

Springfield Technical Community College
Academic Affairs

Course Number: DSC 112 Class/Lect. Hours: 2 Lab Hours: 2 Credits: 3 Dept.: Dental Sciences

OBJECTIVES/COMPETENCIES

Course Objectives	Competencies
<p>Normal Anatomy Identify normal anatomical landmarks in periapical, bite-wing, and panoramic radiographs.</p>	<ol style="list-style-type: none"> 1. Given a specific landmark or dental restorative material, identify its characteristics radiographic appearance (radiolucent/radiopaque). 2. Identify and describe the radiographic appearance of enamel, dentin, pulp, lamina dura, crestal lamina, and periodontal ligament space. 3. Describe the phenomenon of cervical burnout, Mach band affect, horizontal overlap, vertical overlap and how they differ from one another. 4. Identify and describe the radiographic appearance of developing teeth. 5. Identify the age of a patient when shown a panoramic radiograph. 6. Identify and describe the radiographic appearance of cancellous and cortical bone. 7. Given a list of radiographic landmarks, identify the area or region of the maxilla or mandible in which the landmark exists. 8. Define the general terms that describe prominences, spaces and depressions in bone. 9. Recognize and identify major anatomic landmarks of the oral cavity in radiographs or from a written description of the area.
<p>Radiographic Image & Characteristics 1. Consistently produce acceptable diagnostic bite-wing, periapical, occlusal and panoramic radiographs utilizing digital techniques.</p>	<ol style="list-style-type: none"> 1. Explain the three criteria for intraoral radiographic quality assessment. 2. Explain how the goals if paralleling technique differ from those of bisecting-angle technique for periapical radiography. 3. List the instruments that can be used from periapical radiography. 4. Describe the sensor placement for each projection of the STCC full mouth series per the radiographic acceptability criteria. 5. Explain the goals and instruments used for bite-wing radiographs. 6. Explain the indications and limitations of distal molar radiography.

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	<ol style="list-style-type: none"> 7. Describe the technique for standard maxillary and mandibular occlusal radiographs. 8. Define the following items: <ul style="list-style-type: none"> • Intraoral radiography • Periapical radiography • Bite-wing radiography • Paralleling technique • Distal molar radiography • Occlusal radiography • Contrast • Density 9. Explain how geometric principles affect radiographic image quality. 10. Define the following terms: <ul style="list-style-type: none"> • Sharpness • Shape distortion • Foreshortening • Magnification • Elongation 11. Explain how geometric basis for determining image magnification. State and explain the five rules for accurate image formation.

<p>Radiation Physics & Biology Discuss the scientific principles that govern radiographic technique including radiation physics, radiation characteristics and radiation biology</p>	<ol style="list-style-type: none"> 1. Explain the following terms: <ul style="list-style-type: none"> • Atomic nucleus • Binding energy • Ionizing radiation • Cathode rays • Atomic mass • Ionization • Alpha particles • Gamma rays • Orbital electrons • Radiation • Beta particles • X-rays 2. Describe particulate and electromagnetic radiation. 3. Give examples of electromagnetic radiation and explain the differences between them. 4. List the properties of electromagnetic radiation 5. Describe the direct and indirect effects of radiation on molecules
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	<ol style="list-style-type: none"> 6. Describe the x-ray tube, including cathode (filament, focusing cup) anode (target, focusing spot, copper stem), glass envelope, circuits, and transformers. 7. Label the components of an x-ray machine. 8. Explain the role of tungsten in the cathode and anode and its properties 9. Define thermionic emission and how it relates to radiation production. 10. Describe the electron interactions that occur at the target (anode) to produce radiation. 11. Compare and contrast the two types of radiation produced at the target. 12. Define intensity as it describes an x-ray beam. 13. Explain how the following factors affect the intensity of the x-ray beam: exposure, tube voltage, collimation, tube current, filtration, inverse square law. 14. Define the following terms: <ul style="list-style-type: none"> • mAs • kVp • exposure time 15. Explain the ways x-ray photons interact with matter. 16. Describe the types of scattering interaction common in dental radiography 17. Compare and contrast coherent scattering, photoelectric effect, and Compton scattering. 18. Describe the effects of radiation on cell structure and function. 19. List the factors that can affect radiation response in tissues. 20. Rank tissues by their relative radiosensitivity. 21. Define free radicals 22. Define and describe the Acute Radiation Syndrome. 23. List the acute effects of lower energy radiation. 24. Explain the difference between stochastic and deterministic effects of radiation. 25. Explain the threshold dose of radiation 26. Explain how radiation affects the genetic pool 27. Explain how radiation affects the embryo/fetus
<p>Radiation Protection Appreciate and guard against the dangers of x-radiation.</p>	<ol style="list-style-type: none"> 1. Identify the sources of natural radiation 2. Identify the approximate dose for natural radiation in the United States 3. Identify the largest sources of artificial radiation. 4. Identify the unit of measurement that is used to compare that risk of various types of radiation exposures 5. Explain the critical organ concept 6. List the critical organs exposed during dental radiography

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	<ol style="list-style-type: none"> 7. Define the term ALARA/ALADA 8. Define maximum permissible dose 9. Describe the steps should be taken to reduce radiation exposure dose in dental radiography 10. Describe the steps should be taken to protect dental office personnel from excessive radiation exposure. 11. Describe the steps should be taken to protect dental patients from excessive radiation exposure.
<p>Selections Criteria</p> <ol style="list-style-type: none"> 1. List and explain the selection criteria for prescribing dental radiographs. 2. Manage dental patients completely during clinical radiographic procedures. 	<ol style="list-style-type: none"> 1. List the five indications for dental radiographs to be prescribed. 2. List the diseases or conditions that can be evaluated radiographically 3. Discuss the types of projections that are made for dental radiography and explain the information they provide 4. Describe the type of radiographic exam and frequency recommended for new patients who are: children, adolescents, and adults with natural teeth, edentulous adults 5. Discuss the limitations of radiation for the pregnant patients. 6. Explain the special precautions regarding dental radiography for patients who have undergone radiation therapy. 7. Identify the size sensor that should be used on children. 8. Describe the exposure settings that are recommended for children 9. Explain the type of radiation projections that may be necessary for patients affected by trauma or infection 10. Explain the type of imaging used on patients that present with a disability or a patient who needs assistance during the radiographic exposure. 11. Discuss how the operator can minimize a patient's gag reflex 12. Explain the adjustments that should be made for film placement and exposure technique for edentulous patients.
<p>Radiographic Interpretation</p> <p>Interpret radiographs and be able to distinguish normal anatomy from pathology.</p>	<ol style="list-style-type: none"> 1. List and explain that steps interpreting radiographs 2. Explain the factors affect an observer's perception of radiographic images 3. Describe optimal viewing conditions that will enhance interpretation 4. Describe the guidelines that can assist an observer in identifying normal structures on radiographs. 5. Explain the steps in systemically evaluating radiographic images. 6. Describe abnormal lesions using the five descriptor categories. 7. Discuss interpretation tips for evaluating caries, periodontal disease, and pulpal pathologies on a dental radiograph 8. Discuss that factors that influence radiographic interpretation

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<p>Panoramic Radiography</p> <ol style="list-style-type: none"> 1. Identify normal anatomical landmarks in periapical, bite-wing, and panoramic radiographs. 2. Consistently produces acceptable diagnostic periapical, bite-wing, occlusal and panoramic radiographs utilizing proper techniques. 	<ol style="list-style-type: none"> 1. Describe the basics of panoramic methods 2. Describe how the horizontal and vertical angulation determined in panoramic radiology 3. Define the focal trough 4. Describe how magnification may affect the image produced in panoramic radiography. 5. Define and identify ghost images 6. List the advantages and disadvantages of panoramic radiography 7. Identify the rational for requesting a panoramic radiograph on a patient 8. Compare and contrast intraoral radiography and panoramic radiography (such as materials, processing, and technique factors). 9. Identify normal anatomic structures found on panoramic radiographs 10. List the criteria for an ideal panoramic radiograph 11. Discuss the guidelines that should be used for patient positioning for panoramic radiography 12. Describe the causes of common panoramic artifacts and technique errors.
<p>Quality Assurance & Legal Issues</p> <ol style="list-style-type: none"> 1. List and explain state and federal laws that pertain to the practice of dental radiography. 	<ol style="list-style-type: none"> 1. Define quality assurance in dental radiography 2. List the benefits of a quality assurance program in radiology 3. Outline the responsibilities and record-keeping tasks of a quality assurance program. 4. Discuss the federal laws that regulate x-ray equipment and training and certification of those who operate radiographic equipment 5. Discuss the legal status of the selection criteria guidelines recommended by the FDA. 6. Identify the maximum beam diameter allowed for intraoral x-ray machines 7. Identify the minimum target-to –skin distance for intraoral x-ray machines 8. Identify the amount of aluminum filtration is required for intraoral x-ray machines 9. Identify the type of exposure switch required by law 10. Describe the impact of OSHA regulations on radiographic practice 11. Explain who owns the dental radiographs 12 List the practices used to prevent malpractice claims when it pertains to radiographs
<p>Digital Radiography & Localization Techniques</p> <ol style="list-style-type: none"> 1. Explain the purpose, technique and benefits of digital radiography. <p>Describe the techniques and purpose of using localization techniques in radiology.</p>	<ol style="list-style-type: none"> 1. Define digital radiography 2. Describe the components of digital radiographic equipment 3. Define the method of action of the CCD sensor

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	<ol style="list-style-type: none">4. Describe phosphor imaging plates and explain their differences from digital radiography with a CCD sensor.5. List the benefits and limitations of digital imaging.6. Define the key terms associated with occlusal and localization techniques.7. State the purpose of localization techniques8. List and differentiate the three types of localization techniques.9. Describe the technique for standard maxillary and mandibular occlusal radiographs10. Describe the purpose of occlusal examination11. State the recommended vertical angulations for the following mandibular occlusal projections: topographic, cross-sectional and pediatric.