CAMOSUN COLLEGE
School of Health & Human Services
Dental Programs

DHYG 130 Dental Radiology

Winter, 2012

COURSE OUTLINE

The Approved Course Description is available on the web @ http://www.camosun.bc.ca/calendar/current/web/dhyg.html#DHYG130

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	Bev Jackson			
(b) Office hours	By Appointment			
(c) Location	D004			
(d) Phone	(250) 370-3507	**Alternative:**	(250) 478-4130	
(e) E-mail	jacksonb@camosun.bc.ca			
(f) Website	TBA			

2. Course Content and Schedule

a. Calendar Description
Students are introduced to the basic principles of radiation biology and the uses of x-radiation in dentistry. Paralleling and Bisecting techniques are studied foundation for clinical dental hygiene practice as well as for further study.

b. iii) Pre / Co-requisites: DHYG 170, DHYG 171, Biol 160

c. Course Particulars
i) Credits: 3.0
ii) Components: Class Hours: 2.0 hours per week / Seminar hours 2.0 / Practicum hours 0 / Out of class hours 2.0 per week.
iii) Is the course available by distance education? No
iv) Is prior learning available for this course? No

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.

Intended Learning Outcomes

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

- 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.
- This foundation will also provide you with base knowledge required for further study in the dental sciences.

The following chart identifies the National Dental Hygiene Learning Outcomes covered in the DHYG 130 course outcomes.

National Dental Hygiene Competencies			
Competencies	**1**	**2**	**3**
Professional	X		
Communicator and Collaborator	X		
Critical thinker			X
Advocate	X		
Coordinator	X		
Integration of ADPIE in general			*X*
Clinical therapist	X		
Oral health educator	X		
Health promoter	X		
1=Exposure to … **2=Experience with …** **3=Evaluated to …**			

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 identifying the discovery of x-rays and improvements in techniques to date
- define radiation biology and discuss the potentially harmful effect of any exposure to radiation
- differentiate between background and man-made radiation
- describe direct and indirect theories of biological effects of radiation
- discuss the cellular response to radiation including genetic, somatic and carcinogenic effects
- discuss the radio-sensitivity of various cells and tissues
- discuss stochastic and non-stochastic and 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
- discuss the use 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
- describe the risks and benefits of dental radiographs

- briefly describe how radiographs are used during the assessment, planning, implementation and evaluation phases of preventive dental care
- discuss ownership and legal use of dental radiographs
- discuss quality assurance in the dental office

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
- explain the relationship between x-radiation and of other radiation using the electromagnetic spectrum
- describe characteristics of short and long wave x-rays and specifically those of x-radiation
- relate the characteristics of x-rays to their use in dentistry
- 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
- discuss the function that transformers have in the dental x-ray unit
- 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 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
- 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 control as a part of radiation protection

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

- describe radiographic film composition and packaging
- identify various types and sizes of intra-oral film
- discuss the sensitivity of film emulsion (film speed)
- discuss the storage and handling of radiographic film
- describe characteristics of periapical and bitewing radiographs and discuss uses for each in dentistry

- discuss the principles and concepts of the paralleling technique
- discuss the principles and concepts of the bisecting the angle technique
- discuss shadow casting principles, definition and distortion in terms of these two radiographic techniques
- discuss distance factors related to dental radiography and relate the two techniques to the effects on image characteristics.
- discuss armamentarium for various techniques and benefits of each
- describe how the latent image is formed
- define the terms radiopaque and radiolucent
- define density, contrast and detail(definition) and describe imaging factors affecting each
- relate the quantity and quality of x-radiation produced by increased and decreased kV, mA and time to film quality
- discuss terms used to describe quality of radiographic images (umbra, penumbra, magnification, etc.)
- discuss the various distance factors related to dental radiography
- discuss and apply the concepts of the inverse square law
- describe film processing identifying chemical reactions that occur on film during the various steps
- briefly describe the steps for manual processing
- briefly describe the steps for automatic processing
- describe the composition and care of solutions used for manual and automatic processing
- discuss requirements for a darkroom
- describe advantages and disadvantages of manual and automatic processing
- describe effects of processing errors on diagnostic radiographs
- identify processing errors on finished radiographs
- discuss quality control for the darkroom

4. Identify anatomical structures and landmarks visible on dental radiographs.

- discuss why it is important to be able to recognize normal radiographic appearances
- recall the terms 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 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

5. Describe infection control in radiography

- discuss the importance of having infection control guidelines for radiography procedures in the dental office
- discuss benefits of barriers vs. surface disinfection
- describe infection control protocols for handling films during exposure and transfer to processing
- describe prevention of cross-contamination when using manual and automatic processors

3. Required Materials

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

OR New text for 2012 (4th Ed) .
Iannucci & Jansen Howerton (2012). Dental Radiography: Principles and Techniques (4th Ed.). Philadelphia: Saunders Elsevier (ISBN – 978-1-4377-1162-2)

4. Course Content and Schedule

Class hours will consist of two consecutive fifty-minute time periods held once a week over winter term. The weekly schedule of topics, details of assignments, and dates of term test will be provided in the first class.

5. Basis of Student Assessment (Weighting)

Exams:
Midterm – 40% Final – 50%

Group Assignment -10%

6. Grading System

(If any changes are made to this part, then the Approved Course description must also be changed and sent through the approval process.)
(Mark with "X" in box below to show appropriate approved grading system – see last page of this template.)

[x] Standard Grading System (GPA)

[ ] Competency Based Grading System

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

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.
http://www.camosun.bc.ca/policies/E-2.5.pdf

A. GRADING SYSTEMS *http://www.camosun.bc.ca/policies/policies.php*

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-	***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

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	*Incomplete*: 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	*In progress*: 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	*Compulsory Withdrawal*: 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.