

## HIBBING COMMUNITY COLLEGE COURSE OUTLINE

**COURSE NUMBER & TITLE:** DAS1501: X-Ray 1

**CREDITS:** 2 (1 Lec / 1 Lab)

**PREREQUISITES:** None

### **CATALOG DESCRIPTION:**

X-Ray 1 is designed to teach the students the diagnostic importance of dental X-rays. The student will expose, process and evaluate X-rays. The student will first take X-rays on mannequins using the parallel technique. The student will utilize radiation safety and infection control guidelines. This course is a prerequisite for X-Ray 2.

### **OUTLINE OF MAJOR CONTENT AREAS:**

- I. Discovery of X-Rays
  - A. Roentgen
  - B. Kells
- II. Radiation Physics and Biology
  - A. The Structure of an Atom and Ionization
  - B. Radiation Types
  - C. Radiation Units of Measurement
- III. Biological Effects of Radiation
  - A. Somatic and Genetic effects of Radiation
  - B. Radiosensitive Cells
  - C. Occupational Exposure
  - D. Daily Radiation Exposure
  - E. Accumulation of Radiation
- IV. Components of the Dental X-Ray Unit
  - A. Control Panel
  - B. Arm Assembly and Tubehead
- V. Safety and Precautions
  - A. Manufacture's Responsibilities
  - B. Dentist's Responsibilities
  - C. Dental Assistant's Responsibilities
  - D. Patient's Responsibilities
  - E. Additional Notes on Reducing Radiation Exposure
- VI. Radiation Production
  - A. Composition of Dental X-Ray Film
  - B. Film Speed
  - C. Film Sizes
  - D. Dental Film Packet
  - E. Dental Film Storage
- VII. Producing Quality Radiographs
  - A. Preparing for X-Ray Exposure
  - B. During Film Exposure
  - C. Patient Exposure
  - D. After the Films Are Exposed
- VIII. Types of Film Exposures

- A. Periapical
- B. Bite-wing
- C. Occlusal
- IX. Intraoral Techniques for Film Exposures
  - . Bisecting Technique
    - A. Principles
    - B. Disadvantages
- X. Full-Mouth Radiographic Survey
- XI. Bite-Wing Series
  - A. Positioning for Maxillary Arch
  - B. Positioning for Mandibular Arch
- XII. Producing Special Radiographs
  - A. Occlusal Radiographs
  - B. Pediatric Radiographs
  - C. Edentulous Radiographic Survey
  - D. Endodontic Radiographic Technique
  - E. Special Needs Patients/Compromised Patients
- XIII. Processing Quality Radiographs
- XIV. Manual Processing Equipment
  - A. Processing Preparation
  - B. Manual Film Processing Technique
  - C. Composition of Processing Solutions
- XV. Automatic Processing
- XVI. Mounting Radiographs
- XVII. Radiographic Errors
  - A. Common Exposure Errors
    1. Distortion
    2. Elongation
    3. Foreshortening
    4. Overlapping
    5. Cone cutting
    6. Clear film/Absence of film
    7. Double exposure
    8. Blurred image
    9. Underexposed film
    10. Overexposed film
    11. Film artifacts
    12. Backward film
  - B. Common Film Processing Errors
    1. Light film image
    2. Dark film image
    3. Fogged film
    4. Partial image
    5. Spotted Films
    6. Torn or scratched film
    7. Air bubbles
    8. Reticulation
    9. Streaks

- XVIII. Mounting radiographs
  - A. Identification dot
  - B. Anatomical landmarks
  - C. Types of mounts
- XIX. Radiation safety
  - A. Specific radiation
    - 1. Primary radiation
    - 2. Secondary radiation
    - 3. Scatter radiation
    - 4. Leakage radiation
  - B. Controlling factors
    - 1. Kilovoltage
    - 2. Milliamperage
    - 3. Exposure time
  - C. Precautions
    - 1. Operator shielding
    - 2. Patient protection
    - 3. Operator protection
    - 4. Personnel monitoring
    - 5. Radiographs during pregnancy
  - D. State and federal regulations
- XX. Processing dental radiographs
  - A. Automatic processing
  - B. Automatic processor maintenance
  - C. Automatic processing errors
    - 1. Overlapped films
    - 2. Dirty rollers
    - 3. Light leak
  - D. Quality control
    - 1. Crabtree
    - 2. Stepwedge
- XXI. Parallel technique
  - A. Holders
    - 1. XCP's
    - 2. Stabes
    - 3. Rinn's Unibite
  - B. Parallel procedure on mannequins
  - C. Implement infection control
  - D. Process full mouth series
  - E. Mount and critique X-rays
  - F. Retake unacceptable films
  - G. Complete and file X-ray paperwork

**COURSE GOALS/OBJECTIVES/OUTCOMES:**

Students will

1. explain the history of radiation.
2. list the properties of radiation and explain the biological effects of radiation exposure.

3. identify the components of dental x-ray unit and explain the function of each component.
4. describe safety precautions when using radiation.
5. explain how an x-ray is produced.
6. describe the composition.
7. describe a diagnostic-quality x-ray.
8. identify the means of producing quality radiographs.
9. list the types of film exposures.
10. explain the bisecting principle and technique.
11. explain the paralleling principle and techniques including a full-mouth radiographic survey and bite-wing series.
12. describe special radiographs on various patients, including occlusal, pediatric, edentulous, and endodontic radiographs, and special needs/compromised patients.
13. describe manual film-processing equipment and technique.
14. list and explain the composition of processing solutions.
15. describe automatic processing equipment and explain the technique.
16. explain and demonstrate how to mount dental x-rays.
17. list common radiographic errors that occur during exposure and processing of x-ray films.
18. explain how to duplicate dental radiographs.
19. describe the storage of final radiographs and legal implications concerning dental radiographs.
20. list standardized procedures and state policies that dental offices follow to ensure quality radiographs.

**MNTC GOALS AND COMPETENCIES MET:**

N/A

**HCC COMPETENCIES MET:**

Working Productively & Cooperatively

**STUDENT CONTRIBUTIONS:**

Attendance is crucial in this class. The student is expected to attend all lectures and laboratory sessions, participate and implement input into class discussions, complete the required full mouth series using the infection control procedure and required paperwork and critiques, and hand in outside assignments when due.

**STUDENT ASSESSMENT SHALL TAKE PLACE USING INSTRUMENTS SELECTED/DEVELOPED BY THE COURSE INSTRUCTOR.**

**SPECIAL INFORMATION: (SPECIAL FEES, DIRECTIVES ON HAZARDOUS MATERIALS, ETC.)**

<b>AASC APPROVAL DATE: September 17, 2014</b>
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<b>REVIEW DATE: September 2019</b>
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