

MEDICAL IMAGING PROGRAM

COURSE DESCRIPTIONS

(effective January 2020)

BIO 107 Human Anatomy & Physiology I (3.0 credits)

Homeostatic mechanisms of the human body with emphasis on structure and function are studied. Gross and microscopic structures are correlated with function of cells, tissues, organs, and systems of the body. Major topics include: skeletal, muscular, and nervous systems. Three hours of lecture per week.

Co-requisite: BIO 117

BIO 108 Human Anatomy & Physiology II (3.0 credits)

Emphasis is on structure and function of endocrine, cardiovascular, respiratory, lymphatic, digestive, urinary, and reproductive systems. Gross and microscopic structures are correlated with functions of cells, tissues, organs, and systems of the body. Three hours of lecture per week.

Co-requisite: BIO 118

BIO 117 Human Anatomy & Physiology I Lab (1.0 credit)

Experimental approach to the study of human anatomy and physiology is used to reinforce lecture concepts. The exercises present the core elements of the subject matter in a hands-on manner. The labs are presented in the same time period the material is being discussed in lecture. One two-hour lab per week.

Co-requisite: BIO 107

BIO 118 Human Anatomy & Physiology II Lab (1.0 credit)

Experimental approach to the study of human anatomy and physiology is used to reinforce lecture concepts. The exercises present the core elements of the subject matter in a hands-on manner. Labs are presented in the same time period the material is being discussed in lecture. One two-hour lab per week.

Co-requisite: BIO 108

COM 101 Composition & Research (3.0 credits)

Core writing requirement, reviews fundamental principles of rhetoric, grammar, punctuation, and spelling. Requirements include a research paper using MLA documentation guidelines and several expository papers. Course is available only after placement by departmental faculty. Students must achieve "C" or better to fulfill core requirements.

LAE 1 Communication Elective (3.0 credits)

The Liberal Arts Elective 1 requirement can be satisfied by successful completion of COM 213 or a similar COM course. Historically, COM 213 has been offered in the curricula on RHSHS campus, but the school reserves the right to provide a course substitution. Students must receive approval from both RHSHS and Alvernia University for transfer credit.

MAT 102 Algebra II (3.0 credits)

This course is designed to prepare science or mathematics major for precalculus. Topics include algebra of polynomials, roots, radicals, and exponents, relations and functions and their graphs, systems of equations, and logarithms.

Prerequisite: MAT 100 or satisfactory score on Mathematics Placement Test.

LAE 2 Creative Expressions Elective (3.0 credits)

The Liberal Arts Elective 2 requirement can be satisfied by successful completion of MUS or a similar creative expressions course. Historically, MUS has been offered in the curricula on RHSHS campus, but the school reserves the right to provide a course substitution. Students must receive approval from both RHSHS and Alvernia University for transfer credit.

PHI 105 Introduction to Philosophy (3.0 credits)

Historical introduction to fundamental problems and methods of philosophy based on readings in ancient, medieval, and modern literature.

SOC 306 Racial and Cultural Relations (3.0 credits)

Analysis of ethnic and racial differentiation in pluralistic societies. Theories of dominant and minority groups are studied. This course fulfills the human diversity graduation requirement.

THE 210 Medical Moral Theology (3.0 credits)

Investigation of moral problems which can arise in the area of bioethics. Introductory survey of the basic Christian principles of morality is followed by treatment of various medical moral situations. A natural law methodology is applied throughout the course. Fulfills the Ethics/Morality requirement.

***DUALY ENROLLED STUDENTS:** The course titled "THE 210" satisfies a Medical Ethics requirement for the RHSHS Medical Imaging certificate of completion and also satisfies the Philosophy/Theology requirement for the Alvernia University Associate of Science degree. Students may elect (prior to enrollment in the program) to take an equivalent Medical Ethics course in place of THE 210 to meet the RHSHS program requirements. However, additional coursework may be required to also meet the Alvernia University Philosophy/Theology requirement. It is highly suggested that the student meet with the RHSHS admissions staff to verify course transferability prior to enrolling in a substitute course.

MI 110 Introduction to Medical Imaging

This course provides a broad, general introduction to the foundations in radiography and the radiography practitioner's role in the health care delivery system. Principles, practices, and policies of the healthcare organization(s) will be examined, in addition to the professional responsibilities of the radiographer. Common administrative structures found within a radiology department will be discussed and professional organizations significant to radiology will be explored. Students will also be oriented to the mission of Alvernia University, Reading Hospital School of Health Sciences, and the Medical Imaging Program.

Prerequisites: Not Applicable

Theory Hours: 15 Hours (1.0 credit)

Clinical Hours: Not Applicable

MI 116 Patient Care & Pharmacology for Medical Imaging Professionals

This course addresses the basic concepts of patient care within medical imaging and underscores the physical and emotional needs of the patient and family. Ethical and moral implications associated with delivery of care are discussed. Routine and emergency patient care procedures will be addressed as well as infection control procedures utilizing standard precautions. The role of the radiographer in patient education will be identified.

Prerequisites: MI 110: Introduction to Medical Imaging

Theory Hours: 45 Hours (3.0 credits)

Clinical Hours: Not Applicable

MI 120 Radiation Protection & Medical Terminology

This introductory course provides theory and application to the elements of medical terminology. A word-building system will be introduced and abbreviations and symbols will be discussed. Also introduced will be an orientation to the understanding of radiographic orders and interpretation of diagnostic reports. Related terminology is addressed. This course will introduce an overview of the principles of radiation protection, including the responsibilities of the radiographer for patients, personnel, and the public. Devices used for protection will be presented. Radiation health and safety requirements of federal and state regulatory agencies, accreditation agencies, and healthcare organizations are incorporated. (Mathematics involved)

Prerequisites: MI 110: Introduction to Medical Imaging; MAT 102: Algebra II

Theory Hours: 30 Hours (2.0 credits)

Clinical Hours: Not applicable

MI 132 Imaging Principles & Equipment

This course establishes the relationship between radiation production and characteristics, radiographic equipment, and factors that govern the image production process. The basic knowledge of atomic structure and terminology, nature and characteristics of radiation, X-ray production, the fundamentals of photon interactions with matter, and the design and function of the radiographic equipment are explored. The concepts of radiographic brightness, contrast, latitude, spatial resolution, and distortion are analyzed with respect to how they affect the image production process. Ideal technique formulation and selection, troubleshooting, and error correction is examined. (Mathematics involved)

Prerequisites: MAT 102: Algebra II; MI 123: Clinical Seminar I

Theory Hours: 45 Hours (3.0 credits)

Clinical Hours: Not Applicable

MI 237 Medical Image Acquisition & Archival

This course is designed to impart an understanding of the components, principles, and operation of fluoroscopic and digital imaging systems found in diagnostic radiology. Factors impacting patient safety and image quality including grids and beam restriction are also discussed. Guidelines for selecting exposure factors and evaluating images within an imaging system assist students to idealize image acquisition, display, archiving, and retrieval. Principles of quality assurance and maintenance are presented. (Mathematics involved)

Prerequisites: MI 132 Imaging Principles & Equipment; MI 133: Clinical Seminar II

Theory Hours: 60 Hours (4.0 credits)

Clinical Hours: Not applicable

MI 240 Radiation Biology

This course is designed to provide 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.

Prerequisites: BIO 107: Human Anatomy & Physiology I; BIO 117: Human Anatomy & Physiology Laboratory I; BIO 108: Human Anatomy & Physiology II; BIO 118: Human Anatomy & Physiology Laboratory II; MI 120: Radiation Protection & Medical Terminology; MI132 Imaging Principles & Equipment

Theory Hours: 30 Hours (2.0 credits)

Clinical Hours: Not Applicable

MI 262 Introduction to Computed Tomography & Cross-Sectional Anatomy

This course is provided to further continue the study of the gross anatomy of the entire body through cross-sectional imaging. Detailed study of gross anatomical structures will be conducted systematically for location, relationship to other structures, and function. Content will also provide entry-level radiography students with principles related to computed tomography (CT) imaging. Basic principles of linear tomography will be studied in relation to the patient care setting.

Prerequisites: BIO 107: Human Anatomy & Physiology I; BIO 117: Human Anatomy & Physiology Laboratory I; BIO 108: Human Anatomy & Physiology II; BIO 118: Human Anatomy & Physiology Laboratory II; MI 132 Imaging Principles and Equipment; MI 237 Medical Image Acquisition & PACS

Theory Hours: 45 Hours (3.0 credits)

Clinical Hours: Not Applicable

MI 277 Achieving & Advancing Professional Standing

Students prepare for the entry into the profession through a comprehensive review of the curriculum, participation in standardized exams in preparation for the national credentialing examination administered by the American Registry of Radiologic Technologists (ARRT), and investigate a variety of professional growth opportunities. The application process utilized by the ARRT is explained and continuing education requirements for ongoing registry maintenance are discussed. (Mathematics involved)

Prerequisites: MI 263: Clinical Seminar V

Theory Hours: 30 Hours (2.0 credits)

Clinical Hours: Not applicable

MI 123 Clinical Seminar I; Clinical Orientation & Chest Radiography

Clinical Seminar I is designed to support the foundation necessary to perform standard radiographic procedures. The fundamental skills necessary to adapt studies to specific patient needs will be introduced. Chest radiography is introduced. Demonstration of optimal diagnostic examinations and radiographic image evaluation will be included. Laboratory and clinical experience will be used in conjunction with seminars to facilitate mastery of skills necessary for the beginning medical imaging student.

Prerequisites: BIO 107: Human Anatomy & Physiology I; BIO 117: Human Anatomy & Physiology Laboratory I; MI 110: Introduction to Medical Imaging.

Theory Hours: 15 Hours (1.0 credit)

Clinical Hours: 75 Hours (1.0 credit)

MI 133 Clinical Seminar II; Distal Extremities; Abdomen & Advanced Chest Radiography

Clinical Seminar II is designed to support the foundation necessary to perform standard radiographic procedures. Advanced chest radiography, abdominal radiography, and distal portions of the appendicular skeleton will be included. The skills necessary to adapt these studies to specific patient needs will also be introduced. Demonstration of optimal diagnostic examinations and radiographic image evaluation will be included; pathological effects and recommendation for improvement of image quality will be discussed. Laboratory and clinical experience will be used in conjunction with seminars to facilitate mastery of skills necessary for the beginning medical imaging student.

Prerequisites: BIO 107: Human Anatomy & Physiology I; BIO 117: Human Anatomy & Physiology Laboratory I; BIO 108: Human Anatomy & Physiology II; BIO 118: Human Anatomy & Physiology Laboratory II; MI 116: Patient Care & Pharmacology for Medical Imaging Professionals; MI 120: Medical Terminology & Radiation Protection; MI 123: Clinical Seminar I

Theory Hours: 30 Hours (2.0 credits)

Clinical Hours: 225 Hours (3.0 credits)

MI 238 Clinical Seminar III; Proximal Extremities, Shoulder Girdle, Mobile & Surgical

Clinical Seminar III is designed to support the foundation necessary to perform standard radiographic procedures. Proximal Extremity, Shoulder Girdle, Mobile & Surgical Radiography, and Trauma Radiography. The skills necessary to adapt these studies to specific patient needs will also be introduced. Demonstration of optimal diagnostic examinations and radiographic image evaluation will be included; pathological effects and recommendation for improvement of image quality will be discussed. Laboratory and clinical experience will be used in conjunction with seminars to facilitate mastery of skills necessary for the beginning medical imaging student.

Prerequisites: MI 132: Imaging Principles & Equipment; MI 133: Clinical Seminar II

Theory Hours: 30 Hours (2.0 credits)

Clinical Hours: 225 Hours (3.0 credits)

MI 243 Clinical Seminar IV; Bony Thorax, Pelvic Girdle & Vertebral Column

Clinical Seminar IV is designed to support the foundation necessary to perform standard radiographic procedures. Instruction of radiography of the bony thorax, pelvic girdle, and vertebral column will be included. The skills necessary to adapt these studies to specific patient needs will also be introduced. Demonstration of optimal diagnostic examinations and radiographic image evaluation will be included; pathological effects and recommendation for improvement of image quality will be discussed. Laboratory and clinical experience will be used in conjunction with seminars to facilitate mastery of skills necessary for entry-level medical imaging professionals.

Prerequisites: MI 237: Medical Image Acquisition and PACS; MI 238: Clinical Seminar III

Theory Hours: 15 Hours (1.0 credits)

Clinical Hours: 225 Hours (3.0 credits)

MI 263 Clinical Seminar V; Fluoroscopy & Cranium

Clinical Seminar V is designed to support the foundation necessary to perform standard radiographic procedures. Instruction of advanced abdominal radiography, fluoroscopy studies, and imaging procedures associated with the cranium will be included. The skills necessary to adapt these studies to specific patient needs will also be introduced. Demonstration of optimal diagnostic examinations and radiographic image evaluation will be included; pathological effects and recommendation for improvement of image quality will be discussed. Laboratory and clinical experience will be used in conjunction with seminars to facilitate mastery of skills necessary for entry-level medical imaging professionals.

Prerequisites: MI 243: Clinical Seminar IV

Theory Hours: 45 Hours (3.0 credits)

Clinical Hours: 375 Hours (5.0 credits)

MI 278: Clinical Seminar VI; Special Studies & Clinical Proficiencies

Instruction of specialized radiographic projections and protocols will be included. The skills necessary to adapt studies to specific patient needs will be reinforced. Proficiency in production of optimal diagnostic examinations and radiographic image evaluation will be verified; pathological effects and recommendation for improvement of image quality will be further discussed. Laboratory and clinical experience will be used in conjunction with seminars to facilitate mastery of skills necessary for entry-level medical imaging professionals.

Prerequisites: MI 263: Clinical Seminar V

Theory Hours: not applicable

Clinical Hours: 375 Hours (5.0 credits)