



**NEW YORK CITY  
COLLEGE OF  
TECHNOLOGY**

Dental Hygiene Department

**Student Course Document**

COURSE CODE & TITLE: DEN 1218 and DEN 1218L DENTAL RADIOLOGY

TERM: SPRING 2017

COORDINATOR: SHANTEL CHILDS-WILLIAMS, RDH

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OFFICE HOURS: announced at first class meeting (TBA)

CLASS HOURS: 2 PER WEEK

LABORATORY HOURS: 3 PER WEEK

CREDITS: 2

PREREQUISITE: DEN 1100, DEN 1112 & DEN 1114

COREQUISITES: DEN 1200 & DEN 1217

REQUIRED TEXTBOOK: Iannucci, J.M., and Howerton, L.J.,  
DENTAL RADIOLOGY: PRINCIPLES AND TECHNIQUES,  
St. Louis: Elsevier Health Science, (4<sup>th</sup> edition).

OPTIONAL SOURCES: White, S.C., and Pharoah, M.J.  
ORAL RADIOLOGY: PRINCIPLES & INTERPRETATION,  
St. Louis:Elsevier Health Science, 7<sup>th</sup> edition

**Course Description:**

Dental radiology provides the student with the knowledge and experience necessary to work efficiently and safely with x-radiation and radiographic equipment in the dental environment. This course is designed to perfect performance in specific intraoral radiographic techniques and in radiographic interpretation skills.

**Evaluation Procedures**

**College Grading Scale**

93 – 100.....	A
90 – 92.9.....	A-
87 – 89.9.....	B+
83 – 86.9.....	B
80 – 82.9.....	B-
77 – 79.9.....	C+
70 – 76.9.....	C
Below 70.....	Fail.

**Course Assessment Method:**

DEN 1218 and DEN 1218L are graded **independently**. A minimum grade of 70.0 in **each** component must be achieved in order to pass DEN 1218/1218L. The final course grade is determined as follows: Lecture Component is **60% of final grade**; Laboratory Component is **40% of final grade**.

**DEN 1218 (LECTURE COMPONENT)**

**DEN 1218L (LABORATORY COMPONENT)**

Test Average.....60% Assignments Average.... 10% <u>Final Examination.....30%</u>  (60% of final grade)      *100%	Test Average.....40% Assignments & Lab. Exercises Average....20% Full Mouth Series Average..... 20% <u>Bite-Wing Surveys Average..... 20%</u>  (40% of final grade)      *100%
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\*Any or all of the following factors may modify the final course grade:

- All booklets, equipment and materials provided by the department for student use during this course must be returned/replaced in order to receive a final course grade.
- Failure to complete all homework or lab assignments will result in a grade of “0” zero). If this failure to complete an assignment is due to a documented issue (absence with formal excuse); the student must adhere to a two-day extension and will still receive a **two-point** deduction off their **final course grade** (lab or lecture).
- A student’s **final course grade** will be lowered by **one point** for **each** of required material or equipment, **each** time said item is missing and is necessary for that student to function appropriately in class.
- Professionalism-see policy below

## Course Policies:

### a) Attendance policy:

Attendance is recorded promptly at the beginning of each session. If you are not present when your name is called, you will be considered late.

College Attendance Policy: "A student may be absent during the semester without penalty for 10% of the class instructional sessions, [i.e. 1.5 sessions]. When the number of absences exceeds the maximum under the 10% policy...the student is to be assigned a grade of "WU" by the instructor"

Any anticipated absences are to be reported in writing to the instructor **well in advance** of the date of the absence; so that arrangements can be made to make up the missed session if possible.

Regardless of the reason, the student is responsible for all course material missed while not in attendance. When demonstrations and/or hands-on activities, (**excluding test**), are missed, it is the student's responsibility to make up this type of course work **within 10 days** of the student's return to the College, either by: (a) attending another section of the course, (except for exposing radiographs), when the missed course work is being presented or, if that is not possible, by (b) making special arrangements with the instructor, (i.e. being rescheduled to expose and/or process).

### b) Lateness policy:

Students are expected to be in attendance for the entire instructional session. If a student misses 1 hour or 50% of the scheduled class session, the student is considered **absent. Two latenesses equal one absence.** Missing **any** portion of any class session is considered a lateness.

### c) Pregnancy Policy:

It is the sole responsibility of the pregnant student to comply with the Dental Hygiene Pregnancy Policy. The policy is clearly delineated in the Student Manual and must be followed precisely. If, after reading the policy further clarification is needed please meet with your advisor, the Radiology Coordinator, the Clinic Coordinator or the Chairperson of the department.

### d) Professionalism:

Professionalism refers to: cooperation and rapport with faculty, peers, and patients; punctuality; preparedness; timely completion of assignments; appropriate attire and grooming; appropriate language at all times; proper use and care of equipment; management and treatment of patients befitting a dental hygienist; and adherence to radiation safety practices, infection control protocols, and proper use and care of equipment; management and treatment of patients befitting a dental hygienist; and adherence to radiation safety practices, infection control protocols, and quality assurance procedure as established and/or published in course/Department documents. **Non-compliance with any of the above, or the demonstration of academic dishonesty or any deceitful behavior/cheating, will result in an additional modification of the final course grade.**

**e) Testing:**

**1) Dental Hygiene Department Policy on Retesting:**

No student in any Dental Hygiene course will be retested in any examination for any reason. A failing grade on a quiz/examination will remain and be averaged with all other course grades.

**2) New York City College of Technology Policy on Academic Integrity:**

Students and all others who work with information, ideas, texts, images, music, inventions, and other intellectual property owe their audience and sources accuracy and honesty in using, crediting, and citing sources. As a community of intellectual and professional workers, the College recognizes its responsibility for providing instruction in information literacy and academic integrity, offering models of good practice, and responding vigilantly and appropriately to infractions of academic integrity. Accordingly, academic dishonesty is prohibited in The City University of New York and at New York City College of Technology and is punishable by penalties, including failing grades, suspension, and expulsion. The complete text of the College policy on Academic Integrity may be found in the catalog.

**3) Make-up exams:**

Students are expected to take all exams at the scheduled times. There are no make-ups; students who miss an exam will receive a grade of zero.

If an exam is missed under proven (documented) extenuating circumstances i.e. religious holidays, illness or emergency situation, a make-up exam will be given at the convenience of the instructor usually during final exam week or on the day of the final exam for the course.

**4) Arriving Late to a scheduled examination:**

Students who arrive late for an exam will not be given extended time and will be expected to complete the exam in the remaining scheduled exam time.

**5) Cheating:**

Cheating in DEN 1218/1218L includes looking at classmates' exams, talking during an exam, sharing information, viewing electronics, as well as not following instruction during testing. Penalty for a student observed cheating on a DEN 1218/1218L exam will be a **zero** for the exam **plus 10 points off the final grade for professionalism**. If this results in a failing grade for DEN 1218/1218L then **the student will not be allowed to progress and will follow the DH course repeat policy in the student manual**.

**Learning Experience:**

The student will utilize lectures with PowerPoint, BlackBoard, demonstrations, handouts, hands-on experiments, various types of film, film holders, radiographs, x-ray and darkroom equipment, phantoms and clinical patients in order to accomplish the stated objectives.

**COURSE OUTLINE FOR DEN 1218 (LECTURE)**

<b>UNIT #</b>	<b><u>Topic</u></b>
<b>UNIT I</b>	<b><u>Orientation</u></b>  A. Need for x-rays in dentistry B. History of x-radiation and dental radiology
<b>UNIT II</b>	<b>Basic Radiation Physics</b>  A. Atomic structure B. Ionization C. Electromagnetic spectrum D. Properties of x-rays E. Sources & uses of radiation
<b>UNIT III</b>	<b>X-Ray Production</b>  A. Electricity & current B. Components of the x-ray tube, tube head and control panel C. Circuits D. Operation of x-ray machine and beam production
<b>UNIT IV</b>	<b>Units of X-Radiation Measurement, Radiation Detection and Measurement Devices</b>  A. Units of radiation measurement: traditional vs. System International B. Detection and measurement devices
<b>UNIT V</b>	<b>Factors Which Control or Modify Beam Size, Shape Quantity and Quality</b>  A. Collimation B. Filtration C. Distance and position indicating devices (P.I.D.'s or cones) D. kVp, mA and half-value layer
<b>UNIT VI</b>	<b>Exposure Factors Influencing Image Formation</b>  A. Density B. Contrast C. Definition D. Distortion E. Arithmetically altering the interrelationships of exposure factors

<b>UNIT VII</b>	<p><b>Interaction of X-Radiation With Matter</b></p> <ul style="list-style-type: none"> <li>A. Photoelectric Effect</li> <li>B. Compton Effect (modified scatter)</li> <li>C. Thompson Effect (unmodified scatter)</li> <li>D. Primary, secondary and scatter radiation</li> </ul>
<b>UNIT VIII</b>	<p><b>Biologic Effects of Radiation</b></p> <ul style="list-style-type: none"> <li>A. Theories concerning the mechanism of biological damage</li> <li>B. Basic concepts</li> <li>C. Determinants of radiation injury</li> <li>D. Effects of x-radiation on oral and para-oral tissues</li> <li>E. Causes and treatment of osteoradionecrosis</li> </ul>
<b>UNIT IX</b>	<p><b>Radiation Health, Safety and Protection</b></p> <ul style="list-style-type: none"> <li>A. Basic principles of radiological health</li> <li>B. Equipment</li> <li>C. Patient and/or operator protection</li> <li>D. Technique and clinical judgement</li> <li>E. Dental Hygiene Department Ionizing Radiation Use Policy</li> </ul>
<b>UNIT X</b>	<p><b>Radiographic Interpretation</b></p> <ul style="list-style-type: none"> <li>A. Basic principles of interpretation</li> <li>B. Introduction to radiographic appearance of normal oral tissues and common restorative materials</li> <li>C. Anatomic landmarks</li> <li>D. Calculus</li> <li>E. Caries</li> <li>F. Common developmental and non-developmental abnormalities</li> <li>G. Periodontal disease</li> <li>H. Periapical pathosis</li> </ul>
<b>UNIT XI</b>	<p><b>Legal Considerations</b></p> <ul style="list-style-type: none"> <li>A. Laws and governmental regulations vs. recommendations</li> <li>B. Licensure</li> <li>C. Risk management</li> <li>D. Records</li> <li>E. Insurance claims</li> </ul>

## DEN 1218 Course Objectives (Lecture)

### **UNIT I      Orientation**

1. Discuss the development of radiology in modern dentistry, citing major historical milestones and prominent pioneers. (HP5, HP6)

### **UNIT II      Basic Radiation Physics- Discipline Knowledge**

1. Discuss atomic structure as it relates to the concept of ionization. (C4, C5)
2. Discuss wavelength and the electromagnetic spectrum. (C4, C5)
3. Compare the wavelengths of various electromagnetic radiations and relate their wavelengths to their penetrating power. (C4, C5)
4. Describe and compare particulate and electromagnetic radiations, citing their respective properties. (C4, C5)
5. Define and differentiate between background and man-made radiations, providing examples of each. (HP4, HP5)
6. Identify at least 10 uses or sources of radiation in medicine, dentistry, industry, research, etc. (HP4)
7. Explain why radiation workers should minimize the public's exposure to dental x-radiation. (HP4)

#### **GEN Ed SLO's:**

Ethical reasoning; Information Literacy; Scientific Reasoning

### **UNIT III      X-Ray Production- Discipline Knowledge**

1. List the requirements for the production of x-rays. (C4)
2. Define electrical terms. (C4)
3. Describe the relationship between magnetism and electricity as it applies to alternating current. (C4)
4. Identify and describe the function and composition of components of the modern dental x-ray tube and tube housing. (C4)
5. Describe the operation of the modern x-ray tube and compare it to the operation of the early gas x-ray tube. (C4)
6. Indicate the location of the 3 transformers and describe the function and the operation of each. (C4)
7. State the function and describe the operation of the 3 basic electric circuits. (C4)
8. State the function and describe the operation regulating devices found within the control panel and cabinet of the dental x-ray machine. (C4)
9. Discuss the production of x-rays in the dental machine. (C4)

#### **GEN Ed SLO's:**

Critical Thinking; Information Literacy; Scientific Reasoning

**UNIT IV      Units of X-Radiation Measurement, Radiation Detection and Measurement Devices-  
Discipline Knowledge**

1. Define units of x-ray measurement and convert traditional units to System International units. (C4)
2. Describe the design, use and servicing of the film badge. (C2, HP6)
3. Discuss the advantages and/or disadvantages of radiation detection and/or measurement devices. (C4)

**GEN Ed SLO's:**

Critical Thinking; Information Literacy; Scientific Reasoning

**UNIT V      Factors Which Control or Modify Beam Size, Shape, Quality and Quantity-  
Discipline Knowledge**

1. Describe the location, design, composition and function of lead collimators, aluminum filters and a variety of specified position indicating devices (cones). (C4)
2. Select the appropriate collimator, filter, and cone based upon patient category and desired radiographic technique and/or projection. (C4)
3. State and discuss regulations, recommendations and laws regarding the use of collimators, filters and cones. (C2, HP6)
4. Describe the relationship between beam quantity/quality and mA, kVp and half-value layer. (C4)

**GEN Ed SLO's:**

Critical Thinking; Information Literacy; Scientific Reasoning

**UNIT VI      Exposure Factors Influencing Image Formation-  
Discipline Knowledge**

1. Describe the factors which influence image formation, emphasizing the method of choice for altering each of those factors. (C4)
2. Indicate conditions under which it might be necessary to change standard exposure factors. (C4)
3. Discuss how distance plays a role in the intensity of the x-ray beam by applying the inverse square (C4)
4. Demonstrate methods for altering the interrelated exposure variables by arithmetically determining new exposure factors (C4)

**GEN Ed SLO's:**

Critical Thinking; Information Literacy; Scientific Reasoning

**UNIT VII      Interaction of X-Radiation with Matter-  
Discipline Knowledge**

1. Describe and illustrate the primary ways in which x-radiation interacts with matter. (C4, HP6)
2. Define and differentiate among primary, secondary and scatter radiation. (C4)

**GEN Ed SLO's:**

Critical Thinking; Information Literacy; Scientific Reasoning



**UNIT VIII      Biologic Effects of Radiation- Discipline Knowledge**

1. Discuss each of the indicated concepts relating to the biological effects of radiation, providing specific examples for each, with diagrams, if appropriate.
2. State and compare the 2 major theories concerning the mechanism of biological damage. (C5, C8, C10)
3. Describe the indicated determinants of radiation injury, providing specific examples for each.
4. Describe the effects of x-radiation on oral and para-oral tissues. (C5, C8, C10, HP6)
5. Define osteoradionecrosis and discuss the major factors involved in its prevention and treatment. (C5, C8, C10, HP6)

**GEN Ed SLO's:**

Critical Thinking; Information Literacy; Scientific Reasoning; Ethical Reasoning

**UNIT IX      Radiation Health, Safety and Protection- Discipline Knowledge**

1. Define terms relating to radiation control and protection. (C5, C8, C10, HP6)
2. Discuss the philosophy and basic principles/concepts of radiological health.
3. Use and regulate all radiographic equipment in accordance with radiation hygiene principles. (C2, C5, C8 C10, HP6)
4. Describe and discuss currently acceptable methods for reducing patient and operator exposure in the dental environment, including radiographic technique and clinical judgement. (C5, C8, C10, HP6)
5. Discuss those radiation protection regulations and guidelines which specifically apply to dental x-ray units and indicate their sources. (C5, C8, C10, HP6)
6. Present the rationale for and discuss the major components of the Ionizing Radiation Use Policy promulgated and followed by the Dental Hygiene Department of New York City College of Technology. (C5, C8, C10, HP6)

**GEN Ed SLO's:**

Critical Thinking; Information Literacy; Scientific Reasoning

**UNIT X      Radiographic Interpretation- Discipline Knowledge**

1. Apply the principles of interpretation to all individual films and F.M.S. (C3, C5)
2. Demonstrate the use of required interpretation sheets and correlated forms. (C10)
3. Identify, locate, compare and differentiate among the radiographic appearances of all normal calcified and non-calcified tissues of the tooth, its surrounding structures and common tooth restorative materials. (C3)
4. Identify, locate, compare and differentiate among the radiographic appearances of normal anatomic landmarks.(C3)

5. Describe and compare the clinical appearances of calculus and each type of caries with their respective radiographic appearances, at each "stage" of "development". (C3)
6. Discuss and evaluate factors which may influence the detection of calculus and caries on radiographs. (C3, C10)
7. Describe the radiographic characteristics which are indicative of periapical pathosis. (C3, C10)
8. On radiographs, identify and record, when appropriate, the following: potential sites for calculus formation, calcareous deposits, potential sites for carious lesions, all types of carious lesions, common developmental and non-developmental abnormalities and periapical pathosis. (C10, PC1))
9. Describe the radiographic appearance of each stage of periodontal disease and alveolar bone resorption. (C10, PC1)
10. On radiographs, identify and record, if appropriate, the following: normal radiographic appearance of the periodontium, deviations from the normal radiographic appearance of the periodontium and bone loss (location, amount, and direction). (C10, PC1)

**GEN Ed SLO's:**

Critical Thinking; Information Literacy; Scientific Reasoning

**UNIT XI      Legal Considerations Pertaining to X-rays- Discipline Knowledge**

1. Differentiate among laws, regulations and recommendations, citing examples of each. (C2)
2. Discuss relevant and current legal considerations pertaining to the exposure, use and ownership of dental radiographs. (C2)
3. Discuss the concepts of risk management and proper record keeping techniques as they pertain to dental radiographic examination. (C2, C10)

**GEN Ed SLO's:**

Critical Thinking; Information Literacy; Scientific Reasoning

**COURSE OUTLINE FOR DEN 1218L (LAB)**

<b>UNIT #</b>	<b>Topic</b>
<b>UNIT I</b>	<p><b>Orientation</b></p> <ul style="list-style-type: none"> <li>A. Scope of DEN 1218/218L and course requirements</li> <li>B. Tour of radiology facility</li> <li>C. Dental Radiology Laboratory emergency procedures</li> </ul>
<b>UNIT II</b>	<p><b>Dental X-Ray Film and Film Handling</b></p> <ul style="list-style-type: none"> <li>A. Film composition</li> <li>B. Film packet and components</li> <li>C. Film speed or sensitivity</li> <li>D. Intraoral film sizes (types and uses)</li> <li>E. Film hangers (holders, racks)</li> <li>F. Film handling and storage</li> </ul>
<b>UNIT III</b>	<p><b>Introduction to Intraoral Radiography</b></p> <ul style="list-style-type: none"> <li>A. Patient management</li> <li>B. Basic principles of patient positioning</li> <li>C. Principles of shadow casting</li> <li>D. Vertical angulation</li> <li>E. Horizontal angulation</li> <li>F. Intraoral techniques: bite-wing, paralleling and bisecting angle</li> </ul>
<b>UNIT IV</b>	<p><b>Bite-Wing Radiography</b></p> <ul style="list-style-type: none"> <li>A. Theory and purpose: routine posterior, vertical and anterior</li> <li>B. Technique and film placement</li> <li>C. Beam alignment</li> <li>D. Assorted film holding devices</li> </ul>
<b>UNIT V</b>	<p><b>The Darkroom</b></p> <ul style="list-style-type: none"> <li>A. Overview of film processing mechanics</li> <li>B. Darkroom design, equipment, and care</li> <li>C. Safety and infection control practices</li> <li>D. Tank care and solution life</li> <li>E. Darkroom procedures and forms</li> </ul>
<b>UNIT VI</b>	<p><b>Processing</b></p> <ul style="list-style-type: none"> <li>A. Latent and visible image formation</li> <li>B. Radiopaque vs. radiolucent</li> <li>C. Chemistry and action of processing solutions</li> <li>D. Automatic processing</li> <li>E. Time-temperature method vs. visual method</li> </ul>

UNIT VII	<p><b>Film Processing Failures: Causes and Corrective Measures</b></p> <p>A. Incomplete, inadequate, and prolonged processing  B. Careless film handling  C. Poor lighting conditions</p>
UNIT VIII	<p><b>Radiology Lab Procedures for Patient Exposure</b></p> <p>A. Appointment scheduling  B. Patient interview and medical/dental history  C. Pre-exposure, exposure, and post-exposure procedures  D. Infection control procedures  E. Submitting films for grading  F. Releasing films</p>
UNIT IX	<p><b>Paralleling (Right Angle) Technique</b></p> <p>A. Theory  B. Paralleling instruments (X-C-P): components and assembly  C. Technique and film placement  D. General procedures for exposing films and sequence for F.M.S.  E. Beam alignment</p>
UNIT X	<p><b>Rectangular Collimation</b></p> <p>A. Purpose, advantages and disadvantages  B. Equipment  C. Technique</p>
UNIT XI	<p><b>Film Holding Devices/Instruments</b></p> <p>A. Purpose, advantages and disadvantages  B. Techniques</p>
UNIT XII	<p><b>Exposure Errors: Causes and Corrective Measures</b></p> <p>A. Beam alignment errors  B. Exposure technique errors  C. Film placement errors</p>
UNIT XIII	<p><b>Mounting and Viewing Intraoral Radiographs</b></p> <p>A. Viewing equipment and conditions  B. General principles and mounting sequence</p>
UNIT XIV	<p><b>Digital Radiography</b></p> <p>A. Theory  B. Digital Radiography –vs.- Traditional Radiography  C. Equipment components: use and interrelationships  D. Technique and film placement  E. Exposure and printing: settings and modifications</p>

## **DEN 1218L COURSE OBJECTIVES (LABORATORY)**

### **UNIT I           Orientation-Discipline Knowledge**

1. Discuss the scope of DEN 1218/218L and course requirements
2. Comply with requirements, regulations and procedures relating to the safety and radiographic treatment of patients, as delineated in the Student Manual & correlated handouts.(C2, HP6)
3. Define and differentiate among specified radiologic and radiographic terms. (C5)
4. Reiterate and "role play" the procedure for handling an emergency in the Dental Radiology Laboratory. (C4, C5, HP6)

#### **GEN Ed SLO's:**

Critical Thinking, Information Literacy, Scientific Reasoning

### **UNIT II           Dental X-Ray Film and Film Handling**

1. Identify and describe the composition and function of each component of the film packet. (C4)
2. Identify and compare intraoral films by speed and size (type and use or function). (C4)
3. Discuss the characteristics of desirable film hangers and demonstrate their use. (C4).
4. Discuss and follow the recommended methods of film handling and storage. (C4)

#### **GEN Ed SLO's:**

Critical Thinking, Information Literacy, Scientific Reasoning

### **UNIT III          Introduction to Intraoral Radiography**

1. Demonstrate patient management principles and follow established safety protocols. (C5, HP6)
2. Demonstrate chair and patient positioning for each indicated technique with selected equipment. (C4, C5)
3. Relate the principles of shadow casting to specified intraoral radiographic techniques. (C4, C5)
4. Explain and contrast the concepts of vertical and horizontal angulations. (C4, C5)
5. Discuss and compare the basic theories, purposes and techniques for the indicated intraoral techniques (projections). (C4, C5)

**GEN Ed SLO's:**

Critical Thinking, Information Literacy, Scientific Reasoning, Ethical Reasoning

**UNIT IV      Bite-Wing Radiography**

1. Explain the theory and purpose of bite-wing radiographs: routine posterior, vertical and anterior. (C4, C5)
2. Employ all aspects of bite-wing technique so that the resulting radiographs consistently demonstrate maximum diagnostic yield. (C4, C5)
3. Select the appropriate film holding device for different oral "situations" (C4, C5)

**GEN Ed SLO's:**

Critical Thinking, Information Literacy, Scientific Reasoning

**UNIT V      The Darkroom**

1. Outline the mechanics of film processing. (C2, C4, C5)
2. Design an appropriate darkroom and select essential equipment. (C2)
3. Follow established safety protocols, infection control practices and darkroom / processing procedures. (C5, HP6)
4. Complete forms associated with darkroom procedures. (C10)

**GEN Ed SLO's:**

Critical Thinking, Information Literacy, Scientific Reasoning

**UNIT VI      Processing**

1. Describe and contrast latent and visible image formation. (C4, C5)
2. Define and compare the terms radiopaque and radiolucent, providing examples of each. (C4, C5)
3. Describe the action of the chemicals in developer and fixer. (C4, C5)
4. Describe and compare the time-temperature and visual methods of processing. (C4, C5)

**GEN Ed SLO's:**

Critical Thinking, Information Literacy, Scientific Reasoning

**UNIT VII      Film Processing Failures: Causes and Corrective Measures**

1. Identify each processing error, indicate its cause and offer methods/steps for its prevention. (C4, C5)
2. Recognize and remedy poor lighting conditions and careless film handling. (C4, C5)
3. Utilize preventive measures while processing radiographs, or employ appropriate corrective practices. (C8, HP6)

**GEN Ed SLO's:**

Critical Thinking, Information Literacy, Scientific Reasoning, Ethical Reasoning

**UNIT VIII      Radiology Lab Procedures for Patient Exposure**

1. Comply with all established procedures for preparing necessary forms, scheduling appointments, exposing patients, submitting films for grading and releasing films (C2, C4, C5, C10, HP6)

**GEN Ed SLO's:**

Critical Thinking, Information Literacy, Scientific Reasoning, Ethical Reasoning

**UNIT IX      Paralleling Technique (Right-Angle) Technique**

1. Explain the theory of the paralleling (right-angle) technique. (C4, C5)
2. Identify and assemble components of paralleling instruments. (C4, C5)
3. Employ all aspects of the paralleling technique so that the resulting radiographs consistently demonstrate maximum diagnostic yield. (C4, C5)

**GEN Ed SLO's:**

Critical Thinking, Information Literacy, Scientific Reasoning

**UNIT X      Rectangular Collimation**

1. Discuss the purposes of and compare the advantages and disadvantages of rectangular collimation with cylindrical collimation. (C4, C5)
2. Demonstrate the use of the rectangular collimator in exposing a required number of paralleling full mouth series and/or individual films. (C4, C5)

**GEN Ed SLO's:**

Critical Thinking, Information Literacy, Scientific Reasoning

**UNIT XI      Film Holding Devices/Instruments**

1. Demonstrate the use and state the advantages and disadvantages of specified film holding devices. (C4, C5)
2. Select the appropriate film holding device for the dentition or area being exposed. (C4 C5)

**GEN Ed SLO's:**

Critical Thinking, Information Literacy, Scientific Reasoning

**UNIT XII      Exposing Errors: Causes and Corrective Measures**

1. Identify each exposure error, indicate its cause and offer a method for its prevention. (C4, C5)
2. Utilize preventive measures while exposing radiographs, or employ appropriate corrective practices. (C8, HP6)

**GEN Ed SLO's:**

Critical Thinking, Information Literacy, Scientific Reasoning

**UNIT XIII      Mounting and Viewing Intraoral Radiographs**

1. Describe the characteristics of the most desirable mounts, view boxes, masking materials and viewing conditions. (C4, C5, C8)
2. Select viewing and mounting equipment and establish viewing conditions most suitable for each viewing situation (or film type). (C4, C5, C8)
3. Mount individual films, groups of films or full-mouth series. (C4, C5, C8)
4. View radiographs following the specified systematic procedure. (C4, C5, C8)

**GEN Ed SLO's:**

Critical Thinking, Information Literacy, Scientific Reasoning

**UNIT XIV      Digital Radiography**

1. Explain the theory of digital radiography. (C4, C5)
2. Discuss and compare the advantages and disadvantages of digital radiography and traditional radiography. (C4, C5)
3. Identify and compare all equipment components for use. (C4, C5, C8)
4. Demonstrate the use of all digital radiographic equipment so that the resulting radiographs exhibit maximum diagnostic yield. (C4, C5, C8)

**GEN Ed SLO's:**

Critical Thinking, Information Literacy, Scientific Reasoning