

CLASS SYLLABUS



COURSE TITLE: MRAD 159 – Principles of Imaging 2
CLASS SECTION: BX01A-D
TERM: S2022
COURSE CREDITS: 3
DELIVERY METHOD(S): Synchronous

Camosun College campuses are located on the traditional territories of the Lək̓ʷəŋən and W̱SÁNEĆ peoples. We acknowledge their welcome and graciousness to the students who seek knowledge here. Learn more about Camosun's [Territorial Acknowledgement](#).

<https://camosun.ca/about/covid-19-updates>

Camosun College requires mandatory attendance for the first class meeting of each course. If you do not attend, and do not provide your instructor with a reasonable explanation in advance, you will be removed from the course and the space offered to the next waitlisted student.

INSTRUCTOR DETAILS

NAME: Daniel Andrews
EMAIL: AndrewsD@camosun.ca
OFFICE: CHW 317
HOURS: By appointment

As your course instructor, I endeavour to provide an inclusive learning environment. However, if you experience barriers to learning in this course, do not hesitate to discuss them with me. Camosun College is committed to identifying and removing institutional and social barriers that prevent access and impede success.

CALENDAR DESCRIPTION

In this advanced-beginner course, students build on their knowledge of how to operate radiographic and accessory imaging equipment. Students explore fluoroscopy, mammography, mobile radiography, as well as intra-operative equipment. Students focus on the digital imaging process and digital archiving principles as they apply to a variety of radiographic imaging modalities. In the lab component of this course, students execute quality control tests and apply tolerance standards as outlined in federal safety codes to assess equipment performance.

Note: Only open to students in the Medical Radiography program.

PREREQUISITE(S): **All of:** C+ in MRAD 119
CO-REQUISITE(S): [Click or tap here to enter text.](#)
PRE/CO-REQUISITE(S): [Click or tap here to enter text.](#)

COURSE DELIVERY

ACTIVITY	HOURS / WEEK	# OF WEEKS	ACTIVITY HOURS
Lecture	3	14	
Seminar			
Lab / Collaborative Learning	2	14	
Supervised Field Practice			
Workplace Integrated Learning			
Online			
		TOTAL HOURS	70

COURSE LEARNING OUTCOMES

Upon successful completion of this course a student will be able to:

- a) describe the evolution, function, and importance of x-ray tubes used in a variety of medical imaging procedures.
- b) explain how diagnostic images are produced by describing the components and function of computed radiography, digital radiography, fluoroscopy, mobile radiography, mammography, and C-arms.
- c) describe how digital imaging principles and techniques are used in the performance of medical radiography.
- d) describe the use of digital archiving principles in the management of imaging data within a variety of workplace settings.
- e) apply the principles of quality control and quality assurance to review and analyze radiographic images for accuracy and quality.

COURSE OBJECTIVES AND MAPPED PROFESSIONAL COMPETENCIES

(also known as “sub-outcomes” or “learning objectives”)

- 1 Ensure safe and effective operation of medical imaging equipment in the clinical setting (including radiography, fluoroscopy, mammography, and/or bone densitometry) (D.1.2)
- 2 Compare and contrast a variety of medical imaging equipment in terms of components, performance, applications, etc. (D.1.2)
- 3 Discuss emerging technologies in the radiologic technology field (A.2.16)
- 4 Discuss best practices and intended use of new technologies (A.2.16)
- 5 Discuss strategies for minimizing radiation dose in the clinical setting (C.3.1-3.5)
- 6 Discuss issues/implications/challenges with use of technology across clinical settings (A.2.16)
- 7 Describe the purpose of the federal Safety Code for medical x-ray equipment and list the facility personnel roles and responsibilities (A.1.2, C.3.6)
- 8 Describe the typical quality control (QC)-related duties of a Radiologic Technologist (A.7.2)
- 9 Explain the functions of the: kVp selector, mA selector, timer, AEC, and back-up timer (D.1.2, D.2.1-2.2)
- 10 Explain the terms linearity, reproducibility, and reciprocity as they relate to radiation output of the x-ray tube
- 11 Execute a variety of QC procedures in the laboratory setting (e.g. accuracy of tube loading factors, AEC, adequacy of x-ray beam filtration, beam limiting device, etc.) (A.7.2, D.1.2, D.3.1)
- 12 List the materials used in the construction of the computed radiography (CR) imaging plates (IPs) (D.1.2)
- 13 Describe the proper care and usage of CR IPs and the CR reader as per the manufacturer’s guidelines (D.2.1)
- 14 Identify IPs that would no longer be suitable for clinical use due to damage or wear (C.5.1, D.3.1)
- 15 Describe the components of digital radiographic flat panel detectors (FPDs) (D.1.2)

- 16 Describe the proper care and usage of FPDs as per the manufacturer's guidelines (D.2.1)
- 17 Describe the relationship between pixel, matrix, and FOV size and how these affect digital image quality (D.4.1)
- 18 Define the following terms as they pertain to digital radiography: dynamic range, response function, exposure indicator (EI), noise, uniformity, and residual image (D.4.1)
- 19 Explain how the digital imaging system determines the EI value and describe factors that affect the EI value (D.1.3, D.2.1-2.2, D.2.5, D.4.1)
- 20 Describe factors that affect spatial resolution and contrast resolution of a radiographic image (D.2.5, D.4.1)
- 21 Describe the quality control procedures used to assess the performance of digital radiographic equipment and image quality (e.g. spatial resolution, contrast detectability, EI accuracy and reproducibility, noise, uniformity, etc.) (A.7.2, D.2.7, D.3.1, D.4.1)
- 22 Recognize the artifacts associated with digital imaging systems and describe how to minimize/avoid them (C.5.1, D.2.7, D.4.1)
- 23 Recognize when radiographic imaging equipment is malfunctioning and problem solve to determine the most likely cause (C.5.1)
- 24 Apply knowledge of operational components of radiographic imaging systems to clinical practice (D.2.1)

REQUIRED MATERIALS & RECOMMENDED PREPARATION / INFORMATION

Bushong, S.C. (2017). Radiologic Science for Technologists: Physics, Biology, and Protection (11th ed.). Elsevier Health Sciences.

Ch. 14, 17-18, 21-27, 37, 39-40 covered primarily in MRAD 159

Fauber, T. (2017). Radiographic Imaging & Exposure (5th ed.). Elsevier Health Sciences.

Ch. 10 covered in MRAD 159

COURSE SCHEDULE, TOPICS, AND ASSOCIATED PREPARATION / ACTIVITY / EVALUATION

The following schedule and course components are subject to change with reasonable advance notice, as deemed appropriate by the instructor.

WEEK or DATE RANGE	ACTIVITY or TOPIC	OTHER NOTES
1 – May 2-6	Course intro RFP Response letter – due May 8	
2 – May 9-13	Module 2 - Digital radiography and image processing	QC Lab #1
3 – May 16-20	Module 3 - Information literacy/research activity	Work on seminar assignments
4 – May 23-27	No class May 23 (Victoria Day) Seminar 1 + quiz	Work on RFP projects
5 – May 30-June 3	Module 4 – Comparison of DR systems Seminar 2 + quiz	QC Lab #2
6 – June 6-10	Module 5 – Image quality, post-processing, and artifacts Seminar 3 + quiz	QC Lab #3
7 – June 13-17	Module 6 – PACS and imaging informatics Seminar 4 + quiz	QC Lab #4
8 – June 20-24	Work on RFP projects Seminar 5 + quiz	QC Lab #5
9 – June 27-July 1	Module 7 – Digital fluoroscopy No class July 1 (Canada Day)	QC Lab #6

WEEK or DATE RANGE	ACTIVITY or TOPIC	OTHER NOTES
10 – July 4-8	Module 8 – Mobile radiography Seminar 6 + quiz	QC Lab #7
11 – July 11-15	Module 9 – Digital mammography & BMD Seminar 7 + quiz	QC Lab #8
12 – July 18-22	Module 10 – Radiation safety and protection Seminar 8 + quiz	Work on RFP projects
13 – July 25-29	No lecture/seminar/quiz	Work on RFP projects
14 – Aug 1-5	No class Aug 1 (BC Day) RFP presentations – August 3 RFP recommendation – August 7	
15 – Aug 8-12	QC Test (30%)	

Students registered with the Centre for Accessible Learning (CAL) who complete quizzes, tests, and exams with academic accommodations have booking procedures and deadlines with CAL where advanced notice is required. Deadlines can be reviewed on the [CAL exams page](http://camosun.ca/services/accessible-learning/exams.html). <http://camosun.ca/services/accessible-learning/exams.html>

STUDENT EVALUATION

DESCRIPTION	WEIGHTING
Seminar Presentation	20%
Seminar Quizzes (7)	10%
QC Labs (8)	10%
QC Test	30%
RFP Group Project	30%
TOTAL	100%

If you have a concern about a grade you have received for an evaluation, please come and see me as soon as possible. Refer to the [Grade Review and Appeals](http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/e-1.14.pdf) policy for more information. <http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/e-1.14.pdf>

Seminar

Students will host a seminar (in pairs) on a relevant topic. Students are encouraged to access a library session in the third week of class so that they can finalize their topic selection and identify relevant literature. By the end of the session, the pair will select an article to feature in their seminar and submit for approval by the instructor. Once the article has been approved, the pair will be asked to summarize key findings and develop 5 simple multiple choice questions based on the article content.

Seminar Quizzes

The quizzes will be based primarily on the seminar articles. The instructor will post a list of the articles on D2L so that everyone in the class can read the article before each seminar. The 5 multiple choice questions created by the presenters may be used in the quiz, subject to instructor editing/feedback. The instructor will create approximately 5 additional questions. The instructor may draw from prior program or course content, depending on the relevance to the seminar topic. The quizzes will be available online, may be attempted One (1) time and for a 10-

minute window only.

QC Labs and Test

Students are responsible for participating in QC labs throughout the term and submitting their completed work to D2L. Students will receive credit for participating in each lab. Near the end of the course, there will be a written test on the content covered in the labs, which may draw from lecture material, lab exercises, and/or assigned readings.

RFP Project

Students will complete a group project and demonstrate their work in the form of a live presentation to their peers. It is expected that group members make themselves available to participate in group meetings and work on their project during the times allocated in the course schedule or agree to alternative meeting times. The instructor is available to provide guidance and assist students in finding resources for their presentation. More information about all of the assignments will be published on D2L.

COURSE GUIDELINES & EXPECTATIONS

TEST AND EXAMINATION PROCEDURES

There are policies regarding Teaching and Learning Practices for HHS Students, including written test and examination procedures including late arrivals and missed tests. Please see the Health and Human Services Student Handbook item 5.4 for Test and Examination Procedures. (<https://legacy.camosun.ca/learn/school/health-human-services/student-info/index.html#teaching>)

Please, inform me as soon as possible if conditions have arisen to prevent you from taking your examination during the available times.

WRITTEN ASSIGNMENTS

Assignments are due before 2400 hours (midnight) on the assigned day unless otherwise specified. Assignments about patients, residents or clients must be completed using the individual's initials only. Unless otherwise directed by individual course outlines or templates, assignments must be:

- word processed,
- double spaced,
- font meeting APA 7th edition guidelines,
- with a title page and a reference list.

Students requiring an extension for the due date of an assignment must negotiate with the instructor, at least 48 hours before the due date. Assignments submitted late *without* an approved extension will result in a **10% deduction** in marks for each day late, until the eve of the next assignment due date, or whenever the assignment no longer has value; whichever comes first. Abandoned/late assignments will NOT be accepted during the Flex weeks at the end of the semester.

**Bonus assignment points cannot result in greater than 100% total marks in the course, students who have been identified as "at risk" for failing the course MUST complete the bonus assignment in order to be eligible for a supplemental examination. A "supplemental examination" – an alternative demonstration of total course mastery – shall only be offered if the student is within 59.5% in total course marks following tabulation of all grades. The nature of the "supplemental examination" shall be the sole discretion of the instructor and is not subject to the normal application of the Grade Review and Appeals policy as it exists outside of regular course content.*

COURSE COMMUNICATIONS & BEHAVIOURAL EXPECTATIONS

Whenever sending direct emails to the instructor ensure you include the complete D2L title of the course in your subject:

- **2021 Fall Pathology - Part A (MRAD-173-DX01) - MRAD-173-DX01:** URGENT/TOPIC/SICK DAY etc.

The instructor will typically respond to direct emails within two business days (M-F w/in 48 hours). Students should use the “Important” priority tag on any email reporting a missed class or potentially missed assignment or examination.

The instructor intends to begin marking assignments on the day they are due (before the assignment window closes for any assignments submitted in advance) and will strive to have marking completed within three total business days following the close of the assignment window. The instructor will withhold releasing feedback or marks if there are any outstanding assignments until all late assignments have been received, the end of the late assignment acceptance period, or once the student(s) with outstanding assignments have communicated with the instructor that they do not intend to complete their assignment(s).

- Students should familiarize themselves with the Camosun College [Student Learning Success Guides](#) and pay close attention to the [Remote & Online Learning](#) guide in particular. This course will observe the [Student Guidelines for Communicating in Online, Professional Contexts](#) resource. Please watch the [Discussion Board Tips](#) video to help you make the most of our asynchronous discussion activities and assignments.

ATTENDANCE

Students will be expected to “enter class” or start the online portion of synchronous session with video and audio on. This meet-and-greet period of the synchronous online session will last about five minutes and students may elect to switch off their audio/video for the remainder of the synchronous class time unless they are presenting. Students should “mute” their audio whenever they are not actively in conversation or presenting during an online session. At the end of the synchronous online session there will be a five-minute checking-out period. If you are not present and visible for at least a portion of both these parts of the synchronous session, you may not receive participation marks for the synchronous session. Participation marks are awarded for both synchronous and asynchronous course activities at the discretion of the instructor.

- If you choose not to or are unable to attend a synchronous session it is your responsibility to acquire all information given during a class missed, incl. notes, hand-outs, assignments, changed exam dates etc.
- Student attitudes and behaviours surrounding attendance contribute to the professionalism mark in the course; however, attendance is not recorded.
- Should you miss a session for any reason, please inform your instructor as soon as possible once you are in a safe environment. Illness itself shall not be penalized, however students are independently responsible for any content missed.

- Synchronized sessions of this course shall only be recorded and posted to the D2L content with full and enthusiastic approval of all course attendants.

SUGGESTED STUDY TIME & STUDY HABITS

- There is one hour per week “synchronous course activities” and two hours per week of course content/laboratory (reading & assignments).
- A reasonable amount of time to dedicate to studies in this course for *adequate* (65%) comprehension of the course material would be the **three listed course hours, plus three additional hours** of assignments, discussions, study & reading your textbooks.
- Students who desire “full marks” or A+ grades, probably spend *more* than 6 hours outside of class per week studying the content and completing assignments for this course.
- Seeking any percentage above 90% is a waste of time you could be spending on other courses. At Camosun College, 90% is an A+ and no higher GPA can be shown on your transcript.
- Map out a study schedule; include dedicated time for reading, assignments, discussions, group work, and digesting/watching online content – spread it out during the week to give your brain time to absorb different information.
- It can be valuable to review your notes within 24 hours *following* each class to help you retain the information.
- Study/social groups are a highly effective way of learning for many students.

SCHOOL OR DEPARTMENTAL INFORMATION

Health & Human Services Student Handbook: <http://camosun.ca/learn/school/health-human-services/student-info/index.html>

General Practicum Information: <http://camosun.ca/learn/school/health-human-services/student-info/practicum-info.html>

Allied Health & Technologies Department Handbooks:

- Certified Medical Laboratory Assistant: <http://camosun.ca/learn/school/health-human-services/student-info/program-info/cmla.html>
- Diagnostic Medical Sonography: <http://camosun.ca/learn/school/health-human-services/student-info/program-info/sono.html>
- Medical Radiography: <http://camosun.ca/learn/school/health-human-services/student-info/program-info/mrad.html>

Students enrolled in Allied Health & Technologies Programs must achieve a minimum of 65% or a “COM” in each of their courses in order to use their course as a pre-requisite and progress in their program.

Students enrolled in Allied Health & Technologies Programs must participate in learning activities that include intimate and direct personal contact with their classmates during supervised practice. Students are training to perform the duties of a healthcare professional. These duties usually require constant, close physical contact with patients and clients. Students may be required to simulate and perform these activities on one another

during this course. Students may also be required to use special hygiene practices and protective gear to protect themselves from the transmission of communicable diseases (like COVID-19). Risks associated with learning and performing the physical duties of a healthcare profession cannot be entirely eliminated by any amount of caution or protection. Students who refuse, or are incapable of participating and performing these activities due to personal or medical limitations, may only continue to participate in their course work when supported by officially registered accommodations or temporary medical advisory.

STUDENT RESPONSIBILITY

Enrolment at Camosun assumes that the student will become a responsible member of the College community. As such, each student will display a positive work ethic, assist in the preservation of College property, and assume responsibility for their education by researching academic requirements and policies; demonstrating courtesy and respect toward others; and respecting expectations concerning attendance, assignments, deadlines, and appointments.

SUPPORTS AND SERVICES FOR STUDENTS

Camosun College offers a number of services to help you succeed in and out of the classroom. For a detailed overview of the supports and services visit <http://camosun.ca/students/>.

Support Service	Website
Academic Advising	http://camosun.ca/advising
Accessible Learning	http://camosun.ca/accessible-learning
Counselling	http://camosun.ca/counselling
Career Services	http://camosun.ca/coop
Financial Aid and Awards	http://camosun.ca/financialaid
Help Centres (Math/English/Science)	http://camosun.ca/help-centres
Indigenous Student Support	http://camosun.ca/indigenous
International Student Support	http://camosun.ca/international/
Learning Skills	http://camosun.ca/learningskills
Library	http://camosun.ca/services/library/
Office of Student Support	http://camosun.ca/oss

Support Service	Website
Ombudsperson	http://camosun.ca/ombuds
Registration	http://camosun.ca/registration
Technology Support	http://camosun.ca/its
Writing Centre	http://camosun.ca/writing-centre

If you have a mental health concern, please contact Counselling to arrange an appointment as soon as possible. Counselling sessions are available at both campuses during business hours. If you need urgent support after-hours, please contact the Vancouver Island Crisis Line at 1-888-494-3888 or call 911.

COLLEGE-WIDE POLICIES, PROCEDURES, REQUIREMENTS, AND STANDARDS

Academic Accommodations for Students with Disabilities

The College is committed to providing appropriate and reasonable academic accommodations to students with disabilities (i.e. physical, depression, learning, etc). If you have a disability, the [Centre for Accessible Learning](#) (CAL) can help you document your needs, and where disability-related barriers to access in your courses exist, create an accommodation plan. By making a plan through CAL, you can ensure you have the appropriate academic accommodations you need without disclosing your diagnosis or condition to course instructors. Please visit the CAL website for contacts and to learn how to get started:

<http://camosun.ca/services/accessible-learning/>

Academic Integrity

Please visit <http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/e-1.13.pdf> for policy regarding academic expectations and details for addressing and resolving matters of academic misconduct.

Academic Progress

Please visit <http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/e-1.1.pdf> for further details on how Camosun College monitors students' academic progress and what steps can be taken if a student is at risk of not meeting the College's academic progress standards.

Course Withdrawals Policy

Please visit <http://camosun.ca/about/policies/education-academic/e-2-student-services-and-support/e-2.2.pdf> for further details about course withdrawals. For deadline for fees, course drop dates, and tuition refund, please visit <http://camosun.ca/learn/fees/#deadlines>.

Grading Policy

Please visit <http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/e-1.5.pdf> for further details about grading.

Grade Review and Appeals

Please visit <http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/e-1.14.pdf> for policy relating to requests for review and appeal of grades.

Mandatory Attendance for First Class Meeting of Each Course

Camosun College requires mandatory attendance for the first class meeting of each course. If you do not attend, and do not provide your instructor with a reasonable reason in advance, you will be removed from the course and the space offered to the next waitlisted student. For more information, please see the “Attendance” section under “Registration Policies and Procedures” (<http://camosun.ca/learn/calendar/current/procedures.html>) and the Grading Policy at <http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/e-1.5.pdf>.

Medical / Compassionate Withdrawals

Students who are incapacitated and unable to complete or succeed in their studies by virtue of serious and demonstrated exceptional circumstances may be eligible for a medical/compassionate withdrawal. Please visit <http://camosun.ca/about/policies/education-academic/e-2-student-services-and-support/e-2.8.pdf> to learn more about the process involved in a medical/compassionate withdrawal.

Sexual Violence and Misconduct

Camosun is committed to creating a campus culture of safety, respect, and consent. Camosun’s Office of Student Support is responsible for offering support to students impacted by sexual violence. Regardless of when or where the sexual violence or misconduct occurred, students can access support at Camosun. The Office of Student Support will make sure students have a safe and private place to talk and will help them understand what supports are available and their options for next steps. The Office of Student Support respects a student’s right to choose what is right for them. For more information see Camosun’s Sexualized Violence and Misconduct Policy: <http://camosun.ca/about/policies/education-academic/e-2-student-services-and-support/e-2.9.pdf> and camosun.ca/sexual-violence. To contact the Office of Student Support: oss@camosun.ca or by phone: 250-370-3046 or 250-370-3841

Student Misconduct (Non-Academic)

Camosun College is committed to building the academic competency of all students, seeks to empower students to become agents of their own learning, and promotes academic belonging for everyone. Camosun also expects that all students to conduct themselves in a manner that contributes to a positive, supportive, and safe learning environment. Please review Camosun College’s Student Misconduct Policy at

<http://camosun.ca/about/policies/education-academic/e-2-student-services-and-support/e-2.5.pdf> to understand the College's expectations of academic integrity and student behavioural conduct.

Changes to this Syllabus: Every effort has been made to ensure that information in this syllabus is accurate at the time of publication. The College reserves the right to change courses if it becomes necessary so that course content remains relevant. In such cases, the instructor will give the students clear and timely notice of the changes.