Western Technical College

10526170 Radiographic Imaging 2

Course Outcome Summary

Course Information

Description	Explores film processing components as well as the principles and operation of digital imaging systems found in diagnostic radiology. Factors that impact image acquisition, display, archiving and retrieval are discussed. Guidelines for selecting exposure factors and evaluating images within analog and digital systems. Principles of digital system quality assurance and maintenance are presented.
Career Cluster	Health Science
Instructional Level	A.A.S. - Associate in Applied Science
Total Credits	3
Total Hours	72

Pre/Corequisites

Prerequisite 10526159 Radiographic Imaging 1

Textbooks

Essentials of Radiographic Physics and Imaging – with Access. 3rd Edition. Copyright 2020. Johnston, James. Publisher: Elsevier Science. **ISBN-13:** 978-0-323-56668-1. Required. (Part of Western Bundle Package **ISBN-13:** 978-0-323-86245-5)

Success Abilities

1. Live Responsibly: Develop Resilience
2. Refine Professionalism: Improve Critical Thinking
3. Refine Professionalism: Participate Collaboratively

Program Outcomes

1. Carryout the production and evaluation of radiographic images
2. Model professional and ethical behavior consistent with the A.R.R.T. Code of Ethics

3. Apply critical thinking and problem-solving skills in the practice of diagnostic radiography

Course Competencies

1. Analyze exposure factor considerations involved in technique selections

Assessment Strategies

1.1. by analyzing images (format may be oral, written, or graphic)

Criteria

You will know you are successful when

1.1. you use a technique chart to determine exposure factors
1.2. you locate exposure information on a technique chart
1.3. you differentiate between types of technique charts
1.4. you recognize the effects of varying exposure factors on the image
1.5. you adjust exposure factors to improve image quality
1.6. you calculate the relationship between the technical factors of exposure

Learning Objectives

1.a. Locate exposure information on a technique chart
1.b. Use a technique chart to determine exposure factors
1.c. Differentiate between types of technique charts
1.d. Recognize the effects of varying exposure factors on the image
1.e. Adjust exposure factors to improve image quality
1.f. Calculate the relationship between the technical factors of exposure

2. Explain the structure, components and ancillary equipment of the darkroom

Assessment Strategies

2.1. by creating a diagram/written or oral report of ancillary equipment of the darkroom
2.2. in a written examination without resources

Criteria

You will know you are successful when

2.1. you explain the value of the darkroom-related health and safety standards
2.2. you explain the purpose of darkroom equipment
2.3. you explain important features of darkroom design

Learning Objectives

2.a. Explain the value of the darkroom-related health and safety standards
2.b. Explain the purpose of darkroom equipment
2.c. Explain important features of darkroom design

3. Analyze the steps and components of processing systems

Assessment Strategies

3.1. in an oral, written, or graphic analysis of the steps and components of processing systems

Criteria

You will know you are successful when

3.1. you identify the components of the processor in your analysis
3.2. you show the relationship between steps in film processing in your analysis
3.3. you recognize processing artifacts in radiographic images

Learning Objectives

3.a. Compare the use of the characteristic curve for differing types of image receptors and for processing conditions
3.b. Identifies the components of the processor
3.c. Demonstrate the relationship between steps in film processing
3.d. Identify processing artifacts on/in radiographic images

4. Examine basic principles of digital acquisition and display

Assessment Strategies

4.1. in an oral, written, or graphic assessment

Criteria

You will know you are successful when

4.1. you identify digital image characteristics
4.2. you identify various digital receptors
4.3. you compare detector properties
4.4. you describe dynamic range

Learning Objectives

4.a. Explain the function of each component of image receptor systems
4.b. Differentiate between the purpose, principles, and applications of digital/electronic imaging and CR technology
4.c. Identify digital image characteristics
4.d. Identify various digital receptors
4.e. Compare detector properties
4.f. Describe dynamic range

5. Illustrate the process of image acquision

Assessment Strategies

5.1. in an oral, written, or graphic assessment

Criteria

You will know you are successful when

5.1. you describe "latent image" acquisition
5.2. you compare CR and DR image extraction (formation)
5.3. you explain various ways of describing exposure indicators
5.4. you interpret exposure indicators
5.5. you manipulate technical factors based on exposure indicators

Learning Objectives

5.a. Describe "latent image" acquisition
5.b. Compare CR and DR image extraction (formation)
5.c. Explain various ways of describing exposure indicators
5.d. Interpret exposure indicators
5.e. Manipulate technical factors based on exposure indicators

6. Identify image acquisition errors

Assessment Strategies

6.1. in an oral, written, or graphic assessment

Criteria

You will know you are successful when

6.1. you explain an exposure histogram
6.2. you recognize histogram errors
6.3. you identify routine photostimulable plate care
6.4. you make corrective actions
6.5. you describe scatter control in the digital system

Learning Objectives

6.a. Explain an exposure histogram for all basic diagnosic radiographic exams
6.b. Recognize histogram errors of digital images
6.c. Identify routine photostimulable plate care
6.d. Implement appropriate corrective actions based on acquisition errors
6.e. Describe scatter control in the digital systems

7. Analyze the software image processing

Assessment Strategies

7.1. in an oral, written, or graphic assessment

Criteria

You will know you are successful when

7.1. you describe the relationship between window level and image density
7.2. you describe the relationship between window width and image contrast
7.3. you perform all image manipulation functions e.g. level, width, annotation, smoothing, etc.
7.4. you recognize effects of excessive processing

Learning Objectives

7.a. Describe the relationship between window level and image density
7.b. Perform all image manipulation functions e.g. level, width, annotation, smoothing, etc.
7.c. Recognize and explain effects of excessive processing
7.d. Describe the relationship between window width and image contrast

8. Outline fundamental principles of exposure

Assessment Strategies

8.1. in an oral, written, or graphic assessment

Criteria

You will know you are successful when

8.1. you describe appropriate selection of exposure factors for a digital system
8.2. you describe the relationship between exposure factors and patient dose (exposure creep)

Learning Objectives

8.a. Describe appropriate selection of exposure factors for a digital system
8.b. Explain the relationship between exposure factors and patient dose (exposure creep)

9. Evaluate digital images

Assessment Strategies

9.1. in an oral, written, or graphic assessment

Criteria

You will know you are successful when

9.1. you include evidence of appropriate exposure in your evaluation
9.2. you include evidence of appropriate contrast in your evaluation
9.3. you include evidence of appropriate detail in your evaluation
9.4. you include evidence of appropriate anatomical presentation in your evaluation
9.5. you include identification of artifacts in your evaluation

Learning Objectives

9.a. Evaluate appropriate exposure
9.b. Evaluate appropriate contrast
9.c. Evaluate appropriate detail
9.d. Evaluate appropriate anatomical presentation
9.e. Evaluate and identify image artifacts

10. Distinguish the components of a digital image display

Assessment Strategies

10.1. in an oral, written, or graphic assessment

Criteria

You will know you are successful when

10.1. you differentiate between LCD and CRT viewing systems
10.2. you describe horizontal resolution and its effect on image quality
10.3. you describe vertical resolution and its effect on image quality
10.4. you describe a PACS system

10.5. you discuss the changing role of a radiographer in a filmless environment

Learning Objectives

10.a. Differentiate between LCD and CRT viewing systems
10.b. Describe horizontal resolution and its effect on image quality
10.c. Describe vertical resolution and its effect on image quality
10.d. Explain a PACS system
10.e. Describe the changing role of a radiographer in a filmless environment