

Nuclear Medicine Technology

Department of Biotechnical and Clinical Laboratory Sciences

Nuclear Medicine
School of Medicine and Biomedical Sciences
105 Parker Hall
South Campus
Buffalo, NY 14214-3007

PH: 716.838.5889, ext. 115

Fax: 716.838.4918

Web: medicine.buffalo.edu/education/undergraduate.html

Overview

The Nuclear Medicine Technology program (BS) is offered by the Department of Biotechnical and Clinical Laboratory Sciences and is supported in part by the Department of Nuclear Medicine, School of Medicine and Biomedical Sciences. Please direct inquiries to Elpida Crawford.

Nuclear medicine technology is a health-related profession concerned with use of radioactive materials for diagnostic, therapeutic, and research purposes. Nuclear medicine is one of the diagnostic imaging modalities. Although the scope of nuclear medicine technology is not limited to organ imaging, that is one of the major aspects of the work. It is a highly technical profession with a lot of patient interaction. The nuclear medicine technologist works very closely with the nuclear medicine physician, radiologist or cardiologist. There is a demand for well-trained nuclear medicine technologists. Jobs are available in hospitals, outpatient facilities and clinics and commercial equipment and radiopharmaceutical companies.

The Nuclear Medicine Technology program prepares students for entry-level positions as staff technologists. Each student receives a solid foundation in all nuclear medicine procedures. Students who complete the program are eligible to take national certification examinations in nuclear medicine technology.

About our Degrees

NMT is one of the diagnostic imaging modalities. It is not x-ray, CT or CAT scanning, magnetic resonance imaging or ultrasound. Nuclear medicine procedures use small amounts of radioactive materials to study the function of the internal organs. A smaller aspect of the work is radionuclide therapy. The nuclear medicine technologist is a highly skilled individual who, in conjunction with the physician, either directs or participates in the daily operation of the nuclear medicine department. The responsibilities are varied but include three major roles: technical skills, patient care, and administrative functions.

The University at Buffalo Nuclear Medicine Technology Program prepares entry-level technologists through an interdisciplinary curriculum of basic science study and clinical education. In the freshman and sophomore year, students take math and science prerequisite courses for NMT and general education courses. In the junior year, students take the basic science of nuclear medicine courses (eleven courses totaling 27 credit hours). Students have clinical internships and nuclear medicine courses in the senior year.

Twelve to fifteen students are accepted into the program (as juniors) each year.

Acceptance Criteria

Applications to the program should be made before February 15 in the sophomore year. A minimum GPA of 2.0 overall and a minimum GPA of 2.5 in prerequisite science and mathematics courses is necessary for consideration for admission into the program. Every applicant who can feasibly complete the prerequisite courses prior to admission and has the minimum GPA is invited for an interview. Selection is based on prerequisite GPA and information gathered through the interview process. Decisions regarding acceptance are made prior to the end of the spring semester.

Acceptance Information

Number of applicants/year: 25+

Number of accepted majors/year: 12-15

Total number of majors currently enrolled: 24

Degree Requirements

Please see [Degrees and Policies](#).

Nuclear Medicine Technology

About our Courses

Most NMT courses are reserved for majors. Students interested in learning more about the field of nuclear medicine are encouraged to take [NMD 210](#) Introduction to NMT, which is offered in the fall semester.

For course descriptions, please see [Courses](#).

About our Faculty

The faculty of the department of nuclear medicine and the NMT program come from diverse backgrounds. The faculty include physicists, chemists, pharmacists, radiopharmacists, physicians, computer scientists and technologists.

See a list of our [Undergraduate Faculty](#).

About our Facilities

The nuclear medicine technology program utilizes the following sites for clinical training experience:

Buffalo Cardiology and Pulmonary Associates
Buffalo Medical Group
CRS Nuclear
Erie County Medical Center
Kaleida Health's Buffalo General Hospital, Women's and Children's Hospital of Buffalo, and Millard Fillmore Suburban Hospitals
Kenmore Mercy Hospital
Mercy Hospital
Merhige's Cardiology Clinic
Mount Saint Mary's Hospital
Roswell Park Cancer Institute
St. Joseph Hospital
Sisters of Charity Hospital
Suburban Cardiology
Strong Memorial Hospital/Rochester, NY
VA Western New York Healthcare System
Windsong Radiology, PC

The university's department of nuclear medicine operates a positron emission tomography (PET) center. PET, a unique aspect of nuclear medicine, is used for both research and diagnostic clinical studies. The PET center includes a large cyclotron facility for the production of PET radiopharmaceuticals located in Parker Hall, and two PET scanners: one at the VA, and one at a medical office in Amherst. Two cardiology offices in the greater Buffalo region with PET scanners are clinical training sites.

Acceptance Information

Freshman Admission Policy.

Freshman students who enter the university as declared nuclear medicine technology majors are admitted into the program on a conditional basis. A seat in NMT for these students is guaranteed if they meet the 3 conditions listed: (1) the student makes satisfactory progress towards the completion of all lower division math and science prerequisite courses in the first 2 years, (2) attains a grade of C or better in all required math and science prerequisite courses completed, and (3) the student attain a minimum math and science prerequisite GPA of 3.0. Students entering via the Freshman Admissions Policy must submit a Promotion to Professional Program Request form by February 15th of the sophomore year. All students that enter the NMT Program via the qualified freshman admissions policy will also be interviewed in March of the sophomore year.

General Admission.

Students accepted into nuclear medicine technology as freshmen who do not meet the three conditions listed above, as well as students wishing to change their major, are considered for placement in the program through the regular admission process. All students with a minimum prerequisite course GPA of 2.5 are encouraged to apply. Applications are made online through the School of Medicine and Biomedical Sciences website: <http://medicine.buffalo.edu>.

All students must complete all required prerequisite courses prior to the fall semester in which they start taking upper division NMT professional sequence courses.

Nuclear Medicine Technology

Transfer Policy

Transfer students must be accepted by the university and meet the program admission criteria. Prerequisite courses taken at another school must be equivalent in content. Questions regarding prerequisite course equivalency should be directed to the program director.

Transfer applicants must complete their university application (which includes sending official transcripts of the fall semester work) prior to January 15.

Extracurricular Activities

See the [UB Student Association](#).

Complimentary Programs and Courses

Students that have time in their schedules are encouraged to minor in [computer science](#), or [chemistry](#); however, having a minor is not a requirement either for graduation or for employment after graduation. [Business administration](#) courses are also recommended.

Practical Experience and Special Academic Opportunities

Internship

Students spend four days a week both semesters of the senior year in clinical rotations. Each student has two 10-week rotations in a hospital nuclear medicine department and a series of short rotations, which include but are not limited to, Radiopharmacy, Children's Hospital, several sites with Positron Emission Tomography, Roswell Park Cancer Institute, and a cardiology office that performs nuclear cardiology. All clinical sites used by the program have state of the art equipment.

Career Information and Further Study

There are employment opportunities in New York State and across the U.S. Starting salaries are excellent. The majority of positions are in hospitals, physician's offices, and outpatient imaging centers. Many UB Program graduates have moved into supervisory positions relatively quickly. Nuclear medicine technologists can branch into health physics, or work for commercial companies in sales, research, or education. Program graduates may also pursue graduate or professional degrees.

Degrees Offered

Undergraduate: BS

Links to Further Information About this Program

- [Undergraduate Catalog](#)
- [Undergraduate Admissions](#)
- [Graduate Admissions](#)
- [Department of Biotechnical and Clinical Laboratory Sciences](#)
- [School of Medicine and Biomedical Sciences](#)

Nuclear Medicine Technology - B.S.

Acceptance Criteria

Applications to the program should be made before February 15 in the sophomore year. A minimum GPA of 2.0 overall and a minimum GPA of 2.5 in prerequisite science and mathematics courses is necessary for consideration for admission into the program. Every applicant who

Nuclear Medicine Technology

completes the prerequisite courses prior to admission and has the minimum GPA is invited for an interview. Selection is based on GPA and information gathered through the interview process. Decisions regarding acceptance are made prior to the end of the spring semester.

Prerequisite Courses

[ANA 113](#) Human Anatomy
[BIO 200](#) Evolutionary Biology
[BIO 201](#) Cell Biology
[CHE 101](#) General Chemistry
[CHE 102](#) General Chemistry
[PGY 300](#) Human Physiology
[PHY 101/PHY 151](#) College Physics I/Lab
[STA 119](#) Statistical Methods (may substitute [PSY 207](#) Psychological Statistics)

Required Courses

[NMD 305](#) Immunology For NMT
[NMD 324](#) Nuclear Medicine Technology Lab
[NMD 325](#) Radiation Safety for NMT
[NMD 350](#) X-Ray and CT Physics
[NMD 427](#) Radiation Biology
[NMD 340](#) Patient Care and Management in NMT
[NMD 399](#) InVivo Studies I
[NMD 400](#) InVivo Studies II
[NMD 401](#) InVivo Studies III
[NMD 415](#) Radionuclide Therapy
[NMD 416](#) Departmental Management for NMT
[NMD 421](#) Basic Radiation Science
[NMD 424](#) Nuclear Instrumentation
[NMD 425](#) Clinical Conference A
[NMD 426](#) Clinical Conference B
[NMD 451](#) Radiopharmacy
[NMD 496](#) Clinical Rotation (repeatable for credit)

Summary

Total required credit hours for the major...94

See [Baccalaureate Degree Requirements](#) for general education and remaining university requirements.

Recommended Sequence of Program Requirements

FIRST YEAR

Fall [BIO 200](#), [CHE 101](#)
 Spring [BIO 201](#), [CHE 102](#)

SECOND YEAR

Fall [ANA 113](#), [PHY 101](#), [PHY 151](#); [CHE 201](#) (recommended), [NMD 210](#) (recommended)
 Spring [PGY 300](#), [STA 119](#) (may substitute [PSY 207](#)); [CHE 202](#) (recommended)

THIRD YEAR

Fall [NMD 305](#), [NMD 421](#), [NMD 325](#), [NMD 399](#), [NMD 427](#)
 Spring [NMD 324](#), [NMD 340](#), [NMD 350](#), [NMD 424](#), [NMD 451](#), [NMD 400](#)

FOURTH YEAR

Fall [NMD 401](#), [NMD 425](#), [NMD 496](#)
 Spring [NMD 415](#), [NMD 416](#), [NMD 426](#), [NMD 496](#)

NMD 113: Human Anatomy

Credits: 4

Semester(s): Fall

Type: LEC/LAB

Examines the structure and function of organ systems in the human body. Introduces relevant medical terminology.

NMD 210: Introduction to NMT

Nuclear Medicine Technology

Credits: 1
Semester(s): Fall
Type: SEM

Explores applications of nuclear medicine ,career opportunities and current topics within the NMT field. Includes a visit to clinical sites.

NMD 305: Immunology for NMT

Credits: 1
Semester(s): Fall
Type: LEC

Reviews basic immunology terminology and principles, including innate versus acquired immunity, antigens, immunogenicity, structural and biological properties of antibodies, antigen-antibody reactions, and tumor immunology.

NMD 324: Nuclear Medicine Technology Laboratory

Credits: 1
Semester(s): Spring
Pre-requisites: [NMD 421](#) Or [NMD 325](#)
Co-requisites: Student must register for NMD 324LAB and NMD 324REC in the same term.
Type: LAB

Compliments topics covered in [NMD 340](#), [NMD 350](#), [NMD 424](#), and [NMD 451](#). Preparation for senior year clinical rotation.

NMD 325: Radiation Safety for NMT

Credits: 2
Semester(s): Fall
Type: LEC/REC

Covers basic radiation safety for nuclear medicine, including history, license requirements, time/distance shielding, posting, personnel monitoring, required survey records, and misadministration prevention.

NMD 340: Patient Care and Management in NMT

Credits: 3
Semester(s): Spring
Type: LEC

Reviews the basic hospital organization, medical records, and patient-care skills required in nuclear medicine.

NMD 350: X-Ray and CT Physics

Credits: 2
Type: LEC

This course is designed for technologists that will work with hybrid equipment, i.e. the SPECT/CT and PET/CT systems. Covers the production of x-rays, the basic principles of x-ray computed tomography, CT camera design, factors affecting image quality, CT quality control, CT unit safety and dosimetry. Basic principles of MRI imaging will also be introduced.

NMD 399: Invivo Studies I

Credits: 3
Semester(s): Fall
Type: LEC

Involves clinical procedures of the following organ systems - skeletal, respiratory, gastro-intestinal, genitourinary, and endocrine. Focuses on indications, technical aspects, and the technologist's responsibilities.

NMD 400: Invivo Studies II

Credits: 1
Semester(s): Spring
Pre-requisites: [NMD 421](#) Or [NMD 399](#)
Co-requisites: Student must register for NMD 400LEC and NMD 400LAB in the same term
Type: LAB

Involves radionuclide procedures of the central nervous system and the heart. Focuses on indications, technical aspects, and the technologist's responsibilities. The lab is conducted off campus at a clinical site.

NMD 401: Invivo Studies III

Credits: 2
Semester(s): Fall
Pre-requisites: [NMD 424](#) Or [NMD 340](#) Or [NMD 400](#)
Type: LEC

Covers tumor imaging procedures, infrequently performed procedures, and positron emission tomography (PET) studies. Focuses on indications, technical aspects, and the technologist's responsibilities.

NMD 415: Radionuclide Therapy

Credits: 0
Semester(s): Spring
Pre-requisites: [NMD 324](#)
Type: LEC

Covers indications and procedures for all routine approved radionuclide therapies, as well as radiation exposure/protection for the general public from patients receiving these therapies.

NMD 416: Departmental Management for NMT

Credits: 0
Semester(s): Spring
Pre-requisites: [NMD 324](#)
Type: LEC

Helps students understand the roles and responsibilities of supervising technologists. Topics covered include quality assurance, hospital accreditation, accreditation specific to nuclear medicine, billing management, staff supervision, informed consent, liability, and malpractice.

NMD 421: Basic Radiation Science

Credits: 4
Type: LEC/LAB/REC

Nuclear Medicine Technology

Studies basic radiation physics, including atomic structure, radioactivity, properties of ionizing radiation, interaction with matter, and principles of basic radiation detection devices.

NMD 424: Nuclear Instrumentation

Credits: 3
Type: LEC

Examines operating principles of advanced radiation measuring and imaging devices, including sodium-iodide crystal detectors, gamma cameras, and PET Scanners. Also covers instrument quality control, digital imaging, acquisition and reconstruction methods, and causes of artifacts.

NMD 425: Clinical Conference a

Credits: 2
Semester(s): Fall
Type: SEM

Reviews case studies and journal articles, and demonstrates and discusses topics related to the in-vivo studies courses, professional issues and clinical rotations. Requires oral presentations.

NMD 426: Clinical Conference B

Credits: 2
Semester(s): Spring
Type: SEM

Reviews case studies and journal articles, and demonstrates and discusses topics related to the in-vivo studies courses and to Clinical Rotations. Requires oral presentations.

NMD 427: Radiation Biology for NMT

Credits: 2
Type: LEC

Emphasizes human radiation biology. Explores factors influencing radiation effects, tissue-sensitivity tolerance, clinical applications, radiation risk and regulatory issues in medicine and public health.

NMD 450: Clinical Computed Tomography

Credits: 4
Pre-requisites: [NMD 324](#) And [NMD 340](#) And [NMD 350](#) or
Permission of Instructor
Type: LAB

Provide practical experience with a variety of CT diagnostic procedures to prepare the student for the ARRT exam in computed tomography

NMD 451: Radiopharmacy

Credits: 2
Semester(s): Spring
Pre-requisites: [NMD 321](#) Or [NMD 325](#)
Type: LEC/REC

Covers the design, production, quality control, and regulatory

control of radiopharmaceuticals. Kit preparation considerations and dose calculations are also covered.

NMD 496: Clinical Rotation

Credits: 12
Semester(s): Fall, Spring
Pre-requisites: [NMD 324](#) Or [NMD 400](#)
Type: LAB

The content of this course is variable and therefore it is repeatable for credit. The [University Grade Repeat Policy](#) does not apply.

Provides practical experience in various clinical facilities; including static, dynamic, SPECT and PET imaging; in vivo functions studies; instrument operation-gamma cameras, dose calibrators, survey equipment, probe devices, PET scanners and other health physics, radiopharmaceutical preparation and nuclear cardiology.

NMD 498: Undergraduate Research

Credits: 1
Type: TUT

Students will collaborate with a faculty mentor on an ongoing research project or conduct an independent research project under faculty supervision. This project may relate to any aspect of nuclear medicine, including basic science of nuclear medicine or clinical practice.