**The Johns Hopkins Hospital**
**Schools of Medical Imaging**

**2023-2025**
Sponsored by
The Russell H. Morgan Department of Radiology and Radiologic Sciences
of
The Johns Hopkins Hospital

The Johns Hopkins Hospital
Schools of Medical Imaging
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Baltimore, MD 21287

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**Schools of Medical Imaging**
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**Statement Regarding the Privacy Rights of Students**
The Johns Hopkins Hospital Schools of Medical Imaging are prepared to comply with the provisions of the Families Educational Rights and Privacy Act of 1974 (Public Law 90-247, as amended) and any regulations that may be promulgated there under. Students and others who may wish specific information regarding the rights of access to institutional educational records maintained in their names are advised to contact the Program Director.

**Notice of Nondiscriminatory Policy as to Students**
The Johns Hopkins Hospital Schools of Medical Imaging does not discriminate against any person on the basis of race, color, national origin, age, sex, sexual orientation, gender identity, religion, disability, veteran status or any other basis protected by law with respect to any of the rights, privileges, program benefits and activities generally afforded or made available to students at the Schools of Medical Imaging.

Certified to be true and correct of content:

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June 1, 2023

**History**
The Johns Hopkins Medical Institutions were established through a gift of a Quaker merchant, Johns Hopkins, who wanted the Hospital and University built as a joint venture.

Johns Hopkins was born into a very poor family in southern Maryland in 1795. His first name was inherited from his great-great-grandfather, Richard Johns. Because of the family's financial troubles, he was forced to quit school at the age of 12. He went to work for his uncles and by the age of 19 he had established himself as a respected merchant.

Eventually he went into business for himself and built a fortune of 7 million dollars before he died in 1873 at the age of 78. Hopkins never married but gave much thought to what would happen to his estate. He left 3.5 million dollars to build a hospital, for he said, "There will always be suffering." He also left 3.5 million dollars to build a joint university, "for there will always be youth." His concept of the Hospital and the University as a joint venture was a revolutionary idea at the time that set the standard for future medical education in the United States.

In his will he specified that the Hospital was "forever to serve the sick and ill of Baltimore without regard to race, age, sex or the ability to pay." Drs. Welch and Osler, two of the famous "Hopkins Four", brought other philosophies into the pattern of medical education in patient centered medical training and scientific research. Before the Hospital was established, physicians trained at medical schools without ever examining a real patient. The pattern established at The Johns Hopkins Hospital changed U.S. medical education forever by brining medical students to the bedside of patients and placing the practice of medicine on a scientific basis.

The Johns Hopkins Hospital opened on May 7, 1898 followed four years later by the Johns Hopkins University along with the School of Medicine. The opening of the University and the School of Medicine ushered in a new era of medicine. Moving from laboratory to lecture hall to the patient's bedside, students and interns brought the scientific approach to medicine and received first-hand training in diagnosis and treatment. Within two decades, the Hospital and School of Medicine were models of medical care and education for the nation. That distinction has remained intact for over 100 years.

Johns Hopkins willed 13 acres of land in the city of Baltimore to erect the Hospital and wanted it to ultimately receive 400 patients. Today, The Johns

Hopkins Medical Institutions covers a 44-acre area, has more than 1,000 beds, and is recognized as one of the world's leading medical institutions.

**Mission of The Johns Hopkins Hospital**
The mission of The Johns Hopkins Hospital is to improve the health of our community and the world by setting a standard of excellence in patient care. Specifically, we aim:

- To be the world's preeminent health care institution
- To provide the highest quality care and service for all people in the prevention, diagnosis and treatment of human illness
- To operate cooperatively and interdependently with the faculty of The Johns Hopkins University to support education in the health professions and research development into the causes and treatment of human illness
- To be the leading health care institution in the application of discovery
- To attract and support physicians and other health care professionals of the highest character and greatest skill
- To provide facilities and amenities that promote the highest quality care, afford solace and enhance the surrounding community

**Johns Hopkins Medicine Vision**
Johns Hopkins Medicine pushes the boundaries of discovery, transforms health care, advances medical education and creates hope for humanity. Together, we will deliver the promise of medicine.

**Values**
Excellence & Discovery
*Be the best.*
Commit to exceptional quality and service by encouraging curiosity, seeking information and creating innovative solutions.

Leadership & Integrity
*Be a role model.*
Inspire others to achieve their best and have the courage to do the right thing.

Diversity and Inclusion
*Be Open.*
Embrace and value different backgrounds, opinions and experiences.

Respect & Collegiality
*Be kind.*
Listen to understand and embrace others' unique skills and knowledge.

## Mission Statement of the Schools of Medical Imaging

The mission of The Johns Hopkins Hospital Schools of Medical Imaging is to provide a comprehensive medical imaging program that will graduate competent entry-level imaging technologists for the healthcare community. The graduates will exemplify qualities of excellence in patient care and safety, professionalism and ethical behavior thereby enhancing the healthcare experience of the patients they serve.

## Overview of the Programs

The Johns Hopkins Hospital Schools of Medical Imaging is sponsored by the Russell H. Morgan Department of Radiology and Radiologic Sciences. The Schools have three separate programs: The Diagnostic Medical Sonography-Abdominal-Extended and Obstetrics and Gynecology Program, Nuclear Medicine Technology and Radiography. All three of the imaging programs at The Johns Hopkins Hospital are 18 months in length. The Radiography program also offers a 23-month program. Students will graduate with a certificate that allows them to sit for the national board examination given by the American Registry of Radiologic Technologists, the Nuclear Medicine Technology Certification Board, and the American Registry of Diagnostic Medical Sonography. Each program has a full-time director and for DMS and Radiography, clinical coordinators. Clinical instructors are employed by the clinical affiliates. The professional and technical staff of the Department of Radiology of The Johns Hopkins Hospital and clinical affiliates also provide didactic and clinical instruction.

The didactic portion of the imaging programs is offered at 111 Market Place, Suite 830, Baltimore, MD 21202. This location has three classrooms, a lounge area and kitchen space for students. There are eight faculty offices. Classrooms are fully equipped with anatomical models, laptops and WiFi, and a print library. Students will have full digital access to the Welch Medical Library, one of the largest medical libraries in the world. The classroom location is easily accessible by car, bus or subway. Most of the academic classes will be held at this location, with some lectures offered at The Johns Hopkins Hospital.

The clinical training in the program will be completed at The Johns Hopkins Hospital, Johns Hopkins Outpatient Center and Johns Hopkins Imaging, as well as numerous other clinical facilities in the Baltimore metropolitan area. The list of the clinical sites is included in the individual program portions of this catalog.

Completion of one of these programs and passing the credentialing examination allows the graduate to obtain employment in a wide variety of imaging locations to include hospitals and outpatient centers.

## Program Goals and Program Effectiveness Outcomes

### The Diagnostic Medical Sonography-Abdominal-Extended and Obstetrics and Gynecology Program Goals

Goal 1
Students will develop and apply effective critical thinking skills.
Student Learning Outcomes:

1.1 Students will be able to employ critical thinking skills when evaluating ultrasound studies.
1.2 Students will be able to devise modifications to the protocol based on abnormal findings discovered during the ultrasound exam.

Goal 2
Students will demonstrate effective written and oral communication skills.
Student Learning Outcomes:

2.1 Students will be able to communicate in writing normal and abnormal sonographic findings.
2.2 Students will demonstrate oral communication skills as part of the healthcare team.

Goal 3
Students will demonstrate competency in entry-level diagnostic medical sonography skills.

3.1 The student will produce sonographic images of diagnostic quality for multiple protocols.
3.2 The students will develop advanced sonographic skills.

Goal 4
Students will demonstrate effective patient care skills

4.1 Students will demonstrate skill in stocking and turning over rooms
4.2 Students will adhere to best practices associated with patient care.

### The Diagnostic Medical Sonography-Abdominal-Extended and Obstetrics and Gynecology Program Effectiveness Data 2019-2021

2019 Graduates Outcomes

- 100% Job placement within 6 months of graduation
- 0% Attrition

2019 American Registry of Diagnostic Medical Sonography

- 100% Pass Rate for Sonographic Principles and Instrumentation
- 86% Pass Rate for Abdomen
- 100% Pass Rate for Obstetrics and Gynecology

2020 Graduates Outcomes:

- 100% Job placement within 6 months of graduation
- 0% Attrition

2020 American Registry of Diagnostic Medical Sonography

- 100% Pass Rate for Sonographic Principles and Instrumentation
- 92% Pass Rate for Abdomen
- 100% Pass Rate for Obstetrics and Gynecology

2021 Graduates Outcomes:

- 100% Job placement by graduation
- 8% Attrition

2021 American Registry of Diagnostic Medical Sonography

- 100% Pass Rate for Sonographic Principles and Instrumentation
- 100% Pass Rate for Abdomen
- 100% Pass Rate for Obstetrics and Gynecology

2022 American Registry of Diagnostic Medical Sonography

- 100% Pass Rate for Sonographic Principles and Instrumentation
- 100% Pass Rate for Abdomen
- 90% Pass Rate for Obstetrics and Gynecology

2022 Graduates Outcomes:

- 100% Job placement by graduation

16.7% Attrition

**Nuclear Medicine Technology Program Student Learning Outcomes**

Student Learning Outcome 1
The student will demonstrate entry-level competency in nuclear medicine skills by producing diagnostic nuclear medicine studies.

Student Learning Outcome 2
The student will demonstrate entry-level competency in nuclear medicine skills by exhibiting quality patient care.

Student Learning Outcome 3
Students will demonstrate critical thinking in the classroom and clinical setting by being able to scan patients based on their unique physical needs and by evaluating completed nuclear medicine procedures.

Student Learning Outcome 4
The student will understand and apply the principles of radiation safety through didactic courses on radiation safety, biology and governing regulations.

Student Learning Outcome 5
The student will understand and apply the principles of radiation safety by demonstrating their ability to limit radiation exposure to the patient, public, fellow workers, and self.

Student Learning Outcome 6
The student will demonstrate skill in oral and written communication.

**Nuclear Medicine Technology Program Effectiveness Data**
Graduate achievement data is an indicator of program effectiveness, demonstrating the extent to which a program achieves its goals. The current report on graduate achievement data, identified by program, is available on the JRCNMT website by clicking on the following link:
Graduate Achievement Report
The Johns Hopkins Schools of Medical Imaging NMT Program
**Program Effectiveness Data**

| Year of Graduation | Graduated/ Enrolled | % Graduated | Job Placement | Examinees | Pass Rate (First Attempt) | |
|---|---|---|---|---|---|---|
| | | | | | NMTCB | ARRT |
| 2021 | 6/6 | 100% | 100% | 6 | 4/6 | 3/3 |
| 2020 | 6/7 | 86% | 100% | 6 | 5/6 | Not Available |
| 2019 | 6/6 | 100% | 100% | 6 | 5/6 | 4/4 |
| 2018 | 4/5 | 80% | 100% | 4 | 3/3 | 4/4 |
| 2017 | 4/4 | 100% | 100% | 4 | 3/3 | 4/4 |

The Johns Hopkins Schools of Medical Imaging Nuclear Medicine Technology program provides all training necessary to sit for the NMTCB and the ARRT national board examinations. The program satisfies the applicable educational prerequisites for professional licensure in the state of Maryland. According to the ASRT Wage and Salary Survey, 2019, the average salary for all Nuclear Medicine Technologists in the state of Maryland is $68,784.00.

**Radiography Program Goals and Student Learning Outcomes**
Goal 1:
Students will demonstrate critical thinking skills in the classroom and clinical setting.
Student Learning Outcomes:

- Students will be able to formulate effective technical factors based on patient body habitus, trauma, pathology and physical and equipment limitations.
- Students will critically evaluate completed radiographs

Goal 2:
Students will demonstrate skill in written and oral expression
Student learning outcomes:

- Students will demonstrate written communication skills
- Students will demonstrate oral communication skills

Goal 3:
Students will demonstrate professionalism.
Student learning outcomes:

- Students will model professional behavior in the clinical setting
- Students will demonstrate professional behavior in the classroom setting by working effectively on a team

Goal 4:
Students will demonstrate competency in entry-level radiography skills
Student learning outcomes:

- The student will produce radiographs of diagnostic quality
- The student will exhibit quality patient care.

**Radiography Program Effectiveness Data 2016- 2021**
ARRT pass rate: 2017-2021
The Radiography program's 5-year average pass rate on the credentialing examination is 100% on the first attempt.

2018: 100% 12/12 students passed on the first attempt
2019: 100% 15/15 students passed on first attempt
2020: 100% 10/10 students passed on first attempt
2021: 100% 7/7 students passed on the first attempt
2022: 100% 9/9 students passed on the first attempt

Program Completion Rate 2022: 69.2% 13 students matriculated, 9 graduated.

Job Placement Rate within 12 months of graduation. 2016-2021: 5-year average is 100%

2017: 100% 18/18 students
2018: 100% 12/12 students
2019: 100% 15/15 students
2020: 100% 10/10 students

2021: 100% 7/7 students

This information may also be viewed on the JRCERT website at www.jrcert.org

**Accreditation and Approval**

The Diagnostic Medical Sonography-Abdominal-Extended and Obstetrics and Gynecology Program is accredited by:

The Commission on Accreditation of Allied Health Education Programs (CAAHEP)
9355 - 113th St. N, #7709
Seminole, FL 33775
Phone: (727) 210-2350
Fax: (727) 210-2354
http://www.caahep.org/

Upon the recommendation of:
The Joint Review Committee on Education in Diagnostic Medical Sonography (JRC-DMS)
6021 University Boulevard, Suite 500
Ellicott City, MD 21043
(443) 973-3251
http://www.jrcdms.org/

The Nuclear Medicine Technology Program is accredited by:
The Joint Review Committee on Education in Nuclear Medicine Technology.
820 W. Danforth Road #B1
Edmund, OK 73003
405-285-0546
Jrcert.org or mail@jrcnmt.org

The Radiography Program is accredited by:
The Joint Review Committee on Education in Radiologic Technology
20 N. Wacker Drive, Suite 2850
Chicago, IL 60606-3182
312-704-5304
jrcert.org or mail@jrcert.org

The Johns Hopkins Hospital Schools of Medical Imaging is approved by:
Maryland Higher Education Commission
6 North Liberty Street
Baltimore, MD 21201

410-767-3301
Students may contact Maryland Higher Education to access such information as the program enrollment, completion rate, placement rate and pass rate on the credentialing examination.

**Administration and Faculty**
Karen Horton, MD Radiology Department Chairperson
Susan Press Radiology Administrator;
Peg Cooper, MBA Radiology Administrator for Clinical Operations
Mary Fasano, MBA, BS, CNMT, NMTCB(CT) Director, Schools of Medical Imaging
mfasano4@jhmi.edu

**Diagnostic Medical Sonography Program Faculty**

Hayley O. Bartkus, MS-HPEd., BSDMS, RDMS
hobartkus@jhmi.edu
Edward Yuhanna, BA, RDMS, RVT, RMSKS,

**Student Instructor Ratio:**
Lecture: 12:1
Laboratory: 2:1
Clinical 1:1

**Nuclear Medicine Technology Program**
A. Cahid Civelek, MD, Medical Advisor
David Kelkis, BS, CNMT, NMTCB(CT), (RT(N)(CT), Program Director
Dkelkis1@jhmi.edu

**Student Instructor Ratio**
Lecture: 12:1
Lab 2:1
Clinical 1:1

**Radiography Program Faculty**
John Eng, MD, Medical Director
Stacey A. O'Brien, MEHP, RT(R) Program Director sobrie28@jhmi.edu
Shatera Walters, BSRS, RT(R), Clinical Coordinator swalte33@jhmi.edu

**Student Instructor Ratio**
Lecture: 22:1
Laboratory 3:1

Clinical 1:1

**Calendar 2021-2022**

| Date | Event |
|---|---|
| Tuesday, June 1, 2021 | All programs begin |
| Tuesday, June 1, 2021 | Start date Semester 1 |
| Monday, July 5, 2021 | 4th of July holiday Day Off |
| Monday, September 6, 2021 | Labor Day holiday |
| Wed.-Friday, November 24-26, 2021 | Thanksgiving holiday |
| Friday, December 24, 2021 | Christmas holiday |
| Thursday, December 30, 2021 | End date Semester 1 |
| Friday, December 31, 2021 | New Year's Day holiday |
| Monday, January 3, 2022 | Start date Semester 2 |
| Monday, January 18, 2022 | Martin Luther King holiday |
| April 18-April 22, 2022 | Spring Break |
| Monday, May 30, 2022 | Memorial Day holiday |
| Friday, June 30, 2020 | End date Semester 2 |
| Monday, July 1, 2022 | Start date Semester 3 |
| Monday, July 4, 2022 | 4th of July holiday |
| Monday, September 5, 2022 | Labor Day holiday |
| Thursday-Friday, November 24-25, 2022 | Thanksgiving holiday |
| Friday, December 9, 2022 | Graduation, DMS, NM, Rad 18-Month program |
| Monday, December 12, 2022 | Rad 23-Month Program Semester 4 start date |

**Calendar 2022-2024**

| Date | Event |
|---|---|
| Monday, May 31, 2022 | All programs begin |
| Monday, May 31, 2022 | Start date Semester 1 |
| Monday, July 4, 2022 | 4th of July holiday |
| Monday, September 5, 2022 | Labor Day holiday |
| Thursday-Friday, November 24-25, 2022 | Thanksgiving holiday |
| Monday, December 26, 2022 | Christmas holiday |
| Friday, December 30, 2022 | End date Semester 1 |
| Monday January 2, 2023 | New Year's Day holiday |
| Monday, January 3, 2023 | Start date Semester 2 |
| Monday, January 16, 2023 | Martin Luther King holiday |
| April 10-April 14, 2023 | Spring Break |
| Monday, May 29, 2023 | Memorial Day holiday |
| Friday, June 30, 2023 | End date Semester 2 |
| Monday, July 3, 2023 | Start date Semester 3 |

| | |
|---|---|
| Tuesday, July 4, 2023 | 4th of July holiday |
| Monday, September 4, 2023 | Labor Day holiday |
| Thursday-Friday, November 23-24, 2023 | Thanksgiving holiday |
| Friday, December 8, 2023 | Graduation, DMS, NM, Rad 18-Month program |
| Monday, December 11, 2023 | Rad 23-Month Program Semester 4 start date |
| Monday, December 25, 2023 | Christmas holiday |
| Monday, January 1, 2024 | New Year's holiday |
| Monday, January 15, 2024 | Martin Luther King holiday |
| Friday, April 19, 2024 | Graduation, Radiography 23-month program |

**Required Program Academic and Clinical Hours**
All programs have an 18-month, full-time track. The Radiography Program also has a 23-month part-time track. Lecture and clinical hours will vary for each program. Scheduled times for class and clinical will vary in each program.

**Applications and Admission**
Diagnostic Medical Sonography Program and Nuclear Medicine program applicants must have a minimum of an Associate's degree or be enrolled in one of the universities that affiliate with the Schools of Medical Imaging by the date of matriculation or be a graduate of a clinically related accredited program in Allied Health with appropriate credentials.

Radiography applicants must have a minimum of an Associate's degree at the time of matriculation or be enrolled in one of the 2- or 4-year colleges that affiliate with The Schools of Medical Imaging. Students must complete the degree at the time of graduation to be eligible to sit for the credentialing examination.

Students in any of the programs enrolled in one of the affiliate universities must complete the bachelor's degree at the time of graduation from the Schools of Medical Imaging.

**General Application Information**
All three imaging programs begin in early June of each year. Diagnostic Medical Sonography and Nuclear Medicine Technology each begin one cohort, once a year. There is one cohort admitted each year for the 18-month track and one for the Radiography Program 23-month track.
All applications and application fees must be **postmarked** by December 31st for the program that begins the following June. All supporting documents

and transcripts must be **received** no later than January 15th of the matriculation year. Applications postmarked after December 31st or failure to supply supporting documents by January 15th, will only be considered on a space-available basis. It is the responsibility of the applicant to ensure that all materials are received.

Complete applications include:

- Application fee of $40.00 (non-refundable)
- Completed application form (see application section on the website)
- Two references forms: one from a current employer and one from a professor of math or science, completed on program forms (see application section of the website)
- Transcripts documenting **all** post-high school education.
- All prerequisite course work must be completed at a regionally accredited institution.
- Applicants who meet the qualifications specified (see prerequisite courses) will be required to participate in a personal interview. The candidate will be evaluated in an individual interview by a panel. The candidate will be evaluated for professional appearance, behavior and demeanor, ability to answer questions, ability to speak/communicate and overall impression. ***Criminal convictions may affect a student's ability to be credentialed or licensed***. If a prospective student has ever been charged with or convicted of a felony or misdemeanor or has been subject to a disciplinary action (such as suspension or dismissal) from another program, the prospective student must contact their respective credentialing agency to apply for a pre-application review of eligibility.

Diagnostic Medical Sonography Program:
https://www.ardms.org/wp-content/uploads/pdf/Pre-application-Criminal-ARDMS.pdf

Nuclear Medicine Technology Program:
https://www.nmtcb.org/faq/index.php?p=default&cat=8

Radiography Program:
https://www.arrt.org/pages/earn-arrt-credentials/initial-requirements/ethics/ethics-review-preapplication

Acceptance decisions are based on the following:

- GPA in the prerequisite coursework, and in the event of a tie, GPA in all college-level coursework completed. All programs require a minimum of 3.0 GPA in the required prerequisite courses.
    - Students applying to the  programs will be eligible with a prerequisite GPA of 2.8 with a TEAS test overall score of 66%. The cost of the TEAS test is paid by the prospective student. The cost will go toward tuition if the students is accepted.

- Interview scores
- Successful completion of the background check
- Successful completion of the hospital drug screening
- Successful completion of any outstanding prerequisite coursework

While acceptance decisions are not based on volunteer experience, the candidate is encouraged to volunteer in a health care setting in order to solidify the student's desire to work in a health-related profession. The Schools of Medical Imaging do not offer shadow experiences.
In cases where applicants are equally qualified, the program admissions committee will make the final selection.

**Prerequisite Course Work**
There are individual requirements and program prerequisite courses for each of the three imaging programs. To calculate your prerequisite GPA, go to the "prerequisite course" section on the program website and click on the spreadsheet:

https://somi.jh.edu/programs/diagnostic-medical-sonography/
https://somi.jh.edu/programs/nuclear-medicine-technology/
https://somi.jh.edu/programs/radiography/

All prerequisite courses need to be taken at a college or university accredited by U.S. regional accreditation. The requirements are as follows:

**Diagnostic Medical Sonography**
- Human Anatomy & Physiology I and II (4 credits each with laboratory)
- General Physics (Algebra-based, 4 credits with laboratory)
- College Algebra or higher mathematics outside of Statistics
- Medical Terminology – This course must be taken at the college level for credit.
- The applicant must complete one of the following: Speech and Communications or Public Speaking or Interpersonal Communication
- Statistics
- Psychology

**Nuclear Medicine Technology**
- Human Anatomy & Physiology I and II (4 credits with laboratory)
- College Algebra or higher, not including statistics
- College Physics (Algebra-based, (4 credits with laboratory)
- General or Inorganic Chemistry (4 credits with laboratory)
- Medical Terminology – This course must be taken at the college level, for credit.
- The applicant must complete one of the following: Speech and Communications or Public Speaking or Interpersonal Communication

- English Composition

**Radiography**

- Human Anatomy and Physiology I and II, (4 credits each with laboratory)
- College Algebra
- English Composition
- The applicant must complete one of the following: Speech and Communications or Public Speaking or Interpersonal Communication

There is no credit given for prior education.

**Recommendations**

All applicants must submit two recommendation forms (found on the website). One recommendation form must be from a professor of math or science and the other form must be from a current employer. Students who have previously completed another allied health program must have a recommendation form from their program director. Any exceptions to this must be made by the program director.

**Background Check**

Consistent with The Johns Hopkins Hospital policy of requiring a criminal background check for all employees, this requirement is also extended to all students accepted by the Schools of Medical Imaging. Once accepted, the background check will be initiated by the student and will be conducted by PreCheck, Inc., at a current cost of $52.00 per student. The fee for the background check is paid by the student. An acceptable background screening will be required for all students beginning the Program.

**Physical and Technical Requirements**

The student will be expected to do the following:

- Push, pull and lift a minimum of 40-50 pounds.
- Assist patients on and off imaging tables, wheelchairs and stretchers.
- Stand for long periods of time.
- Push and maneuver wheelchairs, stretchers and IV poles.
- Be capable of fine motor control to handle equipment settings, computer use and injection syringes. For Sonography, be able to manipulate the transducer to obtain images.
- Auditory capabilities to hear patient requests, monitoring devices and instructions from staff or physicians made in a normal speaking voice.
    - For Sonography, be able to hear and interpret Doppler signals

- Visual acuity to distinguish shades of grey, read patient monitoring devices and see small details on the medical image.
    - For Sonography, able to see all colors.
- Perform CPR.
- Performing twisting, lifting, pulling and carrying for purposes of moving equipment, transporting cassettes and moving patients.
- Communication abilities to accurately receive, comprehend, write and interpret verbal and written communication in both academic and clinical settings.
- For Radiography, be able to wear lead protective clothing for periods of 2-3 hours at a time.

Prospective students who have questions about performing any of the above activities should contact the program director. There may be other technical requirements for individual imaging programs.

**Degree Options For All Programs**

**Notre Dame of Maryland University**, located in Baltimore, MD, offers a program leading to a bachelor's degree in Radiologic Sciences. Students will complete their prerequisite and general education coursework at NDMU, and then fulfill their degree requirements by completing the imaging specialty program at The Johns Hopkins Hospital. Please contact the advising office of Notre Dame of Maryland University at 410-532-5500, or see the webpage at http://www.ndm.edu and look for the link to Adult Undergraduate Studies for further information.

**Bloomsburg University** located in Bloomsburg, Pennsylvania, offers a program leading to a bachelor's degree in Medical Imaging. Students will complete their prerequisite and general education coursework at Bloomsburg, and then fulfill their degree requirements by completing the imaging program. Please contact the advising office at Bloomsburg University at 570-389-4130, or access the webpage at http://www.bloomu.edu for further information.

**Immaculata University,** located in Immaculata, Pennsylvania, offers a program leading to a Bachelor of Science in Allied Health. The students will complete general education and prerequisite course work at Immaculata University. Once these courses are completed, the student may apply to one of the imaging programs. If the student is accepted and completes the imaging program, Immaculata will grant a Bachelor of Science degree. Please contact the advising office of Immaculata University at 610-647-4400 or see the webpage at http://www.immaculata.edu for further information.

**York College of Pennsylvania**, located in York, Pennsylvania. The students will complete general education and prerequisite course work at York

College. Once these courses are completed, the student may apply to one of the imaging programs. If the student is accepted and completes the imaging program, York College will grant a Bachelor of Science degree. Please contact the advising office at:

**Academic Advising**
Campbell Hall , Room 200
Phone: 717.815.1531
academicadvising@ycp.edu

**Millersville University,** located in Millersville, Pennsylvania. The students will complete general education and prerequisite course work at Millersville University. Once these courses are completed, the student may apply to one of the imaging programs. If the student is accepted and completes the imaging program, Millersville University will grant a Bachelor of Science degree. Please contact the advising office at:
https://www.millersville.edu/advisement/

**Radiography Program Only Degree Options**

**Anne Arundel Community College,** located in Arnold, Maryland, offers the opportunity for prospective students to complete an Associate's degree in Radiologic Technology. The student must complete all program prerequisites and general education coursework before being accepted into the Radiography Program.
For further information, please contact Anne Arundel Community College at 410-777-2222 or access the webpage at www.aacc.edu

**Carroll Community College**, located in Westminster, Maryland offers the opportunity for the student to complete an Associate's degree in General Studies. The student must complete all program prerequisites and general education coursework before being accepted into the Radiography Program. For further information please contact the advising office at Carroll Community College at 410-386-8000 or access the webpage at www.carrollcc.edu

**Harford Community College**, located in Bel Air, Maryland offers the opportunity for the prospective student to complete an Associate's degree in Technical and Professional Studies. The student must complete all program prerequisites and general education coursework before being accepted into the Radiography Program.
For further information, please contact the advising office at Harford Community College at 443-412-2000, or access the webpage at http://www.harford.edu

College of Southern Maryland, located in La Plata, Maryland offers the opportunity for the prospective student to complete an associate degree. The student must complete all program prerequisites and general education coursework before being accepted into the Radiography Program. For information, please contact the office of advising at 301-934-2251.

**Physical Health Examination**

Before the date of matriculation, all students will receive a routine physical examination. Drug testing is performed as part of this physical. CBD product usage may result in a positive drug test and will preclude a student from starting the program. The Johns Hopkins Hospital and all clinical affiliates are drug-free environments and students will not be permitted to enroll if they fail the drug screening.

The routine physical examination, conducted by The Johns Hopkins Hospital Occupational Health, will require the student to show proof of immunity to childhood illness, such as measles, mumps, rubella and varicella. Students who fail to show immunity to these childhood diseases will be offered the vaccines. Students will receive one tuberculosis blood test at the time of the physical. Students will have the opportunity to receive the series of Hepatitis B vaccinations. All students will be required to have the COVID vaccination and a yearly influenza vaccination, which is provided by the hospital. There is no fee for the above-named services. The COVID booster shot may be mandated in the future.

**Transfer Credit Policy**

Transfer credit is not given for previous academic or clinical training in the imaging sciences.

**Tuition and Fees**

| | |
|---|---|
| Application fee: | $40.00 (non-refundable) |
| Background Check: | $52.00 (only for accepted students) |
| Tuition: | $17,500.00 Diagnostic Medical Sonography |
| Tuition: | $12,000.00 Nuclear Medicine Technology |
| Tuition: | $10,000.00 Radiography Program |
| CPR Certification: | $40.00: non-refundable |
| Technology fee: | $150.00: non-refundable upon matriculation (one time) |
| Clinical Lab fees: | $150.00 per clinical semester (3 times per 18-month programs and 4 times for the 23-month program) |
| Uniforms: | Approximately $300.00: arrangements for refunds are made through the vendor |
| Books: | $700.00 DMS |
| Books: | $600.00 NMT |
| Books: | $700.00 Radiography |

Total amount for each program:
Diagnostic Medical Sonography: $19,158.0
Nuclear Medicine Technology: $13,632.00
Radiography 18-month program: $11,732.00
Radiography 23-month program: $11,882.00

All students will need a personal laptop and internet access in order to complete homework assignments and online teaching. The cost of this will vary with choice of computer and internet plan.

Tuition is paid in 4 equal installments during the first 13 months of the 18-month programs. Tuition will be paid in 5 installments for the 23-month Radiography program. Please note that all tuition and fees are subject to change. These figures do not include room, board, health insurance, supplies or transportation.
Uniforms are purchased through the program vendor. Radiography program books will be purchased through the program vendor. All textbooks (most current edition) and uniforms specified by the program are required.

**Tuition Payment**
The office does not send out invoices for tuition. The payment schedule for tuition is as follows
June 1
October 15
March 1
July 15
November 15 (Radiography 23-month)
The payment amounts due on the dates are
Diagnostic Medical Sonography: $4,375.00
Nuclear Medicine Technology: $2,750.00
Radiography (18-month program): $2,500.00 Radiography (23-month program): $2,000.00

- Payment may be deferred if the student is receiving financial aid from Bloomsburg, Notre Dame, Immaculata, York College or Millersville University, or VA benefits.
- Students who do not pay their tuition on time may be offered a 2-week grace period. At the end of the 2-week grace period, the payment must be made, along with a $35.00 late fee. One day late for payment requires a late fee. The program director may offer a waiver for the due date if it falls on a weekend, holiday or if the student is ill or otherwise absent from the program. Payment must then be made on the first available program day.

- Students who have failed to make the tuition payment within 21 calendar days of the due date, will be suspended from the program. The program director has the right to determine if quizzes, tests or finals may be made up. All missed time will be made up after graduation unless the student uses their bank of leave time.
- Failure to make the tuition payment within 30 calendar days will result in dismissal from the program.

Students who are awaiting financial aid from their home university will be allowed to wait for their financial aid to arrive before payment of tuition. For those students applying for VA benefits, the Schools of Medical Imaging will not impose any penalty, including the assessment of late fees, the denial of access to classes, libraries or other institutional facilities, or the requirement that an individual borrow additional funds, on any covered individual because of the individual's inability to meet his or her financial obligations to the institution due to the delayed disbursement funding from VA under Chapter 31 or 33.

**Financial Aid**

The Schools of Medical Imaging is recognized as an eligible institution of higher education for purposes of state financial aid programs. These include Maryland State Scholarships and Veterans Benefits, but do not include Federal financial aid such as Pell Grants and Stafford loans. All financial arrangements should be resolved before attending the program. Students receiving scholarships may defer that part of their tuition that will be covered by the scholarships. The remaining amount must be paid by the due date. Students may also apply for loans through Sallie Mae. The student may pay for tuition payments by using a check or major credit card. Students may also wish to apply for a personal loan through their banking institution.

Because the Schools of Medical Imaging does not participate with federal financial aid, the Schools may not sign off on any government loan deferment.

Upon request, The Schools of Medical Imaging will issue an end-of-year statement that indicates payment of tuition. The ability to use the statement to defer federal taxes is made upon the advice of a tax advisor and does not involve input from the Schools of Medical Imaging. We do not offer the 1098 form.

**VA Approved Program**

The Schools of Medical Imaging programs are approved by the Maryland State Approving Agency to offer training to veterans and other eligible dependents under the VA educational benefit programs.

The individual program will obtain written records on a VA beneficiary's previous education and experience and complete an evaluation. The program generally does not grant credit for previous radiography training, and requests for such must be addressed to the program director.
The program will notify the VA of any change in the enrollment status of students certified to receive Veterans educational benefits. This would include when the student is placed on attendance or academic probation, changes in scheduling or termination of training.
The program will maintain grade records which are updated on a semester basis. VA students who are due a refund, will have the monies reimbursed within 40 days of the last day of attendance.

**Refund Policy**
All fees paid by a student shall be refunded if the student chooses not to enroll in or to withdraw from the school within 7 calendar days after having signed a contract. If, after the 7-day cancellation period expires, a student withdraws after instruction begins, refunds shall be based on the total contract price (assuming that the entire tuition was paid prior to the start of the program) for the course or program and shall include all fees, except registration and application and enrollment fees, any charges for materials, supplies, or books that have purchased from the hospital by the student, and are the property of, the student. If the students is on an official leave of absence and fails to return to training by the end of the leave of absence, a refund due to a student shall be based on the date of withdrawal or termination and paid within 60 days of the scheduled last day of the leave of absence.
Uniforms, books, technology fee, application fees and CPR fees are not refundable.
Percentages of refunds are based on the academic/billing period completed by date of withdrawal.

| | |
|---|---|
| Less than 10%: | 90% refund |
| 10% up to but not including 20%: | 80% refund |
| 20% up to but not including 30%: | 60% refund |
| 30% up to but not including 40%: | 40% refund |
| 40% up to but not including 50%: | 20% refund |
| More than 50%: | no refund |

A refund due a student shall be based on the date of withdrawal or termination and paid within 60 days from the date of withdrawal or termination. In case of an official leave of absence, if a student fails to return to training by the end of the leave of absence, any refund will be based on the date of withdrawal or termination and paid within 60 days of the scheduled last day of the leave of absence. If the school closes or discontinues a course or program, the school will refund to each currently enrolled student monies paid by the student for tuition and fees.

The amount charged a recipient of VA educational funds for tuition, fees and other charges for a portion of the course will not exceed the approximate prorated portion of the total charges for tuition, fees, and other charges that the length of the completed portion of the program bears to the total length. The Program may retain $10.00 for administrative costs.

**Student Records and Transcripts**
The imaging programs maintain all grade records for students. The form to request a transcript may be found on the website. There is no cost for transcripts. Please send the transcript request form to The Johns Hopkins Hospital, Schools of Medical Imaging, 111 Market Place, Suite 830, Baltimore, MD, 21202 or email it to the respective program director.

**Student Placement Assistance**
Students are not guaranteed employment upon graduation. The program director will pass along information concerning job openings and opportunities.

**Right to Make Changes to the Program**
The Schools of Medical Imaging will continually review and update program policies in accordance with their accrediting body standards, Maryland Higher Education Commission and upon the advice and approval of the program's advisory board. The program reserves the right to change administration policies and other regulations at any time with appropriate notice to the student.

**Health Insurance**
Health insurance is required of all students while enrolled in the program. Proof of enrollment will be required. Any student not covered by a personal health insurance policy will not be permitted to participate in clinical training. Any time missed due to lack of coverage will be removed from the student's bank of leave time. Students may obtain their own health insurance or purchase it through the Schools of Medical Imaging. The cost for this plan may be obtained through the individual program directors. Consideration of whether you can receive healthcare in the state of Maryland would be advised.

**Grading Policies**
Didactic (Classroom) Grading Standards:

- Passing grade, "C", for all courses is 75%.
- Students will be issued a written notice of academic warning if, at any point past mid-course, the student's average is between 75-78%.
- Students will be issued a written notice of academic probation if, at any point past mid-course, the student's average is below 75%.
- Failure of any course will result in academic dismissal.

| Percentage Grade | Letter Grade |
|---|---|
| 92.0-100.0 | A |
| 84.0-91.9 | B |
| 75.0-83.9 | C |
| 74.9 and below | F |

Clinical Grading Standards:

- Passing grades for all clinical testing and evaluations is 84% for Diagnostic Medical Sonography and Nuclear Medicine Technology and 2.5 on a 4-point scale for Radiography. Failure of a clinical course will result in clinical dismissal.

Academic probation and warnings will not impact the student's grade and will remain in effect until the end of the course. A student who is placed on probation for attendance issues, or a student who is placed on clinical probation for serious issues such as patient care, radiation safety or ethical issues will be placed on probation for the remainder of the program. Students who fail to achieve the minimum passing grade for any academic class or clinical semester, or who fail to comply with the conditions of a clinical probation will be dismissed from the program. Student grades will be recorded each semester and given to the student.

Students who have been dismissed from the Schools of Medical Imaging for unsatisfactory academic grades may reapply to the program. Credit may not be given for advanced standing should the student be readmitted and will be at the discretion of the program director. Students who are dismissed clinically may not apply for readmission.

**Academic Integrity Policy**

Students are expected to exhibit the highest standards of academic integrity at all times. This includes but may not be limited to:

- Cheating: the deliberate use of unauthorized materials or information in the performance of any academic exercise. This would also include falsification of any records, documents or information.
- Assisting another student in academic dishonesty: deliberately assisting another student in the use of unauthorized materials or information.
- Plagiarism: intentionally adopting the words or ideas of another person without giving that person due credit for such words or ideas.

Adherence to the Academic Integrity Policy is expected and required. Violations of this policy are viewed as a serious offense because it diminishes the quality of scholarship and misrepresents professional knowledge and

integrity. Penalties for violations of the above policy will result in dismissal from the Program.

**Graduation Requirements**
To graduate, students must complete all classwork (minimum grade average of 75%), clinical requirements (84% for DMS and NMT, and 2.5 on a 4.0 scale for Radiography) . A student cannot miss more than 96 hours of the program. Once the 96 hours of leave have been used, the student may be granted an additional 40 hours of emergency leave that must be made up before graduation. A student who misses more than 96 hours of leave, and 40 hours of emergency leave will be dismissed. Outstanding financial issues with the hospital or the Schools of Medical Imaging must be resolved before graduation.

**Funeral Leave**
- A maximum of 3 days absence will be granted for a death in the immediate family of the student. This time is not removed from the student's bank of leave hours.
- Immediate family includes spouse, domestic partner, parent, parent-in-law, stepparent, stepchildren, sibling, child, children of domestic partner, foster parents, legal guardians, grandchild, grandparents.

**Program Schedule**
The Nuclear Medicine and Diagnostic Medical Sonography programs are full-time, Monday through Friday, 40 hours per week. The 18-month Radiography Program (18-month) is Monday through Friday, 36 hours per week. The 23-month Radiography program is Tuesday through Friday, 28 hours per week.
Students will not be in attendance for hospital holidays, spring break or weekends and will have a total of 96 hours of leave during the program. Students will have one week off for spring break. Hours will vary by the program and are posted in the individual sections of this catalog.

**Resources and Services**
The enrolled student will have multiple resources and services available to them. These include:
- A wide variety of imaging suites
- A wide variety of imaging equipment

Computers
- The Schools of Medical Imaging has laptop computers and printers for student use during class time.
- Students will need to have a personal laptop and internet access for homework and access to online teaching.

Wi-Fi

- Wi-Fi is available at the Market Place and JHH and JH Imaging locations. Wi-Fi at other imaging sites is at the discretion of the site.

Welch Medical Library

- The Welch Medical Library is one of the foremost medical libraries in the world. All students have the same access as any employee to all library services.

Candler Building Gym

- The Candler Building (classroom and office location) has an on-site fitness facility that is free of charge for students.

The Denton Cooley Center

- Students may elect to purchase full membership in this athletic facility. The Center is located directly behind Reed Hall adjacent to the Outpatient Center and contains an indoor track, racquetball, basketball, and volleyball courts, saunas, showers and locker rooms.

Physical and Vaccinations

- The Johns Hopkins Hospital provides a pre-matriculation physical to include a drug screening. Hepatitis B and vaccinations for childhood diseases are available through Occupational Health. Yearly influenza vaccinations are free and are mandatory, with exceptions for medical or religious reasons. Johns Hopkins Medicine requires COVID vaccinations. Boosters for COVID are not currently required but are strongly encouraged.

Microsoft365

- Students will have access to Microsoft 365 free of charge.
- Students will have a Microsoft Outlook email account for use while in the program.

CPR certification

- The student will be American Heart Healthcare Provider CPR certified at a cost of $40.00. CPR training must be done at The Johns Hopkins Hospital. This training will be scheduled once the student has been accepted and matriculated. Payment is made directly to the CPR office.

Health Insurance

- The student may purchase health insurance through the hospital. Please inquire through the individual program directors for more information and fees.

Mass Transit

- The student may purchase a mass-transit pass at any Baltimore metro station. Both the East Baltimore campus of The Johns Hopkins Hospital and the classroom location are easily accessible by metro or bus. Affiliate clinical sites will require the student's personal transportation.

Personal Counseling

- Students who desire personal counseling should contact their private physician for recommendation for counseling services.

Accommodations for Disabilities

- If a student has a documented learning, psychological or physical disability, the student may be entitled to reasonable academic accommodations or services. To request accommodations or services, contact the Program Director. All students are expected to fulfill essential course requirements which cannot be waived.

Parking

- Students may access both The Johns Hopkins Hospital and Market Place classroom location by public transportation. If the student chooses to park at either the hospital (hospital parking) or classroom location (local garages), there will be a fee for parking (about $10.00-$24.00 per day). All Johns Hopkins Imaging sites and all affiliate clinical sites offer free parking.

**Uniform Requirements**

Students in The Johns Hopkins Hospital Schools of Medical Imaging Programs represent the Hospital, the profession and of all healthcare providers. A student's appearance is a reflection of their professionalism. Therefore, trendy modes of dress, hairstyle and general appearance that may be acceptable in a social setting are not appropriate for healthcare providers. Program faculty reserves the right to require that students' personal appearance conforms to professional standards. Individual uniform requirements for each imaging program will be provided upon acceptance. Uniforms are purchased from the program vendor.

**Absence and Leave Policy**

The students will be off on the following days:

- New Year's Day
- Martin Luther King Day
- Spring Break (one week)
- Memorial Day
- July 4th
- Labor Day
- Thanksgiving: Thursday and Friday.

- Christmas Day

Please see the academic calendar in this catalog for exact dates.

In addition to the above-named days, the student will be awarded a bank of 12 days (96 hours) to use for personal and sick time. The student may use this time at their discretion with the following stipulations:

- Absences due to personal illness of 3 days or longer will require a physician's note.
- Scheduled absences on class days are at the discretion of the instructor. A physician's note, in case of illness, may be required for an unscheduled absence. It is the student's responsibility to contact the instructor directly and arrange for the possibility of make-up work. Exams, tests or quizzes are made up at the discretion of the instructor. Should the student fail to contact the instructor in the event of a known absence, any missed quizzes or tests will be made up at the discretion of the program faculty.
- Time missed from the classroom or clinic due to tardiness will be removed from the student's bank of time. This time will be removed in increments of 15 minutes.
- The faculty reserves the right at any time to ask for proof of an unscheduled absence. This will include a health care provider's note, court document, towing or garage receipt, etc.
- Students who must miss class or clinic due to an unexpected illness or emergency must contact the program faculty and designated clinical staff at the student's assigned clinical site. If a student fails to contact the program faculty and designated clinical staff prior to the assigned start time, the student will be issued a clinical warning (first offense only). Should the student fail to contact the appropriate program faculty and the clinical instructor on a second occasion, the second offense will result in the student being placed on probation and will remain in effect throughout the remainder of the program. A third offense will result in dismissal. Students who leave a clinical site early without permission from the program director or the clinical coordinator will fall under the same policy. If this is a classroom day, the classroom instructor must be notified.
- If a student is absent due to jury duty, no leave is charged, but proof of attendance will be required. If a student must attend any other court hearing that involves issues personal to the student, time will be removed from the student's bank of leave.
- Student attendance is calculated on an ongoing basis. There is no minimum or maximum time that may be used in each semester, but the student may not go over the total amount of time allotted. Time used will be posted in the student's OneDrive account. A student may not use extended leave time (more than 16 hours) until after July 1, except in the case of serious personal or family illness.

- Once a student has exhausted their bank of leave hours, absences will be limited to Emergency Leave. All emergency leave must include documentation of absence, such as a health care provider's letter. Emergency leave is defined as an acute illness, physician appointment or court date. Students may use up to and including 40 hours of emergency leave.
- Emergency leave must be made up in order to satisfy graduation requirements.
- Make-up time must be approved by the program director and clinical coordinator and a make-up time request form completed. Due to staffing and supervision concerns, students will not be allowed to complete make-up time on designated hospital observed holidays.

**Lateness or Absence**

Students are expected to be present and on time for classroom lectures and program events. This means the student is present and prepared to begin before the scheduled start time. There are grade penalties for lateness or absence from class.

The following policies will apply to all classes and clinical lab.

- Guidelines for attendance and participation will be outlines in each class syllabus.
- In the event of lateness or absence from class, it is the discretion of the instructor to allow the student to make up the quiz, test, or participation. Lateness to a clinical assignment is 1/2 occurrence, which is explained in Attendance Management. It is illegal in the state of Maryland to text while driving or use a cell phone unless it is hands-free. Do not talk or text and drive. Call the appropriate faculty member immediately upon arrival.

**Attendance Management**

- Students are expected to exhibit the qualities of dependability and timeliness while on assignment in clinical rotations.
- An *unscheduled absence* is a failure to report for a scheduled shift or consecutive shifts, whatever the reason, including a medically verified illness. Each unscheduled absence counts as one occurrence. If an unscheduled absence due to illness occurs, and the student is out on consecutive clinical days, this counts as one occurrence. For example, if a student calls out sick on November 1st and remains out on November 2nd and November 3rd, this counts as one occurrence. If a student is out on November 1st, November 15th and November 20th, this is three occurrences. Absences covered under the leave of absence policy are not chargeable for disciplinary

action purposes. Please note absences that are pre-approved by the program are not counted as an unscheduled absence.

- A *shortened work shift* means missing any part of a work shift due to lateness either at the beginning of the day or when returning from lunch or leaving early. Each incident will count as 1/2 of one occurrence.
- The program faculty will determine if the absence is one-half or one occurrence.

| **Unscheduled Absences and/or Shortened Work Shifts For 18 Month Program** | **Disciplinary Action** |
|---|---|
| 3 occurrences | Verbal Warning |
| 6 occurrences | Written warning with grade implication |
| 9 occurrences | Probation with grade implication |
| 12 occurrences | Dismissal |

**Leave of Absence**

A Leave of Absence (LOA) may be granted due to illness or serious established need. The maximum LOA within the programs may not exceed 60 calendar days. The student must submit a written request for consideration of approval of a leave of absence to the Director. Final approval of the request rests with the Director. A student returning from LOA due to illness must have physician clearance before re-entering the program and will be expected to resume normal duties and clinical rotations. Student's clinical skills will also be reassessed upon return from LOA, and additional time may be needed to re-establish clinical competency levels. Time lost due to LOA must be made up before the student will be eligible to graduate from the Schools of Medical Imaging and before the student is eligible to take the credentialing examination.

**Pregnancy Policy for Nuclear Medicine and Radiography Program**

The following policy is based on the Nuclear Regulatory Commission's Regulatory Guide 8.13. A complete copy of this guide is available in the program offices.

If, during the course of their clinical training, a student becomes pregnant, they are strongly encouraged to declare this pregnancy to the program director. Revealing a pregnancy is not required but is the decision of the student. The student who chooses to reveal their pregnancy to the program director will:

- Submit a formal statement in writing to the program director. A sample letter is available in the program office.

- Receive counseling on radiation safety practices to be observed during the course of their pregnancy from the program director, the chief physicist, or the radiation safety officer.
- Receive a fetal radiation monitor, which is to be worn at waist level, and when applicable, *under* the lead apron (for Radiography).
- Revealing a pregnancy allows for monitoring fetal dose to determine the fetal dose does not exceed 0.5 rem.
- This limited radiation dose will begin when the pregnancy is declared.

The student must be aware of the following:

- Only declared pregnancies are subject to the lower dose limit.
- The program will assume that a pregnancy does not exist unless the program director is informed of the pregnancy in writing.
- If a student has declared a pregnancy, the student has the right to withdraw the declaration of pregnancy at any point in time. A withdrawal of declaration of pregnancy must also be in writing.

Pregnant students in the Nuclear Medicine Technology and Radiography program have several options regarding the program. Once the pregnancy is declared, the program faculty will discuss the following options with the student.

The options are as follows:

1. The student may continue both academic and clinical components of the program with no interruption.
2. The student may continue academic course work only. Students seeking this option must have a written communication from their health care provider stating that this is necessary for the safety of the pregnancy. This option is at the discretion of the program director and will depend on the student's place in the program. Students who select this option with the program director's approval will make up all clinical training prior to graduation and receiving a certificate of program completion.
3. Leave the program and re-enter the program at an appropriate time to be determined by the program director. The student may be required to begin the program again, depending on the student's place in the program at the time of withdrawal. The maximum leave of absence for the program is 60 days.

Students who select options 2 or 3 may only re-enter the program if student enrollment does not exceed JRCERT or JRCNMT mandated capacity, or if a waiver is obtained for student capacity.

Regardless of which option is chosen, the student must complete all academic and clinical requirements in a satisfactory manner prior to receiving a certificate from The Johns Hopkins Hospital Schools of Medical Imaging. The student should be aware that this might entail additional

clinical training if the absence from clinical training has been substantial, or if clinical skills need further enhancement.

**Inclement Weather Policy**
If the student is unable to attend due to inclement weather, the attendance policy will be adhered to. In the rare event that class or clinical are canceled, the instructor will email the students by 6:00 am if the classes for that day will be online. Otherwise, the student is expected to attend classes in person.

**Community Service**
All imaging programs are required to complete a minimum of one community service project during the course of the program. The project must be a minimum of 4 hours. This can be done as an individual program, or different programs may work together to complete one project. This project must benefit either The Johns Hopkins Hospital or the surrounding community of the East Baltimore campus. This project must be approved by the individual program director.
The project will take place on a program day and students will not be charged any leave time.
Students are not permitted to attend clinic in lieu of participating in the community service project.

**Disciplinary Policies**
The JHH Schools of Medical Imaging has developed a disciplinary policy to inform students of undesirable behavior, which allows students to correct such behavior and bring performance to an acceptable level. The student may be given, in order of severity, verbal advisement, written citation, written warning, probation and dismissal.

Documentation will be retained in the student's file at every level of the disciplinary process. It is the prerogative of the program faculty to identify and determine the appropriate level of the disciplinary process depending on the nature of the infraction.

**Dismissal**

A student who is being dismissed from the program has generally been issued a written probation. If the stipulations of the written probation have not been accomplished, the student will be dismissed from the program. Clinical dismissal from the program is permanent and does not allow for reapplication to the program. Academic dismissal does allow the student to reapply to the program and may require the applicant to take additional classes at the discretion of the program director. Instances involving patient safety, ethical issues, radiation safety, violations of HIPAA policies or breach

of a critical program disciplinary policy may result in immediate dismissal with no written probation. A student may be dismissed from the program at any time.

Reasons for dismissal may include but are not limited to:

- Unsatisfactory clinical or academic records
- Falsification of records
- Absence for three consecutive days without prior notification of the program faculty
- Breach of a major or critical rule or regulation of The Johns Hopkins Hospital, Department of Radiology, or Schools of Medical Imaging or affiliate clinical site
- Failure to comply with any HIPAA policies
- Failure to comply with a previous probation or has incurred a second probation for a different reason
- Display of an antagonistic disposition or any other undesirable trait, making them unsuitable for the field of medical imaging
- Failure to adapt to any program requirements
- Reporting to the Program while under the influence of any intoxicant, hallucinogenic or narcotic or where the presence of any such agent can be established by a "for cause" drug test under the Substance and Alcohol policy
- Unauthorized possession or use of an intoxicant, hallucinogenic or narcotic while on the premises
- Failure to comply with an alcohol or drug screening
- Unauthorized possession of a weapon on the premises
- Fighting, issuing threats or verbal abuse or other disorderly conduct Exposing an OSL badge on purpose
- Taking unauthorized photographs or recording patient information or images
- Theft or unauthorized possession of
- property
- Failure to abide by the academic integrity policy
- Performance of any imaging procedure without a physician's request or without charge to the patient

**Grievance Policy**

All students have the right to appeal administrative decisions made by faculty and staff of the Schools of Medical Imaging. *Before the grievance policy may be initiated at Level One, the student is required to meet with the other party in an attempt to rectify the situation.* The student must follow the levels as listed below, in the order they are listed. Any attempt to bypass a level of the process will result in termination of the appeal process. If the

perceived grievance is not rectified through a meeting, the formal process of appeal, as detailed below, includes two levels.

Level One
The student must provide a written statement to the Director of the Schools of Medical Imaging within three working days of the incident. The statement must fully describe the circumstances giving rise to the grievance and a description of the efforts that have been made to resolve the grievance. A decision regarding this appeal will be made within three working days of receiving the grievance, exclusive of weekends, holidays, scheduled or unscheduled absences or sick days. The written response to the student at Level One will provide contact information for the grievance committee at Level Two, should the student wish to pursue the matter further.

Level Two
If the student desires to appeal the decision made at Level One, the student must present the grievance within three working days of the decision at Level One to a panel of persons outside of the Schools of Medical Imaging and the department of Radiology. The student must present a written statement to the chairperson of the committee, who will contact other members of the committee. This statement must fully describe the circumstances giving rise to the grievance and a description of the efforts made to resolve the grievance at the previous level. Those persons responsible for hearing the grievance will discuss the circumstances surrounding the grievance with all interested parties and may ask for documentation from any party. Every effort will be made to resolve this issue within two weeks, exclusive of weekends, holidays, scheduled or unscheduled absences or sick days.

**Accreditation Body Appeals Process**

If the student believes that a violation of the accrediting body's standards has occurred, the student should first follow the steps of the program's appeals process. If the student believes that a violation still exists after following all the steps of appeals process, the student should contact the appropriate accrediting body.

The Diagnostic Medical Sonography:
The Commission on Accreditation of Allied Health Education Programs (CAAHEP)
9355 - 113th St. N, #7709
Seminole, FL 33775
Phone: (727) 210-2350
410-764-4777
Fax: (727) 210-2354

http://www.caahep.org/

The Nuclear Medicine Technology Program:
The Joint Review Committee on Education in Nuclear Medicine Technology
820 W. Danforth Road #B1
Edmund, OK 73003
405-285-0546
mail@jrcnmt.org

The Radiography Program:
The Joint Review Committee on Education in Radiologic Technology
20 N. Wacker Drive, Suite 2850
Chicago, IL 60606-3182
312-704-5300
www.jrcert.org
Reference Program #2545

Once the complaint has been filed with the accrediting body, and the program has been contacted by the accrediting body, the program will:

1. Inform the Advisory Board, Director of the Medical Imaging Schools, and Radiology Administration that a formal complaint was filed with the accrediting body.
2. Review the complaint with program faculty and the Director of the Medical Imaging Schools, and offer complete written explanation to above named parties, and the accrediting body as to the events that have occurred. All previous attempts at solving the problem will be outlined. The response will be issued within 10 days of receipt of the complaint.
3. Based on this explanation, the accrediting body will decide whether or not the program is in compliance with the Standards.
4. If the accrediting body believes that the program is not in compliance with the Standards after written explanation, the program will comply with directives issued by the accrediting body to bring the program into compliance. Members of the program's advisory board will meet to develop a plan of action for resolution of the decree of non-compliance. All means of complying with directives will be forwarded to the accrediting body within the indicated time frame.

The person(s) who has issued the complaint will be informed of the progress toward resolving the issue.

The student also has the right to contact the following agencies.

**Maryland Higher Education Appeals Process**

The student has the right to appeal in writing to the Secretary of Higher Education at the Maryland Higher Education Commission concerning possible school violations of Maryland regulations. Maryland Higher Education policies

require that all steps of the program grievance policy be initiated before contacting MHEC.
Maryland Higher Education Commission
6 North Liberty Street
Baltimore, MD 21201
410-767-3301

The student also has the right to contact:
**Maryland Board of Physicians**
4201 Patterson Avenue
Baltimore, MD 21215
400-764-4777

**Maryland State Consumer Protection Agency**
200 St. Paul Street
Baltimore, MD 21202
410-576-6372
**The Diagnostic Medical Sonography-Abdominal-Extended and Obstetrics and Gynecology Program**

**Grading Policies**
Students must complete all academic coursework with a grade of 75% or better and all clinical coursework with a grade of 84% or better. Students who fail an academic or clinical course will be dismissed from the program.

**Diagnostic Medical Sonography Curriculum Outline**

| Subject | Lecture Hours | Scan Lab Hours | Clinical Hours |
|---|---|---|---|
| Introduction to Sonography | 90 | | |
| Patient Care | 26 | | |
| Abdominal Sonography | 66 | | |
| | | | |
| Sonographic Principles and Instrumentation (SPI) | 68.5 | | |
| Clinical Practicum I | | | 608 |
| Scanning Lab I | | 60 | |
| Sonography of Superficial Structures | 45 | | |
| | | | |
| Ethics and Professionalism | 14 | | |
| Obstetrics and Gynecology Sonography | 70 | | |
| | | | |
| Clinical Practicum II | | | 522 |

| | | | |
|---|---|---|---|
| Scanning Lab II | | 32 | |
| Doppler Applications in the Radiology Department | 91.5 | | |
| Pediatric Sonography | 43 | | |
| Advanced Topics in Sonography | 9 | | |
| Clinical Practicum III | | | 808 |
| Scanning Lab III | | 39 | |

**Total Program Hours: 3071**

Please note the program reserves the right to make changes to the calendar based on natural disasters, pandemics, or any other reason that may be deemed appropriate.

**Diagnostic Medical Sonography Course Descriptions**

**Semester One**

**DMS 101:Introduction to Diagnostic Medical Sonography**
The course will cover introductory topics relating to diagnostic medical sonography and the role and responsibilities of the ultrasonographer in the healthcare setting. Topics include cross-sectional anatomy, introductory sonography physics and instrumentation, sonographic terminology, scanning planes, knobology, ultrasound scanning protocols, ergonomic practices, patient exam preparation, and the standards of patient-centered care.

**DMS 102: Patient Care for Sonography Students**
The course will cover topics related to important communication skills needed for proper patient care, patient assessment, vital signs, circumstances requiring unique assistance, and recognizing and addressing medical emergencies in the healthcare environment. The student will learn pathogen types, types of personal protective equipment (PPE), isolation precautions, and the various infection control measures. The course will introduce the students to invasive procedures in which sonographers are involved, in addition to the operating room (OR) environment. The student will learn the different methods of safe patient transport and will practice patient transport techniques in a hospital setting.

**DMS 103: Medical Ethics for Sonography Students**
The course will cover an introduction to medical ethics including values, morals, and the standard of such as outlined by the Society of Diagnostic Medical Sonography's Code of Ethics for the Profession of Diagnostic Medical

Sonography. Students will study patient privacy, informed consent, HIPAA, medical systems and coding, medical law classifications and terminology, as well as medical malpractice and its process. Students will work to identify how these concepts contribute to their responsibilities as ultrasonographers in the form of providing the highest quality patient-centered care while navigating ethical dilemmas. Students will work to discover the kinds of qualities they wish to embody throughout their careers in the field of sonography.

**DMS 104: Abdominal Sonography**
The course will cover the anatomy, physiology, pathophysiology, scanning techniques and protocols, and normal and abnormal sonographic appearance of abdominal organs and structures. The topics covered include the liver, gallbladder and biliary system, pancreas, urinary system, adrenal glands, and spleen. Students will prepare and deliver a case presentation based on an abdominal pathology related to one of the topics discussed in the course.

**DMS 105: Sonography of Superficial Structures** The course will cover the anatomy, physiology, pathophysiology, scanning techniques and protocols, and normal and abnormal sonographic appearance of superficial body structures. The topics covered include the thyroid, parathyroid, cervical lymph node compartments, scrotum, prostate, penis, and breast. Included are sectional and sonographic anatomy of the breast, scanning equipment and techniques, sonographic representation of pathology, and correlated radiographic imaging. Students will prepare and deliver a case presentation based on a pathology related to one of the topics discussed in the course.

**DMS 106: Scanning Laboratory**
In the course students will be introduced to knobology, machine operation, and transducer types. Students will practice the various transducer manipulation techniques. Students will receive individual training in acquiring diagnostic sonographic images of the aorta, right upper quadrant, and renal protocols within the Scan Lab setting. Students will be required to show proficiency in the scanning technique of each protocol within the allotted time by passing the required Scan Lab Proficiencies. Students' participation to be scanned by other classmates is voluntary.

**DMS 107: Clinical Practicum I**
The clinical course will introduce sonography students to the daily operations of clinical practice. Initially, students will be introduced to the clinical area and assisting clinical instructors. Students may then begin performing sonographic exams on patients under the supervision of the credentialed sonographers. Once students have achieved adequate scanning skills, clinical

instructors will allow students to complete sonographic studies and obtain Clinical Competencies.

**Semester II**

**DMS 201: Sonography Principles and Instrumentation**

The course will cover an overview of the fundamental principles of acoustic physics. The topics covered include acoustic variables, wave interference, wave parameters, pulsed wave and continuous wave parameters production, attenuation of sound energy, range equation, transducer components, sound beam anatomy, types of resolution, display modes, transducer types, ultrasound system components and their functions, artifacts, harmonic imaging, contrast-enhanced ultrasound physics, Doppler and hemodynamics, bioeffects, the ALARA principle, and quality assurance.

**DMS 202: Gynecologic Sonography**

The course will cover the anatomy, physiology, pathophysiology, scanning techniques and protocols, and normal and abnormal sonographic appearance of the female pelvic structures and reproductive organs. Topics will also include congenital uterine anomalies, risk stratification of ovarian and adnexal lesions, and an introduction to diagnostic procedures related to the female pelvis.

**DMS 203: Obstretric Sonography**

The course will cover the anatomy, physiology, pathophysiology, scanning techniques and protocols, and normal and abnormal sonographic appearance of the gravid uterus and fetal anatomy. Topics will also include first trimester obstetric sonography, fetal assessment in the normal second and third trimesters, fetal growth assessment, fetal structural abnormalities, genetic abnormalities and syndromes, high-risk obstetrics, interventional procedures, and post-partum complications. Students will prepare and deliver a case presentation related to one of the covered pathologies.

**DMS 204: Scan Laboratory II**

In the course students will receive individual training in acquiring diagnostic sonographic images of the abdomen complete, thyroid, transabdominal female pelvis, neonatal brain, and carotid protocols within the Scan Lab Setting. Students will be required to show proficiency in the scanning technique of each protocol within the allotted time by passing the Scan Lab Proficiencies. Students' participation to be scanned by other classmates is voluntary. Tissue-mimicking phantoms may be used for learning the scanning technique in some of the protocols.

**DMS 205: Clinical Practicum II**

The clinical course will enable students to attend multiple clinical rotations at various sites. Students will continue to learn and perform, under supervision, the various routine ultrasound exams and procedures that are performed at the clinical sites.

**Semester III**

**DMS 301: Doppler Applications in the Radiology Department**

The course will cover the use of ultrasound Doppler in the various sonographic exams. Topics will include hemodynamics, vascular disease processes, carotid duplex, transcranial Doppler, upper and lower extremity venous and arterial studies, abdominal aorta and iliac arteries, liver duplex, renal duplex, liver transplants, renal transplants, pancreas transplants, and mesenteric duplex. Students will learn anatomy, pathologic processes, scanning techniques, and normal and abnormal sonographic findings in the topics discussed. Students will prepare and deliver a case presentation related to one of the covered pathologies.

**DMS 302: Pediatric Sonography**

The course offers an overview of the various sonographic exams that are performed in pediatric sonography. Students will learn the anatomy, physiology, pathophysiology, scanning techniques and protocols, and normal and abnormal sonographic appearances of the various organs and structures of the pediatric patient. The course will cover neonatal brain, pediatric hip, neonatal spine, pediatric abdomen (liver, gallbladder, spleen, and pancreas), pediatric gastrointestinal tract, pediatric urinary system and adrenal glands, pediatric female and male pelvic organs and structures, pediatric neck, pediatric chest, and neurocutaneous syndromes.

**DMS 303: Advanced Topics in Sonography**

The course will introduce advanced sonographic topics, including the use of contrast-enhanced ultrasound (CEUS) applications and the use of elastography to measure tissue stiffness.

**DMS 304: Scan Laboratory III**

In the Lab students will receive individual training in acquiring diagnostic sonographic images of the lower and upper extremity vasculature, liver duplex, bowel, 3D endometrium, and liver elastography protocols within the Scan Lab setting. Students will be required to show proficiency in the scanning technique of each protocol within the allotted time by passing the required Scan Lab Proficiencies. Students' participation in being scanned by other classmates is voluntary. Tissue-mimicking phantoms may be used for learning the scanning technique in some of the protocols

**DMS 305: Clinical Practicum III**
The clinical course will enable students to attend multiple clinical rotations at various sites. Students will continue to learn and perform, under supervision, the various routine ultrasound exams and procedures that are performed at the clinical sites. At this level, students will be working more independently with less help from clinical instructors.

**Diagnostic Medical Sonography Clinical Sites**

- The Johns Hopkins Hospital and The Johns Hopkins Hospital Outpatient Center
    - Pediatrics
    - Maternal Fetal Medicine
    - Avon Breast Center
- The Johns Hopkins University Department of Vascular Surgery
- Johns Hopkins Bayview Medical Center
- Johns Hopkins Medicine, Howard County General Hospital Johns Hopkins Medicine, Sibley Memorial Hospital and Suburban Hospital
- Johns Hopkins Imaging: Green Spring, Columbia & White Marsh
- Anne Arundel Diagnostics
- MedStar Franklin Square
- Medstar Union Memorial
- Mercy Medical Center
- Sinai Hospital of Baltimore
- University of Maryland Medical Center
- Greater Baltimore Medical Center

**Program Hours**

Program hours for the Diagnostic Medical Sonography will vary. On the days when scan labs are scheduled, the hours are 6:30 am to 3:00 pm. Scan labs are held multiple days per week, primarily Monday, Tuesday and Wednesday, but the program reserves the right to vary these days. On days when scan labs are not scheduled the hours are 8:00 am to 4:30 pm.

**Certification Examinations**
The JHH DMS curriculum is currently accredited by the Commission on Accreditation of Allied Health Education Programs (CAAHEP) as a Diagnostic Medical Sonography, Abdomen-Extended and Obstetrics and Gynecology Program. The national certification examinations are administered by the American Registry of Diagnostic Medical Sonography (ARDMS).

Students are required to take and pass the ARDMS Sonographic Principles and Instrumentation examination plus either Abdomen or Obstetrics and

Gynecology before graduation. Students are strongly encouraged to take all three examinations before graduation.
Once the students complete all graduation requirements, and become Registered Diagnostic Medical Sonographers (RDMS), they will be able to apply and sit for other examinations administered by the ARDMS under ARDMS re-applicant status.
Students may also be certified in Sonography by completing the certification offered by the American Registry of Radiologic Technologists.

## Nuclear Medicine Technology

### Grading Policies

Students must complete all academic coursework with a grade of 75% or better and all clinical coursework with a grade of 84% or better. Students who fail an academic or clinical course will be dismissed from the program.

### Nuclear Medicine Technology Curriculum Outline

| Subject | Lecture Hours | Lab Hours | Clinical Hours |
|---|---|---|---|
| NMED 101: Orientation and Introduction to Nuclear Medicine Technology | 100 | 20 | |
| NMED 102: Patient Care | 37 | 2 | |
| NMED 103: Introduction to NMED Procedures | 18 | | |
| NMED 104: Nuclear Physics and Instrumentation | 54 | | |
| NMED 105: Radiation Biology and Safety | 54 | | |
| NMED 106: Clinical Practicum I | | | 867 |
| NMED 201: Medical Ethics and Law for the Imaging Professional | 36 | | |
| NMED 202: Radiopharmacology | 54 | 8 | |
| NMED 203: Advanced Instrumentation | 45 | | |
| NMED 204: Senior Seminar | 54 | | |
| NMED 205: Clinical Practicum II | | | 755 |
| NMED 301: CT Principles and Instrumentation | 40 | | |
| NMED 302: Cross-Sectional Anatomy | 40 | | |
| NMED 303: CT Protocols and Applications | 40 | | |
| NMED 304: Registry Review | 40 | | |
| NMED 305: Clinical Practicum III | | | 688 |

**Total Program Hours: 2952**

Program hours are only listed for those hours the student will be in attendance in the program and do not include hours for breaks, 96 hours of leave or hospital holidays.

Please note the program reserves the right to make changes to the calendar based on natural disasters, pandemics, or any other reason that may be deemed appropriate.

## Nuclear Medicine Technology Course Descriptions

### Semester I

**NMED 101 Orientation and Introduction to Nuclear Medicine Technology**
This course is an introduction to the clinical aspects of nuclear medicine technology in the hospital and outpatient environment. Emphasis is on the basic orientation to the nuclear medicine division, its function, and basic patient care techniques. Students will observe and assist with routine nuclear medicine procedures in this course. Venipuncture skills will be taught and evaluated.
It also includes several days of basic orientation: a review of policies and procedures, a hospital tour, history of the hospital and school, introduction to staff, administration, and instructors. Lectures will also include a history of the hospital system, organization of the department, areas of clinical specialties and others. In addition, all students will complete the required CPR training (American Heart Association – BLS – Healthcare Provider). Basic hospital orientation consists of 1 day of mandatory hospital training.

**NMED: 102: Patient Care and Pharmacology**
This course will provide a basic understanding of the skills needed to allow the student to work comfortably and safely with patients. Some of the areas covered will include standard precautions, infection control, proper body mechanics, patient transport techniques, aseptic technique, communication, age-specific criteria, basic nursing care, and patient monitoring to include vital signs and medical emergencies. Pharmacology and the use of radiographic contrast, including risk factors and reactions, will also be taught. Students will learn to critically evaluate patients and examinations to determine possible risks to the patient or staff.

**NMED 103: Introduction to Nuclear Medicine Procedures**
This course is designed to provide the student with a basic understanding of the various procedures employed in the practice of laboratory and clinical

Nuclear Medicine. The use of nuclear medicine technology in all body systems is covered.

**NMED 104: Nuclear Physics and Instrumentation**
This course is designed to provide the student with a basic understanding of the process and products of radioactive decay, the theory of operation, practical limitations, and selection of radiation detection equipment. The application to problems in Nuclear Medicine is emphasized.

**NMED 105: Radiation Biology and Protection**
This course is designed to acquaint the student with the effects of ionizing radiation on the human body, and optimizing radiation protection for patients, self and other healthcare providers. The first half of the course will focus on radiation biology and covers such concepts as ALARA, ionizing radiation interaction with matter, and early and late effects of ionizing radiation. The second half of the course will focus on means of minimizing radiation exposure to both patients, imaging technologists and other health care workers. Also covered are regulations related to radiation exposure and nuclear medicine equipment. This course will focus on means of minimizing radiation exposure to both patients, imaging technologists and other healthcare workers. Also covered are agencies and regulations related to radiation exposure and nuclear medicine equipment. Additional time will be spent learning and practicing various mathematical formulae used in Nuclear Medicine Technology.

**NMED 106: Clinical Practicum I**
Clinical practice enables the student to work with patients while under close supervision of a qualified technologist. This allows the student to use knowledge gained in the classroom in hands-on application.

**Semester II**

**NMED 201: Ethics and Law for the Imaging Professional**
The purpose of this course is to give the medical imaging student a basic background in ethics, medical-legal issues and ethical decision-making. The field of medical imaging is one where students will be called upon to make decisions that will involve personal and professional ethics and values. This course will be taught as a combination of lecture and class discussion. Student contribution to class discussion is important to this course.

**NMED 202: Radiopharmacology**
This course is designed to provide the student with an understanding of the principles and practice concerning with the use of radiopharmaceuticals. There will be a focus on understanding how to find information relating to the use of radiopharmaceuticals through package inserts and safety data sheets.

**NMED 203: Advanced Instrumentation**
This course focuses on SPECT, PET, computer applications and image processing. Students will learn how all systems work from the moment the radiation leaves the patient through the entirety of our scanners as well as advanced processing maneuvers.

**NMED 204: Senior Seminar**
A collaborative approach to tying together the concepts given in previous classes on nuclear medicine while linking them with computed tomography. Lectures include advanced techniques and procedures, cross-sectional anatomy, and board review. This course includes oral assessments focused on student ability to analyze and converse about common scans at a reading room ready level.

**NMED 205: Clinical Practice II**
Extension of Clinical Practice I, this course provides experience for the student in various areas of clinical Nuclear Medicine. Students continue to apply concepts learned in the classroom and apply these concepts to practical applications in Nuclear Medicine while under the direct and indirect supervision of a qualified technologist.

**Semester III**

**NMED 301: Computed Tomography Principles & Instrumentation,**
This course teaches the physics, image quality control factors, and equipment considerations of CT. Topics include the historical development of CT scanners; factors affecting CT resolution and noise; CT reconstruction algorithms and filters; window width and level controls; tissue density issues; image display parameters; and radiation dose issues. Students also study dynamic CT with contrast enhancement, spiral CT, and 3D CT reconstruction. Current generation CT scanning technology is described and the relative advantages of different systems are compared.

**NMED 302: Cross-sectional Anatomy,**
This course is designed as a survey of human anatomy and selected pathology from a regional rather than system perspective. Students will

become accustomed to viewing anatomy of regions of the body in the different anatomical planes typically produced in cross-sectional imaging. Special emphasis will be placed upon correlating and recognizing anatomical structures as they appear on medical images produced with CT, MRI, nuclear medicine, and ultrasound. Primary regions of interest include head, thorax, abdomen, and pelvis.

**NMED 303: Computed Tomography Protocols & Applications**
This course is a survey of routine CT imaging procedures. The content is divided into three units: (1) head, neck and spine, (2) chest and abdomen, and (3) pelvis and extremities. The student also becomes familiar with contrast administration guidelines and timing issues related to dynamic imaging. Spiral CT, 3D reconstruction procedures, and vascular imaging are discussed and compared with routine imaging of the same anatomical regions.

**NMED 304 – Clinical Practicum III**
This clinical course will allow the student to achieve final competencies in Nuclear Medicine studies and complete CT competencies. Students gain hands-on experience with different types of CT imaging equipment and procedures typically performed on that equipment. Students are expected to master the techniques for each category of CT procedures and will be required to demonstrate competency for a range of routine procedures.

**Nuclear Medicine Clinical Training Sites**

- The Johns Hopkins Hospital and Outpatient Center
- Johns Hopkins Bayview Medical Center
- Sinai Hospital of Baltimore
- MedStar Hospital at Franklin Square
- Baltimore Washington Medical Center
- Chesapeake Medical Imaging
- St. Agnes Hospital
- Suburban Hospital
- Anne Arundel Medical Center
- Jubilant Radiopharma

**Certification Information**
Students who graduate from the Nuclear Medicine Technology Program are eligible to sit for the following board examinations:

- NMTCB (Nuclear Medicine Technology Certification Board)
- ARRT (American Registry of Radiologic Technology)

Students are also eligible upon graduation to sit for the CT board examinations in each of the above-named certification boards.

**Program Hours**
Program Hours for the Nuclear Medicine Technology Program are generally 7:00 am to 3:30 pm. When the student is assigned to a Quality Control rotation, the hours will be 6:30 am to 3:00 pm.

## Radiography

The Radiography Program has two tracks, an 18-month and a 23-month track. Both cohorts will complete the didactic training concurrently (8 hours per week). The 18-month track will attend clinic 28 hours per week with a total commitment of 36 hours per week. The 23-month track will attend clinic 20 hours a week in the first three semesters and 32 hours per week in the fourth semester. This is a commitment of 28 hours per week for the first three semesters and 32 hours per week in the final semester. The fourth semester is clinical only.

**Grading Policies**
Students must complete all academic coursework with a grade of 75% or better and all clinical coursework with a grade of 2.5 or better on a 4.0 scale. Students who fail an academic or clinical course will be dismissed from the program.

**Radiography Curriculum Outline: 18-Month Program**

| Curriculum Outline | Lecture Hours | Lab Hours | Clinical Hours |
|---|---|---|---|
| Rad 101: Orientation and Introduction to Radiography | 93 | 24 | |
| Rad 102: Radiographic Procedures I | 50 | 16 | |
| Rad 103: Equipment Operation | 30 | | |
| Rad 104: Radiation Biology and Protection | 41 | | |
| Rad 105: Image Acquisition and Evaluation I | 20 | | |
| Rad 106: Patient Care and Pharmacology | 42 | 2 | |
| Rad 107: Osteology | 28 | | |
| Rad 108: Medical Terminology | 32 | | |
| Rad 110: Clinical Practicum I | | | 662 |
| Rad 202: Radiographic Procedures II | 40 | 12 | |
| Rad 203: Medical Ethics and Law for the Imaging Professional | 22 | | |

| | | | |
|---|---|---|---|
| Rad 204: Equipment Operation and Quality Control | 20 | | |
| Rad 205: Image Acquisition Evaluation II | 28 | | |
| Rad 206: Venipuncture Training | 8 | 8 | |
| Rad 220: Clinical Practicum II | | | 716 |
| Rad 302: Imaging Modalities and Radiation Therapy | 22 | | |
| Rad 303: Comprehensive Registry Review | 40 | | |
| Rad 304: Introduction to Radiographic Pathology | 34 | | |
| Rad 305: Advanced Topics in Radiography | 34 | | |
| Rad 330: Clinical Practicum III | | | 624 |
| | 584 | 62 | 2,002 |

**Total Program Hours: 2648**

Please note the program reserves the right to make changes to the calendar based on natural disasters, pandemics, or any other reason that may be deemed appropriate.

**Radiography Curriculum Outline: 23-Month Program**

| Curriculum Outline | Lecture Hours | Lab Hours | Clinical Hours |
|---|---|---|---|
| Rad 101: Orientation and Introduction to Radiography | 93 | 24 | |
| Rad 102: Radiographic Procedures I | 50 | 16 | |
| Rad 103: Equipment Operation | 30 | | |
| Rad 104: Radiation Biology and Protection | 41 | | |
| Rad 105: Image Acquisition and Evaluation I | 20 | | |
| Rad 106: Patient Care and Pharmacology | 42 | 2 | |
| Rad 107: Osteology | 28 | | |
| Rad 108: Medical Terminology | 32 | | |
| Rad 110: Clinical Practicum I | | | 422 |
| Rad 202: Radiographic Procedures II | 40 | 12 | |
| Rad 203: Medical Ethics and Law for the Imaging Professional | 22 | | |
| Rad 204: Equipment Operation and Quality Control | 20 | | |
| Rad 205: Image Acquisition Evaluation II | 28 | | |
| Rad 206: Venipuncture Training | 8 | 8 | |
| Rad 220: Clinical Practicum II | | | 516 |

| | | | |
|---|---|---|---|
| Rad 302: Imaging Modalities and Radiation Therapy | 24 | | |
| Rad 303: Comprehensive Registry Review | 40 | | |
| Rad 304: Introduction to Radiographic Pathology | 34 | | |
| Rad 305: Advanced Topics in Radiography | 34 | | |
| Rad 330: Clinical Practicum III | | | 448 |
| Rad 440: Clinical Practicum IV | | | 600 |
| | 584 | 62 | 1986 |

**Total Program Hours: 2632**

Please note the program reserves the right to make changes to the calendar based on natural disasters, pandemics, or any other reason that may be deemed appropriate.

## Course Descriptions

### Semester I

**RAD 101 Orientation and Introduction to Radiography**
This course is designed to provide the student with an overview of the field of radiography and its role in the healthcare system. Topics covered include Radiography Program policies and procedures, the profession of radiography, relevant accreditation and credentialing agencies, hospital and radiology department organization, an overview of other allied health care professions, and professional opportunities for growth and development. Additional topics include training related to cultural competencies, critical thinking, and working with different generations and the LBGTQ community. Clinical orientation will cover an introduction to terms and concepts that are basic to radiographic procedures, the basic operation of the x-ray unit, image processing and radiation protection. Students will attend hospital employee orientation, which will train the student in handling blood and bodily fluid, borne pathogens, harassment, chemical and fire safety. The student will receive training to be CPR certified. Coursework is assigned in the JHH online learning system. Students are expected to pass both clinical and classroom competency evaluations related to this course.

**RAD 102 Radiographic Procedures I**
This course, the first of a two-semester sequence, provides detailed instruction in the fundamental principles of positioning for all routine radiographic procedures. It includes relevant topographic anatomy and cross-sectional anatomy instruction. Also included in this course is an instruction in procedures that are unique to pediatrics, geriatrics, obesity, mobile radiography, trauma and operating room. This course integrates with

the Clinical Competency Program. This course is divided into categories with each category having a laboratory component. The categories are chest, abdomen, extremities, pelvis, and the bony thorax. Emphasis is placed on critical evaluation of images and problem-solving skills about producing diagnostic radiographs.

**RAD 103 Equipment Operation**
In this course, commonly called Radiation Physics, the first semester radiography student will be introduced to the fundamental principles of ionizing radiation. During the course of this semester, the student will be presented with material covering the discovery of x-ray, x-ray properties, x-ray terminology, electricity and magnetism, electromagnetic radiation, the x-ray unit and tube, x-ray production, and the x-ray emission spectrum.

**RAD 104 Radiation Biology and Protection**
This course is designed to acquaint the student with the effects of ionizing radiation on the human body, and optimizing radiation protection for patients, self and other healthcare providers. The first half of the course will focus on radiation biology and covers such concepts as ALARA, ionizing radiation interaction with matter, and early and late effects of ionizing radiation. The second half of the course will focus on means of minimizing radiation exposure to both patients, imaging technologists and other healthcare workers. Also covered are agencies and regulations related to radiation exposure and x-ray equipment.

**RAD 105 Image Acquisition and Evaluation I**
This course, the first in a two-semester sequence, will provide students with the principles of image creation. The primary focus of this course will be the process of digital imaging to include characteristics, image identification, computed radiography, direct radiography, image processing and display, as well as information about RIS, DICOM and PACS.

**RAD 106 Patient Care and Pharmacology**
This course will provide a basic understanding of the skills needed to allow the student to work comfortably and safely with patients. Some of the areas covered will include standard precautions, infection control, proper body mechanics, aseptic technique, communication, age-specific criteria, basic nursing care, and patient monitoring to include vital signs and medical emergencies. Pharmacology and the use of radiographic contrast and radiopharmacuticals, including risk factors and reactions, will also be taught. Students will learn to critically evaluate patients and examinations to determine possible risks to the patient or staff. The course will also include a laboratory component in which the student will be evaluated on basic nursing skills, sterile technique, and aseptic technique.

**RAD 107 Osteology**
This course will provide detailed content in the subject of human osteology. Information will cover the structure and function of bone tissue. Students will learn to identify bones using various instructional means such as dry specimens, drawings and radiographs. Emphasis will be placed throughout the course on arthrology of various joints. This course integrates with Radiographic Positioning and the Clinical Competency Program to prepare the student to identify various bony anatomy on radiographs.

**RAD 108 Medical Terminology**
This course will provide the student with a sound background in the language of the medical profession. The content will be based on word-building skills that begin with a study of prefixes, suffixes and root words. Specific terminology related to radiology will be discussed. Also included in this course will be abbreviations and symbols. An ability to break down and analyze words, correct spelling and pronunciation will be emphasized.

**RAD 110 Clinical Practicum I**
This clinical course will introduce the radiography student to the day-to-day operations of clinical practice. The first part of the course will be spent introducing the student to the clinical area and assisting the technologist. Students may then begin performing radiographic procedures on patients under the direct supervision of a qualified technologist. Latter portions of the course will allow the students to begin documenting and testing on procedures that have been presented in Radiographic Procedures I, once clinical laboratory and classroom testing have been completed.

**Semester II**

**RAD 202 Radiographic Procedures II**
This course will continue to provide students with detailed instruction on increasingly difficult radiographic examinations to include; spine, headwork, contrast imaging, urinary studies, venography, arthrography, myelography and hysterosalpingography. It includes relevant topographic anatomy and cross-sectional anatomy instruction. Continued emphasis is placed on critical evaluation of images and problem-solving skills about producing diagnostic radiographs. This course integrates with the Clinical Competency Program and is divided into categories, each having a laboratory component.

**RAD 203 Medical Ethics and Law for the Imaging Professional**
The purpose of this course is to give the medical imaging student a basic background in ethics, medical-legal issues and ethical decision-making. The field of medical imaging is one where students will be called upon to make

decisions that will involve personal and professional ethics and values. This course is a combination of lecture and class discussion. Student contribution to class discussion is important to this course.

**RAD 204 Equipment Operation and Quality Control**
This course, a continuation of Equipment Operation, will cover the operation of different equipment that uses x-radiation to produce images. This course will include lectures on fluoroscopy, both analog and digital, mammography, tomography, subtraction, and CT equipment. Quality assurance and quality control will be discussed.

**RAD 205 Image Acquisition and Evaluation II**
This course allows the student to develop a working knowledge of the theory and principles of radiographic exposure. The three primary image quality factors of spatial resolution, distortion, and receptor exposure will be covered. Controlling and influencing factors that affect radiographic quality are emphasized. Critical thinking and problem-solving skills will be emphasized as the student learns to manipulate various controlling and influencing factors of radiographic quality to produce the optimal radiograph.

**RAD 206 Venipuncture**
This non-graded course will be successfully completed when the student proves competency through completing the check of by simulating the procedure. Students will complete a self-learning packet of materials required by the Radiology Department for all technologists, nurses, and students who wish to practice venipuncture in the department. Students will participate in a series of classroom demonstrations and simulated practice.

**RAD 220 Clinical Practicum II**

This clinical course will allow the student to perform radiographic examinations under the supervision of a qualified radiographer. The students will continue documenting and testing on studies that have been presented in Radiographic Procedures II, once clinical laboratory and classroom testing has been completed. Emphasis will be placed on continuous improvement of imaging skills and speed in performing examinations.

**Semester III**

**RAD 302 Imaging Modalities and Radiation Therapy**
This course provides an overview of alternate imaging modalities including: Cardiovascular – Interventional Imaging, Neuro-Interventional, Computed Tomography, Nuclear Medicine Technology, DEXA, Diagnostic Medical Sonography, Mammography and Magnetic Resonance Imaging, and

Radiation Therapy. Included in the discussions of these alternate imaging modalities will be necessary requirements to become certified in the areas.

**RAD 303 Comprehensive Review**

This non-graded course is intended to prepare the student for the ARRT Registry Exam in Radiography. The content areas correspond to those content areas of the registry exam. Students will review content, practice exam questions, and have the opportunity to direct the review content to specific areas they determine to be necessary.

**RAD 304 Introduction to Radiographic Pathology**

This course is designed to enable the second-year radiography student to integrate information learned from courses in radiographic positioning and anatomy into pathological processes diagnosed from radiographs. Commonly seen pathologies will be discussed, and their radiographic appearance demonstrated. Included in this course will be a formal presentation on a pathology that has been independently researched by the student.

**RAD 305 Advanced Topics in Radiography**

This course is designed for extensive group and individual participation in the critical evaluation of radiographs, typical and atypical radiographs, procedures and imaging the non-conforming patient. The student is guided by the instructor in using critical thinking skills to identify problems in regard to diagnostic quality of the radiograph. Anatomical structures, associated pathology, positioning, processing problems and pertinent patient clinical data are discussed. This course will also include critical evaluation of journal and internet articles relevant to radiology. The student will create a clinical portfolio during this course.

**RAD 330 Clinical Practicum III**

This clinical course will allow the student to perform radiographic examinations under the supervision of a qualified radiographer. The students will continue documenting and testing studies that have been presented in Radiographic Procedures I and II. Emphasis will be placed on continuous improvement of imaging skills and speed in performing examinations. During this clinical course, the student in the 18-month track will be expected to complete all outstanding clinical competency testing, and complete two Global (terminal) competencies in the areas of Orthopedics and Emergency Department.

**Semester IV**

**RAD 440 Clinical Practicum IV (23-Month Track Only)**

This clinical course will allow the student to perform radiographic examinations under the supervision of a qualified radiographer. The students will continue documenting and testing studies that have been presented in

Radiographic Procedures I and II. Emphasis will be placed on continuous improvement of imaging skills and speed in performing examinations. During this clinical course, the student will be expected to complete all outstanding clinical competency testing, and complete two Global (terminal) competencies in the areas of Orthopedics and Emergency Department.

**Radiography Program Clinical Sites**

- The Johns Hopkins Hospital and Outpatient Center
- Johns Hopkins Imaging at White Marsh, Greenspring, Columbia Orthopedics, and Odenton Orthopedics
- Johns Hopkins Bayview Medical Center
- Advanced Radiology at Annapolis, Timonium, Eldersburg and Westminster
- Lifebridge Health Centers at Sinai Hospital and Northwest Hospital

**Certification Examination**

After completion of the Radiography Program and once the student has obtained an Associate's or Bachelor's degree, the student may sit for the certification board examination through the American Registry of Radiologic Technologists.

**Program Hours**

Radiography program hours are primarily 8:00 am to 4:30 am. The first rotation in the emergency department may be 10:00 am to 6:30 pm. Odenton Orthopedics and the first rotation in pediatrics will be 7:00 am to 3:30 pm. Subsequent rotations in the emergency department and pediatrics will be 1:00 pm to 9:00 pm. There are approximately eight weeks of evening rotations.

The 18-month track will attend 8 hours per day, Monday through Thursday and Friday from 8 am-12:00 pm. The 23-month track will attend 8 hours per day, Tuesday through Thursday and Friday, from 8 am-12:00 pm.

June 1, 2023
All other editions are obsolete