**DAY 1 Anatomy,** **Radiation Safety, Contrast, Protocols**

AIM: Identify the major organs in the abdomen and pelvis, their corresponding venous and arterial anatomy and normal imaging appearance.

**ANATOMY**

* + Basic Anatomy <https://www.youtube.com/watch?v=r6FXMZJGecg&t=533s>
  + Advanced anatomy Part 1 <https://www.youtube.com/watch?v=A6JTfjkJT-c&t=410s>
  + Advanced anatomy Part 2 <https://www.youtube.com/watch?v=5YUnDShI0Cg>
  + Advanced Anatomy Part 3 <https://www.youtube.com/watch?v=y9cHboxdOC0>
  + Advanced CT Anatomy: <https://www.youtube.com/watch?v=Nnr4ZB8e4nc&t=906s>
  + HFU, Window, contrast timing Practical Intro to CT: <https://www.youtube.com/watch?v=VnpqylFYtqI&t=745>s
* Identify and trace the biliary pathway and pancreatic duct anatomy and their variants
  + Gall bladder anatomy: <https://www.youtube.com/watch?v=uQ7Yn40mEP0>
  + Bile duct variants: <https://radiopaedia.org/cases/biliary-tree-anatomical-variant-biliary-trifurcation-2>
  + Pancreatic duct variants: Image <https://www.google.com/search?q=pancreatic+duct+anatomy+variants+radiology&rlz=1C1CHBF_enUS924US924&sxsrf=ALeKk00uthKZQR0OFCTOjaQ8G44-GD-C-w:1614283909735&tbm=isch&source=iu&ictx=1&fir=2V7hzCTHIbE85M%252CqKJTGD3BgRZGbM%252C_&vet=1&usg=AI4_-kQwBT3XCaAV9hzbvIvQQED2XW5now&sa=X&ved=2ahUKEwiLhIaY7IXvAhXTHzQIHZB8CrsQ9QF6BAgKEAE&biw=1006&bih=704&dpr=2.5#imgrc=2V7hzCTHIbE85M>
* Identify adrenal gland and trace the ureter from the kidneys to the bladder
  + Renal anatomy <https://www.youtube.com/watch?v=AZxgHXnzGy4>
  + Retroperitoneaum <https://www.youtube.com/watch?v=3e1eKPzjWkE&list=PLMoHC7ioYlMa19fyt5ZwRkJN3Vqi98pvJ&index=1>
  + Detailed renal findings CT and US part 1 <https://www.youtube.com/watch?v=STjO4x21-h4>
  + Detailed renal findings CT and US part 2 <https://www.youtube.com/watch?v=_gYhROv60zY>
  + Detailed renal findings CT and US part 3 <https://www.youtube.com/watch?v=76IWH2ZcUYI>
* Identify the appendix and its various locations.
  + <https://www.youtube.com/watch?v=DBYg9B1Xg7s>
* Spaces of the peritoneum
  + Peritiums <https://www.youtube.com/watch?app=desktop&v=FrqnzyXdFQM>
  + <https://pubs.rsna.org/doi/full/10.1148/rg.322115032>
  + https://www.sciencedirect.com/science/article/pii/S221156841400206X
* Lymph node stations
  + <https://www.youtube.com/watch?v=PTBLRNiECYw>
* CT Windows, Levels, and densities
  + [(32) CT windows, levels and densities SHORT VERSION - YouTube](https://www.youtube.com/watch?v=4pb1f79h7_I)

**RADIATION SAFETY, CONTRAST, PROTOCOLS**

* CT Contrast and/or Non-Contrast Imaging, Protocols, Contraindications,
  + [Radiographic Contrast Media || Radiology Buzz - Bing video](https://www.bing.com/videos/search?q=positive+vs+negative+oral+contrast+ct&ru=%2fvideos%2fsearch%3fq%3dpositive%2520vs%2520negative%2520oral%2520contrast%2520ct%26qs%3dn%26form%3dQBVR%26sp%3d-1%26pq%3dpositive%2520vs%2520negative%2520oral%2520contrast%2520ct%26sc%3d0-37%26sk%3d%26cvid%3dA4C7978567EE422CAF35A739F17171FD&view=detail&mid=41FC179CEF8E7308E42041FC179CEF8E7308E420&&FORM=VDRVRV)
  + [Contraindications of CT Scan and MRI Scan || Radiology Buzz - Bing video](https://www.bing.com/videos/search?q=cONTRAST+CONTRAINDICATION+CT+SCAN+YOUTUBE&&view=detail&mid=917E75A16DAC646BA589917E75A16DAC646BA589&&FORM=VDRVSR)
  + [Contrast or non-contrast CT? Which one to order? - Bing video](https://www.bing.com/videos/search?q=cONTRAST+CONTRAINDICATION+CT+SCAN+YOUTUBE&docid=608007111127738093&mid=C469DEA784FF2241D636C469DEA784FF2241D636&view=detail&FORM=VIRE)
  + Radiology Assistant: <https://radiologyassistant.nl/more/ct-protocols/ct-contrast-injection-and-protocols>
  + ACR contrast Media: [Contrast\_Media.pdf (acr.org)](https://www.acr.org/-/media/ACR/Files/Clinical-Resources/Contrast_Media.pdf#page=7)
  + ACR Appropriateness Criteria: [ACR Appropriateness Criteria® | American College of Radiology](https://www.acr.org/Clinical-Resources/ACR-Appropriateness-Criteria)
* Radiation Safety:
  + [Patient Safety - Radiation Dose in X-Ray and CT Exams (radiologyinfo.org)](https://www.radiologyinfo.org/en/info/safety-xray)
  + Radiation Dose Chart: [Dose-Reference-Card.pdf (acr.org)](https://www.acr.org/-/media/ACR/Files/Radiology-Safety/Radiation-Safety/Dose-Reference-Card.pdf)

**INTERACTIVE TEACHING FILES:**

**At the completion of the videos and review of teaching files the student should be able to:**

1. **Identify the major organs listed below in the axial and at least one additional plane (coronal and/or sagittal):**

Liver  
Spleen  
Gallbladder  
Pancreas  
Adrenals  
Kidneys  
Bladder  
Uterus  
Ovaries  
Cervix  
Prostate  
Seminal vesicles  
Scrotum, testicles  
Heart  
Diaphragm  
Pleura

1. **Bowel: The student should be able to track the stomach, duodenum and large bowel and rectum from the Cecum to anus.**
2. **Identify the appendix when present**.
3. **Track the arteries and venous structures listed below**:

Aorta and iliac bifurcation  
Celiac axis origins and branches proximal branches  
SMA and IMA origin  
Rt and left Common, internal, and external Iliac arteries, bilateral Common femoral arteries  
Inferior vena cava,   
Renal veins bilateral   
left and right common, external and internal iliac veins and common femoral veins  
Portal Veins into liver and at Portal vein confluence splenic vein and superior mesenteric vein  
Hepatic veins to the intrahepatic portion of the IVC  
Hepatic artery

1. **BILIARY AND PANCREATIC DUCTS:**  
   Main Pancreatic duct and/or pancreatic duct anomaly when present  
   Common bile duct, common hepatic duct and proximal intrahepatic ducts, cystic duct
2. **FACIAL PLANES: Learn the various spaces and mesenteries of the abdomen and pelvis:**Peritoneal cavity  
   Retroperitoneal Spaces  
   Omentum

Pelvic compartments (anterior, Middle and Posterior compartment)

1. **BONES:**  
   Vertebral segments (lower thoracic-lumbar segments)  
   Number the ribs posteriorly  
   Identify the SI joint, pubic symphysis and bilateral hips
2. **PROTOCOLS/ORAL AND IV CONTRAST EXAMINATIONS**

Please watch any/all of the videos provided in this document and be prepared to discuss which scenarios contrast is of benefit; not necessary; and contraindicated

1. **RADIATION SAFETY**

Please watch any/all of the videos and/or PDF’s provided as attachments in this lesson plan and be prepared to identify one or two resources when confronted with questions regarding radiation exposure. Learn about Image Gently and Image Wisely.

Reference Material:

**CT density of Typical Body Fluids (Hounsfield Units). Learn HFU; applications & ability for CT to distinguish fluids.**