

DIAGNOSTIC MEDICAL IMAGING NUCLEAR MEDICINE (DMIN)

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. (3 lecture hours)

Prerequisite: Admission to the Nuclear Medicine Technology program or consent of instructor.

DMIN 1101

Physics & Instrumentation Nuclear Medicin

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. (4 lecture hours, 4 lab hours)

Prerequisite: Admission to the Nuclear Medicine Technology program or consent of instructor.

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. (4 lecture hours, 4 lab hours)

Prerequisite: Admission to Nuclear Medicine Technology program and DMIN 1100, DMIN 1101, and DMIN 1111 or equivalent or consent of instructor.

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 exposure reduction. Concepts of radiation safety for personnel, patients and the environment. (2 lecture hours, 1 lab hour)

Prerequisite: Admission to Nuclear Medicine Technology program or consent of instructor.

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. (24 clinical hours)

Prerequisite: Admission to the Nuclear Medicine Technology program or consent of instructor.

DMIN 1840

Independent Study

1-4 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. (1 to 4 lecture hours)

Prerequisite: Admission to the Nuclear Medicine Technology program and consent of instructor is required.

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. (3 lecture hours, 2 lab hours)

Prerequisite: Admission to the Nuclear Medicine Technology program and DMIN 1100 and DMIN 1103 or consent of instructor. Admission to program is required.

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. (3 lecture hours, 2 lab hours)

Prerequisite: Admission to the Nuclear Medicine Technology program and DMIN 2200 or consent of instructor.

DMIN 2211

Clinical Nuclear Medicine II

3 Credit Hours

Second 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. (24 clinical hours)

Prerequisite: Admission to the Nuclear Medicine Technology program and DMIN 1111 or consent of instructor.

DMIN 2212

Clinical Nuclear Medicine III

3 Credit Hours

Third 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. (24 clinical hours)

Prerequisite: Admission to the Nuclear Medicine Technology program and DMIN 2211 or consent of instructor.

DMIN 2221

PET/CT

3 Credit Hours

Physics, instrumentation and radiochemistry of PET (Positron Emission Tomography). Quality assurance of the PET and PET-CT (computerized tomography) instrumentation. Physiological, biochemical and pharmacological mechanisms of PET radiopharmaceuticals. Radiation safety and protection. Clinical PET imaging in neurological, cardiovascular, oncological and psychiatric disorders. Image reconstruction and display protocols. Case study presentations and journal review. (2 lecture hours, 2 lab hours)

Prerequisite: Admission to the Nuclear Medicine Technology program and DMIN 2202 and DMIN 2211 or consent of instructor.

DMIN 2222

Nuclear Medicine Review Seminar

1 Credit Hour

Prepares students for the Nuclear Medicine Technology Certification Board Examination (NMTCB). Test taking tips and practice exams. Practical application of patient care, human anatomy and physiology, pathology, radiation biology, radiation protection, physics, instrumentation, radiopharmacy, in vivo and in vitro procedures, Diagnostic and Therapeutic Nuclear Medicine procedures, Positron Emission Tomography. Students will complete a registry review project and a mock registry. (1 lecture hour)

Prerequisite: Admission to the Nuclear Medicine Technology program and DMIN 2202 and DMIN 2211 or consent of instructor.

DMIN 2500

Sectional Anatomy and Pathology for Ct

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. (3 lecture hours)

Prerequisite: Admission to the Computed Tomography Program is required or consent of instructor.

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. (3 lecture hours)

Prerequisite: Admission to the Computed Tomography Program is required or consent of instructor.

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. (2 lecture hours, 2 lab hours)

Prerequisite: DMIN 2500 with a grade of C or better, or equivalent and DMIN 2501 with a grade of C or better, or equivalent. Admission to the Computed Tomography Program is required or consent of instructor.

DMIN 2503

Radiation Safety/Quality 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. (2 lecture hours, 2 lab hours)

Prerequisite: DMIN 2500 with a grade of C or better, or equivalent and DMIN 2501 with a grade of C or better, or equivalent.

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. (6 lab hours)

Prerequisite: Admission to the Computed Tomography Program is required or consent of instructor.

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. (6 lab hours)

Prerequisite: DMIN 2511 with a grade of C or better, or equivalent.

DMIN 2860***Internship (Career & Technical Ed)***

1-4 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. (5 to 20 lab hours)

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.

DMIN 2865***Internship Advanced (Career & Tech Ed)***

1-4 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. (5 to 20 lab hours)

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.