Syllabus

Radiation Safety and Protection for Radiologic Technology Students

Course Description

This four-lesson e-learning course introduces beginning radiologic technology students to fundamental radiation-safety principles and their application during radiographic procedures. Through demonstrations, interactive practice, realistic scenarios, discussions, and assessments, learners will develop practical decision-making skills for protecting patients, themselves, and others while minimizing unnecessary radiation exposure.

Instructional Goal

Upon completion of this e-learning course, beginning radiologic technology students will be able to apply fundamental radiation-safety principles and select appropriate protective practices to minimize unnecessary radiation exposure to patients, themselves, and others during radiographic procedures.

Sub-Goals and Performance Objectives

Sub-Goal 1: Fundamentals of Radiation Safety and ALARA

Students will apply fundamental radiation-safety concepts and the ALARA principle to identify methods for reducing unnecessary radiation exposure.

After completing this lesson students will be able to:

- **Objective 1.1:** Identify fundamental radiation-safety principles and the purpose of ALARA.
- **Objective 1.2:** Match basic radiation-protection principles with appropriate exposure-reduction practices.
- **Objective 1.3:** Select appropriate radiation-safety actions in introductory radiographic scenarios with at least 80% accuracy.

Sub-Goal 2: Occupational Radiation Protection

Students will select appropriate radiation-protection practices to minimize occupational exposure to themselves and other healthcare personnel during radiographic procedures.

After completing this lesson students will be able to:

- **Objective 2.1:** Identify appropriate methods for reducing occupational radiation exposure.
- **Objective 2.2:** Select appropriate positioning, distance, barriers, monitoring, or protective measures for presented radiographic situations.
- **Objective 2.3:** Differentiate between safe and unsafe occupational radiation-protection practices in simulated scenarios with at least 80% accuracy.

Sub-Goal 3: Patient Radiation Protection and Exposure Optimization

Students will apply appropriate patient-protection and exposure-optimization practices to minimize unnecessary patient radiation exposure while supporting the clinical purpose of the examination.

After completing this lesson students will be able to:

- **Objective 3.1:** Identify practices that reduce unnecessary radiation exposure to patients.
- **Objective 3.2:** Select appropriate patient-protection and exposure-optimization actions in common radiographic situations.
- **Objective 3.3:** Analyze situations involving positioning, collimation, technical factors, and repeat exposures and choose appropriate corrective actions with at least 80% accuracy.

Sub-Goal 4: Application of Radiation Safety During Radiographic Procedures

Students will analyze simulated radiographic situations and apply appropriate radiation-safety practices to protect patients, themselves, and others.

After completing this lesson students will be able to:

- **Objective 4.1:** Identify radiation-safety risks presented in simulated radiographic procedures.
- **Objective 4.2:** Sequence appropriate radiation-safety actions for selected radiographic situations.
- **Objective 4.3:** Analyze a simulated procedure and select corrective actions that protect the patient, technologist, and others with at least 80% accuracy.

Required Texts and Learning Resources

No separate textbook purchase is required for this e-learning module. Required readings, lesson notes, visual examples, instructional videos, and other electronic learning resources will be provided or linked within the online course. Learners are expected to review the assigned materials for each lesson before completing the related discussion, applied assignment, and quiz.

Course design reference: Conceicao, S. C. O., & Howles, L. L. (2021). Designing the online learning experience: Evidence-based principles and strategies. Stylus Publishing.

Computer and Technical Requirements

- Reliable Internet access and an internet-connected desktop computer, laptop, or compatible tablet.
- A current web browser capable of accessing the course learning-management system and web-based activities.
- Speakers or headphones for instructional videos and multimedia.
- Ability to view PDF documents and common image/video formats.
- Access to the learning-management system and any course-provided interactive activities or online services.
- Basic ability to navigate webpages, select links, enter responses, upload assignments, and participate in online discussions.

Assignments and Assessment

Assessment is designed to support the instructional goal and performance objectives through a consistent pattern of discussion, authentic application, and knowledge checks. Each lesson includes one discussion activity, one applied radiation-safety assignment, and one quiz. Applied assignments use realistic radiographic situations so learners practice making decisions similar to those required in laboratory and clinical learning.

Lesson Discussions (4 x 10 points = 40 points)

Students will respond to a lesson-specific prompt and connect radiation-safety concepts to prior knowledge, observations, or realistic professional situations. Responses should demonstrate thoughtful application of the lesson concepts.

Applied Radiation-Safety Assignments (4 x 20 points = 80 points)

Lesson 1: analyze a basic radiographic situation and identify appropriate ALARA actions.

Lesson 2: evaluate occupational-protection choices involving positioning, distance, barriers, monitoring, and protective measures.

Lesson 3: analyze a patient-protection scenario involving positioning, collimation, technical factors, and repeat-exposure prevention.

Lesson 4: analyze an integrated simulated radiographic procedure, identify safety risks, sequence appropriate actions, and select corrective measures.

Lesson Quizzes (4 x 20 points = 80 points)

Each lesson concludes with a quiz that measures understanding and application of the lesson objectives. Question types may include multiple choice, matching, sequencing, and scenario-based items. Learners should demonstrate at least 80% accuracy on objectives that specify this performance criterion.

Grading

Graded Activity	Number	Points Each	Total Points
Discussion Activities	4	10	40
Applied Assignments	4	20	80
Lesson Quizzes	4	20	80
Total			**200**

Grading Scale: A = 180-200 (90-100%); B = 160-179 (80-89%); C = 140-159 (70-79%); D = 120-139 (60-69%); F = below 120 (<60%).

Late Work Policy: Learners are encouraged to complete activities within the assigned lesson period so knowledge and skills build progressively. If circumstances interfere with timely completion, learners should communicate with the instructor as early as possible. Late work may be accepted according to instructor approval and course requirements.

Topical Course Outline

Lesson	Major Topic	Topics and Subtopics	Learning Experiences & Assessments
Lesson 1	Fundamentals of Radiation Safety and ALARA	1-Purpose of radiation safety; 2-Foundational protection concepts; ALARA; 3-Methods for reducing unnecessary exposure.	Instructional content and video; matching/selection practice; discussion; ALARA safety-analysis assignment; quiz.
Lesson 2	Occupational Radiation Protection	1-Occupational exposure; 2-Psitioning and distance; 3-Barriers and protective measures; 4-Personnel monitoring; safe and unsafe practices.	Demonstration/video; scenario-based safe/unsafe decisions; discussion; occupational-protection assignment; quiz.
Lesson 3	Patient Radiation Protection and Exposure Optimization	1-Patient protection; positioning; collimation; technical factors; 2-Avoiding unnecessary repeats; 3-Exposure optimization.	Visual scenarios and decision practice; discussion; patient-protection and optimization assignment; quiz.
Lesson 4	Applying Radiation Safety During Radiographic Procedures	1-Integration of patient and personnel protection; 2-Recognition of safety risks; sequencing safety actions; 3-Corrective decision-making.	Simulated procedure/video analysis; sequencing and risk-identification practice; discussion; comprehensive safety-case assignment; quiz.

Course Participation and Learner Expectations

Learners are expected to progress through the lessons in order because each lesson builds toward the integrated application required in Lesson 4. Students should review lesson materials, complete interactive practice, participate respectfully in discussions, submit the applied assignment, and complete the quiz for each lesson. Learners are encouraged to revisit demonstrations and practice activities whenever additional review is needed.

Learner-Centered Course Design

The course is designed to move learners from explanation to demonstration, practice, application, and assessment. Clear navigation, concise content, visual demonstrations, realistic scenarios, immediate feedback, and opportunities to retry practice activities are used to support learners with different levels of prior clinical and technical experience. The emphasis throughout the course is on applying radiation-safety principles to meaningful radiographic decisions rather than memorizing isolated facts.

Accessibility and Technical Support Considerations

Course materials will use consistent headings, readable text, clear navigation, and concise instructions. Multimedia should include captions or equivalent text support when available, and important information should not depend on audio alone. Learners who experience difficulty accessing course materials or activities should contact the instructor or the institution's designated technical-support service according to the procedures provided in the learning-management system.

Academic and Professional Expectations

Because radiation safety is a professional responsibility, learners are expected to approach scenarios and discussions respectfully and to base their responses on the instructional content provided in the course. Online activities are educational simulations and do not replace supervision, institutional procedures, or clinical instruction in an approved radiologic technology program.

AI Declaration

This syllabus was developed with support from ChatGPT. ChatGPT was used to assist with organizing the syllabus, refining wording and grammar, aligning course components with the assignment instructions and rubric, and developing consistent descriptions of assignments and assessments. The course topic, instructional goals, performance objectives, assessment decisions, and final review of the content are the author's responsibility.