

DA R011: BEGINNING RADIOLOGY FOR DENTAL ASSISTING

Originator

aderdiarian

Co-Contributor(s)
Name(s)

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College

Oxnard College

Discipline (CB01A)

DA - Dental Assistant

Course Number (CB01B)

R011

Course Title (CB02)

Beginning Radiology for Dental Assisting

Banner/Short Title

Beginning Radiology for DA

Credit Type

Credit

Start Term

Fall 2021

Catalog Course Description

This course teaches the fundamentals of radiation safety and the operation of dental radiology equipment, along with the clinical application of procedures involved in exposing, processing, mounting and interpreting dental radiographs.

Taxonomy of Programs (TOP) Code (CB03)

1240.10 - *Dental Assistant

Course Credit Status (CB04)

D (Credit - Degree Applicable)

Course Transfer Status (CB05) (select one only)

C (Not transferable)

Course Basic Skills Status (CB08)

N - The Course is Not a Basic Skills Course

SAM Priority Code (CB09)

C - Clearly Occupational

Course Cooperative Work Experience Education Status (CB10)

N - Is Not Part of a Cooperative Work Experience Education Program

Course Classification Status (CB11)

Y - Credit Course

Educational Assistance Class Instruction (Approved Special Class) (CB13)

N - The Course is Not an Approved Special Class

Course Prior to Transfer Level (CB21)

Y - Not Applicable

Course Noncredit Category (CB22)

Y - Credit Course

Funding Agency Category (CB23)

Y - Not Applicable (Funding Not Used)

Course Program Status (CB24)

1 - Program Applicable

General Education Status (CB25)

Y - Not Applicable

Support Course Status (CB26)

N - Course is not a support course

Field trips

May be required

Grading method

Letter Graded

Does this course require an instructional materials fee?

No

Repeatable for Credit

No

Is this course part of a family?

No

Units and Hours

Carnegie Unit Override

No

In-Class

Lecture

Minimum Contact/In-Class Lecture Hours

35

Maximum Contact/In-Class Lecture Hours

35

Activity

Laboratory

Minimum Contact/In-Class Laboratory Hours

52.5

Maximum Contact/In-Class Laboratory Hours

52.5

Total in-Class

Total in-Class

Total Minimum Contact/In-Class Hours

87.5

Total Maximum Contact/In-Class Hours

87.5

Outside-of-Class**Internship/Cooperative Work Experience**

Paid

Unpaid

Total Outside-of-Class**Total Outside-of-Class****Minimum Outside-of-Class Hours**

70

Maximum Outside-of-Class Hours

70

Total Student Learning**Total Student Learning****Total Minimum Student Learning Hours**

157.5

Total Maximum Student Learning Hours

157.5

Minimum Units (CB07)

3

Maximum Units (CB06)

3

Corequisites

DA R010 and DA R012 and DA R013 and DA R014 and DA R015

Advisories on Recommended Preparation

High School Diploma or GED and ENGL R101 or ENGL R101H

Limitations on Enrollment

Current CPR certification for health care provider (American Heart Association) or professional rescuer (American Red Cross)

Proof of freedom from and immunity to communicable diseases

No acrylic or long nails in clinical settings

Current negative TB test or chest x-ray

Others (specify)

Physical examination demonstrating general good health

No visible tattoos or visible body piercings except single studs in earlobes

Other Limitations on Enrollment

Admittance to Dental Assisting program per application process

Requisite Justification**Requisite Type**

Advisory

Requisite

ENGL R101 or ENGL R101H

Requisite Description

Course not in a sequence

Level of Scrutiny/Justification

Content review

Requisite Type

Advisory

Requisite

High School Diploma or GED

Requisite Description

Credit program requisite (credit only)

Level of Scrutiny/Justification

Content review

Requisite Type

Corequisite

Requisite

DA R010

Requisite Description

Course in a sequence

Level of Scrutiny/Justification

Content review

Requisite Type

Corequisite

Requisite

DA R012

Requisite Description

Course in a sequence

Level of Scrutiny/Justification

Content review

Requisite Type

Corequisite

Requisite

DA R013

Requisite Description

Course in a sequence

Level of Scrutiny/Justification

Content review

Requisite Type

Corequisite

Requisite

DA R014

Requisite Description

Course in a sequence

Level of Scrutiny/Justification

Content review

Requisite Type

Corequisite

Requisite

DA R015

Requisite Description

Course in a sequence

Level of Scrutiny/Justification

Content review

Student Learning Outcomes (CSLOs)**Upon satisfactory completion of the course, students will be able to:**

- | | |
|---|--|
| 1 | List five factors that contribute to the diagnostic quality radiographs. |
| 2 | Describe the process by which x-rays are produced. |
| 3 | Describe the ionization process and explain its significance. |
| 4 | Identify the components of the x-ray machine and their individual functions. |

Course Objectives**Upon satisfactory completion of the course, students will be able to:**

- | | |
|----|---|
| 1 | Follow the rules of radiation safety for the protection of both patient and operator |
| 2 | Explain the characteristics of radiation, physics, ionization, the electromagnetic spectrum, and the association of x-rays with matter |
| 3 | Identify the components of the x-rays with matter |
| 4 | Identify the components of the x-ray machine and their individual functions |
| 5 | Describe the technical aspects of radiations production and the effects of adjusting the current voltage, and/or exposure time in the production of quality dental radiographs |
| 6 | Identify the parts of the dental films packet and correctly manipulate it |
| 7 | Demonstrate the different sizes and types of dental-x-ray film, and their individual uses |
| 8 | Demonstrate the use of the darkroom facilities and automatic processors in the development of radiographic film |
| 9 | Utilize different position indicating devices (PIDs) when taking intraoral dental x-rays, using both the paralleling techniques |
| 10 | Identify and correct errors in film placement, using the rules of shadow casting and the inverse square law |
| 11 | Take diagnostic bitewing dental x-rays surveys |
| 12 | Identify anatomical landmarks, anomalies, restorations, caries, periapical lesions, and other possible pathological defects in a formal written critique of each full mouth survey of radiographs |

Course Content**Lecture/Course Content**

1. Introduction to History of Radiology & Radiation Safety
 - a. Trace the progress of radiology from its discovery to the present
 - b. Name the pioneers of radiography and identify their contributions
 - c. Compare the theories of biological damage and the possible effect of radiation on somatic and genetic cells
 - d. Identify the body cells in the order of their radio sensitivity
 - e. Identify the factors that determine radiation injuries
 - f. List the sequence of events that may follow exposure to radiation
 - g. Identify the effects of oral radiation
 - h. Identify the terms used to measure radiation
 - i. Differentiate among the various radiation monitoring devices

- j. Recognize the different areas of the x-rays area and their specific utilizations
 - k. List the duties of the Radiology Assistant
2. The Dental X-ray Machine & The Technical Production of X-rays
- a. Identify the types of x-ray machines and their major parts and components
 - b. Identify the functions of the electric circuits, the parts of the x-rays tube and control devices of x-ray machines
 - c. Identify the factors involved in x-ray generation.
 - d. Differentiate between constant potential and varying potential x-ray machines
 - e. Identify the basic requirements of an acceptable diagnostic radiograph
3. Dental X-ray Film, Film Processing, and Asepsis in Radiology
- a. Differentiate between direct-exposure and indirect-exposure
 - b. Identify the parts and identification marks on dental x-ray film packets
 - c. Identify and compare the various intra-oral films according to size, customary usage, and film speed
 - d. Differentiate between intra-oral and extra-oral films
 - e. Identify the parts and intended use of the extra-oral cassette
 - f. Identify correct methods of film handling and storage
 - g. Identify, in sequence, the steps in processing radiographs
 - h. Identify all items of darkroom equipment, the compartments of processing equipment
 - i. List the major ingredients in processing solutions and explain the functions of each ingredient
 - j. Identify three problem areas in quality control during processing
 - k. Place bitewings –x-rays in the mouth of clinic partners
 - l. Expose, mount and critique bitewings x-rays surveys on DXSTR
 - m. Explain and follow rules of asepsis
4. Anatomical Landmarks
- a. Describe why it is important to recognize and identify normal anatomical landmarks of the face and head
 - b. Recognize and identify the facial and cranial bones
 - c. Name all of the anatomical landmarks of the maxilla and the mandible
 - d. Differentiate between the terms radiopaque and radiolucent
 - e. Differentiate, radiographically, between cortical and cancellous bone
 - f. Recognize and describe the radiographic appearance normally seen on radiographs of the maxillary arch and the mandibular arch
 - g. Determine whether a periapical radiograph is of the right or left side
 - h. Identify any given periapical radiograph according to its exact location in the maxilla or mandible and describe how to position it on a film mount
5. Intra-oral Radiology
- a. Identify the three basic intraoral procedures
 - b. Compare the principles of the paralleling and bisecting technique
 - c. Locate the points of entry on the face
 - d. Differentiate between the methods used to obtain proper horizontal and vertical angulation
 - e. Identify the advance preparation required before radiographs are exposed
6. Periapical Radiology
- a. Select the type and number of films required to make a complete periapical survey
 - b. Identify and be able to assemble and position film holders (XCP) or snap-a-Ray) for the paralleling technique
 - c. Differentiate between conventional periapical film placement and endodontic film placement
7. Interpretation of Dental Radiographs
- a. Identify between preliminary interpretation and diagnosis of the radiograph
 - b. Identify all radiopaque and radiolucent-appearing restorative materials
 - c. Identify the radiographic appearance of dental caries
 - d. Identify the radiographic appearance of dental injuries
 - e. Identify two methods used to localize objects in the mouth by applying the buccal-object rule
 - f. Demonstrate the ability to place, expose, mount and critique periapical x-rays taken with the snap-a-ray
8. Identifying and Correcting Faulty Radiographs
- a. Identify the types of radiographic errors caused by faulty exposure techniques.
 - b. Identify the types of radiographic errors caused by incorrect film placement and angulation of the central ray
 - c. Identify the types of radiographic errors caused by faulty processing techniques
 - d. Identify the conditions that cause radiographic to be fogged
 - e. Identify the importance of quality control during chair-side film positioning
9. Occlusal and Extraoral Radiology

- a. Identify the reasons for making an occlusal survey
 - b. Compare the topographical with the cross-sectional exposure method
 - c. Position the film packet and establish horizontal and vertical angulation for maxillary and mandibular areas
 - d. Identify the types of film used in extraoral radiography
 - e. Identify three reasons for making extraoral exposures
 - f. Identify the types of surveys that can be performed extra-orally
 - g. Identify and locate the listed cephalometric landmarks and planes on a cephalometric tracing
10. Radiography for Children and Edentulous Patients, Education of Patients about Radiography
- a. Explain the importance of making radiographic examination on children
 - b. Identify the factors that determine when radiographs on children should be made and what type of film is best suited in each instance
 - c. Apply the procedures involved in exposing radiographs on children and adults
 - d. Describe the importance for making the survey of edentulous areas
 - e. Identify the film requirements used for making an edentulous survey
 - f. Explain the the necessity for patient education in radiology
 - g. Describe several methods by which the patient can be educated to appreciate the value of dental radiology
 - h. Identify goals of the dental radiographer
 - i. Demonstrate the ability to place, expose, mount and critique a full mouth series on a child and edentulous patient
11. Panoramic Radiology
- a. Differentiate between a conventional a panoramic x-ray machine
 - b. Identify the main factor that determines the width of the focal trough
 - c. Identify the major factors that affect the geometry of the image
 - d. Identify in sequence the basic steps in operating a panoramic versus intraoral radiographic surveys
 - e. Identify five major head positioning errors that result in faulty panoramic radiographs

Laboratory or Activity Content

1. Infection control and Radiation safety protocols
2. Use of Rinn kits for exposing radiographic film
3. Use of Paralleling and Bisecting angle technique
4. Exposure of BW's
5. Exposure of PA's
6. Developing exposed radiographic film
7. Mounting films
8. Interpreting mounted films
9. Documenting missing teeth and existing restorations
10. Intro. to Digital technique

Methods of Evaluation

Which of these methods will students use to demonstrate proficiency in the subject matter of this course? (Check all that apply):

Problem solving exercises
 Skills demonstrations
 Written expression

Methods of Evaluation may include, but are not limited to, the following typical classroom assessment techniques/required assignments (check as many as are deemed appropriate):

Clinical demonstration
 Computational homework
 Essay exams
 Essays
 Group projects
 Individual projects
 Laboratory activities
 Objective exams
 Projects
 Problem-Solving Assignments
 Problem-solving exams
 Quizzes
 Skill tests
 Simulations

Instructional Methodology

Specify the methods of instruction that may be employed in this course

Audio-visual presentations
 Collaborative group work
 Clinical demonstrations
 Class activities
 Class discussions
 Distance Education
 Demonstrations
 Instructor-guided interpretation and analysis
 Instructor-guided use of technology
 Internet research
 Laboratory activities
 Lecture
 Role-playing
 Small group activities

Describe specific examples of the methods the instructor will use:

- 1) **Audio Visual Presentations:** Instructor utilizes multimedia presentations to demonstrate the course topics, specifically to highlight safety and accident prevention.
- 2) **Class Activities:** Students will demonstrate understanding and competency of the material by numerous practice activities, to include equipment familiarization, and demonstration of procedures. These activities will be under the direct supervision of a laboratory instructor.
- 3) **Class Discussions:** The instructor will encourage participation and learning by facilitating discussions of the course content.
- 4) **Clinical Demonstrations:** Faculty will demonstrate safety protocols and correct clinical procedures of dental radiography through the use of mannequins, typodonts, and live human patients.
- 4) **Distance Education:** Instructors will have the ability to provide the didactic portion of the course through Distance Education. They will utilize lecturing with Powerpoint slides, A/V presentations and encouraging discussions among the students via the online method.
- 5) **Lectures:** The class employs traditional lectures with Powerpoint presentations to present the material, in addition to supplemental lecture material provided through the online portal.
- 6) **Instructor-guided interpretation and analysis:** Laboratory instructors will work with students in the clinic, encouraging them to evaluate their progress and analyze procedures as to safety and effectiveness. In addition, instructors will guide students as they process analog and digital film and ensuring they follow the ALARA principle.
- 7) **Instructor-guided use of technology:** Laboratory instructors will work with students in the clinic to help them gain competence and mastery of the technology involved in radiology. Mannequins, typodonts, and live patients will assist in the process. Students will become familiar with both the digital and analog technologies in this manner.
- 8) **Internet research:** Instructors will utilize professional websites to provide students up to date information and protocols for dental radiology, in addition to augmenting the traditional instructional methods.
- 9) **Laboratory Activities:** Laboratory instructors will demonstrate and emphasize the didactic material in the clinical setting utilizing both the analog and digital x-ray formats. They will utilize mannequins, typodonts, and live patients. These activities will include role playing, exercises involving equipment management and patient interactions.
- 10) **Lectures:** The class employs traditional lectures with Powerpoint presentations to present the material, in addition to supplemental lecture material provided through the online portal.
- 11) **Role Playing:** Students will demonstrate their understanding of the material by role playing the topics discussed. The role playing ensures an understanding of the topic and allows the opportunity to provide feedback to correct errors.
- 12) **Small Group Activities:** Will help emphasize the material in a manner which encourages interaction with classmates and stimulates real world activities.

Representative Course Assignments

Writing Assignments

1. Students will write responses to the daily learning objectives handed out at the beginning of the class of content material being prepared for the following week.

Reading Assignments

1. Orlen N. Johnson, Essentials of Dental Radiography for the Dental Assistant and the Dental Hygienist.
 - a. History and radiation basics
 - b. Biological effects of radiation and radiation protection
 - c. Dental x-ray film and processing

- d. Dental Radiographer
 - e. Intraoral techniques
 - f. Radiographic errors and quality assurance
 - g. Mounting and viewing dental radiographs
 - h. Patient management and supplemental techniques
 - i. Extraoral techniques
2. A minimum of 4 hours per week outside of regular class time doing the following:
- a. Independent study

Skills Demonstrations

- 1) Prior to students being allowed to take x-rays on actual patients, students will be required to demonstrate proper infection control and radiation safety procedures through a series of skill demonstrations.
- 2) Prior to students being allowed to take x-rays on actual patients they will be required to demonstrate proper placement and technique of the radiology equipment through a series of skill demonstrations using mannequins and typodonts.

Other assignments (if applicable)

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Outside Assignments

District General Education

A. Natural Sciences

B. Social and Behavioral Sciences

C. Humanities

D. Language and Rationality

E. Health and Physical Education/Kinesiology

F. Ethnic Studies/Gender Studies

CSU GE-Breadth

Area A: English Language Communication and Critical Thinking

Area B: Scientific Inquiry and Quantitative Reasoning

Area C: Arts and Humanities

Area D: Social Sciences

Area E: Lifelong Learning and Self-Development

Area F: Ethnic Studies

CSU Graduation Requirement in U.S. History, Constitution and American Ideals:

IGETC

Area 1: English Communication

Area 2A: Mathematical Concepts & Quantitative Reasoning

Area 3: Arts and Humanities

Area 4: Social and Behavioral Sciences

Area 5: Physical and Biological Sciences

Area 6: Languages Other than English (LOTE)

Textbooks and Lab Manuals

Resource Type

Textbook

Description

Johnson, Orlen, H. (2018). *Essentials of Dental Radiography for the Dental Assistant and the Dental Hygienist* (10th). Pearson Prentice Hall.

Resource Type

Other Resource Type

Description

DXXTR.

Resource Type

Other Resource Type

Description

Film positioning devices such as the RINN kit.

Resource Type

Other Resource Type

Description

X-Ray Film.

Library Resources**Sufficient Library Resources exist**

Yes

Distance Education Addendum**Definitions****Distance Education Modalities**

Hybrid (51%–99% online)

Faculty Certifications

Faculty assigned to teach Hybrid or Fully Online sections of this course will receive training in how to satisfy the Federal and state regulations governing regular effective/substantive contact for distance education. The training will include common elements in the district-supported learning management system (LMS), online teaching methods, regular effective/substantive contact, and best practices.

Yes

Faculty assigned to teach Hybrid or Fully Online sections of this course will meet with the EAC Alternate Media Specialist to ensure that the course content meets the required Federal and state accessibility standards for access by students with disabilities. Common areas for discussion include accessibility of PDF files, images, captioning of videos, Power Point presentations, math and scientific notation, and ensuring the use of style mark-up in Word documents.

Yes

Regular Effective/Substantive Contact**Hybrid (51%–99% online) Modality:**

Method of Instruction	Document typical activities or assignments for each method of instruction
Video Conferencing	Didactic instruction will include lectures with Powerpoint presentations. Supplemental lecture material will be provided via the online portal. Students will receive online exercises and quizzes through the online portal

Examinations**Hybrid (51%–99% online) Modality**

Online

Primary Minimum Qualification

DENTAL TECHNOLOGY

Additional local certifications required

Dental assisting faculty must have background in and current knowledge of dental assisting, the specific subjects they are teaching and educational theory and methodology e.g., curriculum development, educational psychology, test construction, measurement and evaluation. Faculty providing didactic instruction must have earned at least a baccalaureate degree or be currently enrolled in a baccalaureate degree program. Laboratory, preclinical and clinical faculty must be a Dental Assisting National Board "Certified Dental Assistant" or a California Registered Dental Assistant. Dentists are exempt from this requirement.

Review and Approval Dates

Department Chair

05/06/2020

Dean

05/06/2020

Technical Review

05/13/2020

Curriculum Committee

05/13/2020

Curriculum Committee

11/25/2020

CCCCO

MM/DD/YYYY

Control Number

CCC000452595

DOE/accreditation approval date

MM/DD/YYYY