



Najran University
College of Applied Medical Sciences
Department of Radiological Sciences



Hazard Guide for Radiological Sciences Program

2025

Development and Quality Unit

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Introduction

This Hazard Guide outlines the potential hazards associated with the Radiological Sciences program at Najran University and provides detailed procedures for managing these risks. This guide aligns with the university's Safety and Risk Management guidelines to ensure a comprehensive approach to health and safety.

Program Mission, Objectives, and Learning Outcomes

Mission:

Preparing distinguished technological specialists in the field of radiological science and medical imaging and promoting scientific research and community service in accordance with the rules of institutional governance.

Objectives:

1. Prepare graduates equipped with the necessary skills to practice efficiently in the field of medical imaging and radiological sciences.
2. Equip students with fundamental research and critical thinking skills in medical imaging and radiological sciences.
3. Enhance clinical training to effectively apply radiological sciences and positively impact community health.
4. Provide a supportive academic environment for developing practical skills in radiological sciences.
5. Improve the program governance for continuous skill development and student performance in radiological sciences.

❖ Learning Outcomes:

Knowledge and Understanding

K1	Describe the principles of anatomy, physiology, pathology of body systems and their applications in the radiological sciences.
K2	Explain the concepts of personal, patient and departmental radiation safety and protection.
K3	Discuss the fundamentals of instrumentation components, imaging protocols, techniques and quality assurance used in different imaging modalities.

Skills

S1	Operate and manage effectively the different medical imaging equipment and practice the clinical and professional fieldwork.
S2	Practice a range of clinical skills used in image processing techniques and in diagnostic imaging systems.
S3	Apply the critical thinking skills that are required in interpretation and evaluation the medical images and in scientific research activities.

Values, Autonomy, and Responsibility

V1	Adhere to professional codes of ethical practice in diagnostic examinations and medical imaging processes.
V2	Display an interest and commitment to lifelong learning and continued learning.
V3	Demonstrate effective communication skills with patients, health team members and public.

General Safety Hazards

Personal Protective Equipment (PPE)

Hazard: Exposure to hazardous materials, radiation, and biological agents.

Management: Ensure all personnel wear appropriate PPE, including lab coats, gloves, safety goggles, and closed-toe shoes. Regularly inspect and maintain PPE.

Emergency Procedures

Hazard: Fire, chemical spills, radiation leaks, and medical emergencies.

Management: Familiarize yourself with emergency exits, fire extinguishers, first aid kits, emergency showers, and eye wash stations. Report any incidents immediately to the lab supervisor and follow established emergency protocols.

Laboratory Conduct

Hazard: Accidents due to improper behavior or cluttered workspaces.

Management: Maintain a clean and organized lab environment. No eating, drinking, or smoking in the labs. Properly label and store all chemicals and materials.

Specific Lab Hazards

Physics Lab

Electrical Safety:

Hazard: Electric shock and equipment damage.

Management: Ensure all electrical equipment is properly grounded. Inspect cords and plugs for damage before use. Avoid using damaged equipment.

Equipment Handling:

Hazard: Injury from improper use of equipment like oscilloscopes, function generators, and multimeters.

Management: Follow the manufacturer's instructions for equipment use. Provide training for proper handling and usage.

2.2 .Radiation Physics Lab

Radiation Exposure:

Hazard: Exposure to ionizing radiation.

Management: Wear dosimeters to monitor radiation levels. Use lead shields and barriers. Follow the ALARA (As Low As Reasonably Achievable) principle.

Radioactive Waste Disposal:

Hazard: Contamination from improper disposal of radioactive materials.

Management: Dispose of radioactive waste in designated containers. Follow proper disposal procedures.

X-ray Lab

Radiation Safety:

Hazard: Exposure to X-ray radiation.

Management: Use lead aprons and thyroid shields. Limit exposure time and maintain a safe distance from the radiation source.

Equipment Maintenance:

Hazard: Malfunctioning X-ray equipment.

Management: Perform regular maintenance and calibration. Ensure safety interlocks are functional.

Ultrasound (US) Lab

Transducer Care:

Hazard: Infection from contaminated transducers.

Management: Clean and disinfect transducers before and after use. Handle with care to avoid damage.

Gel Safety:

Hazard: Slipping hazards from gel spills.

Management: Use approved ultrasound gel. Clean spills immediately.

MRI Lab

Magnetic Safety:

Hazard: Attraction of metallic objects and potential injury.

Management: Screen for metallic objects before entering. Ensure all equipment is MRI-compatible.

Quenching Procedures:

Hazard: Rapid loss of cryogen causing oxygen displacement.

Management: Know and follow the quenching procedures. Evacuate immediately if a quench occurs.

CT Lab

Radiation Safety:

Hazard: Exposure to CT radiation.

Management: Use protective barriers. Ensure proper calibration and maintenance of CT equipment.

Patient Handling:

Hazard: Musculoskeletal injuries from improper patient handling.

Management: Follow proper lifting techniques. Secure patients to prevent movement during scans.

Nuclear Medicine Simulator Lab

Radiation Safety:

Hazard: Exposure to radioactive materials.

Management: Use personal dosimeters and monitor radiation levels regularly. Follow protocols for handling and disposing of radioactive materials.

Simulator Usage:

Hazard: Equipment malfunction or misuse.

Management: Ensure simulators are operated by trained personnel. Regularly check and maintain simulator equipment.

Communication and Training

Training Programs:

Hazard: Lack of knowledge about safety procedures.

Management: Provide regular training sessions for all students and staff on safety protocols and emergency procedures.

Emergency Drills:

Hazard: Inadequate preparedness for emergencies.

Management: Conduct regular emergency drills to ensure everyone knows how to respond in case of an emergency.

Compliance with University Guidelines

Alignment with University Policies:

Hazard: Inconsistency with university-wide safety protocols.

Management: Ensure all safety procedures and guidelines are consistent with the university's Safety and Risk Management guidelines. Regularly review and update the program's safety protocols to align with any changes in university policies.

Conclusion

Adherence to these detailed health, safety, and security guidelines is crucial for maintaining a safe and productive environment in the Radiological Sciences program. Regular training and awareness are essential to ensure that all students, faculty, and staff understand and follow these protocols. This commitment to safety supports the program's mission, objectives, and learning outcomes by ensuring a safe learning environment, promoting professional and ethical practices, and fostering continuous improvement in skills and knowledge.

References

1. **Najran University Safety and Risk Management Guidelines**
 - Official university document outlining the comprehensive safety protocols and risk management procedures applicable to all departments and programs.
 - Available at: Najran University Safety Guidelines
2. **Occupational Safety and Health Administration (OSHA) Standards**
 - Provides guidelines and standards for maintaining safety in laboratory environments, including radiation safety, chemical handling, and emergency procedures.
 - Website: OSHA Laboratory Safety
3. **International Commission on Radiological Protection (ICRP)**
 - Offers recommendations and standards for radiation protection and safety to minimize exposure and manage risks in radiological practices.
 - Website: [ICRP Publications](#)
4. **National Institute for Occupational Safety and Health (NIOSH)**
 - Provides research and recommendations for the prevention of work-related injuries and illnesses, with specific guidelines for laboratory safety.
 - Website: [NIOSH Laboratory Safety](#)
5. **World Health Organization (WHO) Radiation Safety Standards**
 - Sets international standards for radiation safety and protection, providing guidelines for safe practices in medical imaging and radiological sciences.
 - Website: [WHO Radiation Safety](#)
6. **American College of Radiology (ACR) Safety Guidelines**
 - Offers comprehensive safety guidelines for radiological practices, including protocols for MRI, CT, and nuclear medicine.
 - Website: ACR Safety Guidelines
7. **Radiological Society of North America (RSNA)**
 - Provides resources and guidelines on safe radiological practices and protocols for various imaging techniques.
 - Website: RSNA Safety
8. **International Atomic Energy Agency (IAEA) Safety Standards**
 - Offers safety standards and guidelines for radiation protection and safety in medical uses of radiation.
 - Website: IAEA Safety Standards
9. **Canadian Nuclear Safety Commission (CNSC)**
 - Provides regulatory guidelines and safety measures for the use of nuclear substances and radiation devices.

- Website: CNSC Safety

10. **American Society for Radiation Oncology (ASTRO)**

- Offers guidelines and safety protocols for radiation oncology practices.
- Website: ASTRO Safety Guidelines

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