

# NMED-2660: NUCLEAR MEDICINE THERAPY

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## Cuyahoga Community College

**Viewing: NMED-2660 : Nuclear Medicine Therapy**

**Board of Trustees:**

November 2019

**Academic Term:**

Fall 2020

**Subject Code**

NMED - Nuclear Medicine Technology

**Course Number:**

2660

**Title:**

Nuclear Medicine Therapy

**Catalog Description:**

Study the principles and practices of nuclear medicine therapies including palliation, cancer treatment, theranautics, radioimmunotherapies with monoclonal antibodies, and regulations for therapy. Examines special considerations in regards to patient preparation, radiation safety, dose determination for various therapies, and radionuclides used in therapy including characteristics and production. Emerging technologies and clinical trials will be explored.

**Credit Hour(s):**

1

**Lecture Hour(s):**

1

## Requisites

**Prerequisite and Corequisite**

NMED-1200 Radiation Safety & Biology.

## Outcomes

**Course Outcome(s):**

Describe the characteristics of radionuclides used for therapy.

**Objective(s):**

1. Discriminate between therapeutic and diagnostic radionuclides.
2. Identify key components of a therapeutic radionuclide.

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**Course Outcome(s):**

Explain the various therapy procedures used in nuclear medicine and the regulatory agencies and regulations that govern them.

**Essential Learning Outcome Mapping:**

Written Communication: Demonstrate effective written communication for an intended audience that follows genre/disciplinary conventions that reflect clarity, organization, and editing skills.

**Objective(s):**

1. Describe the variety of indications for nuclear medicine therapies.
  2. Explain the usage and administration of radionuclide therapies.
  3. Discuss the governing guidelines and safe handling techniques of therapeutic radionuclides.
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**Methods of Evaluation:**

1. quizzes
2. worksheets
3. mid-term exam
4. final exam
5. research paper
6. presentation

**Course Content Outline:**

1. Radiation Physics for Therapy
  - a. High energy gamma
  - b. Beta radiation
  - c. Alpha radiation
  - d. Production of radionuclides for therapy
2. Regulatory agencies and regulations governing therapy
  - a. Licensing for therapy
  - b. Special instrumentation needed for beta and alpha therapy
  - c. ICRP (International Commission on Radiological Protection)
  - d. NRC (Nuclear Regulatory Commission)
    - i. Code of federal regulations part 19
    - ii. Code of federal regulations part 20
    - iii. Code of federal regulations part 35
  - e. FDA (Federal Drug Administration)
  - f. ODH (Ohio Department of Health)
  - g. EPA (Environmental Protection Agency)
3. Palliative Therapies
  - a. Strontium-89 Chloride
  - b. Samarium-153
  - c. Phosphorus-32
  - d. Patient preparation
  - e. Protocols
  - f. Special considerations
  - g. Dose determination
  - h. Radiation safety considerations for patients and the public
4. Radioimmunotherapy
  - a. Monoclonal antibodies
  - b. Human anti-mouse antigen (HAMA) response
  - c. I-131 Bexxar (tositumomaub)
  - d. Y-90 Zevalin (ibritumomab tiuxetan)
    - i. Imaging with In-111
  - e. Patient preparation
  - f. Protocols
  - g. Special considerations
  - h. Dose determination
    - i. Radiation safety considerations for the patient and the public
5. Cancer Therapies
  - a. I-125
  - b. I-131 Thyroid Therapy
  - c. I-131 MIBG (metaiodobenzylguanidine)
  - d. Y-90 microspheres
  - e. Radium-223
  - f. Patient preparation
  - g. Protocols
  - h. Special considerations

## Resources

Bolus, N., & Glasgow, K.W., (Eds.). (2018) *Review of Nuclear Medicine Technology (5th Ed.)*, Reston, VA: Society of Nuclear Medicine and Molecular Imaging.

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Lee, K.H. . (2015) *Basic Science of Nuclear Medicine: Bare Bone Essentials*, Reston, VA: Society of Nuclear Medicine and Molecular Imaging.

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Mettler, F., & Guiberteau, M. . (2018) *Essentials of Nuclear Medicine and Molecular Imaging (7th ed.)*, Philadelphia, PA: Elsevier.

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Saha, G. (2018) *Fundamentals of Nuclear Pharmacy (7th ed.)*, Cham, Switzerland: Springer International Publishing.

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Ziessman, H.A., O'Malley, J.P., & Thrall, J.H. (2014) *Nuclear Medicine: The Requisites (4th ed.)*, Philadelphia, PA: Elsevier.

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