MINISTRY OF HEALTH OF THE REPUBLIC OF BELARUS
Educational Institution
«BELARUSIAN STATE MEDICAL UNIVERSITY»

APPROVED
by Rector of the Educational Institution «Belarusian State Medical University»
_____ S.P.Rubnikovich
26.06.2025
Reg. # UD-0911-01-40/25 edu.

RADIODIAGNOSIS AND RADIOTHERAPY

Curriculum of the educational institution in the academic discipline for the specialty

7-07-0911-01 «General Medicine»

2025

Curriculum is based on the educational program «Radiodiagnosis and Radiotherapy», approved 26.06.2025, registration # УД-0911-01-40/2526/уч.; on the educational plan in the specialty 1-79 01 01 «General Medicine», approved 16.04.2025, registration # 7-07-0911-01/2526/mf.

COMPILERS:

T.N.Lukyanenko, Head of the Department of the Radiation Diagnostics and Radiation Therapy of the Educational Institution «Belarusian State Medical University», PhD, Associate Professor;

A.I.Aleshkevich, Associate Professor of the Department of the Radiation Diagnostics and Radiation Therapy of the Educational Institution «Belarusian State Medical University», PhD, Associate Professor;

S.L.Kachur, Senior Lecturer of the Department of the Radiation Diagnostics and Radiation Therapy of the Educational Institution «Belarusian State Medical University»

RECOMMENDED FOR APPROVAL:

by the Department of the Radiation Diagnostics and Radiation Therapy of the Educational Institution «Belarusian State Medical University»
(protocol # 27 of 05.05.2025);

by the Scientific and Methodological Council of the Educational Institution «Belarusian State Medical University»
(protocol # 10 of 26.06.2025)

EXPLANATORY NOTE

«Radiodiagnosis and Radiotherapy» is an academic discipline of the module «Therapy Module # 1», which contains systematized scientific knowledge about the methods of radiodiagnosis and radiotherapy used in medicine.

The aim of the academic discipline «Radiodiagnosis and Radiotherapy» is the formation of specialized competencies for solving problems in professional medical diagnostic activities, conducting a differential diagnostic approach by using the capabilities of radiation imaging and treating patients with radiation therapy methods.

The objectives of the academic discipline «Radiodiagnosis and Radiotherapy» are to form students' scientific knowledge about the diagnostic capabilities of radiodiagnosis methods; basic concepts of radiation diagnostics, radiation symptoms and syndromes, about the algorithm for using radiation studies in identifying pathological processes in internal organs, bones and joints; about the basic principles and methods of radiation therapy of malignant neoplasms and non-tumor diseases; skills and abilities required for:

determination of the method of radiation diagnostics, projection and area of study;

interpretation of the results of radiodiagnosis methods;

formulation of the conclusion on the results of radiation methods;

determining indications and contraindications for radiation therapy;

developing a radiation therapy plan.

Relations to other educational disciplines

The knowledge, abilities and skills acquired in the study of the academic discipline «Radiodiagnosis and Radiotherapy» are necessary for the successful study of the following academic disciplines: «Internal Diseases», «Surgical Diseases», «Traumatology and Orthopedics», «Neurology and Neurosurgery», «Medicine Disasters», «Phthisiopulmonology», «Endocrinology».

Studying the educational discipline «Radiodiagnosis and Radiotherapy» should ensure the formation of studens’ specialized competence: examine patients’ condition applying radiation diagnostic methods, identify the main radiation symptoms and syndromes of human diseases applying the combined radiation imaging techniques and radiation therapy.

As a result of studying the discipline «Radiodiagnosis and Radiotherapy», the student should

know:

types and properties of ionizing radiation;

principles of protection against exposure to ionizing radiation;

physical and technical foundations of radiation diagnostics and radiation therapy;

diagnostic capabilities of radiation imaging methods;

symptoms and syndromes of pathological processes of internal organs, bones and joints, detected using various methods of radiation diagnostics;

medical ethics and deontology rules;

be able to:

plan and conduct communication;

analyze normative legal acts regulating legal relations related to the provision of medical care;

determine indications and contraindications for radiological research methods;

determine the method of radiation diagnostics, projection and area of study;

interpret the results of various methods of radiation diagnostics;

master:

the skills of registration of the protocol of research;

the skills of formulating a conclusion based on the data obtained as a result of radiological research methods.

Total number of hours for the study of the discipline is 138 academic hours, including 87 classroom hours and 51 hours of independent student work (self-study).

Classroom hours according to the types of studies: lectures – 21 hours (including 6 hours of supervised student independent work (SSIW)), practical classes – 66 hours.

Intermediate assessment is carried out according to the syllabus of the specialty in the form of a differentiated credit (6 semester).

The form of education is full-time.

ALLOCATION OF ACADEMIC TIME ACCORDING TO SEMESTERS OF STUDY

Code, name of the specialty	Semester	Total number of academic hours	Number of classroom hours				Out-of-class self-studies	Form of intermediate assessment
			Number of classroom hours	including				
				class lectures	SSIW	practicals		
7-07-0911-01 «General Medicine»	5	68	45	9	3	33	23	
	6	70	42	6	3	33	28	Differentiated credit
Total hours		**138**	**87**	**15**	**6**	**66**	**51**	

THEMATIC PLAN

Section (topic) name	Number of class hours	
	lectures (incl. SSIW)	practical
1. Radiation Therapy	**3**	**9**
1.1. Physical and biological bases of radiation diagnostics and radiation therapy	-	3
1.2. Principles of radiation therapy	1,5	3
1.3. Methods of radiation therapy. Radiation therapy complications	1,5	3
2. Radiation Diagnostics	**18**	**57**
2.1. Methods of radiation diagnostics. Physical and technical principles and classification of radiological examination methods	1,5	3
2.2. Physical and technical principles of computed tomography and magnetic resonance imaging. Application of computed tomography and magnetic resonance imaging in medicine	3	9
2.3. Physical and technical fundamentals of radionuclide diagnostics. Application of radionuclide diagnostic methods in medicine	1,5	3
2.4. Physical and technical fundamentals of ultrasound	1,5	3
2.5. Possibilities of ultrasound techniques in studying the morphology and function of organs. Application of ultrasound research in medicine	-	6
2.6. Radiation methods and radiological anatomy of the musculoskeletal system. Radiation semiotics of traumatic bone and joint injuries	1,5	3
2.7. Radiation semiotics of bones and joints pathological processes. Radiation semiotics of inflammatory, degenerative-dystrophic diseases, neoplasms of musculoskeletal system	1,5	6
2.8. Radiation methods for examining of the thoracic cavity organs. Radiation anatomy of the thoracic cavity	-	3
2.9. Radiation semiotics of pathological processes of the thoracic cavity organs	3	6
2.10. Radiation methods and radiological anatomy of the digestive system. Gastrointestinal emergencies	-	3
2.11. Radiation semiotics of digestive diseases	1,5	3
2.12. Radiation examination methods and radiological anatomy of the genitourinary system. Radiation semiotics of pathological changes in the urogenital system	1,5	6
2.13. Radiation methods and radiological anatomy of the head and neck. Radiation semiotics of pathological changes in the organs of the head and neck	1,5	3
Total hours	**21**	**66**

CONTENT OF THE EDUCATIONAL DISCIPLINE

1. Radiation Therapy

1.1. Physical and biological bases of radiation diagnosis and radiation therapy

Introduction to the academic discipline «Radiodiagnosis and Radiotherapy». The place of radiation diagnostics and radiation therapy in the complex of medical knowledge and its connection with other sciences. Law of radioactive decay. Types of decays. Radiation and sources used in medicine, their nature and properties. Fundamentals and principles of dosimetry. The concept of doses. Units of dose, dose rate and radioactivity. Tasks of the dosimetric service. Sanitary norms and rules «Radiation safety requirements».

Medical ethics and deontology in radiation diagnosis and radiation therapy.

1.2. Principles of radiation therapy

Direct and indirect effects of ionizing radiation at the molecular level. Radiobiological effects. Tissue radiosensitivity. Classification of radiation therapy types. Principles of radiation therapy of neoplasms and non-neoplastic processes.

Determination of indications, absolute and relative contraindications to radiation therapy.

1.3. Methods of radiation therapy. Radiation therapy complications

Classification of radiation therapy methods. Justification for the choice of method and devices used. The principle of choosing the type of treatment and determining the therapeutic methods of exposure (complexes). Selection of radiation exposure parameters: irradiation mode and method, total absorbed dose, irradiation rhythm.

Complications of radiation therapy: radiation reactions and radiation injuries. Drawing up a plan for radiation therapy of malignant neoplasms.

2. Radiation Diagnosis

2.1. Methods of radiation diagnostics. Physical and technical principles and classification of radiological examination methods

The role and significance of radiation diagnostics in solving professional problems, its place in the system of medical education and in training a doctor. Classification and main characteristics of radiation diagnostic methods.

Equipment and fitting out of an X-ray room. Organization of radiation protection in the X-ray department. Types of X-ray machines. The principle of an X-ray image obtaining. Characteristics of an X-ray image.

Basic and special X-ray examination methods. Radiography, fluoroscopy, mammography. Methods of spatial research. Methods of artificial contrast. Radiopaque agents, types, dosage, routes of administration and use in clinical practice.

2.2. Physical and technical principles of computed tomography and magnetic resonance imaging. Application of computed tomography and magnetic resonance imaging in medicine

Types of computed tomographs. Image acquisition principle in computed

tomography (CT). Hounsfield scale. Hounsfield units. Visualization window. Post-processing image processing. Image archiving. Software, a set of options and tools for processing CT images. Indications and contraindications for CT. Contrast, types of contrast agents, their dosage and administration routes. Examination protocols. Image interpretation. Dose loads and radiation protection during CT.

Nuclear magnetic resonance phenomenon. Larmor frequency. Precession. Radiofrequency pulse. Relaxation. Image acquisition principle in magnetic resonance imaging (MRI). Magnetic characteristics of tissue: T1 relaxation, T2 relaxation, spin density. Basic pulse sequences: spin-echo, inversion recovery, gradient-echo, fast sequences. Gradient concept. Layer selection. Phase and frequency coding of the signal. Fundamentals of MRI anatomy. Identification of anatomical objects based on MRI results (various pulse sequences). Image quality: layer thickness, layer orientation, spatial and contrast resolution. Selection of examination parameters: TR, TE, T1, number of signal averaging, vector tilt angle, field of view, matrix size, number of slices, layer thickness and distance between them, scanning time and factors affecting it. Special software packages. Types of magnetic resonance imaging scanners. Determination of indications and contraindications for MRI. Contrast in MRI, types of contrast agents, their dosage and methods of administration. Specialized techniques: dynamic MRI, MR angiography, MR sialography,

MR urography, MR cholangiopancreatography, etc. Using MRI in disease diagnosis. Examination protocols. Image interpretation. Safety measures for patients and healthcare professionals in the MRI room.

2.3. Physical and technical fundamentals of radionuclide diagnostics. Application of radionuclide diagnostic methods in medicine

Radionuclide diagnostics: definition and principles. Classification of radionuclide diagnostic methods. Scintigraphy. Gamma-ray chronography studies. High-tech radionuclide diagnostic methods: single-photon emission computed tomography (SPECT), positron emission tomography (PET). Indications and contraindications for radionuclide studies.

Radiopharmaceutical: definition, requirements, sources. Recording equipment for radiodiagnostic studies. Principle of obtaining radionuclide graphic and topographic images. Characteristics of radionuclide images. Preparing patients for radionuclide studies.

Structure and equipment of the radionuclide diagnostic department, work organization. Use of radionuclide diagnostics in medicine. Applications of radionuclide diagnostic methods to detect diseases of the endocrine, musculoskeletal, cardiovascular, respiratory, liver and kidney systems. Application of radionuclide diagnostics in oncology.

Analysis of the results of dynamic and static radionuclide diagnostic methods for the heart, liver, kidneys, thyroid gland and skeleton.

Interpretation of the results of radionuclide diagnostic methods for liver and kidney pathology.

2.4. Physical and technical fundamentals of ultrasound

Physical principles of ultrasound. Ultrasonic frequency, period and

wavelength. Characteristics of ultrasonic waves and their properties (penetration, reflection, absorption, scattering). Inverse and direct piezoelectric effects.

General diagram of a pulse-echo ultrasound device and Doppler ultrasound devices. Resolution and types of ultrasound transducers. Ultrasound machine operating modes: A-mode (Amplitude), M-mode (Motion), B-mode (Brightness), Doppler modes: color, pulsed wave, continuous wave, tissue and power Doppler, 3D/4D modes, elastometry. Ultrasound image formation.

Disinfectants. Compliance with instrument and equipment reprocessing rules.

2.5. Possibilities of ultrasound techniques in studying the morphology and function of organs. Application of ultrasound research in medicine

Key terms used in ultrasound examinations: echo-negative lesion, echo-positive lesion, acoustic shadow, hyperechogenicity, hypoechogenicity and anechoicity. Determining indications for ultrasound. Preparing the patient for examinations of abdominal and pelvic organs. The role of ultrasound in examining children and pregnant women. FAST (Focused assessment with sonography for trauma) protocol.

Algorithms for describing ultrasound images.

Interpretation of ultrasound results in emergency conditions of the thoracic and abdominal organs.

2.6. Radiation methods and radiological anatomy of the musculoskeletal system. Radiation semiotics of traumatic bone and joint injuries

Radiological examination of bones and joints: radiography, linear tomography, CT, MRI, ultrasound, bone scintigraphy, SPECT, PET. Radiation anatomy of the normal musculoskeletal system. Age-related characteristics of the radiographic anatomical structure of the musculoskeletal system in children and the elderly.

Classification of bone fractures and dislocations. Radiation semiotics of traumatic bone and joint injuries. Characteristics of injuries in childhood. Subperiosteal fracture. Traumatic epiphysiolysis. Bone fracture healing in radiographic images. Radiation diagnostics of complications of traumatic bone and joint injuries. Algorithm for describing radiographic images of bones and joints in traumatic injuries.

Interpretation of radiographic examination results in traumatic bone and joint injuries.

2.7. Radiation semiotics of bones and joints pathological processes. Radiation semiotics of inflammatory, degenerative-dystrophic diseases, neoplasms of musculoskeletal system

X-ray semiotics of pathological processes in bones. changes in bone shape and size. Changes in bone tissue structure (osteoporosis, osteosclerosis, destruction, sequestration, osteonecrosis, osteolysis). Bone surface changes. Types of periostitis (linear, bulbous, spiculated, visor (Codman's), fringed, lacy). X-ray semiotics of pathological processes in joints: uzuration, osteophytes and bone ankylosis.

X-ray semiotics of inflammatory skeletal diseases (osteomyelitis, tuberculosis of bones and joints and arthritis). Radiation semiotics of benign and malignant neoplasms of the musculoskeletal system (osteoma, osteoid osteoma, chondroma,

osteochondroma, fibroma, intraosseous hemangioma, intraosseous lipoma, giant cell tumor (osteoblastoclastoma), aneurysmal bone cyst, osteosarcoma, Ewing's sarcoma, chondrosarcoma, multiple myeloma). Radiation semiotics of secondary malignant bone lesions.

Radiation semiotics of degenerative-dystrophic diseases of the musculoskeletal system (osteoarthritis, osteochondrosis). Osteochondropathies.

Algorithm for describing bone and joint radiography in inflammatory, degenerative-dystrophic diseases and neoplasms of the bones and joints.

Interpretation of X-ray examination results for inflammatory, degenerative-dystrophic diseases and neoplasms of the musculoskeletal system.

2.8. Radiation methods for examining of the thoracic cavity organs. Radiation anatomy of the thoracic cavity

Radiographic examination of the chest organs: radiography, fluoroscopy, fluorography, bronchography, angiopulmonography, CT, PET, lung and cardiac scintigraphy and ultrasound of the lungs and pleural cavities.

X-ray anatomy of the chest organs. Lobar and segmental structure of the lungs. Pulmonary fields. Pulmonary sinuses. Root of the lung: structure and size. Normal pulmonary vascular pattern. Radiographic anatomy of the mediastinal organs. Cardiothoracic index.

Algorithm for describing chest radiography: analysis of the airways, lungs, mediastinal organs, bone structure and analysis of adjacent anatomical zones.

2.9. Radiation semiotics of pathological processes of the thoracic cavity organs

Main radiation syndromes of lung diseases (extensive and limited radiopaque (lucency) of the lung field, focal, round and annular shadows, pulmonary dissemination, pathological changes in the root and pulmonary markings, impaired bronchial patency).

Radiological diagnostics of lobar and segmental atelectasis, pneumothorax, hydrothorax, hydropneumothorax, central and peripheral lung cancer, pneumonia, pulmonary tuberculosis, abscesses and pulmonary metastases.

Interpretation of chest X-ray findings in extensive (total, subtotal) and limited radiopaque syndromes, round shadow syndrome, annular shadow syndrome, extensive pulmonary dissemination and total (subtotal) lumen.

2.10. Radiation methods and radiological anatomy of the digestive system. Gastrointestinal emergencies

Radiological examination of the digestive system: radiography, contrast meal, barium enema, barium enema, sialography, cholecystography, cholangiography, endoscopic retrograde cholangiopancreatography, ultrasound, CT, MRI, hepatocholecystoscintigraphy, PET.

Radiological anatomy of the gastrointestinal tract. Sections of the pharynx, esophagus, stomach and intestines. Physiological stenosis of the esophagus. Location of the major sphincters of the gastrointestinal tract. Radiation anatomy of the liver, Couinaud classification. Radiation anatomy of the gallbladder, pancreas and salivary glands. Radiological diagnostics of intestinal obstruction, perforated ulcers, ruptured

hollow organs and foreign objects in the gastrointestinal tract.

Interpretation of radiological examination results in emergency abdominal conditions.

2.11. Radiation semiotics of digestive diseases

The main radiation symptoms of pathological changes in the esophagus, stomach, duodenum, small and large intestines, liver and pancreas. Organ dislocation syndrome. Limited and diffuse narrowing and dilation of the lumen of the gastrointestinal tract. Changes in the mucous membrane of the gastrointestinal tract. Structural changes in the liver and pancreas.

Radiation diagnostics of inflammatory diseases of the digestive organs, gastric and duodenal ulcers, esophageal achalasia, esophageal and intestinal diverticula and gastrointestinal neoplasms.

Digestive organ examination protocol algorithm.

Interpretation of X-ray examination results for gastric ulcers and neoplasms of the esophagus, stomach and intestines.

2.12. Radiation examination methods and radiological anatomy of the genitourinary system. Radiation semiotics of pathological changes in the urogenital system

Radiation methods for examining the genitourinary system: radiography, hysterosalpingography, urethrography, cystography, urography, CT, MRI, ultrasound, nephroscintigraphy, PET. Radiation anatomy of the normal kidneys and urinary tract. Anomalies of the location, size, shape and structure of the urinary system. Radiation anatomy of the vagina, uterus and ovaries in women of reproductive age, during menopause and during pregnancy. Radiation anatomy of the reproductive system in men.

Radiation semiotics of traumatic changes in the urinary system. Radiation diagnostics of inflammatory diseases and neoplasms of the urinary system.

Radiation semiotics of traumatic changes in the reproductive system in men and women. Radiation diagnostics of inflammatory diseases and neoplasms of the reproductive system in men and women.

2.13. Radiation methods and radiological anatomy of the head and neck. Radiation semiotics of pathological changes in the organs of the head and neck

Radiological methods of examining the head and neck: radiography, angiography, CT, MRI, ultrasound, scintigraphy, PET. Age-related features of the structure of the head and neck organs. Visualization of brain structures using CT and MRI. Structure of the bones of the base, fornix and facial region of the skull. Pneumatization of the apex of the pyrimidine of the temporal bones and paranasal sinuses. Radiation anatomy of the thyroid gland, cervical spine and soft tissues of the neck.

Radiological semiotics of trauma, acute cerebrovascular accidents, congenital malformations, inflammatory diseases and neoplasms of the head and neck organs.

Interpretation of CT brain scan results in emergency neurology and neurosurgery.

EDUCATIONAL DISCIPLINE «RADIODIAGNOSIS AND RADIOTHERAPY» CURRICULAR CHART

Section, topic #	Section (topic) name	Number of class hours		Supervised student independent work	Literature	Practical skill	Form of control	
		lectures	practical				of practical skill	of current / intermediate assessment
	5 semester							
	Lectures	**9**	**-**	**3**				
1.2.	Principles of radiation therapy	-	-	1,5	1, 2, 4, 5			Control work
1.3.	Methods of radiation therapy. Radiation therapy complications	-	-	1,5	1, 2, 4, 5			Control work
2.1.	Methods of radiation diagnostics. Physical and technical principles and classification of radiological examination methods	1,5	-	-	1, 2, 3, 5			
2.2.	Physical and technical principles of X-ray computed tomography. Indications and contraindications. Application in medicine	1,5	-	-	1, 2, 3, 5			
2.2.	Physical and technical principles of magnetic resonance imaging. Indications and contraindications. Application in medicine	1,5	-	-	1, 2, 3, 5			
2.3.	Physical and technical fundamentals of radionuclide diagnostics. Application of radionuclide diagnostic methods in medicine	1,5	-	-	1, 2, 5			
2.4.	Physical and technical fundamentals of ultrasound	1,5	-	-	1, 2, 3, 5			

2.6.	Radiation methods and radiological anatomy of the musculoskeletal system. Radiation semiotics of traumatic bone and joint injuries	1,5	-	-	1, 2, 3, 5			
	Practical classes	**-**	**33**	**-**				
1.1.	Physical and biological bases of radiation diagnosis and radiation therapy	-	3	-	1, 2, 4, 5			Interview
2.1.	Methods of radiation diagnostics. Physical and technical principles and classification of radiological examination methods	-	3	-	1, 2, 3, 5			Interview, testing, control work*
2.2.	Physical and technical principles of computed tomography and magnetic resonance imaging.	-	3	-	1, 2, 5			Interview, defense of report
2.2.	Computed tomography. Indications and contraindications. Application of computed tomography in medicine	-	3	-	1, 2, 5			Interview, defense of report
2.2.	Magnetic resonance imaging. Indications and contraindications. Application of magnetic resonance imaging in medicine	-	3	-	1, 2, 3, 5			Interview, defense of report
2.3.	Physical and technical fundamentals of radionuclide diagnostics. Application of radionuclide diagnostic methods in medicine	-	3	-	1, 2, 3, 5	Interpretation of radionuclide imaging findings in liver and kidney pathology	Solving a situational problem with filling out a radiological examination protocol*	Interview, testing
2.4.	Physical and technical fundamentals of ultrasound	-	3	-	1, 2, 3, 5	Compliance with hygienic rules for the processing of instruments and equipment	Visual assessment of skill performance	Interview, testing
2.5.	Possibilities of ultrasound techniques in studying the morphology and function of organs.	-	3	-	1, 2, 3, 5			Interview, control work
2.5.	Application of ultrasound research in medicine	-	3	-	1, 2, 3, 5	Interpretation of ultrasound imaging results for emergency chest and abdominal conditions	Solving a situational problem*	Interview, defense of report

1.2.	Principles of radiation therapy	-	3	-	1, 2, 4, 5			Interview
1.3.	Methods of radiation therapy. Radiation therapy complications	-	3	-	1, 2, 4, 5			Interview, testing, control work
				6 semester				
	Lectures	**6**	**-**	**3**				
2.7.	Radiation semiotics of bones and joints pathological processes. Radiation semiotics of inflammatory, degenerative-dystrophic diseases, neoplasms of musculoskeletal system	1,5	-	-	1, 2, 3, 5			
2.9.	Radiation semiotics of pathological processes of the thoracic cavity organs	1,5	-	1,5	1, 2, 3, 5			Control work; interview
2.11.	Radiation semiotics of digestive diseases	1,5	-	-	1, 2, 3, 5			
2.12.	Radiation examination methods and radiological anatomy of the genitourinary system. Radiation semiotics of pathological changes in the urogenital system	-	-	1,5	1, 2, 3, 5			Interview, defense of report
2.13.	Radiation methods and radiological anatomy of the head and neck. Radiation semiotics of pathological changes in the organs of the head and neck	1,5	-	-	1, 2, 3, 5			
	Practical classes	**-**	**33**	**-**				
2.6.	Radiation methods and radiological anatomy of the musculoskeletal system. Radiation semiotics of traumatic bone and joint injuries	-	3	-	1, 2, 3, 5	Interpretation of X-ray findings in traumatic bone and joint injuries	Solving a situational problem with filling out a radiological examination protocol*	Interview, defense of report
2.7.	Radiation semiotics of bones and joints pathological processes	-	3	-	1, 2, 3, 5			Interview, control work, defense of report
2.7.	Radiation semiotics of inflammatory, degenerative-dystrophic diseases, neoplasms of musculoskeletal system	-	3	-	1, 2, 3, 5	Interpretation of X-ray findings in inflammatory, degenerative-dystrophic	Solving a situational problem with filling out a radiological	Interview, testing

						diseases and neoplasms of the musculoskeletal system	examination protocol*	
2.8.	Radiation methods for examining of the thoracic cavity organs. Radiation anatomy of the thoracic cavity	-	3	-	1, 2, 3, 5			Interview, defense of report
2.9.	Radiation semiotics of pathological processes of the thoracic cavity organs	-	3	-	1, 2, 3, 5			Interview, control work*, defense of report
2.9.	Radiation diagnostics of traumatic injuries and emergency conditions of the thoracic organs	-	3	-	1, 2, 3, 5	Interpretation of the results of chest X-ray examination in the presence of extensive (total, subtotal) or limited radiopague syndrome, round shadow syndrome, annular shadow, extensive pulmonary dissemination and total (subtotal) radiolucency	Solving a situational problem with filling out a radiological examination protocol*	Interview, testing
2.10.	Radiation methods and radiological anatomy of the digestive system. Gastrointestinal emergencies	-	3	-	1, 2, 3, 5	Interpretation of radiation examination findings in abdominal emergencies	Solving a situational problem with filling out a radiological examination protocol*	Interview, defense of report
2.11.	Radiation semiotics of digestive diseases	-	3	-	1, 2, 3, 5	Interpretation of X-ray findings in gastric ulcers, esophageal, gastric and intestinal neoplasms	Solving a situational problem with filling out a radiological examination protocol	Interview, testing
2.13.	Radiation methods and radiological anatomy of the head and neck. Radiation semiotics of pathological changes in the organs of the head and neck	-	3	-	1, 2, 3, 5	Interpretation of CT scan findings of the brain in neurology and neurosurgery emergencies	Solving a situational problem	Interview, defense of report
2.12.	Radiation examination methods and radiological anatomy of the genitourinary system. Radiation semiotics of pathological changes in the urogenital system	-	3	-	1, 2, 3, 5			Interview, control work, defense of report

2.12.	Radiation methods and radiation anatomy of the reproductive system. Radiation semiotics of pathological changes in the reproductive system	-	3	-	1, 2, 3, 5			Differentiated credit
	Total hours	**15**	**66**	**6**				

*This is a mandatory form of current certification

INFORMATION AND INSTRUCTIONAL UNIT

LITERATURE

Basic (relevant):

1. Diagnostic radiology : textbook / G. E. Trufanov, R. M. Akiev, K. N. Alekseev [et al.]; ed. G. E. Trufanov. – Moscow : GEOTAR-Media, 2021. – 444 p.
2. Ovchinnikov, V. A. Radiology and radiotherapy: textbook for students of the faculty of foreign students with English as the language of instruction / V. A. Ovchinnikov. – Minsk : New knowledge, 2020. – 504 p.

Additional:

3. Ermolitsky, N. M. Radiology : teaching guide: in 2 parts. Part 1. Basic diagnostic radiology / N. M. Ermolitsky. – Gomel : Gomel State Medical University, 2022. – 166 p.
4. Ermolitsky, N. M. Radiology: teaching guide : in 2 parts. Part 2. Clinical radiology and radiotherapy / N. M. Ermolitsky. – Gomel : Gomel State Medical University, 2022. – 156 p.

Electronic courseware for the educational discipline «Radiodiagnosis and Radiotherapy»

5. https://etest.bsmu.by/course/view.php?id=1151.

METHODOLOGICAL RECOMMENDATIONS FOR THE ORGANIZATION AND PERFORMANCE OF STUDENT INDEPENDENT WORK IN THE ACADEMIC DISCIPLINE

The time allotted for independent work can be used by students to:

preparation for lectures, practical exercises;

preparation for the differentiated credit in the academic discipline;

study of topics (questions) submitted for independent study;

solution of practical problems;

performance of research and creative tasks;

preparation of thematic reports, abstracts, presentations;

implementation of practical tasks;

note-taking of educational literature;

compiling a review of scientific literature on a given topic;

design of information and demonstration materials (stands, posters, graphics, tables, newspapers, etc.);

compiling a thematic selection of literary sources, Internet sources.

METHODOLOGICAL RECOMMENDATIONS FOR THE ORGANIZATION AND PERFORMANCE OF SUPERVISED STUDENT INDEPENDENT WORK IN THE ACADEMIC DISCIPLINE

APPROXIMATE LIST OF TASKS FOR SUPERVISED STUDENT INDEPENDENT WORK:

preparing thematic reports, papers and presentations;

taking notes from primary sources (collections of documents, monographs, textbooks, etc.);

creating tests for peer review;

designing informational and demonstration materials (stands, posters).

Control of supervised student independent work is carried out in the form of:
control work,
interview,
defense of report

LIST OF AVAILABLE DIAGNOSTIC TOOLS

The following forms of current certification are used to diagnose competencies:
interview,
testing,
defense of report
control work,
solving a situational problem with filling out a protocol;
performing practical skills using equipment.

LIST OF AVAILABLE TEACHING METHODS

Traditional method;
active (interactive) methods:
Problem-Based Learning (PBL);
Team-Based Learning (TBL);
Case-Based Learning (CBL);
Research-Based Learning (RBL);
Simulation-based Learning.

LIST OF PRACTICAL SKILLS

Name of the practical skill	Form of practical skills control
1. Interpretation of X-ray findings in traumatic bone and joint injuries	Solving a situational problem with filling out a radiological examination protocol
2. Interpretation of X-ray findings in inflammatory, degenerative-dystrophic diseases and neoplasms of the musculoskeletal system	Solving a situational problem with filling out a radiological examination protocol
3 Interpretation of the results of chest X-ray examination in the presence of extensive (total, subtotal) or limited radiopague syndrome, round shadow syndrome, annular shadow, extensive pulmonary dissemination and total (subtotal) radiolucency	Solving a situational problem with filling out a radiological examination protocol
4. Interpretation of radiation examination findings in abdominal emergencies	Solving a situational problem with filling out a radiological examination protocol
5. Interpretation of X-ray findings in gastric ulcers, esophageal, gastric and intestinal neoplasms	Solving a situational problem with filling out a radiological examination protocol

Name of the practical skill	Form of practical skills control
6. Interpretation of radionuclide imaging findings in liver and kidney pathology	Solving a situational problem with filling out a radiological examination protocol
7. Interpretation of CT scan findings of the brain in neurology and neurosurgery emergencies	Solving a situational problem
8. Interpretation of ultrasound imaging results for emergency chest and abdominal conditions	Solving a situational problem
9. Compliance with hygienic rules for the processing of instruments and equipment	Visual assessment of skill performance

LIST OF SIMULATION EQUIPMENT USED

Virtual ultrasound diagnostic simulator «Waimedix».

PROTOCOL OF THE CURRICULUM APPROVAL BY OTHER DEPARTMENTS

Title of the discipline requiring approval	Department	Amendments to the curriculum in the academic discipline	Decision of the department, which designed the curriculum (date, protocol No)
Internal Medicine	Department of Internal Medicine, Gastroenterology and with a course for advanced training and retraining	No comments	Protocol # 27 of 05.05.2025
Surgical Diseases	Department of Surgical Diseases with a course for advanced training and retraining	No comments	Protocol # 27 of 05.05.2025
Traumatology and Orthopedics	Department of Traumatology and Orthopedics with a course for advanced training and retraining	No comments	Protocol # 27 of 05.05.2025
Neurology and Neurosurgery	Department of Neurology and Neurosurgery	No comments	Protocol # 27 of 05.05.2025
Endocrinology	Department of Endocrinology	No comments	Protocol # 27 of 05.05.2025
Phthisiopulmonology	Department of Pulmonology, Phthisiology, Allergology and Occupational Pathology with a course for advanced training and retraining	No comments	Protocol # 27 of 05.05.2025

COMPILERS/AUTHORS:

Head of the Department of the Radiation Diagnostics and Radiation Therapy of the Educational Institution «Belarusian State Medical University», PhD, Associate Professor — T.N.Lukyanenko

Associate Professor of the Department of the Radiation Diagnostics and Radiation Therapy of the Educational Institution «Belarusian State Medical University», PhD; Associate Professor — A.I.Aleshkevich

Senior Lecturer of the Department of the Radiation Diagnostics and Radiation Therapy of the Educational Institution «Belarusian State Medical University» — S.L.Kachur

Curriculum content, composition and the accompanying documents comply with the established requirements.

Head of the Office of Educational Activities of the Educational Institution «Belarusian State Medical University» — I.L.Kotovich
24.06.2025

Methodologist of the Educational and Methodological Department of the Office of Educational Activities of the Educational Institution «Belarusian State Medical University» — S.V.Zaturanova
24.06.2025