R T 201: DIGITAL RADIOGRAPHY FOR RADIOLOGIC TECHNOLOGISTS

Foothill College Course Outline of Record

Heading	Value
Effective Term:	Summer 2023
Units:	0.5
Hours:	6 lecture per quarter (6 total per quarter)
Prerequisite:	Current certification in Radiologic Technology.
Degree & Credit Status:	Non-Degree-Applicable Credit Course
Foothill GE:	Non-GE
Transferable:	None
Grade Type:	Letter Grade (Request for Pass/No Pass)
Repeatability:	Unlimited Repeatability

Student Learning Outcomes

- Assess the components of both CR and DR digital radiography systems in order to maximize radiation protection of the patient in the clinical setting.
- Describe the utilization of exposure indexes for various manufacturers and the effects of technical factor selection.

Description

Exploration of how digital radiography allows for the reduction of patient dose. Various manufacturers' equipment and exposure indicators will be reviewed to align technical factor manipulation focusing on dose reduction, image quality factors, and patient safety. Restricted to licensed California Radiologic Technologists to meet continuing education requirements set forth by the Department of Public Health's Radiologic Health Branch.

Course Objectives

The student will be able to:

1. Compare and contrast the computed radiography digital system with the direct radiography digital system
2. Examine the potential impact the properties of digital radiographic systems have on patient exposure and methods of practicing the As Low As Reasonably Achievable (ALARA) concept with digital systems
3. Evaluate manipulation of technical factors and the effect on exposure indicators of various systems

Course Content

1. CR vs. DR systems
   a. Detector types
      i. Direct conversion and thin film transistor (TFT) arrays
         1. Amorphous selenium
      ii. Indirect conversion and thin film transistor (TFT) arrays
         1. Amorphous silicon
         2. Scintillator
      iii. Charge-coupled device (CCD)
      iv. Photostimulable phosphor (PSP) plate
         1. Turbid phosphors
         2. Columnar phosphors
2. Detector properties
   a. Evaluation of detector characteristics
      i. Detective quantum efficiency (DQE)
      ii. Modulation transfer function (MTF)
      iii. Spatial resolution
   b. Dynamic range
   c. Raw data extraction
      i. Data extraction
         1. TFT
         2. PSP
         3. CCD
      ii. Analog to digital conversion
      iii. Exposure field recognition
      iv. Region of interest (ROI)
      v. Histogram analysis
      vi. Exposure index
3. Exposure indicators and deviation index
   a. Deviation index (DI)
   b. Target index (TI)
   c. Exposure indicator issues
      i. Centering and beam collimation
      ii. Optimal value ranges
      iii. Effect of utilizing the 15% rule
      iv. Mathematical relationship between altering technique or SID on exposure index
      v. Difficulties working in environments with multiple exposure indicator types

Lab Content

Not applicable.

Special Facilities and/or Equipment

1. Multimedia classroom, visualizer, internet access.
2. Computer access/internet access for online component.

Method(s) of Evaluation

Methods of Evaluation may include but are not limited to the following:

Quizzes
Participation in class discussion

Method(s) of Instruction

Methods of Instruction may include but are not limited to the following:

Lecture
Discussion
Cooperative learning exercises

Demonstration

Representative Text(s) and Other Materials

Instructor prepared materials.

Types and/or Examples of Required Reading, Writing, and Outside of Class Assignments

1. Completion of a behavior survey related to technical factor alteration and attention to exposure indexes as a methodology for evaluating image quality in the digital radiography environment

Discipline(s)

Radiological Technology