A POLYTECHNIC INSTITUTION

School of Health Sciences
Program: Medical Imaging
Option: Medical Radiography

Course Outline

MRAD 3309
Radiographic Procedures 4

Start Date:	January, 2005				**End Date:**	April, 2005		
Total Hours:	20	**Total Weeks:**	17		**Term/Level:**	3	**Course Credits:**	1.5
Hours/Week:	2/1	**Lecture:**	2/1	**Lab:** 0	**Shop:**		**Seminar:**	**Other:**

Prerequisites

Course No.	Course Name
MRAD 1106	Radiographic Procedures 1
MRAD 2216	Radiographic Procedures 2
MRAD 1104	Radiographic Anatomy 1
MRAD 2214	Radiographic Anatomy 2
MRAD 1102	Image Recording Equipment and Quality Control
MRAD 2212	Image Recording Equipment and Quality Control
MRAD 1180	Patient Care 1
MRAD 2180	Patient Care 2

MRAD 3309 is a Prerequisite for:

Course No.	Course Name
MRAD 4400	Clinical Education 4

■ Course Description

This course introduces the fundamentals of advanced and interventional procedures in radiology. Through lectures, demonstrations, the use of audio visual aids, and student projects, the emphasis is placed on the role and participation of the radiological technologist in performing these specialized patient procedures within this specific health care team.

■ Detailed Course Description

The goals of this course are to provide the learner with the required knowledge, skills, and judgment to:

- adapt basic radiographic positioning principles to acutely ill patients.
- perform proper preparation of relative sterile trays and accessories.
- discuss all aspects of common interventional radiological procedures including:
  - patient preparation and pre-and post procedure education.
  - indications and contraindications.
  - room and equipment preparation.
  - procedure descriptions.
  - image acquisition protocols.
  - roles of other members of health care team.
- discuss details of the radiological technologist's role and duties in the procedures.
- discuss appropriate patient management considerations for the procedures.

■ Evaluation

Quizzes	10%	Comments: All laboratory exercises must be satisfactorily completed for a course mark to be received. 60% is the required pass mark in this course.
Midterm Examination	25%	
Project 1	10%	
Project 2	15%	
Final Examination	40%	
TOTAL	100%	

■ Course Learning Outcomes/Competencies

Upon successful completion, the student will be able to:

- interact with emergency, operating room and other health care team members.
- assist health personnel with diagnostic and/or interventional procedures.
- demonstrate effective communications with patients and peers.
- apply principles of sterile and surgical techniques.
- prepare surgical equipment and supplies.
- determine if correct patient preparation requirements are followed.
- discuss indications and contraindications for diagnostic and interventional procedures.
- prepare for each patient examination.
- provide patient teaching throughout the procedure.
- organize for post-procedural care.
- provide a safe patient environment.
- accurately complete patient documentation and related dismissal tasks.
- explain competent positioning of the patient.
- describe adaptation considerations for pediatric and geriatric patients.
- explain the basic technical requirements of listed radiological procedures.
- consider effective use and treatment of lab and hospital equipment.
- proceed with implementation of solutions to improve image quality.
- discriminate among available contrast media used.

■ CAMRT Competencies

Upon successful completion of the above outcomes, the learner will be prepared to perform the following competencies as defined in the "Competency Profile for radiological technologists as established by the CAMRT (November 2002).

Radiographic Procedures 1
Critical Task List

A1 Utilize the request for consultation

- A1.1 Verify that examination is ordered by authorized professional.
- A1.2 Verify the patient's means of transportation.
- A1.3 Review previous imaging procedures.
- A1.4 Evaluate the correlation between clinical information provided and the requested examination.
- A1.5 Prioritize examinations.
- A1.6 Plan the radiographic imaging procedure.

■ CAMRT Competencies (cont'd.)

A2 Prepare work environment for imaging procedures

- A2.1 Maintain a clean/aseptic work environment.
- A2.3 Prepare sterile trays as required.
- A2.4 Ensure the availability and operation of medical care apparatus and supplies.
- A2.5 Obtain accessory imaging apparatus.
- A2.6 Select/prepare imaging system.

A3 Perform pre-procedural tasks

- A3.1 Identify the patient.
- A3.2 Confirm 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 throughout the procedure.

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 applicable.
- A5.11 Select/monitor fluoroscopic parameters.

■ CAMRT Competencies (cont'd.)

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.
- A7.9 Confirm that any pathologies and anomalies are adequately visualized.
- A7.10 Determine corrective action and repeat the procedure, if the image is unacceptable.
- A7.11 Determine if consultation with physician is necessary prior to dismissal of patient.
- A7.12 Evaluate the need for additional views and perform if required.

A8 Complete post-procedural tasks

- A8.1 Complete the procedure within an appropriate time frame.
- A8.2 Record procedural information.
- A8.3 Educate the appropriate individuals(s) regarding post -procedural activities.
- A8.4 Dismiss the patient.
- A8.5 Process requisition and images for reporting/distribution.
- A8.6 Ensure patient's belongings are returned.
- A8.7 Complete an incident report if necessary.

B1 Protect the patient

- B1.1 Question female patients to ascertain possibility of pregnancy.
- B1.2 Consult with the radiologist or physician in cases of suspected pregnancy.
- B1.3 Adjust imaging routine for pregnant patients.
- B1.4 Educate the patient regarding radiation protection practices
- 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.
- B1.8 Use protective devices/apparel to minimize patient dose.
- B1.9 Monitor and document fluoroscopic time/radiation exposure.

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 beam toward primary barriers only.
- B2.6 Collimate to the area of interest to minimize scatter.
- B2.7 Follow protective practices for pregnant technologists.

■ CAMRT Competencies (cont'd.)

B3 Protect individuals required to be present during the procedure

- B3.1 Advise accompanying females to leave the radiation area when pregnancy is known or suspected.
- B3.2 Instruct individuals in the radiation area to maintain a safe distance and/or use radiation barriers during the exposure.
- B3.3 Provide protective apparel for individuals remaining with patient during exposure.
- B3.4 Collimate to the area of interest to minimize scatter.
- B3.5 Educate individuals regarding radiation protective practices.

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 individuals to leave the vicinity during imaging procedures.
- B4.3 Educate individuals regarding radiation protective practices.

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.
- C1.6 Use safety measures when obliged to leave the patient.

C2 Establish patient trust and confidence

- C2.2 Introduce self to patient.
- C2.3 Communicate at an appropriate level of understanding for the patient.
- C2.4 Respond to the 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.
- C2.9 Request translation services as required.

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 patients physical condition.
- C3.5 Provide for patient privacy.
- C3.6 Respect socio-cultural practices and traditions.

C4 Perform patient care procedures

- C4.2 Use universal/standard precautions.
- C4.3 Use sterile or aseptic techniques.
- C4.4 Use isolation techniques.
- C4.5 Ensure diagnostic/therapeutic lines and tubes are secure.
- C4.6 Monitor the functioning of medical equipment.
- C4.7 Respond to irregularities in the functioning of medical equipment.
- C4.8 Observe and respond to patient's condition throughout procedure.
- C4.9 Recognize the need for immediate medical attention.
- C4.10 Initiate emergency services.
- C4.11 Assist in emergency intervention.
- C4.12 Perform CPR if required.
- C4.13 Record relevant information.

■ CAMRT Competencies (cont'd.)

C5 Assist in the administration of contrast media and other pharmaceuticals

- 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.
- C5.3 Select and prepare contrast media.
- C5.4 Administer contrast media orally, rectally or into an artificial opening.
- C5.5 Assist with the injection of contrast media.
- C5.6 Dispose of sharps in a safe manner.
- C5.7 Dispose of contaminated materials in a safe manner.
- C5.8 Recognize and respond to changes in the patient's condition following the administration of contrast media and other pharmaceuticals.
- C5.9 Remove needles, urinary catheters or other diagnostic/therapeutic devices as indicated.
- C5.10 Instruct patient or care giver(s) on post-procedural care.
- C5.11 Perform delegated medical acts as required, if trained to do so.
- C5.12 Ensure readiness of the emergency response cart.
- C5.13 Inform the patient regarding the possible effects of other pharmaceuticals.
- C5.14 Select and prepare other pharmaceuticals.
- C5.15 Assist with the injection of other pharmaceuticals.

C6 Ensure the confidentiality of patient information

- C6.1 Discuss patient information in an appropriate setting and only with appropriate individuals.
- C6.2 Maintain security of patient information.

D1 Monitor and maintain processing equipment and facilities

- D1.2 Prepare processing chemicals.
- D1.3 Perform start-up/shut-down procedures.

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.

E1 Function within legal and ethical guidelines

- E1.1 Provide patient care that protects patients' legal rights A.
- E1.2 Follow national association and provincial regulatory body code of ethics.
- E1.3 Perform procedures within the accepted scope of practice.

E2 Demonstrate professional behaviour

- E2.1 Interact professionally as a member of the health care team.
- E2.3 Respect values, beliefs and needs of others.
- E2.4 Demonstrate responsibility and accountability in clinical practice.
- E2.5 Demonstrate professional deportment.
- E2.6 Provide education regarding imaging procedures and issues.

E3 Demonstrate professional responsibility

- E3.6 Participate in research activities.

■ Verification

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

Judith Hart — Authoring Instructor
23 December 2004 — Date

I verify that this course outline has been reviewed.

M. Filipacchi — Program Head/Chief Instructor
Dec 29/04 — Date

I verify that this course outline complies with BCIT policy.

Allen Bell — Dean/Associate Dean
Jan 5, 2005 — Date

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:

- MRAD 3309 Student Course Manual – *2005*
- PhilipW. Ballinger *Merrill's Atlas of Radiographic Positions and Radiologic Procedures 10th Edition – 2003*

Recommended:

- Snopek, A. *Fundamentals of Special Radiographic Procedures – 4th edition – 1999*
- Tortorici & Apfel. *Advanced Radiographic and Angiographic Procedures – 1995*
- Torres, L., *Basic Medical Techniques and Patient Care for Radiologic Technologists, 6th edition*
- Eisenberg & Dennis, *Comprehensive Radiographic Pathology – 3rd edition – 2003*
- Medical Dictionary

■ Information for Students

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 current BCIT policy on attendance 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.

■ Assignment Details

To be reviewed in class.

3309 Itinerary - January – April 2005

Week #	Thursday 1130	Friday 0830
1 Jan 4-7	Course Overview Intro to Arthrography	Arthrography
2 Jan 10-14	***QUIZ*** (Arthrography) Hysterosalpingography	Myelography/ Discography
3 Jan 17-21	***QUIZ*** (Salpy's, Myelograms) Venography	Introduction to Angiography
4 Jan 24-28	***QUIZ*** (Venography) Intro to Angiography cont'd	Abdominal Angiography Peripheral Angiography
5 Jan 31, Feb 1-4	***QUIZ*** (Angio-Intro, Abd & Periph) Thoracic, Pulmonary & Cardiac Angiography ***PROJECT 1 DUE***	Cerebral Angiography Digital Subtraction Angiography (DSA)
6 Feb 7-11	Interventional Procedures	Interventional Procedures
7 Feb 14-18	Interventional Procedures	Interventional Procedures
8 Feb 21-25	***MIDTERM EXAM*** Up to and including Angiography (BCAMRT Awards Competition: PP Presentation/ Technical Paper **Applications Deadline** Feb 24)	***QUIZ*** (Interventional) Mammography
9 Feb 28, Mar 1-4	***Euclid takes this hour for the rest of the term***	Mammography
10 March 7-11		***QUIZ*** (Mammo) Sialography
11 March 14-18	SPRING BREAK	
12 March 21-25	**BCAMRT** Awards Competition: PP Presentation /Technical paper manuscript **Deadline** March 24	GOOD FRIDAY
13 Mar 28-31, Apr 1	CAMRT Awards Competition: Application **Deadline** April 1 Visit - www.camrt.ca	***QUIZ*** (Sialography) Computed Tomography
14 April 4-8	**BCAMRT** Awards Competition: Exhibit/Poster **Application** **Deadline** April 7	Computed Tomography ***PROJECT 2 DUE***
15 April 11-15		***QUIZ*** (CT) Bone Mineral Densitometry
16 April 18-22	**EXAM WEEK** **BCAMRT** Awards Comp.: **Deliver** Posters/Exhibits to Kelowna May 5-7	