MOHAWK VALLEY COMMUNITY COLLEGE, UTICA-ROME, NY

COURSE OUTLINE

1. COURSE DESCRIPTION:

**RT204 Radiation Biology II** C-2, P-0, CR-2

This course is the second in a two-semester sequence in Radiation Biology. Topics include radiation effects on organ systems, somatic and genetic damage factors, mutagens responsible for genetic mutations, the doubling dose concept, acute radiation syndromes, embryologic effects during pregnancy, and occupational and non-occupational dose limits. Additional instruction is provided on safety and regulation issues.

**Prerequisites:** RT109 Radiation Biology I

**Corequisites:** RT203 Radiographic Physics, RT205 Advanced Imaging Procedures/Pathology, and RT207 Clinical Education Mastery.

1. STUDENT LEARNING OUTCOMES

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

1. Explain the importance of luminance of the collimator light source, state the requirements for good coincidence between the radiographic beam and the localizing light beam when a variable rectangular collimator is used, and explain the function of the collimator’s positive beam limitation (PBL) feature.
2. Explain the function of x-ray beam filtration in diagnostic radiology, list two types of filtrations used to adequately filter the beam, describe half-value layer (HVL), and give examples of HVLs required for selective peak kilovoltages.
3. Explain the significance of exposure reproducibility and exposure linearity.
4. Identify the minimal source-skin distance (SSD) that must be used for mobile radiography to ensure patient safety and state the reason for this minimal SSD requirement.
5. Explain how patient exposure may be reduced during routine fluoroscopic procedures, C-arm fluoroscopic procedures, high-dose (high-level-control [HLC]) fluoroscopy interventional procedures, cineradiographic procedures, and digital fluoroscopic procedures.
6. Explain the concept of genetically significant dose (GSD).
7. State the annual occupational effective dose limit for whole-body exposure of diagnostic imaging personnel during routine operations and explain the significance of the ALARA (as low as reasonably achievable) concept for these individuals.
8. Explain the various methods and devices that may be used to reduce the radiographer’s exposure during a mobile radiographic examination.
9. Explain the variation in dose rate caused by scatter radiation near the entrance and exit surfaces of the patient during C-arm fluoroscopy and discuss methods of dose reduction for C-arm operators.
10. Describe methods used to provide patient restraint during a diagnostic x-ray procedure and identify individuals who might use them.
11. List the three categories of radiation sources that may be generated in an x-ray room; list the considerations on which the design of radiation-absorbent barriers should be based; and explain the importance of each.
12. Differentiate between a controlled area and an uncontrolled area.
13. Define accreditation, credentialing, certification, licensure, and regulations.
14. MAJOR TOPICS:
15. Image Intensification/Fluoroscopy
16. Equipment design for radiation protection
17. Dose limits for exposure to ionizing radiation
18. Management of patient dose during diagnostic x-ray procedures
19. Management of imaging personnel dose during diagnostic x-ray procedures
20. Radiation Monitoring
21. Radiation protection
22. Accreditation, credentialing, certification, licensure, and regulations