

# COURSE SYLLABUS



Camosun College campuses are located on the traditional territories of the Ləkʷəŋən and WSÁNEĆ peoples. We acknowledge their welcome and graciousness to the students who seek knowledge here.

**TERM:** W2021  
**COURSE & SECTION:** DHYG 231  
**COURSE TITLE:** Radiology  
**SECTION DETAILS:** Wednesdays 8:30-9:20am and Fridays 1:30-2:50pm  
**INSTRUCTOR:** Margit Strobl | D006 | stroblm@camosun.bc.ca  
**OFFICE HOURS:** Posted on D2L

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.

Camosun College will continue to follow the guidance of the Provincial Health Officer, the B.C. Government and WorkSafeBC, and as such may revise the delivery of courses. Courses with an approved face-to-face component may need to move to online or remote delivery if necessary.

The COVID-19 pandemic has presented many challenges, and Camosun College is committed to helping you safely complete your education. Following guidelines from the Provincial Health Officer, WorkSafe BC and the B.C. Government to ensure the health and wellbeing of students and employees Camosun College is providing you with every possible protection to keep you safe including COVID Training for students and employees, health checks, infection control protocols including sanitization of spaces, PPE and ensuring physical distancing. Please refer to: <http://camosun.ca/covid19/faq/covid-faqs-students.html> However, if you're at all uncomfortable being on campus, please share your concerns with your Instructor and if needed, alternatives will be discussed.

## COURSE DESCRIPTION

This course examines the basic principles of x-ray generation, radiation biology and the uses of x-radiation in dentistry. Principles of paralleling and bisecting techniques are taught along with radiation safety and protection in order to provide a safe environment and to produce optimum radiographic images for interpretation. Legal and ethical issues, concepts related to application of advanced radiographic and imaging techniques as well as techniques for clients with special needs are discussed. Learners are also introduced to radiographic interpretation.

<input type="checkbox"/>	<b>Synchronous delivery:</b> Courses will be completely online with online scheduled meetings and expectations for remote student participation. There will be meeting times but not on campus. Students will be expected to manage time	<input type="checkbox"/>	<b>Asynchronous delivery</b> Courses will be completely online with no set meeting schedules. Students may participate from any time zone or anywhere in the world. All evaluation will be managed remotely.	<input checked="" type="checkbox"/>	<b>Blended delivery:</b> A mixed delivery of both synchronous and asynchronous.
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	zone differences for scheduled online activities.			
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Course Credits: 3  
 Prerequisite(s): B- in DHYG 219 and 220  
 Corequisite(s): DHYG 280 and 281  
 Pre/Corequisite(s): B- in BIOL 260, DHYG 221 and 222  
 Exclusion(s):

## COURSE DELIVERY

ACTIVITY	HOURS / WEEK	# OF WEEKS	ACTIVITY HOURS
Lecture	2.5	16	40
Seminar			
Lab / Collaborative Learning			
Supervised Field Practice			
Workplace Integrated Learning			
Online			
		<b>TOTAL HOURS</b>	<b>40</b>

Additional Delivery information:  
 All students will write final exam during Week 17.

## LEARNING OUTCOMES

Upon successful completion of this course, you will be able to:

- Demonstrate an understanding of the basic principles of radiation biology and the uses of x-radiation in dentistry to maintain and provide a safe environment and to produce optimum radiographic images.
- Examine legal and ethical issues related to oral radiography in relation to dental hygiene practice.
- Discuss fundamental principles of radiology.
- Use systematic methods for interpreting radiographs.
- Describe concepts, principles and applications of advanced radiography techniques and radiographic imaging.
- Describe adaptations or modifications to oral radiography techniques required for successful imaging for clients with special needs.

## REQUIRED MATERIALS & RECOMMENDED PREPARATION / INFORMATION

Iannucci J.M., Howerton L. (2017). Dental radiography: principles and techniques (5th Ed.). St. Louis Missouri. Elsevier. (ISBN – 978-0-323-29742-4)

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

ACTIVITY
1. Discuss fundamental principles of radiology.

Describe the history of x-radiation and radiography

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

➤ Discuss the concepts of radiation physics and generation of x-radiation

- 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.
- 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.

➤ Discuss radiographic imaging including film, technique, distance factors, film processing and quality assurance

- 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.
- 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.
- compare shadow casting principles relative to quality of image characteristics for these two radiographic techniques (paralleling and bisecting).
- 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 film quality.
- 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.

2. Demonstrate an understanding of the basic principles of radiation biology and the uses of x-radiation to maintain and provide a safe environment and to produce optimum radiographic images.

- 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.

➤ Use of x-rays 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. Examine legal 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.
- describe the use of radiographs in forensic dentistry.

➤ Describe infection control in radiography

- discuss the importance of having infection control guidelines for radiography procedures in the dental office.
- discuss barriers vs. surface disinfection using the various film/sensor holders and equipment.
- describe infection control protocols for handling films/sensors during all steps of exposure and image uptake or processing.

4. Use systematic methods for interpreting radiographs.

➤ Sort and mount radiographs while identifying anatomical structures and landmarks

- describe preservation of radiographs and purposes of mounting.
- describe types of film mounts including their advantages and disadvantages.
- discuss handling of processed radiographs and correct mounting procedures.
- discuss the purpose of radiographic viewers.
- 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.

## Interpret dental radiographic images

- define and differentiate between "diagnosis" and "interpretation" as they pertain to dental radiographs.
- discuss a systematic method for interpreting radiographs.
- given a full-mouth set of radiographs, systematically review the films, interpreting all normal images and identifying the presence of abnormalities including artifacts and processing errors. • 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.
- recall (from DHYG 221) the radiographic appearance of primary tooth root resorption and incompletely formed apices.

### ➤ Describe and interpret the radiographic appearance of dental restorations and dental restorative materials

- list dental materials that appear either radiopaque or radiolucent.
- identify radiographically, dental restorations and materials as accurately as possible.
- discuss benefits and limitations of radiographs for obtaining specific restorative details

## 5. Describe concepts, principles and applications of advanced radiography techniques and radiographic 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.
- describe traditional techniques that are the same as or different in regard to positioning digital film devices.

### ➤ Discuss specialized intra-oral radiographic techniques

- describe the techniques, indications and limitations of occlusal radiographs.
- describe radiographic techniques used for endodontics.
- describe methods used to localize abnormal radiographic findings, including the 'Buccal Object Rule'.
- describe the disto-molar technique for taking radiographs on third molar.

### ➤ Discuss extra-oral radiography, specifically panoramic imaging

- describe cassettes and film used for extra-oral radiographs.
- discuss the methods used for extra-oral radiographic digital imaging.
- describe uses of extra-oral radiographs in dentistry.
- differentiate the techniques of traditional film and digital panoramic imaging.
- describe the principles, indications and limitations of panoramic radiographs.
- describe the purpose and technique of lateral jaw radiographs, cephalometric radiographs and temporomandibular joint radiographs.

### ➤ Discuss alternate imaging modalities as they are used in dentistry

- discuss reasons for the development of alternate imaging techniques other than conventional radiography.
- 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).

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

## STUDENT EVALUATION

**NOTE: minimum passing grade for this course is B- or 70%**

DESCRIPTION	WEIGHTING
Assignment	15%
Term Test #1	25%
Term Test #2	25%
Final Exam	35%
If you have a concern about a grade you have received for an evaluation, please come and see me as soon as possible. If you wish to dispute a final grade you have received, please refer to the <a href="#">Grade Appeal Policy</a> .	<b>TOTAL</b> 100%

## 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/services/>.

Academic Advising	<a href="http://camosun.ca/services/academic-advising/">http://camosun.ca/services/academic-advising/</a>
Accessible Learning	<a href="http://camosun.ca/services/accessible-learning/">http://camosun.ca/services/accessible-learning/</a>
Counselling	<a href="http://camosun.ca/services/counselling-centre/">http://camosun.ca/services/counselling-centre/</a>
D2L Support	<a href="mailto:desupport@camosun.ca">desupport@camosun.ca</a>
Financial Aid and Awards	<a href="http://camosun.ca/services/financial-aid/">http://camosun.ca/services/financial-aid/</a>
Help Centres (Math/English/Science)	<a href="http://camosun.ca/services/help-centres/">http://camosun.ca/services/help-centres/</a>
Indigenous Student Support	<a href="http://camosun.ca/learn/school/indigenous-education-community-connections/">http://camosun.ca/learn/school/indigenous-education-community-connections/</a>
International Student Support	<a href="http://camosun.ca/international/">http://camosun.ca/international/</a>
Learning Skills	<a href="http://camosun.ca/services/writing-centre/learning-skills">http://camosun.ca/services/writing-centre/learning-skills</a>
Library	<a href="http://camosun.ca/services/library/">http://camosun.ca/services/library/</a>
Office of Student Support	<a href="http://camosun.ca/services/student-support/">http://camosun.ca/services/student-support/</a>
Ombuds	<a href="http://camosun.ca/about/ombudsman/">http://camosun.ca/about/ombudsman/</a>

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Registration	<a href="http://camosun.ca/services/registration/">http://camosun.ca/services/registration/</a>
Technology Support	<a href="http://camosun.ca/services/its/">http://camosun.ca/services/its/</a>
Writing Centre	<a href="http://camosun.ca/services/writing-centre/">http://camosun.ca/services/writing-centre/</a>

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

## STUDENT RESPONSIBILITY

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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.

## STATEMENTS: POLICIES, PROCEDURES, REQUIREMENTS, AND STANDARDS

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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.

### SCHOOL, DEPARTMENT, OR PROGRAM PROCEDURES, REQUIREMENTS, AND STANDARDS

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### COLLEGE-WIDE POLICIES

#### Academic Accommodations for Students with Disabilities

The College is also committed to providing appropriate and reasonable academic accommodations to students with disabilities (i.e. physical, anxiety, depression, learning, etc). If you have a disability, the [Centre for Accessible Learning](#) (CAL) can help you document your needs and create an accommodation plan. By making a plan through CAL, you can ensure you have the appropriate accommodations you need without disclosing your diagnosis or condition to course instructors. If you need to request academic accommodations, you can contact CAL at: [accessible@camosun.ca](mailto:accessible@camosun.ca) or by phone at 250-370-3312 (Lansdowne) or 250-370-4049 (Interurban). Visit <http://camosun.ca/services/accessible-learning/> for more information.

#### 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.

### 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.

### Student Code of Conduct (Academic and 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 Conduct 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.

CHAIR REVIEW DATE: Dec 17, 2020

TEMPLATE VERSION: 2020.1

**Changes to this Course 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.