# Course Syllabus

**Dental Radiology**  
**DHYG 1304**

| Semester with Course Reference Number (CRN) | Fall 2011  
62550 |
| Instructor contact information (phone number and email address) | Tina Padilla  
(713) 718-8339  
tina.padilla@hccs.edu |
| Office Location and Hours | 522  
Monday 10am-12pm |
| Course Location/Time | 577  
Monday 8am -10am |
| Course Semester Credit Hours (SCH) (lecture, lab) If applicable | Credit Hours 3.00  
Lecture Hours 2.00  
Laboratory Hours 4.00 |
| Total Course Contact Hours | 96 |
| Continuing Education Units (CEU): if applicable | |
| Course Length (number of weeks) | |
| Type of Instruction | Lecture/Lab |
| Course Description: | Radiation physics, biology, hygiene, and safety theories with an emphasis on the fundamentals of oral radiographic techniques and interpretation of radiographs; includes exposure of intra-oral radiographs, quality assurance, radiographic interpretation, patient selection criteria and other ancillary radiographic
Course
Prerequisite(s)

PREREQUISITE(S):

- BIOL 2401 with a minimum grade of 70 or better
- CHEM 1305 with a minimum grade of 70 or better
- ENGL 1301 with a minimum grade of 70 or better
- Admission to the Dental Hygiene Program
- HPRS 1201 with a minimum grade of 70 or better

FREQUENT REQUISITES

- College Level Reading
- MATH 0312 (Intermediate Algebra)
- College Level Writing
- Departmental approval
- Admission to the Program

1. Professionalism: The dental Hygienist must be able to discern and manage ethical issues and problems in dental practice, exercise critical thinking and sound clinical judgment and communicate with other professionals.
2. Health Promotion and Disease Prevention: The dental hygienist must be competent in the performance and delivery of oral health promotion and disease prevention services in public health, private practice and alternative settings.
3. Community Involvement: Dental hygienists must appreciate their role as health professionals at the local, state, and national levels. The dental hygienist must assess, plan, and implement programs and activities to benefit the general population. The dental hygienist must also be prepared to influence others to facilitate access to care and services.
4. Patient Care: The dental hygienist must possess a thorough foundation in the biomedical, clinical, and behavioral sciences and be able to apply those principles in assessment, diagnosis, planning, implementation and evaluation of treatment.

1. Adhere to state and federal laws, recommendations and regulations in the provision of dental hygiene care
2. Perform a comprehensive examination using clinical, radiographic, periodontal, dental charting, and other data collection procedures to assess the patient’s needs.
3. Obtain diagnostic quality radiographs.

Adhere to state and federal laws, recommendations and regulations in the provision of dental hygiene care
1. List the federal and state regulations affecting the use of dental x-ray equipment
2. Discuss the regulation of dental x-ray machines at the federal state and local levels
3. Describe how to obtain informed consent from a patient

Perform a comprehensive examination using clinical, radiographic, periodontal, dental charting, and other data collection procedures to assess the patient’s needs.
1. Discuss the steps with the patient used before during and after x-ray exposure.
SCANS and/or Core Curriculum Competencies: If applicable

**SCANS**
- Adhere to state and federal laws, recommendations and regulations in the provision of dental hygiene care
- Perform a comprehensive examination using clinical, radiographic, periodontal, dental charting, and other data collection procedures to assess the patient's needs.
- Obtain diagnostic quality radiographs.
- Workplace Competencies - Information - Acquires & Evaluates
- Workplace Competencies - Information - Interprets & Communicates
- Workplace Competencies - Systems - Understands Systems
- Workplace Competencies - Systems - Monitors & Corrects Performance

**Instructional Methods**
- Face to Face

**Student Assignments**
- Adhere to state and federal laws, recommendations and regulations in the provision of dental hygiene care
- Various assigned readings from textbooks, peer-rev
- Discussions
- Perform a comprehensive examination using clinical, radiographic, periodontal, dental charting, and other data collection procedures to assess the patient's needs.
- Various assigned readings from textbooks, peer-rev
- Discussions
- Obtain diagnostic quality radiographs.
- Various assigned readings from textbooks, peer-rev
- Discussions
- Projects

**Student Assessment(s)**
- Adhere to state and federal laws, recommendations and regulations in the provision of dental hygiene care
- No assessments selected for this outcome
- Perform a comprehensive examination using clinical, radiographic, periodontal, dental charting, and other data collection procedures to assess the patient's needs.
- Quizzes/Tests which may include: definitions, matching, multiple choice, true/false, short answer, brief essay
- Obtain diagnostic quality radiographs.
- Quizzes/Tests which may include: definitions, matching, multiple choice, true/false, short answer, brief essay

**Instructor's Requirements**
- SPECIFIC COURSE OBJECTIVES:
- Lecture/Lab Week 1
Radiation Basics-History, Dental X-ray Film, Film Processing, Infection Control, and Digital Radiography
1. Summarize the importance of dental radiographs.
2. List the uses of dental radiographs.
3. List the highlights in the history of x-ray equipment, film and dental radiographic techniques.
4. Describe the purpose and use of dental x-ray film holders and devices.
5. Identify commonly used dental x-ray film holders and devices.
7. List and describe the different types of x-ray film used in dentistry.
8. Identify the types and sizes of intraoral film available.
9. Discuss film speed, differences between intraoral film and extraoral film.
10. Describe the difference between screen and non-screen films.
11. Describe duplicating film.
12. Discuss proper film storage and protection.
13. Describe how a latent image becomes visible image.
14. List and discuss the five steps of film processing.
15. List and discuss the equipment needed for manual film processing including the step by step procedures.
16. Define the primary purpose of infection control.
17. Detail infection control procedures necessary before, during, and after x-ray exposure.
18. Discuss film handling during processing.
19. Describe the purpose, uses, fundamentals, equipment position and preparation of the digital radiography.
20. Discuss the advantages and disadvantages of digital radiography.

Lecture/Lab Week 2
Bite-Wing Techniques
1. Describe the purpose and use of the bite-wing technique.
2. Describe opened and overlapped contact areas on a bite-wing film.
3. Describe vertical and horizontal angulation.
4. Describe premolar and molar bite-wing film placements.
5. Describe the purpose and use of vertical bite-wings.

Week 3 Exam 1

Lecture/Lab Week 4
Introduction to Radiographic Examinations
Bisecting Technique and Paralleling Technique
1. List the tree types of intraoral radiographic examination.
2. Describe the purpose and the type of film and technique used for each of the tree types of intraoral radiographic examination.
3. List the films that comprise a CMRS.
4. List the general diagnostic criteria for intraoral radiographs.
5. List examples of extraoral radiographs.
6. Describe when prescribing a CMRS for a new patient is warranted.
7. Describe the basic principles of the bisecting technique.
8. Describe the vertical and horizontal angulation.
9. Describe the basic rules of the bisecting technique.
10. Describe the finger holding method and its disadvantages.
11. Describe the 14 periapical film placements.
12. List advantages and disadvantages of the bisecting technique.
13. Describe the basics principles of the paralleling technique.
14. Discuss how object-film distance affects the radiographic image and how target-film distance is used to compensate for such changes.
15. List the film holding devices.
16. Identify and Label the parts of the Rinn XCP instruments.
17. List the five basic rules of the paralleling technique.
18. Describe the 15 periapical film placements.

Lecture/Lab Week 5
Radiation Physics and Characteristics
1. Discuss the difference between radiation and radioactivity.
2. List two types of ionizing radiation and give examples of each.
3. List the characteristics of electromagnetic radiation.
4. Identify the component parts of the x-ray machine.
5. Label the parts if the dental x-ray tubehead and the dental x-ray tube.
7. Describe how x-rays are produced.
8. Describe the effect that the kilovoltage peak has on the quality of the x-ray beam.
9. Describe how milliamperage influences the quantity of the x-ray beam.
10. Identify the range of kilovoltage and milliamperage required for dental radiography.
11. Describe how increasing and decreasing exposure factors affect the density and contrast of the film.
12. State the rules governing kilovoltage, milliamperage, distance, and exposure time that are used when changing exposure variables.
14. Calculate an example of radiation intensity using the inverse square law.
15. Explain how the half-value layer determines the penetrating quality of the x-ray beam.
Lecture/Lab Week 6
Radiation Biology
1. Describe the mechanisms, theories, and sequence of radiation injury.
2. List determining factors for radiation injury.
3. Define and discuss the dose-response curve and radiation injury.
4. Describe the effects of radiation exposure on cells, tissue, and organs.
5. Discuss the short-term effects, long-term effects, somatic, and genetic effects of radiation exposure.
6. Define the units of measurement used in radiation exposure.
9. Discuss dental radiation and exposure risks.
10. Discuss the risk vs. benefit of dental radiographs.

Week 7 Exam 2

Lecture/Lab Week 8
Normal Anatomy & Film Mounting Basics
1. State the difference between cortical and cancellous bone.
2. Identify normal anatomic landmarks.
3. Identify and describe the radiographic appearance of tooth anatomy.
4. Identify radiolucent and radiopaque landmarks.
5. List who is qualified to mount and view dental radiographs.
6. Describe when and where films are mounted.
7. List information placed on film mount.
8. List reasons to use a film mount.
9. Understand the importance of normal anatomy in film mounting.
10. Describe film mounting methods and identification dot location.
11. Identify bony landmarks on a panoramic radiograph.
12. Identify soft tissue images as viewed on the panoramic radiograph.
13. Identify air space images as viewed on the panoramic radiograph.

Lecture/Lab Week 9
Radiographic Interpretation
1. Describe who is able to interpret dental radiographs.
2. Define the roles of the dentist and dental auxiliary in the interpretation of dental radiographs.
3. Discuss the difference between interpretation and diagnosis.
4. Discuss interpretation tips for evaluating caries on a dental radiograph.
5. Discuss factors that may influence the radiographic interpretation of dental caries.
6. Detail the radiographic classification of caries.
7. Identify and describe the radiographic appearance of incipient, moderate and advanced, and severe interproximal caries; including occlusal, buccals, lingual, root, recurrent and rampant caries.
8. Identify the difference between horizontal and vertical bone loss,
localized and generalized bone loss and mild, moderate, severe bone loss.

9. Describe the type of radiographs that should be used to document periodontal disease.

10. Recognize and describe the radiographic appearance of calculus.

11. Define and identify the radiographic appearance of crown, root, jaw fractures, an avulsion, internal and external resorption, pulpal sclerosis. Pulpal obliteration and pulp stones, periapical granuloma, cyst and abscess and condensing osteitis, sclerotic bone and hypercementosis.

Lecture/Lab Week 10
Exposure and Technique Errors
Quality Assurance In Dental Office
1. Describe correct and incorrect horizontal and vertical angulations.
2. State each of the recommended vertical angulations ranges used for periapical exposures in the bisecting technique.
3. State the basic rules of the bisecting technique.
4. Describe the patient and equipment preparations necessary prior to using the bisecting technique.
5. List film holding techniques, including advantages and disadvantages.
6. Describe the purpose and use of the bitewing film including the technique used.
7. Describe the appearance of opened and overlapped contact areas on a dental radiograph.
8. State the basic equipment needed to take bitewing radiograph.
10. Identify and describe the appearance of unexposed film, film exposed to light and underexposed film and overexposed film errors as well as horizontal and vertical angulations errors.
11. Identify and describe the appearance of film bending, film creasing, phalangioma, double exposure, movement and revered film errors.
12. List quality control test and quality administration procedures that should be included in the quality assurance plan.
13. Discuss the purpose and frequency of testing dental x-ray machines.
14. Describe the test used to check for darkroom light leaks and proper safe lighting and frequency of testing.
15. List three tests used to check the strength of the developer and fixer.
16. Explain the reasoning and requirement for the stepwedge test.

Week 11 Exam 3

Lecture/Lab Week 12
Radiation Protection
1. Discuss radiation protection steps used before, during, and after x-ray exposure.
2. Discuss the different types of filtration, and state the recommended total filtration for dental x-ray machines operating above and below 70 kVp.

3. Describe the function and importance of the collimator.

4. List the ways to protect the patient from excess radiation during x-ray exposure.

5. Discuss operator protection and monitoring systems.

6. Discuss radiation exposure guidelines, including radiation safety legislation, MPD, MAD, and ALARA.

Lecture/Lab Week 13
Radiography of Patients with Special Needs
Occlusal Techniques
1. Describe how to manage patients with a hypersensitive gag reflex.
2. Describe how to manage patients with disabilities.
3. Describe the treatment of pediatric patients.
5. List and describe the three types of radiographic examinations that may be used for the edentulous patient and the purpose.
6. Describe the purpose and uses of the occlusal examination.
7. State recommended vertical angulation for maxillary and mandibular occlusal projections
8. State the purpose of localization techniques.
9. Describe the equipment preparations/film placements for buccal object rule and the right angle technique and compare.

Lecture/Lab Week 14
Panoramic Radiography
Extraoral Radiography
1. Describe the purpose and fundamentals of the panoramic radiograph.
2. Describe the patient preparations, equipment preparations, and patient positioning procedures needed before exposing a panoramic film.
3. Identify preparation and positioning errors, causes, and corrective measures.
4. Discuss advantages/disadvantages of panoramic radiography.
5. Describe purpose, use, and equipment associated with extraoral radiography.
6. Identify the specific purpose of each of the extraoral film projections.
7. Describe head position, film position, and beam alignment of each extraoral film projection.

Week 15 Exam 4

Week 16 Comprehensive Final Exam
ASSIGNMENT: Must be completed on time (beginning of class period) and according to specified criteria. You are responsible for all reading assignments in course texts and handouts in addition to the content of the lecture and laboratory sessions themselves. Since information in each assignment will be used during the class sessions for discussions, it is essential that materials be carefully studied prior to class or laboratory. STUDENT SUCCESS: To successfully complete this course, the student will need to:

Complete assignments as indicated on the schedule. Read weekly topic objectives before class and studying for a test. Ask the instructor for help as soon as you realize you are having difficulty. Take notes during class and place a question by anything you do not understand. Additional recommendations can be found in the Dental Health Program student manual. GRADING: A = 92-100 Exam/Quiz B = 82-91 C = 75-81 F= 74 and below** *Lab grade will be included into your Lecture grade. Students are required to pass both Lecture and Lab to advance to DH spring semester. ** A final grade below a (75%) will interrupt a student’s progress through the Program and may result in dismissal from the Program. If you are having trouble with this course, it is your responsibility to contact the professor immediately and arrange for tutoring or other assistance.

HCC Grading Scale

<table>
<thead>
<tr>
<th>Grade</th>
<th>Points per Semester Hour</th>
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<tbody>
<tr>
<td>A</td>
<td>4 points</td>
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<tr>
<td>B</td>
<td>3 points</td>
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<tr>
<td>C</td>
<td>2 points</td>
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<tr>
<td>D</td>
<td>1 point</td>
</tr>
<tr>
<td>F</td>
<td>0 points</td>
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IP (In Progress) is given only in certain developmental courses. The student must re-enroll to receive credit. COM (Completed) is given in non-credit and continuing education courses. To compute grade point average (GPA), divide the total grade points by the total number of semester hours attempted. The grades "IP," "COM" and "I" do not affect GPA.

See "Health Science Program/Discipline Requirements" for grading scale.

Instructor Grading Criteria

GRADING:

A = 92-100  50 % Exam/Quiz
B = 82-91   50% Comprehensive Final
C = 75-81   Total 100%
F = 74 and below**
  *Lab 100%

*Lab grade will be included into your Lecture grade. Students are required to pass both Lecture and Lab to advance to DH spring semester.
** A final grade below a “C” (75%) will interrupt a student’s progress through the Program and may result in dismissal from the Program. If you are having trouble with this course, it is your responsibility to contact the professor immediately and arrange for tutoring or other assistance.

** Instructional Materials**

REFERENCE BOOK: Langlais Robert P.; Exercises in Oral Radiology and Interpretation, Current Edition

**HCC Policy Statement:**

Access Student Services Policies on their Web site: [http://hccs.edu/student-rights](http://hccs.edu/student-rights)

Distance Education and/or Continuing Education Policies


Access CE Policies on their Web site: [http://hccs.edu/CE-student-guidelines](http://hccs.edu/CE-student-guidelines)