Medical Radiography Technology

Specialized Imaging 2

COURSE INFORMATION

COURSE NUMBER	**MRAD 302**
TOTAL HOURS	**100**
THEORY	**100**
PRACTICAL	**0**
PREREQUISITES	**ANPH 252 - Anatomy and Pathology 2** **MRAD 202 - Patient Care 2** **MRAD 240 - Specialized Imaging 1** **MRAD 251 - Computed Tomography Theory 1** **MRAD 254 - Fluoroscopic Imaging** **MRAD 256 - Radiographic Technique 2** **MRAD 358 - Clinical Integration 1** **PRCT 353 - Clinical Placement I**
CO-REQUISITES	**None**
ACADEMIC UNIT RESPONSIBLE FOR COURSE	**Allied Health Education**

STUDENTS, PLEASE NOTE

This course contains information that may be required to substantiate learning for professional recognition. It is your responsibility to retain a copy for your own use during your program and after graduation.

COURSE DESCRIPTION

Specialized Imaging 2 presents specialized examinations, equipment and related procedures used for imaging various body systems. Focus will be placed on bone density, mammography, angiography, radiation protection and patient care. Adjunct diagnostic imaging modalities will also be covered.

COURSE OBJECTIVES

Following completion, the student will be able to:

1. Explain a bone mineral density (BMD) procedure.
    - 1.1 Differentiate between bone density equipment and conventional X-ray imaging equipment.
    - 1.2 Explain how equipment and processing can be used to optimize images.
    - 1.3 Describe a bone density procedure.
    - 1.4 Relate patient history to bone density procedures.
    - 1.5 Describe common indications and contraindications for a bone density procedure.
    - 1.6 Adapt bone density procedures based on patient conditions.
    - 1.7 Describe the rationale for scanning multiple sites and the selection of one site over another.
    - 1.8 Describe the correct positioning for a baseline analysis and dual-energy X-ray absorptiometry (DXA) scan of the spine, proximal femur, and forearm.
    - 1.9 Describe BMD radiation protection procedures.

2. Differentiate between a normal and abnormal bone mineral densitometry result.
    - 2.1 Explain the importance of accuracy and precision in dual-energy X-ray absorptiometry (DXA) scanning.
    - 2.2 Outline the concept of “least significant change.”
    - 2.3 Describe the skeletal image generated by DXA scanning.
    - 2.4 Explain the importance of T and Z scores for diagnosing osteoporosis.
    - 2.5 Describe the concept of “fracture risk.”
    - 2.6 Compare the components of a complete serial DXA report and a complete serial baseline report.
    - 2.7 State the appropriate follow-up intervals for repeat scans.

3. Explain the properties of mammographic equipment.
    - 3.1 Explain how mammography equipment captures a diagnostic image.
    - 3.2 Compare conventional radiography and soft tissue radiography.
    - 3.3 Differentiate between mammographic equipment and conventional X-ray equipment.
    - 3.4 Describe the basic elements of digital mammography.
    - 3.5 State the reasons for compression in a mammography.
    - 3.6 Describe mammographic imaging radiation protection procedures.
    - 3.7 Describe the use of mammographic accessory equipment.

4. Explain a mammographic procedure.

4.1 Compare the strengths and weaknesses of the various modalities in diagnosing breast disease.
4.2 State possible adaptation to the examination based on the needs of an individual.
4.3 Explain a mammographic procedure and any pre- or post-procedural care.
4.4 Examine patient for contraindications.
4.5 Identify how to alter exposure factors for different patients.
4.6 Describe the qualities required for an acceptable mammographic image.

5. Explain the properties of interventional imaging equipment.
5.1 Describe the operation of the basic components of an interventional imaging unit.
5.2 Differentiate between interventional equipment and conventional radiography.
5.3 Describe appropriate controls used for modifying an interventional exam.
5.4 Describe the post-processing function of interventional equipment.
5.5 Outline the performance parameters of an interventional procedure.
5.6 Describe interventional imaging radiation protection procedures.
5.7 List accessory supplies and equipment that may be used in interventional imaging.

6. Explain the basic concepts of interventional imaging.
6.1 Apply gross and relational anatomy related to vascular and interventional studies.
6.2 Apply common pathologies and anomalies related to the vascular and interventional studies.
6.3 Identify terminology specific to angiography and interventional procedures.
6.4 Compare the role of the technologist to other members of the angiography and interventional team.
6.5 Compare the role of angiographic and interventional procedures to other modalities within the diagnostic imaging department.

7. Determine the best patient care plan for an interventional patient.
7.1 Describe a patient's needs prior to starting examination and prior to release.
7.2 Identify patient hypersensitivities and medical contraindications during an angiographic examination.
7.3 Identify important elements of the patient's requisition and consent forms.
7.4 Describe the administration of medications and contrast media to a patient.
7.5 Select the appropriate administration of contrast media for the angiographic examination.
7.6 Describe an appropriate response to an adverse reaction due to administration of contrast media in the angiography suite.
7.7 Describe post-procedural patient care counselling.

8. Explain an interventional examination.
8.1 Identify vascular and interventional procedures.
8.2 Describe the procedures of peripheral, abdominal, pulmonary, thoracic, and cerebral angiography.
8.3 Describe common vascular and interventional procedures.
8.4 Describe the procedures for cardiac catheterization.
8.5 Describe the radiographic anatomy seen in an interventional examination.

8.6 Describe the quality required for a diagnostic interventional image.

9. Specify how the unique qualities of other imaging modalities may affect diagnosis.
   9.1 Identify the principles of positron emission tomography/computed tomography (PET/CT) imaging.
   9.2 Describe the purpose of, and procedures for, PET/CT imaging.
   9.3 Identify the principles of magnetic resonance imaging.
   9.4 Describe the purpose of, and procedures for, magnetic resonance imaging.
   9.5 Identify the principles of diagnostic ultrasound.
   9.6 Describe the purpose of, and procedures for, ultrasound imaging.
   9.7 Identify the principles of single-photon emission computed tomography (SPECT/CT) imaging.
   9.8 Describe the purpose of, and procedures for, SPECT/CT imaging.

COMMON STUDENT LEARNING OUTCOMES

Upon successful completion of Edenbrook College programs, the student will:

Learn
Students will actively and independently acquire, apply, and adapt skills and knowledge to develop expertise and a broader understanding of the world as lifelong learners.

Think
Students will think analytically and creatively to explore ideas, make connections, draw conclusions, and solve problems.

Communicate
Students will exchange ideas and information with clarity and originality in multiple contexts.

Integrate
Students will demonstrate proficiency in the use of technologies in the broadest sense related to their field of study.

Act
Students will act purposefully, reflectively, and respectfully in diverse and complex environments.

EVALUATION

COLLEGE GRADING SYSTEM

The student must achieve an overall minimum grade of 70% on course assessments to be successful.

Students who achieve a failing grade of less than 70% may be eligible to write a supplemental examination to gain course credit. Remedial assistance will be required prior to writing the supplemental examination. Students will not progress in the program without achieving a passing grade in the course.

COURSE EVALUATION

Quizzes (4)	50%

Assignments (12)	20%
Final Exam	30%
TOTAL 100%	

ASSESSMENT RATIONALE/ CRITERIA

Achievement of learning outcomes will be assessed through class participation, class work, group activity, assignment, tests, project, mid-semester examination, and end of semester examination. Assessment will require students to demonstrate understanding and application of all the topics taught.

LEARNING MATERIALS

REQUIRED TEXTS

Bontrager, K. L. & Lampignano, J. (Last Published). Textbook of Radiographic Positioning and Related Anatomy (Current ed.). St. Louis, MO: Mosby Elsevier.

Bushong, S. C. (Last Published). Radiologic Science for Technologists (Current ed.). St. Louis, MO: Mosby Elsevier.

SUGGESTED READINGS

To be determined by the instructor.

REFERENCE TEXTS AND MATERIALS

To be determined by the instructor.

TEACHING/LEARNING STRATEGIES

Lectures on all the topics, power point presentations, video presentations, classwork, assignments, groupwork. All the students are expected to familiarise themselves with foundational knowledge prior to class. Personal study before and after classes and use of online resources are essential.

COLLEGE POLICY STATEMENTS

Refer to the Edenbrook College Student Handbook for more information on the following policies.

ACADEMIC RESPONSIBILITY – STUDENTS

1. Each student must know the due dates for assignments, tests, and examinations.
2. Each student must maintain their own academic record of work covered each Unit/term.
3. Each student must maintain paper and electronic copies of assignments for the academic year.
4. Each student must arrange academic discussion time with a faculty member to discuss progress.
5. Each student must perform self-evaluation on progress in the course.

PERSONAL CONDUCT – STUDENTS

1. Students must arrive on time for class and be prepared to work when the instructor begins.
2. Students must be courteous to faculty and classmates.
3. Eating in classrooms and clinic is not allowed.
4. Cell phones, Text messengers and other electronic devices must be turned off during class time.

ACADEMIC ADVANCEMENT

At mid-point and at the end of each academic term, the members of the Faculty Team (FT) for the Medical Radiography Technology program meet to review the progress of all students. Following these meetings each student is advised orally and in writing of their status in the program.

Students experiencing difficulty will be counseled regarding assistance available to foster academic success.

At the end of each term, the Medical Radiography Technology Program Instructor and or Director of Education will make recommendations after deliberating on all relevant information. Decisions regarding each student may include (but are not limited to) the following. S/he has:

- Successfully completed all program requirements and can graduate.
- Successfully completed all requirements and is promoted to the next academic level in the program.
- Been granted supplemental privileges for courses not successfully completed and if successful will graduate or be promoted to the next academic level. **Supplemental privileges are not automatically granted and will be limited in number.**
- Not successfully completed all elements in the academic level but may remain in the program to repeat failed portions and continue toward program completion according to an individualized timetable.
- Experienced such difficulty that repetition of the entire academic level is required, and a space will be provided for the student in the program at the earliest opportunity if the student wants to return.
- Experienced such difficulty that the student is asked to leave the school and if s/he desires readmission must complete the admissions process in competition with other applicants.

ATTENDANCE

Attendance is mandatory – The College reserves the right to determine whether absences are excused or unexcused (may affect student funding) and to request any medical evidence that may be required. Student tardiness is unacceptable, and students are expected to demonstrate professional behaviour at all times, in class or on a clinical placement. Students are entirely responsible for catching up on their own or for missed material and demonstrations. A doctor's note may be requested for each absence.

Absence from Missed Test/Assignment Due Protocol

Upon return to school, the student is to provide a doctor's note or approved excusable absence to the instructor prior to admission to the make up test/submission of late assignments. Failure to submit an approved excuse within 5 school Units upon return, the student will receive a zero for all missed, tests and late assignments.

Absence from Class Protocol

The College monitors attendance closely. A student who is absent from a class more than 3 times in a term, will be identified at risk and required to submit a doctor's note or approved excusable absence to their instructor(s) and the Program Instructor prior to readmission to the class.

Make-Up Procedure

All students are expected to take exams at the scheduled time. Make-up exams will be arranged only in recognized emergency cases. The instructor must be informed before or during the exam, to be eligible. Refer to the Edenbrook College Student Handbook for protocols. Quizzes are taken in class and at the time specified by the instructor. Late students will be given no extra time for the quiz. Quizzes given in the classroom cannot be made-up.

CHEATING AND PLAGIARISM

Any evidence of cheating will result in a failure for the course. Evidence of plagiarism will result in a failure for all students involved in the plagiarism. Plagiarism is turning in the work of someone else as if it was your own. When working on assignments in a group setting, students must submit their assignments using their own words. Identically worded assignments submitted by multiple students are acts of plagiarism.

MOBILE PHONES

Mobile phones are to be turned completely OFF while class is in session. Please use laptop computers responsibly. Web browsing, messaging, emailing, and recording are otherwise prohibited during class. Students who abuse the privilege of using their laptops will be asked to put it away for the duration of the class.