

Virginia Western Community College

ROC 243

Dosimetry Planning

Prerequisites

Successful completion of MTH 163, ROC 110.

Course Description

Introduces clinical dosimetry and treatment planning to include, various treatment techniques, calculations, equations, and beam arrangements.

Semester Credits: 2

Lecture Hours: 2

Lab/Clinical/Internship Hours: 0

Required Materials

Textbook:

The Physics and Technology of Radiation Therapy. McDermott, P. & Orton, C. (2010). Medical Physics Publishing. ISBN: 9781930524323

Other Required Materials:

Scientific Calculator

Supplementary Material:

Radiation Therapy Planning. Bentel, Gunilla C. 1996. 2nd Edition. McGraw Hill. ISBN: 0070051151

Course Outcomes

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

- Define various terms referring to treatment technique.
- Using various treatment prescriptions, perform percent depth dose calculations for treatment time, given dose, and entrance and exit doses.
- Discuss factors affecting percent depth dose, tissue air ratio, and tissue maximum ratio.
- Define wedge, hinge angles, and discuss the purpose of wedges.
- Discuss the methods used to weight treatment fields.
- Describe influencing factors for an isodose curve.
- Locate correct isodose curves given specific treatment parameters.
- Perform dose calculations for the gap technique.
- Discuss influencing and modifying parameters of moving beam therapy on dose distribution.
- Discuss the parameters influencing the summation curves for various multiple beam techniques.

Topical Description

Chapter 9

- Dose Distribution and Scatter Analysis
- Depth Dose Distribution
- Depth of maximum build up and dependence on energy, distance, and field geometry
- Concepts regarding Isocentric Treatment
- Derivation and Dependence of TMR's
- Irregular Field Calculations

Chapter 10

- Dose Calculation Parameters
 - Percent Depth Dose
 - Tissue Maximum Ration
 - Scatter Maximum Ration
 - Collimator and Phantom Scatter
- Monitor Unit Calculations
 - SSD and SAD set ups
 - Homogenous and Heterogeneous set ups

Chapter 11

- Characteristics of a Single Isodose Curve
- Concepts of Off-Axis Ratios
- Penumbra
- Isodose in Build-up Region
- Measurement Techniques for Isodose Curves
- Modification of Isodose Curves
- Wedges
- Beam Blocking
- Combination and Summation of Isodose Curves
- Single Fields
- Parallel Opposed Fields
- 3 Fields
- 4 Fields
- Wedge Pair Treatment
- Definitions: GTV, CTV, PTV

Chapter 12

- Imaging Techniques
- Portal imaging
- Cone Beam
- OBI
- Heterogeneity Corrections
- Obliquity Corrections

Chapter 13

- Gap Analysis

Note to Instructors