

Common Course Outline

RADT 203

Radiography V

8 credits

The Community College of Baltimore County

Description

Four (4) lecture hours, twenty-four (24) laboratory hours a week, fifteen weeks.

(Offered Spring)

Prerequisite: RADT 221

Radiography IV is the eighth course in the sequence of nine courses that comprise the professional portion of the radiography curriculum. The course consists of both classroom and clinical sessions. Classes cover topics in radiobiology, radiographic pathology, and professional development. An introduction to sectional anatomy and advanced medical imaging is also provided. During the clinical sessions, students continue to participate in actual radiographic procedures as they assist staff at the clinical sites.

Overall Course Objectives

Upon completion of Radiobiology, the student shall be able to:

1. Describe the effects of radiation on biological systems on the atomic, molecular, cellular, and organism level.
2. Compare the indirect and direct effect theories in terms of biological damage.
3. Explain differences in cellular radiosensitivity.
4. Describe whole-body radiation effects.
5. Describe fetal effects in terms of systemic radiosensitivity.
6. Describe radiation mutagenesis and radiation carcinogenesis.
7. Compare extrinsic factors that affect the severity of radiation damage.

Upon completion of Radiographic Pathology, the student shall be able to:

1. Define terms related to pathology.
2. Discuss manifestations of pathological conditions and their relevance to radiologic procedures.
3. Describe the morphological classifications of disease.
4. For each of the systemic classifications of disease, describe etiology, examples and site, complications and prognosis.
5. Explain the role of radiology/medical imaging in the diagnosis and treatment of diseases discussed in each of the systemic classifications.
6. Recognize pathology that requires an alteration in standard imaging procedures.
7. Assess the appropriateness of ordered radiology/medical imaging exams.
8. Provide appropriate assistance in exam interpretation.

Upon completion of the Advanced Medical Imaging module, the student shall be able to:

1. Describe the relationship between the various medical imaging modalities discussed in class.
2. Compare the major advantages and disadvantages of each medical imaging modality.
3. Explain the basic imaging principles of each modality.
4. Identify and briefly explain the operation of the equipment used in each imaging modality.
5. Describe the three-dimensional relationship of anatomical structures discussed in class.
6. Identify major anatomical structures on US, CT and MR images.

Overall Course Objectives, continued

Upon completion of the Professional Development module, the student shall be able to:

1. Describe the organizational structure of a modern hospital.
2. Discuss the changes occurring in health care.
3. Discuss the role of a radiology/hospital administrator.
4. List and describe the steps in preparing an instructional lesson.
5. Prepare and present a short lesson using the principles discussed in class.
6. Define medicolegal terms relating to the practice of radiology.
7. Discriminate between professional & legal standards & describe how each relates to radiography practice.
8. Discuss the elements necessary for a valid malpractice claim.
9. Describe the elements necessary for informed consent.
10. Discuss institutional and professional liability protection typically available to the radiographer.
11. Prepare a legitimate resume to seek a position as a radiographer.
12. Discuss the do's and don'ts of employment interviewing.
13. Compare various types of x-ray equipment in terms of cost, application, use, and repair.
14. Discuss of the concept of Performance Improvement (PI) as it applies to hospitals and radiology departments.

Upon completion of Clinical Education, the student shall be able to:

1. Complete laboratory evaluations (simulations) in category VI (skull and face).
2. Present films for image evaluation in category VI (skull and face).
3. Present films performed under **INDIRECT SUPERVISION** for image evaluation.
4. Complete competency tests for category IV (spine and bony thorax), category V (contrast studies, digestive and urinary), and category VI (skull and face). A minimum of 12 successful competency tests is required during RADT 203.
5. Complete area-specific performance objectives for scheduled RADT 203 clinical areas.
6. Apply principles of film critique in evaluating radiographic images performed during laboratory and clinical assignments.
7. Demonstrate appropriate professional behavior while on clinical duty.

Major Topics

Radiobiology module.

- I. Introduction to Radiobiology
 - A. Properties of Radiation
 - B. Units for Measuring Radiation
- II. Interaction of Radiation With Matter
 - A. Thompson, Photoelectric Effect, Compton, and Pair Production
 - B. Factors that Affect Radiation Alternation
 - C. Half Value Layer
 1. Definition
 2. Relationship with wavelength and frequency
 3. Absorption of radiation in tissue

Major Topics, continued

- III. Review of Cell Biology
 - A. Cellular Components
 - B. DNA
 - C. Cell Types
 - D. Cellular Reproduction
- IV. Biologic Effect of Radiation
 - A. Grothus-Draper Law
 - B. Linear Energy Transfer
 - C. Relative Biologic Effect
 - D. Direct and Indirect Effects of Irradiation
 - E. Somatic, Teratogenic, and Genetic Effects
- V. Radiosensitivity
 - A. Factors That Affect Radiosensitivity
 - B. Priority of Radiosensitivity of Tissues
 - C. Cell Survival Curves
 - D. Oxygen Enhancement Ratio
- VI. Dose Fractionation
 - A. Protraction and Radiobiologic Effects
 - B. Fractionation and Radiobiologic Effects
 - C. Time-Dose Relationships
 - D. Threshold Concept
- V. Effects of Radiation Exposure
 - A. Tissue Reactions to Radiation
 - B. Stochastic and Non-Stochastic Responses
 - C. Short Term and Long Terms Effects
 - D. Dose-Response Curves
- VI. Effective Dose Equivalents
 - A. Genetic Significant Dose
 - B. Mutation Doubling Dose
 - C. Maximum EDE Values

Radiographic Pathology module.

- I. Introduction to Pathology
 - A. Classification of Diseases
 - B. Terminology
- II. Diseases by Category
 - A. Skeletal
 - B. Cardiopulmonary
 - C. Digestive
 - D. Genitourinary
 - E. Central Nervous System

Major Topics, continued

Advanced Medical Imaging module.

- I. Sectional Anatomy
 - A. Thoracic Cavity
 - B. Abdominal Cavity
 - C. Pelvic Cavity
 - D. Cranial Cavity
- II. Introduction to Computed Tomography
 - A. Equipment
 - B. Use of Contrast Media
 - C. Examinations
 - 1. Chest
 - 2. Abdomen
 - 3. Pelvic
 - 4. Head
 - D. Filming
 - E. Common Pathology
- III. Introduction to Sonography
 - A. Equipment
 - B. Introduction to Acoustic Physics
 - C. Common Examinations
 - 1. Abdominal
 - 2. OB
 - 3. Echocardiography
 - 4. Vascular
- IV. Introduction to MRI
 - A. Equipment
 - B. Introduction to Physics
 - C. Precautions
 - D. Common Examinations
 - 1. Head and Spine
 - 2. Extremities
- V. Introduction to Nuclear Medicine
 - A. Equipment
 - B. Radiation Protection
 - C. Common Examinations

Professional Development module.

- I. Healthcare Administration
 - A. Hospital Organization and Administration
 - B. Radiology/Imaging Administration
- II. Introduction to Teaching
 - A. Types of Lessons and Lesson Plans

Major Topics, continued

- III. Legal Aspects of Healthcare and Medical Imaging
 - A. Professional and Legal Standards
 - B. Terminology
 - C. Malpractice
 - D. Informed Consent
- IV. Resume Preparation
- V. Employment Interviewing
- VI. Introduction to Performance Improvement
 - A. Rationale
 - B. Focus- PDCA
- VII. Radiographic Equipment
 - A. Review of Basic X-ray Circuit
 - B. Purchase Specifications
 - C. Quality Control Testing

Course Requirements

Grades for RADT 203 will be determined by the following:

- I. Attendance, Dress Code & Ethics 2.5 points
Minus 0.5 points for each absence or late minus 1.0 point for a "NO-CALL"
Absence from three (3) or more classes or three (3) or more absences from clinical will lower the
course grade one letter unless accompanied by a physician's written reason.
Minus 0.5 for each infraction of uniform policy, minus 1.0 for each infraction after 1st notice
Students must be appropriately attired to permitted in the clinical area.
- II. Clinical Performance Objectives and Exam Record Sheets 5 points
- III. Clinical Evaluations 7.5 points
Evaluations of students' clinical performance are completed weekly by supervising clinical staff.
- IV. Laboratory Evaluations (simulations), Image Evaluations, and 10 points
Clinical Competencies
A minimum of 12 successful competency tests is required during RADT 203.
- V. Film Critique and Clinical Experiments 10 points
Students are responsible for preparing and presenting a film critique and a clinical experiment report.
- VI. QUIZZES*, and units 10 points
- VII. WRITTEN TESTS *(completed at the end of each module) 20 points
- VII. FINAL WRITTEN COMPREHENSIVE EXAM * 35 points
100 points

* Points may be deducted for quizzes, tests, and/or exams that are missed and made up at a later date.

Course Requirements, continued

The ARRT has established a minimum passing scaled score of 75%. The radiography program has established standards that are consistent with grading scales of other radiography programs. Letter grades for RADT 203 will be determined according to the following guidelines:

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| 92 | - | 100 | A |
| 83 | - | 91 | B |
| 75 | - | 82 | C |
| 65 | - | 74 | D |
| Below 65 | | | F |

Other Course Information

Formal admission into the Radiography Program is required prior to registration.

RADT 203 is the eighth course in the sequence of nine courses that comprise the professional portion of the curriculum and must be taken after successful completion of RADT 221.

Date revised: 01/07/04

