# DIAGNOSTIC MEDICAL IMAGING NUCLEAR MEDICINE

**DMIN 1100**
**Basics of Nuclear Medicine**
3 Credit Hours
History and evolution of Nuclear Medicine as an imaging modality. Radionuclide identification, radionuclide energies and half-lives, and commonly used radiopharmaceuticals for Diagnostic Nuclear Medicine procedures. Introduction to Diagnostic Nuclear Medicine procedures. Patient handling techniques and nursing and laboratory procedures relating to Nuclear Medicine. Introduction to professional medical ethics, legal issues and patient rights. Quality assurance procedures for the radiation protection of Nuclear Medicine personnel. Prerequisite: Admission to the Nuclear Medicine Technology program or consent of instructor. (3 lecture hours)

**DMIN 1101**
**Physics & Instrumentation Nuclear Medicine**
6 Credit Hours
Principles of atomic structure, nomenclature and radiation. Introduction to radionuclides, physics of radiation (particulate and non-particulate), natural and artificial radiation, calculations of radioactive decay, exponential equations, calculation of radiation dosimetry, half-life equations, radionuclide production, radiopharmaceutical dose determinations, radiation interactions with matter, radiation protection and safety methodology, radiation shielding formulation and counting statistics. Basic aspects in imaging and non-imaging radiation detection instrumentation including: scintillation detectors, planar, SPECT (single photon emission computerized tomography), PET (positron emission tomography), multichannel analyzers, quality assurance testing for Nuclear Medicine instrumentation including G-M detectors, ionization chambers and scintillation detectors. Prerequisite: Admission to the Nuclear Medicine Technology program or consent of instructor. (4 lecture hours, 4 lab hours)

**DMIN 1102**
**Nuclear Medicine Radiopharmacy**
6 Credit Hours
Nuclear Medicine radiopharmacy including: production of radionuclides, radiopharmaceutical chemistry, radiopharmaceuticals and methods of radiolabeling, characteristics of specific radiopharmaceuticals, biorouting and physiological mechanisms of tracer uptake, pharmacokinetics, radiation units, specific activity, concentration determination, dose calculations, methods of dispensing, quality assurance of radiopharmaceuticals, and universal precautions. Specialized clinical radiopharmaceuticals include: monoclonal antibodies, peptides, receptors, Positron Emission Tomography, therapy, and current research. Radiopharmacy design, management and record keeping, radiation safety and Nuclear Regulatory Commission (NRC) and Illinois Emergency Management Agency (IEMA) radiopharmacy rules and regulations. Prerequisite: Admission to Nuclear Medicine Technology program and Diagnostic Medical Imaging Nuclear Medicine 1100, Diagnostic Medical Imaging Nuclear Medicine 1101, and Diagnostic Medical Imaging Nuclear Medicine 1111 or equivalent or consent of instructor. (4 lecture hours, 4 lab hours)

**DMIN 1103**
**Radiation Biology & Safety Bridge**
2 Credit Hours
Topics in radiation biology will include qualitative and quantitative effects on the human body following exposure to various types of ionizing radiation, and the potential harmful effects and the benefits of the medical uses of radiation. Procedures for personnel and environmental monitoring, emergency management, decontamination, and proper methods of receiving, storing and disposing of radioactive materials. Basic concepts of radiation safety for personnel, patients and the environment. Prerequisite: Admission to Nuclear Medicine Technology program or consent of instructor. (2 lecture hours, 1 lab hour)

**DMIN 1111**
**Clinical Nuclear Medicine I**
3 Credit Hours
First in a three-course sequence of supervised clinical instruction in Nuclear Medicine Technology. Comprehensive study of imaging and non-imaging techniques, instrumentation quality control, patient care, radiopharmacy, computer analysis and quality assurance. Students are expected to demonstrate competency according to defined objectives at prospective clinical affiliates. Prerequisite: Admission to the Nuclear Medicine Technology program or consent of instructor.

**DMIN 1840**
**Independent Study**
1 to 4 Credit Hours
Exploration and analysis of topics within the discipline to meet individual student-defined course description, goals, objectives, topical outline and methods of evaluation in coordination with and approved by the instructor. This course may be taken four times for credit as long as different topics are selected. Prerequisite: Admission to the Nuclear Medicine Technology program and consent of instructor is required. (1 to 4 lecture hours)

**DMIN 2200**
**Nuclear Medicine Procedures II**
4 Credit Hours
Applied anatomy and physiology of cardiovascular, skeletal, genitourinary, gastrointestinal, respiratory and endocrine systems. Diagnostic imaging techniques, radiopharmaceutical agents, indications and limitations of nuclear medicine procedures, normal and abnormal pathology, dosimetry. Computer acquisition and processing techniques. Case study critiques, journal review and case study presentations. Prerequisite: Admission to the Nuclear Medicine Technology program and Diagnostic Medical Imaging Nuclear Medicine 1100 and Diagnostic Medical Imaging Nuclear Medicine 1103 or consent of instructor. Admission to program is required. (3 lecture hours, 2 lab hours)

**DMIN 2202**
**Nuclear Medicine Procedures III**
4 Credit Hours
Applied anatomy and physiology of the central nervous, immune, lymphatic, hematopoietic, exocrine, gastrointestinal systems. Non-imaging tests including Schilling’s, Helibacter pylori and blood volume determination. Advanced topics in nuclear cardiology, tumor imaging, neurology, radioimmunoimaging, radioimmunotherapy and miscellaneous procedures. Diagnostic imaging techniques, radiopharmaceutical agents, indications and limitations of nuclear medicine procedures, normal and abnormal pathology, dosimetry. Computer acquisition and processing techniques. Case study critiques, journal review and case study presentations. Prerequisite: Admission to the Nuclear Medicine Technology program and Diagnostic Medical Imaging Nuclear Medicine Technology program or consent of instructor.
Credit Hours
Sectional Anatomy and Pathology for CT
DMIN 2500
3 Credit Hours
Students will be provided with a review of anatomy and pathology in Computed Tomography (CT) imaging planes. The characteristic appearance of each anatomical structure as it appears on CT images with pathologic and trauma processes is also covered.
Prerequisite: Admission to the Computed Tomography Program is required or consent of instructor. (3 lecture hours)

DMIN 2501
CT Principles & Patient Care
3 Credit Hours
Students are introduced to principles, procedures, and patient care specific to Computed Tomography (CT). Pediatric patient care and routine and emergency procedures are described. CT images are reviewed for quality, positioning, and illustration of anatomy. Prerequisite: Admission to the Computed Tomography Program is required or consent of instructor. (3 lecture hours)

DMIN 2502
Physics and Instrumentation for Ct
3 Credit Hours
Students are provided with the physics and instrumentation principles specific to Computed Tomography (CT). CT image processing and display methods as well as patient factors affecting image quality are identified. Prerequisite: Diagnostic Medical Imaging Nuclear Medicine 2500 with a grade of C or better, or equivalent and Diagnostic Medical Imaging Nuclear Medicine 2501 with a grade of C or better, or equivalent. Admission to the Computed Tomography Program is required or consent of instructor. (2 lecture hours, 2 lab hours)

DMIN 2503
Radiation SafetyQuality Mgmt. for CT
3 Credit Hours
Students will be introduced to necessary principles of radiation safety and quality management specific to Computed Tomography (CT). Radiation health and safety requirements of federal and state regulatory agencies, accreditation agencies, and health care organizations are described. Prerequisite: Diagnostic Medical Imaging Nuclear Medicine 2500 with a grade of C or better, or equivalent and Diagnostic Medical Imaging Nuclear Medicine 2501 with a grade of C or better, or equivalent. (2 lecture hours, 2 lab hours)

DMIN 2511
Clinical Applications of CT I
3 Credit Hours
Students attend clinical rotations to connect theory with practice and performance of Computed Tomography (CT) procedures emphasizing proper patient care. Prerequisite: Admission to the Computed Tomography Program is required or consent of instructor. (6 lab hours)

DMIN 2512
Clinical Applications of CT II
3 Credit Hours
Students complete clinical applications connecting theory with practice through the performance of advanced CT procedures. Prerequisite: Diagnostic Medical Imaging Nuclear Medicine 2511 with a grade of C or better, or equivalent. (6 lab hours)

DMIN 2860
Internship (Career & Technical Ed)
1 to 4 Credit Hours
Course requires participation in Career and Technical Education work experience with onsite supervision. Internship learning objectives are developed by student and faculty member, with approval of employer, to provide appropriate work-based learning experiences. Credit is earned by working a minimum of 75 clock hours per semester credit hour, up to a maximum of four credits. Prerequisite: Consent of instructor and 2.0 cumulative grade point average; 12 semester credits earned in a related field of study; students work with Career Services staff to obtain approval of the internship by the dean from the academic discipline where the student is planning to earn credit.

DMIR 2865
Internship Advanced (Career & Tech Ed)
1 to 4 Credit Hours
Continuation of Internship (Career and Technical Education). Course requires participation in Career & Technical Education work experience with onsite supervision. Internship learning objectives are developed by student and faculty member, with approval of employer, to provide appropriate work-based learning experiences. Credit is earned by working a minimum of 75 clock hours per semester credit hour, up to a maximum of four credits. Prerequisite: Consent of instructor and 2.0 cumulative grade point average; 12 semester credits earned in a related field of study; students work with Career Services staff to obtain approval of the internship by the dean from the academic discipline where the student is planning to earn credit.

DMIR 1100
Introduction to DMIR
2 Credit Hours
An introduction and overview of the field of radiography and radiation safety. This course requires a service learning component. (2 lecture hours)

DMIR 1111
Clinical Education I
1 Credit Hour
Applied radiography at assigned clinical education setting. Satisfies the clinical objectives and competency requirements listed in the Radiography program design for the first semester. Prerequisite: Admission to Diagnostic Medical Imaging Radiography program is required.

DMIR 1112
Clinical Education II
2 Credit Hours
Applied radiography at assigned clinical education centers. Satisfies the clinical objectives and competency requirements as specified in the Radiologic program design for the second semester. Prerequisite: Diagnostic Medical Imaging Radiography 1111 and Diagnostic Medical Imaging Radiography 1131; all with a grade of C or better, or equivalent or consent of instructor.

DMIR 1113
Clinical Education III
2 Credit Hours
Applied radiography at assigned clinical education centers. Satisfies the clinical objectives and competency requirements as specified in the Radiography program design. Prerequisite: Admission to the Diagnostic Medical Imaging Radiography program is required. Diagnostic Medical Imaging Radiography 1112, Diagnostic Medical Imaging Radiography 1121 and Diagnostic Medical Imaging Radiography 1132; all with a grade of C or better, or equivalent or consent of instructor.

DMIR 1121
Radiographic Equipment
4 Credit Hours
Elementary physical principles including systems of measurement, classical mechanics, structure of matter, electricity and magnetism, X-ray production, X-ray circuits, and radiographic and fluoroscopic systems. Prerequisite: Diagnostic Medical Imaging Radiography 1111 and Diagnostic Medical Imaging Radiography 1131; all with a grade of C or better, or equivalent or consent of instructor. (4 lecture hours)

DMIR 1122
Image Formation and Evaluation
5 Credit Hours
Advanced principles and applications of radiographic equipment. Radiographic image production, image quality, film processing, analog image receptors, digital image receptors, and production and control of scattered radiation. Prerequisite: Admission to the Diagnostic Medical Imaging Radiography program is required. Diagnostic Medical Imaging Radiography 1112, Diagnostic Medical Imaging Radiography 1121 and Diagnostic Medical Imaging Radiography 1132; all with a grade of C or better, or equivalent or consent of instructor. (4 lecture hours, 2 lab hours)

DMIR 1131
Radiographic Procedures I
4 Credit Hours
Radiographic patient care, terminology, routine radiographic positioning and radiographic image evaluation of the thorax, abdomen and urinary tract. Prerequisite: Admission to Diagnostic Medical Imaging Radiography Program or consent of instructor. (3 lecture hours, 2 lab hours)

DMIR 1132
Radiographic Procedures II
3 Credit Hours
Routine radiographic positioning and radiographic image evaluation of the upper and lower extremities, bony thorax, and digestive system. Prerequisite: Diagnostic Medical Imaging Radiography 1111 and Diagnostic Medical Imaging Radiography 1131; all with a grade of C or better, or equivalent or consent of instructor. (2 lecture hours, 2 lab hours)

DMIR 1133
Radiographic Procedures III
3 Credit Hours
Routine and special projections/methods of radiographic positioning and radiographic image evaluation of the head and neck, spine and pelvis. Prerequisite: Admission to the Diagnostic Medical Imaging Radiography program is required. Diagnostic Medical Imaging Radiography 1112, Diagnostic Medical Imaging Radiography 1121 and Diagnostic Medical Imaging Radiography 1132; all with a grade of C or better, or equivalent or consent of instructor. (2 lecture hours, 2 lab hours)

DMIR 1140
Ethics & Law Diagnostic Medical Imaging
1 Credit Hour
Provides a fundamental background in medical ethics and law specific to diagnostic medical imaging. Students will use actual case studies and clinical scenarios for application of topics discussed. Prerequisite: Admission to Diagnostic Medical Imaging Radiography program and Diagnostic Medical Imaging Radiography 1113, Diagnostic Medical Imaging Radiography 1122
and Diagnostic Medical Imaging Radiography 1133; all with a grade of C or better or equivalent or consent of instructor. (1 lecture hour)

DMIR 1145
**Ethics, Law & Basic Pharmacology**
1 Credit Hour
Provides the fundamentals in medical ethics, law, and pharmacology in Radiography Prerequisite: Diagnostic Medical Imaging Radiography 1113, Diagnostic Medical Imaging Radiography 1122 and Diagnostic Medical Imaging Radiography 1133; all with a grade of C or better or equivalent or consent of instructor. (1 lecture hour)

DMIR 1151
**Basic Pharmacology**
1 Credit Hour
Basic concepts of pharmacology, drug classification, indications and the types of reactions to diagnostic contrast agents and intravenous medications. Included are the theory of venipuncture and appropriate patient care during these procedures. Prerequisite: Admission to Diagnostic Medical Imaging Radiography program and Diagnostic Medical Imaging Radiography 1113, Diagnostic Medical Imaging Radiography 1122 and Diagnostic Medical Imaging Radiography 1133; all with a grade of C or better or consent of instructor. (1 lecture hour)

DMIR 1840
**Independent Study**
1 to 4 Credit Hours
Exploration and analysis of topics within the discipline to meet individual student-defined course description, goals, objectives, topical outline and methods of evaluation in coordination with and approved by the instructor. This course may be taken four times for credit as long as different topics are selected. Prerequisite: Consent of instructor is required. (1 to 4 lecture hours)

DMIR 2201
**Radiation Physics, Biology & Protection**
3 Credit Hours
Students will learn advanced radiological physics related to biological effects of ionizing radiation as well as principles in personal and patient radiation safety and protection. Prerequisite: Diagnostic Medical Imaging Radiography 1145 with a grade of C or better and Diagnostic Medical Imaging Radiography 2211 with a grade of C or better or consent of instructor. (3 lecture hours)

DMIR 2211
**Clinical Education IV**
1 Credit Hour
Applied radiography at assigned clinical education centers. Satisfies the clinical objectives and competency requirements as specified in the Radiography program design. Prerequisite: Admission to Diagnostic Medical Imaging Radiography program and Diagnostic Medical Imaging Radiography 1113, Diagnostic Medical Imaging Radiography 1122 and Diagnostic Medical Imaging Radiography 1133; all with a grade of C or better, or equivalent or consent of instructor.

DMIR 2212
**Clinical Education V**
3 Credit Hours
Students will apply acquired skills in radiography at assigned clinical education centers. Students must satisfy the clinical objectives and competency requirements as specified in the Diagnostic Medical Imaging Radiography program design. Prerequisite: Diagnostic Medical Imaging Radiography 1145 with a grade of C or better and Diagnostic Medical Imaging Radiography 2211 with a grade of C or better or consent of instructor.

DMIR 2213
**Clinical Education VI**
3 Credit Hours
Applied radiography at assigned clinical education centers. Satisfies the clinical objectives and competency requirements as specified in the Radiography program design. Prerequisite: Admission to the Diagnostic Medical Imaging Radiography program is required. Diagnostic Medical Imaging Radiography 2201, Diagnostic Medical Imaging Radiography 2212 and Diagnostic Medical Imaging Radiography 2225; all with a grade of C or better or consent of instructor.

DMIR 2220
**Sectional Anatomy for Diagnostic Imaging**
2 Credit Hours
Study of human anatomy as demonstrated in sectional planes seen in Computed Tomography (CT), Positron Emission Tomography (PET) and Magnetic Resonance Imaging (MRI). Comparison of planar anatomy to sectional anatomy through the use of diagrams and radiologic images. Emphasis is on anatomy of the head, neck, spine, thorax, abdomen, pelvis, and musculoskeletal system. Prerequisite: American Registry of Radiologic Technologists Certification and/or Nuclear Medicine Certification or consent of instructor. (2 lecture hours)

DMIR 2225
**Basic Pathophysiology**
3 Credit Hours
Students will learn basic concepts of pathology and the causes of disease in the body systems as illustrated by various diagnostic medical imaging disciplines. Prerequisite: Diagnostic Medical Imaging Radiography 1145 with a grade of C or better and Diagnostic Medical Imaging Radiography 2211 with a grade of C or better or consent of instructor. (3 lecture hours)

DMIR 2226
**Advanced Pathophysiology**
1 Credit Hour
Advanced study of pathophysiology in diagnostic medical imaging of the heart and vascular system, the hematopoietic system, central nervous system and the endocrine system. Included are radiographic interpretation, imaging techniques using the disciplines of Radiography primarily with new digital imaging systems, Computed Tomography, Magnetic Resonance Imaging, and also pathology illustrated using Diagnostic Medical Sonography, Nuclear Medicine Technology, and Positron Emission Tomography. Prerequisite: Admission to the program and consent of instructor is required. (1 lecture hour)

DMIR 2235
**Quality Management in Diagnostic Imaging**
2 Credit Hours
Teaches the student the advanced technical aspects of quality assurance and quality management. Includes analog film processing, digital image processing as well as radiographic equipment. Focus is on practical applications in the radiology department. Prerequisite: Admission to the Diagnostic Medical Imaging Radiography program is required. Diagnostic Medical Imaging Radiography 1151, Diagnostic Medical Imaging Radiography 2201, Diagnostic Medical Imaging Radiography 2211,
and Diagnostic Medical Imaging Radiography 2225; all with a grade of C or better or consent of instructor. (1 lecture hour, 2 lab hours)

DMIR 2240
Radiographic Image Analysis
3 Credit Hours
Systematic approach for evaluating radiographic images to determine diagnostic quality. Review and correlation of previous subjects. Prerequisite: Admission to the Diagnostic Medical Imaging Radiography program is required. Diagnostic Medical Imaging Radiography 1151 and Diagnostic Medical Imaging Radiography 2201 and Diagnostic Medical Imaging Radiography 2212 and Diagnostic Medical Imaging Radiography 2225; all with a grade of C or better or consent of instructor. (3 lecture hours)

DMIR 2280
Radiography Review Seminar
1 Credit Hour
Overview of Radiography coursework in preparation for the national certification examination of the American Registry of Radiologic Technologists (ARRT) based on the content specifications. Content areas included are: radiation protection, equipment operation and maintenance, image production and evaluation, radiographic procedures, and patient care. Strategies in testing, test anxiety, and the computer-based test are included in the course. Prerequisite: Admission to Diagnostic Medical Imaging Radiography program, graduate of a Radiologic Technology program or consent of instructor. (1 lecture hour)

DMIR 2400
Clinical Applications of Mammography
2 Credit Hours
Experience in the performance of mammography exams, including patient preparation and education, interventional procedures and the required quality control tests described by the American College of Radiology (ACR) Mammography Quality Control Manual. Designed to meet or exceed the minimum competency requirements for certification by the American Registry of Radiologic Technologists (ARRT). Prerequisite: Admission to Diagnostic Medical Imaging Radiography program and ARRT certification or consent of instructor.

DMIR 2402
Breast Anatomy, Physiology and Pathology
1 Credit Hour
Establishment of baseline knowledge in breast anatomy and physiology. Correlation between breast anatomic structures and mammographic anatomic structures. Introduction to breast viability, benign and cancerous pathology, and mammographic appearance. Prerequisite: Admission to Diagnostic Medical Imaging Radiography program or consent of instructor. (1 lecture hour)

DMIR 2403
Mammography Principles and Procedures
2 Credit Hours
Introduction to technologist-performed physical breast assessment. Preliminary patient assessment, physical breast assessment, and documentation of findings required for a comprehensive examination for imaging correlation of the breasts. A knowledge base of the various positions and projections in mammography along with the clinical data needed to perform the exam and positioning techniques for both screening and diagnostic mammography, including interventional procedures. Prerequisite: Admission to Diagnostic Medical Imaging Radiography program or consent of instructor. (1 lecture hour, 2 lab hours)

DMIR 2404
Mammography Quality Mgmt & Instrumentation
2 Credit Hours
Introduction to mammography equipment along with mandated requirements governing use and factors that influence the production and recording of mammographic images. Accreditation and service delivery standards included. Prerequisite: Admission to Diagnostic Medical Imaging Radiography program or consent of instructor. (2 lecture hours)

DMIR 2600
Cardiac IV Procedures & Patient Care
3 Credit Hours
Overview of diagnostic, therapeutic, and conduction cardiac studies and percutaneous coronary intervention procedures. Hemodynamics and calculations related to cardiac studies. Basic concepts of patient care and management for cardiac procedures and infection prevention. Prerequisite: Admission into the Cardiac Interventional Radiography Specialist Program or consent of instructor. (3 lecture hours)

DMIR 2602
Equipment & Instrumentation in CIVR
1 Credit Hour
Equipment and instrumentation utilized in cardiac interventional radiography studies. Prerequisite: Admission into the Cardiac Interventional Radiography Specialist Program or consent of instructor. (1 lecture hour)

DMIR 2604
Clinical Experience in CIVR
3 Credit Hours
Clinical experience in a dedicated cardiac catheterization laboratory setting. Students will perform the fundamental procedures required for certification in cardiac-interventional radiography. Prerequisite: Admission into the Cardiac Interventional Radiography Specialist Program certified by the American Registry of Radiologic Technologists (ARRT) and licensed by Illinois Emergency Management Agency (IEMA) or consent of instructor. (6 lab hours)

DMIR 2680
Internship (Career & Technical Ed)
1 to 4 Credit Hours
Course requires participation in Career and Technical Education work experience with onsite supervision. Internship learning objectives are developed by student and faculty member, with approval of employer, to provide appropriate work-based learning experiences. Credit is earned by working a minimum of 75 clock hours per semester credit hour, up to a maximum of four credits. Prerequisite: Consent of instructor and 2.0 cumulative grade point average; 12 semester credits earned in a related field of study; students work with Career Services staff to obtain approval of the internship by the Dean from the academic discipline where the student is planning to earn credit.

DMIR 2865
Internship Advanced (Career & Tech Ed)
1 to 4 Credit Hours
Continuation of Internship (Career and Technical Education). Course requires participation in Career & Technical Education work
experience with onsite supervision. Internship learning objectives are developed by student and faculty member, with approval of employer, to provide appropriate work-based learning experiences. Credit is earned by working a minimum of 75 clock hours per semester credit hour, up to a maximum of four credits. Prerequisite: Consent of instructor and 2.0 cumulative grade point average; 12 semester credits earned in a related field of study; students work with Career Services staff to obtain approval of the internship by the Dean from the academic discipline where the student is planning to earn credit.