RADT 63A Course Outline as of Fall 2010

CATALOG INFORMATION

Dept and Nbr: RADT 63A Title: RAD PHYSICS/IMAGING SYST
Full Title: Radiation Physics and Medical Imaging Systems
Last Reviewed: 9/25/2023

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	3.00	Lecture Scheduled	2.00	17.5	Lecture Scheduled	35.00
Minimum	3.00	Lab Scheduled	3.00	17.5	Lab Scheduled	52.50
		Contact DHR	0		Contact DHR	0
		Contact Total	5.00		Contact Total	87.50
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 70.00 Total Student Learning Hours: 157.50

Title 5 Category: AA Degree Applicable
Grading: Grade Only
Repeatability: 00 - Two Repeats if Grade was D, F, NC, or NP
Also Listed As:
Formerly:

Catalog Description:
Conventional photographic and digital aspects of radiography, principles of radiographic exposure and formulation of radiographic technique. Principles of general and applied physics, electromagnetism, digital imaging, electrostatics, x-ray tube, quality control, radiologic equipment and imaging equipment.

Prerequisites/Corequisites:
Concurrent Enrollment in RADT 61B and Concurrent Enrollment in RADT 61BL and Course Completion of RADT 61A

Recommended Preparation:

Limits on Enrollment:

Schedule of Classes Information:
Description: Conventional photographic and digital aspects of radiography, principles of radiographic exposure and formulation of radiographic technique. Principles of general and applied physics, electromagnetics, digital imaging, electrostatics , x-ray tube quality control, radiologic equipment and accessories, and imaging equipment and accessories. (Grade Only)

Prerequisites/Corequisites: Concurrent Enrollment in RADT 61B and Concurrent Enrollment in RADT 61BL and Course Completion of RADT 61A
Recommended:
Limits on Enrollment:
Transfer Credit: CSU;
Repeatability: Two Repeats if Grade was D, F, NC, or NP

ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:

AS Degree:	**Area**	Effective:	Inactive:
CSU GE:	**Transfer Area**	Effective:	Inactive:
IGETC:	**Transfer Area**	Effective:	Inactive:

CSU Transfer:	Transferable	Effective:	Fall 1981	Inactive:
UC Transfer:		Effective:		Inactive:

CID:

Certificate/Major Applicable:
Both Certificate and Major Applicable

COURSE CONTENT

Outcomes and Objectives:
Upon completion of this course students will be able to:
1. Explain principles of general and applied physics as they apply to radiologic technology.
2. Explain the use of radiographic equipment and accessories.
3. Describe the laws of electrostatics and their application to radiologic technology critical for patients.
4. Identify the components of computed and digital radiography systems.
5. Explain the basic mechanics of an automatic processor.
6. Identify problem-solving remedies to film processor and digital readers.
7. Demonstrate accurate use of radiographic technique.
8. Explain electromagnetism and its implication in medical imaging.
9. Demonstrate quality control techniques in image processing and equipment.
10. List important components of a digital imaging system.
11. Identify steps of processing, manipulation, and archiving of digital images.
12. Explain the relationship between the radiation exposure and sensitivity index of image receptors.

Topics and Scope:

1. Fundamental units
   A. Length
   B. Mass
   C. Time
2. Derived units

A. Area
B. Volume
C. Density
D. Temperature

3. Systems of measurement
   A. English
   B. Metric
4. Electrostatics and electromagnetism
   A. Charge
   B. Field
   C. Applications
5. Radiographic technique
   A. Kilovoltage
   B. Milliamperage
   C. Time
   D. Photo timing
6. Scatter radiation
   A.Production
   B.Control
7. Radiographic equipment
   A. Grids
   B. Cones
   D. Screens/ films
   E. Shielding
   F.Computed radiography image receptors
   G.Direct radiography image receptors
8. Radiographic quality control
   A. Contrast
   B. Density
   C. Definition of detail
   D. Processing
   E. Equipment
   F. Darkroom
   G. Digital reader
   H. Image manipulation
9. Film characteristics
   A. Film types
   B. Sensitometry
   C. Construction of film
10. Digital Imaging System
    A. Introduction
    B. Instrumentation
    C. Computed radiography
    D. Indirect digital radiography
    E. Direct digital radiography
    F. Signal to noise
    G. Sensitivity index
11. X-ray Tube
    A. Diagnostic
    B. Fluoroscopy
    C. Mammography
12. Radiographic image quality

A. Artifacts
B. Troubleshooting artifact problems

13. Units of measurements
    A. Gray
    B. Sievert
    C. Roentgen
    D. Kerma
    E. Rad
    F. Conversion

Assignment:

1. Weekly chapter reading (10-40 pages/week)
2. Completion of 8 - 12 laboratory experiments with lab reports
3. Completion of a technique chart project
4. 8-10 quizzes, 1 mid-term, 1 written final
5. Lab final

Methods of Evaluation/Basis of Grade:

Writing: Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

Written homework, Lab reports	Writing 10 - 20%

Problem Solving: Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Technique chart project	Problem solving 10 - 20%

Skill Demonstrations: All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

Lab final exam	Skill Demonstrations 20 - 30%

Exams: All forms of formal testing, other than skill performance exams.

Quizzes, mid-term, final exam	Exams 50 - 60%

Other: Includes any assessment tools that do not logically fit into the above categories.

None	Other Category 0 - 0%

Representative Textbooks and Materials:
- RADIOLOGIC SCIENCE FOR TECHNOLOGISTS by Steward Bushong, Mosby, current edition.

- Radiographic Imagery and Exposure, Fauer, Mosby, current edition.
- Instructor-prepared material.