



BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY

Course Outline Part A

School of Health Sciences

Program: Medical Radiography

Option:

MRAD 3312

***Image Recording, Equipment
and Quality Control III***

Hours/Week:	2	Total Hours:	14	Term/Level:	Level 3
Lecture:		Total Weeks:	7	Credits:	
Lab:					
Other:					

Prerequisites

MRAD 3312 is a Prerequisite for:

Course No.	Course Name	Course No.	Course Name
MRAD 2212	Image Recording, Equipment and Quality Control II		

Course Goals

This course is a continuation of *Image Recording, Equipment and Quality Control II*. It provides students with the fundamental principles of fluoroscopic equipment and selected QC tests for fluoroscopy. In addition, students will explain the operation of mobile radiographic/fluoroscopic equipment and describe the characteristic features of computerized imaging equipment.

Course Description

Through lectures and laboratory exercises, this course will address quality control concepts and tests for radiographic and fluoroscopic imaging systems. In addition, the principles of fluoroscopic imaging systems and mobile radiographic/fluoroscopic systems will be discussed. Finally, the course will conclude with a discussion of computer applications in radiology, including digital imaging concepts, computed tomography, digital radiography and fluoroscopy as well as magnetic resonance imaging.

Evaluation

Final Examination	50%	A grade of 60% is required to pass this course.
Mid-Term	25%	
Projects	15%	
Laboratory	10%	
TOTAL	100%	

Course Outcomes and Sub-Outcomes

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

1. Explain each of the following QC tests for fluoroscopic equipment:
 - a. overload protective circuitry
 - b. radiation leakage
 - c. fluoroscopic resolution
 - d. maximum exposure rate
 - e. fluoroscopic timer accuracy
 - f. inspection procedures for fluoroscopic procedures
 - g. reject analysis
2. Explain the principles of image intensification and describe the following two characteristics of the image intensifier tube:
 - a. conversion factor
 - b. resolution
3. Describe the main components of a fluoroscopic viewing system (image distributor, TV camera tube, and the TV monitor.)
4. Explain how each of the following recording systems for fluoroscopy works:
 - a. spot film devices
 - b. videotape and videodisc recorders
 - c. multi format cameras
5. Describe the major features of each of the following for mobile x-ray units:
 - a. power supply
 - b. capacitor-discharge units
 - c. image intensifier units
6. Discuss each of the following considerations when using mobile x-ray equipment:
 - a. grids
 - b. exposure techniques
 - c. patient
 - d. film/screen combinations
 - e. care and safe handling of equipment

7. Describe the fundamental principles of each of the following computer-assisted imaging techniques:

- a. computed tomography (CT)
- b. digital fluoroscopy (DF)
- c. digital radiography (DR)
- d. magnetic resonance imaging (MRI)
- e. radiology information systems (RIS)
- f. picture archiving and communication systems (PACS)

Course Record

Developed by: _____
Instructor Name and Department (signature)

Date: _____

Revised by: _____
Instructor Name and Department (signature)

Date: _____

Approved by: 
Associate Dean / Program Head (signature)

Start Date: January 1996



BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY

School of Health Sciences

Program: Medical Radiography

Option:

Course Outline Part B

MRAD 3312

**Image Recording, Equipment
and Quality Control III**

Effective Date

January, 1996

Instructor(s)

Euclid Seeram, RTR., B.Sc., M.Sc.

Office No.: SW1 4084

Phone: 8231

Office Hrs.: Posted

Text(s) and Equipment

Required:

Bushong, S. *Radiologic Science for Technologists*. Mosby-Year Book Inc. 5 th Edition, 1993.

Gray, J. et al. *Quality Control in Diagnostic Imaging*. University Park Press. 1983.

Safety Code 20A. *X-ray Equipment in Medical Diagnosis*. Ottawa. 1990

Recommended:

Carlton, R. and Adler, A. *Principles of Radiographic Imaging*. Delmar Publishers. 1992.

Course Notes (Policies and Procedures)

Assignment Details

Quality Assurance Project: Breakdown of Marks

ASSIGNMENT - To be done in Groups

Prepare a Report on the Elements of a QA Program in your hospital.

The report should include a discussion of the following:

- | | |
|---|----------------|
| a. Dept's definition of QA and QC. | |
| b. A brief account on the history of the development of the dept's QC Program. | |
| c. Define staff responsibilities. | |
| d. Discuss the Dept's philosophy on QC. | 10 Marks |
| | |
| e. What parameters are monitored? | |
| f. The format of a QC Test. | |
| g. List equipment available in the dept. (for QC test procedures) | 10 Marks |
| | |
| h. Give examples of QC forms available. | 3 Marks |
| | |
| I. Discuss the dept's image quality standards. | 5 Marks |
| | |
| j. Comment on the following: | |
| • Record keeping | |
| • Education and resources | |
| • Policy and/or Procedural Manual. | 4 Marks |
| | |
| k. Benefits of a QA Program. | |
| l. Conclusion: This should include a statement of your own perceptions of the QA Program (e.g., recommendations). | 4 Marks |
| | |
| m. References. | 2 Marks |
| | |
| n. List of names of students and topics covered. | <u>2 Marks</u> |
| | |
| TOTAL | 40 Marks |



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School of Health Sciences

Program: Medical Radiography

Option:

Schedule

MRAD 3312

**Image Recording, Equipment
and Quality Control III**

Week Lectures or Lab Number	Outcome/Material Covered	Reference
1 2	Fluoroscopic Imaging Systems • Image intensifiers • Viewing systems • Recording system	
3	Reject-Repeat Analysis • Purpose • Equipment • Procedure • Tolerance • Action	
4	QC Tests - Fluoroscopy • Fluoroscopic resolution • Maximum exposure rate • Fluoroscopy timer • Scatter radiation • Inspection procedures	
5	Mobile X-Ray Units • Generators and Power Supply ▸ Fullwave (AC) ▸ Battery (cordless) ▸ Capacitor discharge ▸ Image Intensifier • Considerations Automatic Film Changers and Automatic Injection Devices	
6	Computer Applications • Digital imaging concepts • Computed tomography ▸ Physical principles and instrumentation	

Week Lectures or Lab Number	Outcome/Material Covered	Reference
7	Computer Applications • Digital Fluoroscopy • Digital Radiography • Magnetic Resonance Imaging	

Mid Term Examination

The Mid Term Examination will be scheduled as follows:

AC: Feb. 14
BD: Feb. 28

This examination will be based on material covered in Weeks 1, 2 and 3.