



BROWARD COLLEGE COURSE OUTLINE

LAST REVIEW: 2010-2011 **NEXT REVIEW:** 2015-2016 **STATUS:** A

COURSE TITLE: Imaging I Lab

COMMON COURSE NUMBER: RTE 1418L

CREDIT HOURS: 1

CONTACT HOUR BREAKDOWN

CLOCK HOURS:

Lecture: Lab: 32

Clinic: Other:

PREREQUISITE(S): RTE 1000, RTE 1111, RTE 1503, RTE 1503L, RTE 1804

COREQUISITE(S):

PRE/COREQUISITE(S): RTE 1418, RTE 1513, RTE 1513L, RTE 1613, RTE 1814

COURSE DESCRIPTION: Practical application of theory taught in RTE 1418. Students perform laboratory experiments to demonstrate concepts taught in lecture.

UNIT TITLES

1. Radiographic Equipment and Test Equipment
2. X-Ray Tube
3. Radiation Intensity Relationships
4. Image Receptors
5. Image Production and Receptor Response
6. kVp, mAs, SID/OID, Alignment, Focal Spot Size
7. Beam Characteristics
8. Grid Devices
9. Filters

EVALUATION: Assessment includes laboratory experiments & group activities.

Common Course Number: RTE 1418L

UNITS

Unit 1 Radiographic Equipment and Test Equipment

General Outcome:

- 1.0 The student shall be able to accurately describe and employ the radiographic and test equipment relating to radiographic imaging.**

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 1.1** Identify and appropriately adjust all controls on the x-ray machine, including mA, kVp, Exposure time, Focal Spot Size, SID, Tube angle, Tube center, Bucky center, and PBL activator.
- 1.2** Identify and appropriately employ all necessary test equipment, including Densitometer, Sensitometer, Line-Pair Test Pattern, Penetrometer, Screen Contact Grid, and Ion chambers.

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UNITS

Unit 2 X-Ray Tube

General Outcome:

2.0 The student shall be able to accurately describe the construction and operation of an x-ray tube.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 2.1** Identify and locate on a dismantled radiographic tube all the component parts, to include: housing, high voltage cable connections, rubber bellows, lead housing liner, stator, rotor, cathode, dual filaments, focusing cup, anode disc, focal tract, tube insert, tube window, filament wiring connections, & collimator connection.

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UNITS

Unit 3 Radiation Intensity Relationships

General Outcome:

3.0 The student shall be able to accurately describe and demonstrate the relationships existing between exposure factors and radiation intensity.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 3.1** Experimentally demonstrate and describe the mAs reciprocity law.
- 3.2** Experimentally demonstrate and describe the inverse square and mAs distance laws.
- 3.3** Experimentally demonstrate and describe the 15% rule relating kVp and radiation intensity.

Common Course Number: RTE 1418L

UNITS

Unit 4 Image Receptors

General Outcome:

4.0 The student shall be able to accurately describe and demonstrate the imaging characteristics of various image receptors.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 4.1** Demonstrate the intensifying effect of screens.
- 4.2** Demonstrate the effect of screen speed on density/brightness and contrast/gray scale.
- 4.3** Demonstrate the effect of exposure e change on CR plate exposure index (S-number).
- 4.4** Demonstrate the effect of image receptor speed on spatial resolution.
- 4.5** Demonstrate the effect of exposure setting on image latitude.
- 4.6** Demonstrate screen-film contact problems.
- 4.7** Demonstrate the effects of noise encountered with high speed image receptors.

Common Course Number: RTE 1418L

UNITS

Unit 5 Image Production and Receptor Response

General Outcome:

5.0 The student shall be able to accurately describe the imaging consequences of varying image receptor speed and processing.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 5.1** Develop an H & D curve for the radiographic film employed at BC.
- 5.2** Compare wide and narrow latitude imaging systems (screen-film and digital).
- 5.3** Demonstrate advantages of wide and narrow latitude imaging systems.
- 5.4** Demonstrate the radiographic effects of varying processing conditions (screen-film and digital).
- 5.5** Demonstrate sensitometer use in maintaining processing conditions with screen-film systems.

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UNITS

Unit 6 kVp, mAs, SID/OID, Alignment, Focal Spot Size

General Outcome:

6.0 The student shall be able to accurately describe and demonstrate the imaging consequences of altering kVp, mAs, SID/OID, tube-part-film alignment or focal spot size.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 6.1** Demonstrate the relationship between kVp and density/brightness & contrast/gray scale.
- 6.2** Demonstrate the relationship between mAs and density/brightness & contrast/gray scale.
- 6.3** Demonstrate the relationship between SID (FFD) and density/brightness & contrast/gray scale.
- 6.4** Demonstrate the relationship between OID (OFD) and density/brightness & contrast/gray scale.
- 6.5** Demonstrate the relationships which impact spatial resolution and distortion.
- 6.6** Demonstrate FSS impact on spatial resolution/detail, distortion & heel effect.

Common Course Number: RTE 1418L

UNITS

Unit 7 Beam Characteristics

General Outcome:

7.0 The student shall be able to accurately describe and demonstrate the effects of altering the radiographic field size.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 7.1** Demonstrate the effect of changes in field size on density/brightness & contrast/gray scale.
- 7.2** Demonstrate the effects of field size on scatter production.
- 7.3** Demonstrate the effects of field size on patient exposure.
- 7.4** Demonstrate the effects of field size on digital exposure index (S-number).

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UNITS

Unit 8 Grid Devices

General Outcome:

8.0 The student shall be able to accurately describe and demonstrate the imaging consequences of grid devices.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 8.1** Demonstrate the effects grids have on density/brightness and contrast/gray scale.
- 8.2** Demonstrate the imaging effects of changing grid ratio.
- 8.3** Demonstrate technique conversion for various grids.
- 8.4** Demonstrate the impact of kVp level employed with a grid.
- 8.5** Demonstrate the effects of misalignment of the grid and tube.
- 8.6** Demonstrate the effects of stationary grid alignment and CR scan direction.

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UNITS

Unit 9 Filters

General Outcome:

9.0 The student shall be able to accurately describe and demonstrate the impact of beam filtration.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 9.1** Demonstrate the effects of filtration on patient exposure.
- 9.2** Demonstrate the effect of filtration on density/brightness and contrast/gray scale.
- 9.3** Determine the HVL of the beam.