



A POLYTECHNIC INSTITUTION

School of Health Sciences

Program: Medical Radiography

Option:

MRAD 2222**Image Recording, Equipment and Quality Control 2****Start Date:** September, 2002**End Date:****Total Hours:** 14 **Total Weeks:** 7**Term/Level:** 2 **Course Credits:****Hours/Week:** 2 **Lecture:** 2 **Lab:****Shop:** **Seminar:** **Other:****Prerequisites****Course No.** **Course Name**MRAD 1101 Image Recording, Equipment and
Quality Control 1**MRAD 2222 is a Prerequisite for:****Course No.** **Course Name**MRAD 3313 Image Recording, Equipment and
Quality Control 3**■ Course Description**

Through lectures and readings, this course will deal with x-ray tubes; circuits and generators, and fluoroscopic principles and equipment. In particular, x-ray tubes will be described in terms of recent technical advances, followed by a detailed discussion of the principles and instrumentation for fluoroscopy.

■ Detailed Course Description

The goals of this course are to provide students with a knowledge of the fundamental principles of x-ray tubes, generators and circuits needed for effective utilization and operation of radiographic equipment and to describe the characteristic features of fluoroscopic equipment.

■ Evaluation

Final Examination	50%	Comments: Both examinations will be of the multiple choice format.
Midterm Examination	30%	
Report	10%	
Quiz (1)	10%	
TOTAL	100%	The format of the report will be discussed in class.

■ Course Learning Outcomes/Competencies

Upon successful completion, the student will be able to:

1. describe the major components of the x-ray generator and its associated circuitry.
2. differentiate between different types of x-ray tubes.
3. explain how x-ray exposure timers work.
4. describe the principles of fluoroscopy and outline the characteristic features of fluoroscopic equipment.

■ **Course Learning Outcomes/Competencies (cont'd)**

On successful completion of these outcomes, students will be prepared to meet the requirements of the following competencies as listed in the CAMRT "Competency Profile" for Radiography.

A2 Prepare the room for fluoroscopic imaging procedures.

- A2.5 Obtain accessory imaging equipment.
- A2.6 Select the correct image receptor system (conventional vs digital).

A4 Position the patient.

- A4.10 Collimate to the area of interest only to maximize image quality.

A5 Operate imaging equipment.

- A5.1 Select and use apparatus and accessory equipment safely.
- A5.2 Perform the initial set-up of the equipment.
- A5.3 Select the computer protocol for digital imaging.
- A5.4 Select the source-image distance.
- A5.5 Use radiographic markers.
- A5.6 Select the fastest film/screen/grid combination for optimum image quality appropriate for the examination.
- A5.7 Select appropriate kV, mA and time or automatic exposure control parameters.
- A5.8 Modify exposure factors on the basis of the patient's age, physique and condition.
- A5.9 Take the exposure.

A6 Process images.

- A6.1 Imprint ID information.
- A6.2 Manipulate computer data, if applicable.
- A6.3 Unload the film cassette/magazine and process exposed film.
- A6.4 Reload the cassette/magazine.

A7 Critique images and implement corrective measures.

- A7.8 Manipulate the digital image.

D2 Monitor radiographic/fluoroscopic equipment.

- D2.1 Perform visual inspection of cables and equipment.
- D2.2 Recognize improper functioning of imaging and accessory equipment/devices.
- D2.3 Ensure the proper operation of safety devices.
- D2.4 Record and report equipment malfunctions to the appropriate person.

D3 Perform quality control tasks.

- D3.1 Perform quality control tests on imaging and accessory equipment.
- D3.2 Use test results to initiate corrective action.
- D3.3 Record and maintain records/charts of all tests.
- D3.4 Test lead aprons and shields.
- D3.5 Report test results to appropriate person.
- D3.6 Conduct repeat/reject analysis.

■ Verification

I verify that the content of this course outline is current.

Euclid Seaman
Authoring Instructor

Aug 29-02
Date

I verify that this course outline has been reviewed.

M. Schuppelli
Program Head/Chief Instructor

Aug 29/02
Date

I verify that this course outline complies with BCIT policy.

John H. Enes
Dean/Associate Dean

Aug. 29 2002
Date

Note: Should changes be required to the content of this course outline, students will be given reasonable notice.

■ Instructor(s)

Euclid Seeram, RTR, BSc, MSc.,
FCAMRT

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■ Learning Resources

Required:

- Seeram, E., *Rad Tech's Guide to Equipment Operation and Maintenance*, Blackwell Science, Inc. 2001

Recommended:

- Bushong, S., *Radiologic Science for Technologists*. Mosby-Year Book, Inc. 7th Edition, 2001.

■ Information for Students

(Information below can be adapted and supplemented as necessary.)

Assignments: Late assignments, lab reports or projects will **not** be accepted for marking. Assignments must be done on an individual basis unless otherwise specified by the instructor.

Makeup Tests, Exams or Quizzes: There will be **no** makeup tests, exams or quizzes. If you miss a test, exam or quiz, you will receive zero marks. Exceptions may be made for **documented** medical reasons or extenuating circumstances. In such a case, it is the responsibility of the student to inform the instructor **immediately**.

Ethics: BCIT assumes that all students attending the Institute will follow a high standard of ethics. Incidents of cheating or plagiarism may, therefore, result in a grade of zero for the assignment, quiz, test, exam, or project for all parties involved and/or expulsion from the course.

Attendance: The attendance policy as outlined in the current BCIT Calendar will be enforced. Attendance will be taken at the beginning of each session. Students not present at that time will be recorded as absent.

Illness: A doctor's note is required for any illness causing you to miss assignments, quizzes, tests, projects, or exam. At the discretion of the instructor, you may complete the work missed or have the work prorated.

Attempts: Students must successfully complete a course within a maximum of three attempts at the course. Students with two attempts in a single course will be allowed to repeat the course only upon special written permission from the Associate Dean. Students who have not successfully completed a course within three attempts will not be eligible to graduate from the appropriate program.

Course Outline Changes: The material or schedule specified in this course outline may be changed by the instructor. If changes are required, they will be announced in class.

■ Assignment Details

Schedule

Week	Material Covered	Reference/Reading
1	Course Introduction <ul style="list-style-type: none"> • Learning Outcomes • References • Evaluation X-Ray Generators and Associated Circuitry <ul style="list-style-type: none"> • What is a generator? • Purpose • Types of Generators • Associated Circuitry • Ratings 	Seeram, E. Course Outline Seeram, Ch. 3
2	X-Ray Tubes <ul style="list-style-type: none"> • Stationary-Anode Tubes • Rotating-Anode Tubes • New Anode Disk Technology 	Seeram, Ch. 4
3	X-Ray Tubes (continued) <ul style="list-style-type: none"> • Recent Developments in X-Ray Tubes • Specialized X-Ray Tubes 	Seeram, Ch. 4
4	X-Ray Exposure Timers <ul style="list-style-type: none"> • Electronic Timers • Automatic Exposure Timers 	Seeram, Ch. 6
5	MID-TERM EXAMINATION The exam is based on all materials covered up to Week 4 and will be held on the first hour of class.	Seeram, E.
5	Fluoroscopy <ul style="list-style-type: none"> • Overview • Special Demands • Fluoroscopic Technique 	Seeram, Ch. 8
6	Fluoroscopy <ul style="list-style-type: none"> • Image Intensification • The Image Intensifier Tube • Multifield Image Intensification 	Seeram, Ch. 8

Week	Material Covered	Reference/Reading
7	Fluoroscopy <ul style="list-style-type: none">• Television Monitoring• Charge Coupled Device• Image Recording• Introduction to Digital Fluoroscopy• Radiation Protection Considerations	Seeram, Ch. 8
8	FINAL EXAMINATION The final examination is based on the entire course, however, the exam will be weighted on topics after the mid-term. Best wishes.	Seeram, E.