

RAD Radiologic Technology

RAD 101 Introduction to Radiologic Technology (3-0) 3 crs.

Provides an introduction to the field of radiologic technology, health care delivery systems, issues related to the health care environment, importance of effective communication, team building, professionalism, and diversity in the health care center. The student will develop basic skills in radiography and patient care essential for providing quality health care. Professional development and lifelong learning will also be emphasized by introducing the students to various organizations and agencies within radiography and other health care systems. **NOTE:** Students must be admitted into the Radiologic Technology program to register for this course.

RAD 102 Radiologic Procedures I (2-2) 3 crs.

Examines radiologic anatomy and examination procedures for the upper appendicular skeleton, the chest and the abdomen. The basic concepts of radiologic positioning are presented. Students are taught techniques and procedures related to reading various types of technique charts and are able to program X-ray units for correct exposure for designated examination. **NOTE:** Students must be admitted into the Radiologic Technology program to register for this course.

Prerequisite: RAD 101 with a grade of C or better.

Corequisite: RAD 103 and RAD 107.

RAD 103 Radiologic Principles I (2-2) 3 crs.

Introduces students to the principles of radiography and factors controlling radiologic production and radiation protection. Radiation production, prime factors, producing qualitative radiographic images; and types of image receptors are presented.

Prerequisite: RAD 101 with a C or better.

Corequisite: RAD 102 and RAD 107.

RAD 105 Radiologic Procedures II (2-2) 3 crs.

Examines the radiologic anatomy and radiographic procedures for the lower extremity and bony thorax. Routine fluoroscopic procedures of the digestive and urinary tract will be introduced.

Prerequisite: RAD 102 and RAD 103 with grades of C or better.

Corequisite: RAD 106 and RAD 108.

RAD 106 Radiologic Principles II (2-2) 3 crs.

Provides supervised environment to develop the necessary skills needed to evaluate the radiologic image and provide appropriate recommendations for improving the diagnostic quality of the radiograph. Introduces digital imaging.

Prerequisite: RAD 102, RAD 103 and RAD 107 with grades of C or better.

Corequisite: RAD 105 and RAD 108.

RAD 107 Radiologic Clinical Practicum I (0-20) 2 crs.

Applies principles of radiologic positioning under the supervision of qualified registered American Registry of Radiologic Technologists (ARRT) technologist. Emphasizes appendicular and axial skeleton. Includes principles of exposure, image quality and other associated professional skills. Placement of clinical assignment by program coordinator. **NOTE:** All health requirements, as mandated by clinical sites, must be completed prior to placement in a clinical rotation.

Prerequisite: RAD 101 with a grade of C or better.

Corequisite: RAD 102 and RAD 103.

RAD 108 Radiologic Clinical Practicum II (0-20) 2 crs.

Applies principles of radiologic positioning under the supervision of registered American Registry of Radiologic Technologists (ARRT) technologist. Continued emphasis on contrasted procedures, appendicular and axial skeleton, the chest and bony thorax, and other radiologic skills.

Prerequisite: RAD 102, RAD 103, and RAD 107 with grades of C or better.

Corequisite: RAD 105 and RAD 106.

RAD 215 Principles and Procedures in Mammography (3-0) 3 crs.

Provides a detailed overview of the history, equipment and radiographic principles and their application to mammography. Course focuses on breast anatomy and physiology, mammographic techniques, positioning skills, critical equipment features, image receptor characteristics, and image quality management. Successful completion of this course along with RAD 216 will meet the required contact hours of documented learning required by the American Registry of Radiologic Technologist (ARRT). This course is offered every spring and fall. **Prerequisite:** Admission into the Mammography certificate program.

RAD 216 Mammography Externship (0-8) 1 cr.

Provides students with clinical experience to gain required skills to perform quality breast imaging mammograms in a health care setting under the direct supervision of a qualified practitioner. Emphasis on principles and procedures of mammography. Presented as a preceptor clinical experience according to ARRT guidelines.

Prerequisite: Prior or concurrent enrollment in RAD 215.

RAD 221 Radiologic Procedures III (2-2) 3 crs.

Covers the radiologic anatomy and examination procedures for the vertebral column, the cranium, paranasal sinuses and facial bones. Includes instruction of how to read various types of technique charts and program X-ray units for correct exposure for these examinations.

Prerequisite: RAD 225 with a grade of C or better.

Corequisite: RAD 223, RAD 224, and RAD 228.

RAD 222 Radiologic Procedures IV (2-2) 3 crs.

Covers the radiologic anatomy and examination procedures for the vertebral column, the cranium, paranasal sinuses and facial bones. Includes instruction on how to read various types of technique charts and program X-ray units for correct exposure for these examinations.

Prerequisite: RAD 102, RAD 105 and RAD 202 with grades of C or better.

Corequisite: RAD 225.

RAD 223 Advanced Radiologic Principles (2-0) 2 crs.

Provides a continuation of topics covered in RAD 106 such as the principles involved in diagnostic X-ray production and radiographic and fluoroscopic equipment. Topics include X-ray production, electromagnetic interactions with matter, X-ray devices, equipment circuitry, targets and filtration. Covers the application of physical concepts as related to X-ray image production.

Prerequisite: RAD 106 and RAD 225 with grades of C or better.

Corequisite: RAD 221, RAD 224, and RAD 228.

RAD 224 Radiobiology (2-0) 2 crs.

Provides an in-depth study of radiation biology, radiation regulations and radiation measurements. Somatic and genetic effects of ionizing radiation are presented. Radiation safety practices for staff and patients/clients are covered.

Prerequisite: RAD 106 and RAD 225 with grades of C or better.

Corequisite: RAD 221, RAD 223 and RAD 228.

RAD 225 Radiologic Clinical Practicum III (0-12) 3 crs.

Provides a continuation of radiologic experiences with emphasis on radiographic positioning of the cranial and facial bones; trauma; surgery and mobile procedures; and observation of radiologic interpretation. Placement of clinical assignment by program coordinator.

Prerequisite: RAD 108 with a grade of C or better.

RAD 228 Digital Imaging (1.5-1) 2 crs.

Provides an in-depth investigation of digital medical imaging including digital radiography systems, image acquisition, exposure principles, image processing and post-processing, image display and quality control, and picture archiving communication systems. The student will gain a comprehensive understanding of computer system components and function, digital imaging systems (including comparison with film/screen systems), radiation safety principles, cassette-based compared with cassetteless systems, exposure factor and processing selections, quality assurance and acceptance standards.

Prerequisite: RAD 106 with a grade of C or better.

Corequisite: RAD 221, RAD 223, and RAD 224.

RAD 236 Radiologic Pathology (3-0) 3 crs.

Examines the etiology and processes of trauma and disease. Emphasis placed on radiologic pathology of body systems.

Prerequisite: RAD 224 and RAD 240 with grades of C or better.

Corequisite: RAD 238, RAD 239, and RAD 251.

RAD 238 Sectional Anatomy for Imaging (2-0) 2 crs.

Studies human anatomical structures in multiple imaging planes. Reviews images created by MRI and Computed Tomography as well as gross anatomical images. Focuses primarily on identification of normal anatomy, but also includes some pathological conditions. Discusses the role of MRI and CT in physiological imaging.

Prerequisite: BIO 261 with a grade of C or better.

RAD 239 Radiologic Special Procedures (3-0) 3 crs.

Emphasizes routine special procedures including cardiovascular imaging, neuroradiography, reproductive system radiography and special studies of the viscera. The course details portable and surgical radiography, pediatric and geriatric radiography and related imaging modalities such as mammography, computed tomography, magnetic resonance imaging, ultrasonography and neuroradiography. Includes interventional radiology procedures such as stent-coil placement and venous access placement. The student will be able to participate and function in each of these different special procedures.

Prerequisite: RAD 221 with a grade of C or better.

Corequisite: RAD 236, RAD 238, and RAD 251.

RAD 240 Radiologic Clinical Practicum IV (0-30) 3 crs.

Covers advanced clinical experiences with guided practice of special procedures. Experience with mobile units at bedside and in the operating room and emergency room. Placement of clinical assignment by the program coordinator.

Prerequisite: RAD 225 with a grade of C or better.

Corequisite: RAD 221, RAD 223, and RAD 224.

RAD 251 Radiologic Clinical Practicum V (0-30) 3 crs.

Provides a continuation of advanced clinical experiences with guided practice of special procedures. Experience with mobile units at bedside, in the operating room and in the emergency room. Placement of clinical assignment by the program coordinator.

Prerequisite: RAD 223, RAD 224, RAD 228, and RAD 240 with grades of C or better.

Corequisite: RAD 236, RAD 238, and RAD 239.

RAD 258 Radiologic Seminar (1-0) 1 cr.

Provides a review and discussion of radiologic principles, techniques and methods, and film critique. Emphasis is placed on the interdependence of theory and principles in preparation for the American Registry for Radiologic Technology (ARRT) examination and resume writing and job search skills.

Prerequisite: RAD 223, RAD 224, and RAD 228 and RAD 240 with grades of C or better.

Corequisite: RAD 236, RAD 238, RAD 239, and RAD 251.

RAD 260 CT Procedures/Patient Care (3-0) 3 crs.

Provides detailed coverage of procedures for CT imaging. Procedures include, but are not limited to, indications for the procedure, patient education, preparation, orientation and positioning, patient history and assessment, contrast media usage, scout image, selectable scan parameters, filming and archiving of the images. CT procedures will be taught for differentiation of specific structures, patient symptomology and pathology. CT images studied will be reviewed for quality, anatomy and pathology. CT procedures vary from facility to facility and normally are dependent on the preferences of the radiologists.

Prerequisite: Admission into the Computed Tomography program and prior or concurrent enrollment in RAD 238 with a grade of C or better.

Corequisite: RAD 261.

RAD 261 CT Principles I (3-0) 3 crs.

Imparts the fundamentals of the physical principles and instrumentation utilized in computed tomography (CT). Reviews the historical development and evolution of CT. Physics topics covered include CT beam attenuation, linear attenuation coefficients, tissue characteristics and Hounsfield numbers application. Explains data acquisition and manipulation techniques and image reconstruction algorithms such as filtered back-projection. Explores CT systems and operations with full coverage of radiographic tube configuration, collimator design and function, detector type, characteristics and functions of the CT computer and array processor. Examines CT image processing and display from data acquisition through post-processing and archiving, and patient factors related to other elements affecting image quality as well as artifact production and reduction, and image communication.

Prerequisite: Admission to the Computed Tomography (CT) Program is required or consent of instructor and prior of concurrent enrollment in RAD 238 with a grade of C or better.

Corequisite: RAD 260.

RAD 262 CT Principles II (2-0) 2 crs.

Continues the physical principles and instrumentation involved in computed tomography (CT). Physics topics covered include the characteristics of x-radiation, CT beam attenuation, linear attenuation coefficients, tissue characteristics and quality control procedures. Also includes an overview of the principles of radiation protection including the responsibilities of the radiographer for patients, personnel and the public. Incorporates radiation health and safety requirements of federal and state regulatory agencies, accreditation agencies and health care organizations.

Prerequisite: RAD 238, RAD 260 and RAD 261 with grades of C or better.

RAD 263 CT Clinical Education I (0-12) 3 crs.

Applies principles of computed tomography procedures under the supervision of qualified registered American Registry of Radiologic Technologists (ARRT) technologist. Emphasizes principles of exposure, image quality, patient care, radiation safety and other associated professional skills. Placement of clinical assignment is by program coordinator. NOTE: American Heart Association Cardiopulmonary Resuscitation (CPR) certification must be completed prior to placement in a clinical rotation.

Prerequisite: RAD 260 and RAD 261 with grades of C or better.

Corequisite: RAD 262.

RAD 264 CT Clinical Education II (0-12) 3 crs.

Continues to apply the principles of computed tomography procedures under the supervision of a qualified registered American Registry of Radiologic Technologists (ARRT) technologist. Emphasizes the principles of exposure, image quality, patient care, radiation safety and other associated professional skills. Placement of clinical assignment is by program coordinator. NOTE: American Heart Association Cardiopulmonary Resuscitation (CPR) certification must be completed prior to placement in a clinical rotation.

Prerequisite: RAD 262 and RAD 263 with grades of C or better.

RAD 270 MRI Patient Care and Procedures (3-0) 3 crs.

Provides detailed coverage of procedures for MR imaging. Procedures include, but are not limited to, indications for the procedure, patient education, preparation, orientation and positioning, patient history and assessment, contrast media usage, scout image, selectable scan parameters, filming and archiving of the images. MR procedures will be taught for differentiation of specific structures, patient symptomology and pathology. MR images studied will be reviewed for quality, anatomy and pathology. MR procedures vary from facility to facility and normally are dependent on the preferences of the radiologists.

Prerequisite: Admission into the Magnetic Resonance Imaging program, and prior or concurrent enrollment in RAD 238 with a grade of C or better.

Corequisite: RAD 271.

RAD 271 MRI Principles I (3-0) 3 crs.

Reviews the historical development and foundation of magnetic resonance imaging (MRI). Explains basic principles and fundamentals classically and through quantum physics. Explores MRI systems and interactions of the magnetic fields within the systems. Discusses advantages of MRI imaging through contrast characteristics exploring the important mechanisms that affect image contrast in MRI. Explains resonance, interaction of radiofrequency, gradients including data collection and image formation. Explores hardware required for production of magnetic resonance images to include magnet, radiofrequency source, image processor, computer system including MRI ancillary equipment. Discusses the artifacts causes and explores solutions to avoid artifact appearance.

Prerequisite: Admission to the Magnetic Resonance Imaging (MRI) Program is required or consent of instructor, and prior or concurrent enrollment in RAD 238 with a grade of C or better.

Corequisite: RAD 270.

RAD 272 MRI Principles II (2-0) 2 crs.

Continues the physical principles and instrumentation involved in magnetic resonance imaging (MRI). Explains data acquisition and processing, sequence parameters and imaging options. Explains quality control and quality assurance principles in magnetic resonance imaging. Incorporates magnetic resonance health and safety requirements of federal and state regulatory agencies, accreditation agencies and health care organizations.

Prerequisite: RAD 271 with a grade of C or better.

RAD 273 MRI Clinical Education I (0-12) 3 crs.

Applies principles of magnetic resonance imaging procedures under the supervision of a qualified registered American Registry of Radiologic Technologists (ARRT) technologist. Emphasizes principles of exposure, image quality, patient care, radiation safety and other associated professional skills. Placement of clinical assignment by program coordinator.

Prerequisite: RAD 270 and RAD 271 with grades of C or better.

Corequisite: RAD 272.

RAD 274 MRI Clinical Education II (0-12) 3 crs.

Continues to apply the principles of magnetic resonance imaging procedures under the supervision of a qualified registered American Registry of Radiologic Technologists (ARRT) technologist. Emphasizes the principles of exposure, image quality, patient care, radiation safety and other associated professional skills. Placement of clinical assignment by program coordinator. NOTE: American Heart Association Cardiopulmonary Resuscitation (CPR) certification must be completed prior to placement in a clinical rotation.

Prerequisite: RAD 272 and RAD 273 with grades of C or better.