

Course Outline

Health Science and Medical Technology

REVISED: August/2022

Job Title

X-Ray Technician

76-45-89

Career Pathway:

Patient Care

X-Ray Technology/3

Industry Sector:

Health Science and Medical
Technology

Credits: 35

Hours: 450

O*NET-SOC CODE:

29-2034.00

Course Description:

This competency-based course is the last in a sequence of three designed for x-ray technology. It provides students with project-based experiences according to the California State certification examination requirements in the limited category of skull. Didactic and clinical instruction includes parts three of anatomy and physiology (including cranial and facial bone pathologies), radiographic positioning, and film critique. Emphasis is also placed on digital radiography, employability skills, and the evaluation process. Students are given maximum hours available for clinical experience in health care facilities supervised by the instructor and staff personnel in order to perform as safe, competent, and professional X-Ray Technicians. The passing of the state examination allows graduates to work as X-Ray Technicians under a supervising licentiate. The competencies in this course are aligned with the California High School Academic Content Standards and the California Career Technical Education Model Curriculum Standards.

CBEDS Title:

Healthcare Occupations

Prerequisites:

Enrollment requires successful completion of the X-Ray Technology/2 (76-45-86) course.

CBEDS No.:

4257

NOTE: For Perkins purposes this course has been designated as a **capstone** course.

This course **cannot** be repeated once a student receives a Certificate of Completion.



COURSE OUTLINE COMPETENCY-BASED COMPONENTS

A course outline reflects the essential intent and content of the course described. Acceptable course outlines have six components. (Education Code Section 52506). Course outlines for all apportionment classes, including those in jails, state hospitals, and convalescent hospitals, contain the six required elements:

(EC 52504; 5CCR 10508 [b]; Adult Education Handbook for California [1977], Section 100)

COURSE OUTLINE COMPONENTS

LOCATION

GOALS AND PURPOSES

Cover

The educational goals or purposes of every course are clearly stated and the class periods are devoted to instruction. The course should be broad enough in scope and should have sufficient educational worth to justify the expenditure of public funds.

The goals and purpose of a course are stated in the COURSE DESCRIPTION. Course descriptions state the major emphasis and content of a course, and are written to be understandable by a prospective student.

PERFORMANCE OBJECTIVES OR COMPETENCIES

pp. 7-13

Objectives should be delineated and described in terms of measurable results for the student and include the possible ways in which the objectives contribute to the student's acquisition of skills and competencies.

Performance Objectives are sequentially listed in the COMPETENCY-BASED COMPONENTS section of the course outline. Competency Areas are units of instruction based on related competencies. Competency Statements are competency area goals that together define the framework and purpose of a course. Competencies fall on a continuum between goals and performance objectives and denote the outcome of instruction.

Competency-based instruction tells a student before instruction what skills or knowledge they will demonstrate after instruction. Competency-based education provides instruction which enables each student to attain individual goals as measured against pre-stated standards.

Competency-based instruction provides immediate and continual repetition. In competency-based education the curriculum, instruction, and assessment share common characteristics based on clearly stated competencies. Curriculum, instruction and assessment in competency-based education are: explicit, known, agreed upon, integrated, performance oriented, and adaptive.

COURSE OUTLINE COMPETENCY-BASED COMPONENTS
(continued)

COURSE OUTLINE COMPONENTS

LOCATION

INSTRUCTIONAL STRATEGIES

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Instructional techniques or methods could include laboratory techniques, lecture method, small-group discussion, grouping plans, and other strategies used in the classroom.

Instructional strategies for this course are listed in the TEACHING STRATEGIES AND EVALUATION section of the course outline. Instructional strategies and activities for a course should be selected so that the overall teaching approach takes into account the instructional standards of a particular program, i.e., English as a Second Language, Programs for Adults with Disabilities.

UNITS OF STUDY, WITH APPROXIMATE HOURS ALLOTTED FOR EACH UNIT

Cover

The approximate time devoted to each instructional unit within the course, as well as the total hours for the course, is indicated. The time in class is consistent with the needs of the student, and the length of the class should be that it ensures the student will learn at an optimum level.

pp. 7-13

Units of study, with approximate hours allotted for each unit are listed in the COMPETENCY AREA STATEMENT(S) of the course outline. The total hours of the course, including work-based learning hours (community classroom and cooperative vocational education) is listed on the cover of every CBE course outline. Each Competency Area listed within a CBE outline is assigned hours of instruction per unit.

EVALUATION PROCEDURES

p. 15

The evaluation describes measurable evaluation criteria clearly within the reach of the student. The evaluation indicates anticipated improvement in performances as well as anticipated skills and competencies to be achieved.

Evaluation procedures are detailed in the TEACHING STRATEGIES AND EVALUATION section of the course outline. Instructors monitor students' progress on a continuing basis, assessing students on attainment of objectives identified in the course outline through a variety of formal and informal tests (applied performance procedures, observations, and simulations), paper and pencil exams, and standardized tests.

REPETITION POLICY THAT PREVENTS PERPETUATION OF STUDENT ENROLLMENT

Cover

After a student has completed all the objectives of the course, he or she should not be allowed to reenroll in the course. There is, therefore, a need for a statement about the conditions for possible repetition of a course to prevent perpetuation of students in a particular program for an indefinite period of time.

ACKNOWLEDGMENTS

Thanks to VERONICA AGUILAR, JENNIFER AYONN and LUZ GRANADOS for developing and editing this curriculum. Acknowledgment is also given to ERICA ROSARIO for designing the original artwork for the course covers.

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CALIFORNIA CAREER TECHNICAL EDUCATION MODEL CURRICULUM STANDARDS

Health Science and Medical Technology Industry Sector

Knowledge and Performance Anchor Standards

1.0 Academics

Analyze and apply appropriate academic standards required for successful industry sector pathway completion leading to postsecondary education and employment. Refer to the Health Science and Medical Technology academic alignment matrix for identification of standards.

2.0 Communications

Acquire and accurately use Health Science and Medical Technology sector terminology and protocols at the career and college readiness level for communicating effectively in oral, written, and multimedia formats.

3.0 Career Planning and Management

Integrate multiple sources of career information from diverse formats to make informed career decisions, solve problems, and manage personal career plans.

4.0 Technology

Use existing and emerging technology to investigate, research, and produce products and services, including new information, as required in the Health Science and Medical Technology sector workplace environment.

5.0 Problem Solving and Critical Thinking

Conduct short, as well as more sustained, research to create alternative solutions to answer a question or solve a problem unique to the Health Science and Medical Technology sector using critical and creative thinking, logical reasoning, analysis, inquiry, and problem-solving techniques.

6.0 Health and Safety

Demonstrate health and safety procedures, regulations, and personal health practices and determine the meaning of symbols, key terms, and domain-specific words and phrases as related to the Health Science and Medical Technology sector workplace environment.

7.0 Responsibility and Flexibility

Initiate, and participate in, a range of collaborations demonstrating behaviors that reflect personal and professional responsibility, flexibility, and respect in the Health Science and Medical Technology sector workplace environment and community settings.

8.0 Ethics and Legal Responsibilities

Practice professional, ethical, and legal behavior, responding thoughtfully to diverse perspectives and resolving contradictions when possible, consistent with applicable laws, regulations, and organizational norms.

9.0 Leadership and Teamwork

Work with peers to promote divergent and creative perspectives, effective leadership, group dynamics, team and individual decision making, benefits of workforce diversity, and conflict resolution as practiced in the Cal-HOSA career technical student organization.

10.0 Technical Knowledge and Skills

Apply essential technical knowledge and skills common to all pathways in the Health Science and Medical Technology sector, following procedures when carrying out experiments or performing technical tasks.

11.0 Demonstration and Application

Demonstrate and apply the knowledge and skills contained in the Health Science and Medical Technology anchor standards, pathway standards, and performance indicators in classroom, laboratory, and workplace settings and through the Cal-HOSA career technical student organization.

Health Science and Medical Technology Pathway Standards

B. Patient Care Pathway

The standards for the Patient Care pathway apply to occupations or functions involved in the prevention, treatment, and management of illness and the preservation of mental and physical well-being through the services offered by the medical and allied health professions. The standards specify the knowledge and skills needed by professional and technical personnel pursuing careers in this pathway.

Sample occupations associated with this pathway:

- ◆ Kinesiotherapist
- ◆ Nurse Anesthetist
- ◆ Respiratory Therapist
- ◆ Radiologic Technician
- ◆ Dental Hygienist

- B1.0 Recognize the integrated systems approach to health care delivery services: prevention, diagnosis, pathology, and treatment
- B2.0 Understand the basic structure and function of the human body and relate normal function to common disorders.
- B3.0 Know how to apply mathematical computations used in health care delivery system.
- B4.0 Recognize and practice components of an intake assessment relevant to patient care.
- B5.0 Know the definition, spelling, pronunciation, and use of appropriate terminology in the health care setting.
- B6.0 Communicate procedures and goals to patients using various communication strategies to respond to questions and concerns.
- B7.0 Apply observation techniques to detect changes in the health status of patients.
- B8.0 Demonstrate the principles of body mechanics as they apply to the positioning, transferring, and transporting of patients.
- B9.0 Implement wellness strategies for the prevention of injury and disease behaviors that prevent injury and illness
- B10.0 Comply with protocols and preventative health practices necessary to maintain a safe
- B11.0 Comply with hazardous waste disposal policies and procedures, including documentation, to ensure that regulated waste is handled, packaged, stored, and disposed of in accordance with federal, state, and local regulations.
- B12.0 Adhere to the roles and responsibilities, within the scope of practice, that contribute to the design and implementation of treatment planning
- B13.0 Research factors that define cultural differences between and among different ethnic, racial, and cultural groups and special populations.

CBE
Competency-Based Education

COMPETENCY-BASED COMPONENTS
for the X-Ray Technology/3 Course

COMPETENCY AREAS AND STATEMENTS	MINIMAL COMPETENCIES	STANDARDS
<p>A. ANATOMY AND PHYSIOLOGY III</p> <p>Understand, apply, and evaluate the organs of the body systems from a radiologic perspective and function.</p> <p>(Theory: 30 hours)</p>	<ol style="list-style-type: none"> 1. Identify and describe the following: <ol style="list-style-type: none"> a. eight cranial bones and their features, related structures, location, and function b. specific radiographic and topographical landmarks of the cranium c. identifying the locations and joint classification of sutures and joints of the cranium and facial bones d. 14 facial bones and their features, structures, location, and function e. number and names of cranial/facial bones with which each cranial and facial bone articulate f. cranial and facial bones that make up the bony orbits g. three main portions of the temporal bone h. causes and radiographic implications of a blowout and tripod fractures of the facial bones i. differences among the three shape and size classifications of the cranium and their implications to radiography of the cranium j. reference points, positioning lines, and topographical landmarks as they relate to the cranium and the facial bones k. cranial and facial bone pathologies 2. Identify and describe the following: <ol style="list-style-type: none"> a. structures of the external, middle, and internal ear b. major parts of the ear 3. Identify and describe the following: <ol style="list-style-type: none"> a. how the ear maintains balance and equilibrium b. functions of the nasal cavity c. four groups of paranasal sinuses and their features, location, and function 4. Identify and describe the following: <ol style="list-style-type: none"> a. labeling on a diagram the external, middle, and internal ear b. labeling on a diagram major parts of the ear 5. Identify and describe the following: <ol style="list-style-type: none"> a. classification of ribs: true, false, or floating b. structures that are best seen with specific projections of the ribs and sternum 6. Pass the safety test with 100% accuracy. 	<p>Career Ready Practice: 1, 2, 5</p> <p>CTE Anchor: Academics: 1.0 Communications: 2.4, 2.7, 2.8 Problem Solving and Critical Thinking: 5.4</p> <p>CTE Pathway: B2.1, B2.2, B2.3, B2.4, B5.1, B5.2, B5.3, B5.4, B5.5, B5.7</p>

COMPETENCY AREAS AND STATEMENTS	MINIMAL COMPETENCIES	STANDARDS
<p>B. RADIOGRAPHIC POSITIONING III</p> <p>Understand, apply, and evaluate the basic radiographic positioning for exams involving the cranium.</p> <p>(Theory: 30 hours)</p>	<ol style="list-style-type: none"> 1. Describe and demonstrate the basic and special positioning used to visualize anatomic structures of the cranium and facial bones. 2. List and identify the central ray location with angulation specifics, cassette size and orientation, and the extent of the field necessary for both the basic and special projections of the following: <ol style="list-style-type: none"> a. cranium b. facial bones c. paranasal sinuses 3. Identify and describe the technical factors required to produce an acceptable radiograph for basic and special projections of the: <ol style="list-style-type: none"> a. cranium b. facial bones c. paranasal sinuses 4. Identify and describe the patient instructions for basic and special projections of the: <ol style="list-style-type: none"> a. cranium b. facial bones c. paranasal sinuses 5. Describe and demonstrate the following: <ol style="list-style-type: none"> a. identifying the differences in patient dose on alternative frontal (AP) vs. posteroanterior (PA) projections of the cranium and facial bones b. positioning the basic and special projections of the cranium, facial bones, and paranasal sinuses on phantom and human models c. making accurate evaluations of positioning and technical factors based on given radiographs d. making procedural modifications for atypical or impaired patients to better demonstrate the anatomic area of interest 	<p>Career Ready Practice: 1, 2, 5, 7, 8, 9, 10</p> <p>CTE Anchor: Academics: 1.0 Communications: 2.1, 2.2, 2.4, 2.7, 2.8 Problem Solving and Critical Thinking: 5.1, 5.4, 5.5, 5.6 Responsibility and Flexibility: 7.2, 7.3, 7.4, 7.7 Ethics and Legal Responsibilities: 8.3, 8.4 Leadership and Teamwork: 9.6 Technical Knowledge and Skills: 10.1, 10.2 Demonstration and Application: 11.2</p> <p>CTE Pathway: B2.1, B2.3, B3.1, B5.1, B5.2, B5.3, B5.4, B5.6, B5.7, B6.1, B6.2, B6.3, B6.4, B8.5, B12.1, B12.2, B12.3, B12.4</p>
<p>C. IMAGE CRITIQUE III</p> <p>Review, apply, and evaluate the procedures used to produce quality radiographic products.</p>	<ol style="list-style-type: none"> 1. Review the definitions of the following: <ol style="list-style-type: none"> a. radiographic detail b. image sharpness c. radiographic density d. contrast e. short-scale contrast image f. long-scale contrast image g. radiographic distortion h. collimation 2. Review and describe: <ol style="list-style-type: none"> a. role of the radiographer in image analysis b. elements of a diagnostic image 	<p>Career Ready Practice: 1, 2, 5, 7, 8, 10</p> <p>CTE Anchor: Academics: 1.0 Communications: 2.4 Problem Solving and Critical Thinking: 5.1, 5.2, 5.3, 5.4, 5.5, 5.6</p>

COMPETENCY AREAS AND STATEMENTS	MINIMAL COMPETENCIES	STANDARDS
(Theory: 5 hours)	<ul style="list-style-type: none"> c. conditions that must be present in a radiographic image that would indicate acceptable visibility of image details d. controlling factors for radiographic density and contrast e. image quality factors of a radiograph f. geometric factors that influence image sharpness g. ways of controlling involuntary and voluntary motion h. parameters for evaluating visibility of detail on the image i. controlling factors for radiographic distortions j. criteria for evaluating radiographic distortions <p>3. Review and demonstrate:</p> <ul style="list-style-type: none"> a. determining that the adequate level of penetration has been applied to produce the desired level of contrast b. techniques for adequate density, contrast, recorded detail and acceptable limits of distortion of a radiographic image c. identifying short scale contrast and long scale contrast images d. evaluating image distortion <p>4. Review and describe the following:</p> <ul style="list-style-type: none"> a. criteria for evaluating radiographs of the extremities for positioning accuracy and overall image quality b. importance of collimation, anatomic side markers, and proper radiograph identification c. general criteria for repeating a radiograph d. elements of a diagnostic image as they relate to film critique e. differences between technical factor problems, procedural problems, and equipment malfunctions f. common equipment malfunctions that affect image quality g. impact of patient preparation on the resulting radiographic image h. modifications of procedures for atypical or impaired patients to better demonstrate the anatomic area of interest <p>5. Describe/review and demonstrate the following:</p> <ul style="list-style-type: none"> a. analyzing samples of the cranial radiographs b. recommending modifications for improvement: c. discriminating acceptable radiographs from the unacceptable ones based on the following criteria: <ul style="list-style-type: none"> i. exposure factors ii. motion iii. collimation iv. positioning errors 	<p>Responsibility and Flexibility: 7.2</p> <p>Ethics and Legal Responsibilities: 8.1, 8.4</p> <p>Demonstration and Application: 11.2</p> <p>CTE Pathway: B3.1, B3.2, B5.2, B6.1, B6.2, B6.3, B6.4, B7.4, B12.1, B12.2, B12.3, B12.4</p>
<p>D. DIGITAL RADIOGRAPHY</p> <p>Understand, apply, and evaluate the basic radiation protection principles and procedures used in digital radiography.</p>	<p>1. Identify and describe the following:</p> <ul style="list-style-type: none"> a. modalities that use digital radiography b. differences between digital radiography and conventional radiography c. imaging process in digital radiography d. primary factors controlling image quality in digital radiography e. criteria for evaluating digital radiographs f. differences between technical factor problems, procedural problems, and equipment malfunctions g. common equipment malfunctions that affect image quality 	<p>Career Ready Practice: 1, 2, 4, 5, 6, 7, 8, 10</p> <p>CTE Anchor: Academics: 1.0 Communications: 2.4, 2.7, 2.8 Technology: 4.5</p>

COMPETENCY AREAS AND STATEMENTS	MINIMAL COMPETENCIES	STANDARDS
<p>(Theory: 10 hours) (Laboratory: 5 hours)</p>	<ul style="list-style-type: none"> h. impact of patient preparation on the resulting digital image i. importance of matching the body part being examined to the examination menu j. importance of preprocessing collimation k. extraction of the image in a cassette-less system l. extraction of the image in a cassette-based system m. effects of incorrect histogram model selection n. exposure indicator in a cassette-less system (DAP) and the need for routine calibration o. differences in exposure indicators from various vendors p. advantages and limitations of digital imaging over film-screen radiography q. differences between image latitude in digital imaging with film-screen radiography r. automatic rescaling of pixels in digital radiography and how it increases the range of exposures s. differences in exposure indicators from various vendors t. advantages and limitations of digital imaging over film-screen radiography u. differences between image latitude in digital imaging with film-screen radiography v. automatic rescaling of pixels in digital radiography and how it increases the range of exposures w. effective beam-part-receptor alignment latitude x. effects of the beam-part-receptor alignment on the histogram analysis <p>2. Describe and demonstrate the following:</p> <ul style="list-style-type: none"> a. analyzing digital images of the extremities (two), torsoskeleton (three), chest (four), and cranium (five) b. discriminating acceptable digital images from the unacceptable ones based on the following criteria: <ul style="list-style-type: none"> i. technical factors ii. patient preparation c. digital imaging techniques by: <ul style="list-style-type: none"> i. appropriate menu selection ii. patient preparation d. perform labs to illustrate the use of appropriate menu selection, part placement, pre- & post-processing, and receptor erasure & cleaning 	<p>Problem Solving and Critical Thinking: 5.1, 5.2, 5.3, 5.4, 5.5, 5.6</p> <p>Health and Safety: 6.2</p> <p>Responsibility and Flexibility: 7.2, 7.4</p> <p>Ethics and Responsibilities: 8.1, 8.2, 8.3, 8.4</p> <p>Technical Knowledge and Skills: 10.1, 10.2</p> <p>Demonstration and Application: 11.2</p> <p>CTE Pathway: B2.1, B2.3, B3.1, B3.2, B5.2, B6.2, B7.4, B9.3</p>
<p>E. REVIEW AND EVALUATION</p> <p>Complete state required number of exams within the mandated time period and pass final exams with at least 75%.</p>	<p>1. Pass each of the following final exams with at least 75%:</p> <ul style="list-style-type: none"> a. chest b. extremity c. torsoskeleton d. cranium e. core section <ul style="list-style-type: none"> i. radiation protection ii. equipment operation and maintenance iii. image production and evaluation iv. patient care and management 	<p>Career Ready Practice: 1, 2, 4, 5, 6, 7, 8</p> <p>CTE Anchor: Academics: 1.0 Communications: 2.1, 2.2, 2.3, 2.4, 2.7, 2.8</p>

COMPETENCY AREAS AND STATEMENTS	MINIMAL COMPETENCIES	STANDARDS
(Theory: 20 hours)	<ol style="list-style-type: none"> 2. Demonstrate competency standards for chest, extremity, torsoskeletal, and cranial categories by: <ol style="list-style-type: none"> a. calculating mAs when given mA and exposure time b. calculating mA when given mAs and exposure time c. positioning the patient effectively and accurately d. determining the central ray location effectively and accurately e. completing the examination in a timely manner f. producing optimum radiographic diagnostic quality g. optimizing functional critique skills 3. Demonstrate minimal competencies in the following sections of the X-Ray Technician course sequence: <ol style="list-style-type: none"> a. orientation and general safety principles b. radiobiology and radiation safety c. radiologic physics d. principles of exposure and image quality e. image receptor system f. medical and radiologic terminology g. clinical assistant procedures h. image critique i. anatomy and physiology j. radiographic positioning k. digital radiography l. clinical experience 4. Pass a final comprehensive exam with at least 75% accuracy. 	<p>Technology: 4.1 Problem Solving and Critical Thinking: 5.1, 5.2, 5.3, 5.4, 5.5, 5.6 Health and Safety: 6.2 Responsibility and Flexibility: 7.2 Ethics and Legal Responsibilities: 8.1, 8.2, 8.3</p> <p>CTE Pathway: B2.1, B2.2, B2.3, B2.4, B3.1, B3.2, B5.2, B5.6, B7.1, B12.1, B12.2, B12.3</p>
<p>F. CLINICAL EXPERIENCE II</p> <p>Demonstrate proficiency in clinical skills and radiographic procedures in a health care facility.</p>	<ol style="list-style-type: none"> 1. Review and demonstrate the following: <ol style="list-style-type: none"> a. knowledge of selected medical and radiological terminology; the effects of and regulations for radiation exposure b. understanding of the parts, appropriate use, and care of the radiographic machine; the principles involved in the function of the radiographic machine c. professional and ethical standards for safe practice as an x-ray technician d. occupational safety standards, including usage of effective body mechanics and avoidance of physical hazards e. effective hand washing techniques f. effective patient transfer and ambulation techniques g. accurate interpretation of radiographic calculations and exposure conditions affecting the quality of radiographs h. steps necessary to develop radiographs i. knowledge of medical and radiologic terminology when documenting on a patient's chart j. obtaining radial pulse, counting respirations, obtaining temperature and blood pressure k. documenting vital signs on patient records according to clinics' policy l. evaluating the diagnostic and radiographic quality of radiographs, making modifications as needed m. combining basic clinical procedures skills and radiographic skills in a health care facility 	<p>Career Ready Practice: 1, 2, 5, 6, 7, 8, 10</p> <p>CTE Anchor: Academics: 1.0 Communications: 2.1, 2.2, 2.3, 2.4, 2.6, 2.7 Problem Solving and Critical Thinking: 5.1, 5.2, 5.3, 5.4, 5.5, 5.6 Health and Safety: 6.2 Responsibility and Flexibility: 7.4 Ethics and Legal Responsibilities: 8.2 Demonstration and Application: 11.1</p>

COMPETENCY AREAS AND STATEMENTS	MINIMAL COMPETENCIES	STANDARDS
(Clinical 345 hours)	<ol style="list-style-type: none"> 2. Describe and demonstrate the following radiographic standards: <ol style="list-style-type: none"> a. effective and accurate positioning of the patient b. effective and accurate central ray location c. familiarity with the examination, so that it is completed in a timely manner d. optimum radiographic diagnostic quality e. optimum radiation protection for the patient, clinical personnel, and self f. well-organized critique skills g. attentiveness to the factors that affect radiographic quality h. effective interpretation of radiographic calculations and exposure conditions affecting the quality of radiographs i. responding appropriately to patient emergencies, as well as clinical emergencies 3. Demonstrate the following: <ol style="list-style-type: none"> a. perform State required experiments to illustrate effects of kVp, mA, SID, heel effect, and scattered radiation on image quality 4. Describe and demonstrate: <ol style="list-style-type: none"> a. proper imaging procedures under the appropriate level of supervision b. complete and record 50 actual patient chest exams required by the State within the mandated time period of 12 consecutive months c. complete and record 200 actual patient torsoskeletal exams required by the State within the mandated time period of 12 consecutive months d. complete and record 100 actual patient extremity exams required by the State within the mandated time period of 12 consecutive months e. complete and record of 40 actual patient cranial exams (plus 60 phantoms) 	<p>CTE Pathway: B2.1, B2.2, B2.3, B2.4, B5.1, B5.2, B5.3, B5.6, B8.1, B8.2, B8.3, B8.4, B8.5, B9.1, B10.1, B10.2, B10.3, B10.5</p>
<p>G. EMPLOYABILITY SKILLS & RESUME PREPARATION</p> <p>Understand the processes involved in seeking, gaining, and maintaining employment.</p>	<ol style="list-style-type: none"> 1. Understand employer requirements for soft skills such as: <ol style="list-style-type: none"> a. punctuality and attendance b. time management c. flexibility and adaptability d. interpersonal skills e. work ethic f. communication and collaboration g. teamwork h. critical thinking and problem solving i. leadership and responsibility j. ethical behavior k. cultural and diversity differences 2. Create/revise a resume, cover letter and/or portfolio. 3. Review the role of online job searching platforms and career websites. 4. Complete and/or review an on-line job application. 	<p>Career Ready Practice: 1, 2, 3, 4, 5, 7, 8, 9</p> <p>CTE Anchor: Academics: 1.0 Communications: 2.2, 2.3, 2.4, 2.5 Career Planning and Management: 3.2, 3.3, 3.4, 3.6, 3.8 Technology: 4.1, 4.3 Problem Solving & Critical Thinking: 5.1</p>

COMPETENCY AREAS AND STATEMENTS	MINIMAL COMPETENCIES	STANDARDS
(Theory: 5 hours)	<ol style="list-style-type: none"> 5. Discuss interview skills to get the job: <ol style="list-style-type: none"> a. do's and don'ts for job interviews b. how to dress for the job 6. Create sample follow-up letters. 7. Understand the importance of the continuous upgrading of job skills as it relates to: <ol style="list-style-type: none"> a. certification, licensure, and/or renewal b. professional organizations/events c. industry associations and/or organized labor 	Responsibility and Flexibility: 7.2, 7.3, 7.4, 7.7 Ethics and Legal Responsibilities: 8.4 Leadership and Teamwork: 9.2, 9.3, 9.4, 9.6 Demonstration & Application: 11.5 CTE Pathway: B3.3, B5.2, B5.6, B6.2, B6.6, B12.1, B12.2, B12.3, B12.4

SUGGESTED INSTRUCTIONAL MATERIALS and OTHER RESOURCES

TEXTBOOKS

Kendrick, Leslie E. and Lampignano, John. Bontrager's Textbook of Radiographic Positioning and Related Anatomy, 10th Edition. Elsevier Health Science, 2021.

Kendrick, Leslie E. and Lampignano, John. Workbook for Bontrager's Textbook of Radiographic Positioning and Related Anatomy, 10th Edition. Elsevier Health Science, 2021.

Mason, Starla. Essentials of Radiologic Science Second Edition. Wolters Kluwer. 2018

Mason, Starla. Essentials of Radiologic Science Work Book Second Edition. Wolters Kluwer. 2018

Coakes, Dawn M. and Ehrlich, Ruth Ann. Patient Care in Radiography: With an Introduction to Medical Imaging 10th Edition. Elsevier Health Science, 2020.

ASRT Scanner. Monthly News Magazine of American Society of Radiologic Technologists.

RESOURCES

Employer Advisory Board members

California Career Technical Education Model Curriculum Standards

<https://www.cde.ca.gov/ci/ct/sf/documents/healthmedical.pdf>

American Registry of Radiologic Technologists (ARRT): <https://www.arrt.org/>

Joint Review Committee on Education in Radiologic Technology (JRCERT): <https://www.jrcert.org/>

Radiologic Health Branch: <https://www.cdph.ca.gov/Programs/CEH/DRSEM/Pages/RHB.aspx>

COMPETENCY CHECKLIST

TEACHING STRATEGIES and EVALUATION

METHODS AND PROCEDURES

- A. Teacher and student guided:
 - 1. Lecture
 - 2. Discussion
 - 3. Role play
 - 4. Problem-solving
 - 5. Demonstration/practice/return demonstration
 - 6. Home assignment, patient case studies
- B. Field trips
- C. Multi-sensory presentations
 - 1. Films, videos
 - 2. PowerPoint presentations
 - 3. Mock-ups
 - 4. Audio-visuals, CD-ROMs
 - 5. Radiographs
- D. Clinical activities

EVALUATION

SECTION A – Anatomy and Physiology III – Pass all assignments and exams with a minimum score of 75% or higher. Pass the safety test with 100% accuracy.

SECTION B – Radiographic Positioning III – Pass all assignments and exams with a minimum score of 75% or higher.

SECTION C – Image Critique III – Pass all assignments and exams with a minimum score of 75% or higher.

SECTION D – Digital Radiography – Pass all assignments and exams with a minimum score of 75% or higher.

SECTION E – Review and Evaluation – Pass all assignments and exams with a minimum score of 75% or higher.

SECTION F – Clinical Experience II – Pass all assignments and exams with a minimum score of 75% or higher.

SECTION G – Employability Skills & Resume Preparation – Pass all assignments and exams with a minimum score of 75% or higher.

Standards for Career Ready Practice

1. Apply appropriate technical skills and academic knowledge.

Career-ready individuals readily access and use the knowledge and skills acquired through experience and education. They make connections between abstract concepts with real-world applications and recognize the value of academic preparation for solving problems, communicating with others, calculating measures, and performing other work-related practices.

2. Communicate clearly, effectively, and with reason.

Career-ready individuals communicate thoughts, ideas, and action plans with clarity, using written, verbal, electronic, and/or visual methods. They are skilled at interacting with others: they are active listeners who speak clearly and with purpose, and they are comfortable with terminology that is common to workplace environments. Career-ready individuals consider the audience for their communication and prepare accordingly to ensure the desired outcome.

3. Develop an education and career plan aligned with personal goals.

Career-ready individuals take personal ownership of their educational and career goals and manage their individual plan to attain these goals. They recognize the value of each step in the educational and experiential process, and they understand that nearly all career paths require ongoing education and experience to adapt to practices, procedures, and expectations of an ever-changing work environment. They seek counselors, mentors, and other experts to assist in the planning and execution of education and career plans.

4. Apply technology to enhance productivity.

Career-ready individuals find and maximize the productive value of existing and new technology to accomplish workplace tasks and solve workplace problems. They are flexible and adaptive in acquiring and using new technology. They understand the inherent risks—personal and organizational—of technology applications, and they take actions to prevent or mitigate these risks.

5. Utilize critical thinking to make sense of problems and persevere in solving them

Career-ready individuals recognize problems in the workplace, understand the nature of the problems, and devise effective plans to solve the problems. They thoughtfully investigate the root cause of a problem prior to introducing solutions. They carefully consider options to solve a problem and, once agreed upon, follow through to ensure the problem is resolved.

6. Practice personal health and understand financial literacy.

Career-ready individuals understand the relationship between personal health and workplace performance. They contribute to their personal well-being through a healthy diet, regular exercise, and mental health activities. Career-ready individuals also understand that financial literacy leads to a secure future that enables career success.

7. Act as a responsible citizen in the workplace and the community.

Career-ready individuals understand the obligations and responsibilities of being a member of a community and demonstrate this understanding every day through their interactions with others. They are aware of the impacts of their decisions on others and the environment around them, and they think about the short-term and long-term consequences of their actions. They are reliable and consistent in going beyond minimum expectations and in participating in activities that serve the greater good.

8. Model integrity, ethical leadership, and effective management.

Career-ready individuals consistently act in ways that align with personal and community-held ideals and principles. They employ ethical behaviors and actions that positively influence others. They have a clear understanding of integrity and act on this understanding in every decision. They use a variety of means to positively impact the direction and actions of a team or organization, and they recognize the short-term and long-term effects that management's actions and attitudes can have on productivity, morale, and organizational culture.

9. Work productively in teams while integrating cultural and global competence.

Career-ready individuals contribute positively to every team, as both team leaders and team members. To avoid barriers to productive and positive interaction, they apply an awareness of cultural differences. They interact effectively and sensitively with all members of the team and find ways to increase the engagement and contribution of other members.

10. Demonstrate creativity and innovation.

Career-ready individuals recommend ideas that solve problems in new and different ways and contribute to the improvement of the organization. They consider unconventional ideas and suggestions by others as solutions to issues, tasks, or problems. They discern which ideas and suggestions may have the greatest value. They seek new methods, practices, and ideas from a variety of sources and apply those ideas to their own workplace practices.

11. Employ valid and reliable research strategies.

Career-ready individuals employ research practices to plan and carry out investigations, create solutions, and keep abreast of the most current findings related to workplace environments and practices. They use a reliable research process to search for new information and confirm the validity of sources when considering the use and adoption of external information or practices.

12. Understand the environmental, societal, and economic impacts of decisions.

Career-ready individuals understand the interrelated nature of their actions and regularly make decisions that positively impact other people, organizations, the workplace, and the environment. They are aware of and utilize new technologies, understandings, procedures, and materials and adhere to regulations affecting the nature of their work. They are cognizant of impacts on the social condition, environment, workplace, and profitability of the organization.

Statement for Civil Rights

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