Nuclear Medicine and Molecular Imaging Sciences

Degree Offered	M.S.
Program Director	Amy Brady, M.A.Ed, CNMT
Phone	(205) 934-1785
E-Mail	amybrady@uab.edu
Website	https://www.uab.edu/shp/cds/nmmis

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:

- Hold a baccalaureate 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, see all international admission requirements at https://www.uab.edu/graduate/admissions/international-applicants.

The completed application and observation form must be on file with the program office. All eligible applicants will be interviewed. 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

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
2000 W. Danforth Road
Suite 130, #203
Edmond, OK 73003
Phone: 405.285.0546
Fax: 405.285.0579
Email: 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
Email: board@nmtcb.org
https://www.nmtcb.org/

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
Deadline for All Application Materials to be in the Graduate School Office:	First Consideration: December 1; Space available basis after first consideration, up to August 1
International Applicants:	https://www.uab.edu/gradadmissions/apply/international-applicants

Contact Information

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 via one of three specialty tracks (Imaging Specialist, Radiation Safety Officer, or Research).

NOTE: You must make a decision to follow one of the three tracks upon program acceptance. You may not move between tracks once your decision is official.

Imaging Specialist Track - Plan II

Requirements		Hours
Core Courses		
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	2
NMT 641	Regulations, Radiation Protection/Biology and Lab	4
NMT 653	Research Methodology and Publication Analysis	2
NMT 660	Radiopharmacy, Pharmacology & Lab	4
NMT 696	Seminar and Registry Review	2
Clinical Practice		**11**
NMT 691	NMT Clinical Practice	
Imaging Specialist Track Courses		
NMT 624	Physics/Instrumentation of Nuclear Magnetic Resonance	2
NMT 633	Computed Tomography Procedures	2
NMT 634	MRI Scanning and Sequence	2
NMT 692	NMT and CT Clinical Practice	7
NMT 694	Computed Tomography Clinical Practice	7
or NMT 695	MRI Clinical Practice	
NMT 698	Non-Thesis Research	4
Total Hours		**64**

Radiation Safety Track - Plan II

Requirements		Hours
Core Courses		
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	2
NMT 641	Regulations, Radiation Protection/Biology and Lab	4
NMT 653	Research Methodology and Publication Analysis	2
NMT 660	Radiopharmacy, Pharmacology & Lab	4
NMT 696	Seminar and Registry Review	2
Clinical Practice		**11**
NMT 691	NMT Clinical Practice	
Radiation Safety Officer Track Courses		
NMT 611	Physics of Diagnostic Imaging for Radiation Safety Officer	3
NMT 651	Radiation Safety Officer Advanced Radiation Biology	3
NMT 698	Non-Thesis Research	4
Radiation Safety Practice		**14**
NMT 693	Radiation Safety Officer Supervised Practice	
Total Hours		**64**

Research Track - Plan I, 64 credit hours with Thesis

Requirements		Hours
Core Courses		
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	2
NMT 641	Regulations, Radiation Protection/Biology and Lab	4
NMT 653	Research Methodology and Publication Analysis	2
NMT 660	Radiopharmacy, Pharmacology & Lab	4
NMT 696	Seminar and Registry Review	2
Clinical Practice		**11**
NMT 691	NMT Clinical Practice	
Research Track Courses		
BST 603	Introductory Biostatistics for Graduate Biomedical Sciences (or an approved elective)	3
NMT 651	Radiation Safety Officer Advanced Radiation Biology	3
Journal Club		**2**
NMT 697	Journal Club in Nuclear Medicine and Molecular Imaging Sciences	
Thesis		
NMT 698	Non-Thesis Research	6
NMT 699	Thesis Research	10
Total Hours		**64**

Graduate Certificate in Computed Tomography (CT)

The Graduate Certificate in Computed Tomography (CT) is designed for those who hold both a bachelor's degree and a primary certification in radiography, nuclear medicine technology, or radiation therapy. This customized certificate will provide you with the didactic and clinical training for professional practice in CT.

Upon successful completion of our CT certificate, you will be eligible to sit for the post-primary certification exam for CT offered by the Nuclear Medicine Technology Certification Board (NMTCB) and/or the American Registry of Radiologic Technologists (ARRT).

This certificate is a hybrid mix of didactic courses (online) and clinical work (in-person).

The certificate requires a total of 15 hours. Eight of those hours are for "NMT 694 - CT Clinical Practice" which can be split across two or more semesters.

Our CT certificate is a pathway to the UAB Master of Science in Interdisciplinary Graduate Studies (IGS). You may combine this certificate along with another graduate certificate affiliated with the IGS program. Visit the UAB IGS website to learn how.

Graduate Certificate in Computed Tomography

Requirements		Hours
CDS 505	Professional Skills Development	1
NMT 605	Cross-Sectional Anatomy	2
NMT 625	CT Physics and Instrumentation	2
NMT 633	Computed Tomography Procedures	2
NMT 694	Computed Tomography Clinical Practice	8
Total Hours		**15**

Graduate Certificate in Magnetic Resonance Imaging (MRI)

The Graduate Certificate in Magnetic Resonance Imaging (MRI) is available to those who hold both a bachelor's degree and a primary certification in radiography, nuclear medicine technology, sonography, or radiation therapy. This customized certificate will provide you with the didactic and clinical training for professional practice in MRI.

Upon successful completion of the certificate, you will be eligible to sit for the MRI board exam offered by the American Registry of Radiologic Technologists (ARRT).

This certificate is a hybrid mix of didactic courses (online) and clinical work (in-person).

The certificate requires a total of 16 credit hours (or semester hours). Ten of those hours are for "NMT 695 – MRI Clinical Practice" which will be split across two or more semesters.

Our MRI certificate is a pathway to the UAB Master of Science in Interdisciplinary Graduate Studies (IGS). You may combine this certificate along with another graduate certificate affiliated with the IGS program. Visit the UAB IGS website to learn how.

Graduate Certificate in Magnetic Resonance Imaging

Requirements		Hours
NMT 603	Patient Care and Safety in MRI	2
NMT 624	Physics/Instrumentation of Nuclear Magnetic Resonance	2
NMT 634	MRI Scanning and Sequence	2
NMT 695	MRI Clinical Practice	10
Total Hours		**16**

Courses

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 603. Patient Care and Safety in MRI. 2 Hours.
Topics related to general patient care in radiographic imaging settings (e.g. patient communication/education, infection control, contrast administration and legal/ethical considerations) with an emphasis on the MRI environment in terms of patient safety/education and contrast media.

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 611. Physics of Diagnostic Imaging for Radiation Safety Officer. 3 Hours.
Overview of the various imaging modalities used in a clinical setting. Topics include the basics of X-rays, ultrasound, CT, MRI, SPECT & PET imaging.
Prerequisites: NMT 620 [Min Grade: C]

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 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.

NMT 632. Nuclear Medicine Anatomy & Physiology - Procedures II. 2 Hours.
Study of the utilization of nuclear medicine procedures including nuclear cardiology, oncology, central nervous and hematopoietic systems and applications of position 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 651. Radiation Safety Officer Advanced Radiation Biology. 3 Hours.
Effects of radiation at the molecular, cellular and whole-tissue level. Topics include cell survival curves, repair of radiation damage, radiation carcinogenesis, risk assessment models, cancer biology, model tumor systems, and dose fractionation in radiotherapy.
Prerequisites: NMT 641 [Min Grade: C]

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.

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 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 693. Radiation Safety Officer Supervised Practice. 1-8 Hour.
Practical experience in Radiation Safety Practices. Practical experiences that students can engage in at UAB include research labs where radioisotopes are used, radiation oncology, nuclear medicine (imaging, therapy, and radiopharmacy), the molecular imaging center, the cyclotron facility, and occupational health & safety.
Prerequisites: NMT 620 [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. 1-10 Hour.
Directed clinical practice: MRI instrumentation quality control; applied application of MRI procedures.
Prerequisites: NMT 624 [Min Grade: C] and NMT 634 [Min Grade: C]

NMT 696. Seminar and Registry Review. 2 Hours.
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