Course Syllabus

Course title: Radiology in Dental Practice
Class section: DHYG **-** 231 **-** X01
Term: 2025W
Course credits: 3
Total hours: 42.5
Delivery method: In-Person

Territorial Acknowledgement

Camosun College respectfully acknowledges that our campuses are situated on the territories of the L□k□□□ŋ□n (Songhees and Kosapsum) and W□SÁNEĆ peoples. We honour their knowledge and welcome to all students who seek education here.

Instructor Details

Name: Michelle Meunier
Email: MeunierM@camosun.ca

Instructor Statement

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.

Instructor Office Hours

Office:	Hours:
D004	By Appointment - Email meunierm@camosun.ca

Course Description

Course Description:
Students will examine the principles of x-ray generation, radiation biology and uses of imaging in dentistry. Students learn a variety of imaging techniques in order to produce diagnostic images of oral structures. Students discuss legal requirements, ethical issues, and radiation safety and protection as they pertain to dental practice. Learners are also introduced to radiographic interpretation of dental structures and the surrounding tissues.

Prerequisites:
All of:

- B- in DHYG 219
- B- in DHYG 220

Pre or Co-requisites:
All of:

- B- in BIOL 260
- B- in DHYG 221
- B- in DHYG 222

Course Delivery Hours

ACTIVITY	HOURS / WEEK	# OF WEEKS	ACTIVITY HOURS
Lecture	2.5	17	42.5
Seminar			
Lab / Collaborative Learning			
		TOTAL HOURS:	**42.5**

ACTIVITY	HOURS / WEEK	# OF WEEKS	ACTIVITY HOURS
Supervised Field Practice			
Final Exam			
		TOTAL HOURS:	**42.5**

Course Learning Outcomes / Objectives

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

- Discuss fundamental principles of radiology as they pertain to dental practice.
- Describe radiation biology and the uses of x-radiation in dentistry to maintain a safe environment.
- Describe concepts, principles and applications of radiography techniques and radiographic imaging in dentistry.
- Describe adaptations or modifications to oral radiography techniques for successful imaging for clients with special needs.
- Examine legal requirements and ethical issues related to oral radiography in relation to dental hygiene practice.
- Utilize foundational knowledge in order to examine diagnostic images of oral structures.
- Apply systematic methods for interpreting radiographs in dental practice.

Course Materials - Required

Iannucci, J.M., & Howerton, L.J. (2022). Dental radiography: Principles and techniques (6th ed.). Elsevier.

Learning Outcomes and Performance Indicators

1. Discuss fundamental principles of radiology as they pertain to dental practice.

History of radiation:

- Describe briefly the history of x-radiation and radiography identifying the discovery of x-rays and improvements in techniques to date.

Radiation physics

- Describe the physics of radiation in terms such as atomic structure as it pertains to the production of x-radiation.
- Define ionizing radiation and the concept of ionization.
- Explain the relationship between x-radiation and other sources of electromagnetic radiation using the electromagnetic spectrum.
- Describe characteristics of short and long wave x-rays, specifically those of x-radiation.

Generation of x-radiation

- Describe the generation of x-radiation including electrical terms and equipment required for production.
- Describe in detail the x-ray tube, its' components, and their functions.
- Describe conditions that must exist for the production of x-radiation and explain, in a simplified manner, how x-radiation is produced.
- Name and describe the two ways in which x-rays are produced; Bremsstrahlung and Characteristic.
- Explain the effect of increased and decreased kilovoltage (kV), milliamperage (mA) and time (s) on the quality and quantity of x-radiation produced.
- Describe ways in which x-rays interact with matter including the Photoelectric effect, Compton scatter and Unmodified (Coherent) scatter.

2. Describe radiation biology and the uses of x-radiation in dentistry to maintain a safe environment.

Radiation biology:

- Differentiate between background and man-made radiation.
- Describe direct and indirect theories of biological effects of radiation.
- Define radiation biology and discuss the potentially harmful effect of any exposure to radiation including factors that influence the body's response.
- Discuss the cellular response to radiation including genetic, somatic and carcinogenic.
- Discuss the radio-sensitivity of various cells and tissues.
- Describe the effects of radiation therapy on oral tissues.

Uses of radiation in dentistry:

- Briefly define exposure, dose and dose equivalence using SI units and traditional units of radiation measurement.
- Discuss the amounts of radiation used in dental radiography.
- Discuss the need for radiation protection standards for the public and operators of x-radiation equipment.
- Define primary beam, secondary radiation, scatter radiation and leakage radiation.
- Relate the characteristics of x-rays to their use in dentistry.
- Describe the risks and benefits of dental radiographs.
- Discuss the ALARA concept and describe ways of applying the concept to reduce radiation exposure to the dental client.
- Discuss ways dental office personnel can protect themselves from x-radiation.
- Discuss quality assurance mechanisms as a part of radiation protection.

3. Describe concepts, principles and applications of radiography techniques and radiographic imaging in dentistry.

Concepts/principles of radiographic imaging:

- Define density, contrast and detail(definition) and describe imaging factors affecting each.
- Discuss terms used to describe quality of radiographic images (umbra, penumbra, magnification, etc.).
- Discuss and apply the concepts of the inverse square law.
- Relate the quantity and quality of x-radiation produced by increased and decreased kV, mA and time to image quality.

Traditional film imaging:

- Describe traditional radiographic film composition including the sensitivity of film emulsion (film speed).
- Describe the concept of latent image.
- Discuss the storage and handling of radiographic film.
- Describe film processing identifying chemical reactions that occur on film during the various steps.
- Describe the composition and care of solutions used for automatic processing.
- Discuss requirements and quality control for the darkroom.

- Describe and identify causes for processing errors on finished radiographs.

Digital imaging:

- Discuss digital intra-oral radiography techniques
- Describe radiographic imaging using digital technology.
- Differentiate between the two types of intra oral technology (PSP and CCD ‘sensor’).
- Discuss how a computer stores the radiographic images.

Advanced imaging techniques:

- Discuss reasons for the development of alternate imaging techniques other than conventional radiography as it pertains to dentistry.
- Describe and discuss the use of the following techniques as they are used in dentistry; contrast media (angiography, sialography, etc.) computerized tomography, subtraction techniques, ultrasound, magnetic resonance imaging and positron emission tomography (nuclear medicine).

Radiography techniques:

- Identify various types and sizes of intra-oral film and packaging.
- Describe characteristics of periapical and bitewing radiographs and discuss uses for each in dentistry.
- Describe rationale and methodology for the paralleling technique.
- Describe rationale and methodology for the bitewing technique.
- Describe principles, indications and limitations of bisecting the angle technique.
- Discuss the methods used for extra-oral radiographic digital imaging.
- Describe uses of extra-oral radiographs in dentistry.
- Describe the principles, indications and limitations of panoramic radiographs.
- Describe the techniques, indications and limitations of occlusal radiographs.
- Describe radiographic techniques used for endodontics.
- Describe the purpose and technique of lateral jaw radiographs, cephalometric radiographs and temporomandibular joint radiographs.

- Describe methods used to localize abnormal radiographic findings, including the ‘Buccal Object Rule’.
- Describe the disto-molar technique for taking radiographs on third molar.

4. Describe adaptations or modifications to oral radiography techniques for successful imaging for clients with special needs.

Modifications:

- Describe radiographic techniques for edentulous clients.
- Describe modifications to radiographic techniques for children.
- Describe modifications to radiographic techniques that may be required for clients with special medical, physical or intra-oral needs.

5. Examine legal requirements and ethical issues related to oral radiography in relation to dental hygiene practice.

- Describe the main legal and ethical issues related to dental radiography.
- Briefly describe how radiographs are used during the assessment, planning, implementation and evaluation phases of preventive dental care.
- Identify rationale to determine the need for radiographs.
- Explain "informed consent" as it relates to oral radiographs and describes issues related to informed consent.
- Define the client's and dentist's ownership rights of radiographic records.

6. Utilize foundational knowledge in order to examine diagnostic images of oral structures.

- Describe the terms radiopaque and radiolucent and apply these terms to structures on dental radiographs.
- Identify normal soft and hard tissues and structures on a full mouth set of radiographs differentiating between mandibular and maxillary anatomy.
- Describe radiographically, normal variations to anatomic landmarks including foramina, sinuses, trabecular patterns, etc.

7. Apply systematic methods for interpreting radiographs in dental practice.

- Discuss handling of processed radiographic images and correct mounting procedures.
- Define and differentiate between "diagnosis" and "interpretation" as they pertain to dental radiographs.
- Discuss a systematic method for interpreting radiographs.
- Describe and apply correct descriptive terminology in interpreting radiographs.
- Describe how to use the problem-solving process to distinguish normal from abnormal conditions.
- Describe the radiographic appearance of common anatomic variations that mimic pathology.
- List dental materials that appear either radiopaque or radiolucent.
- Identify radiographically, dental restorations and materials as accurately as possible.

Course Schedule, Topics, and Associated Preparation / Activity

The following schedule and course components are subject to change with reasonable advance notice, as deemed appropriate by the instructor. Course days, times and locations can be found on MyCamosun.

Week or Date Range	Activity or Topic	Other Notes
Week 1	• Intro to radiology, History of radiology • Infection control, stepwedge, QA • Reminder –Bring container and plates for RADS for next weeks RAD Lab	
Week 2	• Radiology physics • Paralleling technique Horizontal and Vertical BW's using Paralleling technique • Practice with RINN holder set up for BW's	

Week or Date Range	Activity or Topic	Other Notes
Week 3	• X-radiation generation and interactions • X-radiation and image characteristics	
Week 4	• Digital imaging • Radiation biology • Paralleling Technique • For Periapical exposures – anterior and posterior Practice with RINN holder set up for PA's	
Week 5	Term test #1	
Week 6	• BW technique • Bisecting technique • Radiation protection	
Week 7	Reading Break	
Week 8	• Exposure and technique errors Anatomical landmarks	
Week 9	• Anatomical landmarks and mounting • Client management (clients with special needs) • Mounting practice Discuss Assignment	
Week 10	Term Test #2	

Week or Date Range	Activity or Topic	Other Notes
Week 11	• Extra oral Radiography • Rad interpretation	
Week 12	• Rad Interpretation	
Week 13	• Specialized techniques including occlusal and localization techniques • Alternate imaging techniques (3D imaging) • Rad interpretation	
Week 14	• Legal and ethical issues relative to radiography • Rad interpretation • BW Technique review for clinic	
Week 15	• Film processing • Film and latent imaging Discussion of assignment scenarios	
Week 16	Discussion of assignment scenarios	
Week 17	Final Exam TBD	

Evaluation of Learning: Weighted

DESCRIPTION	WEIGHTING
Assignment	**15%**
Term Test #1	**25%**
Term Test #2	**25%**
TOTAL:	**100%**

DESCRIPTION	WEIGHTING
Final exam	**35%**
TOTAL:	**100%**

NOTE: Minimum passing grade for this course is a B- of 70%

See Camosun's Grading Systems for Details
https://camosun.ca/registration-records/student-records/camosun-grading-systems

Grade Reviews and Appeals

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 policy** for more information.
http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/e-1.14.pdf

The Centre for Accessible Learning (CAL) is part of Camosun's Student Affairs unit. CAL coordinates academic accommodations and provides related programs and services to students with documented disabilities.

Students who require academic accommodations are expected to request and arrange accommodations through CAL in a timely fashion. While we understand that not all accommodation needs are known to students at the beginning of a course, accommodations cannot be provided unless the proper process is followed through CAL and an accommodation letter has been released to the instructor. Students are responsible for providing CAL with the proper documentation prior to the beginning of a course.

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 noticed is required.

Deadlines can be reviewed on the CAL exams page
https://camosun.ca/services/academic-supports/accessible-learning/academic-accommodations-exams

Please consult the CAL webpage for more information:
https://camosun.ca/services/academic-supports/accessible-learning

Artificial Intelligence: A Guide for Students

Generative Artificial Intelligence (GenAI) is an evolving technology that brings potential benefits but also substantial risks. While GenAI tools have the ability to transform how we work and learn, it is

essential for the college community to adapt to these changes in a thoughtful and secure way.

When using GenAI tools, students should ensure proper citation and attribution guidelines are followed. This includes acknowledging AI assistance in reports ,presentations, or any external communications. Clear citation helps build trust, ensures ethical use, and reduces the risk of misinformation or copyright issues.

For citation support visit the college's citation style guide.
https://camosun.libguides.com/cite

Artificial Intelligence: A Guide for Students
Visit the following website to learn about AI use in academic settings.
https://camosun.libguides.com/artificialintelligence/home

Course Guidelines & Expectations

Regular attendance and engagement with course material is necessary to understand and apply the content and concepts from this course into clinical practice. Students are expected to internalize and integrate the knowledge, skills and expectations for professional behaviour from this course to safely deliver dental hygiene care. Absence from class and lack of preparation increases the risk for students to be unsuccessful in meeting the learning outcomes for this course. Students are responsible to acquire all information given during a missed class, including notes, handouts, schedule changes, etc.

School or Departmental Information

Students are required to read and are accountable for the College policies (outlined in the section below).

If relevant, students are required to read and are accountable for the guidelines noted on the HHS Clinical and Practice Placements website.
https://camosun.ca/programs-courses/school-health-and-human-services/hhs-programs/practicums

In addition students are required to follow the guidelines as described in the School of Health & Human Services (HHS) and program handbooks, including information on supplemental exams.

School of Health & Human Services (HHS) Handbook
https://camosun.ca/programs-courses/school-health-and-human-services/information-health-and-human-services-students-1#top

Dental Hygiene Handbook
https://camosun.ca/programs-courses/school-health-and-human-services/information-health-and-human-services-students-4

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.

College Policies

Academic Integrity

Students are expected to follow the college's Academic Integrity policy, and be honest and ethical in all aspects of their studies. To help you understand these responsibilities review the online Academic Integrity guide.

The college's Academic Integrity policy and supporting documents detail the process for addressing and resolving matters of academic misconduct.

Academic Accommodations for Students with Disabilities

If you have a documented disability and need accommodations contact the Centre for Accessible Learning (CAL). CAL will arrange the appropriate academic accommodations so you can participate in all academic activities. Visit the CAL website for more information

Academic Progress

The Academic Progress policy details how the college monitors students' academic progress and what steps are taken if a student is at risk of not meeting the college's academic progress standards.

Acceptable Technology Use

The Acceptable Technology Use policy outlines how students are expected to use college technology resources, this includes using your own devices on the college's network. The use of

the college resources in a way that violates a person's right to study in an environment free of discrimination, harassment or sexual violation is prohibited.

Course Withdrawals Policy

For details about course withdrawal see the Course Withdrawals policy. Be aware of the deadlines for fees, course drop dates, and tuition refunds.

Grading Policy

To learn more about grading see the Grading Policy.

Grade Review and Appeals

The process to request a review of grades is outlined in the Grade Review and Appeals policy.

Medical / Compassionate Withdrawals

If you have experienced a serious health or personal issue, you may be eligible for a medical/compassionate withdrawal. The Medical / Compassionate Withdrawal Request form outlines what is required.

Sexual Violence

If you have experienced sexual violence on or off campus, you can get support from the Office of Student Support. The Office of Student Support is a safe and private place to talk about what supports are available and your options for next steps. Visit the sexual violence support and education site to learn more or email oss@camosun.ca or phone: 250-370-3046 or 250-370-3841.

Student Misconduct (Non-Academic)

Camosun expects students to conduct themselves in a manner that contributes to a positive, supportive, and safe learning environment. Review the Student Misconduct Policy to understand the college's expectations of conduct.

Looking for other policies? See Camosun College Policies and Directives

Services and Supports

Services are free and available to all students.

Academic Supports	Enrollment Supports
Centre for Accessible Learning English, Math and Science Help Centres Library Writing Centre & Learning Skills	Academic Advising Financial Aid and Awards Registration Tuition and Fees
Health and Wellness	**Applied learning**
Counseling Fitness and Recreation Office of Student Support	Co-operative Education and Career Services Makerspace

The Centre for Indigenous Education Centre and Community Connections provides cultural and academic supports for Indigenous students.

Camosun International provides supports to international students.

The Ombudsperson provides an impartial, independent service to ensure students are treated fairly. The service is a safe place for students to voice and clarify concerns and complaints.

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

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 the course content or schedule. When changes are necessary the instructor will give clear and timely notice.