Course Acronym:	RTEC
Course Number:	A
Descriptive Title:	Introduction to Radiologic Technology
Division:	Health Sciences and Athletics
Department:	Radiologic Technology
Course Disciplines:	Radiologic Technology
Catalog Description:	This course provides an introduction to Radiologic Technology as a profession including foundational skills necessary to prepare students planning to enter the Radiologic Technology A.S. Degree Program. Course topics includes educational and career pathways for radiologic technologists, program application procedures, radiographic and digital imaging equipment, principles of radiation production, exposure and quality, image processing, radiation safety, patient care, medical malpractice, professional ethics, and introduction to radiographic examinations.
Prerequisite:	Proficient in pre-algebra skills AND Eligibility for English 1A
Co-requisite:	
Recommended Preparation:	
Enrollment Limitation:	
Hours Lecture (per week):	3
Hours Laboratory (per week):	0
Outside Study Hours:	6
Total Course Hours:	54
Course Units:	3
Grading Method:	Letter Grade only
Credit Status:	Credit, degree applicable
Transfer CSU:	Yes
Effective Date:	3/15/1999
Transfer UC:	No
Effective Date:	
General Education: ECC	
Term:	
Other:	
CSU GE:	
Term:	
Other:	
IGETC:	
Term:	

Other:	
Student Learning Outcomes:	**SLO #1 Radiographic Protection** Students will analyze different methods to reduce radiation dose to the patient in the radiology department. **SLO #2 Radiographic Quality** Students will explain the concepts of contrast and density of a radiograph. **SLO #3 Radiation in Matter** Students will differentiate between the 5 photon interactions in matter by describing the origin of the interaction and its effect on the body.
Course Objectives:	1. Appraise diagnostic imaging educational programs with career pathways available for Certified Radiologic Technologists and describe the types of imaging modalities used in radiology. 2. Explain the discovery of x-rays, its fundamental properties, and the relationship between x-ray production and photon interaction with matter. 3. List the x-ray exposure factors that are controlled by a technologist and evaluate how these factors can affect radiographic quality, density, brightness and contrast on a radiographic image. 4. Define image detail and distortion, contrast and density, kVp and mAs, and explain their effects on image quality. 5. Calculate the difference in radiation dose rate using the inverse square law, kilovoltage 15% rule change and the millamperage-seconds doubling rule changes. 6. Compare and contrast how radiographic images are acquired, processed and viewed with digital radiography systems. 7. Describe picture archiving and communication systems (PACS), digital imaging and communications in medicine (DICOM) and teleradiograpy and their function in digital imaging and distinguish between the fundamentals of direct and indirect capture. 8. Identify and label the types of equipment used in radiography such as x-ray tube components, circuitry, image receptors, and digital imaging components. 9. Classify the units of radiation and measurement and discuss the safety precautions used for technologists and patients. 10. Analyze the relationship of radiographic exposure and "As low as reasonable achievable" (ALARA) to the direct and indirect biologic effects on humans. 11. Discuss the proper locations and methods of obtaining vital signs, applying universal precautions for infection control and using effective communication techniques with various types of patients. 12. Evaluate legal and ethical dilemmas related to the Radiologic Technology profession.
Major Topics:	**I. INTRODUCTION (6 hours, lecture)** A. Course requirements, assessments, instructor/student expectations B. Radiologic technology training programs C. Career paths and imaging modalities D. ECC program acceptance process E. History of x-ray technology

F. Professional organizations

II. RADIOGRAPHIC AND FLUOROSCOPIC IMAGING EQUIPMENT (6 hours, lecture)

A. Generic components

B. Exposure factors

C. Tube movements and controls

D. Mobile equipment

III. X-RAY EXPOSURE (6 hours, lecture)

A. General science review

B. X-ray tube production and interactions

C. Contrast and density

D. Technique conversions, kilovoltage peak and milliampere seconds rules

E. General overview of X-ray tube circuitry

IV. RADIATION PROTECTION (12 hours, lecture)

A. Radiation biology

B. X-ray photon tissue interactions

C. Inverse square law conversions

D. As low as reasonably achievable (ALARA)

VI. DIGITAL IMAGE CAPTURE (7 hours, lecture)

A. Image formation and capture

B. Processing

1. Computerized radiography

2. Digital radiography

C. Picture archiving and communication systems (PACS)

D. Digital imaging and communications in medicine (DICOM)

VII. IMAGE QUALITY AND ARTIFACTS (6 hours, lecture)

A. Radiographic qualities

B. Geometric qualities

C. Artifacts

VIII. PATIENT CARE SKILLS (8 hours, lecture)

	A. Communication B. Medical emergencies C. Vital signs D. Infection control **IX. ETHICAL/LEGAL ISSUES and CLINICAL ENVIRONMENT (3 hours, lecture)** A. Professional ethics B. Patient confidentiality and the Health Insurance Portability and Accountability Act of 1974 (HIPAA) C. Medical Law 1. malpractice 2. Patient immobilization D. Human diversity E. Critical thinking F. Problem solving strategies
Total Lecture Hours:	54
Total Laboratory Hours:	0
Total Hours:	54
Primary Method of Evaluation:	2) Problem solving demonstrations (computational or non-computational)
Typical Assignment Using Primary Method of Evaluation:	Students will complete computational problems using the Inverse Square Law, 15% rule change and the mAs doubling rule. Students will apply these problem solving skills to simulated circumstances to arrive at proper technique for imaging.
Critical Thinking Assignment 1:	Using the information from the lecture, class discussion and your text, draw a color coded diagram demonstrating the five photon interactions with matter and three electron interactions in the x-ray tube. Briefly describe each x-ray interaction in your own words.
Critical Thinking Assignment 2:	Write a three- to five-page essay describing exactly how a radiograph was produced. Include in your essay the equipment required, x-ray tube interaction, tissue interactions and image processing procedures. Describe the radiograph in terms of contrast and density and the steps taken to reduce radiation exposure to the technologist and object during exposure.
Other Evaluation Methods:	
Instructional Methods:	
If other:	Demonstration Discussion Group Activities Guest Speakers Internet Presentation/Resources Laboratory Lecture Multimedia presentations Role Play Other (please specify)

Work Outside of Class:	0ther
If Other:	Study Answer questions Required reading Problem solving activities Written work
Up-To-Date Representative Texts:	A. Adler & R. Carlton. Introduction to Radiologic and imaging Sciences and Patient Care. 8th ed. Cengage, 2022.
Alternative Texts:	
Required Supplementary Readings:	
Other Required Materials:	
Requisite:	Prerequisite
Category:	communication or computation skill
Requisite course(s): List both prerequisites and corequisites in this box.	
Requisite and Matching skill(s):Bold the requisite skill. List the corresponding course objective under each skill(s).	
Requisite Skill:	Proficient in pre-algebra skills AND Eligibility for English 1A
Requisite Skill and Matching Skill(s): Bold the requisite skill(s). If applicable	**Students need basic algebraic skills in order to solve equations such as the Inverse Square Law. Students without these math skills perform poorly on exams. This resulted in a high attrition rate for the course. A student's success in this class will be enhanced if they have these skills.** Students will need to have a mastery of basic algebraic skills in order to do radiation protections computations including ratio, proportion and squares and square roots. **Students need to be able to read college level textbooks and write a college level essay. Students who were not well prepared with their reading and writing skills, performed poorly on exams. This resulted in a high attrition rate for the course. A student's success in this class will be enhanced if they have these skills.** Summarize, analyze, evaluate, and synthesize college-level texts. Write a well-reasoned, well-supported expository essay that demonstrates application of the academic writing process.
Requisite course:	
Requisite and Matching skill(s):Bold the requisite skill. List the corresponding course objective under each skill(s).	
Requisite Skill:	
Requisite Skill and Matching skill(s): Bold	

the requisite skill. List the corresponding course objective under each skill(s). If applicable	
Enrollment Limitations and Category:	
Enrollment Limitations Impact:	
Course Created by:	J. Visintainer
Date:	10/05/1974
Original Board Approval Date:	
Last Reviewed and/or Revised by:	Michele Perez
Date:	02/14/2024
Last Board Approval Date:	05/20/2024
Effective Term:	FALL 2025