Miami Dade College

Course Description

RAT 2618 | Radiation Therapy Physics 2 | 2 credits

This course builds upon concepts taut in RAT 1618C. Students will be introduced to basic radiation physics, containing fundamental principles and concepts. The course includes radiation production, properties, and characteristics as well as structure of the atom and matter, electrostatics, magnetism, electrodynamics, and the electromagnetic spectrum and ed physics of ionizing radiation including measurements, dosages, absorption, isodose curves, filters, radioactive materials treatment planning, radiation safety and health physics.

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.

Learning Outcomes

- *Learning outcome 3*

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.

Learning Outcomes

- *Learning outcome 3*

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.

Discuss the relationship between kinetic energy released in the medium (KERMA), exposure and absorbed dose.Learning Outcomes

- *Learning outcome 3*