

## LIMITED MEDICAL RADIOLOGIC TECHNOLOGIST CERTIFICATE PROGRAM

Offered at HNL, HSW, AUS, FW and SA Campuses

**Objective:** Limited medical radiologic technologists are trained to perform routine diagnostic X-ray exams of the skull, extremities and vertebral column. The emphasis of training is on the anatomy of the human body and the proper positioning of the patient to achieve a quality radiograph. Training also includes the history, theory and application of diagnostic X-rays and their effect upon the human body. Students learn the theory of radiation production and the proper procedures and techniques to reduce radiation exposure to the patient and themselves. Students will also learn the operation, maintenance and quality control of the radiology equipment. Skills on medical terminology, professionalism and patient care prepare the student to become an effective member of the health care team and provide quality care to their patients. Graduates will have obtained the knowledge and skills necessary to pass the state licensing exam and find employment in a variety of medical clinics and physicians' offices. The program objectives are achieved through classroom and clinical hands on training as well as professional development.

**Program Requirements:** Each program participant must have a high school diploma or GED and should be able to read and write English. All entrants must pass the Scholastic Level Exam with a minimum score of 16. The participant should also have good coordination, be neat, professional, and be able to lift 40 pounds.

**\*NOTE:** Any person convicted of a misdemeanor or felony offense under various titles of the Texas Penal Code may be denied a State LMRT license. Students are responsible for inquiring with the appropriate agencies about current requirements and their eligibility to sit for the state examination prior to enrolling.

**Program Length:** The length of the day program is approximately 56 weeks. The length of the afternoon or evening program is approximately 75 weeks. The program is comprised of two components: X-ray instruction, and X-ray externship, totaling 1,500 hours.

		Lecture Hours	Lab Hours	Extern Hours	Total Hours	Semester Credits
<b>MODULE I</b>						
MSS 100	Master Student / Study Skills	30	0	0	30	2.0
PRO 100	Professionalism	15	0	0	15	1.0
HIP 100	HIPAA / OSHA / Infection Control	15	0	0	15	1.0
MED 100	Medical Terminology	30	0	0	30	2.0
APM 100	Overview of Anatomy & Physiology	30	0	0	30	2.0
<b>MODULE II</b>						
RAD 201	Introduction to Radiologic Science / Ethics and Law	30	0	0	30	2.0
RAD 202	Radiographic Math and Calculations	30	0	0	30	2.0
RAD 203	Radiographic Terminology	30	0	0	30	2.0
RAD 204	Radiation Production and Exposure	30	0	0	30	2.0
<b>MODULE III</b>						
RAD 205	Radiation Protection and Safety	30	0	0	30	2.0
RAD 210	A & P, Pathology and Medical Terminology of the Upper Extremities.	40	0	0	40	2.5
RAD 220	Radiographic Procedures and Image Analysis of the Upper Extremity Lab	0	50	0	50	1.5
<b>MODULE IV</b>						
RAD 206	Imaging Equipment	30	0	0	30	2.0
RAD 211	A & P, Pathology and Medical Terminology of the Lower Extremity and Abdomen/Pelvis	40	0	0	40	2.5
RAD 221	Radiographic Procedures and Image Analysis of the Lower Extremity and Abdomen/Pelvis Lab	0	50	0	50	1.5
<b>MODULE V</b>						
RAD 207	Patient Care in Radiologic Sciences	50	0	0	50	3.0
RAD 212	A & P, Pathology and Medical Terminology of the Chest and Bony Thorax	30	0	0	30	2.0
RAD 222	Radiographic Procedures and Image Analysis of the Chest and Bony Thorax Lab	0	40	0	40	1.0

		Lecture Hours	Lab Hours	Extern Hours	Total Hours	Semester Credits
<b>MODULE VI</b>						
RAD 208	Radiation Biology	30	0	0	30	2.0
RAD 213	A & P, Pathology and Medical Terminology of the Vertebral Column	40	0	0	40	2.5
RAD 223	Radiographic Procedures and Image Analysis of the Vertebral Column Lab	0	50	0	50	1.5
<b>MODULE VII</b>						
RAD 209	Digital Image Acquisition, Display and File/Screen Image Production and Evaluation	40	0	0	40	2.5
RAD 214	A & P, Pathology and Medical Terminology of the Skull and Facial Bones	40	0	0	40	2.5
RAD 224	Radiographic Procedures and Image Analysis of the Skull and Facial Bones Lab	0	40	0	40	1.0
<b>MODULE VIII</b>						
RAD 225	Comprehensive Review	60	0	0	60	4.0
RAD 230	Radiology Externship	0	0	600	600	13.0
<b>Totals Hours/Credits</b>		<b>670</b>	<b>230</b>	<b>600</b>	<b>1500</b>	<b>63.0</b>
<b>Total Program Hours = 1500/63.0 Semester Credits</b>						

*\* Note: Students have a maximum time frame of 180 days to complete the externship portion of the program. Students who fail to complete the externship within 180 days will be dismissed.*

The Texas Medical Board and the Texas Workforce Commission, Career Schools and Colleges jointly regulate this program.

**COURSE DESCRIPTIONS:**

Course descriptions include the course number, title, and synopsis, a listing of lecture, laboratory, externship hours, total clock hours and academic credits. For example, the listing “15/30/0/45/2.0” indicates that the course consists of 15 hours of lecture, 30 hours of laboratory, 0 externship hours, 45 total clock hours and 2.0 academic credits.

*Note: Students must successfully complete all courses before entering externship. Courses may not be offered in the sequence list below.*

<b>MSS 100</b>	<b>MASTER STUDENT/STUDY SKILLS</b>	<b>30/0/0/30/2.0</b>
Students will become familiar with basic study and learning skills to include learning styles, goal setting, memorization techniques, reading comprehension, note taking, test taking, critical thinking, effective communication diversity, and technology. <b>No Prerequisite.</b>		
<b>PRO 100</b>	<b>PROFESSIONALISM</b>	<b>15/0/0/15/1.0</b>
Students will learn and become familiar with the soft skills and habits that are necessary to be a successful employee in the allied healthcare field. This course is designed to help students identify the attributes of an employee that are sought-after in the professional setting and to develop a personal plan to expand their talents to meet the expectations of the educational institution and workplace. <b>No Prerequisite.</b>		
<b>HIP 100</b>	<b>HIPAA/OSHA/INFECTION CONTROL</b>	<b>15/0/0/15/1.0</b>
Students will learn about the Health Insurance Portability and Accountability Act (HIPAA). This course will identify rights for individuals and the processes that health care providers must implement to support individual rights. Students must demonstrate knowledge of the rules for the use and disclosure of information. Students will learn about transmission of disease, hand washing techniques and gloving. This course will ensure that students are aware of biohazards and airborne pathogens, including infection control procedures and laboratory safety. Students must demonstrate infection control procedures and laboratory safety. <b>No Prerequisite</b>		
<b>APM 100</b>	<b>OVERVIEW OF ANATOMY &amp; PHYSIOLOGY</b>	<b>30/0/0/30/2.0</b>
Students will learn and identify basic structures, functions and dysfunctions of the body. This course covers a general treatment of the sensory, muscular, nervous, endocrine, digestive, respiratory, circulatory, urinary, reproductive, integumentary, and skeletal system. <b>No Prerequisite.</b>		
<b>MED 100</b>	<b>MEDICAL TERMINOLOGY</b>	<b>30/0/0/30/2.0</b>
Students will learn the study of the word roots, prefixes, suffixes as well as abbreviations and symbols that are necessary tools for building a medical vocabulary. <b>No Prerequisite.</b>		

<b>RAD 201</b>	<b>INTRODUCTION TO RADIOLOGIC SCIENCE / ETHICS AND LAW</b>	<b>30/0/0/30/2.0</b>
Content provides an overview of the foundations of radiography and the practitioner's role in the health care delivery system. A review of the history of radiography, properties of the X-ray beam and basic atomic structure will be discussed. The principles, practices and policies of health care organizations are examined and discussed in addition to the professional responsibilities of the radiographer. <b>Prerequisite – Mod I</b>		
<b>RAD 202</b>	<b>RADIOGRAPHIC MATH AND CALCULATIONS</b>	<b>30/0/0/30/2.0</b>
Content imparts knowledge to the students for performing functions with fractions and decimals. Factors that determine significant digits in a number, perform calculations in scientific notation with signed numbers and exponents. Content is also designed to simplify algebraic expressions and convert units within the SI system. Reading word problems. <b>Prerequisite – Mod I</b>		
<b>RAD 203</b>	<b>RADIOGRAPHIC TERMINOLOGY</b>	<b>30/0/0/30/2.0</b>
The student will learn the definitions of radiographic terminology, as well as their applications regarding radiographic anatomy, physiology, and positioning. <b>Prerequisite – Mod I</b>		
<b>RAD 204</b>	<b>RADIATION PRODUCTION AND EXPOSURE</b>	<b>30/0/0/30/2.0</b>
Students will explain production of x-rays in the tube (Bremsstrahlung vs. Characteristics), distinguish between density, contrast, and the factors that control them. The will understand the fundamentals of photon interactions with matter. They will have a basic understanding of energy, wavelength and frequency. They will define total filtration (inherent and added) and its effect on the primary beam, compare factors in technique (mA, time, kVp, and distance) and their related effects on density and contrast. How differences in IR's and grids interact with x-rays. Explain the basic construction of grids and their effect on density and contrast. Apply conversion factors for changes with distance, grids, image receptors, reciprocity law and 15% rule. <b>Prerequisite – Mod I</b>		
<b>RAD 205</b>	<b>RADIATION PROTECTION AND SAFETY</b>	<b>30/0/0/30/2.0</b>
Content presents an overview of the principles of radiation protection, including the responsibilities of the radiographer for patients, personnel, and the general public. Radiation health and safety requirements of federal and state regulatory agencies, accreditation agencies, and health care organizations are incorporated. <b>Prerequisite – Mod I &amp; II</b>		
<b>RAD 210</b>	<b>A&amp;P, PATHOLOGY AND MEDICAL TERMINOLOGY OF THE UPPER EXTREMITIES</b>	<b>40/0/0/40/2.5</b>
The student will learn anatomy and physiology of the upper extremities and structures associated with these regions. Medical terminology specific to this anatomical area will be discussed, as well as provide a knowledge base necessary to define pathologic conditions. <b>Prerequisite – Mod I &amp; II</b>		
<b>RAD 220</b>	<b>RADIOGRAPHIC PROCEDURES AND IMAGE ANALYSIS OF THE UPPER EXTREMITY LAB</b>	<b>0/50/0/50/1.5</b>
This course will teach the student how to correctly position the anatomy of the upper limb to include the shoulder girdle and acromioclavicular joints in order to produce quality diagnostic radiographic images. This course will also teach the student how to analyze the images for radiographic and diagnostic quality. <b>Prerequisite – Mod I &amp; II</b>		
<b>RAD 206</b>	<b>IMAGING EQUIPMENT</b>	<b>30/0/0/30/2.0</b>
Students will be introduced to the ionization of matter and its various interactions. Identify the units of radiation as well as explain the electromagnetic spectrum and its makeup. They will learn and explain the radiographic tube construction, the x-ray table, circuitry, generators and their purposes. The will have a basic knowledge of Electricity. They will understand the factors that affect and control the recorded image. <b>Prerequisite – Mod I &amp; II</b>		
<b>RAD 211</b>	<b>A&amp;P, PATHOLOGY AND MEDICAL TERMINOLOGY OF THE LOWER EXTREMITY AND ABDOMEN/PELVIS</b>	<b>40/0/0/40/2.5</b>
The student will learn anatomy and physiology of the lower extremities, abdomen, and structures associated with these regions. Medical terminology specific to this anatomical area will be discussed, as well as provide a knowledge base necessary to define pathologic conditions. <b>Prerequisite – Mod I &amp; II</b>		
<b>RAD 221</b>	<b>RADIOGRAPHIC PROCEDURES AND IMAGE ANALYSIS OF THE LOWER EXTREMITY AND ABDOMEN/PELVIS LAB</b>	<b>0/50/0/50/1.5</b>
This course will teach the student how to correctly position the anatomy of the Lower limb including the pelvic girdle and abdomen in order to produce quality diagnostic radiographic images. This course will also teach the student how to analyze the images for radiographic and diagnostic quality. <b>Prerequisite – Mod I &amp; II</b>		
<b>RAD 207</b>	<b>PATIENT CARE IN RADIOLOGIC SCIENCES</b>	<b>50/0/0/50/3.0</b>
Students will learn to identify their scope of practice and legal aspects pertaining to patient care. They will learn the aspects of death and the grieving process as well as the value of communications. Students will learn the importance of vital signs as a diagnostic tool and what are considered to be normal range. Students will be introduced to phlebotomy techniques. Students will learn/demonstrate patient transfer techniques. Students will learn and explain medical emergencies and BLS techniques. <b>Prerequisite – Mod I &amp; II</b>		

<b>RAD 212</b>	<b>A&amp;P, PATHOLOGY AND MEDICAL TERMINOLOGY OF THE CHEST AND BONY THORAX</b>	<b>30/0/0/30/2.0</b>
The student will learn anatomy and physiology of the chest, bony thorax, and structures associated with these regions. Medical terminology specific to this anatomical area will be discussed, as well as provide a knowledge base necessary to define pathologic conditions. <b>Prerequisite – Mod I &amp; II</b>		
<b>RAD 222</b>	<b>RADIOGRAPHIC PROCEDURES AND IMAGE ANALYSIS OF THE CHEST AND BONY THORAX LAB</b>	<b>0/40/0/40/1.5</b>
This course will teach the student how to correctly position the anatomy of the respiratory system and bony thorax in order to produce quality diagnostic radiographic images. This course will also teach the student how to analyze the images for radiographic and diagnostic quality. <b>Prerequisite – Mod I &amp; II</b>		
<b>RAD 208</b>	<b>RADIATION BIOLOGY</b>	<b>30/0/0/30/2.0</b>
Content provides an overview of the principles of the interaction of radiation with living systems. Radiation effects on molecules, cells, tissues, and the body as a whole are presented. Factors affecting biological response are presented, including acute and chronic effects of radiation. <b>Prerequisite – Mod I &amp; II</b>		
<b>RAD 213</b>	<b>A&amp;P, PATHOLOGY AND MEDICAL TERMINOLOGY OF THE VERTEBRAL COLUMN</b>	<b>40/0/0/40/2.5</b>
The student will learn anatomy and physiology of the vertebral column and structures associated with these regions. Medical terminology specific to this anatomical area will be discussed, as well as provide a knowledge base necessary to define pathologic conditions. <b>Prerequisite – Mod I &amp; II</b>		
<b>RAD 223</b>	<b>RADIOGRAPHIC PROCEDURES AND IMAGE ANALYSIS OF THE VERTEBRAL COLUMN LAB</b>	<b>0/50/0/50/1.5</b>
This course will teach the student how to correctly position the anatomy of the vertebral column and sacrum and coccyx in order to produce quality diagnostic radiographic images. This course will also teach the student how to analyze the images for radiographic and diagnostic quality. <b>Prerequisite – Mod I &amp; II</b>		
<b>RAD 209</b>	<b>DIGITAL IMAGE ACQUISITION, DISPLAY AND FILE/SCREEN IMAGE PRODUCTION AND EVALUATION</b>	<b>40/0/0/40/2.5</b>
Content imparts an understanding of the components, principles and operation of digital imaging systems found in diagnostic radiology. Factors that impact image acquisition, display, archiving and retrieval are discussed. Principles of digital system quality assurance and maintenance are presented. An overview of how an image is obtained utilizing the film screen method. <b>Prerequisite – Mod I &amp; II</b>		
<b>RAD 214</b>	<b>A&amp;P, PATHOLOGY AND MEDICAL TERMINOLOGY OF THE SKULL AND FACIAL BONES</b>	<b>40/0/0/40/2.5</b>
The student will learn anatomy and physiology of the skull, facial bones, and structures associated with these regions. Medical terminology specific to this anatomical area will be discussed, as well as provide a knowledge base necessary to define pathologic conditions. <b>Prerequisite – Mod I &amp; II</b>		
<b>RAD 224</b>	<b>RADIOGRAPHIC PROCEDURES AND IMAGE ANALYSIS OF THE SKULL AND FACIAL BONES LAB</b>	<b>0/40/0/40/1.0</b>
This course will teach the student how to correctly position the anatomy of the skull, facial bones and sinuses in order to produce quality diagnostic radiographic images. This course will also teach the student how to analyze the images for radiographic and diagnostic quality. <b>Prerequisite – Mod I &amp; II</b>		
<b>RAD 225</b>	<b>COMPREHENSIVE REVIEW</b>	<b>60/0/0/60/4.0</b>
This course provides students the opportunity to review for the Texas Limited Examination in Medical Radiologic Technology so they may procure a permanent Texas Limited Medical Radiologic Technologist license. This is done through using review materials as well as utilizing practice exams in all areas of the test. The students will also fill out and mail the application to set up an appointment to take the exam. <b>Prerequisite – Modules I, II, III, IV, V, VI and VII</b>		
<b>RAD 230</b>	<b>RADIOLOGY EXTERNSHIP</b>	<b>0/0/600/600/13.0</b>
This course provides placement of the student in a clinical setting in which the student will have the opportunity to gain hands-on experience as a clinical X-ray technologist. Students will utilize the knowledge and demonstrate skills learned in the classroom and laboratory. Prerequisites: Completion of all limited medical radiologic technologist classes, current on financial obligations to the school, and recommendation of the instructor and externship coordinator.		
<b>** LMRT Externship must be completed within 180 days.**</b>		