

**RAD 520**  
**The Physics of Medical Dosimetry I**  
**Fall Semester Syllabus**

**COURSE DEFINITION:**

**RAD 520-3 The Physics of Medical Dosimetry I-** This course covers the following topics: Radiologic Physics, production of x-rays, radiation treatment and simulation machines, interactions of ionizing radiation, radiation measurements, dose calculations, computerized treatment planning, dose calculation algorithms, electron beam characteristics, and brachytherapy physics and procedures. This course is twenty weeks in length. Prerequisite: Admission to the Medical Dosimetry Program.

**COURSE OBJECTIVES:**

1. Demonstrate an understanding of radiation physics for photons and electrons.
2. Demonstrate an understanding of the different types of radiation production.
3. Demonstrate an understanding of radiation dose calculations and algorithms.
4. Understand brachytherapy procedures and calculate radiation attenuation and decay.
5. Demonstrate an understanding of the different types of radiation detectors.
6. Demonstrate an understanding of general treatment planning.

**COURSE OUTLINE:**

**Topics**

1. Radiation physics
2. Radiation generators
3. External beam calculations
4. Brachytherapy calculations
5. Treatment planning
6. Electron beam physics

**COURSE REQUIREMENTS:**

Purchase all texts, attend all lectures, and complete required examinations, quizzes, and homeworks.  
Purchase a T130XA scientific calculator.

**PREREQUISITES:** Admittance to the Medical Dosimetry Program.

**TEXTBOOKS:**

**Required:**

1. Khan, F. M. (2014). *The physics of radiation therapy* (5<sup>th</sup> ed.). Philadelphia: Wolters Kluwer
2. Khan, F.M. (2016). *Treatment planning in radiation oncology* (4<sup>th</sup> ed.). Philadelphia: Wolters Kluwer
3. Washington, C. M., & Leaver, D. T. (2015). *Principles and practices of radiation therapy* (4th Ed). St. Louis: Mosby.

**Optional: (Students typically use clinical sites' copy)**

1. Bentel, G. C. (1992). *Radiation therapy planning* (2nd ed.). New York: McGraw-Hill.
2. Halperin, E. C., Brady, L. W., Perez, C. A., & Wazer, D. E. (2013). *Principles and practice of radiation oncology* (6<sup>th</sup> edition). Lippincott Williams & Wilkins.

- Vann, A. M., et. al. (2013). *Portal design in radiation therapy* (3rd ed.). Augusta, Georgia: DMV Enterprises.

**GRADING SCALE:**

90-100	A
80-89	B
70-79	C
<70	Failing

Grades will be determined by:

Test Performance	65%
Quizzes/Homework	35%

**Note: An overall GPA of 3.0 or greater in all graduate coursework is required to successfully complete the Medical Dosimetry Program. This is a SIUC Graduate School Policy.**