

### **Course Description**

#### **NMT2824C | Nuclear Medicine Clinical Education 3 | 5.00 credits**

This is the final course in the series of three clinical courses. Students will learn to apply all didactic competencies in the Nuclear Medicine department setting, as well as perform all procedures from the two Nuclear Medicine Procedures courses with minimal supervision. The ARRT Competency Requirements must be completed in this course. Prerequisites: NMT2814C

### **Course Competencies:**

**Competency 1:** The student will be able to practice non-emergency patient care and prepare patients for Nuclear Medicine procedures by:

1. Using correct body mechanics and support holds when moving or assisting patients
2. Using side rails or stretcher/wheelchair straps on patients as appropriate
3. Monitoring the disoriented, unconscious, sedated, or pediatric patient
4. Providing patient comfort before, during, and after the nuclear medicine procedure
5. Using correct medical asepsis techniques during venipuncture procedures
6. Using correct isolation procedures when indicated
7. Demonstrating how to observe and maintain intravenous tubing, nasogastric tubing, chest tubes, urinary retention catheters, surgical dressing, CVP lines, T-tube colostomy, and oxygen administration, as appropriate
8. Assisting patients with the use of bedpans/urinals or emesis basins, as needed

**Competency 2:** The student will be able to implement primary emergency patient care by:

1. Implementing reading and recording vital signs as needed, including blood pressure, pulse, respiratory rate, and temperature
2. Identifying an emergency that requires immediate notification of a physician and making the proper notification
3. Demonstrating an emergency that requires immediate notification of the hospital "code" team and making the proper notification
4. Performing Cardiopulmonary resuscitation techniques, if necessary
5. Finding and assisting with the use of the emergency cart as appropriate
6. Maintaining life support equipment as appropriate
7. Providing appropriate care in response to patient seizures, hemorrhage, and fainting

**Competency 3:** The student will be able to exhibit professional behavior and awareness for the patient's comfort by:

1. Creating a protocol to welcome the patient to the department, including introducing yourself and addressing the patient by name
2. Addressing patients, families, co-workers, and hospital personnel by appropriate names or titles
3. Demonstrating the respect given to patients, families, co-workers, and hospital personnel
4. Controlling one's emotional reactions such as distaste, disgust, and surprise
5. Refraining from discussing confidential or potentially alarming news in front of or near the patient
6. Preventing unnecessary exposure of the patient's body
7. Utilizing time management skills to minimize patient waiting periods
8. Assessing the patient's comfort level and providing pleasantness as conditions allow
9. Demonstrating why a patient has been kept waiting and assuring them they have not been forgotten
10. Maintaining confidence in any information offered by the patient unless it is understood by the patient that will become a part of the medical record
11. Preparing a report of patient condition changes to the appropriate person

12. Applying to the patient what the examination involves, what the patient will feel, and what the patient will be required to do before beginning the examination
13. Explaining the procedure to the patient, considering the patient's age, degree of illness, intelligence, and possible language difficulties
14. Communicating with the patient throughout the procedure

**Competency 4:** The student will be able to perform essential administrative/management functions of the department by:

1. Demonstrating how to maintain inventory supplies and determining when to restock routine items, radiopharmaceuticals, and radio-assay kits with specific shelf lives
2. Communicating effectively with hospital and departmental staff to schedule patient studies, including determining the correct sequence for multiple procedures in nuclear medicine and radiology
3. Maintaining appropriate records of patient doses, quality control procedures, radioactive waste disposal, patient reports, film reports, and all other records required by the hospital, JCAHO, NRC, or licensing bodies
4. Interpreting and following the departmental procedure manual
5. Creating a personal procedure manual to reflect the level of knowledge of procedures performed in the facility

**Competency 5:** The student will be able to recognize in vivo imaging procedures by:

1. Implementing how to maintain the requisition for completeness of the information
2. Retrieving and preparing the patient file
3. Identifying relevant data from the medical record and requisition as appropriate
4. Obtaining positive patient identification, conducting a patient interview, and explaining the study (obtaining formal consent when needed)
5. Determining whether the patient has undergone the necessary pre-examination procedures when appropriate
6. Determining whether the patient has received any medication or had any examination that would interfere with or contraindicate the nuclear medicine study
7. Implementing corrective action or make appropriate notation on the requisition if the patient has either not undergone necessary pre-exam procedures or has had any medication or examination that would interfere with the nuclear medicine study
8. Preparing the patient and instructing the patient as to any particular preparation necessary for the imaging procedure
9. Calculating the correct radio-pharmaceutical dose to be administered
10. Determining the radio-pharmaceutical administration time and time at which imaging should be performed post-administration
11. Preparing the administration tray and apply the correct radiopharmaceutical in the appropriate dosage
12. Administering the radio-pharmaceutical according to protocol was permitted by law or policy
13. Selecting instrument, collimator, and auxiliary equipment for the study and determining that all equipment functions properly
14. Selecting and adjusting instrument parameters for the images as each view is performed
15. Selecting and adjusting the photo display unit for the study

**Competency 6:** The student will be able to operate Nuclear Medicine instruments by:

1. Preparing the scintillation camera (planar or SPECT) for a procedure
2. Selecting and attaching the proper collimator
3. Selecting and adjusting the imaging parameters
4. Recognizing imaging artifacts that reflect malfunctioning or incorrectly adjusted instruments
5. Performing and analyzing a field uniformity check
6. Selecting a radio-nuclide source of appropriate quantity and energy

7. Adjusting pulse-height analyzer photo peak
8. Constructing uniform images using standardized techniques
9. Comparing a current field uniformity image with previous images and identifying any non-uniformities
10. Performing and analyzing a detector linearity check
11. Performing a sensitivity check according to the established protocol and procedures on the departmental camera
12. Performing each exam within the expected frequency

**Competency 7:** The student will be able to practice the skills of dose calculation and administration by:

1. Calculating the dose of a specific radio-pharmacological product for a certain study using a calculator and decay chart
2. Verifying and record the patient's name, age, and the study requested
3. Identifying the concentration, total activity, total volume, assay time, and date of assay from the label on the radio- pharmaceutical vial
4. Determining the lapsed time and calculating the activity remaining
5. Analyzing the activity needed for the procedure
6. Calculating the volume of the radio- pharmaceutical required to provide the appropriate patient dosage
7. Recording the appropriate data into radio-pharmaceutical dispensing records for the procedure
8. Calculating the correct radio-pharmaceutical dose
9. Demonstrating the correct method for dispensing a liquid radiopharmaceutical for an intravenous administration
10. Using aseptic techniques
11. Using gloves and shields to minimize self-contamination problems
12. Drawing up the radio-pharmaceutical behind a lead shield to within +/- 5% of the calculated dose
13. Calculating the radioactivity with the dose calibrator
14. Recording patient data and radio-pharmaceutical data according to approval policy
15. Labeling the syringe and syringe shield

**Competency 8:** The student will be able to demonstrate an understanding of radio pharmacy by:

1. Demonstrating the correct procedure for eluting a Mo/99mTc generator.
2. Assembling the shield, vials, and all materials necessary for aseptic elution of the generator.
3. Performing the complete procedure behind a lead shield using gloves.
4. Attaching vials to correct input and output needles (a shield on the vial will be used to contain the eluate assay)
5. Eluting in the dose calibrator and recording the eluate activity in the appropriate radiopharmaceutical accountability log
6. Checking whether the volume and activity eluted are appropriate to the volume used and activity expected for that day
7. Labeling the vial/shield with the appropriate information to include activity, volume, concentration, date and time of assay, and radio-pharmaceutical
8. Performing a 99Mo breakthrough Verify test on a 99Mo/99mTc eluate
9. Determining 99mTc activity per volume using the appropriate dose calibrator setting
10. Determining 99Mo activity per volume using the appropriate dose calibrator setting

**Competency 9:** The student will be able to implement radiation safety and protection techniques by:

1. Wearing whole-body and ring badges at all times in the clinical area
2. Reviewing the monthly and cumulative personnel exposure records with regard to dose limits
3. Recognizing and taking appropriate measures to reduce exposure
4. Using appropriate protection techniques to keep exposure as low as reasonably achievable
5. Performing area surveys of the hot lab and department
6. Checking survey instruments for proper function and calibration

7. Using department protocol to determine areas for survey
8. Using correct survey instrument for each type and level of radiation
9. Interpreting results and notifying personnel as appropriate
10. Performing wipe tests and decontamination procedures as appropriate
11. Receiving and processing radioactive shipments, including the generator, in the laboratory
12. Recording the receipt of radioactive shipments
13. Identifying damaged packaging and take appropriate precautions
14. Monitoring packaging material

**Learning Outcomes:**

- Communicate effectively using listening, speaking, reading, and writing skills
- Solve problems using critical and creative thinking and scientific reasoning
- Formulate strategies to locate, evaluate, and apply information