

STATE OF OREGON



Board of Radiologic Technology

PHONE 971.673.0215 FAX 971.673.0218

www.oregon.gov/RadTech

**Overview of Guidelines for Instructors of
Courses in Preparation for the Limited Scope Examination in
Diagnostic Radiologic Technology**

October 01, 2008

Table of Contents

INTRODUCTION	3
COURSE CONTENT	3
PROGRAM REQUIREMENTS	6
DIRECTOR	6
INSTRUCTORS	7
FACILITIES.....	8
STUDENT POSITIONING PRACTICE	8
COURSE OBJECTIVES.....	9
RADIOGRAPHIC PROCEDURES and POSITIONING	9
VIEW SELECTION	10
ANATOMY	10
TECHNIQUE.....	11
EQUIPMENT OPERATION and X-RAY PRODUCTION	11
RADIATION PROTECTION (CORE).....	12
EXAMINATION.....	14
TIME FRAME.....	15

INTRODUCTION

The purpose of the limited permit course is to give students the opportunity to learn and be able to demonstrate basic principles of Radiation Protection, Quality Control, Equipment Operation, Image Production and Evaluation, Patient Care, and Radiographic Procedures. The course must be directed toward individuals working in X-ray who are not and cannot be ARRT certified. The radiographic principles taught in this course should be designed for the X-ray technician who has a limited science and medical background. The course must cover basic radiographic principles; radiographic positioning; film and processing; formulation of radiographic techniques; patient care; and radiation protection. A certificate must be issued to the student upon successful completion of the course.

I. COURSE CONTENT

Enclosed is a topical outline containing **minimum** guidelines; it does not necessarily show the sequence in which the material should be presented. As an instructor, you would submit to the board for approval your own course outline that includes the subjects listed on the following pages.

The course consists of three parts:

1. Core Module covering Radiation Protection Equipment Operation, Quality Control, Image Production and Evaluation, and Patient Care;
2. Radiographic Procedure Module(s) covering the Positioning and Techniques for each specific body area;
3. Practical Experience

The **Core** portion of the course must contain a minimum of 52 hours of instruction approved by the Board and reflect the current Core Module of the “**Content Specifications for the Examination for the Limited Scope of Practice in Radiography**” published by the American Registry of Radiologic Technology. The curriculum shall include, but is not limited to:

- Biological effects of radiation
- Interaction of radiation with matter
- Low-dose technique and minimizing patient exposure
- Personnel Protection
- Radiation exposure, monitoring, and radiation units
- Applicable Federal and State radiation regulations
- Radiation physics
- Principle of the radiographic equipment
- Darkroom and film processing and quality assurance
- Digital and computer-generated radiographic imaging
- Film and image critique
- Developing and using technique charts
- Patient Care

The **Radiographic Procedures** portion of the course must meet the **minimum** hourly requirements listed below, and reflect the current Radiographic Procedure Module for of the “**Content Specifications for the Examination for the Limited Scope of Practice in Radiography**” published by the American Registry of Radiologic Technology. The curriculum shall include, but is not limited to:

Skull/Sinus	18 hours
Spine	30 hours
Chest	12 hours
Extremities	60 hours
Podiatric	10 hours

The **Practical Experience** component of the student's training must consist of experience with live patients during which images are acquired and the finished radiographic images are made available to the Practical Experience Evaluator for critique.

II. PROGRAM REQUIREMENTS

Prior to the first class meeting, Board approval to offer the course is required. In order to receive approval, please meet these requirements and provide the Board with the following information:

1. The portions of the limited permit course you plan to teach.
2. The number of classroom hours for each portion.
3. The location of the course.
4. The topics that will be covered in each portion of the course.

If you don't plan to follow the enclosed outlines for the didactic portions of the course, please provide the Board with a detailed outline of the topics you plan to cover.

Additionally, please provide detailed information about how you plan for the practical experience requirement to be fulfilled, including any types of examinations your students will be required to perform on live patients. Prior to the time the student is allowed to take an X-ray on a live patient, will they have peer-positioned? Will they have taken X-rays on phantoms? If so, what kind of phantoms will be used (articulating, whole body part)?

If you plan to offer limited permit classes on a continual basis, please request approval annually by submitting to the Board an outline of the program and the names of all Board approved instructors. The deadline for your submittal is July 1; the Board will remind you of this obligation.

A. DIRECTOR

1. Currently licensed, in good standing for at least one year in Diagnostic Radiologic Technology and
2. Currently ARRT certified (No CE Probation) in Diagnostic Radiologic Technology and
3. 10,000 hours of documented diagnostic experience in Radiologic Technology.

B. INSTRUCTORS

1. Formal teaching method of new approved instructors will be evaluated by the Board on a case-by-case basis. This assessment will include the use of:
 - a. Instructional aids
 - b. Demonstration methodology
 - c. Handouts/study materials
 - d. Curriculum guide
 - e. Personal interview with a site survey member or Limited Permit committee member

2. Qualifications of Radiation Protection Instructors
 - a. Currently ARRT certified (No CE Probation) in Diagnostic Radiologic Technology and
 - b. Currently licensed, in good standing for at least one year in Diagnostic Radiologic Technology and
 - c. 4,000 hours of documented diagnostic experience in Radiologic Technology. or
 - d. Medical Radiation Physicist; or
 - e. Doctor of Medicine, Osteopathy, Chiropractic or Podiatric Medicine, board qualified/certified in Diagnostic Radiology

3. Qualification of Equipment Operation, Quality Control, Image Production, Image Evaluation, and Patient Care Instructors
 - a. Currently ARRT certified (No CE Probation) in Diagnostic Radiologic Technology and
 - b. Currently licensed, in good standing for at least one year in Diagnostic Radiologic Technology and
 - c. 4,000 hours of documented diagnostic experience in Radiologic Technology.

4. Qualifications of Radiographic Procedure Modules Instructors
 - a. Currently ARRT certified (No CE Probation) in Diagnostic Radiologic Technology and
 - b. Currently licensed, in good standing for at least one year in Diagnostic Radiologic Technology and
 - c. 4,000 hours of documented diagnostic experience in Radiologic Technology. Or
 - d. As an exception to the above qualifications, **lectures associated with positioning classes** may be given by a doctor of Medicine, Osteopathy, Chiropractic or Podiatric Medicine, board qualified/certified in Diagnostic Radiology (based on their scope of practice).

C. FACILITIES

1. Minimum of one energized X-ray machine available for student use under the direct supervision of the Board approved training program instructor, for Radiation Protection, Image Production and Evaluation labs and anatomic positioning demonstrations
2. Operational darkroom available for student use (manual or automatic processing)
3. Technique charts specifically correlated to each control panel utilized by students

D. STUDENT POSITIONING PRACTICE

During positioning practice and labs, after demonstration and explanation by the instructor, the student will:

1. Demonstrate on a peer or other instructor the proper patient positioning, tube alignment and angulations, and film or image receptor position for all major and most secondary views that pertain to the anatomical area being taught as outlined in the "Content Specifications for the Examination for the Limited Scope of Practice in Radiography" published by the ARRT.
2. Prior to being allowed to perform positioning on live patients, the student will demonstrate proficiency in performing the appropriate positions in a simulated setting.

III. COURSE OBJECTIVES

NOTE: The following course objectives should be used in correlation with the **“Content Specifications for the Examination for the Limited Scope of Practice in Radiography”** published by the American Registry of Radiologic Technologists.

A. RADIOGRAPHIC PROCEDURES and POSITIONING

1. Name the position/projection when given a description of the position/projection.
2. When given a specific projection for a specific anatomic part, select the aspect of the part that is in contact with the film.
3. Name and select the appropriate landmarks when given a specific projection for a specific anatomic structure.
4. Identify the proper alignment of the body plane to the film for a specific projection for a specific anatomic structure.
5. Identify the orientation of the central ray relative to the specific body plane, the film and the specific anatomic structure when given a specific projection for a specific anatomic structure.
6. Identify the radiographic appearance of a specific anatomic structure when that structure is properly positioned.
7. Give the reason for a general requirement of correct positioning for a specific projection. Describe the specific positioning method required and/or a description of the radiographic evidence verifying the correct positioning.
8. Identify common positioning errors for a specific projection.
9. Describe an appropriate modification of a usual positioning technique for a specific examination when pathologic conditions require modification of the usual technique.
10. Identify the correct orientation of a reference line to the film and/or the orientation of the central ray to a reference line of a specific projection.

B. VIEW SELECTION

1. Select the anatomic structure(s) best demonstrated or not well demonstrated and/or pathology that must be demonstrated when given the name of a specific projection or examination.
2. Select the appropriate projections or positions and/or the most common projections when given an anatomic structure or an area to be radiographed.
3. When given the name or description of a specific pathologic condition, select the appropriate projection(s)/position(s) that will demonstrate that specific pathologic condition.
4. When given an anatomic diagram designating a specific structure, select the appropriate projection/position to demonstrate the designated structure.
5. When given a specific description of a specific fracture, select the name of the fracture or fracture type.

C. ANATOMY

1. When given an anatomic term, select its synonym and/or its definition.
2. When given the name of an anatomic structure, identify the following:
 - a. a description of the structure
 - b. a description of its location
 - c. the name(s) of one or more components
 - d. a name which does not designate a component
 - e. the number of its components
 - f. the name of the surrounding structure(s)
 - g. a description of the surrounding structure(s)
3. When given the description and/or location of an anatomic structure or group of structures, select:
 - a. the names of additional parts
 - b. the name of the structure
 - c. the location of the structure
 - d. the location of the part relative to the structure
4. When given the name of a bone, identify the following:

- a. the name(s) of (a) bone(s) with which it articulates
 - b. the number of bones with which it articulates
5. When given an anatomic diagram, identify the following:
 - a. the name of the structure depicted
 - b. the position or aspect of the structure depicted
 6. When given the name of a specific anatomical structure, state the basic physiology of that structure.

D. TECHNIQUE

1. Select accessory devices necessary or not necessary such as grid device for trunk, spine, skull when given a specific radiographic examination.
2. Identify the major source of secondary radiation such as parts measuring over 10 cm and not air-filled, kV higher than 100 when given a specific radiographic examination.
3. Select the appropriate corrective measure when given a specific radiographic examination and description of a problem or error.
4. Select the purpose, the examination or projection for which a specific respiratory phase or method is used and the anatomy best demonstrated when given a specific respiratory phase or method.
5. Select proper machine settings for given radiographic positions taking into consideration all technical variables such as patient size, age, pathologies, casts, and accessory devices.

E. EQUIPMENT OPERATION and X-Ray Production

1. Identify the basic components of an x-ray tube, state the function of each and its purpose in the production of x-rays. Include:
 - a. electron source and composition
 - b. target and composition
 - c. characteristic radiation
 - d. Bremsstrahlung

2. Identify the basic components of the x-ray generator, state the function of each and its purpose in the production of x-rays. Include:
 - a. basic electrical circuits
 - b. transformers
 - c. rectifiers
 - d. phase, pulse, and frequency
3. Identify and operate the basic components of the radiographic unit, state the function of each and its purpose in the over all operation of the unit. Include:
 - a. operator's console and all controls
 - b. exam table, upright bucky and all controls
 - c. tube and beam restriction devices and all controls
4. Explain the basic characteristics of the x-ray beam and those exposure factors that affect each. Include:
 - a. wave length and frequency
 - b. primary, remnant, and scatter
 - c. quantity vs. quality
5. Explain the basic concepts of photon interaction with matter. Include:
 - a. tissue attenuation vs. body habitus, size, and anatomical part
 - b. Compton effect
 - c. absorption and scatter

F. RADIATION PROTECTION

1. Explain the biological effects of radiation on humans, giving examples of those effects. Include:
 - a. the relative radiosensitivity of, and reactions to radiation of each body system
 - b. Somatic Effects
 - c. Systemic Effects
 - d. Genetic Effects
 - e. Fetal risks
2. Explain methods of reducing patient exposure during radiographic examinations. Include:
 - a. relationship of exposure factors to dose (kVp, mAs, SID, OFD)
 - b. collimation and beam restriction methods

- c. shielding
 - d. filtration, requirements, and effects
 - e. film, screen, and other image receptors sensitivity
3. Explain methods of protecting personnel and other non-patients from exposure during radiographic examinations.
 - a. Identify sources of exposure
 - b. Identify methods of protection to include time, distance, and shielding
 - c. Identify types of protective devices and their required lead equivalents
 4. Define the units of measurement for radiation exposure, the recommended maximum doses for various populations, and the devices used to measure those doses.
 5. Explain and give examples for applying ALARA

IV. LIMITED SCOPE EXAMINATION IN DIAGNOSTIC RADIOLOGIC TECHNOLOGY

After successful completion of the Core Module and the Radiographic Procedure Module(s), students will be required to take the **Limited Scope of Practice in Radiography Examination** administered through the American Registry of Radiologic Technologists (ARRT) effective January 1, 2007.

A minimum score of 75% is required to be considered a passing score.

V. TIME FRAME

Students must complete all requirements to obtain a limited permit, or add categories to an existing permit, within one year of completing the course.

The four steps to a limited permit:

1. Successfully complete an approved limited permit course which includes
 - a. Core module **and** Radiographic Procedure Module(s) **or**
 - b. Bone Densitometry Equipment Operators.
2. Pass the **Limited Scope of Practice in Radiography Examination** administered through ARRT.
3. Successfully complete the practical-experience requirements while under the supervision of an Oregon-licensed physician or other practitioner.

Note: *Students attempting to satisfy practical experience requirements shall obtain a temporary permit from the Board **PRIOR TO** taking radiographs on live patients. Permits are valid for six months **or** up to the expiration of the course, whichever comes first. Students who have completed an approved course in limited radiologic technology should obtain the most current application from the OBRT website: www.oregon.gov/RadTech.*

4. Apply to the Board for the limited permit.

Additional program questions should be directed to the Board office at 971.673.0215, FAX 971.673.0218.