# NMED-130L: NUCLEAR MEDICINE LABORATORY I

## Cuyahoga Community College

### Viewing: NMED-130L : Nuclear Medicine Laboratory I

**Board of Trustees:**
October 2019

**Academic Term:**
Fall 2020

**Subject Code**
NMED - Nuclear Medicine Technology

**Course Number:**
130L

**Title:**
Nuclear Medicine Laboratory I

**Catalog Description:**
Introduction to and application of lab practices of a Nuclear Medicine Technologist including radiopharmaceutical and instrumentation principles. Emphasis on radiation safety, practicing quality assurance, and instrumentation controls.

**Credit Hour(s):**
1

**Lab Hour(s):**
2

### Requisites

**Prerequisite and Corequisite**
Concurrent enrollment in NMED-1301 Nuclear Medicine Procedures I and departmental approval: admission to program.

### Outcomes

**Course Outcome(s):**
Demonstrate professionalism in carrying out the functions of a Nuclear Medicine Technologist.

**Objective(s):**
1. Exhibit proper communication skills in the laboratory environment.
2. Seek to assist and cooperate when opportunity arises.
3. Display an ethic that is considerate to peers.

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**Course Outcome(s):**
Comply with state and federal regulations and professional standards when working as a Nuclear Medicine Technologist.

**Objective(s):**
1. Discuss the impact of the Health Insurance Portability Accountability Act.
2. Define standards set by the Nuclear Regulatory Commission (NRC) and the Joint Committee Accreditation of Hospitals Organization. (JCAHO).
3. List required radiation safety procedures.
4. Identify proper record keeping procedures.
5. Discuss appropriate dress code and conduct for the laboratory.
6. Identify procedures needed to comply with ocupational Safety and Health Admistration (OSHA) regulations.

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**Course Outcome(s):**
Utilize Nuclear Medicine instruments and perform quality assurance testing.

**Essential Learning Outcome Mapping:**

Critical/Creative Thinking: Analyze, evaluate, and synthesize information in order to consider problems/ideas and transform them in innovative or imaginative ways.

**Objective(s):**

1. Demonstrate competency in performing quality control on nuclear medicine instrumentation.
2. Demontrate competency in performing basic radiopharmacy skills required for nuclear medicine technologists.
3. Demonstrate the use of radiation safety in the nuclear medicine environment.
4. Demonstrate the use of  quality control in the nuclear medicine hot lab.

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**Methods of Evaluation:**

1. quizzes
2. lab projects
3. competency exams
4. final exam

**Course Content Outline:**

1. Nuclear Medicine Hot Lab Policies
    a. Nuclear Regulatory Commission Regulations
    b. Occupational Safety and Health Administration Policies
    c. Radiation safety
        i. As low as Reasonably Achievable (ALARA)
        ii. Postings and trigger limits
        iii. Policies
        iv. Decontamination process/spill kit usage
    d. Hot lab security
    e. Dress code and appropriate laboratory conduct
2. Operations of Instrumentation
    a. Gas Filled Detectors
        i. Geiger Mueller Survey Meter
        ii. Dose Calibrator
    b. Scintillation Detectors
        i. Well Counter
        ii. Thyroid Uptake Probe
        iii. Gamma Camera
3. Quality Control and Calibration of Instrumentation
    a. Gas Filled Detectors
        i. Geiger Mueller Survey Meter
        ii. Dose Calibrator
    b. Scintillation Detectors
        i. Well Counter
        ii. Thyroid Uptake Probe
        iii. Gamma Camera
4. Proper receipt of radiopharmaceuticals
    a. Ingoing and outgoing
    b. Survey
    c. Wipe Testing
    d. Department of Transportation labels
    e. Storage and Decay
    f. Disposal
    g. Recording Keeping
5. Elution of a generator
    a. Elution techniques
    b. Radionuclide impurity
    c. Radiochemical impurity
    d. Chemical impurity
    e. Biological and Sterility testing
    f. Yield Calculations

6. Prepare a radiopharmaceutical kit
    a. Aseptic and safe handling techniques
    b. Calibrating a dose
    c. Dose calculations and adjustments
    d. Quality control
    e. Disposal and record keeping

## Resources

Harvey A. Ziessman, MD, Janis P. O'Malley, MD and James H. Thrall, MD. *Nuclear Medicine: The Requisites.* 4th. Elsevier, 2014.

Prekeges, Jennifer. *Nuclear Medicine Instrumentation.* 2nd. Sudbury, MA: Jones and Barlette Publishing, 2013.

Adler, Arlene, Richard R. Carlton. *Introduction to Radiologic Sciences and Patient Care*. 6th. St. Louis, MO: Elsiever, 2016.

Mettler, Fred and Milton Guiberteau. *Essentials of Nuclear Medicine Imaging*. 7th ed. Philadelphia, PA: Saunders Elsevier, 2018.

Saha, Gospal B. *Fundamentals of Nuclear Pharmacy*. 7th ed. Cleveland, OH: Springer Publishing, 2018.

Schackett, Pete. *Nuclear Medicine Technology- Procedures and Quick Reference*. latest edition. Philadelphia, PA: Lippincott, Williams, and Wilkins, 2000.

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