electromagnetic spectrum; they range in frequency from 300 megahertz (MHz) to 300 gigahertz (GHz). Microwaves are used for communications, radar, intrusion alarms, door openers, and medical therapy, but they are most commonly used for cooking.

Metal reflects microwave radiation, but dry nonmetallic surfaces allow microwaves to pass through with little or no heating effect. Organic materials, however, are extremely heat conductive. Because microwaves can penetrate organic materials, including tissues, thermal burns and other effects may result from microwave exposure.

NOTE:
Microwave ovens are very safe when kept in good working condition and used properly. They do not serve as a source of exposure to harmful microwaves.

- Even though microwave ovens are not a source of harmful radiation exposure, they should be properly used and maintained.
- Do not put metal objects (including aluminum foil) into a microwave oven.
- Do not use a microwave oven if it is damaged.
- Ensure that the seal on a microwave oven is tight, intact, and in good condition (i.e., not charred or distorted).
- Ensure that microwave ovens are clearly labeled for laboratory use or food preparation only. Microwave ovens should only be repaired by trained personnel.