



BROWARD COMMUNITY COLLEGE COURSE OUTLINE

LAST REVIEW: 2008-2009 **NEXT REVIEW:** 2013-2014 **STATUS:** A
(i.e. 2003-2004) *(i.e. 2008-2009)* *(A, I, D)*

COURSE TITLE: Nuclear Medicine Radiation Protection

COMMON COURSE NUMBER: NMT 1312

CREDIT HOURS: 3

CONTACT HOUR BREAKDOWN
(per 16 week term)

CLOCK HOURS:
(Voc. Course ONLY)

Lecture: 48 Lab: 0

Clinic: 0 Other: 0

PREREQUISITE(S): NMT 1002 and 1002L

COREQUISITE(S):

PRE/COREQUISITE(S): NMT 1814

COURSE DESCRIPTION

Designed to assure compliance with local, state and federal regulations; follow appropriate protection procedures; perform area surveys and wipe tests; decontamination procedures; dispose of radioactive waste; practice personnel monitoring of radiation exposure; darkroom techniques; follow approved procedures for identifying and labeling.

UNIT TITLES

1. Introduction to Radiation
2. Personnel Monitoring
3. Personnel Exposure Calculations
4. NRC & HRS Regulations for Licensing
5. Quality Control Procedures
6. Performing Surveys, Decontaminating and Waste Disposal
7. Radiopharmaceutical Therapy



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ASSESSMENT:

Please provide a brief description (250 characters maximum) that details how students will be assessed on the course outcomes.

1. Announced and unannounced quizzes and Unit examinations;
2. Mid term and/or Final Exam (cumulative/comprehensive);
3. Assessment of reading and online assignments via submission of homework projects.

**** Complete the following only if course is seeking general education status ****

GENERAL EDUCATION Competencies and Skills *:

Please highlight in green font all Competencies/Skills from the list below that apply to this course. In the box to the right of the Competency/Skill, enter all specific learning outcome numbers (i.e. 1.1, 2.7, 5.12) that apply.

1. Read with critical comprehension	
2. Speak and listen effectively	
3. Speak and listen effectively	
4. Think creatively, logically, critically, and reflectively (analyze, synthesize, apply, and evaluate)	
5. Demonstrate and apply literacy in its various forms:	
6. Apply problem solving techniques to real-world experiences	
7. Apply methods of scientific inquiry	
8. Demonstrate an understanding of the physical and biological environment and how it is impacted by human beings	
9. Demonstrate an understanding of and appreciation for human diversities and commonalities	
10. Collaborate with others to achieve common goals.	
11. Research, synthesize and produce original work	
12. Practice ethical behavior	
13. Demonstrate self-direction and self motivation	
14. Assume responsibility for and understand the impact of personal behaviors on self and society	
15. Contribute to the welfare of the community	

** General Education Competencies and Skills endorsed by '05-'06 General Education Task Force*



Common Course Number: NMT 1312

Unit 1 Introduction to Radiation

General Outcome:

- 1.0 The student shall be able to demonstrate an understanding of the principles and concepts related to radiation.**

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 1.1 Discuss sources of radiation exposure to man, including natural and manmade sources.
- 1.2 Compare the average annual exposure from various sources of radiation.
- 1.3 Classify the various types of radiation based on ionization characteristics.
- 1.4 Define the various units used to describe radiation exposure and dose in both traditional and SI units.
- 1.5 Calculate and convert units to solve simple problems using the units of exposure, absorbed dose, dose equivalent, and quality factor.



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Unit 2 Personnel Monitoring

General Outcome:

2.0 The student shall be able to be able to demonstrate an understanding of personnel monitoring.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 2.1 State the NRC maximum permissible dose limits for the radiation worker, including body parts, per year, quarter, and month.
- 2.2 Discuss the NCRP guidelines for radiation exposure to the worker, the public (patient) and to family members of the patient.
- 2.3 Discuss the concept of ALARA as it applies to the practice of nuclear medicine.
- 2.4 List various types of personnel monitors and state the intended use of each type monitor.
- 2.5 Compare the advantages and disadvantages of the various types of personnel monitors, given specific setting for their use.
- 2.6 Compare the use of G-M survey instruments to ionization chambers as survey instruments used in radiation safety work.
- 2.7 Discuss the importance of personnel monitoring and bioassay as required by NRC regulations.



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Unit 3 Personnel Exposure Calculations

General Outcome:

3.0 The student shall be able to demonstrate an understanding of personnel exposure calculations.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

Discuss the requirements for radiation exposure data entry into personnel records and personnel record maintenance.

Recommend appropriate techniques used in the application of the principles of time, distance, and shielding for radiation safety practice.

Recommend appropriate data, state the appropriate formula (law) and calculate radiation exposure from a source using factors of time, distance and shielding.



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Unit 4 NRC & HRS Regulations for Licensing

General Outcome:

4.0 The student shall be able to demonstrate an understanding of NRC and HRS regulations.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 4.1 Name and describe the various types of licenses for the use of radioactive materials in medical practice.
- 4.2 Given appropriate data, determine the type of license which should be used and demonstrate knowledge in the ability to complete relevant parts of the license application.
- 4.3 Cite NRC regulations regarding the posting of work place and instructions to workers.
- 4.4 State circumstances where improper actions or incidents require notification to the radiation officer and/or NRC office.
- 4.5 State the responsibilities of the Radiation Safety Officer and Radiation Safety Committee in the implementation of ALARA.
- 4.6 Define "misadministration" as applied to both diagnostic and therapeutic practice of nuclear medicine and describe the type(s) that must be filed when such an incident occurs.



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Unit 5 Quality Control Procedures

General Outcome:

5.0 The student shall be able to demonstrate an understanding of Quality Control Procedures.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 5.1 List and describe the quality control procedures that must be completed for the dose calibrator.
- 5.2 Perform dose calibrator quality control checks and determine whether the instrument is functioning within accepted limits.
- 5.3 Demonstrate the proper procedure for calibration of a dose calibrator and state the acceptable limits for accuracy.
- 5.4 State the NRC regulations regarding calibration of patient doses and records that must be maintained regarding each administered dose.
- 5.5 State the NRC regulation regarding the use and labeling of syringe and via shields.
- 5.6 Demonstrate the proper procedure for calibration for performing leak testing on sealed sources.
- 5.7 State NRC requirements regarding room preparation and monitoring for the use of aerosols and or gases.



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Unit 6 Performing Surveys, Decontaminating and Waste Disposal

General Outcome:

6.0 The student shall be able to demonstrate an understanding of decontaminating waste.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 6.1 Demonstrate the proper procedure for receiving, logging in, and opening a package of radioactive materials.
- 6.2 Perform a survey and wipe test on a radioactive package being received in the department.
- 6.3 Prepare a radioactive materials package for shipping, including packing, labeling, monitoring, and records of shipping papers.
- 6.4 Perform a room survey and wipe test.
- 6.5 Discuss and demonstrate the proper procedure for decontamination of a spill.
- 6.6 Discuss procedures for waste disposal, stating quantities and specific materials that can be disposed by each method.



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Unit 7 Radiopharmaceutical Therapy

General Outcome:

7.0 The student shall be able to demonstrate an understanding of radiopharmaceutical therapy.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 7.1 Discuss safety precautions that must be applied in the administration of radiation therapy via oral or IV radiopharmaceuticals, including for patient, the technologist, nursing staff, and family members.
- 7.2 Discuss the procedure for administration of an oral therapy dose so as to minimize radioactive contamination.
- 7.3 Designate room for inpatients treated with radioactive materials and advise nursing staff about radiation safety practice.
- 7.4 Monitor the patient post-treatment to determine discharge time and activity level.
- 7.5 Survey and monitor the room after patient discharge to determine removal of all radioactive contamination.
- 7.6 State the basic considerations of radiation disaster planning and define the nuclear medicine technologist's role in community disaster planning.