MOHAWK VALLEY COMMUNITY COLLEGE, UTICA-ROME, NY

Radiological Technology

COURSE OUTLINE

1. COURSE DESCRIPTION:

**RT109 Radiation Biology I** C-2, P-0, CR-2

This course is the first in a two-semester sequence in Radiation Biology. Topics include an introduction to basic concepts of physics that relate to radiation absorption and scatter, analysis of ionizing and nonionizing radiation, the electromagnetic spectrum, the process of interaction between radiation and matter, sources of radiation both natural and artificial, and units of measure. Basic concepts of molecular and cell biology in the context of the sequence of events that occur after absorption of energy from ionizing radiation and consequences on living systems are discussed.

**Prerequisites:** RT101

**Corequisites:** RT200, RT201, RT202

1. STUDENT LEARNING OUTCOMES

**Upon completion of this course the student will be able to:**

1. Explain the concepts of skin erythema dose, tolerance dose, and threshold dose.
2. Identify and differentiate between the quantities of exposure, absorbed dose, equivalent dose, and effective dose and their SI units.
3. Determine the four factors on which the amount of somatic and genetic biologic damage resulting from radiation exposure depend.
4. Describe early and late deterministic somatic effects and late stochastic effects of ionizing radiation on living systems.
5. Describe acute radiation syndrome and list 3 separate dose-related syndromes that occur as part of the total body syndrome and their response stages.
6. Explain the doubling dose concept.
7. Discuss the concept of radiation- induced genetic effects.
8. State the annual occupational effective dose limits, cumulative dose limit for whole-body exposure, tissues and organs, and general public, embryo-fetus dose limits.
9. Compare the various components of the film badge, optically stimulated luminescence, pocket ionization chamber device, and thermoluminescent dosimeter.
10. Explain the function of radiation survey instruments.
11. Identify radiation-induced responses that warrant serious radiation protection concerns.
12. Explain the concept of risk as it relates to the medical imaging industry.
13. MAJOR TOPICS:
14. Radiation Quantities and Units
15. Radiation Monitoring
16. Overview of Cell Biology
17. Molecular and Cellular Biology
18. Early Deterministic Radiation Effects on Organ Systems
19. Late Deterministic and Stochastic Radiation Effects on Organ Systems