A POLYTECHNIC INSTITUTION

Course Outline

School of Health Sciences
Program: Medical Radiography
Option:

MRAD 2216
Radiographic Procedures 2

Start Date:	September, 2006				**End Date:**	December, 2006			
Total Hours:	40	**Total Weeks:**	4		**Term/Level:**	2A	**Course Credits:**	4	
Hours/Week:	10	**Lecture:**	5	**Lab:** 5	**Shop:**		**Seminar:**		**Other:**
Total Hours: 35		**Total Weeks 5**			**Term: 2B**				
Hours/Week: 7		**Lecture 2**		**Lab 5**					

Prerequisites

Successful completion of Level 1

MRAD 2216 is a Prerequisite for:

Entry into Level 3

Course Description (required)

Positioning for radiographic procedures related to the urinary and digestive systems as well as vertebral column, hip and shoulder girdle radiography will be covered. Skills to evaluate the diagnostic and technical acceptability of the radiographs for the respective areas will also be examined. Practice formulating technique changes for various exams and for the variations of the normal patient will be provided. Labs will reinforce theoretical components of the course.

Detailed Course Description (optional)

The goals of this course are to provide students with the skills required to:

1. position patients for the views/projections being studied.
2. evaluate the diagnostic and technical acceptability of radiographs of areas being studied.
3. calculate technique changes and recognize variables of techniques for various exams and the variations of the normal patient.
4. produce specified radiographs using radiographic phantoms.

Evaluation

Final Examination	40%	Comments: All labs and projects must be satisfactorily
Midterm 1	10%	completed before a course mark will be given.
Midterm 2	20%	
Rad Eval Quizzes	10%	
Applied Lab	10%	
Positioning Lab Assignment	5%	
Positioning Lab	5%	(65% is required for a pass.)
TOTAL	100%	

Course Learning Outcomes/Competencies

Upon successful completion, the student will be able to:

1. Define, describe and demonstrate beam directions, centring points and patient positioning relating to the radiography of the:
   - vertebral column
   - shoulder girdle
   - hip girdle
   - colon
   - stomach
   - urinary system
2. Describe required projections relating to radiographic examinations of the colon and urinary system.
3. Demonstrate radiographic judgement, organizational and communication skills and radiographic competence while positioning a patient.
4. Evaluate radiographs for the studied areas for diagnostic acceptability based on:
   a. inclusion of all required structures
   b. demonstration of correct positioning
   c. appropriate level of density and contrast demonstrated
5. Assess main contributing factors to the overall radiographic image quality based on the:
   a. type of patient involved (body habitus, pathology, and limitation of movement)
   b. appropriate technique factors required
   c. acceptable processing methods used
6. Propose possible solutions to poor radiographic quality.
7. Calculate radiographic technique factors using the DuPont Bit System.

CAMRT COMPETENCIES

On successful completion of the above outcomes, you should be prepared to perform the following competencies as defined in the "Competency Profile" for radiographers established by the CAMRT.

RADIOGRAPHIC PROCEDURES 3

Critical Task List

A1 ***Utilize the request for consultation***
A1.4 Correlate clinical information to the prescribed examination
A1.5 Priorize examinations
A1.6 Plan the radiographic imaging procedure

A2 ***Prepare work environment for imaging procedures***
A2.1 Maintain a clean/aseptic work environment
A2.5 Obtain accessory imaging apparatus
A2.6 Select/prepare imaging system

A3 ***Perform pre-procedural tasks***
A3.1 Identify the patient
A3.2 Verify clinical information with the patient or clinical staff, adjusting the examination when necessary
A3.3 Ensure proper patient attire for the procedure
A3.4 Confirm patient preparation
A3.5 Remove all items that would compromise the quality of the image
A3.6 Educate the patient, family and others about the procedure
A3.7 Confirm that patient's consent is obtained before commencing the procedure
A3.8 Take appropriate action if patient refuses procedure
A3.9 Document patient's history of risk factors when using contrast media
A3.10 Record additional clinical information

A4 ***Perform patient positioning and related tasks***
A4.1 Plan/adapt positioning requirements according to patient condition
A4.2 Demonstrate knowledge of the imaging procedure
A4.3 Inform the patient of the need to touch prior to touching
A4.4 Use touch for guidance, safety and comfort
A4.5 Touch the patient at the required anatomical landmark(s)
A4.6 Position the patient to demonstrate the required anatomical structures
A4.7 Use immobilization and positioning aids as required
A4.8 Direct beam, angling as required, to demonstrate all required anatomical structures
A4.9 Align the imaging system with the required anatomical structures
A4.10 Collimate to the area of interest to include required anatomical structures
A4.11 Provide the patient with breathing instructions
A4.12 Use proper body mechanics when moving patient

A5 ***Operate imaging equipment***
A5.1 Select and use apparatus and accessory equipment
A5.2 Ensure accuracy of patient demographics in digital imaging systems
A5.3 Select and use examination protocol for digital imaging
A5.4 Select/adjust distance parameters

A5.5 Use appropriate radiographic markers
A5.6 Select the image receptor system
A5.7 Select/modify exposure factors on the basis of technical considerations
A5.8 Select/modify exposure factors on the basis of patient considerations
A5.9 Take/monitor the exposure
A5.10 Select automatic exposure control parameters where applicabel

A6 ***Perform image processing tasks***
A6.1 Imprint ID information
A6.2 Manipulate computer data, if applicable
A6.3 Process images
A6.4 Reload the cassette/magazine

A7 ***Critique images and implement corrective measures***
A7.1 Verify patient ID on the image
A7.2 Check for correct use and proper placement of markers
A7.3 Identify anatomy and patient position on the image
A7.4 Verify that required structures are demonstrated
A7.5 Recognize image artifacts and take appropriate action
A7.6 Determine whether the diagnostic quality of the image is acceptable
A7.7 If image is unacceptable, determine the reason
A7.8 Manipulate the digital image
A7.10 Determine corrective action and repeat the procedure, if the image is unacceptable
A7.12 Evaluate the need for additional views and perform if required

A8 ***Complete post-procedural tasks***
A8.1 Complete the examination within an appropriate time frame
A8.2 Record procedural information
A8.3 Educate the appropriate individual(s) regarding post-procedural activities
A8.4 Dismiss the patient

B1 ***Protect the patient***
B1.1 Question female patients to ascertain possibility of pregnancy
B1.5 Use protective practices to reduce radiation risks
B1.6 Collimate to the area of interest to minimize patient dose
B1.7 Select exposure factors, keeping radiation dose as low as reasonably achievable

B2 ***Protect the technologist***
B2.1 Stand behind protective barriers
B2.2 Wear lead protective apparel
B2.3 Remain as far as possible from patient and source during exposure
B2.4 Use positioning aids/immobilization devices
B2.5 Direct x-ray towards primary barriers only
B2.6 Collimate to the area of interest to minimize scatter

B4 ***Protect individuals not required to be present during the procedure***
B4.1 Close the doors of the radiation area when in use
B4.2 Instruct people to leave the vicinity during imaging procedure

B5 ***Monitor personal radiation exposure***
B5.1 Wear/maintain radiation monitoring device

C1 ***Ensure patient safety***
C1.2 Provide for the patient's safety needs
C1.3 Use proper patient transfer techniques
C1.4 Use stretcher and wheelchair locks and guardrails
C1.5 Use immobilization devices

C2 ***Establish patient trust and confidence***
C2.1 Dress in a professional manner
C2.2 Introduce self to patient
C2.3 Communicate at an appropriate level of understanding for the patient
C2.4 Respond to patient's concerns
C2.5 Avoid inappropriate conversation in the presence of the patient
C2.6 Use reassuring verbal and non-verbal communication techniques
C2.8 Perform tasks in an organized and confident manner

C3 ***Attend to the patient's comfort and needs***
C3.1 Acknowledge and respond to the patient's emotional needs
C3.2 Acknowledge and respond to the patient's physical needs
C3.3 Move patient during procedure, with consideration to patient's physical condition
C3.5 Provide for patient privacy

C5 ***Assist in the administration of contrast media and other drugs***
C5.1 Obtain the patient's history to determine contraindications to contrast media
C5.2 Inform the patient regarding the possible effects of contrast media and other drugs
C5.8 Watch for changes in patient's status after the administration of contrast media and other drugs

D1 ***Monitor and maintain processing equipment and facilities***
D1.2 Prepare new chemicals
D1.3 Perform start-up/shut-down procedures
D1.7 Check solution levels
D1.13 Perform sensitometry
D1.14 Use sensitometry results to initiate corrective action

D2 ***Monitor radiographic equipment***
D2.1 Perform visual inspection of cables and equipment
D2.2 Recognize improper functioning of imaging and accessory equipment/devices
D2.4 Document and report equipment malfunctions

E2 ***Demonstrate professional behaviour***
E2.1 Participate as a member of the health care team
E2.2 Practice effective communication and conflict resolution skills
E2.3 Respect values, beliefs and needs of others
E2.4 Take responsibility for actions
E2.5 Demonstrate professional deportment
E2.6 Provide education regarding imaging procedures and issues

Verification

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

Authoring Instructor — Date: Aug 28/06

I verify that this course outline has been reviewed.

Program Head/Chief Instructor — Date: Aug 28/06

I verify that this course outline complies with BCIT policy.

Dean/Associate Dean — Date: Aug. 28/06

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

Instructor(s)

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Learning Resources

Required:

1. MRAD 2216 Radiographic Procedures 2 Manual.
2. "Merrill's Atlas of Radiographic Positions and Radiologic Procedures," Phillip W. Ballinger (10th Edition). Vol.1, 2 and 3 (2203)
3. "Radiographic Critique" Kathy McQuillen-Martensen (2006).

Recommended:

1. "Skeletal Anatomy" — Byron.
2. "Textbook of Radiographic Positioning and Related Anatomy" — Bontrager.

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.

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.

Student Policies: Further information on the student policies can be found at http://www.bcit.ca/files/pdf/policies/5002.pdf

Information for Students (cont'd.)

Radiographic Evaluation Quizzes

There will be a Rad Eval quiz each week in the film critique labs (Room 4060). In addition to ensuring comprehension of material, the objective of these quizzes is to encourage peer coaching and to promote confidence in your abilities. These are desirable skills in the workplace.

Persons participating in the Rad Eval quiz will be randomly selected each week. The topic will be from the area studied the previous week. Persons not selected for the weekly quiz may be asked to prepare an oral presentation.

In Term 2, the quizzes will be done with partners. The procedure will be as follows:

- During the lab, you will be given 5 minutes to critique a radiographic image using the 10 point radiographic evaluation technique and form.
- When you have finished critiquing your radiograph, a partner will be assigned to review the critique.
- Discuss the critique with your partner. You may choose to change the critique after the discussion, prior to handing in the Rad Eval form.
- The final decision on what is presented on the radiographic evaluation form rests with the originating partner.

Rad Eval Quizzes are worth 10% of the final grade

Applied Lab

The lab will be done with an assigned partner. Partners and room assignments will be randomly selected on a weekly basis.

Assume that you are relieving another technologist for break. He/she has just exposed the last image for a radiographic series on the patient on the table.

The following set-up will be used:
- machine/equipment will be on
- view/projection will be indicated on the radiographic evaluation form
- phantom will be on the table in the position that it was when the radiograph was taken
- technique that was used for the radiograph will be set on the control panel
- exposed cassette will be in position as it was exposed
- only one repeat exposure is allowed

You will process and evaluate the image with your partner using the 10 point radiographic system.

Repeat the radiograph if not all criteria are met. Clinical notebooks may be used. **Only one repeat may be made.** While one person is processing the image, the other person should shut the room down. Complete the 10 point radiographic evaluation for your repeat radiograph.

Students are responsible for ensuring rooms are left neat and tidy.
Digital images are to be sent to PACS and radiographs and corresponding rad eval sheets are to be handed in at the end of the lab. This lab is worth 10% of the final grade.

Positioning Lab Radiograph Assignment Details

When a radiographic examination is to be performed in lab:

- If requested submit the images and blue instruction sheet(s) on which you have printed your lab x-ray room number and the names of the group of students.
- The radiographs will be graded and returned to one of the students.
- Each student in the group will receive the same grade.
- Marks will be assigned for:

1. positioning (phantom limitations noted)
2. structures included
3. density/contrast
4. collimation
5. markers and ID
6. lack of artifacts
7. filtration use
8. correct film size (if applicable)
9. timely submission
10. thoroughness and professionalism of submission