

**University of Arkansas – Fort Smith**

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**General Syllabus**

**RADT 1202 Radiographic Exposures I**

**Credit Hours:** 2      **Lecture Hours:** 2      **Laboratory Hours:**

**Prerequisites:** RADT 1104 Introduction to Radiography

**Prerequisite or corequisite:** HLTH 1473 Medical Terminology

**Corequisites:** RADT 1212 Radiographic Procedures II, RADT 1224 Clinical Education II, and RADT 1232 Radiographic Physics

**Effective Semester:** Spring 2014

**I. Course Information**

**A. Catalog Description**

An introduction of the physics of x-ray production and emission and the factors influencing quality image production. Study will be focused on the x-ray tube construction and the two types of radiation produced by an x-ray machine, x-ray quantity versus quality, primary, secondary, and scatter radiation, and the four radiographic qualities of density, contrast, distortion, and detail. Grid, film, and screen construction and combinations will be discussed, as well as processing the latent image.

**B. Additional Information**

**II. Student Learning Outcomes**

**A. Subject Matter**

Upon successful completion of this course, the student will be able to:

1. List the parts of the housing.
2. Identify the components of the glass or metal envelope that make up the x-ray tube.
3. Discuss the cathode and filament current.
4. Define the line-focus principle and the heel effect.
5. Identify the causes of tube failure.
6. Explain the use of tube rating charts to prevent tube failure
7. Discuss the interactions between electrons and the x-ray target.
8. Describe the production of both characteristic and bremsstrahlung radiation.
9. Explain how mAs, kVp, added filtration, target material, and voltage ripple affect x-ray emission spectra.
10. Define and describe radiation quantity in relation to intensity and mAs.
11. List and discuss the factors affecting the quantity of x-rays in the beam.
12. Explain x-ray quality or penetrability
13. List and discuss factors affecting the quality of the x-ray beam.

14. List the four radiographic qualities that are used together to produce a radiographic image.
15. Define each of the four radiographic qualities.
16. Identify the radiographic qualities that are considered photographic properties and those that are considered geometric properties.
17. List some of the factors that control or influence each radiographic quality
18. Define primary, scattered and remnant radiation.
19. Discuss devices developed to minimize scatter radiation
20. Define and discuss the characteristics of grid construction and errors in utilizing them.
21. Calculate new techniques based on grid construction.
22. Discuss the construction of radiographic film and the formation of the latent image.
23. List and describe the sequential steps in processing the latent image.
24. Identify the chemicals used in the processing of film and describe their function.
25. Describe the screen composition.
26. Discuss screen characteristics and luminescence.
27. Evaluate film/screen combinations/compatibility.

## **B. University Learning Outcomes**

This course enhances student abilities in the following areas:

### **Analytical Skills**

Using principles of film processing students will determine cause and propose solution to various processing problems. Based on principles of exposure, students will explain results of experimentation.

### **Communication Skills**

Students will complete a written article review as pertains to subject

### **Technological Skills**

Students will do research for an article review via the computer. Students will write a description of the process of x-ray production. Students will write a paper on the sequential sates of electrical flow through a high frequency x-ray generator.

### **Ethics**

Students will be able to understand the UA Fort Smith Standards of Conduct and Academic Honesty policies and be able to apply these standards to particular fact situations. Student will be able to apply ethical concepts and rules to determine viable alternative in any given situation. Students will be able to analyze ethical dilemmas.

### **Quantitative Reasoning**

Students will interpret tube rating charts and graphs, x-ray emission spectrums and anode cooling graphs. Students will calculate inverse square law, x-ray quantity, power rating, and half-value layers.

## **III. Major Course Topics**

- A. X-ray Tube Construction
- B. X-ray Production and Emission
- C. The Four Radiographic Qualities

- D. Scatter Radiation and Beam Limiting Devices
- E. Grid Construction
- F. Radiographic Film and Intensifying Screens
- G. Processing the Latent Image