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| **Course Acronym:** | RTEC |
| **Course Number:** | 106 |
| **Descriptive Title:** | Clinical Experience 1 |
| **Division:** | Health Sciences and Athletics |
| **Department:** | Radiologic Technology |
| **Course Disciplines:** | Radiologic Technology |
| **Catalog Description:** | This course provides an environment to apply and develop skills learned in patient transportation, hospital policies and procedures, image processing, professional ethics, practical aspects of radiation protection, and introduction to patient positioning. |
| **Prerequisite:** | RTEC - A Introduction to Radiologic Techology<br><br>Acceptance by application and admission into the Radiologic Technology Program. |
| **Co-requisite:** | Radiologic Technology 111 AND Radiologic Technology 123 |
| **Recommended Preparation:** | |
| **Enrollment Limitation:** | Admission to the Radiologic Technology Program |
| **Hours Lecture (per week):** | 0 |
| **Hours Laboratory (per week):** | 12 |
| **Outside Study Hours:** | 0 |
| **Total Course Hours:** | 216 |
| **Course Units:** | 4 |
| **Grading Method:** | Letter Grade only |
| **Credit Status:** | Credit, degree applicable |
| **Transfer CSU:** | Yes |
| **Effective Date:** | 03/15/1999 |
| **Transfer UC:** | |
| **Effective Date:** | |
| **General Education: ECC** | |
| **Term:** | |
| **Other:** | |
| **CSU GE:** | |
| **Term:** | |
| **Other:** | |
| **IGETC:** | |

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| **Term:** | |
| **Other:** | |
| **Student Learning Outcomes:** | **SLO #1 Technique Factors**<br><br>Students will demonstrate the ability to select appropriate technical factors for beginning radiologic exams.<br><br>**SLO #2 Radiation Safety Basics**<br><br>Student will demonstrate knowledge of radiation protection and application of these principles to patients, self and staff.<br><br>**SLO #3 Transporting Patients**<br><br>Students demonstrate the proper transporting technique via wheelchair and gurney. |
| **Course Objectives:** | 1. Apply knowledge of professional ethics pertinent to the interactions with patients, staff and other health care professionals.<br>2. Recognize and adhere to radiology department operational policies and clinical education policies.<br>3. Demonstrate knowledge of radiation protection and application principles of patients, self and staff.<br>4. Recognize specific departmental emergency codes.<br>5. Integrate the use of appropriate and effective written, oral and nonverbal communication with patients, the public and member of the health care team in the clinical setting.<br>6. Identify and label accessory items in the radiographic suite.<br>7. Identify and manipulate various radiographic equipment found in the radiographic suite.<br>8. List the ordered sequence in the retrieval of radiographic images in storage.<br>9. Demonstrate the proper transporting technique via wheelchair and stretcher.<br>10. Identify various types and sizes of imaging cassettes and detectors.<br>11. Demonstrate the start-up and shutdown procedures of an image processor.<br>12. List body planes and topographic anatomy used in positioning routine radiographic procedures.<br>13. Set control panel with appropriate technical factors under direct supervision. |
| **Major Topics:** | **I. Code of Ethics and Professional Behavior (22 hours, lab)**<br><br>A. Consistency, accuracy, responsibility and excellence (CARE) in medical imaging<br><br>B. Standards for supervision<br><br>1. Direct<br><br>2. Indirect<br><br>C. Patient care<br><br>1. Expectations |

2. Rights

3. Responsibilities

4. Safety

5. Incident reporting

**II. Professional and Effective Communication (22 hours, lab)**

A. Patients

B. Patient's family

C. Radiology and health care team

D. Confidentiality of patient records

1. Health Insurance Portability and Accountability Act

**III. Imaging (22 hours, lab)**

A. Scheduling and sequencing of exams

B. Order/requisition evaluation and corrective measures

C. Facilities setup

D. Proper body mechanics

1. Patient transportation

2. Patient positioning

E. Technical considerations

F. Image acquisition

G. Image processing

H. Image analysis

I. Electronic medical records (EMR)

1. Picture Archiving and Communication System (PACS)

2. Radiology Information System (RIS)

3. Hospital Information System (HIS)

**IV. Radiation Protection (15 hours, lab)**

A. Principles

B. Equipment and accessories

**V. Patient Assessment (25 hours, lab)**

A. Patient monitoring

B. Assessment and clinical history

C. Equipment

D. Emergency response

E. Patient privacy and confidentiality

F. Documentation and charting

G. Infection control

H. Patient education

1. Age-specific

2. Cultural and socioeconomic sensitivity

**VI. While correctly using equipment and safety devices, perform the following procedures at the clinical education centers with direct and indirect supervision of a radiologic technologist. (35 hours, lab)**

**A. Upright Chest**

1. Posterior Anterior (PA)
2. Left Lateral Projections

**VII. While correctly using equipment and safety devices, perform the following procedures at the clinical education centers with direct and indirect supervision of a radiologic technologist. (35 hours, lab)**

**A. Upper Extremities**

1. Fingers & Thumb (Digits)
2. Hand
3. Wrist

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| | 4. Forearm<br>5. Elbow<br>6. Humerus<br><br>**VIII. While correctly using equipment and safety devices, perform the following procedures at the clinical education centers with direct and indirect supervision of a radiologic technologist. (35 hours, lab)**<br><br>**A. Lower Extremities**<br><br>1. Toes<br>2. Foot<br>3. Calcaneous<br>4. Ankle<br>5. Tibia/Fibula<br>6. Knee<br>7. Femur<br><br>**IX. Image Critique (5 hours, lab)**<br><br>A. Presentation of images<br><br>B. Explanation of image quality |
| **Total Lecture Hours:** | 0 |
| **Total Laboratory Hours:** | 216 |
| **Total Hours:** | 216 |
| **Primary Method of Evaluation:** | 3) Skills demonstration |
| **Typical Assignment Using Primary Method of Evaluation:** | Demonstrate, under direct supervision, safe image receptor handling and processing of a complete radiographic examination. |
| **Critical Thinking Assignment 1:** | Demonstrate to a Registered Technologist, in a clinical setting, appropriate technical factors, apply correct positioning and safety principles for a radiographic exam of the chest. |
| **Critical Thinking Assignment 2:** | Analyze and critique a radiographic image of the chest for diagnostic quality contrast, density and recorded detail. In an oral report, identify areas on the image that could or should be improved and how to accomplish the improvements. |
| **Other Evaluation Methods:** | Class Performance, Fieldwork, Performance Exams |
| **Instructional Methods:** | Demonstration, Lecture, Multimedia presentations |
| **If other:** | Computer programs |
| **Work Outside of Class:** | Answer questions, Journal (done on a continuing basis throughout the semester), Observation of or participation in an activity related to course content (such as theatre event, museum, concert, debate, meeting), Required reading, Study |

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| **If Other:** | |
| **Up-To-Date Representative Texts:** | Adler and Carlton. INTRODUCTION TO RADIOGRAPHY AND PATIENT CARE 6th edition. Cengage publisher, 2021.<br><br>Phillip Ballinger. MERRILL'S ATLAS OF RADIOGRAPHIC POSITIONS AND RADIOGRAPHIC PROCEDURES 15th edition; VOLUMES I and II. Elsevier C.V. Mosby Company Publishers , 2023. |
| **Alternative Texts:** | |
| **Required Supplementary Readings:** | |
| **Other Required Materials:** | Radiologic Technology Student Handbook, Year of admission into Program |
| **Requisite:** | Corequisite RTEC 111 & 123 |
| **Category:** | sequential |
| **Requisite course(s): List both prerequisites and corequisites in this box.** | **Program Pre-Requisite**<br><br>Student must complete RTEC A- Introduction to Radiologic Technology prior to enrolling in this course.<br><br>Student must apply and be accepted into the Radiologic Technology Program<br><br>Students must be enrolled in R111, RT 123 and RT 106 during the spring semester of their first year as noted in the program outline.<br><br>**Course Corequisite:** Radiologic Technology-111 AND Radiologic Technology-123 |
| **Requisite and Matching skill(s):Bold the requisite skill. List the corresponding course objective under each skill(s).** | **Knowledge of radiation safety and protection for the patient and operator.**<br><br>RTEC A - Analyze the relationship of radiographic exposure and "As low as reasonable achievable" (ALARA) to the direct and indirect biologic effects on humans.<br><br>RTEC 111 - Describe the physical concepts of energy and the basic structure of matter, the principles of x-ray production, the relationship of x-ray photon interaction with matter and the effects of radiation exposure produced in humans. Formulate appropriate radiographic exposure factors and select correct factors on an x-ray machine control panel to produce radiographic images using radiographic phantoms.<br><br>RTEC 111 - Identify, label and describe the function of the equipment used in radiography such as; an x-ray tube, the x-ray circuit, image receptors (film based and digital) , digital image (direct and indirect capture) processing equipment, a film processor and darkroom equipment. Demonstrate safe manipulation and operation of radiographic equipment.<br><br>RTEC 111 - Compare and contrast how radiographic images are acquired, processed, viewed and archived using screen/film, computerized and direct digital radiography systems.<br><br>RTEC 111 - List the x-ray exposure factors that are controlled by a technologist and evaluate how these factors can affect radiographic quality, density and contrast (subject |

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| | and film contrast) on a radiographic image. Calculate the new kilovoltage peak or millamperage-seconds needed to maintain density when other technical factors change. Produce images that demonstrate the effects of changes in kilovoltage, milliamperage, filtration, distance, film and screen types and speed, and the anode heel effect on x-ray output exposure, density and contrast, using radiographic phantoms, stepwedge devices, and ionization chambers.<br><br>RTEC 111 - Demonstrate the proper use of radiographic equipment and accessory items to produce high quality radiographs such as; darkroom processing, computerized processing, image display, and radiation protection techniques. Compare and contrast how proper use of these devices and processing can influence the outcome image and patient dose.<br><br>RTEC 111 - Perform experiments to demonstrate collimation changes and control of scatter radiation and accuracy (field size accuracy, X-ray/light-field congruence) and the effects of collimation on radiation protection and patient dose. Compare and contrast beam restriction with post processing electronic shuttering.<br><br>RTEC 111 - Define recorded detail and distortion and their effects on image quality. Produce radiographic images demonstrating changes in; source and subject-film distance, factors that influence image sharpness (penumbra), focal spot size, motion, magnification and distortion.<br><br>RTEC 111 - State the inverse square law, calculate and demonstrate exposure changes with a given distance change using a radiographic phantom and step-wedge in the lab.<br><br>RTEC 111 - Describe picture archiving and communication systems (PACS), digital imaging and communications in medicine (DICOM) and teleradiography and their function in digital imaging.<br><br>RTEC 111 -Differentiate how brightness and contrast, window leveling and window width influence radiographic images displayed on a computer monitor. Compare and contrast film and digital cassette exposures to quality images and patient dose.<br><br>RTEC 111 -Perform additional experiments, using phantoms and accessories, to illustrate various types of: grids and grid errors, air gap technique, intensifying screens (type and speed), poor screen-film contact, safe light testing and other quality control and equipment testing.<br><br>**Knowledge of radiographic techniques and controlling factors.**<br><br>RTEC A - 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.<br><br>RTEC A - Calculate the difference in radiation dose rate using the inverse square law, kilovoltage 15% rule change and the millamperage-seconds doubling rule changes.<br><br>RTEC 111 - Describe the physical concepts of energy and the basic structure of matter, the principles of x-ray production, the relationship of x-ray photon interaction with matter and the effects of radiation exposure produced in humans. Formulate appropriate radiographic exposure factors and select correct factors on an x-ray machine control panel to produce radiographic images using radiographic phantoms. |

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| | RTEC 111 - List the x-ray exposure factors that are controlled by a technologist and evaluate how these factors can affect radiographic quality, density and contrast (subject and film contrast) on a radiographic image. Calculate the new kilovoltage peak or millamperage-seconds needed to maintain density when other technical factors change. Produce images that demonstrate the effects of changes in kilovoltage, milliamperage, filtration, distance, film and screen types and speed, and the anode heel effect on x-ray output exposure, density and contrast, using radiographic phantoms, stepwedge devices, and ionization chambers.<br><br>RTEC 111 - Differentiate how brightness and contrast, window leveling and window width influence radiographic images displayed on a computer monitor. Compare and contrast film and digital cassette exposures to quality images and patient dose.<br><br>**Ability to properly manipulate basic radiographic equipment and position patients for specific radiographic examinations.**<br><br>RTEC 123 - Assess the patient's status and condition before, during and following the radiographic procedure.<br><br>RTEC 123 - Demonstrate the proper use of radiographic equipment and perform radiographic procedures using the energized laboratory and phantoms.<br><br>RTEC 123 - Evaluate and analyze radiographic images for technical quality, correct positioning and basic pathology.<br><br>RTEC 123 - Demonstrate the proper use of accessories and protective devices to meet acceptable patient care standards. |
| **Requisite Skill:** | |
| **Requisite Skill and Matching Skill(s): Bold the requisite skill(s). If applicable** | |
| **Requisite course:** | |
| **Requisite and Matching skill(s):Bold the requisite skill. List the corresponding course objective under each skill(s).** | |
| **Requisite Skill:** | |
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| **Enrollment Limitations and Category:** | Admission to the Radiologic Technology Program |

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| **Enrollment Limitations Impact:** | |
| **Course Created by:** | D. Visintainer/J. Stawicki |
| **Date:** | 11/01/1979 |
| **Original Board Approval Date:** | . |
| **Last Reviewed and/or Revised by:** | Dawn Charman & Eric Villa |
| **Date:** | 10/15/2023 |
| **Last Board Approval Date:** | 01/17/2024 |
| **Effective Term:** | FALL 2024 |