COURSE INFORMATION FORM

DISCIPLINE
Allied Health / DENA

COURSE TITLE
Dental Radiology I

CR.HR.  4  LECT HR.  2  LAB HR.  4  CLIN/INTERN HR.  _______  CLOCK HR.  _______

CATALOG DESCRIPTION
This course is an introduction to radiography history, characteristics of radiation production, film composition, x-radiation terminology, effects of radiation exposure and protection. Exposing, processing and mounting of radiographs taken on a radiographic manikin.

PREREQUISITES
DENA 101, DENA 102, DENA 103, DENA 104, DENA 105, EMS 100

EXPECTED STUDENT OUTCOMES IN THE COURSE (ESO)
Upon completion of this course, the student will be able to:

1. Describe the highlights in the history of ionizing radiation, x-ray equipment and how x-rays are produced in an x-ray machine.
2. Identify equipment components and methods used to minimize exposure to ionizing radiation in dentistry.
3. Demonstrate infection control, quality assurance plan, processing, mounting and evaluation of radiographic surveys to determine diagnostic acceptability in dental radiography.
4. Describe film composition and the influence of exposure time, milliamperage, kilovoltage and source-to-receptor distance on the quality and quantity of the x-ray beam.
5. Describe different dental x-ray machines used for intraoral, extraoral radiography and various processing techniques.
6. Identify the common exposure, technique and processing errors in radiographs.
7. Describe the effects of radiation exposure on cells, tissues and organs.
8. Employ proper patient and operator radiation protection, safety during the radiographic acquisition procedures.
9. Apply knowledge of anatomical landmarks and radiographic interpretation.
10. Demonstrate both intraoral and extraoral radiography as well as other techniques to make diagnostically acceptable radiographs while meeting current radiation safety standards.
11. Apply exposure and processing of a complete full mouth radiographic survey on a manikin using digital imaging.
12. Identify the advantages and disadvantages of digital imaging and purpose of three-dimensional digital imaging.

GENERAL EDUCATION OUTCOMES (ESO)
Specify which general education outcomes, if any, are substantially addressed by the course. Numbers in parentheses identify the Expected Student Outcomes linked to the specific General Education Outcome.

Outcomes  ESO

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PROGRAM-LEVEL OUTCOMES

CAREER AND TECHNICAL EDUCATION PROGRAM OUTCOMES
Specify which Career and Technical program outcomes, if any, are substantially addressed by the course by completing the “Career and Technical Education template” to show the relationship between course and program outcomes to assessment measures.

1. Carry out the role and function of a Dental Assistant.
   • Administer assessments appropriately and professionally.
3. Exhibit professional code of ethics and values of the profession.
   • Demonstrate professional responsibilities of a dental assistant in the field.
   • Demonstrate knowledge of state and federal regulatory legislative actions and their effect on delivery of dental assisting.
5. Understand importance of lifelong learning to promote personal and professional growth.
   • Understand the importance of improving academic and clinical skills to enhance occupational performance.

CLASS-LEVEL ASSESSMENT MEASURES
Student accomplishment of expected student outcomes may be assessed using the following measures. (Identify which measures are used to assess which outcomes.)

1. Written Examinations, 1-12
2. Assignments, 1-12
3. Quizzes, 1-12
4. Student Performance Evaluations, 1-12
Individual instructors may order this outline as fits the needs of their individual courses. In addition, they may place more emphasis on some areas than on others. What is assured is that this particular list is covered in the course. Other topics may be added to a course as the instructor sees fit, and as time and interest allow. An *asterisk can be used to mark an item as optional.

I. History of Radiology and Terminology
   A. Dentistry and X-radiation
   B. Pioneers in Dental X-radiation
   C. History of Dental X-ray equipment
   D. History of Dental X-ray film
   E. History of Dental Radiographic Techniques
II. Radiation Physics and Characteristics
   A. Fundamental concepts
   B. Production of X-rays
   C. Interaction of X-radiation
   D. X-ray Beam Quality and Quantity
   E. X-ray beam Intensity
III. Radiation Biology and Radiation Protection
   A. Radiation Injury
   B. Radiation Effects
   C. Radiation Measurements
   D. Radiation Risks
   E. Patient and operator protection
   F. Radiation exposure guidelines
   G. Radiation protection and patient education (ALARA Concept)
IV. Dental X-Ray Equipment
   A. X-Ray Machines
   B. Film holders and Beam alignment Devices
   C. Film composition
   D. Types of dental x-ray films
   E. Film storage and protection
   F. Film processing
      1. Manual vs Automatic
      2. Darkroom
      3. Film duplication
      4. Processing problems and solutions
V. Dental X-ray Image Characteristics
   A. Visual Characteristics
      1. Density
      2. Contrast
   B. Geometric Characteristics
      1. Sharpness
      2. Magnification
      3. Distortion
VI. Infection Control in Dental Radiography
VII. Radiographic examinations
   A. Intraoral
   B. Extraoral
   C. Prescription of Dental Radiographs
   D. Techniques
      1. Paralleling vs Bisecting
      2. Bitewing

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3. Occlusal
4. Localization
E. Exposure and Technique Errors

VIII. Panoramic Imaging
A. Basic concepts
B. Step-by-step procedures
C. Common Errors
D. Advantages and disadvantages

IX. Extraoral Imaging
A. Basic concepts
B. Step-by-step procedures
C. Techniques

X. Anatomical Landmarks
A. Normal Anatomy - Rules
B. Maxillary and Mandibular Anatomy
   1. Maxillary
      a. Lucent anatomy
      b. Opaque anatomy
   2. Mandibular
C. Panoramic Image Normal Anatomy

XI. Image Interpretation Basics
A. Interpretation vs Diagnosis
B. Radiograph/Dental Image vs X-ray
C. Identification
   1. Restorations
   2. Dental Materials
   3. Foreign Objects
   4. Dental Caries
   5. Periodontal Disease
   6. Trauma
   7. Pulpal and periapical lesions

XII. Quality Assurance and legal issues in the Dental Office

XIII. Care of the X-Ray Unit
A. KVP test device
B. Aluminum filters
C. Brass spinning top
D. Step wedge
E. Coin test
F. Rare earth fluorescent screen

XIV. Digital Imaging
A. Basic Concepts
B. Types
C. Step-by-step procedures
D. Advantages and Disadvantages

XV. Three-dimensional Digital Imaging
A. Basic Concepts
B. Step-by-step procedures
C. Advantages and disadvantages

XVI. Imaging in patients with special needs and patient education