Ministry of Science and Higher Education of the Russian Federation Ulyanovsk State University	The form	
F-Work program of the discipline		

APPROVED
by the decision of the Academic Council of the USU
Institute of Medicine, Ecology and Physical Culture
16.05.2024 Record No. 9/260
Chairman Mashin V.V. _____
(Signature, Name)
«16» 05 2024.

EDUCATIONAL PLAN

Subject	Radiation diagnostics
Faculty	Medical
Department	Oncology and radiation diagnostics im. O.P. Modnikova
Course	6

Speciality 31.05.01. «General medicine»
(code of the speciality, full name)

Form of education- full-time education

Date of introducing in the instruction process at USU: « 01 » of September 2024.

The program was updated at the meeting of the department: №___ of _____ 20___.
The program was updated at the meeting of the department: №___ of _____ 20___.
The program was updated at the meeting of the department: №___ of _____ 20___.
The program was updated at the meeting of the department: №___ of _____ 20___.
The program was updated at the meeting of the department: №___ of _____ 20___.

Information about the authors:

Initials	Department	Position, academic degree, scientific rank
Sharafutdinov M.G.	Oncology and radiation diagnostics	Head of the Department, Candidate of Medical Sciences, Associate Professor
MorozovV.S.	Oncology and radiation diagnostics	Candidate of Medical Sciences, Associate Professor
Matveeva L.V.	Oncology and radiation diagnostics	Candidate of Medical Sciences, Associate Professor

AGREED	AGREED
Head of the department of Oncology and radiation diagnostics im. O.P. Modnikova, implementing the discipline	Head of the graduating department of Hospital therapy
_____ / Sharafutdinov M.G. / *Signature* «16» 05 2024	_____ / Vize-Khripunova M.A./ *Signature* «16» 05 2024

GOALS AND OBJECTIVES OF LEARNING THE DISCIPLINE:

Objectives of mastering the discipline:

- the acquisition by students of knowledge on radiation diagnostics of diseases of various organs, systems of the human body, the study of the features of diagnostics and training in the correct and adequate use of the knowledge gained in the therapeutic and diagnostic process.
- formation of students' holistic understanding of the formation of radiation symptoms and syndromes in pathological changes in organs from the point of view of objectivity and completeness of obtaining information obtained using various methods of radiation diagnostics, taking into account the full scope of their use.
- forming students' stable motivation for a deep study of radiation manifestations of various diseases, with the aim of further applying the knowledge gained in the subsequent study of other clinical disciplines (therapy, surgery, general medicine, oncology, orthopedics and traumatology, etc.), as well as in the real practice of a doctor ...

Objectives of mastering the discipline:

- study and assessment of the main regulatory parameters;
- methods of protection against ionizing radiation;
- the study of X-ray terminology, the peculiarities of the skialogical picture of X-rays, the construction of a symptom complex of diseases;
- study and assessment of information about new achievements and prospects for the use of various methods of radiation diagnostics;
- study of possible errors in the practice of a specialist in radiation diagnostics.

2. PLACE OF DISCIPLINE IN THE STRUCTURE OF OPOP:

Discipline "Radiation diagnostics" refers to the basic part of the disciplines of the curriculum of the direction of training "General Medicine".

The study of the nature and biological effect of radiation is carried out at the departments of medical and biological physics, medical biology, pathological anatomy, and pathological physiology. The basics of radiation diagnostics are presented at the department

Oncology and radiation diagnostics in the 6th year. In the future, this information is deepened and consolidated during the passage of clinical disciplines (hospital therapy and surgery, obstetrics and gynecology, oncology, etc.), where the problems of private radiation diagnostics and endoscopy are considered in conjunction with specific issues of clinical diagnosis and treatment of patients. Thus, teaching students the basics of general and private radiation diagnostics and radiation therapy occurs throughout the entire 6 course.

Teaching "Radiation Diagnostics" is based on the knowledge gained in the course of studying the following disciplines:

Propedeutics of internal diseases **PC-2; PC-3**
General surgery. Introduction to the specialty **PC-2**
Pathological anatomy **PC-2; PC-3**
Dentistry **PC-2; PC-3**
Dermatovenerology **PC-2; PC-3**
Neurology, medical genetics, neurosurgery **PC-2, PC-3**
Otorhinolaryngology **PC-2; PC-3**
Pediatrics **PC-2**
Faculty Surgery **PC-2**
Obstetrics and gynecology **PC-2**
Ophthalmology **PC-2; PC-3**
Occupational diseases **PC-2**
Psychiatry, medical psychology **PC-2 PC-3**
Endocrinology **GPC-11 PC-2;**

Hospital therapy **PC-2;**
Infectious diseases **PC-2**
Traumatology, orthopedics **GPC-11; PC-3**
Polyclinic therapy **GPC-11; PC-2; PC-3**
Hospital surgery, pediatric surgery **PC-2; PC-3**
Phtisiology **PC-2**
Oncology, radiation therapy **GPC-11, PC-2;**
Radiation diagnostics **GPC-11; PC-2; PC-3**
Analysis of scientific text (obstetrics) **PC-2**
Analysis of scientific text (therapy) **PC-2**
Clinical psychology **PC-2**
Topical issues of gynecology **PC-2; PC-3**
Modern aspects of oncology **PC-2**
Topical issues of internal diseases **PC-3**
Urology and Andrology **PC-2**
Preparation for clinical practice **PC-3**
Therapeutic patient care **PC-3**
Junior medical staff assistant **PC-2**
Familiarization practice **PC-2**
Diagnostics and treatment of extrapulmonary tuberculosis **PC-2**
Surgical gastroenterology and endoscopy **PC-2**
Palliative medicine **PC-3**
Diabetology and emergency endocrinology **PC-3**
Topical issues of HIV infection **PC-2**
Clinical electrocardiography **PC-2**
Nurse assistant **PC-2**
Ward nurse Assistant **PC-2**
Practice for obtaining professional skills and professional experience in the positions of paramedical personnel **PC-2**
Diagnostic practice **PC-2**
Inpatient physician assistant **PC-2**
Outpatient clinic physician assistant **PC-3**
Preparation and passing of the state exam **GPC-11; PC-2; PC-3**

3. LIST OF PLANNED LEARNING OUTCOMES ON THE DISCIPLINE (MODULE), CORRELATED TO THE PLANNED OUTCOMES OF THE BASIC PROFESSIONAL EDUCATIONAL PROGRAM

Code and name of the implemented competence	The list of planned learning outcomes for the discipline (module), correlated with indicators of achievement (IA) of competencies
GPC-11 (capable to prepare and apply scientific, scientific production, design, organizational, managerial and regulatory documentation in health care system)	IA-1 (GPC-11) Know: maintaining standard of accounting and reporting medical documentation in medical organizations; fundamentals of the technique of translating a scientific text in a specialty, the basics of annotating and abstracting a scientific text; the main types of special dictionary and reference literature and the rules for working with it; science concept; classification of sciences; scientific research and its stages; methodological foundations of scientific knowledge, modern classification of diseases. IA-2 (GPC-11) Be able to: use databases for storing and using information in healthcare; use computer programs to solve problems of mathematical

	statistics in professional activities; interpret and use the data of the main instrumental examination methods (ECG, ultrasound, X-ray, ECHO CS, RF, FGDS, etc.), take an ECG on your own; correctly draw up the documentation. IA-3 (GPC-11) Possess: the basics of working on a personal computer, the ability to maintain medical records.
PC-2 (readiness to collect and analyze patient complaints, data from his anamnesis, examination results, laboratory, instrumental, pathological, anatomical and other studies in order to recognize a condition or establish the presence or absence of a disease)	Know: diagnostic methods, diagnostic capabilities of methods of direct examination of a patient of a therapeutic, surgical and obstetric-gynecological profile; modern methods of clinical, laboratory, instrumental examination of patients (including endoscopic, radiological methods, ultrasound diagnostics). Be able to: determine the patient's status - collect anamnesis, interview the patient and / or his relatives, conduct a physical examination of the patient (examination, palpation, auscultation); conduct a primary examination of systems and organs: respiratory, cardiovascular, blood and hematopoietic organs, digestive, endocrine and urinary; outline the volume of additional studies in accordance with the prognosis of the disease, to clarify the diagnosis and obtain a reliable result. Possess: methods of general clinical objective examination (questioning, examination, palpation, percussion, auscultation) for diseases of internal organs; interpretation of the results of laboratory, instrumental diagnostic methods for pathology of internal organs.
PC -3 (readiness to manage and treat patients with various nosological forms on an outpatient basis and in a day hospital)	Know: the criteria for the diagnosis of the most common diseases of internal organs. Features of the organization and scope of work of an outpatient clinic doctor, modern diagnostic capabilities of polyclinic service, methods of emergency measures, indications for planned hospitalization; features of the treatment of diseases of internal organs in an outpatient setting, incl. day hospital conditions. Be able to: formulate indications for the chosen method of treatment, taking into account etiotropic and pathogenetic agents; to develop an algorithm for the management of a patient's therapeutic profile in a polyclinic. Possess: an algorithm for determining the tactics of managing a patient with a therapeutic pathology, conducting a differential diagnosis in a therapeutic pathology.

4. TOTAL EMPLOYMENT OF THE DISCIPLINE

4.1. Discipline volume in credit units (total) 2 ZET

4.2. Discipline volume by type of academic work (in hours) 72 hours

Type of educational work	Number of hours (full-time education)	
	Total according to plan	Incl. by semester eleven
1	2	3
Contact work of students with the teacher in accordance with the UP	42	42

Auditory lessons:	42	42
lectures	10	10
Seminars and workshops	32	32
laboratory works, workshops	-	-
Independent work	30	30
Form of current control of knowledge and control independent work: testing, counter. work, colloquium, etc. (at least 2 types)	Oral survey	Oral survey
Course work	-	-
Types of intermediate certification (exam, test)	Offset	Offset
Total hours by discipline	72	72

4.3. Content of the discipline (module.) Distribution of hours by topics and types of academic work:
Full-time form of education

Title and sections and topics	Total	Types of training sessions					Knowledge current control form
		Auditory lessons			Interactive classes	Independent work	
		lectures	practical training, seminar	laboratory work			
1	2	3	4	five	6	7	8
Section 1. Radiology							
1. Introduction to Radiology.	4	2	2	-			Oral survey
2. X-ray diagnostics of diseases of the osteoarticular apparatus.	4		2	-	1	2	Oral survey
3. X-ray diagnostics of diseases of the respiratory system, heart and mediastinum	4		2	-		2	Oral survey
4. X-ray diagnostics of breast diseases. Benign tumors. Mastopathy. Mammary cancer.	5		2	-		3	Oral survey
5. Radiation diagnosis of diseases, esophagus, stomach, intestines.	5		2	-		3	Oral survey
Section 2. Radionuclide diagnostics							
6. Radionuclide diagnostics.	6	2	2	-		2	Oral survey
Section 3. Ultrasound diagnostics							
7. Fundamentals of ultrasound diagnostics. Radiation methods for examining the liver, gastrointestinal tract, pancreas.	6	2	2	-		2	Oral survey

8. Radiation methods of research of kidneys, bladder, prostate gland.	4		2	-		2	Oral survey
Section 4. CT diagnostics							
9. Basics of CT diagnostics. CT diagnostics of diseases of the brain and chest organs.	5	1	2	-	1	2	Oral survey, testing
10. CT diagnostics of diseases of the abdominal cavity, retroperitoneal space, small pelvis, musculoskeletal system.	4		2	-		2	Oral survey, testing
Section 5. MRI diagnostics							
11. Basics of MRI diagnostics. Diagnosis of diseases of the brain.	6	1	3	-	1	2	Oral survey, testing
12. Basics of MRI diagnostics. Radiation diagnosis of diseases of the breast, spine and spinal cord.	5		3	-		2	Oral survey, testing
Section 6. Radiation therapy							
13. Radiation therapy. Types of ionizing radiation and their sources. Radiation therapy methods. Radiosensitivity and radio modification.	8	2	3	-	1	3	Oral survey
14. Radiation therapy. Pre-ray period. Ray period. Post-radiation period. Complications of radiation therapy and control of them.	6		3	-		3	Oral survey
Total	72	10	32	-	4	30	

5. CONTENT OF THE DISCIPLINE (MODULE)

Section 1. Radiology.

Topic 1. Questions of general radiology. Features of the X-ray examination technique. X-ray diagnostics of diseases of the osteoarticular apparatus.

Content of the topic: What are X-rays, their properties. The history of the discovery, its essence, practical application. Classification of the main types of ionizing radiation. Conditions for the use of radiological research methods. Requirements for personnel, premises, work organization. The concept of "medical diagnostic image". Imaging system in radiation diagnostics. Image analysis system in radiation diagnostics. Computer processing of information in radiation diagnostics. The role and place of computer technology in modern medicine. Analog and matrix image. The principle of the X-ray examination method. What is the natural contrast of an organ and how an X-ray image is formed. Artificial contrasting of organs, its goals, objectives, ways of conducting, indications, contraindications, complications. What is

fluoroscopy and how is it performed, the frequency of application of the method. What is radiography, how is it carried out. Digital X-ray, principles, benefits. Special methods of X-ray examination, their purpose. Radiation anatomy of bones and joints, structural features. Radiation methods for studying bones and joints. X-ray anatomy of bone fractures. X-ray semiotics of focal and diffuse skeletal lesions

Topic 2. X-ray diagnostics of diseases of the osteoarticular apparatus.

Radiation anatomy of bones and joints, structural features. Radiation methods for studying bones and joints. X-ray anatomy of bone fractures. X-ray semiotics of focal and diffuse skeletal lesions

Topic 3. X-ray diagnostics of diseases of the respiratory system, heart, mediastinum.

Content of the topic: The concept of a shadow on an X-ray, their classification, the analysis system. Principles of formation of pathological changes in X-ray examination. X-ray anatomy of the lungs. Methods of X-ray examination of the lungs, the principle of image formation, indications for conducting. The main radiological syndromes of lung damage and the mechanism of their formation. Inflammatory diseases of the lungs in the x-ray image.

Radiation methods of heart research. The main radiation signs of heart damage. Radiation methods of research of vessels. Radiation signs of the main vascular pathology. Interventional radiology concept.

Topic 4 . X-ray diagnostics of diseases of the esophagus, stomach, intestines.

Content of the topic: Radiation methods for studying the esophagus Radiation anatomy and pathology of the esophagus. Radiation methods for studying the stomach and duodenum. Radiation anatomy and pathology of the stomach and duodenum. Radiation semiotics of diseases of the stomach and duodenum. Radiation methods for studying the intestines. Radiation semiotics of intestinal obstruction. Radiation semiotics of intestinal diseases

Topic 5 . X-ray diagnostics of breast diseases. Benign tumors. Mastopathy. Mammary cancer.

Topic content: Normal and variable radial anatomy of the mammary glands.

Research methods of the mammary glands. X-ray semiotics of breast diseases.

Features of radiation diagnosis of mammary glands with an implant. Radiation diagnosis of inflammatory diseases of the mammary glands: abscess, mastitis, lactostasis. Radiation diagnosis of inflammatory diseases of the mammary glands: specific inflammation, tuberculosis, syphilis, actinomycosis. Radiation diagnosis of breast injuries: hematoma, foreign bodies. Radiation diagnosis of benign breast diseases. Radiation semiotics. Radiation diagnostics of malignant diseases of the breast. Classification and staging. Radiation diagnostics of malignant diseases of the breast. Pathology of the zones of regional lymph outflow.

Radiation diagnosis of breast diseases in men.

Section 2. Radionuclide diagnostics.

Topic 6. Radionuclide diagnostics.

Topic content: Radionuclide, its characteristics. Scheme of radionuclide research. Indications for a radionuclide study. Radioprotective measures. Radionuclide imaging methods: scanning, scintigraphy, SPECT, advantages and disadvantages. Positron emission tomography method, field of application, difference from other methods of radionuclide diagnostics.

Section 3. Ultrasound diagnostics.

Topic 7. Physical and technical foundations of the ultrasonic research method.

Content of the topic: Physical properties of ultrasound. Ultrasonic device design. Principles of ultrasound research, features of the method. Ultrasound research methods: A, B, M, dopplerography.

Topic 8. Ultrasound diagnostics of superficially located structures.

Ultrasound diagnostics of thyroid diseases (cysts, goiter, benign and malignant tumors). Ultrasound diagnostics of breast diseases (fibrocystic disease, benign tumors). Ultrasound diagnostics of peripheral lymph node diseases (lymphadenitis, malignant lymphomas).

Topic 9. Ultrasound diagnostics of diseases of the cardiovascular system.

Content of the topic: Types of ultrasound examination of the heart. Ultrasound imaging of heart structures (atria, ventricles, valves). Congenital heart defects. Ultrasound diagnosis of vascular diseases of the head

and neck. Ultrasound diagnosis of vascular diseases of the upper and lower extremities. Ultrasound diagnostics of diseases of the abdominal aorta and its visceral branches.

Topic 10. Ultrasound diagnostics of diseases of the abdominal organs.

Content of the topic: Radiation diagnostics of diffuse liver lesions (hepatitis, fatty hepatosis, cirrhosis). Radiation diagnosis of focal liver lesions (cysts, abscesses, tumors). Ultrasound diagnostics of gallbladder diseases (malformations, calculous and acalculous cholecytitis, tumors). Differential diagnosis of jaundice in the study of the hepatobiliary system. Ultrasound diagnostics of pancreatic diseases (pancreatitis, cysts, tumors). Ultrasound diagnostics of spleen diseases (splenomegaly, trauma, tumor).

Topic 11. Ultrasound diagnostics of kidney and urinary tract diseases.

Content of the topic: Ultrasound diagnosis of kidney diseases (malformations, urolithiasis, inflammatory diseases, cysts, tumors). Ultrasound diagnosis of bladder diseases (urolithiasis, malformations). Ultrasound examination of the adrenal glands.

Section 4. X-ray CT diagnostics.

Topic 12. Physical and technical foundations of X-ray computed tomography.

Topic content: Principle of scanning. Image reconstruction. Display and documentation of images. Scan options. Types of tomographs. Detector types. Basic rules for reading computer tomograms. Preparing the patient for the study.

Topic 13. X-ray CT of the brain.

Content of the topic: X-ray CT diagnosis of hydrocephalus.

Neuroimaging of the bypass system and complications of bypass surgery.

Topic 14. X-ray CT of the brain

Topic content: CT-diagnostics of hemorrhage, trauma, tumors and non-tumor masses, inflammatory diseases (CMV, herpes, congenital toxoplasmosis, meningitis, encephalitis), vascular malformations.

Topic 15. X-ray CT of the brain.

Content of the topic: X-ray CT diagnosis of congenital malformations of the central nervous system: Arnold-Chiari anomaly; Dandy Walker's anomaly; holoporencephaly; hydranencephaly; congenital malformation of the vein of Galen; congenital cysts.

Topic 16. X-ray CT diagnostics of diseases of the organs of the mammary glue.

Content of the topic: Congenital malformations of the lungs and bronchi. Lung cysts. Tumors and cysts of the mediastinum. Infectious diseases (pneumonia, lung abscess, pleurisy, tuberculosis), pleural effusion.

Topic 17. X-ray CT diagnostics of diseases of the abdominal cavity, retroperitoneal space.

Topic content: CT signs of diffuse and focal liver pathology (hepatitis, cirrhosis, cysts, benign and malignant tumors), biliary tract (malformations, choledocholithiasis), pancreas (pancreatitis, cysts, tumors), spleen, adrenal glands, kidneys (pyelonephritis, urolithiasis, tuberculosis, tumors), hollow organs of the gastrointestinal tract. CT signs of specific and nonspecific lymphadenopathy. CT diagnostics of benign and malignant tumors of the retroperitoneal space.

Section 5. MRI diagnostics.

Topic 18. Physical and technical foundations of magnetic resonance imaging.

Content of the topic: Physical and biological foundations of the method of magnetic resonance imaging. Main indications and contraindications for MRI examination, requirements. Preparing the patient for the study.

Topic 19. MRI diagnostics of congenital anomalies and malformations of the brain.

Topic content: Arachnoid cysts, Arnold-Chiari anomaly, Dandy-Walker anomaly, agenesis of the corpus callosum, heterotopia, anomaly of furrow development, phakomatosis-tuberous sclerosis, Hippel-Lindau disease.

Topic 20. MRI diagnostics of congenital pathology of the spinal cord and spine.

Content of the topic: "Spinal dysraphism" syndrome. MR-semiotics of myelocele, myelomeningocele, MR-semiotics of diastematomyelia, syringomyelia.

Topic 21. MRI diagnostics of brain tumors.
Content of the topic: Tumors of the supratentorial region: intracerebral tumors, tumors of the suprasellar region, pineal region, base of the skull. Tumors of the posterior cranial fossa (tumors of the trunk, tumors of the worm and cerebellar hemispheres). Advantages and disadvantages of MRI in the diagnosis of brain tumors.
Topic 22. MRI diagnostics of hydrocephalus and its causes of development.
Topic content: Epilepsy and the importance of MRI in visualizing structural changes in the brain substance.
Topic 23. MRI diagnostics of spinal cord diseases.
Content of the topic: MRI semiotics of spinal cord tumors. MRI diagnostics of intramedullary and extramedullary cysts. MRI signs of spinal cord demyelination.
Topic 24. MRI diagnostics of heart diseases.
Content of the topic: Diagnostic capabilities of MRI in the diagnosis of heart disease. Indications for MRI of the heart. MRI diagnostics of coronary heart disease. Possibilities of MRI in the diagnosis of cardiomyopathies, myocarditis, pericardial disease. MR-semiotics of acquired heart defects. MR-semiotics of congenital heart defects. MR-semiotics of cardiac tumors.
Topic 25. MRI diagnostics of kidney and pelvic diseases.
Topic content: Indications for MRI of the kidneys. MRI diagnostics of renal cystic formations. MRI diagnostics of benign and malignant kidney tumors (Wilms tumor). MRI diagnostics of diseases of the small pelvis.

6. TOPICS OF PRACTICAL AND SEMINAR LESSONS

Section 1. Radiology.

Topic 1. Questions of general radiology. Features of the X-ray examination technique. X-ray diagnostics of diseases of the osteoarticular apparatus.

Questions on the topics of the section :

1. What are X-rays, their properties. The history of the discovery, its essence, practical application.
2. Classification of the main types of ionizing radiation.
3. Conditions for the use of radiological research methods.
4. Requirements for personnel, premises, work organization.
5. The concept of "medical diagnostic image".
6. Imaging system in radiation diagnostics.
7. Image analysis system in radiation diagnostics.
8. Computer processing of information in radiation diagnostics. The role and place of computer technology in modern medicine.
9. Analog and matrix image.
10. The principle of the X-ray examination method.
11. What is the natural contrast of an organ and how an X-ray image is formed. Artificial contrasting of organs, its goals, objectives, ways of conducting, indications, contraindications, complications.
12. What is fluoroscopy and how is it performed, the frequency of application of the method.
13. What is radiography, how is it carried out.
14. Digital X-ray, principles, benefits.
15. Special methods of X-ray examination, their purpose.

Topic 2. X-ray diagnostics of diseases of the osteoarticular apparatus.

Questions on the topics of the section :

1. X-ray anatomy of bones and joints.
2. Age features of bones and joints.
3. Bones and joints in the X-ray image.
4. X-ray picture of the main pathological processes of bones and joints.
5. X-ray semiotics of injuries of the musculoskeletal system: dislocations, fractures and their healing.

6. X-ray picture of diseases of bones and joints: systemic and widespread (avitaminosis, dystrophy, blood diseases, etc.), focal (osteomyelitis, tuberculosis, degenerative-dystrophic lesions, tumors).

Topic 3. X-ray diagnostics of diseases of the respiratory system, heart, mediastinum.

Questions on the topics of the section :

1. The concept of a shadow on a radiograph, their classification, analysis system.
2. Principles of formation of pathological changes in X-ray examination.
3. X-ray anatomy of the lungs.
4. Methods of X-ray examination of the lungs, the principle of image formation, indications for conducting.
5. The main radiological syndromes of lung damage and the mechanism of their formation.
6. Inflammatory diseases of the lungs in the x-ray image.
7. Radiation methods of heart research. The main radiation signs of heart damage.
8. Radiation methods of research of vessels. Radiation signs of the main vascular pathology.
9. Interventional radiology concept.

Topic 4 . X-ray diagnostics of diseases of the esophagus, stomach, intestines.

Questions on the topics of the section :

1. Radiation methods for studying the esophagus.
2. Radiation anatomy and pathology of the esophagus.
3. Radiation methods for studying the stomach and duodenum.
4. Radiation anatomy and pathology of the stomach and duodenum.
5. Radiation semiotics of diseases of the stomach and duodenum.
6. Radiation methods for studying the intestines.
7. Radiation semiotics of intestinal obstruction.
8. Radiation semiotics of intestinal diseases

Topic 5 . X-ray diagnostics of breast diseases. Benign tumors. Mastopathy. Mammary cancer.

Questions on the topics of the section :

1. Normal and variable radial anatomy of the mammary glands.
2. Research methods of the mammary glands.
3. X-ray semiotics of breast diseases.
4. Features of radiation diagnosis of mammary glands with an implant.
5. Radiation diagnosis of inflammatory diseases of the mammary glands: abscess, mastitis, lactostasis.
6. Radiation diagnosis of inflammatory diseases of the mammary glands: specific inflammation, tuberculosis, syphilis, actinomycosis.
7. Radiation diagnosis of breast injuries: hematoma, foreign bodies.
8. Radiation diagnosis of benign breast diseases. Radiation semiotics.
9. Radiation diagnostics of malignant diseases of the breast. Classification and staging.
10. Radiation diagnostics of malignant diseases of the breast. Pathology of the zones of regional lymph outflow.
11. Radiation diagnosis of breast diseases in men.

Section 2. Radionuclide diagnostics.

Topic 6. Radionuclide diagnostics.

Questions on the topics of the section :

1. Radionuclide, its characteristics.
2. Scheme of radionuclide research.
3. Indications for a radionuclide study.
4. Radioprotective measures.
5. Radionuclide imaging methods: scanning, scintigraphy, SPECT, advantages and disadvantages.
6. Positron emission tomography method, field of application, difference from other methods of radionuclide diagnostics.

Section 3. Ultrasound diagnostics.

Topic 7: Physical and technical foundations of the ultrasonic research method.

Questions on the topics of the section :

1. Physical properties of ultrasound.
2. Ultrasonic device design.
3. Principles of ultrasound examination.
4. Ultrasound research methods: A, B, M, dopplerography.

Topic 8. Ultrasound diagnostics of superficially located structures.

Questions on the topics of the section :

1. Ultrasound diagnostics of thyroid diseases (cysts, goiter, benign and malignant tumors).
2. Ultrasound diagnostics of breast diseases (fibrocystic disease, benign tumors).
3. Ultrasound diagnostics of peripheral lymph node diseases (lymphadenitis, malignant lymphomas).

Topic 9. Ultrasound diagnostics of diseases of the cardiovascular system.

Questions on the topics of the section :

1. Types of ultrasound examination of the heart.
2. Ultrasound imaging of heart structures (atria, ventricles, valves).
3. Congenital heart defects.
4. Ultrasound diagnosis of vascular diseases of the head and neck.
5. Ultrasound diagnosis of vascular diseases of the upper and lower extremities. Ultrasound diagnostics of diseases of the abdominal aorta and its visceral branches.

Topic 10. Ultrasound diagnostics of diseases of the abdominal organs.

Questions on the topics of the section :

1. Radiological diagnosis of diffuse liver lesions (hepatitis, fatty hepatosis, cirrhosis).
2. Radiation diagnosis of focal liver lesions (cysts, abscesses, tumors).
3. Ultrasound diagnostics of gallbladder diseases (malformations, calculous and acalculous cholecytitis, tumors).
4. Differential diagnosis of jaundice in the study of the hepatobiliary system.
5. Ultrasound diagnostics of pancreatic diseases (pancreatitis, cysts, tumors).
6. Ultrasound diagnostics of spleen diseases (splenomegaly, trauma, tumor).

Topic 11. Ultrasound diagnostics of kidney and urinary tract diseases.

Questions on the topics of the section :

1. Ultrasound diagnostics of kidney diseases (malformations, urolithiasis, inflammatory diseases, cysts, tumors).
2. Ultrasound diagnosis of bladder diseases (urolithiasis, malformations).
3. Ultrasound examination of the adrenal glands.

Section 4. X-ray CT diagnostics.

Topic 12. Physical and technical foundations of X-ray computed tomography.

Questions on the topics of the section :

1. Scanning principle.
2. Image reconstruction.
3. Display and documentation of images.
4. Scan options.
5. Types of tomographs.
6. Detector types.
7. Basic rules for reading computer tomograms.
8. Preparing the patient for the study.

Topic 13. X-ray CT of the brain.

Questions on the topics of the section :

1. RCT diagnosis of hydrocephalus.

2. Neuroimaging of the bypass system and complications of bypass surgery.
3. X-ray CT diagnostics of hemorrhage, trauma, tumors and non-tumor masses, inflammatory diseases (CMV, herpes, congenital toxoplasmosis, meningitis, encephalitis), vascular malformations.
4. X-ray CT diagnosis of congenital malformations of the central nervous system: Arnold-Chiari malformation; Dandy Walker's anomaly; holoporencephaly; hydranencephaly; congenital malformation of the vein of Galen; congenital cysts.

Topic 14. X-ray CT-diagnostics of diseases of the organs of the breast.

Questions on the topics of the section :

1. Congenital malformations of the lungs and bronchi.
2. Lung cysts.
3. Tumors and cysts of the mediastinum.
4. Infectious diseases (pneumonia, lung abscess, pleurisy, tuberculosis), pleural effusion.

Topic15. X-ray CT diagnostics of diseases of the abdominal cavity, retroperitoneal space.

Questions on the topics of the section :

1. CT signs of diffuse and focal liver pathology (hepatitis, cirrhosis, cysts, benign and malignant tumors),
2. CT signs of biliary tract pathology (malformations, choledocholithiasis),
3. CT signs of pancreatic pathology (pancreatitis, cysts, tumors), spleen,
4. CT signs of adrenal and kidney pathology (pyelonephritis, urolithiasis, tuberculosis, tumors),
5. CT signs of pathology of the hollow organs of the gastrointestinal tract.
6. CT signs of specific and nonspecific lymphadenopathy.
7. CT diagnostics of benign and malignant tumors of the retroperitoneal space.

Section 5. MRI diagnostics.

Topic 16. Physical and technical foundations of magnetic resonance imaging.

Questions on the topics of the section :

1. Physical and biological foundations of the method of magnetic resonance imaging.
2. Main indications and contraindications for MRI examination, requirements.
3. Preparing the patient for the study.

Topic 17. MRI diagnostics of congenital anomalies and malformations of the brain.

Questions on the topics of the section :

1. Arachnoid cysts.
2. Arnold-Chiari anomaly.
3. Dandy Walker Anomaly.
4. Agenesis of the corpus callosum.
5. Heterotopia, anomaly in the development of furrows.
6. Phakomatoses - tuberous sclerosis.
7. Hippel-Lindau disease.

Topic 18. MRI diagnostics of congenital pathology of the spinal cord and spine.

Questions on the topics of the section :

1. Spinal dysraphism syndrome.
2. MR-semiotics of myelocele, myelomeningocele
3. MR-semiotics of diastematomyelia, syringomyelia.

Topic 19. MRI diagnostics of brain tumors.

Questions on the topics of the section :

1. Tumors of the supratentorial region: intracerebral tumors, tumors of the suprasellar region, pineal region, skull base.
2. Tumors of the posterior cranial fossa (tumors of the trunk, tumors of the worm and cerebellar hemispheres).
3. Advantages and disadvantages of MRI in the diagnosis of brain tumors.

Topic 20. MRI diagnostics of hydrocephalus and its causes of development.

Questions on the topics of the section :
Epilepsy and the importance of MRI in visualization of structural changes in brain matter.

Topic 21. MRI diagnostics of spinal cord diseases.

Questions on the topics of the section :
MRI semiotics of spinal cord tumors. MRI diagnostics of intramedullary and extramedullary cysts. MRI signs of spinal cord demyelination.

Topic 22. MRI diagnostics of heart diseases.

Questions on the topics of the section :

1. Diagnostic capabilities of MRI in the diagnosis of heart disease.
2. Indications for MRI of the heart.
3. MRI diagnostics of coronary heart disease.
4. Possibilities of MRI in the diagnosis of cardiomyopathies, myocarditis, pericardial disease.
5. MR-semiotics of acquired heart defects.
6. MR-semiotics of congenital heart defects. MR-semiotics of cardiac tumors.

Topic 23. MRI diagnostics of diseases of the kidneys, pelvic organs.

Questions on the topics of the section :

1. Indications for MRI of the kidneys.
2. MRI diagnostics of renal cystic formations.
3. MRI diagnostics of benign and malignant kidney tumors (Wilms tumor).
4. MRI diagnostics of diseases of the small pelvis.

7. LABORATORY WORKS, PRACTICE

This type of work is not provided for by the EP

8. ABSTRACT TOPICS

This type of work is not provided for by the EP

9. LIST OF QUESTIONS TO CREDIT

1. What are X-rays and their properties? The history of the discovery, its essence, practical application.
2. Classification of the main types of ionizing radiation.
3. Conditions for the use of radiological research methods. Requirements for personnel, premises, work organization.
4. The concept of "medical diagnostic image". Imaging system in radiation diagnostics.
5. The role and place of computer technology in modern medicine. Analog and matrix image.
6. The principle of the X-ray examination method.
7. What is the natural contrast of an organ and how is an X-ray image formed?
8. Artificial contrasting of organs, its goals, objectives, ways of conducting, indications, contraindications, complications.
9. What is fluoroscopy and how is it done? The frequency of application of the method in pediatrics.
10. Digital X-ray, principles, benefits.
11. Radiation methods for studying bones and joints.
12. X-ray anatomy of bone fractures.
13. X-ray semiotics of focal and diffuse skeletal lesions.
14. Methods of X-ray examination of the lungs, the principle of image formation, indications for conducting.
15. Inflammatory diseases of the lungs in the x-ray image.
16. X-ray diagnosis of pulmonary tuberculosis.
17. X-ray picture of lung cancer (central, peripheral cancer).
18. Diagnosis of thromboembolism of the branches of the pulmonary artery.

19. The main radiation signs of heart damage.
20. Radiation methods of research of vessels.
21. The concept of interventional radiology, examples of application in pediatric practice.
22. Radiation methods for studying the esophagus.
23. Radiation methods for studying the stomach and duodenum.
24. Radiation semiotics of diseases of the stomach and duodenum.
25. Radiation semiotics of intestinal diseases.
26. The concept of natural and artificial radioactivity, the essence of the phenomenon, the history of the discovery.
27. The concept of radionuclide diagnostics. The frequency of application of the method in the diagnosis of diseases. Radionuclide, its characteristics.
28. Radiopharmaceutical, requirements for it.
29. Scheme of radionuclide research.
30. Image visualization systems in radionuclide diagnostics.
31. Methods of radiometry, radiography, their essence, disadvantages.
32. Radionuclide imaging methods: scanning, scintigraphy, SPECT, advantages and disadvantages.
33. Positron emission tomography method, field of application, difference from other methods of radionuclide diagnostics.
34. Thermography method, essence, main indications for use.
35. Basic principles of radiation diagnostics.
36. Differential diagnosis of jaundice in the study of the hepatobiliary system.
37. Radiation anatomy of the liver and gastrointestinal tract using various methods of radiation diagnostics.
38. Ultrasonic waves, concept. Ultrasound examination scheme.
39. Ultrasound research methods: A, B, M, dopplerography. The frequency of their use in pediatrics.
40. Radiation physiology of the hepatobiliary system. Cholelithiasis.
41. Diagnostic algorithms in the study of the hepatobiliary system.
42. Radiation diagnosis of focal liver lesions (cysts, abscesses, tumors).
43. Radiological diagnosis of diffuse liver lesions (hepatitis, fatty hepatosis, cirrhosis).
44. Radiation anatomy and physiology of the pancreas, radiation pathology (diffuse and focal).
45. Radiation anatomy of the kidneys and urinary tract, their radiation physiology. Features.
46. Urolithiasis, its radiation anatomy and physiology. Radiation diagnosis of renal malformations. Radiation diagnosis of inflammatory kidney disease.
47. Hematuria. The logic of radiation examination.
48. Radiation picture of hydronephrotic transformation. Radiation anatomy of focal kidney pathology (cysts, tumors).
49. Radiation anatomy and semiotics of urinary bladder diseases.
50. Frequency of CT application in pediatrics, main indications.
51. X-ray diagnosis of pulmonary tuberculosis.
52. Analysis of CT images of the brain and skull of newborns and young children: features of the X-ray anatomy of the brain and skull. Congenital malformations of the brain. Brain tumors.
53. Analysis of CT images of the brain and skull of newborns and young children: intracranial hemorrhages, pathology with infections of the central nervous system (CMV, herpes, congenital toxoplasmosis, meningitis, encephalitis), hydrocephalus (open, occlusive).
54. The use of contrast agents: indications, contraindications, features of use.
55. CT scan of the chest: indications for examination. Analysis of CT images: radiation anatomy of the chest organs of newborns and young children; congenital developmental anomalies.
56. CT signs of pathological changes: diffuse and focal changes in the chest organs.
57. CT signs of pathological changes: diffuse and focal changes in the chest organs.

58. Features of the anatomy of the abdominal cavity and retroperitoneal space in the CT image. CT diagnosis of congenital structural anomalies, inflammatory diseases, tumors (neuroblastoma, Wilms tumor).
59. Radiation anatomy of the pelvic organs. CT diagnostics of inflammatory, benign and malignant diseases of the pelvic organs in men and women.
60. Tumor diseases of the musculoskeletal system: CT diagnosis of primary and secondary tumor changes.
61. Physical and biological foundations of the method of magnetic resonance imaging.
62. MRI of the brain: radiation anatomy of the brain in magnetic resonance imaging, diagnostics of vascular diseases (aneurysms, ischemic disorders of cerebral circulation, intracerebral hemorrhage).
63. MRI diagnostics of brain tumors, criteria for benign and malignant tumors. Epilepsy.
64. MRI diagnostics of diseases of the spine and spinal cord: developmental anomalies, trauma, syringomyelia.
65. MRI diagnostics of diseases of the spine and spinal cord: primary and metastatic tumors of the spine, spinal cord.
66. Main indications and contraindications for MRI examination, requirements.
67. MRI diagnostics of demyelinating diseases of the nervous system, diagnostic criteria for multiple sclerosis.
68. Methods of radiological diagnostics of breast pathology. MRI diagnostics of juvenile fibroadenoma, galactocele.
69. CT diagnosis of traumatic, inflammatory, degenerative-dystrophic lesions of the bone system, congenital developmental anomalies.
70. MRI diagnostics of pathological changes in the lymph nodes.

10. INDEPENDENT WORK OF STUDENTS

Full-time study form

Title of sections and topics	**Type of independent work *(study of educational material, problem solving, test work, preparation for passing the test, exam, etc.)***	**Volume in hours**	**form of control (*checking the solution of problems, abstract, etc.)***
Section 1. Radiology	study of educational material, preparation for passing the test	10	oral questioning
Section 2. Radionuclide diagnostics.	study of educational material, preparation for passing the test	2	oral questioning
Section 3. Ultrasound diagnostics	study of educational material, preparation for passing the test	4	oral questioning
Section 4. CT diagnostics	study of educational material, preparation for passing the test	4	oral questioning
Section 5. MRI diagnostics	study of educational material, preparation for passing the test	4	oral questioning
Section 6. Radiation therapy	study of educational material, preparation for passing the test	6	oral questioning
Total:		30 h.	

11. УЧЕБНО-МЕТОДИЧЕСКОЕ И ИНФОРМАЦИОННОЕ ОБЕСПЕЧЕНИЕ ДИСЦИПЛИНЫ

а) Список рекомендуемой литературы

основная

1. Trufanov, G. E. Diagnosticradiology :textbook / G. E. Trufanov, R. M. Akiev, K. N. Alekseev [etal.] ; ed. G. E. Trufanov. - Москва : ГЭОТАР-Медиа, 2021. - 444 с. - ISBN 978-5-9704-5963-8. - Текст : электронный // ЭБС "Консультант студента" : [сайт]. - URL : https://www.studentlibrary.ru/book/ISBN9785970459638.html

2. Кира, Е. Ф. Thebasicquestionsofoncogynecology Основные вопросы онкогинекологии : учебник на английском и русском языках / Кира Е. Ф. [и др.]. - Москва : ГЭОТАР-Медиа, 2018. - 288 с. - ISBN 978-5-9704-4565-5. - Текст : электронный // ЭБС "Консультант студента" : [сайт]. - URL : https://www.studentlibrary.ru/book/ISBN9785970445655.html

дополнительная:

1КаравайА. В. Clinical Oncology in two parts. Part I = Клиническая онкология в двух частях. Часть I : пособие для студентов учреждений высшего образования, обучающихся по специальности 1-79 01 01 «Лечебное дело» : manualforstudentsofhighereducationinstitutionsstudyinginthespecialty 1-79 01 01 «GeneralMedicine» / А. В. Каравай, Г. Г. Божко. - Гродно :ГрГМУ, 2018. - 304 с. - ISBN 9789855589892. - Текст : электронный // ЭБС "Букап" : [сайт]. - URL : https://www.books-up.ru/ru/book/clinical-oncology-in-two-parts-part-i-12199149/

2. Хоров А. О. Clinicaltasksinoncology = Клинические задачи по онкологии : пособие для студентов факультета иностранных студентов с английским языком обучения (специальность 1-79 01 01 «Лечебное дело») [на англ. яз.] : handbookfortheforeignstudentsoftheMedicalFaculty / А. О. Хоров, А. В. Каравай, К. Н. Угляница. - Гродно :ГрГМУ, 2018. - 72 с. - ISBN 9789855589533. - Текст : электронный // ЭБС "Букап" : [сайт]. - URL : https://www.books-up.ru/ru/book/slinical-tasks-in-oncology-12199649/

3 Antoneeva I. I. Studying oncology: the selected chapters : Tutorial / I. I. Antoneeva; Ulyanovsk State University, Faculty of Medicine. - Ulyanovsk :UlSU, 2021. - 172 p. - Наангл. яз.; Загл. с экрана. - URL: http://lib.ulsu.ru/MegaPro/Download/MObject/14450.

учебно-методическая

1. SharafutdinovM. G.
Guidelines for independent work of students in the discipline «Radiation diagnosis» for specialty 31.05.01 «General medicine» / M. G. Sharafutdinov, L. V. Matveeva. - Ulyanovsk :UlSU, 2022. - Неопубликованныйресурс; Наангл. яз. - URL: http://lib.ulsu.ru/MegaPro/Download/MObject/11511. - Режимдоступа: ЭБСУлГУ. - Текст :электронный.
2.Sharafutdinov M. G.
Methodological instructions for preparation for practical studies of students on the discipline «Radiation diagnosis» for specialty 31.05.01 «General medicine» / M. G. Sharafutdinov, L. V. Matveeva. - Ulyanovsk :UlSU, 2022. - Неопубликованныйресурс; Наангл. яз. - URL: http://lib.ulsu.ru/MegaPro/Download/MObject/11516. - Режимдоступа: ЭБСУлГУ. - Текст :электронный.

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Leading specialist Стадольникова/_____  _/_____2024_

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Профессиональные базы данных, информационно-справочные системы

1. Электронно-библиотечные системы:

1.1. Цифровой образовательный ресурс IPRsmart : электронно-библиотечная система : сайт / ООО Компания «Ай Пи Ар Медиа». - Саратов, [2024]. – URL: http://www.iprbookshop.ru. – Режим доступа: для зарегистрир. пользователей. - Текст : электронный.

1.2. Образовательная платформа ЮРАЙТ : образовательный ресурс, электронная библиотека : сайт / ООО Электронное издательство «ЮРАЙТ». – Москва, [2024]. - URL: https://urait.ru . – Режим доступа: для зарегистрир. пользователей. - Текст : электронный.

1.3. База данных «Электронная библиотека технического ВУЗа (ЭБС «Консультант студента») : электронно-библиотечная система : сайт / ООО «Политехресурс». – Москва, [2024]. – URL: https://www.studentlibrary.ru/cgi-bin/mb4x. – Режим доступа: для зарегистрир. пользователей. – Текст : электронный.

1.4. Консультант врача. Электронная медицинская библиотека : база данных : сайт / ООО «Высшая школа организации и управления здравоохранением-Комплексный медицинский консалтинг». – Москва, [2024]. – URL: https://www.rosmedlib.ru. – Режим доступа: для зарегистрир. пользователей. – Текст : электронный.

1.5. Большая медицинская библиотека : электронно-библиотечная система : сайт / ООО «Букап». – Томск, [2024]. – URL: https://www.books-up.ru/ru/library/ . – Режим доступа: для зарегистрир. пользователей. – Текст : электронный.

1.6. ЭБС Лань : электронно-библиотечная система : сайт / ООО ЭБС «Лань». – Санкт-Петербург, [2024]. – URL: https://e.lanbook.com. – Режим доступа: для зарегистрир. пользователей. – Текст : электронный.

1.7. ЭБС Znanium.com : электронно-библиотечная система : сайт / ООО «Знаниум». - Москва, [2024]. - URL: http://znanium.com . – Режим доступа : для зарегистрир. пользователей. - Текст : электронный.

2. КонсультантПлюс [Электронный ресурс]: справочная правовая система. / ООО «Консультант Плюс» - Электрон. дан. - Москва : КонсультантПлюс, [2024].

3. eLIBRARY.RU: научная электронная библиотека : сайт / ООО «Научная Электронная Библиотека». – Москва, [2024]. – URL: http://elibrary.ru. – Режим доступа : для авториз. пользователей. – Текст : электронный

4. Федеральная государственная информационная система «Национальная электронная библиотека» : электронная библиотека : сайт / ФГБУ РГБ. – Москва, [2024]. – URL: https://нэб.рф. – Режим доступа : для пользователей научной библиотеки. – Текст : электронный.

5. Российское образование : федеральный портал / учредитель ФГАУ «ФИЦТО». – URL: http://www.edu.ru. – Текст : электронный.

6. Электронная библиотечная система УлГУ : модуль «Электронная библиотека» АБИС Мега-ПРО / ООО «Дата Экспресс». – URL: http://lib.ulsu.ru/MegaPro/Web. – Режим доступа : для пользователей научной библиотеки. – Текст : электронный.

Инженер ведущий Щуренко Ю.В. 2024

12. MATERIAL AND TECHNICAL SUPPORT OF THE DISCIPLINE:

Auditoriums for lectures, seminars, for monitoring and intermediate certification, group and individual consultations.

The auditoriums are equipped with specialized furniture, a training board. Lecture rooms are equipped with multimedia equipment to provide information to a large audience. Premises for independent work are equipped with computer equipment with the ability to connect to the Internet and provide access to the electronic information and educational environment, the electronic library system. The list of equipment used in the educational process is indicated in accordance with the information on the material and technical support and equipment of the educational process posted on the official website of UlSU in the section "Information about the educational organization".

1. Methodical recommendations on all topics of the course.
2. Negatoscope.
3. A set of computer tomograms.
4. A set of sonograms, scans
5. A set of magnetic resonance imaging.
6. Tables, chairs, whiteboard
7. Flexible fiber endoscope, flexible bronchoscope.
8. Computers with Internet access.
9. Multimedia projector, screen, overhead projector

13. SPECIAL CONDITIONS FOR STUDENTS WITH DISABLED POSSIBILITIES

If necessary, students from among persons with disabilities (at the request of the student) can be offered one of the following options for the perception of information, taking into account their individual psychophysical characteristics:

-for persons with visual impairments: in printed form in an enlarged font; in the form of an electronic document; in the form of an audio file (translation of educational materials into audio format); in printed form in Braille; individual consultations with the involvement of a tiflosurd interpreter; individual assignments and consultations;

-for persons with hearing impairments: in printed form; in the form of an electronic document; videos with subtitles; individual consultations with the involvement of a sign language interpreter; individual assignments and consultations;

-for persons with disabilities of the musculoskeletal system: in printed form; in the form of an electronic document; in the form of an audio file; individual assignments and consultations.

If it is necessary to use partially/exclusively distance educational technologies in the educational process, the organization of the work of teaching staff with students with disabilities and disabilities is provided in an electronic information and educational environment, taking into account their individual psychophysical characteristics.

Developer _____ Head of the Department, Candidate of Medical Sciences, Associate Professor Sharafutdinov M.G
signature position full name

Developer _____ Candidate of Medical Sciences, Associate Professor MorozovV.S
signature position full name

Developer _____ Candidate of Medical Sciences, Associate Professo Matveeva L.V.
signature position full name