



MRAD 119 Principles of Imaging 1
Fall 2019

COURSE OUTLINE

The course description is available on the web:
<http://camosun.ca/learn/calendar/current/web/mrad.html#mrad119>

Ω Please note: This outline will not be kept indefinitely. Students are recommended to keep this outline for their records, especially to assist in transfer credit to post-secondary institutions.

1. Instructor Information

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|------------------|-----------------------|---------------------|
| (a) Instructor | Brent Mekelburg | |
| (b) Office hours | By appointment | |
| (c) Location | CHW 317 | |
| (d) Phone | 4758 | Alternative: |
| (e) E-mail | mekelburgb@camosun.ca | |
| (f) Website | | |

2. Intended Learning Outcomes

1. Describe the equipment and components of a general x-ray room (including accessories), and explain how they interrelate to produce a diagnostic image.
2. Explain the influence of technical and non-technical factors on the resultant image.
3. Discuss problem solving for equipment malfunction and technical errors based on image artifacts.
4. List the major components of a CR system and summarize how a digital image is created and processed.
5. Compare and contrast the use of a characteristic curve for describing conventional versus digital radiography.
6. Explain the fundamental principles of radiation protection and current radiation protection standards as it applies to diagnostic radiology.

3. Required Materials

Fauber, T. (2013). *Radiographic Imaging & Exposure* (5th ed.). Elsevier Health Sciences.
 Bushong, S.C. (2008). *Radiologic Science for Technologists: Physics, Biology, and Protection* (11th ed.). Elsevier Health Sciences.

4. Course Content and Schedule

Week	Dates	Lecture/Module	Chapter	Lab	Quiz
1	Sept 3-6 Labour Day	1. Introduction: History, Properties & Equipment	F:1		
2	Sept 9-13	2. The X-Ray Beam	F: 2 B: 6&7	X-ray room scavenger hunt	
3	Sept 16-20	3. Conventional Radiography & The Characteristic Curve (Film-screen Imaging)	B: 10+12 F: 5	Tube Warm-up & Equipment Orientation	MQ1&2 PRQ3
4	Sept 23-27	4. Image Formation and Radiographic Quality	F: 3	Sensitometry CR	PRQ4
5	Sept 30-Oct 4	5. Exposure Technique Factors	F: 6	Dose creep & Distortion	MQ3&4 PRQ5
6	Oct 7-11			Exposure Indices, mAs, & DRLs	
7	Oct 14-18 Thanksgiving	6. Scatter control & Grid errors	F: 7 B:11	No Lab	PRQ6
8	Oct 21-25	7. Image Receptors & Image Acquisition (Digital Imaging)	F: 4 B: 15 & 16	Grid Use	PRQ7 MQ5,6&7
9	Oct 28-Nov 1	8. Exposure Technique Selection	F: 8 FWS 8	Inverse and Direct Square Law	PRQ 8
10	Nov 4-8	9. Image Evaluation	F: 9	Exposure Technique Chart	PRQ 9
11	Nov 12-15 Remembrance Day	10. Radiobiology	B:29	No Lab	MQ 8&9 PRQ 10
12	Nov 18-22	10. Radiobiology	B:29&30	SNR & Image Noise	
		Project Help Class			
13	Nov 25-29	11. Radiation Protection	B:35&36	Radiation Safety	PRQ11
		Project Help Class			
14	Dec 2-6	Project Presentations		No Lab	
15	Dec 9-13	FINAL EXAM PERIOD			

5. Basis of Student Assessment (Weighting)

Reading Quizzes	10%
Module Quizzes	20%
Term Project	30%
Cumulative Final Exam	40%
TOTAL	100%

Reading Quizzes

In order to gain the most from lectures, students should come to class prepared. This means having done the assigned reading beforehand. In order to assess your understanding of the material, there will be a short 5-10 question reading quiz at the beginning of class that covers the general concepts addressed in the readings.

Module Quizzes

In lieu of a midterm exam, there will be module quizzes to assess your level of knowledge as it relates to the theory of rad sciences. The purpose of these quizzes throughout the term is to keep you up to date on course content, help you identify areas of weakness, celebrate successful integration of knowledge, provide confidence, decrease anxiety, and expose you to the type of questions you can expect on the final exam.

Term Project

The term project provides an alternative platform for you to demonstrate your expert knowledge of a Radiographic Imaging Principle. It is an individual, term-long project in which you will build stepwise towards producing a 7minute multimedia video presentation based on subject matter covered in this course. We will gather during the last week of class to celebrate your work, watch the videos you have produced, and use them as a review tool to study for the final exam. Details will be discussed in class.

Final Exam

The final examination is cumulative and includes material from all modules covered in the course. This final examination will occur during the regularly scheduled final exam week.

In emergency circumstances, a student may write a test or final examination before or after the scheduled time if the student would otherwise be unable to complete the program or course. Exceptions due to emergency circumstances, such as unavoidable employment commitments, health problems, or unavoidable family crises, require the approval of the instructor. Holidays or scheduled flights are not considered to be emergencies. The student may be required to provide verification of the emergency circumstance. Camosun Academic Policy retrievable from: <http://camosun.ca/learn/calendar/current/pdf/academic-policies.pdf>

Missed quizzes or examinations cannot be made-up except in the case of documented illness (doctor's note).

6. Grading System

- Standard Grading System (GPA)
- Competency Based Grading System

7. Recommended Materials to Assist Students to Succeed Throughout the Course

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8. College Supports, Services and Policies

Immediate, Urgent, or Emergency Support



If you or someone you know requires immediate, urgent, or emergency support (e.g., illness, injury, thoughts of suicide, sexual assault, etc.), **SEEK HELP**. Resource contacts:

<http://camosun.ca/about/mental-health/emergency.html> or
<http://camosun.ca/services/sexual-violence/get-support.html#urgent>

College Services

Camosun offers a variety of health and academic support services, including counselling, dental, centre for accessibility, help centre, learning skills, sexual violence support & education, library, and writing centre. For more information on each of these services, visit Student Services at <http://camosun.ca/services>

College Policies

Policies are available on the College website at <http://camosun.ca/about/policies>. Camosun strives to provide clear, transparent, and easily accessible policies that exemplify the college's commitment to life-changing learning. It is the student's responsibility to become familiar with college policies.

Education and academic policies include, but are not limited to, [Academic Progress](#), [Admission](#), [Course Withdrawals](#), [Grading](#), [Involuntary Health and Safety Leave of Absence](#), [Prior Learning Assessment](#), [Medical/Compassionate Withdrawals](#), [Sexual Violence and Misconduct](#), [Standards for Awarding Credentials](#), [Student Ancillary Fees](#), [Student Appeals](#), and [Student Penalties and Fines](#).

Student Conduct Policy

The [Student Conduct Policy](#) provides clear expectations of appropriate academic and non-academic student conduct and establishes processes for resolution of conduct issues or the imposition of sanctions for inappropriate conduct. It is the student's responsibility to become familiar with the content of this policy.

A. GRADING SYSTEMS

<http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/e-1.5.pdf>

The following two grading systems are used at Camosun College:

1. Standard Grading System (GPA)

Percentage	Grade	Description	Grade Point Equivalency
90-100	A+		9
85-89	A		8
80-84	A-		7
77-79	B+		6
73-76	B		5

70-72	B-		4
65-69	C+		3
60-64	C		2
50-59	D		1
0-49	F	Minimum level has not been achieved.	0

2. Competency Based Grading System (Non GPA)

This grading system is based on satisfactory acquisition of defined skills or successful completion of the course learning outcomes.

Grade	Description
COM	The student has met the goals, criteria, or competencies established for this course practicum or field placement.
DST	The student has met and exceeded, above and beyond expectation, the goals, criteria, or competencies established for this course, practicum or field placement.
NC	The student has not met the goals, criteria or competencies established for this course, practicum or field placement.

B. Temporary Grades

Temporary grades are assigned for specific circumstances and will convert to a final grade according to the grading scheme being used in the course. See Grading Policy at <http://www.camosun.bc.ca/policies/E-1.5.pdf> for information on conversion to final grades, and for additional information on student record and transcript notations.

Temporary Grade	Description
I	<i>Incomplete:</i> A temporary grade assigned when the requirements of a course have not yet been completed due to hardship or extenuating circumstances, such as illness or death in the family.
IP	<i>In progress:</i> A temporary grade assigned for courses that are designed to have an anticipated enrollment that extends beyond one term. No more than two IP grades will be assigned for the same course.
CW	<i>Compulsory Withdrawal:</i> A temporary grade assigned by a Dean when an instructor, after documenting the prescriptive strategies applied and consulting with peers, deems that a student is unsafe to self or others and must be removed from the lab, practicum, worksite, or field placement.