DE 55A Course Outline as of Fall 2023

CATALOG INFORMATION

Dept and Nbr: DE 55A Title: INTRO DENTAL RADIOLOGY
Full Title: Introduction to Dental Radiology
Last Reviewed: 11/14/2022

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	2.00	Lecture Scheduled	1.00	17.5	Lecture Scheduled	17.50
Minimum	2.00	Lab Scheduled	3.00	17.5	Lab Scheduled	52.50
		Contact DHR	0		Contact DHR	0
		Contact Total	4.00		Contact Total	70.00
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 35.00 Total Student Learning Hours: 105.00

Title 5 Category:	AA Degree Applicable
Grading:	Grade Only
Repeatability:	00 - Two Repeats if Grade was D, F, NC, or NP
Also Listed As:	
Formerly:	DNA 65A

Catalog Description:
In this course students will learn basic principles of radiology including history, physics, characteristics, biological effects, equipment, film and digital imaging, infection control, and safety. The techniques of film or sensor placement and exposure, mounting films, and evaluation of images will be covered.

Prerequisites/Corequisites:
Course Completion or Current Enrollment in DE 51

Recommended Preparation:

Limits on Enrollment:
Acceptance to Allied Dental Program

Schedule of Classes Information:
Description: In this course students will learn basic principles of radiology including history, physics, characteristics, biological effects, equipment, film and digital imaging, infection control, and safety. The techniques of film or sensor placement and exposure, mounting films, and evaluation of images will be covered. (Grade Only)
Prerequisites/Corequisites: Course Completion or Current Enrollment in DE 51

Recommended:
Limits on Enrollment: Acceptance to Allied Dental Program
Transfer Credit: CSU;
Repeatability: Two Repeats if Grade was D, F, NC, or NP

ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:

AS Degree:	**Area**			Effective:	Inactive:
CSU GE:	**Transfer Area**			Effective:	Inactive:
IGETC:	**Transfer Area**			Effective:	Inactive:
CSU Transfer:	Transferable	Effective:	Fall 1981	Inactive:	
UC Transfer:		Effective:		Inactive:	

CID:

Certificate/Major Applicable:
Both Certificate and Major Applicable

COURSE CONTENT

Student Learning Outcomes:
At the conclusion of this course, the student should be able to:
1. Explain the principles of radiation, infection control, safety and quality assurance, as they apply to dental radiography.
2. Produce diagnostically acceptable radiographic images utilizing bite-wing, parallel and bisecting techniques.

Objectives:
At the conclusion of this course, the student should be able to:
1. Describe the basic principles and concepts of radiation.
2. List the component parts and functions of the dental X-ray machine and describe the production of X-rays.
3. Explain the factors affecting the quality and quantity of the X-ray beam and how these factors affect the radiographic image.
4. Describe film composition, basic digital imaging components, and latent image formation.
5. Discuss film speed, sizes, types, digital image receptors and proper storage and protection.
6. Describe the effects of ionizing radiation on living tissue.
7. List radiation protection procedures for the operator and patient.
8. Describe intraoral techniques for bite-wings, and parallel and bisecting periapical radiographs.
9. Produce radiographic images of acceptable diagnostic quality with proper contrast, density, definition and minimal magnification or anatomic distortion.
10. Describe the purpose and uses of supplemental introral imaging techniques.
11. Demonstrate supplemental imaging techniques of occlusal, buccal object, distal-oblique third molar, vertical bitewings and pedontic bitewings utilizing correct positioning and exposure settings.
12. Explain the techniques of proper film handling, manual and automatic processing, and mounting of radiographs.
13. Explain the techniques of digital imaging process.

14. Describe the chemicals used in processing and the proper disposal techniques, as it relates to dental imaging.
15. State diagnostic procedures to align with quality assurance standards, relating to diagnostic radiographs.
16. Critically evaluate radiographic images to assess errors and indicate proper methods for correction.
17. Apply infection control techniques for prevention of disease transmission through demonstration of proper pre- and post-appointment operatory preparation procedures, instrument recirculation methods, and aseptic technique.

Topics and Scope:

I. Radiation History
- A. Discovery
- B. Pioneers
- C. Uses of dental radiographs

II. Equipment Description and Application*
- A. Major components of the dental X-ray machine, tubehead, and operatory
- B. Settings and function of control panel
- C. Mannequins
- D. Additional equipment

III. Imaging Media
- A. Film
  - 1. Speed
  - 2. Size
  - 3. Composition
  - 4. Types
- B. Digital
  - 1. Direct
  - 2. Indirect

IV. Capturing Images*
- A. Digital
  - 1. Equipment
  - 2. Software
  - 3. Direct or indirect image receptors
  - 4. Advantages and limitations
- B. Film
  - 1. Darkroom and daylight loaders
  - 2. Technique
  - 3. Manual and automatic processors
  - 4. Processing errors

V. Physics
- A. Ionizing radiation
- B. Electromagnetic waves
- C. Properties of radiation
- D. X-ray production

VI. Film Mounting
- A. Film handling and storage
- B. Type of mounts
- C. Film orientation
- D. Procedure*

VII. Exposure Factors

A. Kilovoltage
B. Milliamperage
C. Exposure time
D. Intensity
E. Distance
F. Density, contrast, magnification, and sharpness
G. Assessment of exposure and control factors*

VIII. Radiation Biology and Protection Description and Application
A. Radiation monitoring devices
B. Regulatory agencies
C. ALARA (As Low As Reasonably Achievable) concept
D. Biological response
E. Protection*
1. Operator
2. Patient
3. State requirements
F. Risk vs. benefit

IX. Intraoral Procedures*
A. Examinations
1. Bitewing technique
2. Parallel technique
3. Bisecting technique
4. Occlusal
5. Buccal
6. Distal-oblique third molar
7. Vertical bitewings
8. Pedodontic bitewings
B. Image receptor placement
C. Positioning Indicating Device (PID) positioning
D. Angulation-vertical and horizontal

X. Exposure and Technique Errors*
A. Angulation
B. Exposure factors
C. Positioning of PID (position indicating device)
D. Image receptor placement
E. Critical evaluation of errors and corrections

*These items are introduced in lecture, and the related skill is performed in the lab.

XI. Laboratory Exercises
A. Production of diagnostic images with proper contrast, density, definition, and minimal magnification or anatomic distortion
B. Demonstration of supplemental intraoral techniques
C. Application of infection control techniques for prevention of disease transmission through demonstration of proper pre- and post-appointment operatory preparation procedures, instrument recirculation methods, and aseptic technique

Assignment:

Lecture-Related Assignments:
1. Reading from text pages a week (20-30)
2. Quizzes (2-4)

3. Exams, including midterms (2) and final

Laboratory-Related Assignments:
1. Student digital and film placement proficiencies (6-10)
2. Film mounting proficiencies (1-2)
3. Bitewing series (BTW), digital and film, mannequin (2-4)
4. Full mouth series (FMX), digital and film, mannequin (4-6)
5. Supplemental images (5-7)
6. Written homework assignments (6-8)

Methods of Evaluation/Basis of Grade:

Writing: Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

Written evaluation of errors and corrections for film bitewing and full mouth series; homework assignments	Writing 5 - 10%

Problem Solving: Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

None	Problem solving 0 - 0%

Skill Demonstrations: All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

Film or sensor placement techniques; mounting proficiencies; bitewing; full mouth series competencies; supplemental images	Skill Demonstrations 45 - 60%

Exams: All forms of formal testing, other than skill performance exams.

Quizzes; exams; midterms; final exam	Exams 30 - 45%

Other: Includes any assessment tools that do not logically fit into the above categories.

None	Other Category 0 - 0%

Representative Textbooks and Materials:
Modern Dental Assisting. 13th Edition. Bird, Doni and Robinson, Debbie. Elsevier 2021.
Dental Radiography, Principles and Techniques. 6th Edition. Iannucci, Joen and Howerton, Laura. Elsevier. 2022.
Dental Radiography, Principles and Techniques. Workbook and Laboratory Manual. 6th Edition. Lannucci, Joen and Howerton, Laura. Elsevier. 2022.
Instructor prepared materials