**SYLLABUS**

**CODE**: RADT 150  
**TITLE**: Introduction to Radiologic Technology

**INSTITUTE**: Health Science  
**DEPARTMENT**: Radiologic Technology

**COURSE DESCRIPTION**: This introductory course provides a foundation for the practice of radiologic technology. It provides fundamental concepts of radiation protection principles, image creation, and processing.

**PREREQUISITES**: A grade of “C” or higher in HESC 105 and BIOL 111; Admission to the Radiologic Technology Program

**COREQUISITES**: RADT 151, and RADT 152, and RADT 153

**CREDITS**: 2  
**LECTURE HOURS**: 2  
**LAB HOURS**: 0

**REQUIRED MATERIALS:**

**TEXTBOOKS**
3. Chapter questions – Statkiewicz-Sherer
4. CANVAS (RADT 150-DEOD)
5. Narrated lectures
6. Practice tests
7. On-line modules
8. Bushong’s Radiologic Science for Technologists Workbook worksheets

**ADDITIONAL TIME REQUIREMENTS:**
For information on Brookdale’s policy on credit hour requirements and outside class student work refer to Academic Credit Hour Policy.

**COURSE LEARNING OUTCOMES:**

Upon completion of this course, students will be able to:

1. Demonstrate appropriate radiation protection procedures and techniques.

2. Apply technical principles of image development to film/ screen and digital imaging processes.
SYLLABUS

**Grading Standard:**
Please refer to the complete syllabi and the radiology handbook

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The course grade will be derived as follows:

- **Quizzes** 10%
- **Unit Exam 1** 20%
- **Unit Exam 2** 20%
- **Unit Exam 3** 20%
- **Written Assignment(1)** 10%
- **Final Exam** 20%

100%

**Course Content:**
*Unit One: Principles of Radiation Protection*

I. **Introduction to Radiation Protection**

A. Discuss the radiation protection responsibilities of the radiographer to patients, personnel, self and the public.

B. Discuss the production and uses of ionizing radiation for beneficial purposes and the potentially harmful effects.

C. Identify the various sources of natural and man-made radiation.

II. **Protection of the Patient During Radiographic Procedures**

A. Explain the need for effective communication between the patient and radiographer.

B. Identify the need for sufficient immobilization.

C. Describe the various beam limiting devices and identify the most efficient devices.

D. Explain the function of x-ray beam filtration.

E. Discuss the need for gonadal shields and identify the different types.

F. Discuss the need for appropriate exposure factors to decrease repeat radiographs.

G. Explain the benefits of high speed film screen combinations.

H. Discuss the value of efficient radiographic processing to reduce radiographic exposure to the patient.

I. State the reason for reducing patient exposure.
SYLLABUS

J. Discuss how patient exposure can be reduced during special procedures and fluoroscopy.

III. Protection of the Radiographer
   A. Know the maximum permissible dose for whole body occupational exposure.
   B. Explain why the episodic and lifetime occupational exposure to radiation must be limited.
   C. Identify the types of radiation that are hazardous.
   D. Discuss various techniques that reduce exposure to the radiographer as well as the patient.
   E. Explain how distance plays an important part in protection along with the inverse square law.
   F. Describe the various protective devices that are used to reduce the radiographer’s exposure during x-ray, fluoroscopic and mobile procedures.
   G. Discuss how the immobilization of patients and/or film can decrease exposure

UNIT TWO: RADIATION UNITS AND QUANTITY

I. Radiation Units and Quantities
   A. Discuss the historical evolution of radiation measurement.
   B. Define the radiation units of exposure, absorbed dose and equivalency.
   C. Discuss the traditional and SI units of measurement.
   D. Explain the importance of linear energy transfer (LET) as it applies to biological damage of human tissue.
   E. Identify the qualifying factor as it relates to the different ionizing radiations.
   F. Determine dose equivalency.

II. Basic Interactions of X-Radiation With Matter.
   A. Define the terms primary, remnant and attenuation.
   B. Identify 4 events that occur as x-radiation passes through matter.
   C. Understand the effects of scatter radiation.
   D. Identify important x-ray photon interactions.
   E. Discuss the effects of kVp upon radiographic quality and patient doses.

III. Dose Limits
   A. Identify various US agencies who share responsibilities of radiation standards.
B. Define MPD.

C. Explain the ALARA concept.

D. State the formula for determining the MPD equivalent.

IV. Radiation Monitoring

A. Discuss the need for the radiographer to wear personal monitoring devices.

B. Identify appropriate places to wear personal monitoring devices.

C. Identify the various components of film badge.

D. Describe and explain ionization chambers, thermoluminescent dosimeters and radiation survey instruments.

E. List four gas filled radiation detection instruments.

F. Explain the requirements for radiation survey instruments.

G. Explain the function of protective monitoring devices:
   1. ionization chambers
   2. proportional counters
   3. Geiger-Muller detectors
   4. Victoreen Condenser R-meters.

UNIT THREE: RADIOGRAPHIC IMAGE PROCESSING

The student will—

I. Characteristics of an X-ray

A. Describe the major characteristics of an x-ray.

B. Define penetration, photographic effect, fluorescence and rectilinear propagation.

C. Explain interaction of ionization with film.

D. Discuss the generation and film pathway of a photon.

II. Characteristics of Radiographic Film

A. Describe the properties of radiographic film.

B. Discuss the uses of the different types of film.

C. Explain the formation of the latent image on film.

D. describe formation of digital radiographic image.
SYLLABUS

E. Discuss the characteristics curve and exposure range, what it is, its purpose, how it is interpreted.

III. Handling and Storage

A. Discuss the conditions for proper storage of film.
B. Explain the considerations for the processing of film.
C. Discuss the handling, management and maintenance of CR plates

IV. Artifacts

A. Define film and digital artifacts.
B. Categorize artifacts.
C. Identify artifacts.
D. Determine the cause of artifacts.

UNIT FOUR: RADIOGRAPHIC IMAGE PROCESSING

The student will—

I. Automatic Film and Digital Processing

A. Identify the parts of an automatic processor.
B. Explain the systems of the processor.
C. Discuss the composition of the developer and the fixer and the chemicals used.

II. Processing Considerations

A. Discuss lighting, both safe lights and day light processing.
B. Discuss the specific arrangements of a worker friendly processing area.
C. Explain the purposes of silver recovery.
D. Discuss purpose and operation of laser printers.

DEPARTMENT POLICIES:
See Radiologic Technology Student Handbook.
**SYLLABUS**

**COLLEGE POLICIES:**
For information regarding—
- Brookdale’s Academic Integrity Code,
- Student Conduct Code, and
- Student Grade Appeal Process—
Please refer to the **BCC STUDENT HANDBOOK AND BCC CATALOG**

**NOTIFICATION FOR STUDENTS WITH DISABILITIES:**
Brookdale Community College offers reasonable accommodations and/or services to persons with disabilities. Students with disabilities who wish to self-identify must contact the Disabilities Services Office at 732-224-2730 or 732-842-4211 (TTY), provide appropriate documentation of the disability, and request specific accommodations or services. If a student qualifies, reasonable accommodations and/or services, which are appropriate for the college level and are recommended in the documentation, can be approved.

**ADDITIONAL SUPPORT LABS:**
Lab Assistant support in Radiology Lab, MAS 133. 732-224-2081.

*The syllabus is intended to give student guidance in what may be covered during the semester and will be followed as closely as possible. However, the faculty member reserves the right to modify, supplement, and make changes as the need arises.*