



CAMOSUN COLLEGE
School of Health & Human Services
Dental Programs

DHYG 131 Dental Radiology

Winter, 2013

COURSE OUTLINE

The Approved Course Description is available on the web @

<http://camosun.ca/learn/calendar/current/web/dhyg.html>

Ω Please note: This outline will not be kept indefinitely. It is recommended students keep this outline for their records.

1. Instructor Information

(a) Instructor	Melissa Schaefer
(b) Office hours	By Appointment
(c) Location	D003
(d) Phone	(250) 370-3193 Alternative: (250) 370-1344
(e) E-mail	schaefer@camosun.bc.ca
(f) Website	n/a

2. Course Description

- a. Calendar 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.
- b. ii) Pre-requisites: DHYG 110, DHYG 120, DHYG 170, DHYG 171, DHYG 145
- c. iii) Pre / Co-requisites: DHYG 180, DHYG 181, DHYG 123, DHYG 122, DHYG 146
- d. Course Particulars
 - i) Credits: 3.0
 - ii) Components: Class Hours: 2.5 hours per week / Seminar hours 2.5 / Practicum hours 0 / Out of class hours 2 per week.
 - iii) Is the course available by distance education? No
 - iv) Is prior learning available for this course? Yes

A weekly schedule of classes will be distributed separately. Students are expected to be prepared for class by reading text chapters and completing related manual notes for each class as necessary.

3. Required Materials

(a) Texts Required:

Iannucci & Jansen Howerton (*4th Ed.*). (2012). *Dental Radiography: Principles and Techniques* (4th Ed). Philadelphia: Saunders Elsevier.

OR Previous Edition will suffice for this year.

Haring & Howerton (2006). *Dental Radiography: Principles and Techniques* (3rd Ed.). Philadelphia: Saunders Elsevier

(b) Other: TBA - Workbook / Manual may be available through the Camosun College Bookstore Powerpoints and /or course information will be posted on the D2L site after the course commences.

4. Intended Learning Outcomes

Learning Outcomes for DHYG 131 Radiology	Program (Global) Outcomes (FYI)
<p>By the end of this course you will know and be able to:</p> <ol style="list-style-type: none"> 1. Understand the basic principles of radiation biology and the uses of x-radiation in dentistry in regards to x-ray generation and radiation protection in order to provide a safe environment and to produce optimum radiographic images for interpretation. 2. This foundation will also provide you with base knowledge required for further study in the dental sciences. 3. Describe and apply concepts dealing with legal and ethical issues of dental radiography. 4. Interpret dental radiographic images. 5. Understand and apply concepts, principles and applications of specialized and advanced radiography techniques and radiographic imaging. 	<ol style="list-style-type: none"> A. <i>Function as a professional dental hygienist.</i> B. <i>Communicate and collaborate effectively with individuals, family, community and interdisciplinary teams.</i> C. <i>Demonstrate critical thinking and use evidence based decision-making to provide optimal dental hygiene services to individuals, families and community.</i> D. <i>Advocate improving oral health and access to oral health services for individuals, families and community.</i> E. <i>Coordinate and contribute to the effective management of the practice environment to ensure quality care and services.</i> F. <i>Function as a competent clinician using the dental hygiene process of care.</i> G. <i>Educate individuals, families and community about oral health including its relationship to general health.</i> H. <i>Apply health promotion principles to improve the health of individuals, families and community.</i>

5. Critical Elements

1. Discuss the basic principles of radiation biology and the uses of x-radiation in dentistry and medicine.

- describe briefly the history of x-radiation and radiography
- define radiation biology and discuss the potentially harmful effect of different types of radiation exposure
- differentiate between background and man-made radiation
- discuss the radio-sensitivity of various cells and tissues
- discuss short and long term biologic effects of radiation exposure including factors that influence the body's response
- describe the effects of radiation therapy on oral tissues
- define the terms associated with units of radiation measurement including exposure, dose and dose equivalence using SI units and traditional units
- discuss the use of radiation in dentistry and medicine
- briefly describe how radiographs are used during the assessment, planning, implementation and evaluation phases of preventive dental care

2. Discuss the concepts of radiation physics, generation of x-radiation and radiation protection

- describe the physics of radiation in terms such as atomic structure as it pertains to the production of x-radiation
- define ionization and ionizing radiation
- identify the relationship between x-radiation and of other types of radiation using the electromagnetic spectrum
- describe characteristics of electromagnetic radiation, specifically those of x-rays
- describe the generation of x-radiation including electrical terms and equipment required for x-ray production
- describe the two ways in which x-rays are produced in dental x-ray machines; 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 the need for radiation protection standards for the public and for operators of x-radiation equipment
- define primary beam, secondary radiation, scatter radiation and leakage radiation
- discuss the ALARA concept and describe ways of applying the concept to reduce radiation exposure to the dental client
- discuss quality control as a part of radiation protection including risks and benefits of dental radiographs
- be familiar with safety code 30 as a guide for radiation protection standards in dentistry

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

- describe radiographic film and apply specific uses for each type and size
- discuss the sensitivity of film emulsion (film speed)
- discuss the storage and handling of radiographic film
- describe characteristics of periapical and bitewing radiographs
- discuss the principles of the paralleling technique and bisecting the angle technique
- discuss image characteristics in terms of these two radiographic techniques
- describe how the latent image is formed
- define the terms radiopaque, radiolucent, density, contrast and detail(definition)
- describe the quantity and quality of x-radiation relating kV, mA and time to film quality
- discuss and apply the concepts of the inverse square law
- describe film processing identifying chemical reactions that occur on film during the various steps
- differentiate between manual and automatic processing and have a basic understanding of the composition and care of solutions used
- discuss the requirements for a darkroom and describe quality assurance mechanisms used
- identify processing and technique errors on finished radiographs and use critical thinking to analyze causes and prevention for each

4. Describe infection control in radiography

- discuss the importance of having infection control guidelines for radiography procedures in the dental office
- describe infection control protocols in dental radiography and discuss the protocols that are used at the Camosun Dental Clinic

5. Identify anatomical structures and landmarks visible on dental radiographs using proper viewing techniques.

- describe radiopaque and radiolucent and apply these terms to structures on dental radiographs
- identify normal soft and hard tissue landmarks on a full mouth set of radiographs differentiating between mandibular and maxillary structures
- describe, radiographically, normal variations to anatomic landmarks including foramina, sinuses, trabecular patterns, etc.
- describe preservation of radiographs and mounting
- discuss handling of processed radiographs and correct mounting procedures
- discuss the purpose of radiographic viewers

6. Interpret dental radiographic images.

- define and differentiate between "diagnosis" and "interpretation"
- discuss a systematic method for interpreting radiographs and apply a problem-solving process to distinguish normal from abnormal
- describe and apply correct descriptive terminology in interpreting radiographs
- using 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 interpret the radiographic appearance of dental restorations and dental restorative materials using appropriate terminology
- Describe the radiographic appearance of dental caries (relate information discussed in DHYG 122)

7. Understand and apply concepts, principles and applications of specialized and advanced radiography techniques and radiographic imaging.

➤ **Specialized Intra-oral radiographic techniques**

- Describe the principles and techniques associated with occlusal radiographs.
- Describe radiographic techniques for edentulous clients.
- Describe modifications to radiographic techniques for children.
- Describe radiographic techniques used for endodontics.
- Describe modifications to radiographic techniques that may be required for clients with special medical, physical or intra-oral needs.
- Describe localization methods including the Buccal Object Rule.
- Describe the techniques for taking radiographs on third molars.

➤ **Extra-oral and panoramic radiography.**

- Describe cassettes and film used for extra-oral radiographs.
- Describe uses of extra-oral radiographs in dentistry.
- Describe the purpose and technique of lateral jaw, cephalometric and temporomandibular joint radiographs.
- Describe the principles, concepts, indications and limitations of panoramic radiographs.

➤ **Discuss alternate imaging modalities as they are used in dentistry.**

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

8. Describe and apply concepts dealing with legal and ethical issues of dental radiography.

- Discuss protocols for identification of the need for radiographs and discuss rationale for radiography guidelines applied in dentistry
- Describe the main legal and ethical issues related to dental radiography.
- Describe quality assurance and risk management issues related to oral radiography
- Explain "informed consent" as it relates to oral radiographs and describes issues related to informed consent
- Define the ownership rights of radiographic records
- Describe the use of radiographs in forensic dentistry

6. Basis of Student Assessment (weighting)

- a. Assignments – One assignment 10% Specifics to be discussed in class
- b. Quizzes – 1 term test 40%
- c. Final – 50%

7. Grading System

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

A. GRADING SYSTEMS <http://camosun.ca/learn/calendar/current/pdf/academic-policies.pdf>

The following two grading systems are used at Camosun College (#2 is not applicable for this course so is omitted in this outline).

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

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://camosun.ca/learn/calendar/current/pdf/academic-policies.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.

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

LEARNING SUPPORT AND SERVICES FOR STUDENTS

There are a variety of services available for students to assist them throughout their learning. This information is available in the College Calendar, Student Services or the College web site at <http://www.camosun.bc.ca>. Also, refer to the resources for learning section of the DHYG student handbook.

STUDENT CONDUCT POLICY

There is a Student Conduct Policy. It is the student's responsibility to become familiar with the content of this policy. The policy is available in each School Administration Office, Registration, and on the College web site in the Policy Section. Additional information regarding the dental hygiene program is in the student handbook.
<http://camosun.ca/learn/calendar/current/pdf/academic-policies.pdf>