

**Florida Department of Education
CURRICULUM FRAMEWORK**

Program Title: Basic X-Ray Machine Operator
Program Type: Job Preparatory
Occupational Area: Health Science Education
Components: Core, One Program, One Occupational Completion Point.

PSAV

Program Numbers	H170209
CIP Number	0317.020902
Grade Level	30, 31
Standard Length	650 hours
Certification	Tec X-Ray @ 7 G
Facility Code	252
VSO	HOSA
Coop Method	No
Apprenticeship	No
Basic Skills	
Math	10
Language	10
Reading	10

- I. **PURPOSE:** The purpose of this program is to prepare students for employment as Basic X-ray Machine Operator or SOC 29-2034 (Radiologic Technologists and Technicians)
The content includes, but is not limited to, patient care, radiation protection, patient positioning, radiographic equipment and accessories, image production and evaluation, administrative and personal competence, and communication and employability skills. Legal and ethical responsibilities, health-illness concepts, emergency procedures, including CPR, first aid, safety and security procedures, medical terminology, and anatomy and physiology are basic to all health occupation programs.

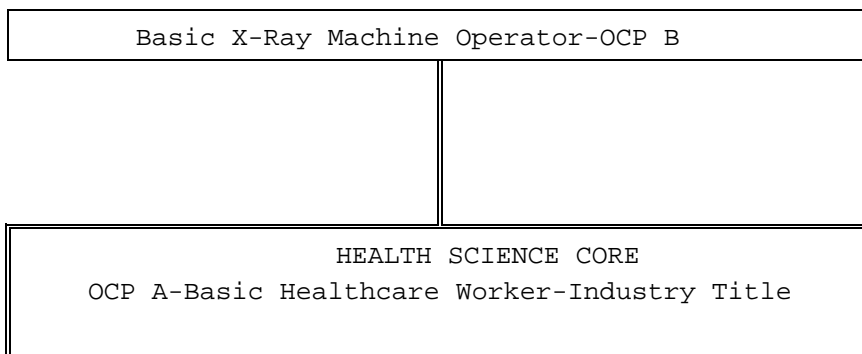
Reinforcement of basic skills in English, mathematics, and science appropriate for the job preparatory programs occurs through vocational classroom instruction and applied laboratory procedures or practice.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the health care industry; planning, management, finance, technical and production skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

- II. **PROGRAM STRUCTURE:** This program is a planned sequence of instruction consisting of one program and 2 occupational completion points. Students must complete the core, or demonstrate the mastery of skills standards contained in the core, before advancing in the program:

BASIC X-RAY MACHINE OPERATOR

THE FOLLOWING DIAGRAM ILLUSTRATES THE CLUSTER STRUCTURE



III. **LABORATORY ACTIVITIES:** Simulation exercises and laboratory activities should be provided using energized radiographic equipment and facilities. Special emphasis should be placed on radiation protection, patient positioning, with image quality. Clinical learning experiences in a radiographic room with related accessories must be an integral part of this program. All clinical experience must be under the direct supervision of a licensed practitioner.

IV. **SPECIAL NOTE:** This program meets the Department of Health HIV/AIDS education requirements. Upon completion of this program, the instructor will provide a certificate to the student verifying that the HIV/AIDS requirements have been met.

Health Occupations Students of America, (HOSA) Inc., is the appropriate Career/Technical Student Organization (CSO) as well as participation in a career related professional organization for providing leadership training experiences and for reinforcing specific career/technical skills. CSOs, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065(8), FAC.

The program sponsor should be familiar with the guidelines and requirements of a limited radiography program developed by the Joint Review Committee on Education in Radiologic Technology. Program completers will be eligible to take the Florida certification examination administered by the Florida Department of Health. Florida requires licensing of Basic X-Ray Machine Operators by the DOH. Articulation into the Radiography program should be considered in planning this program.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade level required for this postsecondary adult vocational program is: Mathematics 10, Language 10 and Reading 10. These grade level numbers correspond to a grade equivalent score obtained on one of the state designated basic skills examinations. If a student does not meet the basic skills level required for completion of the program, remediation should be provided concurrently in the System for Applied Individualized Learning

(SAIL) lab prior to admission in an Adult Basic Education (ABE) setting.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

This program may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 1001.44 F.S.

SCANS Competencies: Instructional strategies for this program must include methods that require students to identify, organize, and use resources appropriately; to work with each other cooperatively and productively; to acquire and use information; to understand social, organizational, and technological systems; and to work with a variety of tools and equipment. Instructional strategies must also incorporate the methods to improve students' personal qualities and high-order thinking skills.

Federal and state legislation requires the provision of accommodations for students with disabilities to meet individual needs and ensure equal access. Adult students with disabilities must self-identify and request such services. Students with disabilities may need accommodations in such areas as instructional methods and materials, assignments and assessments, time demands and schedules, learning environment, assistive technology and special communication systems. Documentation of the accommodations requested and provided should be maintained in a confidential file.

Equipment List: A generic equipment list is available for this program and is printed in a supplement to this document.

The standard length of the program is 650 hours.

INTENDED OUTCOMES:

Outcomes 01-11 are referred to as the Health Science Core and do not have to be completed if the student has previously completed the Core in another health occupations program at any level. The Core should be taken first or concurrently with the first course in the program. Following the successful completion of the core, the student is eligible to take the national internet certification examination (Nocti) with instructor approval and the completion of a portfolio.

After successfully completing this program, the student will be able to:

HEALTH SCIENCE CORE (01-11) OCP A-Basic Healthcare Worker- SOC Code 31-9099 Healthcare Support Workers, All Others

01.0 Demonstrate knowledge of the health care delivery system and health occupations.

- 02.0 Demonstrate the ability to communicate and use interpersonal skills effectively.
- 03.0 Demonstrate legal and ethical responsibilities.
- 04.0 Demonstrate an understanding of and apply wellness and disease concepts.
- 05.0 Recognize and practice safety and security procedures.
- 06.0 Recognize and respond to emergency situations.
- 07.0 Recognize and practice infection control procedures.
- 08.0 Demonstrate computer literacy.
- 09.0 Demonstrate employability skills.
- 10.0 Demonstrate knowledge of blood borne diseases, including AIDS.
- 11.0 Apply basic math and science skills.

OCCUPATIONAL COMPLETION POINT - DATA CODE B (12.0 - 23.0)

BASIC X-RAY MACHINE OPERATOR - Industry Title-Soc Code-29-2034 (Radiologic Technologists and Technicians)

- 12.0 Provide basic patient care.
- 13.0 Demonstrate communication skills.
- 14.0 Demonstrate the ability to provide patient instruction and care as it relates to radiology.
- 15.0 Demonstrate proper radiation protection to patients, self and others.
- 16.0 Demonstrate an understanding of the use of contrast media in radiographic studies.
- 17.0 Demonstrate an understanding of how to properly position patients for prescribed radiographic studies.
- 18.0 Demonstrate the ability to operate and maintain radiographic equipment/accessories.
- 19.0 Demonstrate an understanding in selecting the manual technique necessary to produce quality radiographs.
- 20.0 Demonstrate knowledge of how to process radiographic films and maintain processing equipment.
- 21.0 Demonstrate knowledge necessary to evaluate x-ray film quality.
- 22.0 Demonstrate knowledge of how to perform managerial activities.
- 23.0 Demonstrate knowledge of how to develop personal/professional competence.

**Florida Department of Education
STUDENT PERFORMANCE STANDARDS**

Program Title: Basic X-Ray Machine Operator
Secondary Number:
Postsecondary Number: H170209

HEALTH SCIENCE CORE: The Health Science Core is a core of basic knowledge necessary for any health occupations career. Students who have previously completed the Health Science Core in any other health occupations program do not have to repeat intended outcomes 01-11.

OCP A-Basic Healthcare Worker-SOC 31-9099(Healthcare Support Workers, all other

01.0 DEMONSTRATE KNOWLEDGE OF THE HEALTH CARE DELIVERY SYSTEM AND HEALTH OCCUPATIONS -- The student will be able to:

- 01.01 Identify the basic components of the health care delivery system.
- 01.02 Describe the various types of health care providers and the range of services available including resources to victims of domestic violence.
- 01.03 Describe the composition and functions of a health care team.
- 01.04 Identify the general roles and responsibilities of the individual members of the health care team.
- 01.05 Develop a basic understanding of human needs throughout the lifespan.
- 01.06 Explain the importance of maintaining professional competence through continuing education.
- 01.07 Describe trends affecting the delivery system of health care.

02.0 DEMONSTRATE THE ABILITY TO COMMUNICATE AND USE INTERPERSONAL SKILLS EFFECTIVELY -- The student will be able to:

- 02.01 Develop basic listening skills.
- 02.02 Develop basic observational skills and related documentation strategies in written and oral form.
- 02.03 Identify characteristics of successful and unsuccessful communication including barriers.
- 02.04 Respond to verbal and non-verbal cues.
- 02.05 Compose written communication using correct spelling, grammar, and format.
- 02.06 Use appropriate medical terminology and abbreviations.
- 02.07 Recognize the importance of courtesy and respect for patients and other health care workers and maintain good interpersonal relationships.
- 02.08 Recognize the importance of patient/client education regarding health care.
- 02.09 Adapt communication skills to varied levels of understanding and cultural orientation.
- 02.10 Demonstrate telephone usage including taking messages.
- 02.11 Demonstrate ability to give and follow directions.
- 02.12 Distinguish between factual reports and personal opinion.
- 02.13 Read and discuss technical material.

03.0 DEMONSTRATE LEGAL AND ETHICAL RESPONSIBILITIES

-- The student will be able to:

- 03.01 Discuss the legal framework of the health care occupation.
- 03.02 Explain the medical liability of health care workers.
- 03.03 Explain the patients' "Bill of Rights."
- 03.04 Describe a Code of Ethics consistent with the health care occupation.
- 03.05 Discuss the importance of maintaining confidentiality of information, including computer information.
- 03.06 Recognize the limits of authority and responsibility of health care workers.
- 03.07 Recognize and report illegal and unethical practices of health care workers.
- 03.08 Recognize and report abuse and neglect.
- 03.09 Recognize sexual harassment and domestic violence.

04.0 DEMONSTRATE AN UNDERSTANDING OF AND APPLY WELLNESS AND DISEASE CONCEPTS -- The student will be able to:

- 04.01 Develop a basic understanding of the structure and function of the body systems.
- 04.02 Identify personal health practices and environmental factors which affect optimal function of each of the major body systems.
- 04.03 Identify psychological reactions to illness including defense mechanisms.
- 04.04 Recognize the steps in the grief process.
- 04.05 Explain basic concepts of positive self image, wellness and stress.
- 04.06 Develop a wellness and stress control plan that can be used in personal and professional life.
- 04.07 Explain the nutrition pyramid.
- 04.08 Discuss the adverse effects of the use of alcohol, illegal drugs and steroids on the human body.

05.0 RECOGNIZE AND PRACTICE SAFETY AND SECURITY PROCEDURES

-- The student will be able to:

- 05.01 Demonstrate the safe use of medical equipment.
- 05.02 Recognize and report safety hazards.
- 05.03 Identify and practice security procedures for medical supplies and equipment.
- 05.04 Demonstrate proper body mechanics.
- 05.05 Demonstrate the procedure for properly identifying patients.
- 05.06 Demonstrate procedures for the safe transport and transfer of patients.
- 05.07 Describe fire safety and evacuation procedures.
- 05.08 Discuss JCAHO patient safety goals. (www.JCAHO.org)

06.0 RECOGNIZE AND RESPOND TO EMERGENCY SITUATIONS

-- The student will be able to:

- 06.01 Monitor and record vital signs.
- 06.02 Describe legal parameters relating to the administration of emergency care.
- 06.03 Obtain and maintain CPR skills.
- 06.04 Demonstrate basic understanding of first aid and emergency care.

- 06.05 Recognize adverse drug related emergencies and take appropriate first aid action.
- 07.0 RECOGNIZE AND PRACTICE INFECTION CONTROL PROCEDURES
 - The student will be able to:
 - 07.01 Demonstrate knowledge of medical asepsis and practice procedures such as handwashing and isolation.
 - 07.02 Demonstrate knowledge of surgical asepsis as utilized in sterilization.
 - 07.03 Describe how to dispose correctly of biohazardous materials, according to appropriate government guidelines such as OSHA.
- 08.0 DEMONSTRATE COMPUTER LITERACY -- The student will be able to:
 - 08.01 Define terms and demonstrate basic computer skills.
 - 08.02 Describe the uses of computers in health care.
- 09.0 DEMONSTRATE EMPLOYABILITY SKILLS -- The student will be able to:
 - 09.01 Conduct a job search.
 - 09.02 Secure information about a job.
 - 09.03 Identify documents that may be required when applying for a job.
 - 09.04 Complete a job application form correctly.
 - 09.05 Demonstrate competence in job interview techniques.
 - 09.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor, or other persons.
 - 09.07 Identify acceptable work habits.
 - 09.08 Demonstrate knowledge of how to make job changes appropriately.
 - 09.09 Demonstrate desirable health habits.
 - 09.10 Recognize appropriate affective/professional behavior.
 - 09.11 Write an appropriate resume.
- 10.0 DEMONSTRATE KNOWLEDGE OF BLOOD BORNE DISEASES, INCLUDING AIDS
 - The student will be able to:
 - 10.01 Distinguish between fact and fallacy about the transmission and treatment of diseases caused by blood borne pathogens including Hepatitis B.
 - 10.02 Identify community resources and services available to the individuals with diseases caused by blood borne pathogens.
 - 10.03 Identify "at risk" behaviors which promote the spread of diseases caused by blood borne pathogens and the public education necessary to combat the spread of these diseases.
 - 10.04 Apply infection control techniques designed to prevent the spread of diseases caused by blood borne pathogens to the care of all patients following Centers for Disease Control (CDC) guidelines.
 - 10.05 Demonstrate knowledge of the legal aspects of AIDS, including testing.
- 11.0 APPLY BASIC MATH AND SCIENCE SKILLS -- The student will be able to:
 - 11.01 Draw, read, and report on graphs, charts and tables.

- 11.02 Measure time, temperature, distance, capacity, and mass/weight.
- 11.03 Make and use measurements in both traditional and metric units.
- 11.04 Make estimates and approximations and judge the reasonableness of the result.
- 11.05 Convert from regular to 24 hour time.
- 11.06 Demonstrate ability to evaluate and draw conclusions.
- 11.07 Organize and communicate the results obtained by observation and experimentation.
- 11.08 Ask appropriate scientific questions and recognize what is involved in experimental approaches to the solution of such questions.
- 11.09 Calculate ratios.

BASIC X-RAY MACHINE OPERATOR--The intended outcome (12-26) completes the occupational completion point-Data Code B of Basic X-Ray Machine Operator (Industry Title). Soc Code 29-2034 (Radiologic Technologists and Technicians) To facilitate cross-training, Licensed Practical Nurses do not have to repeat intended outcomes 12 and 13.

12.0 PROVIDE PATIENT CARE--The student will be able to:

- 12.01 Preserve patient's dignity and privacy.
- 12.02 Address the needs of elderly patients.
- 12.03 Address the needs of pediatric patients.
- 12.04 Address the needs of trauma patients.
- 12.05 Address the needs of handicapped patients.
- 12.06 Take and record patient's vital signs.
- 12.07 Use aseptic techniques.
- 12.08 Identify emergency situations.
- 12.09 Identify emergency evacuation procedures.

13.0 DEMONSTRATE COMMUNICATION SKILLS--The student will be able to:

- 13.01 Establish patient rapport.
- 13.02 Confirm doctor's verbal orders.
- 13.03 Confirm doctor's written orders.
- 13.04 Use effective communication with patients.
- 13.05 Obtain pertinent and relevant patient information to assist in the diagnosis.

14.0 DEMONSTRATE THE ABILITY TO PROVIDE PATIENT INSTRUCTION AND CARE AS IT RELATES TO RADIOLOGY--The student will be able to:

- 14.01 Explain radiographic procedure(s) to patient.
- 14.02 Interview patients for possible sensitivity to contrast media.
- 14.03 Provide for patients' comfort as related to radiologic procedures.
- 14.04 Check integrity of all equipment attached to patients.
- 14.05 Prepare patients properly for radiograph/contrast media examinations.
- 14.06 Select contrast media equipment.
- 14.07 Confirm patients' preparation for contrast media exam.
- 14.08 Prepare contrast media.
- 14.09 Assist physician in administering contrast media.
- 14.10 Identify and report patient reaction to contrast media.
- 14.11 Attend to post-examination needs of patients.

- 14.12 Evaluate and apply first aid procedures in a trauma situation.
 - 14.13 Implement appropriate JCAHO patient safety goals.
- 15.0 DEMONSTRATE PROPER RADIATION PROTECTION TO PATIENTS, SELF AND OTHERS--The student will be able to:
- 15.01 Explain biological effects of ionizing radiation.
 - 15.02 Question female patients concerning the possibility of pregnancy and document in patients' charts.
 - 15.03 Identify and select proper Pb shielding (gonadal, thyroid, eye).
 - 15.04 Select appropriate film/screen combination (fastest without compromising quality of image).
 - 15.05 Determine shortest possible exposure time.
 - 15.06 Identify and use personnel radiation monitoring devices properly.
 - 15.07 Identify and select proper immobilization/protective devices.
 - 15.08 Stand behind protective barrier during exposure.
 - 15.09 Secure the area prior to taking radiograph.
 - 15.10 Minimize repeat radiographs.
 - 15.11 Identify and use the principles of time, distance, and shielding.
 - 15.12 Utilize collimation/restriction of primary x-ray beam, to limit the area being exposed by radiation.
- 16.0 DEMONSTRATE AN UNDERSTANDING OF THE USE OF CONTRAST MEDIA IN RADIOGRAPHIC STUDIES--The student will be able to:
- 16.01 Interview patients for possible sensitivity to contrast media.
 - 16.02 Select contrast media equipment.
 - 16.03 Confirm patients' preparation for contrast media exam.
 - 16.04 Prepare contrast media.
 - 16.05 Assist physician in administering contrast media.
 - 16.06 Identify and report patient reaction to contrast media.
 - 16.07 Recognize and respond to patients' reactions to contrast media.
- 17.0 DEMONSTRATE AN UNDERSTANDING OF HOW TO PROPERLY POSITION PATIENTS FOR PRESCRIBED RADIOGRAPHIC STUDIES--The student will be able to:
- 17.01 Identify the anatomy and physiology and use appropriate medical terminology for the part to be radiographed.
 - 17.02 Locate the anatomical landmarks and utilize the appropriate landmarks when doing radiographs.
 - 17.03 Apply appropriate immobilization devices as necessary.
 - 17.04 Apply positioning aids (sponges, compression bands, film/cassette holders, tape, etc.).
 - 17.05 Apply lead blockers/strips/shields.
 - 17.06 Position patients for radiographs of the following: upper and lower extremities, abdomen, spine, skull, chest, sinuses, contrast media studies, and foreign body localization.
 - 17.07 Demonstrate appropriate positioning for pediatric radiographic examinations.
 - 17.08 Demonstrate care and proper Pb shielding of pediatric patients.

- 17.09 Instruct patient in proper breathing technique for the anatomical part being x-rayed (inspiration and expiration).
- 17.10 Use appropriate radiographic terminology.
- 18.0 DEMONSTRATE THE ABILITY TO OPERATE AND MAINTAIN RADIOGRAPHIC EQUIPMENT/ACCESSORIES--The student will be able to:
 - 18.01 Activate equipment (properly warm-up x-ray tube to prevent damage).
 - 18.02 Select appropriate film/screen combinations.
 - 18.03 Select appropriate film holder size and type of cassette (i.e. 8X10/10X12, screen/grid, etc).
 - 18.04 Apply correct lead markers (Lt, Rt, upright, decub, etc.) prior to exposure.
 - 18.05 Place cassette appropriately (lengthwise or crosswise).
 - 18.06 Maneuver radiographic tables and tubes.
 - 18.07 Handle exposed film/holder appropriately.
 - 18.09 Maintain radiographic tables in operable condition.
 - 18.10 Store unexposed film properly (open and closed boxes of film).
 - 18.11 Clean film holders, including screens.
 - 18.12 Replace collimator light bulb.
 - 18.13 Identify and report basic radiographic equipment malfunctions.
 - 18.14 Organize, maintain cleanliness, and keep radiographic room adequately stocked with necessary supplies.
 - 18.15 Demonstrate proper use of radiolucent and radiopaque accessories and techniques.
- 19.0 DEMONSTRATE AN UNDERSTANDING IN SELECTING THE MANUAL TECHNIQUE NECESSARY TO PRODUCE QUALITY RADIOGRAPHS--The student will be able to:
 - 19.01 Set proper radiographic source image distance (table top or bucky).
 - 19.02 Adjust collimator.
 - 19.03 Properly measure patient with calipers.
 - 19.04 Consult technique chart.
 - 19.05 Select bucky/non-bucky control.
 - 19.06 Set kV control.
 - 19.07 Set mA control.
 - 19.08 Set timer control.
 - 19.09 Expose radiographs.
- 20.0 DEMONSTRATE KNOWLEDGE OF HOW TO PROCESS RADIOGRAPHIC FILMS AND MAINTAIN PROCESSING EQUIPMENT--The student will be able to:
 - 20.01 Clean chemical tanks periodically.
 - 20.02 Replenish chemicals properly.
 - 20.03 Check and maintain developer temperature.
 - 20.04 Secure developing room (free of light leaks).
 - 20.05 Remove film from film cassette properly.
 - 20.06 Place patient identification on film.
 - 20.07 Perform daily maintenance for automatic processor.
 - 20.08 Start up automatic processor.
 - 20.09 Insert exposed film into automatic processor.
 - 20.10 Reload and store cassettes properly.
 - 20.11 Remove dry film.
 - 20.12 Identify and report film processor malfunctions.

21.0 DEMONSTRATE KNOWLEDGE NECESSARY TO EVALUATE X-RAY FILM QUALITY--
The student will be able to:

- 21.01 Place film in correct anatomical position on view box.
- 21.02 Determine image sharpness.
- 21.03 Determine proper contrast.
- 21.04 Determine proper density.
- 21.05 Evaluate anatomical positioning.
- 21.06 Identify film artifacts and their possible causes.
- 21.07 Confirm patient identification on film.
- 21.08 Confirm anatomical areas with Pb markers (exposed on film).
- 21.09 Confirm that the film demonstrates all anatomical structures and are visible for the radiographic study ordered by the physician.
- 21.10 Review film with supervisor.
- 21.11 Identify possible causes of radiographic errors.
- 21.12 Verify proper number of films and anatomical positions radiographed.

22.0 DEMONSTRATE KNOWLEDGE OF HOW TO PERFORM MANAGERIAL ACTIVITIES--The student will be able to:

- 22.01 Order radiographic supplies.
- 22.02 Order office/clerical supplies.
- 22.03 File radiographic reports.
- 22.04 Maintain radiographic film files and purge outdated film.
- 22.05 Schedule patients' examinations.
- 22.06 Prepare and process incident reports.
- 22.07 Demonstrate knowledge of basic computer skills.
- 22.08 Know the physicians' standards when calling and/or send radiographic report(s) to appropriate personnel.
- 22.09 Properly prepare and process x-ray requisitions.

23.0 DEMONSTRATE KNOWLEDGE OF HOW TO DEVELOP PERSONAL/ PROFESSIONAL COMPETENCE--The student will be able to:

- 23.01 Maintain current knowledge of technological developments.
- 23.02 Interpret and comply with standard operating procedures.
- 23.03 Know and comply with legal standards for Basic X-ray Machine Operator.
- 23.04 Know and comply with state regulations and laws for Basic X-ray Machine Operator.
- 23.05 Determine personal liability needs for Basic X-ray Machine Operator.
- 23.06 Maintain professional radiologic standards.
- 23.07 Practice proper body mechanics related to radiologic situations.
- 23.08 Maintain state licensure and affiliation with professional organizations.