

# **Common Course Outline**

**RTTT 212**

**Dosimetry I**

**3 Credits**

## **The Community College of Baltimore County**

### **Description**

Dosimetry I explores established factors that influence and govern clinical planning of patient treatment. Course encompasses isodose descriptions, patient contouring, radiobiologic considerations, dosimetric calculations, compensation, and clinical application of treatment beams. Optimal treatment planning is emphasized along with particle beams.

3 credits; 3 lecture hours; 0 laboratory hours required.

Prerequisite: RTTT 202

### **Overall Course Objectives**

Upon completion of this course the student will be able to:

1. compare photon isodose curves for clinically relevant photon beams;
2. describe the general influencing factors that distinguish various isodose curves;
3. determine internal and external patient factors that influence a beam's distribution and apply isodose correction methods;
4. describe methods of determining a patient's external contour, definition of internal structures and volumes of interest used in treatment planning;
5. identify organs and tissues at risk and their dose limitations using published tolerance dose tables;
6. describe how biologic effective dose is influenced by prescription and treatment variables;
7. compare fractionation schemes;
8. use appropriate factors for manual treatment calculations;
9. describe the interrelationships of the various factors used in treatment calculations;
10. perform dose calculations for external photon and electron beam treatments for all clinical variations;
11. calculate the absorbed dose to off axis points of interest;
12. describe the process of making an SAR ruler to determine applicable TAR;
13. describe the effect of asymmetric beam collimation on dose distribution;
14. calculate dose under a block using manual and computerized methods;
15. evaluate a variety of treatment plans for clinical use;
16. identify all possible techniques that may be employed to clinically match adjacent fields;
17. describe the multiple junction shift methods;

18. examine hot and cold regions that occur with the various matching methods;
19. evaluate possible corrections for treatment errors to correct misadministration of prescribed dose;
20. differentiate between the treatment planning terms: maximum, minimum, mean, modal and median dose;
21. describe International Commission on Radiological Units (ICRU) recommendations on dose variance within a target volume and the effect that variances may have on cure rates, local control and tolerance;
22. analyze dose volume histograms relative to treatment planning;
23. describe how inhomogeneities influence electron beam path;
24. discuss the considerations of matching an electron field to other adjacent photon or electron fields;
25. calculate “rule of thumb” percentage depth dose for 10%, 50%, 80% and 90% lines for various electron energies;
26. describe the considerations in the clinical application of special electron treatments, including total skin irradiation and arc therapy;
27. determine clinical usefulness of various beam types and the clinical implications involved; and
28. describe clinical applications of radiosurgery.

### **Major Topics:**

- I. Photon Beams
- II. Electron Beams
- III. Computerized Calculations
- IV. Manual Calculations
- V. Isodose Curves
- VI. Compensators
- VII. Shielding

### **Course Requirements**

Grading/exams: Grading procedures will be determined by the individual faculty member, but will include the following:

1. Class participation
2. A minimum of at least one exam