



BROWARD COMMUNITY COLLEGE COURSE OUTLINE

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

COURSE TITLE: Radiology for the Medical Assistant

COMMON COURSE NUMBER: MEA 0258

CREDIT HOURS:

CONTACT HOUR BREAKDOWN

(per 16 week term)

CLOCK HOURS: 4
(Voc. Course ONLY)

Lecture: **64** Lab:

Clinic: Other:

PREREQUISITE(S): Program admission or department permission.

COREQUISITE(S):

PRE/COREQUISITE(S):

COURSE DESCRIPTION: Provides instruction in the basic principles of x-ray production, physics, radiographic equipment, imaging, processing, radiobiology, and radiation safety.

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. Introduction to Limited Radiography
2. X-rays & Radiographic Equipment
3. Basic Radiation Physics
4. X-ray Production
5. X-ray Circuits
6. Principles of Exposure & Image Quality
7. Image Receptors
8. Image Processing
9. Controlling Scatter Radiation
10. Formulating X-ray Techniques
11. Radiobiology & Radiation Safety



BROWARD COMMUNITY COLLEGE COURSE OUTLINE

EVALUATION:

Please provide a brief description (250 characters maximum) that details how students will be assessed on the course outcomes.

Assessment includes examinations, assignments, & online posts.

**** 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: MEA 0258

UNITS

Unit 1 Introduction to Limited Radiography

General Outcome:

- 1.0 The student shall be able to describe the practice of a limited x-ray machine operator (LXMO).**

Specific Measurable Learning Outcomes:

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

- 1.1** Differentiate between a LXMO & a registered radiographer.
- 1.2** Identify the discoverer of x-rays.
- 1.3** Explain the primary purposes of the ASRT, ARRT, & JRCERT.
- 1.4** Identify imaging & treatment modalities related to limited radiography.
- 1.5** Discuss the legal & credentialing requirements for a LXMO.
- 1.6** Describe the typical work environment of a LXMO.
- 1.7** Describe the duties & scope of practice for a LXMO.



Common Course Number: MEA 0258

UNITS

Unit 2 X-rays & Radiographic Equipment

General Outcome:

2.0 The student shall be able to describe the properties of x-rays and identify features of radiographic equipment.

Specific Measurable Learning Outcomes:

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

- 2.1** Define terminology related to the x-ray beam & radiographic equipment.
- 2.2** Identify the different types & properties of radiation.
- 2.3** Identify the components of various image receptor (IR) systems.
- 2.4** Describe the layout of a typical x-ray room & the x-ray equipment within.
- 2.5** Describe x-ray tube motions.
- 2.6** Discuss safety precautions when moving x-ray equipment.
- 2.7** Discuss the fundamentals of radiation safety relative to the use of x-ray equipment.



Common Course Number: MEA 0258

UNITS

Unit 3 Basic Radiation Physics

General Outcome:

3.0 The student shall be able to discuss the basic physics of x-radiation.

Specific Measurable Learning Outcomes:

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

- 3.1** Define matter & list its various forms.
- 3.2** Describe the components & properties of atoms, molecules, & elements.
- 3.3** Describe the process of ionization.
- 3.4** Define energy & identify various types.
- 3.5** Describe the characteristics of electromagnetic energy/x-rays.
- 3.6** Describe the nature of electricity.
- 3.7** Define units of electricity.
- 3.8** Describe electrical circuits used in x-ray equipment.
- 3.9** Describe electromagnetic induction & transformers.



Common Course Number: MEA 0258

UNITS

Unit 4 X-ray Production

General Outcome:

4.0 The student shall be able to describe the production of x-radiation inside a radiographic tube.

Specific Measurable Learning Outcomes:

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

- 4.1** Identify the structure of a radiographic tube.
- 4.2** Describe the function of the parts of a radiographic tube.
- 4.3** Describe the production of x-radiation in a radiographic tube.
- 4.4** Discuss the electrical control of x-ray production.
- 4.5** Describe the effects of filtration on x-ray production.



Common Course Number: MEA 0258

UNITS

Unit 5 X-ray Circuits

General Outcome:

5.0 The student shall be able to describe the components and functions of x-ray circuits.

Specific Measurable Learning Outcomes:

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

- 5.1** Identify the components of an x-ray circuit.
- 5.2** Describe the functions of x-ray circuits.
- 5.3** Describe the process of rectification.
- 5.4** Differentiate between the types of x-ray generators.
- 5.5** Identify & discuss adjustment devices on the x-ray control panel.
- 5.6** Describe the components & operation of an automatic exposure control (AEC).
- 5.7** Discuss possible causes of x-ray tube failure & methods to prevent them.
- 5.8** Describe the utilization of tube rating charts.
- 5.9** Calculate heat units for single, three-phase, & high frequency generators.



Common Course Number: MEA 0258

UNITS

Unit 6 Principles of Exposure & Image Quality

General Outcome:

6.0 The student shall be able to describe the principles of x-ray exposure and discuss factors affecting image quality.

Specific Measurable Learning Outcomes:

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

- 6.1** Describe the prime factors of radiographic exposure.
- 6.2** Calculate milliamperere-seconds (mAs).
- 6.3** Describe & employ the inverse square law.
- 6.4** Define & discuss factors related to image quality.



Common Course Number: MEA 0258

UNITS

Unit 7 Image Receptors

General Outcome:

7.0 The student shall be able to describe radiographic image receptor systems.

Specific Measurable Learning Outcomes:

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

- 7.1** Identify & describe the components of cassettes.
- 7.2** Describe the components, purpose, & utilization of intensifying screens.
- 7.3** Describe the components & characteristics of radiographic film.
- 7.4** Discuss the care & maintenance of cassettes, intensifying screens, & x-ray film.



Common Course Number: MEA 0258

UNITS

Unit 8 Image Processing

General Outcome:

8.0 The student shall be able to describe image processing and quality control measures.

Specific Measurable Learning Outcomes:

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

- 8.1** Describe the components & characteristics of a radiographic darkroom.
- 8.2** Discuss film identification.
- 8.3** Describe methods & considerations for film handling.
- 8.4** Describe the procedures for manual & automatic film processing.
- 8.5** Describe the components & operation of an automatic film processor.
- 8.6** Discuss procedures for processor quality control.
- 8.7** Identify common image artifacts & discuss their prevention.



Common Course Number: MEA 0258

UNITS

Unit 9 Controlling Scatter Radiation

General Outcome:

9.0 The student shall be able to describe scatter radiation and discuss its control.

Specific Measurable Learning Outcomes:

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

- 9.1** Describe the interactions of x-rays with matter.
- 9.2** Discuss the effects of scatter radiation on image quality.
- 9.3** Describe methods & equipment used to control scatter radiation.



Common Course Number: MEA 0258

UNITS

Unit 10 Formulating X-ray Techniques

General Outcome:

10.0 The student shall be able to formulate and adjust x-ray techniques.

Specific Measurable Learning Outcomes:

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

- 10.1** Describe the purpose & utilization of an x-ray technique chart.
- 10.2** Describe how to develop fixed & variable kVp technique charts.
- 10.3** Discuss criteria for mAs & kVp selection.
- 10.4** Calculate & describe exposure adjustments for changes in technical factors, patient size, & equipment.



Common Course Number: MEA 0258

UNITS

Unit 11 Radiobiology & Radiation Safety

General Outcome:

11.0 The student shall be able to describe the biological effects of x-radiation and discuss radiation protection measures.

Specific Measurable Learning Outcomes:

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

- 11.1** Identify & define units of radiation measurement.
- 11.2** Calculate entrance skin exposure.
- 11.3** Describe the effects of radiation exposure on cells.
- 11.4** Differentiate between stochastic & nonstochastic biological effects of radiation exposure.
- 11.5** Differentiate between somatic & genetic biological effects of radiation exposure.
- 11.6** Describe methods for minimizing patient exposure to x-radiation.
- 11.7** Describe methods for minimizing radiation exposure to the LXMO.
- 11.8** Describe various types of radiation monitoring devices.