BAKER COLLEGE
STUDENT LEARNING OUTCOMES

RDT 3110 Radition Therapy Physics I

3 Semester Hours

Student Learning Outcomes and Enabling Objectives

1. Explain Basic Principles of the production of Radiation
   a. Explain basic production processes
   b. Discuss the use of diagnostic x-ray tubes.
   c. Discuss the four fundamental forces of nature.
   d. Explain electromagnetic radiation and its characteristics.
   e. Identify the factors that influence x-ray production and output.
   f. Discuss the use of linear accelerators and other high-energy machines.
   g. Discuss concepts of radiation and principles of radioactivity including:
      i. Wavelength
      ii. Velocity
      iii. Frequency
      iv. Properties and laws
      v. Process of ionization
2. Discuss Atomic Theory and Structure
   a. Practice use of appropriate nomenclature.
   b. Explain quantum structure
   c. Explain differences between isotope, isotone, isobar and isomer
   d. Discuss the Bohrs Model
   e. Identify similarities and differences of atomic structure and composition among the elements of the periodic table, including but not limited to:
      i. particles (their location, energy level, and charge)
      ii. atomic number
      iii. mass number
3. Perform mathematical operations that relate to physics
   a. Identify units of measure
   b. Perform measurement conversions.
4. Explain the interactions of radiation with matter
   a. Define 5 common interactions.
   b. Describe absorption and scatter.
5. Apply principles of radiation protection
   a. Explain somatic and genetic effects of radiation exposure.
   b. Discuss stochastic and non-stochastic effects of radiation exposure.

c. Defend the concept of As Low as Reasonably Achievable (ALARA)
d. Discuss the concept of negligible individual risk.
e. Describe the legal and ethical radiation protection responsibilities of radiation workers.
f. Use appropriate terminology and units when discussing radiation protection issues.
g. Select the correct units of radiation for exposure, absorbed dose, dose equivalence, and radioactivity.
h. Discuss the interrelationship between biological effectiveness and quality factors.
i. Explain the theory, operation, applications, and limitations of radiation detection devices.
j. State the authority, boundaries, and regulations of the state and national regulatory agencies.
k. Discuss the requirements and responsibilities of the radiation safety officer.
l. Discuss various methods used for personnel monitoring.
m. State the exposure limits for occupational and non-occupational individuals.
n. Explain techniques used to reduce unnecessary doses to the patient.
o. Explain the need for an emergency action plan for equipment failure.

Big Ideas and Essential Questions

Big Ideas

- Atomic theory and structure
- General physics concepts and principles
- Units of measurement
- Radiation concepts & principles of radioactivity
- Production and characteristics of radiation
- Radiation protection

Essential Questions

1. What is the impact of math and physics on radiation therapy?
2. Why is physics important to a radiation therapist?
3. How does atomic theory relate to the production of radiation?
4. How does knowledge of units of measurement affect a therapist's responsibilities?
5. What is the importance of radioactive protection?
6. How does the process of ionization relate to radioactivity?

These SLOs are not approved for experiential credit.

Effective: Fall 2018