Medical Radiography Technology
Quality Assurance and Control Instructor Manual

COURSE OVERVIEW

Quality Assurance and Control provides an introduction to quality control tests for radiographic equipment and the development and maintenance of a quality assurance program. The values of resource management and quality assurance in the diagnostic imaging department will also be discussed. By combining hands-on training in the clinical setting with online learning, students can benefit from a more flexible learning experience.

COURSE OBJECTIVES

Following completion, the student will be able to:

1. Describe the principles of resource management.
    - 1.1 Differentiate between a capital and an operating budget.
    - 1.2 Identify the ways in which different radiology examinations may affect budgets.
    - 1.3 Optimize patient scheduling.
    - 1.4 Describe the monitoring of inventory of supplies and materials.
    - 1.5 Identify the factors that affect workflow.
    - 1.6 Prioritize resources based on the factors that affect workflow.

2. Explain activities that support a quality assurance (QA) program.
    - 2.1 Explain the concept of process improvement through continuous quality management.
    - 2.2 Explain how problem identification and analysis can improve departmental policies.
    - 2.3 Identify the appropriate method to collect, store, and share quality assurance data.
    - 2.4 Explain how the Workplace Hazardous Materials Information System (WHMIS) is implemented in an imaging department.
    - 2.5 Discuss the performance of an imaging department as it relates to a quality assurance program.

3. Evaluate the standard performance of a radiographic unit according to Safety Code 35 requirements.
    - 3.1 Identify the Safety Code 35 recommendations for an X-ray tube and generator.
    - 3.2 List the equipment used for testing a tube and generator.
    - 3.3 Describe the procedures for testing an X-ray tube and generator function.
    - 3.4 Evaluate the results of an X-ray tube and generator.
    - 3.5 Identify the testing frequency required for each X-ray tube and generator test.
    - 3.6 Describe the best method to initiate corrective actions for an X-ray tube and generator.

4. Evaluate the performance of the accessory equipment according to Safety Code 35 requirements.

4.1 Identify the Safety Code 35 safety recommendations for radiographic accessory equipment.
4.2 List the equipment used in each quality control procedure of accessory equipment.
4.3 Describe the procedures for testing specified aspects of equipment and accessories.
4.4 Evaluate results of accessory equipment tests.
4.5 Identify the testing frequency required for accessory equipment tests.
4.6 Evaluate the integrity of the lead apparel.
4.7 Describe the best method to initiate corrective actions for each piece of accessory equipment.

5. Evaluate the fluoroscopic performance of an X-ray room according to Safety Code 35 requirements.
5.1 Identify the Safety Code 35 recommendations for fluoroscopic equipment.
5.2 List the equipment used to test fluoroscopy equipment.
5.3 Describe the procedures for testing fluoroscopy equipment.
5.4 Evaluate the results of fluoroscopic equipment test.
5.5 Identify the testing frequency required for fluoroscopic equipment tests.
5.6 Describe the best method to initiate corrective actions for fluoroscopic equipment.

6. Evaluate the performance of a computed radiographic (CR) system according to Safety Code 35 requirements.
6.1 Identify the equipment required to test the performance of a CR system.
6.2 Describe the tests that should be performed on a CR system.
6.3 Evaluate the results of CR tests.
6.4 Identify the testing frequency required for each CR test.
6.5 Describe the best method to initiate corrective actions for a CR system.

7. Evaluate the performance of a direct radiography (DR) system according to Safety Code 35 requirements.
7.1 Identify the equipment required to test the performance of a DR system.
7.2 Describe the tests that should be performed on a DR system.
7.3 Evaluate the results of DR tests.
7.4 Identify the testing frequency required for each DR test.
7.5 Describe the best method to initiate corrective actions for a DR system.

8. Evaluate the performance of a mammography system according to Safety Code 36 requirements.
8.1 Identify the equipment required to test the performance of a mammography system.
8.2 Describe the tests that should be performed on a mammography system.
8.3 Evaluate the results of mammography system tests.
8.4 Identify the testing frequency required for each mammography system test.
8.5 Describe the best method to initiate corrective actions for a mammography system.

9. Evaluate the performance of adjunct modalities in the diagnostic imaging department.
9.1 List the tests performed on the digital networking and archival system.
9.2 Identify the Safety Code 35 recommendations that correlate to the equipment being tested.
9.3 Describe the procedures for testing specified aspects of adjunct modality equipment and accessories.
9.4 Evaluate the results of adjunct modality tests.
9.5 Describe the best method to initiate corrective actions for adjunct modalities.

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 (2)	40%
Discussion Board (2)	30%
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

Lavie, C. & Martel, N. (Eds). (2008). **Safety Code 35**: Safety Procedures for the Installation, Use and Control of x-Ray Equipment in Large Medical Radiological Facilities (HC Publication: 4000). Retrieved from: http://www.hc-sc.gc.ca/ewhsemt/pubs/radiation/safety-code_35-securite/index-eng.php

Papp, J. (Last Published). Quality Management in the Imaging Sciences (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.

Teaching Presentation

Teaching / Learning Strategies	Activities to Enhance Learning
Lectures — Question/Answer SessionsVideos	Assignments
Class Discussions GroupAssignments	Group Discussions
Individual Reading/Research	Games
	Internet Research
	Self and Peer Evaluation
Computer Investigation	Role Play
Classroom Exercises	One-on-One Feedback
Instructor/Student Interaction	Practical Activities

Equipment Requirements

Resources listed in the lesson plans.

Assignments

All assignments are in D2L if applicable.

Homework

Instructors will assign chapters to read prior to the lesson for the next day. Lessons and lectures will be based on the book chapters which the student will have previous reading knowledge of. Instructors will assign homework pertaining to the chapters covered the day of the lesson.

Ungraded Activities

Ungraded activities are found throughout the course. The purpose of these activities is to promote student learning comprehension, provide different learning situations for learning style application and for the instructor to complete formative assessment.

Lesson Plan

Session		Overview of Content
		Week 1
Day 1	Online	**Welcome and Introduction** • Brief instructor introduction • Instructor office hours • Brief student introduction **Discuss** • The program • Classroom expectations – virtual or in person • Virtual class will be on Teams • Expectations • Professionalism • Program schedule including holidays **Introduction and Orientation to Edenbrook** • Access, follow guidelines provided in Edenbrook training • All program and course materials located in Edenbrook • Review course syllabus and course schedule **Refer to "Faculty Notes" module for important information and Answer Keys.** **Check "Quizzes" tab for additional practice for students (self-tests/practice tests/quizzes, etc.) if applicable.** **Show students the Quizzes tab in Edenbrook for the location of assignments,quizzes, and the final exam. Check the Discussion tab for information.** **Review the Course Introduction and Information** **Introduce, review and prepare for the Quiz** • **Students complete Quiz – Resource Management and Quality Assurance on day 2 or 3 of this Week** (20%) **Introduce, review and prepare for Discussion #1: Quality Assurance and Resource Management** (15%) **Lecture – introduction** • Resource Management and Quality Assurance – introduce Discussion Board #1 Activity

		• Resource Management and Quality Assurance PowerPoint • Review course materials in the Learning Materials area **Student tasks** • Read important information in Welcome Module and Student Learning areas in Edenbrook • Refer to the course schedule for due dates • Complete the assigned textbook readings where applicable • Review the PowerPoint presentations and Learning Materials • Complete the Worksheets **Review the Answer Keys with students once they have completed the worksheets.** **Review of the day**
Day 2	Online	**Recap of the previous day** **Q and A** • Students may have questions • Check in with students to ensure they are assessing all content that is open to them in the course **Review and complete the Quiz – can complete this quiz tomorrow** • **Students complete Quiz – Resource Management and Quality Assurance on day 2 or 3 of this Week** (20%) **Review and prepare for Discussion #1: Quality Assurance and Resource Management** (15%) **Lecture – continued** • Resource Management and Quality Assurance PowerPoint continued • Radiographic Unit and Accessory Equipment • Review course materials in the Learning Materials area • Prepare for quizzes and discussion board **Student tasks** • Read important information in Welcome Module and Student Learning areas in Edenbrook • Refer to the course schedule for due dates • Complete the assigned textbook readings where applicable

		• Review the PowerPoint presentations and Learning Materials • Complete the Worksheets **Review the Answer Keys with students once they have completed the worksheets.** **Review of the day**
Day 3	Online	**Recap of the previous day** **Q and A** • Students may have questions • Check in with students **Review and complete the Quiz, students complete Quiz – Resource Management and Quality Assurance** (20%) **Review and prepare for Discussion #1: Quality Assurance and Resource Management** (15%) **Introduce, review and prepare for the Quiz – Radiographic Unit and Accessory Equipment** (20%) **Lecture – review Modules and Learning Materials from day 1 and day 2** • Review course materials • Prepare for quizzes and discussion board **Student tasks** • Read important information in Welcome Module and Student Learning areas in Edenbrook • Refer to the course schedule for due dates • Complete the assigned textbook readings where applicable • Review the PowerPoint presentations and Learning Materials • Complete the Worksheets **Review of the day**

Day 4	Online	**Recap of the previous day** **Q and A** • Students may have questions • Check in with students **Review and complete Quiz – Radiographic Unit and Accessory Equipment** (20%) – can be completed early next week **Review and prepare for Discussion #1: Quality Assurance and Resource Management** (15%) **Lecture – review Modules and Learning Materials from day 1 and day 2** • Review course materials • Prepare for quizzes and discussion board **Student tasks** • Read important information in Welcome Module and Student Learning areas in Edenbrook • Refer to the course schedule for due dates • Complete the assigned textbook readings where applicable • Review the PowerPoint presentations and Learning Materials • Complete the Worksheets **Review of the day**
Day 5	Online	**Recap of the previous day** **Q and A** • Students may have questions • Check in with students **Review and complete Quiz – Radiographic Unit and Accessory Equipment** (20%) – can be completed early next week **Review and complete Discussion #1: Quality Assurance and Resource Management** (15%) **Lecture – review Modules and Learning Materials from day 1 and day 2** • Review course materials

		• Prepare for quizzes and discussion board **Student tasks** • Read important information in Welcome Module and Student Learning areas in Edenbrook • Refer to the course schedule for due dates • Complete the assigned textbook readings where applicable • Review the PowerPoint presentations and Learning Materials • Complete the Worksheets **Review of the day**
Week 2		
Day 1	Online	**Recap of the previous week** **Q and A** • Students may have questions about Edenbrook • Check in with students **Introduce, review and prepare for the Discussion #2: CR and DR Equipment** (15%) **Introduce, review and prepare for the Final Exam.** Information is in "Faculty Notes" Module, look for "Quality Assurance and Control" Final Exam Comprehensive Review and Answer Key". • **Students complete the Final Exam at end of learning on day 5** (30%) • The Final Exam is 125 minutes in duration **Lecture – review over 2 days** • Fluoroscopy • CR and DR Systems **Student tasks** • Read important information in Welcome Module and Student Learning areas in Edenbrook • Refer to the course schedule for due dates • Complete the assigned textbook readings where applicable • Review the PowerPoint presentations and Learning Materials • Complete the Worksheets

		Review of the day
Day 2	Online	**Recap of the previous week** **Q and A** • Students may have questions • Check in with students **Review and complete the Discussion #2: CR and DR Equipment** (15%) – can complete tomorrow if needed **Review and prepare for the Final Exam.** Information is in "Faculty Notes" Module, look for "Quality Assurance and Control" Final Exam Comprehensive Review and Answer Key". • **Students complete the Final Exam at end of learning on day 5** (30%) • The Final Exam is 125 minutes in duration **Lecture – review over 2 days** • Fluoroscopy • CR and DR Systems • Adjunct Modalities **Student tasks** • Read important information in Welcome Module and Student Learning areas in Edenbrook • Refer to the course schedule for due dates • Complete the assigned textbook readings where applicable • Review the PowerPoint presentations and Learning Materials • Complete the Worksheets **Review of the day**

Online	**Recap of the previous day** **Q and A** • Students may have questions • Check in with students **Review and complete for the Discussion #2: CR and DR Equipment** (15%) **Review and prepare for the Final Exam.** Information is in "Faculty Notes" Module, look for "Quality Assurance and Control" Final Exam Comprehensive Review and Answer Key". • **Students complete the Final Exam at end of learning on day 5** (30%) • The Final Exam is 125 minutes in duration **Lecture – review** • Resource Management and Quality Assurance – introduce Discussion Board #1 Activity • Resource Management and Quality Assurance PowerPoint • Radiographic Unit and Accessory Equipment • Fluoroscopy • CR and DR Systems • Adjunct Modalities • Review course materials and exam review • Prepare for quizzes and discussion board **Student tasks** • Read important information in Welcome Module and Student Learning areas in Edenbrook • Refer to the course schedule for due dates • Complete the assigned textbook readings where applicable • Review the PowerPoint presentations and Learning Materials • Complete the Worksheets **Review of the day**

Online	**Recap of the previous day** **Q and A** • Students may have questions • Check in with students **Review and prepare for the Final Exam.** Information is in "Faculty Notes" Module, look for "Quality Assurance and Control" Final Exam Comprehensive Review and Answer Key". • **Students complete the Final Exam at end of learning on day 5** (30%) • The Final Exam is 125 minutes in duration **Lecture – review** • Resource Management and Quality Assurance – introduce Discussion Board #1 Activity • Resource Management and Quality Assurance PowerPoint • Radiographic Unit and Accessory Equipment • Fluoroscopy • CR and DR Systems • Adjunct Modalities • Review course materials and exam review • Prepare for quizzes and discussion board **Student tasks** • Read important information in Welcome Module and Student Learning areas in Edenbrook • Refer to the course schedule for due dates • Complete the assigned textbook readings where applicable • Review the PowerPoint presentations and Learning Materials • Complete the Worksheets **Review of the day**

Day 5	Online	**Recap of the previous day** **Q and A** • Students may have questions • Check in with students **Review and prepare for the Final Exam.** Information is in "Faculty Notes" Module, look for "Quality Assurance and Control" Final Exam Comprehensive Review and Answer Key". • **Students complete the Final Exam at end of learning on day 5** (30%) • The Final Exam is 125 minutes in duration **Lecture – review** • Resource Management and Quality Assurance – introduce Discussion Board #1 Activity • Resource Management and Quality Assurance PowerPoint • Radiographic Unit and Accessory Equipment • Fluoroscopy • CR and DR Systems • Adjunct Modalities • Review course materials and exam review • Prepare for quizzes and discussion board **Student tasks** • Read important information in Welcome Module and Student Learning areas in Edenbrook • Refer to the course schedule for due dates • Complete the assigned textbook readings where applicable • Review the PowerPoint presentations and Learning Materials • Complete the Worksheets **Review of the day**

EDENBROOK COLLEGE