COURSE OUTLINE

Course Number	Course Title	Credits
RAD232	**Imaging Equipment & Radiography Seminar**	**4**

Hours: Lecture/Lab/Other	Co- or Pre-requisite	Implementation Semester & Year
3/2	**Pre-requisites: RAD228, RAD217** **Co-requisites: RAD 224, RAD 240**	**Spring 2025**

Catalog description:
Evaluation of radiographic equipment in tandem with quality control standards to ensure optimal diagnostic images. Includes discussion of state, federal and non-governmental requirements. The seminar focuses on professional development and helps students prepare for the A.R.R.T. examination.

General Education Category:
Not GenEd

Course coordinator:
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Required texts & Other materials:

Title: Correctec Online Review Course (Subscription purchased online): https://www.corectecreview.com/modules.php?name=ReviewCourse&file=order
Title: RADTECH Bootcamp Online Review Course

Title: Radiography Review Value Pack
(Radiography Prep 9th edition & Lange Q&A Radiography Examination 11th edition)
Author: D.A. Saia
Publisher: McGraw Hill
Edition: 10th

Title: Radiologic Science for Technologists
Author: Stewart Bushong
Publisher: Elsevier
Edition: 11th

Title: Digital Radiography and PACS
Author: Christi Carter
Publisher: Elsevier
Edition: 3rd

Recommended Text:

Title:	Comprehensive Review of Radiography
Author:	William Callaway
Publisher:	Mosby
Edition:	8th

Course Student Learning Outcomes (SLO):

Upon completion of this course t*he student will be able to:*

1. Explain conventional, image-intensified and digital fluoroscopy and their associated equipment (ILG 2, 4)
2. Indicate the purpose, construction and application of video camera tubes, TV monitors and video recorders (ILG 2, 4)
3. Define terminology associated with digital imaging systems and explain the basic concepts associated with digital image acquisition and display (ILG 4)
4. Explain the components of radiographic film and the latent image formation (ILG 3, 4)
5. Differentiate between quality improvement/management, quality assurance and quality control (ILG 4)
6. Evaluate the basic QC tests and the benefits of a quality management program in Radiography and Mammography (ILG 2, 3, 4)
7. Identify resources to apply the knowledge and skills necessary for employment as an entry-level radiography position (ILG 10, 11)
8. Develop an understanding of the value of skills that promote career-long learning, and instructing radiography students in the clinical environment. (ILG 10, 11)

Course-specific Institutional Learning Goals (ILG):

Institutional Learning Goal 2. Mathematics. Students will use appropriate mathematical and statistical concepts and operations to interpret data and to solve problems.
Institutional Learning Goal 3. Science. Students will use the scientific method of inquiry, through the acquisition of scientific knowledge.
Institutional Learning Goal 4. Technology. Students will use computer systems or other appropriate forms of technology to achieve educational and personal goals.
Institutional Learning Goal 10. Information Literacy: Students will recognize when information is needed and have the knowledge and skills to locate, evaluate, and effectively use information for college level work.
Institutional Learning Goal 11. Critical Thinking: Students will use critical thinking skills understand, analyze, or apply information or solve problems.

Units of study in detail – Unit Student Learning Outcomes

Unit I**:** Image Intensified Fluoroscopy [Supports Course SLOs #1, 2]

Learning Objectives:

The student will be able to:

- Explain image-intensified and digital fluoroscopy
  - Discuss gain and conversion factors as they relate to image intensification

- Discuss conventional and digital fluoroscopic image formation
  - Identify fluoroscopic recording equipment
- Indicate the purpose, construction and application of video camera tubes, TV monitors and video recorders
- Explain the purpose, principles and application of linear tomography

Unit II Computers in Radiography, Computed & Digital Radiography [Supports Course SLOs # 3, 8]

Learning Objectives:

The student will be able to:

- Define terminology associated with digital imaging systems and explain the basic concepts associated with digital image acquisition and display including the following concepts:
  - Types of digital receptors
    - Image acquisition and extraction of data in Cassette-based vs. cassette-less digital systems
  - Histogram analysis
  - Automatic rescaling
  - Exposure index/s-number and images
  - Exposure variations and digital systems
  - Dynamic range/latitude of screen film vs. digital systems
  - PSP-based systems and exposure indices
  - DAP of a flat panel system vs. exposure index for a PSP-based system
  - Exposure indicator values of a digital system and relationship to technical factors, calibration, part/beam/IR alignment and patient exposure
  - PSP and direct digital radiography: effects if background radiation and scatter
  - Grid cut-off and Moiré effect in digital systems
  - Quantum Mottle and DR systems
  - SNR & CNR
  - Histogram analysis and beam/part/IR alignment
  - Image processing for DR systems
  - Processes to minimize histogram analysis and rescaling errors
  - Acquisition precautions utilized to avoid poor quality images
  - ALARA and DR systems
  - Components of PACS
  - Functions of PACS
  - Teleradiography
  - DICOM & HL7
  - Accession Number, Worklist and usage
  - Diagnostic workstations vs. Clinical Display workstation
  - HIPAA concerns with electronic information

Unit III Digital Fluoroscopy Supports Course [SLOs #1, 2]

Learning Objectives:

The student will be able to:

- Discuss conventional and digital fluoroscopic image formation
  - Identify fluoroscopic recording equipment

- Indicate the purpose, construction and application of video camera tubes, TV monitors and video recorders
- Explain the purpose, principles and application of linear tomography

Unit IV Film-Screen, Darkroom, Processing [Supports Course [SLO #4]

Learning Objectives:

The student will be able to:

- Describe the function of each component of an intensifying screen
- Explain latent image formation using radiographic film
- Describe the function of each component of radiographic film
- Identify the features of a well- designed darkroom and an automatic processor

Unit V Quality Assurance and Quality Control [Supports Course [SLOs #5, 6]

Learning Objectives:

The student will be able to:

- Differentiate between quality improvement/management, quality assurance and quality control
- List the benefits of a quality management program to the patient and to the department
- List element of a quality management program and discuss how each is related to the quality management program
- Discuss the proper test equipment/procedures for evaluating the operation of an x-ray generator
- Read a cooling curve and tube rating chart
- Perform basic calculations to determine the maximum number of exposures permitted given a generator's heat loading capacity

Unit VI Mammography and Quality Control [Supports Course [SLO #6]

Learning Objectives:

The student will be able to:

- Evaluate the basic QC tests in radiography and mammography

Units of study in detail – Unit Student Learning Outcomes

Upon completion of the weekly laboratory sessions, the student will be able to:

[Supports Course SLOs # 7, 8]

- Utilize examination materials to prepare for the American Registry of Radiologic Technologists Examination in Radiography.
- Identify the essential requirements to apply for the American Registry of Radiologic Technologists (ARRT) Examination in Radiography and state licensure.
- Explain the continuing education requirements to maintain (ARRT) registration and licensure essential for employment.
- Evaluate skills that promote career-long learning, where the radiographer assumes the role of student and that of teacher.
- Evaluate methods to gain employment in diagnostic radiography.
- Identify the essential elements of a resume.
- Explain the skills necessary to be a successful candidate for the employment interview.

Evaluation of student learning:
A grade of "C+" (77%) or higher must be achieved in the course to progress to RAD 242; a pass score must be achieved in the laboratory to pass the course. The following grading policy will be utilized:

Course Grade

Lecture:	100%
Laboratory:	Pass/Fail

Lecture Grade:

Continuing Education Plan	10%
Quizzes	20%
Exams	40%
Final Exam	30%

Laboratory Grade:
Comprehensive examinations and online module assessments are assigned. Details of the requirements and minimum score needed will be provided by the instructor.