

# Medical Radiography (RADT)

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## **RADT 1010. Intro to Radiography. 2 Hours.**

Open to all students interested in medical radiography. Explores the field of radiography and its role in health care delivery. Covers fundamental concepts including medical terminology, radiation protection, ethics, career opportunities, professional development, and hospital operations. This course may be taken a maximum of two times. Course is offered either in person or online depending on the semester. This course requires a Differential Tuition Rate which is an additional fee of \$60 charged per credit hour. **\*\*COURSE LEARNING OUTCOMES (CLOs)** At the successful conclusion of this course, students will be able to: 1. Implement the strategies used to become a successful student radiographer. 2. Describe the roles, responsibilities, and professional ethics of a radiographer. 3. Explain the function of imaging equipment and the fundamental process of x-ray production. 4. Identify basic radiation protection techniques used by radiographers. 5. Recognize medical procedures and terminology often used in medical imaging. FA, SP.

## **RADT 1020. Radiographic Procedures I. 4 Hours.**

First semester course. Instruction in how to perform radiographic procedures and identifying anatomy of the upper/lower extremities, chest, abdomen, bony thorax and pelvis with emphasis on radiation protection, surface landmarks, and pathology. Image analysis is introduced. Taught in cohort rotation. This course requires a Differential Tuition Rate which is an additional fee of \$60 charged per credit hour. **\*\*COURSE LEARNING OUTCOMES (CLOs)** At the successful conclusion of this course, students will be able to: 1. Describe correct positioning and technical factors for radiography procedures including; chest, abdomen, upper and lower extremities, hip and pelvis. 2. Identify anatomy on a diagram or radiograph. 3. Discuss clinical indications or pathologies demonstrated on radiographic images. 4. Compare appropriate radiation safety techniques to minimize exposure to patients, self, and others. 5. Explain evaluation criteria for radiographic procedures. Course fee required. Prerequisites: Admission to the Utah Tech University Medical Radiography program. Corequisite: RADT 1026.

## **RADT 1026. Radiographic Procedures I Lab. 1 Hour.**

First semester course. Knowledge learned from RADT 1020 lecture will be applied in the radiography lab. Taught in cohort rotation. This course requires a Differential Tuition Rate which is an additional fee of \$60 charged per credit hour. **\*\*COURSE LEARNING OUTCOMES (CLOs)** At the successful conclusion of this course, students will be able to: 1. Operate the x-ray tube, table, and console safely. 2. Simulate correct positioning and give appropriate patient directions for radiography procedures including; chest, abdomen, upper and lower extremities, and pelvis. 3. Critique radiographic images using the following criteria; positioning, anatomy demonstrated, technical factors, and collimation. 4. Apply techniques to minimize radiation exposure to patients. 5. Demonstrate professional behaviors expected of radiologic technologists. Prerequisites: Admission to the Utah Tech University Medical Radiography program. Corequisite: RADT 1020.

## **RADT 1030. Radiographic Imaging I. 3 Hours.**

First semester course. Analysis of factors affecting image quality and application of radiographic principles using imaging devices such as image receptors, grids and beam limiting devices, processing procedures, as well as introduction of basic digital imaging concepts. Taught in cohort rotation. This course requires a Differential Tuition Rate which is an additional fee of \$60 charged per credit hour. **\*\*COURSE LEARNING OUTCOMES (CLOs)** At the successful conclusion of this course, students will be able to: 1. Describe the function of the major components of the x-ray tube. 2. Analyze the various components of radiographic quality. 3. Manipulate exposure factors and explain their effect on image quality and radiation dose. 4. Calculate conversion formulas to compensate for changes in technical and patient factors. 5. Explain the image acquisition process and determine causes of errors and artifacts. Prerequisite: Admission to the Utah Tech University Medical Radiography program.

## **RADT 1040. Clinical Education I (ALPP). 4 Hours.**

First Semester Course. Students will apply theories and develop skills in a supervised setting through observation, assisting, and performing basic radiographic procedures on upper/lower extremities, chest, abdomen, pelvis and bony thorax. Approximately 180 clinical hours. Taught in cohort rotation. This course is designated as an Active Learning Professional Practice (ALPP) course. This course allows students to explore and apply content learned in the course in a professional experience away from the classroom. This course requires a Differential Tuition Rate which is an additional fee of \$60 charged per credit hour. **\*\*COURSE LEARNING OUTCOMES (CLOs)** At the successful conclusion of this course, students will be able to: 1. Perform radiographic procedures appropriate to student's level of skill and knowledge. 2. Evaluate patient's status and condition before, during and following the radiologic procedure. 3. Apply professional communication techniques with patients, support staff, and technologists. 4. Distinguish between acceptable and unacceptable radiographic images. 5. Practice occupational and patient radiation protection techniques. Prerequisite: Admission to the Utah Tech University Medical Radiography program.

## **RADT 1050. Patient Care. 2 Hours.**

First semester course. Introduces the role of the radiographer as a health care provider. Topics include patient communication and education, patient transfer, vital signs, infection control, oxygen, suction, age-specific needs and cultural diversity. Taught in cohort rotation. This course requires a Differential Tuition Rate which is an additional fee of \$60 charged per credit hour. **\*\*COURSE LEARNING OUTCOMES (CLOs)** At the successful conclusion of this course, students will be able to: 1. Describe how professional values and ethics influence patient care. 2. Discuss professional communication and compassionate care in a healthcare setting. 3. Demonstrate taking vital signs required to evaluate patient health. 4. Evaluate the importance of standard precautions and isolation procedures to include infectious processes. 5. Explain special considerations necessary when performing radiographic procedures on a diverse patient population. Prerequisite: Acceptance into the Medical Radiography Program.

**RADT 1120. Radiographic Procedures II. 3 Hours.**

Second Semester Course. Instruction in performing radiographic procedures and identifying anatomy of the vertebral column, genitourinary, gastrointestinal and biliary systems, skull and facial bones, as well as advanced mobile and surgical procedures, composition and the use and effects of contrast media. Taught in cohort rotation. This course requires a Differential Tuition Rate which is an additional fee of \$60 charged per credit hour. **\*\*COURSE LEARNING OUTCOMES (CLOs)** At the successful conclusion of this course, students will be able to: 1. Describe correct positioning and technical factors for radiography procedures including; spine, head, and fluoroscopy. 2. Identify patient positions and anatomical structures on a radiographic image. 3. Determine ways to modify procedures and positioning due to patient conditions that limit mobility. 4. Describe contrast studies, including patient preparation and positioning. 5. Recognize special concerns and techniques for fluoroscopy, mobile, and surgical radiography. Course fee required. Prerequisites: Admission to the Utah Tech University Medical Radiography program. Corequisite: RADT 1126. SP.

**RADT 1126. Radiographic Procedures II Lab. 1 Hour.**

Second semester course. Knowledge learned from RADT 1120 lecture will be applied in the radiography lab. Taught in cohort rotation. This course requires a Differential Tuition Rate which is an additional fee of \$60 charged per credit hour. **\*\*COURSE LEARNING OUTCOMES (CLOs)** At the successful conclusion of this course, students will be able to: 1. Simulate correct positioning and give appropriate patient directions for radiography procedures including; spine, head, and fluoroscopy. 2. Critique radiographic images using the following criteria; positioning, anatomy demonstrated, technical factors, and collimation. 3. Modify procedures and positioning due to patient conditions that limit mobility. 4. Apply appropriate technical factors for radiographic procedures. 5. Demonstrate professional behaviors expected of radiologic technologists. Prerequisites: Admission to the Utah Tech University Medical Radiography program. Corequisite: RADT 1120.

**RADT 1140. Clinical Education II (ALPP). 5 Hours.**

Second Semester Course. Continuation of RADT 1040, providing students with the opportunity to apply theories and further develop technical skills with emphasis placed on vertebral column, biliary system, gastrointestinal and genitourinary procedures, skull and facial bones. Patient management specific to fluoroscopic and advanced radiographic procedures. Approximately 225 clinical hours. Taught in cohort rotation. This course is designated as an Active Learning Professional Practice (ALPP) course. This course allows students to explore and apply content learned in the course in a professional experience away from the classroom. This course requires a Differential Tuition Rate which is an additional fee of \$60 charged per credit hour. **\*\*COURSE LEARNING OUTCOMES (CLOs)** At the successful conclusion of this course, students will be able to: 1. Demonstrate competency in routine radiographic procedures. 2. Manipulate technical exposure factors to produce quality images while minimizing patient dose. 3. Apply professional communication techniques with patients, support staff, and technologists. 4. Conduct mobile, fluoroscopic, and surgical radiography procedures including patient preparation and positioning. 5. Evaluate radiographic orders for accuracy and rectify when needed. Course fee required. Prerequisites: Admission to the Utah Tech University Medical Radiography program. SP.

**RADT 1230. Radiographic Imaging II. 2 Hours.**

Second Semester Course. Builds on theories and concepts introduced in RADT 1030, emphasizing quality assurance and quality control, digital and computed imaging components and processes and data and information management with PACS. Taught in cohort rotation. This course requires a Differential Tuition Rate which is an additional fee of \$60 charged per credit hour. **\*\*COURSE LEARNING OUTCOMES (CLOs)** At the successful conclusion of this course, students will be able to: 1. Determine the benefits of quality management programs for the patient and imaging department. 2. Apply quality management techniques for process improvements. 3. Compare the different types of image acquisition in digital radiography, and their effect on patient dose and image quality. 4. Describe various image post-processing techniques employed for digital radiography. 5. Critique digital radiographic images to determine corrective actions for improved image quality. Prerequisite: Admission to the Utah Tech University Medical Radiography program.

**RADT 1240. Clinical Education III (ALPP). 7 Hours.**

Third semester course. Continuation of RADT 1140, providing students with the opportunity to apply theories and further develop technical skills. Students will gain experience in effective patient and time management specific to advanced radiographic procedures. Approximately 315 clinical hours. Taught in cohort rotation. This course is designated as an Active Learning Professional Practice (ALPP) course. This course allows students to explore and apply content learned in the course in a professional experience away from the classroom. This course requires a Differential Tuition Rate which is an additional fee of \$60 charged per credit hour. **\*\*COURSE LEARNING OUTCOMES (CLOs)** At the successful conclusion of this course, students will be able to: 1. Demonstrate continued proficiency in areas of previously completed competency testing. 2. Conduct mobile, fluoroscopic, and surgical radiography procedures, including patient preparation and positioning. 3. Assess technical exposure factors needed to produce quality images while minimizing patient exposure. 4. Adapt to varying clinical situations and modify positioning for non-routine procedures. 5. Evaluate resources to effectively complete inpatients, outpatients, and emergency exams. Course fee required. Prerequisite: Admission to the Utah Tech University Medical Radiography program.

**RADT 1250. Advanced Patient Care. 2 Hours.**

Second semester course. Instruction in advanced patient care skills, including pharmacology and contrast administration for medical imaging, medical ethics and law, and mobile and surgical radiography. Taught in cohort rotation. This course requires a Differential Tuition Rate which is an additional fee of \$60 charged per credit hour. **\*\*COURSE LEARNING OUTCOMES (CLOs)** At the successful conclusion of this course, students will be able to: 1. Explain the role of ethical behavior in health care delivery. 2. Discuss the basis of legal terms, principles, and law to evaluate ethical dilemmas in the healthcare setting. 3. Perform venipuncture using correct technique and standard precautions. 4. Demonstrate appropriate management of interventional medical devices. 5. Recognize common pathologies seen on radiographic images. Prerequisite: Admission to the Utah Tech University Medical Radiography program.

**RADT 2030. Radiographic Physics. 3 Hours.**

Fourth semester course. In depth analysis of electrical circuitry, transformers, and rectifiers as they relate to x-ray production, as well as construction and function of the x-ray tube, fluoroscopic systems, video systems, AEC, and digital imaging. Taught in cohort rotation. This course requires a Differential Tuition Rate which is an additional fee of \$60 charged per credit hour. **\*\*COURSE LEARNING OUTCOMES (CLOs)** At the successful conclusion of this course, students will be able to: 1. Diagram the components of the x-ray circuit of the x-ray tube. 2. Discuss types of radiation and photon interactions with matter. 3. Explain the elements and process of x-ray production. 4. Analyze the radiographic factors that affect the x-ray emission spectrum. 5. Describe the elements and operation of fluoroscopy systems. Prerequisite: Admission to the Utah Tech University Medical Radiography program.

**RADT 2040. Clinical Education IV (ALPP). 7 Hours.**

Fourth semester course. Continuation of RADT 1240 with emphasis on mastering basic procedures and attaining experience in advanced procedures with further awareness of radiation protection requirements. Students will rotate through advanced modality areas as assigned by Clinical Coordinator. Approximately 315 clinical hours. Taught in cohort rotation. This course is designated as an Active Learning Professional Practice (ALPP) course. This course allows students to explore and apply content learned in the course in a professional experience away from the classroom. This course requires a Differential Tuition Rate which is an additional fee of \$60 charged per credit hour. **\*\*COURSE LEARNING OUTCOMES (CLOs)** At the successful conclusion of this course, students will be able to: 1. Practice continued proficiency in areas of previously completed competency testing. 2. Apply occupational and patient radiation protection techniques. 3. Critique radiographic images, applying corrective measures as needed. 4. Differentiate the importance of special modalities diagnostic efficacy and patient care considerations. 5. Prioritize interprofessional collaboration with members of the healthcare team. Course fee required. Prerequisite: Admission to the Utah Tech University Medical Radiography program.

**RADT 3020. Advanced Medical Imaging. 3 Hours.**

Fourth semester course. Introduces additional imaging modalities and radiation therapy, including interventional radiography, sonography, CT, MRI, mammography, nuclear medicine and basic sectional anatomy. Taught in cohort rotation. This course requires a Differential Tuition Rate which is an additional fee of \$60 charged per credit hour. **\*\*COURSE LEARNING OUTCOMES (CLOs)** At the successful conclusion of this course, students will be able to: 1. Compare the strengths and limitations of the different medical imaging modalities. 2. Differentiate the image appearance and principles of operation for equipment used in imaging modalities. 3. Identify major anatomical structures on cross-sectional images. 4. Consider unique patient preparation necessary for special radiographic procedures and various imaging modalities. 5. Assess imaging pathologies, including body systems, complications, and imaging considerations. Prerequisite: Admission to the Utah Tech University Medical Radiography program.

**RADT 3150. Radiobiology and Protection. 3 Hours.**

Fourth semester course. In depth analysis of ionizing radiation and its effects on matter, including early and late effects of radiation, dose limits, radiation monitoring, and limiting radiation exposure to patients and personnel. Taught in cohort rotation. This course requires a Differential Tuition Rate which is an additional fee of \$60 charged per credit hour. **\*\*COURSE LEARNING OUTCOMES (CLOs)** At the successful conclusion of this course, students will be able to: 1. Explain basic cellular biology and the molecular effects of ionizing radiation. 2. Evaluate the types of radiation and various health effects of radiation exposure. 3. Differentiate variations in cell radio sensitivity and response. 4. Distinguish the regulatory agencies and units of measure involved in radiation exposure and safety. 5. Assess radiation protection tools and methods to reduce occupational and patient exposure. Prerequisite: Admission to Utah Tech Medical Radiography program.

**RADT 3240. Clinical Education V (ALPP). 7 Hours.**

Fifth semester course. Continuation of RADT 2040 with emphasis on developing an autonomous approach to the diversity of clinical situations and successfully adapting to them. Extended advanced modality rotations may be arranged following established guidelines and at the discretion of the Clinical Coordinator. Approximately 315 clinical hours. Taught in cohort rotation. This course is designated as an Active Learning Professional Practice (ALPP) course. This course allows students to explore and apply content learned in the course in a professional experience away from the classroom. This course requires a Differential Tuition Rate which is an additional fee of \$60 charged per credit hour. **\*\*COURSE LEARNING OUTCOMES (CLOs)** At the successful conclusion of this course, students will be able to: 1. Demonstrate continued competence in all routine, mobile, fluoroscopic, and surgical radiographic procedures. 2. Critique radiographic images, applying corrective measures as needed. 3. Demonstrate ethical and compassionate care while communicating effectively with patients, support staff, and technologists. 4. Adapt to changes and varying clinical situations as well as modifying positioning for non-routine (trauma) procedures. 5. Practice occupational and patient radiation protection techniques. Course fee required. Prerequisite: Admission to the Utah Tech University Medical Radiography program.

**RADT 3260. Radiography Seminar. 3 Hours.**

Fifth semester course. Capstone course that offers review and reflection on previous coursework, providing students with a meaningful approach to evaluate strengths and weaknesses and to prepare for credentialing exams and employment. Taught in cohort rotation. This course requires a Differential Tuition Rate which is an additional fee of \$60 charged per credit hour. **\*\*COURSE LEARNING OUTCOMES (CLOs)** At the successful conclusion of this course, students will be able to: 1. Demonstrate through practice testing the mastery of concepts in patient care, procedures, image production, and safety. 2. Assemble a portfolio containing samples of student work demonstrating accomplishments of the program learning outcomes. 3. Develop a comprehensive lesson plan to review an assigned ARRT registry section. 4. Collaborate in a group as an effective team member to present the assigned review lesson to their peers. Prerequisite: Admission to the Utah Tech University Medical Radiography program.