# ROC 141
# Therapy Physics I

**COURSE OUTLINE**

**Prerequisites:**

ROC 110, ROC 161

Course Description:

Focuses on concepts of radiation production, interaction, and influencing factors. Emphasis is placed on atomic interactions and dose measurement techniques. Presents a comprehensive overview of the different types of machines used in Radiation Oncology. Evaluation of student will be through weekly homework assignments and examinations.

**Semester Credits:** 2

**Lecture Hours: 2**

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**Course Outcomes:**

At the completion of this course, the student should be able to:

1. Describe the characteristics of various elements using a periodic table.
2. Examine the properties of photons and apply those properties as they relate to Radiation Oncology.
3. Compare various types of radioactive decay, and perform decay calculation.
4. Describe how x-rays are produced at the atomic level and how the components of an x-ray tube work
5. Describe the various interactions of high-energy x- and gamma rays with matter.
6. Compare physical characteristics and basic operation of a variety of treatment units.

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Required Materials:

A TI-30XS or equivalent calculator is required for the course. Equivalent means the keypad has the same layout as the Pearson-Vue® on screen calculator.


Textbook:

McDerrmott, P. and Orton, C. (2010). *The physics and technology of radiation therapy*. Medical Physics Publishing. ISBN-13: 978-1-930524-32-3

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Topical Description:

Class I – Mathematics Review
Class II – Mathematics Review
Class III – Review of Basic Physics
Class IV – Atomic Nuclei and Radioactivity
Class VI – X-ray Production I: Technology
Class VII – X-ray Production II: Basic Principles
Class VIII - Interaction of Radiation with Matter
Class IX – Radiation Measurement Quantities
Class X – Radiation Detection and Measurement
Class XI – External Beam Radiation Therapy Units
Class XII – Imaging In Radiation Therapy
Class XIII – Radiation Protection
Class XIV –Physical Quality Assurance and Patient Safety
Class XV - Review for final

This is a rough outline of the course content. At the discretion of the instructor some content may be omitted based on the progress of the class as a whole.

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