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| 1 | Course title | Radiology  |
| 2 | Course number  |  2 |
| 3 | Course hours  | 30 |
| 4 | Prerequisites | Graduated from 4th stage  |
| 5. | Awarding institution | The University of Al-Qadisiyah |
| 6 | Faculty | Medicine |
| 7 | Department  | Surgery |
| 8 | Level of course | Bachelor |
| 9 | Year of study | 2022- 2023 |
| 10 | Language of Instruction | English |
| 11 | Courses Coordinator | Ass. Prof. Dr .shiamaa A kadhum  |
| 12 | Corse description  | The course teach the student the basics of the radiology by which the student can know the general uses of main radiological modalities and headlines of radiological appearances of different diseases in these modalities which are essential to know in his future medical career .  |
| 13 |  Number of teaching staff  |  6 teachers ( 1 Prof , 3 ass. Prof and 2 lecturers )  Asiss. Prof Dr. Khalil al umeri Prof. Dr amjaad majeedAssis Prof Dr . Najat AdelAsiss Prof Dr shaimaa A. kadhum Lecturer Dr . maal Anwer kadhum Lecturer Dr. Doaa Faris  |
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| **Item**  | Lecture 1  |
| **Subject**  | Introduction / basic principles in radiology  |
| **Learning objectives**  | To understand :Physics of X-ray and different imaging modalities .Discussion about the radiation hazards and how to protect the patients from these hazards  |
| **Content**  | Introduction : X-ray production and absorption .physics of X-ray , CT scan , ultrasound and MRI .Radiation hazards and protection . |
| **Time**  | 1 hour  |
| **Lecturer**  | Dr. Kahlil Al – umeri  |
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| **Item**  | Lecture 2 |
| **Subject**  | Introduction for radiology of urinary system  |
| **Learning objectives**  | To understand :* Review of radiological anatomy of urinary system
* What are the different types, of radiological modalities used to evaluate the urinary system
* The normal appearance of different parts of urinary system in these modalities
* Main uses of each radiological modality in evaluation of urinary system
 |
| **content** | * Introduction
* Radiological Investigations of urinary system
* Ultrasound
* Pain film / KUB
* EU
* Urethrography
* Cystography

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| **Time**  | 1 hour  |
| **Lecturer** | Dr. Shaimaa A. kadhum  |
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| **Item**  | Lecture 3  |
| **Subject**  | Continue for introduction of urinary stem  |
| **Learning objectives**  | To understand :* Normal appearance of urinary system in CT , MRI , radio radionuclide studies
* main uses of previous modalities
* Review images for radiological appearance of urinary system

In CT , MRI and isotope scan  |
| **content** | * Computed tomography in urinary system , uses and normal appearance of urinary system
* MRI in urinary system , the main uses and normal appearance
* Radionuclide studies in urinary system
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| **Time**  | 1 hour  |
| **Lecturer** | Dr. shaimaaa A. kadhum  |
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| **Item**  | Lecture 4 |
| **Subject**  |  Congenital variations of urinary system  |
| **Learning objectives**  | To understand :* The types of congenital variations of urinary system
* The clinical significance of each type
* The radiological appearance of different and most common types of congenital variations of urinary system
 |
| **content** | * Ectopic kidney
* Rotated kidney
* Duplicated PCS
* Uretrocels
* Horseshoe kidney
 |
| **Time**  | 1 hour  |
| **Lecturer** | Dr. Shaimaa A. kadum  |
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| **Item**  | Lecture 5 |
| **Subject**  | Pathology of urinary system ( part 1 )  |
| **Learning objectives**  | To understand :* The radiological appearance of common disease in urinary system
* Methods for evaluation of stones and their types according to contents
* Techniques for evaluation of urinary tract obstruction and its possible causes What is the meaning and the causes of non visualized kidney in IVU
* Renal mass evaluation how to differentiate benign and malignant masses The area and depth of burns
 |
| **content** | * Urinary tract calculi
* Nephrocalcinosis
* Urinary tract obstruction
* Causes of obstruction according to the level
* PUJ obstruction in details as example for urinary tract obstruction
* Causes of non visualized kidney in IVU
* Renal mass evaluation
 |
| **Time**  | 1 hour  |
| **Lecturer** | Dr. Shaimaa A. kadhum  |
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| **Item**  | Lecture 6 |
| **Subject**  |  Continues Urinary tract pathology ( part 2 ) |
| **Learning objectives**  | To understand : •The radiological appearance of different types of urinary tracts infections •Radiological evaluation of urinary system trauma specially renal trauma • Radiological evaluation of renal failure • UB pathology regarding stones , tumor ,and obstruction and trauma  |
| **content** | * Pyelonephritis :radiological appearance in different modalities
* Nephric and Perinephric abcess
* Tuberculosis affecting urinary system
* radiological appearance of kidney in renal trauma
* radiological appearance of kidney in renal failure …
* Urinary bladder ( stone , tumor, obstruction )
* Types of bladder rupture
 |
| **Time**  | 1 hour  |
| **Lecturer** | Dr. Shaimaa A. kadhum  |
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| **Item**  | Lecture 7 |
| **Subject**  | Introduction to gasterointestinal tract Radiology |
| **Learning objectives**  | To understand : • Review of radiological anatomy of gasterointestinal tract.* Different types of imaging modalities used in evaluation of abdominal pathologies.
* Different plain abdominal film projections , and advantages of each one.
* Normal plain abdomen.
* How to differentiated between small and large bowel by plain abdominal film.
* Plain abdominal film to detect different pathologies.

  |
| **content** | * Introduction about different imaging modalities used to assessed abdominal pathologies.
* Advantages of plain abdominal film.
* Different types of abdominal x-ray positions (supine AP film, erect abdominal film, left lateral decubitus, CXR) and its indications.
* Types of intestinal obstruction ( large and small bowel obstruction) the causes and how to assessed and reaching the diagnosis.
* Mechanical vs functional obstruction.
* Types of large bowel volvulus .
* Toxic megacolon
* Causes of extraluminal air including pneumoperitonium.
* Cuses of abdominal calcification.
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| **Time**  | 1 hour  |
| **Lecturer** | Dr. Maal Anwer Kadhum |
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| **Item**  | Lecture 8 |
| **Subject**  | Contrast study in GIT |
| **Learning objectives**  | * knowledge about different types of contrast study
* imaging techniques: general principles.
* Review of endoscopy and transesophageal ultrasound.
* knowledge of esophageal pathologies and how to choice modality of image and reach diagnosis.
* Pathologies of stomach with imaging techniques.
 |
| **content** | * Types of contrast study
* Indications and contraindication for each types of contrast material.
* Abnormalities in abrium study.
* Esophageal abnormalities (strictures, masses, dilatation, webs , hernias)
* Stomach and duodenum (barium study, CT)
* Stomach and duodenal pathologies(peptic ulcer, tumoers, lymphoma, ect..)
* Imaging signs of diseases of small intestine (dilatation , narrowing , crohns disease
 |
| **Time**  | 1 hour  |
| **Lecturer** | Dr. Maal Anwer Kadhum. |
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| **Item**  | Lecture 9  |
| **Subject**  | Imaging techniques of large intestine |
| **Learning objectives**  | To understand: • imaging techniques (x ray , contrast study , CT, MRI)* Normal appearance of large intestine.
* Different pathologies of large intestine and how to choose tge best imaging modality.
 |
| **content** | * Normal appearance of colon.
* Imaginges of diseases of large intestine ( narrowing, dilatation, inflammatory bowel disese, ulcerative colitis,)
* Diverticular disease.
* Appendicitis.
* Pneumatosis coli.
* Intussusception.
* Hirschsprung disease.
* Colon polyps and tumors.
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| **Time**  | 1 hour  |
| **Lecturer** | Dr. Maal Anwer Kadhum. |
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| **Item**  | Lecture 10  |
| **Subject**  | Radiology of Hepatobilliary system  |
| **Learning objectives**  | To understand: • methods of imaging.* Knowledge about liver disease.
* Understand the basis of Ultrasound , CT, MRI in liver disease.
* Imaging techniques in biliary system ( ultrasound , ERCP. MRCP).
* Gall bladder diseases and best imaging modality in each pathology.

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| **content** | * Ultrasound of normal liver , and liver anatomical segment classification
* CT, MRI of liver.
* Liver masses
* Liver abscess
* Cirrhosis of liver and portal hypertension.
* Fatty infilteration of liver.
* ERCP and MRCP
* Gall stones.
* Cholecystitis.
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| **Time**  | 1 hour  |
| **Lecturer** | Dr. Maal Anwer Kadhum. |
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| **Item**  | Lecture 11  |
| **Subject**  | Radiology of pancreas and spleen |
| **Learning objectives**  | * Demonstrate imaging techniques in pancreatic diseases.
* How to diffrentiaited between acute and chronic pancreatitis.
* Pancreatic mass.
* Splenic trauma.
 |
| **content** | * Ultrasound of normal pancreas.
* Pancreatic masses.
* Acute pancreatitis.
* Chronic pancreatitis.
* Splenic trauma.
 |
| **Time**  | 1 hour  |
| **Lecturer** | Dr. Maal Anwer Kadhum. |
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| **Item**  | Lecture 12  |
| **Subject**  | Introduction of Respiratory system  |
| **Learning objectives**  | To know type of imaging of chest radiology Advantage & disadvantage of each oneNormal CXR in details |
| **content** | * CXR normal appearance
* CT scan of chest
* MRI of the chest
* Foroscopy of the chest
* US of the chest
* Isotopes of the chest
 |
| **Time**  | 1 hour  |
| **Lecturer** | Dr. Amjaad Majeed  |
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| **Item**  | Lecture 13  |
| **Subject**  | :Radiological sign of lung disease  |
| **Learning objectives**  | * To know the appearance of abnormal CXR
* To identify the caused of abnormal CXR
 |
| **content** | Air space filling (pulmonary oedema or consolidation ) . Pulmonary collapse (atelactasis ) . Spherical shadows . Line shadows ,Widespread small shadows .the presence of cavitations or calcification should be noted .  |
| **Time**  | 1 hour  |
| **Lecturer** | Dr . Amjaad Majeed  |
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| **Item**  | Lecture 14  |
| **Subject**  | Specific lung disease  |
| **Learning objectives**  | * To know the radiological appearance of different types of lung disease
 |
| **content** | * Pneumonia its type & their radiological appearance
* TB appearance in cxr & CT scan
* Primary , post-primary & military TB
* Hydatid cyst of the chest
* Complicated hydatid cyst
* Radiology of COPD
 |
| **Time**  | 1 hour  |
| **Lecturer** | Dr. Amjaad Majeed  |
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| **Item**  | Lecture 15 |
| **Subject**  | Pleura , mediastinum & hilum  |
| **Learning objectives**  | * To know the radiological appearance of pleura & mediastinum diseases & masses
* To differentiated pleura & mediastinal pathology from pulmonary pathology
 |
| **content** | * Pleural effusion
* Pneumothorax
* Localized & free pleural effusion
* Pleural masses
* Mediastinal masses
* Mediastinal shift
* Hilar enlargement
 |
| **Time**  | 1 hour  |
| **Lecturer** | Dr. Amjaad Majeed  |
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| **Item**  | Lecture 16  |
| **Subject**  | Lung tumors  |
| **Learning objectives**  | Radiological appearance of primary & secondary lung tumors  Sign of tumor spread Staging of the tumors |
| **content** | * Types of lung neoplasm
* Central bronchogenic carcinoma in CXR & CT scan
* Peripheral bonchogenic carcinoma in CXR & CT scan
* Sign of local & distance spread
* Sign of lung deposite from other primary
* Role of CT scan in diagnosis & staging of lung related tumor
 |
| **Time**  | 1 hour  |
| **Lecturer** | Dr. Amjaad Majeed  |
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| **Item**  | Lecture 17  |
| **Subject**  | Radiological anatomy of brain  |
| **Learning objectives**  | To understand:Radiological methods which used to investigation brain diseases. Radiolical appearance of normal brain tissue in CT scan and MRI .Induction of each modality in brain diseases  |
| **content** | * Radiological anatomy of skull.
* Meninges.
* Brain
* Ventricles
* Blood supply.
* Indications of plain X ray.
* Indications of CT scan .
* Indications of MRI
 |
| **Time**  | 1 hour  |
| **Lecturer** | Dr. Najat Adel Hashim |
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| **Item**  | Lecture 18  |
| **Subject**  | Intracranial hemorrhage  |
| **Learning objectives**  | To understand:• types of intracranial hemorrhage according to anatomical site.Radiological appearance of hemorrhage in different stages: acute, sub acute and chronic .Common causes of each types of hemorrhage.  |
| **content** | * Intracranial hemorrhage types : intra-axial and extra-axial.
* Types of extra-axial hemorrhage :
* extra dural hemorrhage , causes and radiological appearance in CT scan and MRI.
* Sub dural hemorrhage, causes and radiological appearance in CT scan and MRI.
* Sub arachniod hemorrhage, causes and radiological appearance in CT scan and MRI.
* Types of intracranial axial hemorrhage:
* Intracerebral hemorrhage, causes and radiological appearance in CT scan and MRI.
* Intra ventricular hemorrhage, causes and radiological appearance in CT scan and MRI.
 |
| **Time**  | 1 hour  |
| **Lecturer** | Dr. Najat Adel Hashim  |
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| **Item**  | Lecture 19 |
| **Subject**  | Brain infarction  |
| **Learning objectives**  | To understand:• what is ischaemic changes and brain infarction .Types of infarction. Common image modality use in investigation of infarction. Radiological appearance of infarction in different stages.  |
| **content** | * Defintion of stroke
* Ischaemic stroke , and it is types .
* Indications of CT scan and radiological signs different stages
* Indications of MRI and radiological signs in different stages.
 |
| **Time**  | 1 hour  |
| **Lecturer** | Dr . Najat Adel Hashim  |
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| **Item**  | Lecture 20  |
| **Subject**  |  Intracranial infections  |
| **Learning objectives**  | To understand:• types of intracranial infections according to anatomical site. Indications of radiological investigation. Radiological appearance of ech types of infection . |
| **content** | * Role of radiology in intracranial infections.
* Forming of intracranial infections : cerebritis ,brain abscess, encephalitis and meningitis.
* Radiological signs of intracranial infections forming,in CT SCAN and MRI.
* Complications of intracranial infections and radiological appearance in CT scan and MRI.
* Brain tuberculosis radiological signs and complications.
* Brain hydatid cyst radiological signs and complications.
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| **Time**  | 1 hour  |
| **Lecturer** | Dr . Najat Adel Hashim |
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| **Item**  | Lecture 21  |
| **Subject**  | Intracranial tumor  |
| **Learning objectives**  | To understand:Types of intracranial tumors .How can differentiate between intra-axial and extra-axial tumor mass .What images modality of choice for diagnosis and follow up tumor mass |
| **content** | * Roles of imaging diagnosis intracranial tumors.
* Types of intracranial tumores :
* Intra-axial tumors : primary tumors it is Gillman.
* Types of brain glioma and radiological signs in CT scan and MRI .
* Secondary tumor : Brain metastasis : radiological signs in CT scan and MRI.
* Extra axial tumor : Meningioma ,radiological signs in CT scan and MRI.
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| **Time**  | 1 hour  |
| **Lecturer** | Dr . Najat Adel Hashim  |
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| **Item**  | Lecture 22 |
| **Subject**  | Imaging of bone disease :  |
| **Learning objectives**  | To understand :Basic signs of bone diseases in X-rays .Role of other imaging modalities in musculoskeletal system.  |
| **Content**  |  Plain x-ray ( basic signs of bone diseases ) .CT scan (Indications of CT scan ) MRI ( technique , types of images , indications ) Ultrasound role in musculoskeletal diseases .Nuclear medicine bone scan ( Indications of bone scan) |
| **Time**  | 1 hour  |
| **Lecturer**  | Dr. Kahlil Al – umeri  |

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| **Item**  | Lecture 23 |
| **Subject**  | Imaging of bone disease : Bone tumors and Osteomyelitis :   |
| **Learning objectives**  | To understand :Bone tumors types and radiological features in different imaging modalities .Discussion about osteomyelitis .  |
| **Content**  | Types of bone tumors Types of primary tumors according to the cell of origin Radiological features of primary tumors Secondary bone tumors , sites of involvement .Osteomyelitis : organisms , spread , radiological features in different imaging modalities . |
| **Time**  | 1 hour  |
| **Lecturer**  | Dr. Kahlil Al – umeri  |

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| **Item**  | Lecture 24 |
| **Subject**  | Imaging of bone disease : Joints diseases . |
| **Learning objectives**  | To understand :Bone tumors types and radiological features in different imaging modalities .Discussion about osteomyelitis .  |
| **Content**  | Radiological anatomy of the joint in plain filmSigns of joint diseases by plain film , CT scan and MRI Radiological features of rheumatoid arthritis , osteoarthritis and gout . |
| **Time**  | 1 hour  |
| **Lecturer**  | Dr. Kahlil Al – umeri  |

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| **Item**  | Lecture 25 |
| **Subject**  | Imaging of bone disease : Spines |
| **Learning objectives**  | To understand :Bone tumors types and radiological features in different imaging modalities .Discussion about osteomyelitis .  |
| **Content**  | X-ray of cervical and Lumbar spines .Plain spine X-rays views Anatomy Stability lines Vertebral CT scan and MRI imaging Radiological pathological features . |
| **Time**  | 1 hour  |
| **Lecturer**  | Dr. Kahlil Al – umeri  |

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| **Item**  | Lecture 26 |
| **Subject**  | Imaging of bone disease : Spines |
| **Learning objectives**  | To understand :Bone tumors types and radiological features in different imaging modalities .Discussion about osteomyelitis .  |
| **Content**  | X-ray of cervical and Lumbar spines .Plain spine X-rays views Anatomy Stability lines Vertebral CT scan and MRI imaging Radiological pathological features . |
| **Time**  | 1 hour  |
| **Lecturer**  | Dr. Kahlil Al – umeri  |
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| **Item**  | **Lecture 27** |
| **Subject**  | Breast imaging |
| **Learning objectives**  | 1. Introduction to breast imaging
2. Overview of breast radiologic anatomy

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| **Content**  | 1. Discussing different imaging modalities used in breast assessment,
2. Their indications, limitations, advantages, and disadvantages, and when to request certain modalities
3. normal appearance on mammogram and ultrasound in different age groups clarifying the hormonal influence on breast appearance e.g: pregnancy, lactation, and menopause
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| **Time**  | 1 hour  |
| **Lecturer**  | Dr. Doaa Faris  |
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| **Item**  | **Lecture 28** |
| **Subject**  | Breast imaging |
| **Learning objectives**  | Learn how to characterize common breast pathologies, stressing on the ability to characterize them into benign and malignant ones relying on imaging, and clinical findings  |
| **Content** | 1. diffuse breast abnormality
2. focal lesions: cysts, fibroadenoma, and cancer
 |
| **Time**  | 1 hour  |
| **Lecturer**  | Dr. Doaa Faris  |
| **Item**  | **Lecture 29** |
| **Subject**  | Breast imaging |
| **Learning objectives**  | 1. breast screening program
2. Male breast
 |
| **Content**  | 1. Simplified overview of the breast screening program: indication, modalities, and commonly used lexicon
2. Male breast: normal appearance, gynecomastia, and cancer
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| **Time**  | 1 hour  |
| **Lecturer**  | Dr. Doaa Faris  |
| **Item**  | **Lecture 30** |
| **Subject**  | Para-nasal sinus imaging  |
| **Learning objectives**  | Learn the radiologic anatomy on different imaging modalities with brief discussion on commonly encountered pathologic process affecting the PNS |
| **Content**  | 1. Trauma
2. Infection
3. Neoplastic process
 |
| **Time**  | 1 hour  |
| **Lecturer**  | Dr. Doaa Faris  |

Chief of department

Prof. Dr. Adel Shaker Al-Tamimi

**The end**