BROWARD COMMUNITY COLLEGE
COURSE OUTLINE

LAST REVIEW: Academic Year 2008-2009 *(i.e. 2003-2004)* **NEXT REVIEW:** Academic Year 2013-2014 *(i.e. 2008-2009)* **STATUS:** A *(A, I, D)*

COURSE TITLE: Dosimetry and Computer Treatment Planning

COMMON COURSE NUMBER: RAT2619L

CREDIT HOURS: 1

CONTACT HOUR BREAKDOWN *(per 16 week term)*

CLOCK HOURS: *(Voc. Course ONLY)*

Lecture: Lab: *32*

Clinic: Other:

PREREQISITE(S): **RAT2022, RAT2618, RAT2824, RAT2241, RAT 2657, RAT 2834**

PRE/COREQUISITE(S): **RAT2619l, RAT2834,**

COURSE DESCRIPTION *(750 character smaximum)*:

General Education Requirements – Associate of Arts Degree (AA), meets Area(s): Area
General Education Requirements – Associate in Science Degree (AS), meets Area(s): Area
General Education Requirements – Associate in Applied Science Degree (AAS), meets Area(s): Area

UNIT TITLES

1. **Factors involved in generating isodose curves**
2. **Isodose distribution of single beam therapy**
3. **Isodose distribution of parallel-opposed therapy**
4. **Isodose distribution of multiple beam therapy, including arc/rotational therapy.**
5. **Isodose distribution of irregular surfaces.**
6. **Isodose distribution with wedges, and/or compensators in place.**
7. **Isodose distribution for mantle treatment-Clarkson method.**
8. **Isodose distribution of irregular ports.**
9. **Brachytherapy application.**
10. **Rules of distribution of interstitial implants.**
11. **Rules of distribution of intracavitary implants.**

ASSESSMENT:

Please provide a brief description (250 characters maximum) that details how students will be assessed on the course outcomes.
Assignments, lab projects, comprehensive/cumulative final exam

****** Complete the following only if course is seeking general education status ******

GENERAL EDUCATION Competencies and Skills *:

Please highlight in green font all Competencies/Skills from the list below that apply to this course. In the box to the right of the Competency/Skill, enter all specific learning outcome numbers (i.e. 1.1, 2.7, 5.12) that apply.

1. Read with critical comprehension	
2. Speak and listen effectively	
3. Speak and listen effectively	
4. Think creatively, logically, critically, and reflectively (analyze, synthesize, apply, and evaluate)	
5. **Demonstrate and apply literacy in its various forms:** *(highlight in green ALL that apply)* (1. technological, 2. informational, 3. mathematical, 4. scientific, 5. cultural, 6. historical, 7. aesthetic and/or 8. environmental)	
6. Apply problem solving techniques to real-world experiences	
7. Apply methods of scientific inquiry	
8. Demonstrate an understanding of the physical and biological environment and how it is impacted by human beings	
9. Demonstrate an understanding of and appreciation for human diversities and commonalities	
10. Collaborate with others to achieve common goals.	
11. Research, synthesize and produce original work	
12. Practice ethical behavior	
13. Demonstrate self-direction and self motivation	
14. Assume responsibility for and understand the impact of personal behaviors on self and society	
15. Contribute to the welfare of the community	

* *General Education Competencies and Skills endorsed by '05-'06 General Education Task Force*

Common Course Number: RAT2619L

UNITS

Unit 1 Factors involved in generating isodose curves.

General Outcome:

1.0 The student shall: be able to describe the general factors involved in isodose curve generation.

Specific Measurable Learning Outcomes:
Upon successful completion of this unit, the student shall be able to:

1.1 Define SSD/SAD.

1.2 Discuss central axis vs.: off-axis.

1.3 Define normalization point.

1.4 Compare fl/Max and midplane doses.

1.5 Define depth dose percentage.

1.6 Compare TAR, TMR, and TPR.

1.7 Discuss the relationship of beam energy, field size, and depth of calculation.

1.8 Discuss source size as it relates to penumbra.

1.9 Relate methods of dose measurement.

1.10 Discuss methods of patient contours.

Common Course Number: RAT 2619L

UNITS

Unit 2 Isodose distribution of single beam therapy.

General Outcome:

2.0 The student shall: be able to describe the isodose distribution of external beam therapy with the use of a single beam.

Specific Measurable Learning Outcomes:
Upon successful completion of this unit, the student shall be able to:

2.1 Relate the rationale for the use of single beam treatment in patient care.

2.2 Compare single beams generated with different energy machines.

2.3 Identify points of distribution of an isodose curve.

Common Course Number: RAT 2619L

UNITS

Unit 3 Isodose distribution of parallel-opposed therapy.

General Outcome:

3.0 The student shall: be able to describe the isodose distribution of external beam therapy utilizing parallel-opposed beams.

Specific Measurable Learning Outcomes:
Upon successful completion of this unit, the student shall be able to:

3.1 Relate the rationale for the use of parallel-opposed beams in patient care.

3.2 Compare parallel-opposed beams generated with different energy machines.

3.3 Describe the results when joining parallel-opposed beams.

3.4 Compare evenly weighted and unevenly weighted parallel-opposed beams.

Common Course Number: RAT 2619L

UNITS

Unit 4 Isodose distribution of multiple beam therapy, including arc/rotational.

General Outcome:

4.0 The student shall: be able to describe the isodose distribution of external beam therapy utilizing multiple beam and arc/rotational beam ports.

Specific Measurable Learning Outcomes:
Upon successful completion of this unit, the student shall be able to:

4.1 Relate the rationale for the use of multiple beam therapy in patient care.

4.2 Relate the rationale for the use of arc/rotational beam therapy in patient care.

4.3 Describe and contract field rotation and patient rotation.

Common Course Number: RAT 2619L

UNITS

Unit 5 Isodose distribution of irregular surfaces.

General Outcome:

5.0 The student shall: be able to describe the isodose distribution of external beam therapy when encountering an irregular surface on the patient.

Specific Measurable Learning Outcomes:
Upon successful completion of this unit, the student shall be able to:

5.1 Relate specific patient conditions that require corrections for irregular surfaces

5.2 Describe the shift method of correction for sloping surfaces.

5.3 Describe other methods of correction for sloping surfaces.

Common Course Number: RAT 2619L

UNITS

Unit 6 Isodose distribution with wedges, and/or compensators.

General Outcome:

6.0 The student shall: be able to describe the isodose distribution of external beam therapy utilizing wedge, bolus, and tissue compensators.

Specific Measurable Learning Outcomes:
Upon successful completion of this unit, the student shall be able to:

6.1 Discuss the rationale for the use of wedge in patient care.

6.2 Relate the rationale for the use of bolus and other tissue compensators.

6.3 Describe the methods used to eliminate hot spots with proper use of wedges.

6.4 Discuss the construction of wedges.

6.5 Define wedge angle, and hinge angle.

6.6 List the most common wedges and their application.

6.7 Discuss bolus materials.

6.8 Discuss the construction of machine tissue compensators.

6.9 Describe the use of bolus to eliminate air gaps.

6.10 Describe the use of tissue compensators to eliminate air gaps.

Common Course Number: RAT 2619L

UNITS

Unit 7 Isodose distribution for mantle treatment, using the Clarkson method.

General Outcome:

7.0 The student shall: be able to describe the isodose distribution of external beam therapy when calculating a mantle port.

Specific Measurable Learning Outcomes:
Upon successful completion of this unit, the student shall be able to:

7.1 Discuss the difficulties encountered when planning a mantle port.

7.2 Define scatter air ratio.

7.3 Calculate TAR for a mantle port utilizing a SAR ruler.

7.4 Discuss the Clarkson method of calculation.

Common Course Number: RAT 2619L

UNITS

Unit 8 Isodose distribution of irregular ports.

General Outcome:

8.0 The student shall: be able to describe the isodose distribution of external beam therapy when calculating an irregularly shaped port.

Specific Measurable Learning Outcomes:
Upon successful completion of this unit, the student shall be able to:

8.1 List and describe methods for calculating of TAR/DD% for irregular fields.

8.2 Discuss equivalent squares.

8.3 Describe the calculation of dose under a block using the TAR-SAR method.

Common Course Number: RAT 2619L

UNITS

Unit 9 Brachytherapy application

General Outcome:

9.0 The student shall: be able to describe the appropriate application of implants in patient care.

Specific Measurable Learning Outcomes:
Upon successful completion of this unit, the student shall be able to:

9.1 Relate the history of brachytherapy.

9.2 List the different types of radioactive elements used in brachytherapy.

9.3 Discuss the half-life and average life of radioactive elements.

9.4 Describe the types of radioactive applicators.

9.5 Discuss the appropriate uses of seeds, needles, and tubes in implants.

9.6 Define after loading techniques.

9.7 Discuss the exposure rate constant.

9.8 Define the gamma constant for radium.

9.9 Compare low dose rate and high dose rate implants.

Common Course Number: RAT 2619L

UNITS

Unit 10 Rules of distribution of interstitial implants.

General Outcome:

10.0 The student shall: be able to discuss the specific rules of application when calculating an interstitial implant.

Specific Measurable Learning Outcomes:
Upon successful completion of this unit, the student shall be able to:

10.1 Discuss the Paterson-Parker (Manchester) system.

10.2 Define the rules of distribution.

10.3 Discuss the correction factors.

10.4 Compare a single-plane and two plane implant.

10.5 Discuss the rules of distribution for a volume implant.

10.6 Define the correction factors for a volume implant.

10.7 Discuss the Quimby system of calculation.

10.8 Relate the choice between seeds and needles for interstitial implants.

Common Course Number: RAT 2619L

UNITS

Unit 11 Rules of distribution of intracavity implants.

General Outcome:

11.0 The student shall: be able to discuss the specific rules of application when calculating an intracavity implant.

Specific Measurable Learning Outcomes:
Upon successful completion of this unit, the student shall be able to:

11.1 Discuss the rationale for implants of the cervix and/or endometrium.

11.2 Define points A & B.

11.3 Describe linear source calculations.

11.4 Discuss the formula for calculating the implant time.

11.5 Define MgHrs.

11.6 Define MgRa.

11.7 Discuss the dose limiting structures encountered in implants.