

Nuclear Medicine and Molecular Imaging Sciences

Degree Offered	M.S.
Program Director	Amy Brady, M.A.Ed, CNMT
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Program Information

Program Mission

The mission of the Master of Science in Nuclear Medicine and Molecular Imaging Sciences (NMMIS) program in the School of Health Professions at the University of Alabama at Birmingham (UAB) is to provide comprehensive didactic and clinical educational experiences reflecting 21st century workforce demands that prepare graduates to be competent practitioners and innovative leaders within the nuclear medicine profession.

Admission Requirements

In addition to the general Graduate School admission requirements, applicants to the M.S. program must:

- Have any baccalaureate degree in biology, physics, chemistry, biomedical sciences, bioengineering, or a related degree from an accredited college or university, along with pre-requisite course requirements,
- Have a minimum undergraduate GPA of 3.0 (A= 4.0), computed from all undergraduate credits or from the last 60 semester hours of undergraduate course credit,
- Apply for admission to the UAB NMMIS Program,
- Complete a clinical observation and write a reflection on the observation,
- International students from non-English speaking countries are required to submit English proficiency scores (TOEFL/IELTS/ PTEA/Duolingo) that meet the Graduate School's minimum score requirements: TOEFL - 80; IELTS - 6.5; PTEA:- 53; IELA - 176 - Duolingo - 120. See other international admission requirements at <https://www.uab.edu/graduate/admissions/international-applicants/requirements>.

The completed application and observation form must be on file with the program office by February 15th for a priority interview to be granted. All eligible applicants will be interviewed in March for admission decisions in early April. Eligible late applicants will be considered on a space-available basis up to August 1st.

If accepted, students must complete the UAB medical history questionnaire and physical, provide proof of required immunizations, and receive satisfactory screening by the UAB Medical Center Student Health Service before enrollment. A background check and drug screen will be required at program admission and prior to clinical placement.

Persons with a baccalaureate degree may be eligible to register for courses as non-degree seeking graduate students before acceptance

into the M.S. program. If a non-degree seeking graduate student meets the M.S. program admission requirements, up to 12 semester hours of approved non-degree graduate coursework may be accepted for the M.S. degree. Admission of a student to any course as a non-degree student does not constitute admission to the M.S. degree program.

Early Acceptance

Early Acceptance Programs are designed for academically superior high-school students. Early Acceptance Programs allow high achieving students to be admitted to the Master of Science in Nuclear Medicine and Molecular Imaging Sciences program at the same time they are admitted to an undergraduate program.

Eligible students are required to maintain a 3.5 undergraduate GPA and complete the following pre-requisite courses: MA 106, CH 105-CH 108 or CH 115-CH 118, BY 216 or NMT 320, BY 115, BY 116, MA 180, PH 201, PH 202, HCM 350, HCM 330, CDS 425

Essential Functions

Essential functions are physical abilities, mental abilities, skills, attitudes, and behaviors the students must show evidence of to be able perform at each stage of their didactic and clinical education. A list of essential functions is on file in the NMMIS Program Office and in the NMMIS Student Handbook.

If you have a disability, but have not contacted Disability Support Services (DSS), please call (205) 934-4205 (voice) or (205) 934-4248 (TDD), or visit the DSS offices at 1701 9th Avenue South. Additional information is available at <http://www.uab.edu/students/disability/>.

Accreditation and Certification

Nuclear Medicine and Molecular Imaging Sciences academic programs are accredited by the Joint Review Committee on Nuclear Medicine Technology Programs (JRCNMT). Program graduates are eligible to apply for the certification examination offered by both the Nuclear Medicine Technology Certification Board (NMTCB) or the American Registry of Radiological Technologists (ARRT).

JRCNMT

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Edmond, OK 73003

Phone: 405.285.0546

Fax: 405.285.0579

jrcnmt@coxinet.net

<http://www.jrcnmt.org/>

NMTCB 3558 Habersham at Northlake Building I Tucker, GA 30084
Phone: 404.315.1739 Fax: 404.315.6502 board@nmtcb.org <http://www.nmtcb.org/root/default.php>

ARRT 1255 Northland Drive St. Paul, MN 55120 Phone: 651.687.0048
Fax: 651.687.3299 <https://www.arrt.org/>

Additional Information

Entry Term	Fall Semester
Deadline for All Application Materials to be in the Graduate School Office	First Consideration: February 15th; Space available basis after first consideration, up to August 1st
Entrance Tests	For international applicants from non-English speaking countries, minimum score requirements: TOEFL - 80; IELTS - 6.5; PTEA:- 53; IELA - 176 - Duolingo - 120.
Comments	Scholarship money is available, but is very limited; transcript evaluation by WES is required for applicants with foreign university degrees

Contact Information

For detailed information, contact the Department of Clinical and Diagnostic Sciences, Nuclear Medicine and Molecular Imaging Sciences Program, UAB School of Health Professions, SHPB 446, 1716 9th Avenue South, Birmingham, Alabama 35294-1212.
Telephone 205-934-3209.
E-mail AskCDS@uab.edu

Master of Science in Nuclear Medicine and Molecular Imaging Sciences

The Master of Science in Nuclear Medicine and Molecular Imaging Sciences follows a Core/Track model which consists of a total of 64 semester hours. 39 semester hours are taken in the core Nuclear Medicine and Molecular Imaging Sciences courses. The remaining 25 semester hours are taken on one of three specialty tracks (Imaging Specialists, Radiation Safety, or Research).

Requirements	Hours
CDS 505 Professional Skills Development	1
NMT 604 Introduction to Nuclear Medicine, Management, Patient Care & Lab	2
NMT 605 Cross-Sectional Anatomy	2
NMT 620 Nuclear Medicine Physics, Instrumentation, and Lab	4
NMT 625 CT Physics and Instrumentation	2
NMT 631 Nuclear Medicine Anatomy & Physiology - Procedures I	4
NMT 632 Nuclear Medicine Anatomy & Physiology - Procedures II	1
NMT 641 Regulations, Radiation Protection/Biology and Lab	4
NMT 653 Research Methodology and Publication Analysis	2
NMT 660 Radiopharmacy, Pharmacology & Lab	4
NMT 691 NMT Clinical Practice	5
NMT 692 NMT and CT Clinical Practice	7
NMT 696 Seminar and Registry Review	1
Total Hours	39

Imaging Specialist Track

Requirements	Hours
NMT 624 Physics/Instrumentation of Nuclear Magnetic Resonance	2
NMT 633 Computed Tomography Procedures	2
NMT 634 MRI Scanning and Sequence	2
NMT 673 Analysis Methodology & Software Tools for Molecular Imaging in Nuclear Medicine	1

NMT 692	NMT and CT Clinical Practice	7
NMT 694	Computed Tomography Clinical Practice	7
NMT 698	Non-Thesis Research	4
Total Hours		25

Radiation Safety Track

Requirements	Hours
MHP 651 Advanced Radiation Biology	3
MHP 691 Supervised Practice	9
MHP 611 Physics of Diagnostic Imaging	3
NMT 691 NMT Clinical Practice	6
NMT 698 Non-Thesis Research	4
Total Hours	25

Research Track

Requirements	Hours
NMT 697 Journal Club in Nuclear Medicine and Molecular Imaging Sciences will be taken two semesters	2
NMT 697 Journal Club in Nuclear Medicine and Molecular Imaging Sciences	
MHP 651 Advanced Radiation Biology	3
NMT 698 Non-Thesis Research	7
NMT 699 Thesis Research	10
BST 603 Introductory Biostatistics for Graduate Biomedical Sciences	3
Total Hours	25

Courses

NMT 525. First Aid and Healthcare Provider CPR and AED. 1 Hour.

Knowledge and skills needed to perform basic first aid and CPR procedures for adult, child and infant victims according to the American Heart Association (AHA) Standards.

NMT 540. Physics in Biomedical Sciences. 3 Hours.

Physical concepts used in biology, human anatomy, physiology, as well as in medical diagnosis and treatment. Topics include mechanics, fluids, waves, heat, sound, optics, electricity & magnetism. Advanced topics include radiation, X-rays, MRI, and nuclear medicine.

NMT 601. Introduction to MRI Clinic. 2 Hours.

Overview of patient management, MRI screening and safety procedures, quality assurance procedures and FDA guidelines.

NMT 602. Introduction to Nuclear Medicine, Patient Care & Communication Skills. 3 Hours.

Overview of professional organizations and nuclear medicine; hospital organization; medical terminology; medical records; communication skills, health law and medical ethics; basic patient care theory.

NMT 604. Introduction to Nuclear Medicine, Management, Patient Care & Lab. 2 Hours.

Overview of professional organizations and nuclear medicine; hospital organization; medical terminology; medical records; introduction to other aspects of nuclear medicine technology including management, communication skills, health law and medical ethics; basic patient care theory and techniques including standard precautions, infection control, vital signs, venipuncture, patient transfer techniques, immobilization techniques, aseptic and non-aseptic techniques, oxygen administration, and medical emergencies which are required for nuclear medicine students prior to entering clinical training.

NMT 605. Cross-Sectional Anatomy. 2 Hours.

Integration of the knowledge of gross anatomy with the identification and location of structures in cross-sectional images. Computed Tomography (CT) and Magnetic Resonance (MR).

NMT 610. Medical Radiation Physics. 4 Hours.

Overview of basic medical radiation physics concepts and experiments.

NMT 620. Nuclear Medicine Physics, Instrumentation, and Lab. 4 Hours.

Principles and applications of nuclear medicine physics and instrumentation.

Prerequisites: MA 180 [Min Grade: C] and PH 201 [Min Grade: C] and PH 202 [Min Grade: C]

NMT 621. Nuclear Medicine Instrumentation I. 4 Hours.

Theory and experiments on radiation detection instrumentation; calibration; maintenance standards; practical uses of gaseous detectors, scintillation detectors, and multichannel analyzers; quality assurance testing for nuclear medicine instrumentation including GM detectors, ionization chambers and scintillation detectors.

NMT 623. CT Instrumentation. 3 Hours.

Theoretical principles of Computed Tomography (CT); CT instrumentation, data acquisition, data processing, and image quality.

Prerequisites: NMT 605 [Min Grade: C]

NMT 624. Physics/Instrumentation of Nuclear Magnetic Resonance. 2 Hours.

Fundamental physical principles of nuclear magnetic resonance, including structure of atom, concept of resonance, Larmor frequency, gyromagnetic ratio, T1 and T2 and methods of generating magnetic fields.

NMT 625. CT Physics and Instrumentation. 2 Hours.

Provide theoretical principles of Computed Tomography (CT); CT instrumentation, physics, data, acquisition, data processing and image quality.

NMT 631. Nuclear Medicine Anatomy & Physiology - Procedures I. 4 Hours.

Study of the utilization of nuclear medicine procedures including skeletal, respiratory, endocrine, gastrointestinal and genitourinary systems.

Anatomy and relevant concepts in physiology are reviewed and applied to each procedure.

Prerequisites: NMT 601 [Min Grade: C]

NMT 632. Nuclear Medicine Anatomy & Physiology - Procedures II. 1 Hour.

Study of the utilization of nuclear medicine procedures including nuclear cardiology, oncology, central nervous and hematopoietic systems and applications of positron emission tomography. Anatomy and relevant concepts in physiology are reviewed and applied to each procedure.

Prerequisites: NMT 631 [Min Grade: C]

NMT 633. Computed Tomography Procedures. 2 Hours.

Overview of CT positioning criteria, specific selections, and options in protocols. Understanding concepts in advanced CT including interventional imaging, positron emission tomography and special procedures.

NMT 634. MRI Scanning and Sequence. 2 Hours.

Overview of basic MRI theory; imaging sequences, parameter optimizations, and imaging procedures, flow imaging, and MR spectroscopy.

Prerequisites: NMT 624 [Min Grade: C]

NMT 641. Regulations, Radiation Protection/Biology and Lab. 4 Hours.

Overview of principles and methods of radiation protection, radiation biology and ionizing radiation regulations.

NMT 653. Research Methodology and Publication Analysis. 2 Hours.

Perform scientific research, critically evaluate scientific literature, and write an abstract and scientific poster on a topic relevant to nuclear medicine.

Prerequisites: CDS 610 [Min Grade: C]

NMT 660. Radiopharmacy, Pharmacology & Lab. 4 Hours.

Overview of fundamentals of radiopharmacy and experiments including radionuclide generator design, elution and operation, labeling and quality control of Tc-99m labeled compounds, unit dose preparation; radiopharmaceutical design, IND process, MIRD, contrast media and pharmacology.

NMT 673. Analysis Methodology & Software Tools for Molecular Imaging in Nuclear Medicine. 1 Hour.

Discussion of various analysis methodologies and software tools used for molecular imaging applications and research in nuclear medicine sciences.

NMT 675. Special Topics in Nuclear Medicine Technology. 1-4 Hour.

Faculty-led exploration of current topics and issues in nuclear medicine technology.

NMT 691. NMT Clinical Practice. 3-9 Hours.

Directed clinical practice: in vivo procedures; instrumentation quality control; radiopharmacy; applied radiation safety procedures.

NMT 692. NMT and CT Clinical Practice. 7 Hours.

Clinical experience providing the opportunity to observe, work, and train to become a Nuclear Medicine Technologist in a clinical setting.

Prerequisites: NMT 691 [Min Grade: C]

NMT 694. Computed Tomography Clinical Practice. 1-10 Hour.

Directed clinical practice: CT instrumentation quality control; applied application of CT procedures.

Prerequisites: NMT 605 [Min Grade: C] and NMT 623 [Min Grade: C] and NMT 633 [Min Grade: C]

NMT 695. MRI Clinical Practice. 10 Hours.

Directed clinical practice: MRI instrumentation quality control; applied application of MRI procedures.

Prerequisites: NMT 602 [Min Grade: C] and NMT 605 [Min Grade: C] and NMT 624 [Min Grade: C] and NMT 634 [Min Grade: C]

NMT 696. Seminar and Registry Review. 1 Hour.

Ethics, healthcare disparities and costs associated with selected disease conditions; board exam review.

NMT 697. Journal Club in Nuclear Medicine and Molecular Imaging Sciences. 1 Hour.

Analysis of primary scientific literature in the field of nuclear medicine and molecular imaging sciences.

NMT 698. Non-Thesis Research. 1-10 Hour.

Directed research for a non-thesis master of science degree project.

NMT 699. Thesis Research. 1-10 Hour.

Original research in nuclear medicine technology and interpretation of results. Demonstrates student's acquaintance with literature of field and competency in proper selection and execution of research methodology.

Prerequisites: GAC M