COURSE SYLLABUS
TM 210 COMPUTED TOMOGRAPHY
PATIENT CARE AND MANAGEMENT

CLASS HOURS: 4
LABORATORY HOURS: 0
CREDIT HOURS: 4

CATALOG COURSE DESCRIPTION: This is one of a three-course set in whole body Computed Tomography (CT) imaging. The complete set provides formal specialized training in CT whole body imaging prior to independent performance. Topics included in this course are patient care and management, whole body cross-sectional anatomy, pathology, imaging procedures with protocols, and special procedures in CT.

ENTRY LEVEL STANDARDS: Radiologic Technologist certified or eligible for certification by the American Registry of Radiologic Technologists (ARRT) (R).

PREREQUISITE: Graduate of CAHEA/JRCERT accredited Radiologic Technology Program and certified or eligible for certification by the American Registry of Radiologic Technologists.

COREQUISITES: TM 220, TM 230

TEXTBOOK(S) AND OTHER REFERENCE MATERIAL BASIC TO COURSE:

Required Student Learning Outcomes (Program Student Learning Outcomes and Course Student Learning Outcomes):
PSLO # 1: The computed tomography technical certificate program exists to prepare graduates who possess the knowledge, skill, and affect to meet the demands of an entry-level position in computed tomography. (COM, ANA, CT, TEC, CUL, KNO)
CSLO#1 Apply knowledge of human anatomy, physiology, and pathology to demonstrate structures in a computed tomography examination.
CSLO#2 Identify cross-sectional anatomy of the head, neck, spine, thorax, abdomen, pelvis and upper, and lower extremities in the coronal, sagittal, and transverse planes.
CSLO#3 Provide basic patient care and comfort and anticipate/adapt patient needs based on physical/social/psychological assessment.
CSLO#4 Perform patient assessment including evaluation of the medical records and physical assessment of the patient to identify potential problems or life-threatening conditions.
CSLO#5 Prepare and use procedural materials such as drugs, contrast media, medical trays, sterile instruments, linens and patient care items following sterile, and aseptic technique.
CSLO#6 Apply universal precautions (mask, gown, gloves) as indicated for a given patient condition and based on the probability for exposure to blood or other body fluids.
CSLO#7 Having assessed the physical condition of the patient, choose the interventions necessary for patient’s health and comfort; e.g. IVs, oxygen, vital signs.
CSLO#8 Prepare and administer drugs used in computed tomography imaging, e.g. IV and oral.
CSLO#9 Evaluate the use of contrast agents with respect to indications, contraindications, dose calculations, administration route, and the way the image and pathology is affected for the specified anatomy.

CSLO#10 Comply with established (societal and professional) medicolegal principles and medical ethics.

CSLO#11 Assess the CT scanning procedures/protocols used to view the body with regards to type of scout, acquisition method, parameter selection, demonstration of normal anatomy, and/or pathology or trauma.

CSLO#12 Recognize disease/traumatic processes in the body and describe how the effects of disease are shown in CT imaging.

CSLO#13 Critique the special procedures used in computed tomography relative to their value in the diagnosis and treatment of disease, e.g. 3-D studies, biopsies, radiation treatment planning, stereotaxis, drainage, and aspiration.

Other Learning Indicators or Objectives (optional): The Student will:

Cranium and Facial Bones (A) (B)
1. Identify the location and unique structures of each cranial and facial bone.
2. Describe the structures that comprise the temporomandibular joint.
3. Identify the location of each paranasal sinus and the meatus in which it drains.
4. Identify the structures of the osteomental complex.
5. Identify the structures of the ear and describe their functions.
6. Identify the bones that form the orbit and their associated openings.
7. Describe the structures that comprise the globe of the eye.
8. List the muscles of the eye and describe their functions and locations.

Brain (A) (B)
1. Describe the location of the three layers of meninges.
2. Describe the production and absorption of cerebral spinal fluid.
3. Identify the components of the ventricular system.
4. Describe the location and function of the components of the cerebrum, brain stem and cerebellum.
5. Identify the major arteries of the cranium and list the structures they supply.
6. List the arteries that comprise the circle of Willis.
7. Identify the superficial cortical veins, deep veins, and dural sinuses of the cerebrum.
8. Identify the function and course of the cranial nerves.

Spine (A) (B)
1. List the sections of the spine.
2. Identify the structures of a typical vertebra.
3. Identify the structures of the atlas and axis, thoracic vertebrae, sacrum, and coccyx.
4. Identify and state the function of the spinal ligaments.
5. Define the action of and identify the muscle groups of the spine.
6. Describe the composition of the spinal cord.
7. List the four plexuses of the spinal cord.
8. Identify the vasculature of the spine.

Neck (A) (B)
1. Identify the visceral structures of the neck and define their functions.
2. Recognize the anatomic relationships between the visceral structures of the neck.
3. List the three anatomic sections of the pharynx.
4. List the muscles associated with facial expression and mastication and state their actions.
5. State the triangles of the neck and identify the muscle that divides them.
6. List the muscles located within each triangle of the neck and state their actions.
7. Describe the course of the major vessels located within the neck.

Thorax (A) (B)
1. Describe the boundaries of the thorax including the inlet, outlet, and angles.
2. Describe the layers and functions of the pleural cavities.
3. List the structures of the mediastinum and describe their anatomic relationships to each other.
4. Describe the functions of the structures located in the mediastinum.
5. List the muscles involved with respiration by function and location.
6. Identify the skeletal components that form the thoracic cage.
7. Identify the structures of the heart and trace the path of blood through the heart.
8. Differentiate between pulmonary arteries and veins by function and location.
9. Identify the great vessels and describe the distribution of their associated arteries and veins.

Abdomen (A) (B)
1. List the structures of the abdominal cavity and differentiate between those that are contained within the peritoneum and those that are contained within the retroperitoneum.
2. Describe the peritoneal and retroperitoneal spaces.
3. Describe the location, anatomy, and function of the abdominal viscera.
4. List the structures that comprise the portal hepatic system and describe its function.
5. Identify the branches of the abdominal aorta and the structures they supply.
6. Identify the tributaries of the inferior vena cava and the structures they drain.
7. List the muscles of the abdomen and describe their function.

Pelvis (A) (B)
1. Identify the musculoskeletal structures that contribute to the pelvic girdle and diaphragm.
2. Describe the location and function of the male and female reproductive organs.
3. Identify the major arteries and veins that are located within the pelvis.
4. Identify the location of the bladder in relation to the reproductive organs.
5. Describe the location of the ureters as they descend into the pelvis and their entry point into the bladder.

Upper Extremity Joints (A) (B)
1. Identify the bony anatomy of the upper extremity joints.
2. Identify and state the action of the muscles as well as their origins and insertion sites.
3. Describe the key stabilizing elements of each joint.
4. Identify the components that contribute to the glenoid labrum and describe its function.
5. List the neurovascular structures identified within each joint.
6. List and describe the ligaments and tendons of each joint.

Lower Extremity Joints (A) (B)
1. Identify the bony anatomy of the lower extremity joints.
2. Identify and state the actions of the muscles as well as their origins and insertion sites.
3. Describe the key stabilizing elements of each joint.
4. List the neurovascular structures identified within the knee and hip.
5. List and describe the ligaments and tendons of each joint.

PATIENT CARE AND MANAGEMENT
Legal and Ethical Issues (J)
1. Define ethics, scope of practice, and standard of care and discuss each as it applies to a technologist’s work in computed tomography.
2. Explain the legal obligations the CT radiographer has toward his patients, his peers, and other members of the health care team.
3. Define patient rights and describe the role of the CT technologists in protecting these rights.
4. Discuss the legal implications of the use of immobilization techniques, unusual occurrence reports, good samaritan laws, informed consent, and malpractice insurance.
5. Explain the need for accurate and complete medical records and documentation in health care and the obligations of the radiographer in this aspect of patient care.
6. Discuss legal issues for the CT technologist relative to the following:
   a. Common Law vs. Statutory Law
   b. Civil Law (Tort) vs. Criminal Law
   c. Assault and the Act of Battery
   d. Negligence
7. State the four components necessary to prove negligence.
8. Identify the components of actual and implied consent.

**Patient Assessment (C, D, G)**
1. Describe the processes involved in a physical assessment of a patient.
2. Summarize the necessary elements of a database.
3. Perform a five minute physical assessment.
4. Take a limited patient history to include prior conditions and surgery as well as allergies.
5. Determine functional status through interview and/or actual observations.
6. Discuss developmental considerations of infants, children, adolescents, and elderly adults.
7. Apply four basic skills used during the physical assessment.
   a. Inspection
   b. Palpation
   c. Percussion
   d. Auscultation
8. Perform/Assess vital signs.
9. Know normal and abnormal findings for each vital sign.
10. Complete appropriate documentation, e.g. occurrence reports, informed consent forms, and patient’s medical records.
11. Determine normal vs. abnormal values to include the following if applicable:
   a. pH  
   b. PaCO2  
   c. PaO2  
   d. BUN  
   e. Creatinine  
   f. SaO2  
   g. PT  
   h. PTT
12. Know which lab values are pertinent to the specific CT exam.
13. Identify potential life threatening conditions that can be discovered in the primary survey.

**Patient Preparation/Education (C)**
1. Instruct the patient in the procedures to follow to prepare for the examination and what to expect during the visit.
2. Explain the procedure to the patient and the necessity for contrast administration if indicated and to remain still during the exam.
3. If applicable to the facility have patient sign consent form to indicate patient’s understanding of the administration and potential complications associated with IV contrast and/or sedation or consent for surgical procedure, such as biopsy or drainage.
4. Seek clarification if there is a discrepancy between the CT study ordered on the paperwork and the one described by the patient.
5. Inform patient when and how they will learn about the results of the CT exam.
6. Instruct the patient in the measures which he/she must follow after the procedure, e.g. fluids, laxatives, supervision.

**Maintaining Accessory Devices (D, E)**
1. Identify the most common types of oxygen administration equipment and explain their potential hazards.
2. Explain the reasons for nasogastric and nasoenteric intubation and the radiographer’s responsibilities when these tubes are in place.
3. Describe the precautions the radiographer must take if the patient has a gastrostomy tube in place.
4. Describe the patient care considerations for the radiographer working with a patient who requires parenteral nutrition or has a central venous catheter.
5. Describe the symptoms a patient will demonstrate if he is in need of suctioning and explain the action the radiographer must take if this situation should occur.
6. Explain the precautions the radiographer must take when working with a patient who has a tracheostomy.
7. List the precautions the radiographer must take when working with a patient requiring mechanical ventilation.
8. List the patient care precautions the radiographer must take if the patient has a chest tube in place with water-sealed drainage.
9. Describe the patient care considerations for the radiographer if the patient has a tissue drain in place.
10. Describe the precautions the radiographer must take if the patient has a urinary retention catheter in place.

**Administration of Diagnostic Drugs (D, E, F, H, I)**

1. Explain the purpose of contrast media used in CT imaging.
2. Name the three categories of contrast media (Intravenous, Oral or Rectal, Intrathecal).
3. Identify indications for IV contrast of the brain.
4. Identify indications for IV contrast of the body.
5. Define the following phases of tissue enhancement following the injection of contrast:
   a. Bolus Phase (DD between abdominal aorta (AA) and Inferior Vena Cava (IVC) > 30 Hounsfield Units (H.U.))
   b. Non-Equilibrium Phase (DD between AA and IVC between 10 and 30 H.U.)
   c. Equilibrium Phase (DD between AA and IVC < 10 H.U.)
6. Identify an area of the body in which the phase of tissue enhancement is very important.
7. Explain what determines the length of the three phases of tissue enhancement.
8. Compare and contrast ionic and nonionic iodinated contrast media.
10. Define viscosity.
11. State typical plasma osmolality.
12. Compare nonionic contrast agent’s osmolality with that for plasma.
13. Compare ionic contrast agent’s osmolality with that for plasma and nonionic media.
15. Give the typical iodine concentrations of both ionic and nonionic contrast media.
16. Give the quantity of iodine for a typical dose of contrast medium in CT.
17. Identify contraindications, warnings, and precaution to be taken with the administration of contrast media.
18. Identify an adverse reaction to contrast media as either mild, moderate, or severe.
19. Describe the treatment which may be necessary for:
   a. Mild Reaction
   b. Moderate Reaction
   c. Severe Reaction
   d. Extravasation at Injection Site
20. Prepare contrast media (oral, rectal or IV) for administration to patient.
21. Explain the necessity of using oral contrast in the CT examination of the GI tract.
22. Give the two types of oral contrast media which may be used in CT imaging.
23. Describe the barium sulfate suspension used for CT of the GI tract relative to percentage of barium sulfate.
24. Give several contraindications to the use of barium sulfate.
25. Give several adverse reactions to the administration of barium sulfate.
26. Describe the administration of barium for each of the following areas of the GI tract:
   a. Stomach
   b. Small Intestine
   c. Total GI Tract
   d. Rectum or Lower Bowel
27. Give the indications for the use of oral iodinated contrast media.
28. Explain why oral iodinated contrast medium for visualization of the distal small intestine is difficult.
29. Identify contraindications, warnings and precautions of oral iodinated contrast media.
30. Define intrathecal injection.
31. Describe a CT exam of the spine after a myelographic study.
32. Explain the purpose of a 1-4 hour delay between the intrathecal contrast administration and the CT scan.
33. Explain the need to slightly elevate the head for a post myelographic patient.
34. Describe the technique sometimes used for post-myelography CT scanning to keep the contrast agent and CSF from layering.
35. Identify normally enhancing structures of the brain after administration of IV contrast.
36. Identify disease processes of the brain which enhance with administration of an IV iodinated contrast medium.
37. Give typical doses of iodinated contrast used when scanning the brain.
38. Explain why injection rates are not important in brain CT.
39. Explain the delay of 45 to 60 minutes in studies to rule out metastatic disease, AIDS, and multiple sclerosis of the brain.
40. Define scan delay.
41. Identify disease processes of the head which are generally performed without intravenous contrast injection.
42. Explain why IV iodinated contrast agents are used when scanning the neck.
43. Give typical doses of iodinated contrast used when scanning the neck.
44. Give typical injection rates of iodinated contrast medium for CT of the neck.
45. Give typical scan delay for CT of the neck after IV administration of iodinated contrast.
46. Identify disease processes of the neck which call for contrast injection.
47. Explain why it is advantageous to inject in the arm which is contralateral to the side of primary interest when scanning the brachial plexus.
48. Give typical doses of IV contrast medium for CT of the abdomen.
49. Give typical injection rates for contrast examination of the abdomen.
50. Give typical delay times for the following organs of the abdomen:
   a. Liver
   b. Pancreas
   c. Kidneys/Adrenal Glands
51. Give the typical dose of IV contrast medium used for scanning the pelvis.
52. Give the typical delay time for examination of the pelvis.
53. Identify the disease processes which may indicate the need for IV contrast of the chest.

**IV Procedures (C-J)**

1. Use sterile or aseptic technique to prevent contamination of patient self, sterile trays, instruments, and fields.
2. Properly identify patient for venipuncture and IV administration of contrast medium.
3. Explain procedure and obtain patient cooperation.
4. Evaluate the patient for potential injection sites. Giving consideration to the following:
   a. CVA
   b. Radical Mastectomy or other Pertinent Surgery
   c. History of Drug Abuse
   d. Prior Cutdowns
   e. Arthritis
5. Assemble supplies needed for venipuncture and administration of IV contrast agent.
6. Select appropriate needle type and size.
7. Perform venipuncture and administer medications (simulation) observing for patency of vein.
8. Clean, disinfect or sterilize facilities and equipment.
9. Dispose of contaminated items following the prescribed procedure of the clinical site.
10. Observe patient for reactions.
12. Withdraw needle and apply pressure to prevent bleeding.
13. Given a venipuncture site complication, state an appropriate intervention.
15. Outline the five rights of drug administration.
16. Give precautions indications and advantages of the various IV access devices.
17. If an automatic injector is used set rate of injection, volume of injection and delays as per doctor’s orders or departmental protocol.
Dealing with Life Threatening Emergencies (C, D, G, I)
1. Assess the basic levels of neurological and cognitive functioning.
2. List and describe the progressive stages and types of shock.
3. Explain the radiographer’s role in the management of a patient in the early stages of shock.
4. List the symptoms of anaphylactic shock and explain the radiographer’s need to recognize it in its earliest stage.
5. Describe the early symptoms of pulmonary embolus, and explain the actions the radiographer must take if these symptoms appear.
6. List the symptoms of hypoglycemia and ketoacidosis, and describe the action the radiographer must take if these symptoms occur.
7. List the initial signs of a cerebral vascular accident and the radiographer’s role should these symptoms appear while the patient is in the radiographer’s care.
8. List the symptoms of cardiac and respiratory failure, and describe the action that the radiographer must take in each of these emergencies.
9. Explain the symptoms of mechanical airway obstruction and the emergency intervention necessary.
10. Describe the action the radiographer must take if a patient faints or has a seizure while in the radiographer’s care.

CT PATHOLOGY (L)
Chest – Mediastinum (L)
1. Given CT scans of the mediastinum, identify the following:
   a. Mediastinal Spaces
   b. Mediastinal Vessels
   c. Trachea
   d. Thyroid Gland
   e. Esophagus
   f. Lymph Nodes
   g. Thymus Gland
2. Describe the following enlargement of the mediastinal lymph nodes as to a description of the primary lesion and its manifestation on both plain and contrast enhanced CT images:
   a. Malignant Lymphoma
   b. Lymph Node Metastases
   c. Involvement of lymph nodes in Granulomatous Disease
      1) Sarcoidosis
      2) Florid Lymph Node Tuberculosis
      3) Pneumoconiosis
      4) Angiofollicular Hyperplasia
      5) Non-Specific Hyperplasia
3. Describe primary tumors of the anterior mediastinum as to a description of the primary lesion and its manifestation on both plain and contrast enhanced CT images:
   a. Mesenchymal Tumors
   b. Tumors of the Thymus
   c. Teratoid Blastomas
   d. Goiter
   e. Parathyroid Tumors
4. Describe primary tumors of the middle mediastinum as to a description of the primary lesion and its manifestation on both plain and contrast enhanced CT images:
   a. Tumors of Trachea
   b. Bronchogenic Cysts
   c. Pleuropericardial (Mesothelial) Cysts
5. Describe primary tumors of the posterior mediastinum as to a description of the primary lesion and its manifestation on both plain and contrast enhanced CT images:
   a. Solid Neurogenic Tumors
b. Cystic Lesions

6. Describe vascular disorders of the mediastinum as to a description of the lesion and its manifestation on both plain and contrast enhanced CT images:
   a. Congenital Deformities
   b. Aneurysms (Arteriosclerotic)
   c. Aneurysms (Traumatic)
   d. Dissecting Aneurysms
   e. Ectasia of:
      1) Brachiocephalic
      2) Pulmonary
      3) Azygos

7. Describe inflammatory processes of the mediastinum as to a description of the inflammation and its manifestation on both plain and contrast enhanced CT images:
   a. Acute Mediastinitis
   b. Chronic Mediastinitis

8. Give the origins of pneumomediastinum and mediastinal hematoma and describe their manifestation on plain and contrast enhanced CT images.

9. Define the following terms:
   a. Lymphoma
   b. Sarcoidosis
   c. Tuberculosis
   d. Pneumoconiosis
   e. Hyperplasia
   f. Goiter
   g. Teratoid Blastoma
   h. Dermoid
   i. Teratomas
   j. Coarctation
   k. Aneurysm
   l. Ectasia
   m. Phlegmon

Chest – Heart (L)

1. Given CT scans of the chest, identify the following structures of the heart:
   a. Left Ventricle
   b. Right Ventricle
   c. Left Atrium
   d. Right Atrium
   e. Interventricular Septum
   f. Interarterial Septum
   g. Superior Vena Cava
   h. Ascending Cone
   i. Inferior Vena Cava
   j. Mitral Valve
   k. Tricuspid Valve
   l. Pulmonary Artery

2. Recognize cardiologic applications of computed tomography include evaluation or confirmation of:
   a. The size and shape of the heart
   b. The positional relationship of the cardiac chambers and large vessels exiting the heart
   c. The presence of intracavitary masses
   d. The patency of aortocoronary bypasses

3. Differentiate the following functional conditions of the heart:
   a. Volume Stress
   b. Pressure Stress
4. Define cardiomyopathy.
5. Describe valvular defects of the heart as to a description of the defect and its manifestation on both plain and contrast enhanced CT images.
6. Describe intracavitary masses of the heart as to a description of the tumor and its manifestation on both plain and contrast enhanced CT images:
   a. Myxoma
   b. Rhabdomyomas
   c. Sarcomas (Primary Malignant Tumors)
   d. Metastases from Carcinoma of the Bronchus, Melanomas, Malignant Lymphomas (Secondary Neoplasms)
7. Describe the following disorders of the pericardium as to a description of the process and its manifestation on both plain and contrast enhanced CT images:
   a. Pericardial Anomalies
   b. Pericardial Fluid Collections
   c. Acute and Chronic Pericarditis

Chest – Lungs (L)
1. Given CT scans of the lungs, identify the following structures:
   a. Left and Right Bronchus
   b. Upper Lobar Bronchus
   c. Lower Lobar Bronchus
   d. Segmental Bronchus
   e. Bronchovascular Structures
2. Describe respiratory defects of the lung as to a description of the condition and its manifestation on plain and contrast enhanced CT images:
   a. Dystelectasis
   b. Atelectasis
   c. Round Atelectasis
3. Describe parenchymal lung abnormalities as to a description of the condition and its manifestation on plain and contrast enhanced CT images:
   a. Infiltration
   b. Emphysema
4. Describe bronchopulmonary anomalies as to a description of the condition and its manifestation on plain and contrast enhanced CT images:
   a. Pulmonary Sequestration
   b. Bronchiectasis
5. Describe pulmonary inflammations as to a description of the condition and its manifestation on plain and contrast enhanced CT images:
   a. Pneumonia
      1) Lobar Pneumonia
      2) Bronchopneumonia
      3) Interstitial Pneumonia]
   b. Pulmonary Abscess
   c. Tuberculosis
   d. Aspergilloma
6. Describe interstitial lung diseases as to a description of the condition and its manifestation on plain and contrast enhanced CT images:
   a. Idiopathic Pulmonary Fibrosis
   b. Sarcoidosis
   c. Histiocytosis
   d. Lymphangiomatomyomatosis
   e. Asbestosis
   f. Silicosis
   g. Carcinomatous Lymphangitis
h. Interstitial Tumor Infiltration

7. Describe perfusion disorders of the lung as to a description of the condition and its manifestation on plain and contrast enhanced CT images:
   a. Embolism
   b. Infarction

8. Describe lung injuries as to a description of the condition and its manifestation on plain and contrast enhanced CT images:
   a. Contusion
   b. Hematoma
   c. Pneumothorax

9. Describe pulmonary neoplasms as to a description of the condition and its manifestation on plain and contrast enhanced CT images:
   a. Benign Tumors
      1) Lipoma
      2) Chondromas
      3) Osteomas
      4) Hemartomas
   b. Bronchial Adenoma
   c. Bronchial Carcinoma
      1) Squamous cell Ca
      2) Small-cell (oat cell) Ca
      3) Adenocarcinoma
      4) Large-cell Ca
   d. Pulmonary Metastases
   e. Solitary Tumor Nodules

Chest – Pleura (L)

1. Given CT scans of the lungs for pleura assessment, identify the following structures:
   a. Parietal Pleura
   b. Endothoracic Fascia
   c. Extrapleural Fat
   d. Subcostal Muscle
   e. Transverse Thoracic Muscle
   f. Intercostal Vein
   g. Intercostal Muscles

2. Differentiate transudate and exudate.

3. Identify several common causes of pleural effusion based on formation of the following:
   a. Transudate
   b. Exudate

4. Describe the manifestation of pleural effusion on CT images.

5. Define Empyema.

6. Describe the manifestation of empyema on plain and contrast enhanced CT images.

7. Describe pleural thickening as to a description of the condition and its manifestation on CT images.

8. Describe the radiographic appearance of asbestosis as it affects the pleura and is demonstrated on CT images.

9. Describe primary neoplasms of the pleura as to description of the condition and its manifestation on plain and contrast enhanced CT images:
   a. Benign
      1) Mesothelioma
      2) Multiple fibroma
      3) Lipomas
   b. Malignant
      1) Mesothelioma
   c. Pleural Metastases
Chest – Chest Wall (L)

1. Describe tumors of the chest wall as to description of the condition and its manifestation on plain and/or contrast enhanced CT images:
   a. Primary Intra-osseous Neoplasms
   b. Secondary Intra-osseous Neoplasms
   c. Primary Soft-tissue Neoplasms
   d. Others

2. Describe inflammations of the chest wall as to description of the condition and its manifestation on plain and/or contrast enhanced CT images:
   a. Tuberculosis
   b. Fungal Infections
   c. Osteomyelitis of Ribs or Sternum
   d. Phlegmon Post Chest Surgery

3. Describe trauma to the chest wall as to description of the condition and its manifestation on CT images:
   a. Rib Fractures
   b. Hematomas
   c. Soft-tissue Emphysema

Abdomen – Liver (L)

1. Given CT scans of the abdomen at levels of the liver, identify the following structures of the liver:
   a. Portal Vein
   b. Left Main Branch of the Portal Vein
   c. Right Main Branch of the Portal Vein
   d. Hepatic Artery
   e. Lobes
   f. Inferior Vena Cava

2. Describe cystic liver diseases as to description of the condition and its manifestation on plain and contrast enhanced CT images:
   a. Dysontogenetic Cysts
   b. Solitary Hepatic Cysts

3. Describe solid tumors of the liver as to description of the condition and its manifestation on plain and contrast enhanced CT images:
   a. Adenomas and Focal Nodular Hyperplasia (FNH)
   b. Hepatic Lipoma
   c. Hemangioma
   d. Mesenchymal Hamartoma
   e. Hepatocellular Carcinoma (HCC)
   f. Cholangiocarcinoma
   g. Fibrolamellar Hepatocellular Carcinoma
   h. Secondary Tumors of the Liver (Metastases)
   i. Lymphoma

4. Describe inflammatory regressive changes in the liver as to description of the condition and its manifestation on both plain and contrast enhanced CT images:
   a. Fatty Infiltration of the Liver
      1) Obesity
      2) Cushing’s Disease
      3) Diabetes Mellitus
      4) Hyperalimentation
      5) Malnutrition
      6) Chronic Infection
      7) Chemotherapy
   b. Hepatitis
   c. Cirrhosis
d. Hemochromatosis  
e) Abscesses  
   1) Bacterial  
   2) Fungal  
   3) Amebic  
   4) Echinococcus Granulosus and Alveolaris

5. Describe injury to the liver as to description of the condition and its manifestation on plain and contrast enhanced CT images:  
   a. Laceration  
   b. Hematoma  
   c. Contusion

6. Describe vascular processes of the liver as to description of the condition and its manifestation on plain and contrast enhanced CT images:  
   a. Port Venous Thrombosis  
   b. Budd-Chiari Syndrome (Stenosis and Vascular Thrombosis of Hepatic Veins)

Abdomen – Biliary System (L)  
1. Given CT scans of the liver and gallbladder identify:  
   a. Gallbladder  
   b. Common Bile Duct  
   c. Hepatic Lobes

2. Identify the various causes for an enlarged gallbladder.

3. Describe the appearance of the gallbladder in a CT image if there is acute cholecystitis.

4. Differentiate the following inflammatory conditions of the gallbladder as to their particular manifestation on CT images.  
   a. Acute Cholecystitis  
   b. Chronic Cholecystitis  
   c. Emphysematous Cholecystitis  
   d. Inflammation Associated with Cholelithiasis

5. Define cholecystitis and cholelithiasis.

6. Describe the following tumors of the gallbladder as to a description of the primary lesion and its manifestation on both plain and contrast enhanced CT images:  
   a. Cholesterol Papilloma  
   b. True Papilloma  
   c. Adenomas  
   d. Carcinoma (Mostly Adenocarcinoma)  
   e. Sarcoma (Rare)  
   f. Metastatic Spread to Gallbladder Attributable to Melanoma

7. Give the various causes of biliary obstruction and describe the manifestation of biliary obstruction in CT images.

8. Define the following terms:  
   a. Cholangitis  
   b. Cholangiocarcinoma

9. Identify the following as congenital anomalies of the common bile duct.  
   a. Choledochal Diverticula  
   b. Choledochoceles  
   c. Choledochal Cyst

10. Describe the manifestation of a choledochal cyst in CT images.

11. Recognize Caroli’s Disease as being a congenital abnormality of the biliary tract which also can involve the kidneys as (medullary sponge kidney).

Abdomen – Pancreas (L)  
1. Given CT scans of the pancreas, identify the following structures:  
   a. Tail of Pancreas  
   b. Body of Pancreas
2. Describe cystic pancreatic diseases as to a description of the condition and its manifestation on both plain and contrast enhanced CT images:
   a. Dysontogenetic Cyst (Hamartoma)
   b. Retention Cyst
   c. Pseudocyst

3. Describe pancreatic tumors as to a description of the lesion and its manifestation on both plain and contrast enhanced CT images:
   a. Microcystic Adenoma
   b. Macrocystic Adenoma
   c. Carcinoma
   d. Cystadenocarcinoma
   e. Islet Cell Tumors
      1) Insulomas
      2) Gastrinomas
   f. Secondary Tumors (Metastases)
      1) May Arise from Primary Tumors of:
         a) Lung
         b) Breast
         c) Thyroid
         d) Liver
         e) Ovary
         f) Testis
         g) Malignant Melanomas
      2) Advanced Tumors in Adjacent Organs:
         a) Stomach
         b) Colon
         c) Kidneys
   3) Malignant Lymphomas

4. Describe inflammatory changes of the pancreas as to a description of the condition and its manifestation on both plain and contrast enhanced CT images:
   a. Acute Pancreatitis
   b. Chronic Pancreatitis
   c. Pancreatic Abscess

5. Describe the effect of trauma to the pancreas as to a description of the injury and its manifestation on both plain and contrast enhanced CT images:
   a. Hematoma
   b. Confusion
   c. Incomplete Pancreatic Rupture
   d. Complete Pancreatic Rupture
   e. Pancreatic Duct Rupture
   f. Traumatic Pseudocyst

6. Describe the manifestation of lipomatosis and atrophy of the pancreas on CT images.

Abdomen – The Gastrointestinal Tract (L)
1. Given CT images of the GI tract identify the following structures:
   a. Esophagus
   b. Stomach
   c. Small Intestine
   d. Colon

2. Describe the various types of esophageal neoplasms as to a description and its manifestation on both plain and contrast enhanced CT images:
   a. Squamous Cell Carcinoma
b. Leiomyosarcoma
c. Benign Growths
   1) Polyps
   2) Adenomas
   3) Papillomas
   4) Myomas
   5) Neurinomas
   6) Lipomas
   7) Hamartomas

3. Define the following inflammatory esophageal abnormalities and describe their appearance on CT images:
   a. Reflux Esophagitis
   b. Candidial Esophagitis
   c. Tuberculosis
   d. Syphilis

4. Describe tumors of the stomach as to a description of the lesion and its manifestation on both plain and contrast enhanced CT images:
   a. Malignant Tumors
   b. Carcinoma
   c. Sarcomas
   d. Benign Tumors
      1) Leiomyomas
      2) Neurogenic Tumors
         a) Schwannomas
         b) Neurofibromas
      3) Fibromas
      4) Lipomas
      5) Hemangiomas

5. Describe the manifestation of gastric inflammation on CT images.
6. Describe small intestine and colon cysts as to a description of the condition and its manifestation on CT images.
7. Describe solid tumors of the small intestine and colon as to a description on the lesion and its manifestation on both plain and contrast enhanced CT images:
   a. Benign Tumors
      1) Adenoma
      2) Lipoma
   b. Malignant Tumors
      1) Lymphoma
      2) Myosarcoma
      3) Small Intestine Carcinoids
      4) Colorectal Carcinoma

8. Given various inflammatory diseases of the small intestines and colon, describe the condition and its manifestation on both plain and contrast enhanced CT images:
   a. Chronic Granulomatous Disease
   b. Crohn’s Disease
   c. Ulcerative Colitis
   d. Appendicitis
   e. Radiation Colitis
   f. Diverticulitis
   g. Ischemia

9. Describe the manifestation of hernia and mesenteric ischemia on both plain and contrast enhanced CT images.
Abdomen – Peritoneal Cavity (L)
1. Define Ascites.
2. Describe the appearance of ascites on CT images.
3. Describe the appearance of peritonitis on CT images.
4. Describe the appearance of peritoneal abscess on CT images.
5. Give several causes of hemorrhage in the abdominal cavity, e.g.:
   a. Blunt Abdominal Trauma
   b. Intestinal Perforation with Vascular Erosion
   c. Rupture of a Vascularized Tumor
   d. Extrauterine Pregnancy
   e. Excessive Anticoagulant Therapy
6. Describe the appearance of hemorrhage in the abdominal cavity on CT images.
7. Define biliary ascites (biloma) and describe its appearance on CT images.
8. Define pseudomyxoma peritonei.
9. Describe primary and metastatic peritoneal neoplasms as to a description of the condition and its manifestation on both plain and contrast enhanced CT images:
   a. Primary
      1) Mesothelioma
      2) Sarcoma
   b. Secondary (Metastases)
      1) Ovarian Carcinoma
      2) Colon
      3) Stomach
      4) Pancreas
      5) Liver

Abdomen – Spleen (L)
1. List several causes for splenomegaly.
2. Describe the appearance of splenomegaly on CT images.
3. Identify several diseases from which splenic calcification can arise.
4. Describe the appearance of cysts in the spleen as represented in CT images.
5. Describe solid tumors of the spleen as to a description of the condition and its manifestation on both plain and contrast enhanced CT images:
6. Given inflammatory processes of the spleen, describe their appearance on contrast and noncontrast CT examinations.
7. Name several causes of spleen rupture or laceration.
8. Differentiate the clinical appearance of fresh hematomas as compared to long-standing hematomas of the spleen.
9. Define:
   a. Subcapsular hematoma
   b. Intraparenchymal hematoma
10. Explain the importance of a contrast – enhanced CT scan to demarcate parenchymal lacerations.
11. Give the etiology of splenic infarction and splenic vein thrombosis.
12. Differentiate CT scans of the spleen using contrast enhancement and not using contrast enhancement for the following conditions:
   a. Splenic infarction
   b. Splenic vein thrombosis
13. Define:
   a. Asplenia
   b. Polysplenia
   c. Accessory spleens
   d. Splenosis
14. Describe the plain and contrast enhanced CT scans of an accessory spleen.
15. Explain nuclear medicine’s role in differentiating questionable accessory spleen.
Abdomen – Kidney (L)

1. Describe the normal appearance of the kidneys on transverse CT scans using no contrast and contrast enhancement.
2. Differentiate the following cystic renal diseases relative to CT characteristics, differential diagnosis, and CT appearance based on plain scans and contrast enhanced scans:
   a. Renal cysts
   b. Polycystic renal disease in children and adults
   c. Multicystic renal dysplasia
   d. Multilocular cystic nephroma
3. Describe the probability of a solid tumor that develops in the parenchyma of the kidney to be malignant.
4. Describe the CT appearance of renal cell carcinoma using both contrast enhanced and plain scans.
5. Given the following solid tumors of the kidney, differentiate based on CT characteristics, differential diagnosis, and CT appearance using both contrast and plain scans:
   a. Nephradenoma
   b. Oncocytoma
   c. Mesenchymal tumors
      1) Angiomyolipoma (hamartoma)
      2) Fibroma
      3) Lipoma
      4) Leiomyoma
      5) Hemangioma
   d. Renal pelvis
      1) Papillary tumors
      2) Carcinoma
      3) Squamous cell
   e. Renal lymphoma
   f. Renal metastasis
      1) Carcinoma of bronchus
      2) Carcinoma of breast, contralateral kidney, colon, stomach, cervix, ovaries, pancreas, and prostate.
   g. Nephroblastoma (Wilms’ tumor)
6. Given the following inflammatory renal diseases, differentiate based on CT characteristics, differential diagnosis, and CT appearance using both contrast and plain scans:
   a. Acute pyelonephritis – local bacterial nephritis
   b. Renal abscess
   c. Emphysematous pyelonephritis
   d. Xanthogranulomatous pyelonephritis
   e. Chronic pyelonephritis
   f. Renal tuberculosis
   g. Acute or chronic organ rejection in renal transplants
   h. Fibrolipomatosis
7. Define the following terms:
   a. Contusion
   b. Rupture
   c. Transection
   d. Hematomas
8. Given renal contusion, renal pedicle injury and renal hematoma, differentiate based on CT characteristics, differential diagnosis, and CT appearance using plain scans and contrast – enhanced scans.
9. Identify the following conditions as causing hydronephrosis:
   a. Lithiasis
   b. Tumor
c. Trauma
d. Intramural processes
   1) Congenital
   2) Inflammatory
   3) Radiation Strictures
   4) Atresia
e. Compression of efferent urinary passages
   1) Retroperitoneal tumor
   2) Lymphoma
   3) Retroperitoneal fibrosis
   4) Pelvic tumor
   5) Hematoma
   6) Trauma
   7) Atypical ureteral course
f. Functional causes
   1) Neurogenic
   2) Ureterovesical reflux

10. Given the following obstructive uropathies, differentiate based on CT characteristics, differential diagnosis, and CT appearance using plain scans and contrast – enhanced scans of the kidneys:
   a. Hydronephrosis
   b. Pyonephrosis
   c. Urolithiasis

11. Given the following vascular processes involving the kidneys, differentiate based on CT characteristics, differential diagnosis, and CT appearance using contrast – enhanced scans and plain scans:
   a. Renal artery stenosis
   b. Renal infarction
   c. Renal vein thrombosis

12. Identify the following conditions as being congenital anomalies of the kidney:
   a. Agenesis
   b. Aplasia
   c. Lubar dysmorphism
   d. Malposition (ectopia and ptosis)
   e. Dystopia
   f. Horseshoe kidneys

13. Given the preceding congenital variations (anomalies) of the kidneys, describe the appearance in computed tomography imaging.

Abdomen – Adrenal Glands (L)

1. Given hyperplasia and the following tumors of the adrenal cortex, describe their manifestation on both plain and contrast – enhanced CT images:
   a. Adrenocortical hyperplasia
   b. Adrenocortical adenoma
   c. Adrenocortical carcinoma
   d. Nonfunctioning adenoma

2. Given the following adrenal medullary tumors, describe the lesion and its manifestation on both plain and contrast enhanced CT images.
   a. Myelolipoma
   b. Pheochromocytoma
   c. Pheochromoblastoma
   d. Neuroblastoma

3. Identify the various origins (primary malignant sites) of metastases into the adrenals.

4. Describe the CT appearance of metastases into the adrenals.

5. Describe the CT appearance of adrenal cysts.
6. Identify the following as being primary causes of adrenal hemorrhage:
   a. Blunt trauma
   b. Coagulopathy
   c. Anticoagulant therapy
   d. Malignant hypertension
   e. Septic abortion
   f. Toxicemia
   g. Organ transplantation

7. Identify the following conditions as primary causes of inflammatory adrenal enlargement.

8. Describe the CT appearance of:
   a. Florid stages of inflammation
   b. Healed granulomatous infection

9. List various reasons for hypoplastic atrophy of the adrenal glands.

**Urinary Bladder (L)**

1. Describe the CT appearance of the bladder empty, fully distended, and filled with contrast medium.

2. Identify the following as being causes for displacement of the bladder:
   a. Tumors of female genitalia
   b. Prostatic lesions
   c. Tumors and abnormal masses in the intestines (especially sigmoid colon and rectum)
   d. Aneurysms in pelvic vessels
   e. Primary and secondary tumors of bony pelvis
   f. Pelvic lipomatosis
   g. Neurofibromatosis

3. Identify the following as being anomalies of the bladder:
   a. Persistent urachus
   b. Bladder diverticula

4. Describe the CT manifestation of:
   a. Acute infections of the bladder
   b. Chronic infections of the bladder

5. Describe the use of CT in staging malignant tumors of the bladder.

6. Describe the various types of malignant and benign tumors of the bladder as to their manifestation using plain CT scans and contrast – enhanced CT scans.

**Prostate and Seminal Vesicles (L)**

1. Given CT scans of the male pelvis, identify the following structures:
   a. prostate
   b. seminal vesicle
   c. testes
   d. urethra
   e. urinary bladder
   f. rectum

2. Describe prostatic cysts as to a description of the lesion and its manifestation on both plain and contrast enhanced CT images.

3. Describe prostatic adenomas as to a description of the lesion and its manifestation on both plain and contrast enhanced CT images.

4. Differentiate between benign prostatic hyperplasia and prostatic carcinomas.

5. Describe location, size, and sites of invasion of prostatic carcinomas.

6. Describe signs and symptoms of prostatic infections.

7. Describe prostatic infections on both plain and contrast enhanced CT images. Define agenesis of the seminal vesicles.

8. Differentiate between various diseases of the seminal vesicles:
   a. agenesis
   b. cysts
   c. abscesses
Female Genital Organs (L)
1. Given CT images of the female pelvis identify the following structures:
   a. vagina
   b. ovary
   c. rectum
d. round ligament of the uterus
e. urinary bladder
f. uterine corpus
g. recto-uterine pouch
h. uterine cervix
2. Describe the various types of uterine tumors as to a description and its manifestation on both plain and contrast enhanced CT images:
   a. myomas
   b. carcinoma of the body of the uterus
c. recurrent malignant uterine tumors
3. Describe carcinoma of the cervix as to a description of the lesion and its manifestation on both plain and contrast enhanced CT images.
4. Explain how a good overview of the cervical region can be obtained with CT imaging as related to patient considerations.
5. Describe the different stages of carcinomas of the cervix.
6. Describe the various types of ovarian tumors as to a description of the lesion and its manifestation on both plain and contrast enhanced CT images:
   a. cysts
      1) functional cysts and retention cysts
      2) neoplastic cysts
      3) dermoid cysts
   b. cystic solid and solid tumors of the ovary
      1) tumors of the germinal epithelium
      2) tumors of the ovarian stroma
      3) germ cell tumors
7. Describe the various types of inflammatory processes of the female pelvis and its manifestation on both plain and contrast enhanced CT images:
   a. uterine inflammation
   b. adnexal inflammation
c. parametrial inflammation

Retroperitoneal Cavity (L)
1. Given CT images of the retroperitoneal cavity identify the following structures:
   a. retroperitoneal vessels
   b. retrocrural space
c. diaphragm
d. fascial spaces of the retroperitoneal
e. subperitoneal fascial spaces
f. lymph nodes
2. Describe peri-and pararenal lesions as to a description of the lesion and its manifestation on both plain and contrast enhanced CT images:
   a. exudative hemorrhagic lesions of the perirenal space
   b. urinomas (perirenal pseudocyst)
c. perirenal hematoma
d. solid perirenal lesions
e. lesions in the anterior pararenal space
f. lesions in the posterior pararenal space
g. lesions in the subperitoneal space
h. lesions not bound by compartmental fascia
   1) primary retroperitoneal fibrosis
   2) secondary retroperitoneal fibrosis
   3) pelvic fibrolipomatosis
   4) malignant lymphoma
   5) lymph node metastases
   6) benign lymphadenopathies
   7) primary retroperitoneal tumors

3. Define the following vascular lesions of the retroperitoneal cavity and describe their appearance on CT images:
   a. aneurysms
   b. aortic trauma
   c. anomalies of the IVC
   d. thrombosis of the IVC (including pelvic veins)

Muscles Tissue (L)
1. Define progressive muscular dystrophy.
2. Describe how progressive muscular dystrophy is characterized on plain CT images.
3. Given various inflammatory muscular diseases of the muscle tissue, describe the condition and its manifestation on both plain and contrast enhanced CT images:
   a. pyogenic myositis
   b. sarcoidosis
   c. polymyositis
4. Describe muscular hematomas as to a description of the lesion and its manifestation on both plain and contrast enhanced CT images.
5. Describe the appearance of myositis ossificans on CT images.

Soft Tissue Tumors (L)
1. List various types of tissues found in the human body.
2. Describe the appearance of a lipoma on both plain and contrast enhanced CT images.
3. Given a list of benign and malignant tumors, properly place the tumor in the correct tissue type category.
4. Give examples of benign tumors of:
   a. fatty tissue
   b. muscle tissue
   c. blood vessels
   d. lymph vessels
   e. synovial tissue
   f. mesothelial tissue
   g. mesenchymal tissue
   h. bone and cartilage
   i. autonomous ganglia
   j. paraganglionic tissue
   k. peripheral nerves
5. Give examples of malignant tumors of:
   a. fatty tissue
   b. muscle tissue
   c. blood vessels
   d. lymph vessels
   e. synovial tissue
   f. mesothelial tissue
   g. mesenchymal tissue
   h. bone and cartilage
   i. autonomous ganglia
   j. paraganglionic tissue
Bone Tumors (L)

1. State the diagnostic data CT images can provide about bone tumors.
2. State another imaging modality which is the primary imaging modality for differential diagnosis of bone tumors.
3. Given various tumors of the bone describe the condition and manifestation on CT images:
   a. chondrogenous tumors
   b. osteogenic tumors
   c. fibrous tumors
   d. myelogenic tumors
4. Define reticulum cell sarcoma.
6. Describe the appearances of hemangiomas of bone on both plain and contrast enhanced CT images.
7. Discuss the utilization of CT imaging for giant cell tumors.

The Spine (L)

1. Given CT scans of the spine at varying levels identify the following structures:
   a. vertebral body
   b. root of the arch
   c. superior articular process
   d. inferior articular process
   e. transverse process
   f. spinous process
   g. intervertebral joint
   h. thecal sac
   i. lateral recess
2. Describe degenerative spinal diseases as to a description of the lesion and its manifestation on both plain and contrast enhanced CT images:
   a. degenerative processes in intervertebral discs
   b. disc herniation and prolapse
   c. post-op recurrent herniation
3. Discuss the three basic types of disc herniation according to their location:
   a. medial herniation
   b. mediolateral herniation
   c. lateral herniation
4. Describe spondlarthrosis of the spine as to a description of the lesion and its manifestation on both plain and contrast enhanced CT images.
5. Describe spondylosis of the spine as to a description of the lesion and its manifestation on both plain and contrast enhanced CT images.
6. Describe spinal stenosis of the spine as to a description of the lesion and its manifestation on both plain and contrast enhanced CT images.
7. Describe spinal injuries as to a description of the lesion and its manifestation on both plain and contrast enhanced CT images:
   a. impacted compression fracture
   b. incomplete burst fracture
   c. complete burst fracture
   d. chance fracture-distraction trauma
   e. flexion-distraction trauma
   f. translation injuries
   g. atlanto-occipital dislocation
   h. atlanto-odontoid subluxation
   i. rotary atlantoaxial dislocation
   j. fractures of the atlas
   k. dens fracture
1. fractures of the arch of the axis
2. fracture of the cervical arches and articular processes of the middle and lower cervical spine and lower cervical spine (C3-7)

8. Describe vertebral tumors and tumor-like lesions as to a description of the lesions and its manifestation on both plain and contrast enhanced CT images.

9. Describe intraspinal masses as to a description of the lesions and its manifestation on both plain and contrast enhanced CT images:
   a. congenital masses
   b. acquire masses

10. Describe spondylitis - spondylodiscitis as to a description of the lesions and its manifestation on both plain and contrast enhanced CT images.

The Bony Pelvis (L)
1. Given CT scans of the bony pelvis identify the following structures:
   a. wing of the ilium
   b. promontory
   c. sacral canal
   d. sacro-iliac joints
   e. sacral foramen of the pelvis
   f. sacrum
   g. head of the femur
   h. anterior column of the acetabulum
   i. posterior column of the acetabulum
   j. tuberosity of the pubis
   k. neck of the femur
   l. greater trochanter
   m. symphysis
   n. coccyx
   o. femur

2. List the three therapeutic and prognostic criteria used to classify pelvic fractures.

3. Describe pelvic trauma of the bony pelvis as to a description and its manifestation on plain CT images:
   a. fractures of the posterior pelvic girdle
   b. acetabular fracture

4. Describe coxitis as to a description and its manifestation on both plain and contrast enhanced CT images.

5. Describe sacroilitis as to a description and its manifestation on both plain and contrast enhanced CT images.

CT EXAMINATION OF THE TOTAL BODY

Head (I, K, L, M)
1. Give indications for CT examination of the brain and face.

2. Given an anatomic region of the head or face assess the examination based on the following:
   a. Patient/Equipment Preparation
   b. Patient Positioning
   c. Scan Technique
      1) Scout
      2) Slice Thickness
      3) Spacing
      4) Matrix
      5) mAs and kVp
      6) Display Field of View
      7) Contrast /No Contrast
      8) Algorithm
9) Filming and Post-Processing
3. Recognize diseases/traumatic processes of the head and face and describe how the effects of disease and injury are shown in CT imaging.
4. Critique the special procedures used in computed tomography relative to their value in the diagnosis and treatment of diseases of the brain and face.

**Neck (I, K, L, M)**
1. Give indications for CT examination of the Neck.
2. Assess CT examination of the soft tissue of the neck based on the following:
   a. Patient/Equipment Preparation
   b. Patient Positioning
   c. Scan Technique
      1) Scout
      2) Slice Thickness
      3) Slice Spacing
      4) mAs and kVp
      5) Matrix
      6) Display Field of View
      7) Contrast/No Contrast
      8) Algorithm
      9) Filming and Post-Processing
3. Recognize disease/traumatic processes of the neck and describe how the effects of disease or injury are shown in CT imaging.
4. Critique the special procedures used in CT relative to their value in the diagnosis and treatment of diseases of the neck.

**Spine (I, K, L, M)**
1. Give indications for CT examination of the spine including CT examination of post-myelography spine.
2. Assess CT examination of the spine based on the following:
   a. Patient/Equipment Preparation
   b. Patient Positioning
   c. Scan Technique
      1) Scout
      2) Slice Thickness
      3) Slice Spacing
      4) mAs and kVp
      5) Matrix
      6) Display Field of View
      7) Contrast/No Contrast
      8) Algorithm
      9) Filming and Post-Processing
3. Recognize diseases/traumatic processes of the spine and describe how the effects of disease or injury of the spine are shown in CT imaging.
4. Critique the special procedures used in CT relative to their value in the diagnosis and treatment of diseases of the spine.

**Musculoskeletal (I, K, L, M)**
1. Give indications for CT examination of the musculoskeletal system.
2. Explain the scanning of opposite normal anatomy when performing CT examination of the musculoskeletal structures.
3. Given a particular structure of the musculoskeletal system, assess the examination based on the following:
   a. Patient/Equipment Preparation
   b. Patient Positioning
c. Scan Technique
   1) Scout
   2) Slice Thickness
   3) Slice Spacing
   4) mAs and kVp
   5) Matrix
   6) Display Field of View
   7) Contrast/No Contrast
   8) Algorithm
   9) Filming and Post-Processing

4. Recognize diseases/traumatic processes of the musculoskeletal system and describe how the effects of disease and injury are shown in CT imaging.

5. Critique the special procedures used in computed tomography relative to their value in the diagnosis and treatment of diseases of the musculoskeletal system.

**Chest, Mediastinum, Lung (I, K, L, M)**

1. Give indications for CT examination of the chest, mediastinum and lungs.
2. Given an anatomic region of the chest, mediastinum and lung, assess the CT examination based on the following:
   a. Patient/Equipment Preparation
   b. Patient Positioning
   c. Scan Technique
      1) Scout
      2) Slice Thickness
      3) Slice Spacing
      4) mAs and kVp
      5) Matrix
      6) Display Field of View
      7) Contrast/No Contrast
      8) Algorithm
      9) Filming and Post-Processing
   3. Recognize diseases/traumatic processes of the chest, mediastinum and lungs and describe how the effects of disease and injury are shown in CT imaging.
   4. Critique the special procedures used in computed tomography relative to their value in the diagnosis and treatment of diseases of the chest, mediastinum and lungs.

**Abdomen and Abdominal Organs (I, K, L, M)**

1. Give indications for CT examination of the abdomen in general and individual abdominal structure in particular.
2. Given an anatomic organ of the abdomen, assess the examination based on the following:
   a. Patient/Equipment Preparation
   b. Patient Positioning
   c. Scan Technique
      1) Scout
      2) Slice Thickness
      3) Slice Spacing
      4) mAs and kVp
      5) Matrix
      6) Display Field of View
      7) Contrast/No Contrast
      8) Algorithm
      9) Filming and Post-Processing
   3. Recognize diseases/traumatic processes of the abdominal organs and describe how the effects of disease and injury are shown in CT imaging.
4. Critique the special procedures used in computed tomography relative to their value in the diagnosis and treatment of diseases of the abdominal organs.

**Pelvis – Bladder, Rectum, Male/Female Reproductive Organs (I, K, L, M)**

1. Give indications for CT examination of the pelvis in general and the individual pelvic organs in particular.

2. Given an anatomic organ of the pelvis, assess the examination based on the following:
   a. Patient/Equipment Preparation
   b. Patient Positioning
   c. Scan Technique
      1) Scout
      2) Slice Thickness
      3) Slice Spacing
      4) mAs and kVp
      5) Matrix
      6) Display Field of View
      7) Contrast/No Contrast
      8) Algorithm
      9) Filming and Post-Processing

3. Recognize diseases/traumatic processes of the pelvis and pelvic organs and describe how the effects of disease and injury are shown in CT imaging.

4. Critique the special procedures used in computed tomography relative to their value in the diagnosis and treatment of diseases of the pelvis and pelvic organs.

**Special Procedures (M)**

1. Explain the following methods used in 3-D CT imaging:
   a. Surface Rendering
   b. Volumetric Rendering

2. Describe clinical applications of 3-D CT imaging and give disadvantages of these procedures.

3. Define stereotaxis.

4. Describe the clinical applications of stereotaxis.

5. Describe the application of CT in biopsies, aspiration, and drainage.

6. Describe the special requirements of radiation treatment planning using computed tomography.

**Required Assessments:**

A. **Assessment Names and Descriptions:** Each student will be required to be present in class, complete reading assignments, study guide activities, and written examinations. Mastery level for each unit examination must be 75% or greater.

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<th>CSLO/Assessment Alignment:</th>
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<tr>
<td><strong>Course</strong></td>
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<tr>
<td><strong>CSLO 11</strong></td>
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<td><strong>Major test 4, quiz 5-7, final exam</strong></td>
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Grading Scale or Policy, Weekly Outline, Topics, or Instructional Activities:

(1) 60% of Mean Average of Unit Tests and 500 word paper
(2) 20% of Mean Average of Study Guide Activities, other Homework Assignments
(3) 20% of Final Examination