

Course Objectives/Course Outline
Spokane Community College

Course Title: Radiographic Principles I

Prefix and Course Number: RAD 115

Course Learning Outcomes:

By the end of this course, a student should be able to:

- Identify considerations that affect the recorded details of the radiograph
- Identify and control technical factors affecting image distortion, density and contrast
- Apply knowledge in controlling image quality in a clinical setting
- Demonstrate the understanding of the interrelationships of radiographic image formation factors
- Define the properties and characteristics of x-rays
- Identify, define and discuss radiographic quality

Course Outline:

- I. X-ray and Radiographic Variables
 - A. Generation of the X-ray
 - B. Interactions in the Anode
 - C. X-ray Beam
 - D. Attenuation
 - E. X-ray Beam Nomenclature
 - F. Types of Radiographic Variables
- II. Qualities of the Radiographic Image
- III. Interactions with X-rays within the Patient
 - A. Types of Interactions
 - B. Production of Subject Contrast
- IV. Milliampere—Second
 - A. Effect on X-ray Beam Spectrum
 - B. Reciprocity Law
 - C. Relationship between mA and Time
 - D. Effect on Geometric Functions
 - E. Effect on Visibility Functions
- V. Kilovoltage-peak
 - A. Effect on X-ray Beam Spectrum
 - B. Control of Contrast
 - C. Overexposure by Kilovoltage
 - D. Effect on Geometric Functions
 - E. Optimum kVp
 - F. 15% Rule
 - G. kVp vs. mAs for Brightness Control
 - H. Effect on Visibility Functions
- VI. Machine Phase and Rectification
 - A. Generators
 - B. Efficiency on the Beam Spectrum

- C. Effect on Geometric Functions
- D. Effect on Visibility Functions
- E. Rectification and X-ray Generators
- VII. Beam Filtration
 - A. Protective Filtration
 - B. Compensating Filtration
 - C. X-ray Beam Quality and HVL
- VIII. Field Size Limitation
 - A. Collimation Devices
 - B. Positive Beam Limitations
 - C. Over Collimation
 - D. Effect on Geometric Functions
 - E. Effect on Visibility Functions
 - F. Calculated Field-size Coverage
- IX. Patient Status and Contrast Agents
 - A. Physique
 - B. Body Tissues
 - C. Evaluation of Patient
 - D. Influence of Age
 - E. Body Thickness
 - F. Use of Contrast Agents
 - G. Influence of Respiration
- X. Pathology and Casts
 - A. Additive Diseases
 - B. Destructive Diseases
 - C. Casts and Splints
 - D. Trauma
- XI. Scattered Radiation and Image Fog
 - A. Desirable Gray Scale vs. Fog
 - B. Causes of Scatter Fog
 - D. Effects on Density and Contrast
 - E. Scatter and Radiation Exposure
- XII. Grids
 - A. Types of Grids
 - B. Grid Ratio
 - C. Effect on Contrast
 - D. Grid Ratios and Density Compensation
 - E. Effects on Other Qualities
 - F. Grid Cut-off
 - G. Grid Radius
 - H. Alignment of Beam and Grid
- XIII. Automatic Exposure Controls
 - A. Minimum Response Time
 - B. Back-up Time
 - C. The AEC Density Control
 - D. Limitations of AEC
 - E. Detector Cell Configuration
 - F. AEC Technique Charts
- XIV. Focal Spot

- A. Define the Focal spot
- B. Effects of the Focal Spot
- C. Effects on Penumbra
- XV. Anode Bevel
 - A. Line-focus Principle
 - B. Anode Heel Effect
- XVI. Source-image Receptor Distance
 - A. Effects on Geometric Functions
 - B. Effects on Visibility Functions
- XVII. Object-image Receptor Distance
 - A. Effects on Geometric Functions
 - B. Effects on Visibility Functions
- XVIII. Distance Ratios
 - A. Magnification
 - B. Sharpness
 - C. Macradiography and Similar Triangles