



El Camino College  
COURSE OUTLINE OF RECORD – Official

<b>Course Acronym:</b>	RTEC
<b>Course Number:</b>	107
<b>Descriptive Title:</b>	Clinical Experience 2
<b>Division:</b>	Health Sciences and Athletics
<b>Department:</b>	Radiologic Technology
<b>Course Disciplines:</b>	Radiologic Technology
<b>Catalog Description:</b>	This course provides an introduction to routine radiographic procedures and positioning skills for the performance of upper extremity, lower extremity, thorax, vertebral column, biliary, genitourinary, and gastrointestinal system examinations.
<b>Prerequisite:</b>	Radiologic Technology 106 , Radiologic Technology 111 , Radiologic Technology 123 with a minimum grade of C in prerequisite
<b>Co-requisite:</b>	Radiologic Technology 124
<b>Recommended Preparation:</b>	
<b>Enrollment Limitation:</b>	
<b>Hours Lecture (per week):</b>	0
<b>Hours Laboratory (per week):</b>	21
<b>Outside Study Hours:</b>	0
<b>Total Course Hours:</b>	378
<b>Course Units:</b>	7
<b>Grading Method:</b>	Letter Grade only
<b>Credit Status:</b>	Credit, degree applicable
<b>Transfer CSU:</b>	Yes
<b>Effective Date:</b>	3/15/1999
<b>Transfer UC:</b>	No
<b>Effective Date:</b>	
<b>General Education:</b>	ECC
<b>Term:</b>	
<b>Other:</b>	
<b>CSU GE:</b>	
<b>Term:</b>	
<b>Other:</b>	
<b>IGETC:</b>	
<b>Term:</b>	
<b>Other:</b>	

<p><b>Student Learning Outcomes:</b></p>	<p><b>SLO #1 Universal Precautions</b></p> <p>Students will demonstrate the proper use of protective devices for patient safety during the radiographic procedures.</p> <p><b>SLO #2 Upper Extremity Techniques</b></p> <p>Students will identify appropriate exposure factors on a control panel for upper extremities.</p> <p><b>SLO #3 Infection Control Methods</b></p> <p>Students will apply basic infection control methods.</p>
<p><b>Course Objectives:</b></p>	<ol style="list-style-type: none"> <li>1. Assess the operational characteristics of the radiographic equipment and accessories for each examining area.</li> <li>2. Set up exam area and demonstrate the appropriate clinical skills required to successfully perform the minimum number of performance evaluations (competencies) outlined on the course syllabus.</li> <li>3. Demonstrate the proper use of protective devices for patient safety during the radiographic procedures.</li> <li>4. List requirements and procedures of universal precaution guidelines.</li> <li>5. Calculate and set appropriate exposure factors on a machine control panel for a specific procedure.</li> <li>6. Interpret doctors' orders for radiologic procedures from patient's chart.</li> <li>7. Apply knowledge of professional ethics pertinent to the interactions with patients, staff and other health care professionals.</li> <li>8. 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.</li> <li>9. Recognize and adhere to radiology department operational policies and clinical education policies.</li> <li>10. Recognize specific departmental emergency codes.</li> </ol>
<p><b>Major Topics:</b></p>	<p><b>I. Code of Ethics and Professional Behavior (21 hours, lab)</b></p> <p>A. Consistency, accuracy, responsibility and excellence (CARE) in medical imaging</p> <p>B. Standards for supervision</p> <ol style="list-style-type: none"> <li>1. Direct</li> <li>2. Indirect</li> </ol> <p>C. Patient care</p> <ol style="list-style-type: none"> <li>1. Expectations</li> <li>2. Rights</li> <li>3. Responsibilities</li> <li>4. Safety</li> </ol> <p>D. Incident reporting</p> <p><b>II. Professional and Effective Communication (20 hours, lab)</b></p> <p>A. Patients</p> <p>B. Patient's family</p> <p>C. Radiology and health care team</p> <p>D. Confidentiality of patient records (Health Insurance Portability and Accountability Act, or HIPAA, compliance)</p> <p><b>III. Imaging (20 hours, lab)</b></p> <p>A. Scheduling and sequencing of exams</p> <p>B. Order/requisition evaluation and corrective measures</p> <p>C. Facilities setup</p> <p>D. Proper body mechanics</p> <ol style="list-style-type: none"> <li>1. Patient transportation</li> <li>2. Patient positioning</li> </ol>

- 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 (40 hours, lab)**

- A. Principles
- B. Equipment and accessories
- C. Proper use of ALARA (As low as reasonably achievable) principles

**V. Patient Assessment, Clinical History, Education and Care (30 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. (50 hours, lab)**

**Upright Chest**

- A. Posterior Anterior (PA)
- B. Left Lateral Projections
- C. Bony thorax

**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. (50 hours, lab)**

**Upper Extremities**

- A. Fingers & Thumb (Digits)
- B. Hand
- C. Wrist
- D. Forearm
- E. Elbow
- F. Humerus

**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. (50 hours, lab)**

**A. Lower Extremities**

- 1. Toes
- 2. Foot
- 3. Calcaneous
- 4. Ankle
- 5. Tibia/Fibula

	6. Knee 7. G. Femur <b>IX. 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. ( 50 hours, lab)</b> <b>A. Thorax</b> 1. Pelvic girdle/hip 2. Spinal column 3. C. Shoulder girdle <b>X. 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. (42 hours, lab)</b>  <b>Contrast Examinations</b> A. Digestive system B. Biliary system C. Urinary system <b>XI. Image Critique (5 hours, lab)</b> A. Presentation of images B. Explanation of image quality
<b>Total Lecture Hours:</b>	
<b>Total Laboratory Hours:</b>	378
<b>Total Hours:</b>	378
<b>Primary Method of Evaluation:</b>	3) Skills demonstration
<b>Typical Assignment Using Primary Method of Evaluation:</b>	Demonstrate proper positioning skills, technique development, and the utilization of appropriate safety procedures in the performance of an upper extremity examination.
<b>Critical Thinking Assignment 1:</b>	During an image critique session, present in an oral and written format, a review of a radiographic examination that you performed at the clinical site within the past month. Discuss the difficulties presented with performing and completing this procedure. The presentation must include an analysis and critique of all radiographs presented. The critique shall include the technical factors used, positioning, pathology involved, terminology explanation and radiation protection principles employed.
<b>Critical Thinking Assignment 2:</b>	Demonstrate to a Registered Technologist, in a clinical setting, appropriate technical factors, apply correct positioning and safety principles for a radiographic exam of the lumbar spine.
<b>Other Evaluation Methods:</b>	
<b>Instructional Methods:</b>	
<b>If other:</b>	Demonstration Other (please specify) 1. Radiographic film critique 2. Clinical assignments at hospital affiliate 3. Direct supervision during performance of radiographic procedures
<b>Work Outside of Class:</b>	Other
<b>If Other:</b>	Study Required reading

<b>Up-To-Date Representative Texts:</b>	Rollins, J.et al. <u>MERRILL'S ATLAS OF RADIOGRAPHIC POSITIONS AND RADIOGRAPHIC PROCEDURES; VOLUMES I, II &amp; III.</u> 15 <sup>th</sup> ed. Mosby/Elsevier 2023
<b>Alternative Texts:</b>	
<b>Required Supplementary Readings:</b>	
<b>Other Required Materials:</b>	Hospital uniform and supplies as outlined in the Student Handbook.
<b>Requisite:</b>	Prerequisite
<b>Category:</b>	sequential
<b>Requisite course(s): List both prerequisites and corequisites in this box.</b>	<p><b>Prerequisite:</b> Radiologic Technology-106 and Radiologic Technology-111 and Radiologic Technology-123</p> <p><b>Corequisite:</b> Radiologic Technology-124</p>
<b>Requisite and Matching skill(s):Bold the requisite skill. List the corresponding course objective under each skill(s).</b>	<p><b>Knowledge of radiation protection.</b></p> <p>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.</p> <p>RTEC 106 Demonstrate knowledge of radiation protection and application principles of patients, self and staff.</p> <p>RTEC 124 - Demonstrate the use of accessories, protective devices, and technical competence to perform diagnostic imaging procedures and meet acceptable patient care standards.</p> <p>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 milliamperage-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.</p> <p>RTEC 106 -Identify and label accessory items in the x-ray suite.</p> <p>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.</p> <p>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.</p> <p>RTEC 124 - Compare and contrast the benefits and risks of a fluoroscopy procedure.</p>

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.

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.

RTEC 124 - Formulate special technical considerations and demonstrate positioning skills necessary when performing radiographic procedures on an infant, elderly, or surgical patient.

RTEC 111 - Differentiate between the various advisory groups and regulatory agencies involved in developing radiation protections standards. Correlate the protection standards set by the regulatory agencies to the standard practices of radiation safety for the patients, technologists and other medical staff.

RTEC 124 - Explain the appropriate radiation protection required when performing mobile and surgical radiography.  
**Knowledge of specific anatomy and positions required to obtain thoracic and extremity radiographs.**

RTEC 124 - Identify standard radiographic positions and anatomical structures on a radiographic image.

RTEC 124 - Use topographical anatomy in the performance of radiographic positions.

RTEC 124 - Evaluate and analyze radiographic images.

RTEC 124 - Demonstrate the proper use of radiographic equipment and perform radiographic procedures using the energized laboratory and phantoms.

RTEC 106 -Identify and manipulate various radiographic equipment found in the radiographic suite.

RTEC 123 - Identify standard radiographic positions and perform radiographic procedures and the proper use of radiographic equipment using the energized laboratory and phantoms.

RTEC 124 - Demonstrate the proper use of fixed and mobile radiographic equipment.

RTEC 106 -Demonstrate the start-up and shutdown procedures of an automatic processor.

RTEC 124 - Formulate special technical considerations and demonstrate positioning skills necessary when performing radiographic procedures on an infant, elderly, or surgical patient.

RTEC 106  
 List body planes and topographic anatomy used in positioning routine radiographic procedures.

RTEC 124 - Explain the types of immobilization devices and positioning considerations required for patients with fractures, wounds, head injuries and other types of trauma.

RTEC 123 -Evaluate and analyze radiographic images for anatomy identification, technical quality, correct positioning and basic pathology.

RTEC 124 - Identify specific types of tubes, lines and catheters and describe the special problems faced in performing procedures on the acutely ill patient with these devices in place. RTEC 123 -

**Demonstrate technical competence and prudent judgment and the proper use of protective devices while administering ionizing radiation to perform diagnostic imaging procedures of the Chest, Upper and Lower extremities, to meet acceptable patient care standards.**

RTEC 123 -Adapt radiographic procedures to meet age-specific, disease-specific and cultural needs of patients.

**Knowledge and ability to maneuver and operate radiographic equipment and accessories necessary for routine radiography.**

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.

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.

RTEC 111 - Compare and contrast how radiographic images are acquired, processed, viewed and archived using screen/film, computerized and direct digital radiography systems.

RTEC 124 - Demonstrate the use of accessories, protective devices, and technical competence to perform diagnostic imaging procedures and meet acceptable patient care standards

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 milliamperage-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.

RTEC 124 - Demonstrate the proper use of radiographic equipment and perform radiographic procedures using the energized laboratory and phantoms.

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.

RTEC 106 - Identify and label accessory items in the x-ray suite.

RTEC 106 - Identify and manipulate various radiographic equipment found in the radiographic suite.

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.

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

	<p>influence image sharpness (penumbra), focal spot size, motion, magnification and distortion.</p> <p>RTEC 106 -Identify various types and sizes of x-ray film and holders.</p> <p>RTEC 124 - Demonstrate the proper use of fixed and mobile radiographic equipment.</p> <p>RTEC 106 -Demonstrate the start-up and shutdown procedures of an automaticprocessor.</p> <p>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.</p> <p>RTEC 124 - Explain the types of immobilization devices and positioning considerations required for patients with fractures, wounds, head injuries and other types of trauma.</p> <p>RTEC 106 - Set control panel with appropriate technical factors under directsupervision.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.</p> <p>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.</p>
<b>Requisite Skill:</b>	
<b>Requisite Skill and Matching Skill(s): Bold the requisite skill(s). If applicable</b>	
<b>Requisite course:</b>	
<b>Requisite and Matching skill(s):Bold the requisite skill. List the corresponding course objective under each skill(s).</b>	
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<b>Requisite Skill and Matching skill(s): Bold the requisite skill. List the corresponding course objective under each skill(s). If applicable</b>	
<b>Enrollment Limitations and Category:</b>	
<b>Enrollment Limitations Impact:</b>	
<b>Course Created by:</b>	Donald Visintainer
<b>Date:</b>	11/01/1979

<b>Original Board Approval Date:</b>	
<b>Last Reviewed and/or Revised by:</b>	Dawn Charman & Eric Villa
<b>Date:</b>	02/14/2024
<b>Last Board Approval Date:</b>	05/20/2024
<b>Effective Term:</b>	FALL 2025