# NMT2804C  Nuclear Medicine Clinic Practice & Conference 1

**Course Description:**
This course will introduce the student to the fundamentals of clinical nuclear medicine primarily through hospital involvement. The student will learn practical experience in a Nuclear Medicine department by performing the principles taught in class.

## Course Competency

### Competency 1: The student will be able to demonstrate an understanding of the basic operations of the nuclear medicine department and facility's rules and regulations through an orienting process by:

1. Obtaining vital signs as needed, including blood pressure, pulse, respiratory rate, and temperature.
2. Recognizing an emergency that requires immediate notification of a physician and making the proper notification.
3. Recognizing an emergency that requires immediate notification of the hospital "code" team and make 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/or fainting.

### Learning Outcomes
- Critical thinking
- Ethical issues

### Competency 2: The student will exhibit professional behavior and awareness for the patient comfort by:

1. Introducing himself/herself to the patient, welcoming the patient to the department, and addressing the patient by name.
2. Addressing patients, families, co-workers and hospital personnel by appropriate names or titles.
3. Respecting all patients, families, co-workers, and hospital personnel.

- Ethical Issues
4. Avoiding the display of emotional reactions such as distaste, disgust and/or surprise.
5. Maintaining private anything confidential or potentially alarming to the patient within the patient's hearing.
6. Refraining from discussion of patients with colleagues in patient areas and/or in any way that is not pertinent for relevant to the procedure or patient care.
7. Preventing unnecessary exposure of the patient's body.
8. Working proficiently and scheduling carefully in order to minimize patient waiting periods as much as possible.
9. Providing the patient who must wait before or during a procedure with as much comfort and pleasantness as conditions allow.
10. Providing an explanation and apology when a patient must be kept waiting and assuring the patient he/she has not been forgotten.
11. Holding in confidence any information offered by the patient, unless it is understood by the patient that it will become a part of the medical record.
12. Reporting any changes in the patient's condition to the appropriate person.
13. Discussing with the patient what the examination involves, what the patient will feel, and what the patient will be required to do, prior to beginning the examination.
14. Explaining the procedure to the patient, taking into consideration age, degree of illness, intelligence and possible language difficulties of the patient.
15. Communicating with the patient throughout the procedure to ensure patient comfort and cooperation.
16. Demonstrating sensitivity to the feelings, fears, doubts and embarrassment of the patient.

**Competency 3:** The student will perform basic administrative/management functions of the department by:
1. Reviewing inventory supplies and determining when to restock routine items as well as radio-pharmaceuticals and/or radio-assay kits that have specific shelf lives.
2. Interacting with hospital and departmental staff to schedule patients studies effectively, including determination of the correct sequence for multiple procedures, both in nuclear medicine and in 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. Following the departmental procedure manual.
5. Developing a personal procedure manual to reflect the level of knowledge of procedures performed in the facility.

**Competency 4:** The student will recognize in vivo imaging procedures by:

- Numbers / Data
- Computer / Technology Usage

1. Reviewing the requisition for completeness of information.
2. Retrieving and/or 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 (obtain formal consent when needed).
5. Establishing 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. Taking appropriate corrective action or making appropriate notation on requisition if the patient has either not undergone necessary pre-examination procedures or has had any medication or examination that would interfere with the nuclear medicine study.
8. Preparing the patient and/or 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. Setting up administration tray and preparing the correct radio-pharmaceutical in the appropriate dosage.
12. Administering the radio-pharmaceutical according to procedure protocol where permitted by law or policy.
13. Selecting instrument, collimator and auxiliary equipment for the study and determining that all equipment is functioning properly.
14. Selecting and adjusting instrument parameters for the images as each vie is performed.
15. Selecting and adjusting the photo display unit for the study.
16. Selecting correct parameters for computer data acquisition as appropriate.
17. Positioning the patient for all views normally performed with the study, considering specific patient conditions.
18. Processing all films and reloading the cassettes.
19. Labeling and assembling all films for presentation to the physician or supervisor, including notation of anatomical landmarks as appropriate.
20. Completing all departmental forms/paperwork.
21. Evaluating the study for technical mistakes, and identifying additional or repeat images that may be needed.

**Competency 5:** The student will operate Nuclear Medicine instruments by:

*Updated Spring 2021*
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. Obtain uniformity images using standardized technique.
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 6:** The student will practice the skills of dose calculation and administration by:

- Numbers / Data
- Critical thinking

1. Calculating the dose of a specific radio-pharmaceutical for a certain study using a calculator and decay chart.
2. Verifying and recording patient name and age and the study requested.
3. Identifying from the label on the radio-pharmaceutical vial the concentration, total activity, total volume, assay time, and date of assay.
4. Determining lapsed time and calculate activity remaining.
5. Ascertaining the activity needed for the procedure.
6. Calculating the volume of the radio-pharmaceutical required to provide the appropriate patient dosage.

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<th>Course Competency 7: The student will demonstrate an understanding of radio-pharmacy by:</th>
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<tr>
<td>1. Demonstrating the correct procedure for elution of a Mo/99mTc generator.</td>
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<td>2. Assembling the shield, vials, and all materials necessary for aseptic elution of the generator.</td>
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<td>3. Performing the complete procedure behind a lead shield using gloves.</td>
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<td>4. Attaching vials to correct input and output needles.</td>
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<td>5. Using a shield on the vial that will contain eluate assay.</td>
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<td>6. Eluting in the dose calibrator and recording the eluate activity in appropriate radiopharmaceutical accountability log.</td>
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<td>7. Checking to determine whether volume and activity eluted are appropriate to volume used and activity expected for that day.</td>
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<td>8. Labeling the vial/shield with the appropriate information to include activity, volume,</td>
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concentration, date and time of assay and radio-pharmaceutical.

10. Determining 99mTc activity per volume using the appropriate dose calibrator setting.
11. Determining 99Mo activity per volume using the appropriate dose calibrator setting.

**Course Competency 9:** The student will 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 reasonable 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. Logging in the receipt of radioactive shipments.
13. Visually determining damaged packaging, and taking appropriate precautions.
14. Monitoring packaging material.

*Updated Spring 2021*