

NUCLEAR MEDICINE TECHNOLOGY (NUCM)

NUCM 401 Administration Management Methods and Hospital Orientation (1)

Discusses the basis of Nuclear Department administration, management, and communication issues. Career skills are developed through student participation and seminars. Professional approach, patient care guidelines, medical ethics, communication skills, and medicolegal considerations are discussed. The interview process, resume preparation, and other related skills are also developed.

NUCM 402 Clinical Corr. Anat/Phys/Path (3)

Is a lecture series of topics of current interest selected and presented by nuclear medicine physicians. Emphasis is on clinical interpretation of organ systems pathophysiology as reviewed by the practicing nuclear medicine physician.

NUCM 403 Diagnostic Nuclear Imaging Clinical Practicum I (4)

Supervised clinical education that gives the student the opportunity to perform a variety of patient procedures on both SPECT, SPECT/CT, PET and PET/CT imaging systems for all diagnostic, therapeutic, non-imaging in-vivo and in-vitro procedures. Clinical competencies developed in patient care, positioning techniques, analyzing images, and the selection of imaging parameters and collimators. Knowledge of integrated computer systems designed for use with clinical gamma cameras, Single Photon Emission Computed Tomography (SPECT), SPECT/CT, Positron Emission Tomography (PET), and PET/CT images. The clinical practicum is designed to promote independent critical thinking, balanced responsibility, organization and accountability in the student. Students will demonstrate competence in all procedures presented.

NUCM 404 Diagnostic Nuclear Imaging Clinical Practicum II (4)

A continuation of NUCM 403. Supervised clinical education that gives the student the opportunity to perform a variety of patient procedures on both SPECT, SPECT/CT, PET and PET/CT imaging systems for all diagnostic, therapeutic, non-imaging in-vivo and in-vitro procedures. Clinical competencies developed in patient care, positioning techniques, analyzing images, and the selection of imaging parameters and collimators. Knowledge of integrated computer systems designed for use with clinical gamma cameras, Single Photon Emission Computed Tomography (SPECT), SPECT/CT, Positron Emission Tomography (PET), and PET/CT images. The clinical practicum is designed to promote independent critical thinking, balanced responsibility, organization and accountability in the student. Students will demonstrate competence in all procedures presented.

NUCM 405 Radiation Protect/RS Practicum (2)

This practicum addresses the principles of Radiation Detection which include the design and function of instrumentation used in the nuclear medicine laboratory. Principles and theory of radiation measurement, event counting activity, exposure, absorbed energy dose, biological effects, unit analysis, absolute and comparative counting, detector types, scintillation detectors, pulse height spectra, detection efficiency, resolving time and statistics are discussed.

NUCM 406 Management/Methods Patient Care I (3)

Skills in problem solving, critical-thinking, and decision-making are developed as well as oral and written communication skills. Career skills are enhanced through the interview process, resume writing, and administrative duties including; budgeting, medical and legal considerations and political issues affecting health care. Special emphasis is placed on research methods, medical law and ethics, and scheduling guidelines. Focus on basic measures necessary to provide quality patient care. Basic principles of record keeping and maintaining confidentiality of information are explained.

NUCM 407 Nuclear Physics and Instrumentation (3)

Addresses basic facts and physical principles associated with the atom, nucleus and quantum physics related to radioactive decay. The theory of electron shells and its relation to the properties of the elements and the production of characteristic X and gamma rays, alpha electrons and Bremsstrahlung; the nucleus and modes of nuclear decay; radiation dosimetry, interaction with ionizing radiation with matter, and performance characteristics of gamma cameras are discussed.

NUCM 408 Management/Methods Patient Care II (1)

A continuation of NUCM 406. Skills in problem solving, critical-thinking, and decision-making are developed as well as oral and written communication skills. Career skills are enhanced through the interview process, resume writing, and administrative duties including; budgeting, medical and legal considerations and political issues affecting health care. Special emphasis is placed on research methods, medical law and ethics, and scheduling guidelines. Focus on basic measures necessary to provide quality patient care. Basic principles of record keeping and maintaining confidentiality of information are explained.

NUCM 409 Applied Technology and Basic Mathematics (1)

Explores mathematics as applied to nuclear medicine technology, radiation unit conversion, radioactive dose calculations, determination of specific activity and solution concentration in radioimmunoassay and imaging laboratory. The topic is a continuation of NUCM 407.

NUCM 410 Clinical Nuclear Medicine Procedures I (3)

Emphasis on theory and techniques of clinical procedures used in nuclear medicine imaging. Areas emphasized include patient care, developing acquisition parameters, imaging techniques, radionuclide identification, energies, half-lives, and principles of radionuclides in imaging and non-imaging procedures. Students will continue to develop an increased degree of competence in their performance of the skills related to critical thinking and problem solving.

NUCM 411 Clinical Nuclear Medicine Procedures II (3)

A continuation of NUCM 410. Emphasis on theory and techniques of clinical procedures used in nuclear medicine imaging. Areas emphasized include patient care, developing acquisition parameters, imaging techniques, radionuclide identification, energies, half-lives, and principles of radionuclides in imaging and non-imaging procedures. Students will continue to develop an increased degree of competence in their performance of the skills related to critical thinking and problem solving.

NUCM 412 Clinical Nuclear Practicum I (5)

Is a supervised clinical practice to develop advanced static dynamic and SPECT organ imaging techniques to produce planar and three-dimensional images of pathophysiological processes. Fundamental skills of patient care - preparation and positioning; radiopharmaceutical dose preparation and administration; film critique, image identification and evaluation; scintillation camera use and collimator selection; anatomy and physiology related radiopharmaceutical localization; patient scheduling and record keeping are addressed.

NUCM 413 Clinical Nuclear Practicum II (5)

Is a continuation of NUCM 412.

Restrictions: Enrollment is limited to students with a major in Nuclear Medicine Technology.

NUCM 414 Radiation Safety/Protection (3)

Supervised practice and procedures for the receipt, handling, transporting, storage, usage, record keeping, disposal and decontamination of radioactive materials. Emphasis on licensing and regulations set forth by local, state and federal agencies. Academic and clinical instruction to provide the student with radiation safety techniques to minimize exposure to themselves, the patient, public, fellow workers and themselves. Regulations regarding therapeutic dosages and follow-up procedures. Focus on practical mathematics in nuclear medicine including radiation unit conversion, dose conversion, dose calculation, determination of specific activity, decay, and half-life calculation, counting efficiency, and statistics.

NUCM 415 Radiopharmacy/Laboratory (2)

Discusses the chemical, physical and biological properties of radiopharmaceutical. Emphasis is given to radioactive properties, decay and half-life, tissue localization, production techniques, chemical impurities, generator systems, patient dose and preparation, regulatory agencies and S.I. units in radiopharmacy.

Restrictions: Students cannot enroll who have a major in Nuclear Medicine Technology.

NUCM 416 Nuclear Medical Quality Control Program (2)

Discusses elution of Mo/Tc generator, preparation and testing of radiopharmaceutical products as well as gamma camera uniformity, relative sensitivity and spatial linearity and resolution testing. The use of flood field and bar phantoms on in vitro imaging detectors in the nuclear medicine imaging laboratory.

Restrictions: Enrollment is limited to students with a major in Nuclear Medicine Technology.

NUCM 417 Radionuclide Chemistry/Radiopharmacy (3)

The chemical, physical and biological properties of radiopharmaceuticals used in diagnosis and therapy. Emphasis is given to the preparation, calculation, identification, administration, and disposal of radiopharmaceuticals. Performance of all radionuclide quality control and quality assurance procedures. Principles of decay and half-life, tissue localization, chemical impurities, generator systems, dose preparation and techniques of good laboratory practices and cell labeling.

NUCM 418 Clinical Procedures Review (2)

Explores classroom instruction with emphasis on theory and techniques of clinical procedures used in nuclear medicine including SPECT and PET imaging. The fundamental skills of patient care, radiopharmaceutical preparation, and administration are covered. Emphasis is also on computer processing techniques used in coordination with imaging procedures.

NUCM 419 Radiobiology (2)

Explores cellular and organ responses to the effect of ionizing radiation sources and radionuclides including units of exposure and dose and their harmful effects on biological systems. Methods of organ dose calculation and body distribution are also explained.

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NUCM 420 Gamma Cameras (1)

Consists of lectures and laboratory sessions relating to the gamma camera from a physics point of view, principles of gamma camera operation, methods of measuring and maintaining camera performance, and the theory and practice of acquiring tomographic studies are addressed.

NUCM 421 Radiation Physics/Instrumentation (3)

Theory and physical principles associated with atomic structure, nuclear and quantum physics related to radioactive decay. Properties of the elements and the production of characteristic x and gamma rays, alpha electrons and Bremsstrahlung. Instruction on the modes of decay, radiation dosimetry, and interaction of ionizing radiation with matter. Basic physics, instrumentation, and radiochemistry of SPECT (Single Photon Emission Computed Tomography), SPECT/CT, Positron Emission Tomography (PET), and PET/CT.

NUCM 422 Medical Terminology for Nuclear Medicine (1)

Consists of a study of root words, prefixes, and suffixes of medical vocabulary. Also included are medical abbreviations and applicable symbols. A combination of learning exercises and chapter quizzes are utilized. Emphasis is on application of terminology through the use of chapter objectives, learning exercises, and critical thinking exercises. As an independent study, students may choose to progress more rapidly than the assignment schedule outlines.

NUCM 423 Principles of Radioassay (2)

Addresses the theory and principles which underlie the application and practice of immunoassays. Discussed are fundamental principles, methodology, production of poly- and monoclonal antibodies and methods for good laboratory practice and quality assurance. The medical significance of the assays and correlation with physiology and clinical status of the patient is emphasized.

Restrictions: Students cannot enroll who have a major in Nuclear Medicine Technology.

NUCM 424 Radiation Detection/Instrumentation (3)

Evaluation, maintenance and function of instrumentation used in imaging and in the laboratory. Principles and theory of PET/CT and scintillation camera operation and performance. Radiation measurement, event counting activity, pulse height spectra, detection efficiency, resolving time and statistics. Flood field and bar phantom use for assessing camera uniformity, relative sensitivity, spatial linearity and resolution testing. Quality assurance procedures for the PET scanner include radial, tangential and axial resolution, sensitivity, linearity, uniformity, attenuation accuracy, scatter determination and dead time corrections. Knowledge of the operations and maintenance of computer hardware and software. Emphasis on data collection, analysis and processing used in clinical imaging. Application of computer devices and memory usage. Emphasis on SPECT, SPECT/CT, PET and PET/CT quality control procedures.

NUCM 426 Computed Tomography/Cross Sectional Anatomy (2)

Introduction to the fundamental concepts and principles of computed technology and its role in medical imaging. Specific topics include physics & instrumentation of CT scanning, image production, and cross-sectional anatomy of the head, neck, thorax, abdomen, and pelvis. Emphasis placed on patient considerations, patient safety, and radiation protection.

NUCM 427 Computer Applications in Nuclear Medicine (3)

Addresses the clinical application of "hardware and software" processing used in the clinical medicine laboratory. Emphasis is on the basic definition of computer concepts such as devices, memory usage, and SPECT imaging. Introduction to the computer processing of digital images is offered.

Restrictions: Enrollment is limited to students with a major in Nuclear Medicine Technology.

NUCM 429 Radiation Biology (1)

Knowledge of cell structure and function as a basis for understanding cellular and organ responses to the effects of ionizing radiation, radionuclides and radiation oncology. Understanding units of exposure, organ dose calculation and body distribution.

NUCM 430 Clinical Correlation/Pathology (2)

Focus on the study of the structure and function of human cells, tissues, organs and systems. Clinical interpretation of organ systems with emphasis on immunology, and anatomy and physiology, which will provide a basis for understanding abnormal or pathological conditions as applied to nuclear medicine. Causes, symptoms, and treatments of disease are discussed as well as its effect on the images. In addition, the student is scheduled to observe the interpretation of images with the physician staff.

NUCM 499 Independent Study (1-3)

Requires that oral and written communication skills be developed as used by the nuclear medicine technologist. Emphasis is on clinical articles, laboratory procedures, special patient case history, and scientific research projects.

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