



Course Description

RAT2618 | Radiation Therapy Physics 2 | 2.00 credits

Specifics of ionizing radiation such as details of production, interactions, and types of radiation and their application to the patient treatment. Properties of production, photon interactions, beam characteristics, and particle irradiation will be discussed. Prerequisite: RAT 1614; corequisites: RAT 1657, 1824L, 2022, 2241.

Course Competencies

Competency 1: The student will recognize major aspects of cell biology and radiation genetics by:

1. Listing all the structures that are found within a cell
2. Discussing the molecular components and their abundance in a cell
3. Listing all the stages of mitosis

Competency 2: The student will discuss cellular response to radiation by:

1. Explaining how radiation impacts cell replication and identifying what stages are radiosensitive or radioresistant
2. Discussing radio-sensitivity and how it is related to the type of cell
3. Stating the Law of Bergonie and Tribondeau
4. Discussing the consequences of irradiation that may lead to interphase death, reproductive failure, and delay in cell division
5. Defining: a. Lethal Dose b. Relative Biologic Effectiveness c. Linear Energy Transfer d. Oxygen enhancement Ratio
6. Discussing the concept of the Target Theory
7. Explaining how physical, chemical and biological factors can affect a cell's response to radiation

Competency 3: The student will demonstrate an advanced understanding of the concepts and theories of radiation therapy physics by:

1. Compare isotope, isotone, isobar and isomer
2. Discuss nuclear stability and types of radioactive decay
3. Calculate radioactivity, decay constant, activity and half-life, average life and attenuation requirements for commonly used isotopes in radiation therapy
4. Describe methods of artificial production of radionuclides
5. Describe x-ray production for linear accelerators
6. Compare absorbed dose vs. exposure
7. Discuss the relationship between kinetic energy released in the medium (KERMA), exposure and absorbed dose

Learning Outcomes

- Solve problems using critical and creative thinking and scientific reasoning