Program of Study	**:**	General Medicine
Course	**:**	Radiology and Nuclear Medicine
Abbreviation	**:**	RAD/VA013
Schedule	**:**	24 hours of lectures
		46 hours of exercises
Course Distribution	**:**	4th year
Number of Credits	**:**	4
Course Form	**:**	Lectures, exercises

Lectures :

Teachers :
prof. MUDr. Miroslav Heřman, Ph.D.
prof. MUDr. Martin Köcher, Ph.D.
prof. MUDr. Marie Černá, Ph.D.
odb.as. MUDr. Eva Čecháková
doc. MUDr. Filip Čtvrtlík, Ph.D.
doc. MUDr. Zbyněk Tüdös, Ph.D.
odb.as. MUDr. Lucia Veverková, Ph.D.
doc. MUDr. Zuzana Sedláčková, Ph.D.
odb.as. MUDr. Jakub Čivrný
odb.as. MUDr. Jan Macek
MUDr. Radim Kovář
doc. MUDr. Stanislav Buřval, Ph.D.
doc. MUDr. Pavel Koranda, Ph.D.
prof. MUDr. Milan Kamínek, Ph.D.
odb. as. Mgr. Pavel Karhan
odb. as. MUDr. Libuše Quinn
doc. Marina Hodolič, MD, PhD

Study :
Block
Department of Nuclear Medicine: **7:30 – 9:45**
lecture room (building J3)

Department of Radiology: 10:00 – 13:00
lecture room (building A)

Block Date :
I.: 28. 11. – 09. 12. 2022
II.: 12. 12. – 23. 12. 2022
III.: 27. 02. – 10. 03. 2023
IV.: 08. 05. – 19. 05. 2023

Block Day		Subject	No. of Less.	Teacher
1	RAD NM	Basic radiologic techniques Introduction , Bone Imaging	1 2	Heřman Kamínek
2	RAD NM	Ultrasound, CT Physical Principles	1 2	Heřman Karhan
3	RAD NM	Magnetic resonance Nuclear Cardiology	1 2	Heřman Kamínek
4	RAD NM	Angiography Lung Imaging	1 2	Černá Kamínek
5	RAD NM	Interventional radiology Kidneys	1 2	Köcher Koranda
6	RAD NM	Imaging of the chest Gastrointestinal Imaging, Hematology	1 2	Heřman Koranda
7	RAD NM	Abdominal paging Infection and Inflammation	1 2	Köcher Quinn
8	RAD NM	Neuroradiology Neurology, Lymphoscintigraphy	1 2	Heřman Koranda
9	RAD NM	Imaging of the musculosceletal systém Endocrinology, Therapy	1 2	Köcher Koranda
10	RAD NM	Imaging of the urogenital systém Oncology	1 2	Heřman Hodolič

Exercises :

Leading Teacher : prof. MUDr. Miroslav Heřman, Ph.D.
doc. MUDr. Pavel Koranda, Ph.D.

Study : Block

Block Date :
I.: 28. 11. – 09. 12. 2022
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IV.: 08. 05. – 19. 05. 2023

Block Day		Subject	No. of Less.
1	NM RAD	Bone Imaging Radiologic techniques I.	1 3
2	NM RAD	Radiation protection. SPECT/CT, PET/CT Radiologic techniques II.	1 3
3	NM RAD	Nuclear Cardiology Visit of the department of radiology.	1 3
4	NM RAD	Lung Imaging Angiology and imaging of the cardiovascular system.	1 3
5	NM RAD	Kidneys Interventional radiology. Mammology.	1 3
6	NM	Radionuclide studies in gastroenterology and heamatology.	1 3

	RAD	**Imaging of the thorax.**	
7	**NM** **RAD**	**Scintigraphy in the detection of inflammations.** **Abdominal imaging.**	**1** **3**
8	**NM** **RAD**	**Sentinel lymf node detection** **Neuroradiology.**	**1** **3**
9	**NM** **RAD**	**Radionuclide examination in endocrinology.** **Radionuclide therapy.** **Imaging of the musculosceletal system.**	**1** **3**
10	**NM** **RAD**	**PET/CT** **Imaging of the urogenital tract.**	**1** **3**

Evidence Based Medicine principles will be used in topics Imaging of the thorax and Interventional radiology.

Completed by : Practicavit and examination

Requirements : Active attendance at at least 90% of exercises.

Practical image reading is 1/3 of examination.

Literature : Heřman M. et al.: Basics of Radiology. Vydavatelství Univerzity Palackého 2021

ISBN 978-80-244-5697-3

or

Rockall A.G, Hatrick A., Armstrong P., Wastie M:
Diagnostic Imaging, 7th Ed., Wiley-Blackwell Science Ltd., 2013. ISBN 978-0470658901

and

Mettler F.A. Jr, Guibertau MJ: Essentials of Nuclear Medicine Imaging . 6th Edition. Saunders Comp., 2012. ISBN 978-1-4557-0104-9

QUESTIONS IN RADIOLOGY FOR MEDICAL STUDENTS

1. X-ray properties, X-ray biological effects, basic principles of radiation protection
2. Basic technical principles and indications of X-ray, fluoroscopy and angiography
3. Basic technical principles and indications of ultrasonography
4. Basic technical principles and indications of computed tomography
5. Basic technical principles and indications of magnetic resonance (MRI, MRA, MRS, fMRI)
6. Contrast agents
7. Imaging methods in chest diseases (indications, technique)
8. Pulmonary infections (pneumonia, atypical pneumonia, pneumonia complications, tuberculosis, COPD)
9. Interstitial lung diseases (pneumoconioses, sarcoidosis, hypersensitivity pneumonitis, pulmonary fibrosis)
10. Tumours of the lungs and bronchi (bronchogenic carcinoma, lung metastases, intrathoracic lymphomas and leukaemias, benign lung tumours)

11. Diseases of pulmonary circulation (congenital anomalies, pulmonary embolism, pulmonary hypertension, pulmonary oedema)
12. Imaging of the heart and mediastinum (heart: congenital anomalies, heart failure, diseases of the valves, bacterial endocarditis, intracardiac expansions, ischemic heart disease, myocardial infarction, hypertension, pericardial diseases; mediastinum: expansions, mediastinitis)
13. Imaging of the pleura (pleural fluid, pneumothorax, pleural thickening, tumours), chest trauma
14. Imaging of musculoskeletal system (indications, technique)
15. Skeletal trauma (types of fractures, fracture healing, complications of fracture healing)
16. Trauma of the joints, muscles and tendons
17. Degenerative joint diseases
18. Inflammatory bone and joint disease (osteomyelitis, arthritis)
19. Tumours of the bones and soft tissue, other diseases of the musculoskeletal system (avascular necrosis, osteoporosis, Paget's disease, fibrous dysplasia)
20. Imaging of gastrointestinal tract (indications, technique)
21. Diseases of the pharynx and oesophagus (inflammations, retropharyngeal abscess, tumours, diverticula, achalasia, gastroesophageal varices, oesophageal perforation)
22. Diseases of the stomach and duodenum (inflammations, peptic ulcer disease, tumours, hiatal hernia, blunt trauma of the duodenum, duodenal diverticula)
23. Diseases of the small bowel (inflammation, malabsorption, tumours, Meckel's diverticulum)
24. Diseases of the colon (inflammation, tumours, diverticulosis, anorectal dysfunctions)
25. Imaging of the liver (steatosis, cirrhosis, portal hypertension, cysts, abscesses, tumours, trauma)
26. Imaging of the gallbladder and biliary tree (gallstones, choledocholithiasis, cholecystitis, cholangitis, tumours, icterus, postoperative complications)
27. Imaging of the pancreas a spleen (acute pancreatitis, chronic pancreatitis, pancreatic tumours, splenomegaly, trauma)
28. Acute abdomen
29. Genitourinary imaging (indications, technique)
30. Congenital anomalies and variations of the urinary system, nephrolithiasis, obstructive uropathy
31. Expansions and inflammations of the urinary system
32. Urinary system trauma, renovascular hypertension, transplanted kidney
33. Diseases of the prostate and testes
34. Adrenal glands, retroperitoneum
35. Imaging methods in neuroradiology (indications, technique)
36. Congenital anomalies and variations of the brain (indications of imaging methods), trauma of the skull and brain
37. Stroke
38. Tumours and inflammations of the brain and meninges, white-matter diseases, diseases of the vessels supplying brain, brain degenerative diseases
39. Diseases of the spine and spinal cord (trauma, tumours, degenerative and inflammatory diseases)
40. Head and neck diseases (indications of imaging methods, thyroid gland, parathyroid glands, lymphadenopathy, neck expansions,

tumours, paranasal sinuses, temporal bone, salivary glands, orbits, facial trauma)

41. Breast imaging (indication and technique of imaging methods, inflammations and tumours of the breast)
42. Female pelvis imaging (imaging during pregnancy, female infertility imaging, inflammations of the uterus and adnexa, endometriosis, cystic and tumorous expansions)
43. Imaging of the arterial diseases (indications and technique of imaging methods, diseases of the arteries supplying brain, peripheral system arteries and pulmonary arteries)
44. Imaging of diseases of the veins and lymphatic system (indications and technique of imaging methods, imaging of pathologic changes)
45. Vascular interventional radiology
46. Non-vascular interventional radiology
47. Paediatric radiology

QUESTIONS IN NUCLEAR MEDICINE FOR MEDICAL STUDENTS

1. Radiation detection in nuclear medicine. Principle of the scintillation detector. Instruments - gammacamera, SPECT, PET.
2. Characteristics of radionuclides and radiopharmaceuticals - physical half-life, emitted radiation and its energy, apyrogenity, sterility, radionuclidic and radiochemical purity. Principle of radionuclide generator. Frequently used radiopharmaceuticals, their distribution and kinetics in the body.
3. Biological effects of ionising radiation - stochastic and deterministic effects. Effective dose. Radiation protection of workers and patients in nuclear medicine.
4. Nuclear cardiology - stress techniques, diagnosis of coronary artery disease, prognostic value of cardiac gated SPECT imaging, myocardial viability assessment. First-pass radionuclide angiocardiography.
5. Perfusion and ventilation lung scintigraphy.
6. Radionuclide brain imaging.
7. Genitourinary tract: static and dynamic kidney scintigraphy, diuretic renography, detection of renovascular hypertension, cystography.
8. Evaluation of musculoskeletal system.
9. Evaluation of gastrointestinal tract and liver.
10. Radionuclide studies in hematology. Splenic scintigraphy. Bone marrow imaging.
11. Radionuclides in endocrinology.
12. Radionuclide therapies.
13. Nuclear oncology.
14. Sentinel lymph node detection and biopsy.
15. Detection of infection and inflammation.