

I. General information	
Name of faculty	Medical faculty № 1
Educational programme (branch, specialty, level of high education, form of education)	22 Health care Specialty 222 "Medicine" second (master's) level of higher education, full-time
Academic year	2023-2024
Name of the discipline, code (e-mail on the Danylo Halytsky LNMU web-site)	Radiology, OK 24.1 kaf_radiology@meduniv.lviv.ua
Department (name, address, phone number, e-mail)	Radiology and radiation medicine Communal Noncommercial Enterprise of Lviv Regional Council "Lviv Regional Clinical Hospital" 79010, Lviv, Nekrasova str., 4, phone: (032) 276-78-06 e-mail: kaf_radiology@meduniv.lviv.ua Municipal Non-Commercial Enterprise of Lviv Regional Council "Western Ukrainian Specialized Children's Medical Center" 79035, Lviv, Dnisterska st., 27 phone: (032) 270-22-07, fax: +38(032)2702679 e-mail: zusdmc@ukr.net
Head of the department (e-mail)	Igor DATS – PhD, associate professor, datsigor57@gmail.com
Year of study (year when realizing of disciplines` study takes place)	3 year
Semester	V / VI
Type of discipline	Obligatory
Teachers (names, surnames, scientific degrees and titles of teachers who teach the discipline, contact e-mail)	Yulian MYTSYK - doctor of medical sciences, professor, mytsyk.yulian@i.ua Bohdana VERVEHA – doctor of medical sciences, associate professor, danaverveha@gmail.com
Erasmus yes/no (availability of discipline for students in programme Erasmus)	No
The person responsible for the syllabus (person to whom comments regarding the syllabus should be provided, contact e-mail)	Bohdana VERVEHA – doctor of medical sciences, associate professor, danaverveha@gmail.com
Amount of credits ECTS	4,0
Amount of hours (lectures/practical classes/independent work of students)	Number of hours: total - 120 lectures - 14 practical classes - 45 independent work of students - 61
Language of studying	English
Information about consultations	According to the schedule

Address, phone number, and hours of operation of the clinical department	Communal Noncommercial Enterprise of Lviv Regional Council “Lviv Regional Clinical Hospital” 79010, Lviv, Chernihivska st., 7 (24/7); phone: (032) 275-50-20, (032) 278-62-10 (around the clock) Municipal Non-Commercial Enterprise of Lviv Regional Council “Western Ukrainian Specialized Children's Medical Center”; 79035, Lviv, Dnisterska st., 27 phone: (032) 270-22-07 (around the clock)
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2. Brief anotation to the discipline

Radiology is one of the fundamental natural sciences in the system of higher medical education, the knowledge of which is necessary for the high-quality training of specialists in the field of health care. This is due to the fact that radiological research methods occupy a leading place in the diagnosis of most diseases. In recent decades, medical radiology has been replenished with new research methods (computed tomography and magnetic resonance imaging, ultrasound, positron and single-photon emission tomography, interventional methods), and only 40% of radiological diagnostics is left to traditional radiology. The state standards of higher medical education also provide that a clinician should be able to evaluate the possibilities of various methods of radiation therapy and choose the optimal one for the treatment of tumor and non-tumor diseases.

Knowledge of radiology will allow the future specialist to choose the optimal research method for detecting functional and morphological changes in the pathology of various organs and systems, and to interpret the data of radiological diagnostic methods in relation to clinical diagnosis, to evaluate the possibilities of various methods of radiation therapy and to choose the optimal one for the treatment of tumor and non-tumor diseases.

Types of educational activities of students according to the curriculum are lectures, practical classes and independent work.

Systematic assessment of academic performance and enrollment of individual components of the discipline includes the following elements: current academic performance, independent work and semester credit. Current educational activity of students is monitored in practical classes. The following methods of checking the level of students' training are used: oral survey, situational tasks, written tasks. During the evaluation of the mastery of each topic for the current educational activity, the student is given grades on a four-point scale. A student must receive a grade for each class.

Independent work of students is evaluated during the current control of the topic in the corresponding lesson. The learning of topics that are assigned only to independent extracurricular work is monitored during the final examination.

Differentiated credit is a form of final control, which consists in assessing the student's mastery of educational material from the discipline solely on the basis of the results of his performance of all types of educational work provided for in the work educational programme

3. Purpose and tasks of discipline.

1. The purpose of teaching the academic discipline "Radiology" is the formation of the scientific outlook of students, the development of modern forms of theoretical thinking and the ability to analyze the results of radiation research, the formation of abilities and skills for the application of radiation diagnostics methods during the study of other disciplines and in future practical activities.

2. The main tasks of studying the discipline "Radiology": According to the requirements of the educational and professional program, students must:

To know:

1. To know methods and means of protection against ionizing radiation;
2. To know the main properties of ionizing radiation;
3. To know radioactivity, its units and doses;
4. To know the structure of radiometers and dosimeters;
5. To know radiomodifying agents;
6. To know the basic principles and tasks of radiation therapy;
7. To know indications and contraindications for radiation therapy;
8. To know the algorithms of radionuclide diagnostics of different organs and systems, the basics of X-ray semiotics;

9. To know methods of contact radiation therapy;
10. To know hepatobiliary nuclear medicine imaging;
11. To know renal imaging in nuclear medicine;
12. To know radiopharmaceuticals used for renal scintigraphy and for hepatobiliary scintigraphy;
13. To know the role and place of ultrasound diagnostics in the in the complex of diagnostic radiology;
14. To know gallbladder radionuclide scan;
15. To know radionuclide diagnostics of diseases of the thyroid gland, hepatobiliary and cardiovascular systems;
16. To know tumor-tropic radiopharmaceuticals;
17. To know the biological effect of ionizing radiation;
18. To know the classification and characteristics of tumor markers;
19. To know methods of "in vivo" and "in vitro" diagnostics;
20. To know local radiation reactions and complications, clinic, treatment, prevention;
21. To know how to make a clinical and radiological diagnosis;
22. To know the chest X-ray anatomy and radiological methods of assessing of the lungs;
23. To know X-ray methods of imaging of the heart and large vessels;
24. To know the radiological features of diseases of salivary gland;
25. To know radiological signs of gallbladder, liver and biliary tract diseases;
26. To know X-ray anatomy and physiology of the urinary system;
27. To know radiological signs of pathology of the reproductive system and mammary glands;
28. To know radiographic findings of the bones and joints associated with aging;
29. To know radiographic signs of diseases and injuries of the bones and joints;
30. To know the radiological signs of pathology of the skull and spine, brain and spinal cord;
31. To know the radiological signs of diseases signs of diseases in otorhinolaryngology and ophthalmology;
32. To know modern diagnostic imaging such as Computed Tomography scans and Magnetic Resonance Imagine;
33. To know the radiological features of the diagnosis of viral pneumonias, including atypical pneumonia due to SARS-CoV-2;
34. To know radiological semiotics of foreign bodies.

To be able:

1. To be able to choose a method of radiation therapy for tumors and non-tumor diseases;
2. To be able to determine the radiotherapeutic interval;
3. To be able to choose the optimal radiological examination to detect functional and morphological changes in the pathology of different organs and systems;
4. To be able to interpret a hepatogram;
5. To be able to interpret a renogram;
6. To be able to choose the field of irradiation;
7. To be able to interpret the chest X-ray;
8. To be able to evaluate the X-ray image of the heart and large vessels;
9. To be able to draw up a radiation treatment plan for oncological diseases;
10. To be able to carry out a radiological examination of the lung;
11. To be able to conduct a radiological examination of the heart and large vessels;
12. To be able to conduct a radiological examination of the gastro-intestinal tract;
13. To be able to conduct a radiological examination of the hepatobiliary system;
14. To be able to conduct a radiological investigation of the urinary system;
15. To be able to conduct a radiological investigation of the reproductive system and mammary glands;
16. To be able to conduct a radiological examination of the bone-joint system;
17. To be able to conduct a radiological examination of the central nervous system;

18. To be able to conduct a radiological examination in otorhinolaryngology and ophthalmology;
19. To be able to describe radiological features of atypical pneumonia due to SARS-CoV-2.

3. Competencies and learning outcomes, the formation of which is facilitated by the discipline (general competencies and special competencies).

– integral competence

The ability to solve complex problems, including those of a research and innovation nature in the field of medicine. The ability to continue learning with a high degree of autonomy.

According to the requirements of the Higher Education Standard, the discipline ensures that students acquire the following **competencies**:

- general competencies (GC):

GC1. Ability to abstract thinking, analysis and synthesis;

GC2. Ability to learn and master modern knowledge;

GC3. Ability to apply knowledge in practical situations;

GC4. Knowledge and understanding of the subject area and understanding of professional activity;

GC5. Ability to adapt and act in a new situation;

GC6. Ability to make informed decisions;

GC7. Ability to work in a team;

GC8. Ability to interpersonal interaction;

GC10. Ability to use information and communication technologies;

GC11. Ability to search, process and analyze information from various sources

GC12. Determination and persistence in relation to assigned tasks and assumed responsibilities;

GC13. Awareness of equal opportunities and tender issues;

C14. The ability to realize one's rights and responsibilities as a member of society, to be aware of the values of civil (free democratic) society and the need for its sustainable development, the rule of law, the rights and freedoms of a person and a citizen in Ukraine;

GC15. The ability to preserve and multiply moral, cultural, scientific values and achievements of society based on understanding the history and patterns of development of the subject area, its place in the general system of knowledge about nature and society and in the development of society, technology and technology, use different types and forms of motor activities for active recreation and leading a healthy lifestyle.

- special (professional, subject) competencies (PC):

PC1. Ability to collect medical information about the patient and analyze clinical data;

PC2. Ability to determine the necessary list of laboratory and instrumental studies and evaluate their results;

PC3. Ability to establish a preliminary and clinical diagnosis of the disease;

PC4. Ability to determine the necessary regime of work and rest in the treatment and prevention of diseases;

PC5. Ability to determine the nature of nutrition in the treatment and prevention of diseases;

PC6. Ability to determine the principles and nature of treatment and prevention of diseases;

PC7. Ability to diagnose emergency conditions;

PC8. Ability to determine the tactics of providing emergency medical care;

PC9. Ability to conduct medical evacuation measures;

PC10. Ability to perform medical manipulations;

PC11. Ability to solve medical problems in new or unfamiliar environments in the presence of incomplete or limited information, taking into account aspects of social and ethical responsibility;

PC15. Ability to conduct an examination of working capacity;

PC16. Ability to maintain medical documentation, including electronic forms;

PC17. Ability to assess the impact of the environment, socio-economic and biological determinants on the state of health of an individual, family, population;

PC20. Ability to conduct epidemiological and medical-statistical research on the health of the population; processing of social, economic and medical information;

PC21. It is clear and unambiguous to convey one's own knowledge, conclusions and arguments on health care problems and related issues to specialists and non-specialists, in particular to persons who are studying;

PC24. Adherence to ethical principles when working with patients and laboratory animals;

PC25. Adherence to professional and academic integrity, to be responsible for the reliability of the obtained scientific results.

Detailing of competencies in accordance with the NQF descriptors in the form of the "Competence Matrix".

4. Prerequisites of discipline

The study of the discipline "Radiology" is provided for the III year in the 5th and 6th semesters, when the student has acquired relevant knowledge of the main basic disciplines with which the program of the educational discipline is integrated.

For successful learning and mastering of competencies in this discipline, it is advisable to acquire knowledge in such disciplines as: medical biology, parasitology and genetics, medical physics, biological chemistry, bioorganic chemistry, bioinorganic chemistry, physical and colloidal chemistry, human anatomy, normal physiology, pathological anatomy, pathological physiology, which students receive in parallel with studying radiology. It lays the foundations for the study of propaedeutics of internal diseases with patient care, general surgery with anesthesiology and patient care, propaedeutics of pediatrics with child care, which involves the integration of teaching with these disciplines and the formation of skills to apply knowledge of radiology in the process of further education and in professional activity.

5. Programme learning outcomes

List of learning outcomes

Results of study	Code of programmatic result of study	Code of competencies
To have thorough knowledge of the structure of professional activity. To be able to carry out professional activities that require updating and integration of knowledge. To be responsible for professional development, the ability for further professional training with a high level of autonomy.	PRS 1	GC1, GC2, GC3, GC4, GC5, GC6, GC7, GC8, GC10, GC11, GC12, GC13, GC14, GC15.
Understanding and knowledge of basic and clinical biomedical sciences, at a level sufficient for solving professional tasks in the field of health care.	PRS 2	GC1, GC2, GC3, GC4, GC5, GC6, GC7, GC8, GC10, GC11, GC12, GC13, GC14, GC15.
Specialized conceptual knowledge that includes scientific achievements in the field of health care and is the basis for conducting research, critical understanding of problems in the field of medicine and related interdisciplinary problems.	PRS 3	GC1, GC2, GC3, GC4, GC5, GC6, GC7, GC8, GC10, GC11, GC12, GC13, GC14, GC15.
To isolate and identify the leading clinical symptoms and syndromes according to standard methods, using the previous data of the patient's history, the data of the patient's examination, knowledge about the person, his organs and systems, to establish a preliminary clinical diagnosis of the disease.	PRS 4	GC1, GC2, GC3, GC6, GC7, GC8; PC1, PC2, PC3, PC24, PC25

<p>To collect complaints, anamnesis of life and diseases, evaluate the psychomotor and physical development of the patient, the state of organs and systems of the body, based on the results of laboratory and instrumental studies, evaluate information about the diagnosis, taking into account the age of the patient.</p>	<p>PRS 5</p>	<p>GC1,GC, GC3, GC6,GC, GC8; PC1, PC2, PC24, PC25</p>
<p>To establish the final clinical diagnosis by making a reasoned decision and analyzing the received subjective and objective data of clinical, additional examination, differential diagnosis, observing the relevant ethical and legal norms, under the control of the head physician in the conditions of the health care institution.</p>	<p>PRS 6</p>	<p>GC1, 3K2, 3K3, 3K6, 3K7, 3K8; PC1, PC2, PC3, PC24.</p>
<p>To assign and analyze additional (mandatory and optional) examination methods (laboratory, functional and/or instrumental) of patients with diseases of organs and body systems for differential diagnosis of diseases.</p>	<p>PRS7</p>	<p>GC1, GC2, GC3, GC4, GC6, PC2.</p>
<p>To determine the main clinical syndrome or what causes the severity of the victim/victim's condition (according to list 3) by making a reasoned decision and assessing the person's condition under any circumstances (in the conditions of a health care facility, outside its borders), including in conditions of emergency and hostilities, in field conditions, in conditions of lack of information and limited time.</p>	<p>PRS8</p>	<p>GC1, GC2, GC3, GC4, GC5, GC6, GC7, GC8, PC1,PC3, PC7, PC8, PC9, PC10, PC11.</p>
<p>To determine the nature and principles of treatment (conservative, operative) of patients with diseases (according to list 2), taking into account the age of the patient, in the conditions of the health care institution, outside its borders and at the stages of medical evacuation, including in field conditions, on the basis of a preliminary clinical diagnosis, observing the relevant ethical and legal norms, by making a reasoned decision according to existing algorithms and standard schemes, in case of the need to expand the standard scheme, be able to justify personalized recommendations under the control of the head physician in the conditions of a medical institution.</p>	<p>PRS9</p>	<p>GC1, GC2, GC3, GC4, GC5, GC6, GC7, GC8, PC1,PC3, PC6, PC7, PC8, PC9, PC10, PC11.</p>
<p>To determine the necessary mode of work, rest and nutrition on the basis of the final clinical diagnosis, observing the relevant ethical and legal norms, by making a reasoned decision according to existing algorithms and standard schemes.</p>	<p>PRS 10</p>	<p>GC1, GC2, GC3, GC4, GC5, GC6, GC7, GC8, PC1,PC3, PC4, PC6, PC7, PC8, PC9, PC10, PC11, PC24.</p>
<p>To determine tactics and provide emergency medical care in emergency situations (according to list 3) in limited time conditions according to existing clinical protocols and standards of treatment.</p>	<p>PRS 14</p>	<p>GC1, GC2, GC3, GC4, GC5, GC6, GC7, GC8, PC7, PC8, PC9, PC10.</p>
<p>To organize the provision of medical aid and medical evacuation measures to the population and military personnel in emergency situations and hostilities, including in field conditions.</p>	<p>PRS 15</p>	<p>GC1, GC2, GC3, GC4, GC5, GC6, GC7, GC8, PC6-PC10.</p>

To form rational medical routes for patients; organize interaction with colleagues in their own and other institutions, organizations and institutions; to apply tools for the promotion of medical services in the market, based on the analysis of the needs of the population, in the conditions of the functioning of the health care institution, its division, in a competitive environment.	PRS 16	GC1, GC2, GC3, GC4, GC5, GC6, GC7, GC8, PC6, PC7, PC8, PC9, PC11, PC17.
To perform medical manipulations (according to list 5) in the conditions of a medical institution, at home or at work based on a previous clinical diagnosis and/or indicators of the patient's condition by making a reasoned decision, observing the relevant ethical and legal norms.	PRS 17	GC1, GC2, GC3, GC4, GC5, GC6, PC10, PC24.
To determine the state of functioning and limitations of a person's vital activities and the duration of incapacity for work with the preparation of relevant documents, in the conditions of a health care institution, based on data about the disease and its course, peculiarities of a person's professional activity, etc. Maintain medical documentation regarding the patient and the contingent of the population on the basis of regulatory documents.	PRS 18	GC1, GC2, GC3, GC4, GC5, GC6, GC7, GC8,; PC11,PC15,PC16, PC25.
To search for the necessary information in the professional literature and databases of other sources, analyze, evaluate and apply this information.	PRS 21	GC1, GC2, GC3, GC4, GC6, C10;GC11,GC12; PC21, PC25.
To apply modern digital technologies, specialized software, and statistical data analysis methods to solve complex healthcare problems.	PRS 22	GC1, GC2, GC3, GC4, GC5, GC6,GC10; PC21, PC25.
To assess the impact of the environment on human health in order to assess the morbidity of the population.	PRS 23	GC1, GC2, GC3, GC4, GC5, GC6,GC10; PC17, PC21, PC25.
To organize the necessary level of individual safety (own and the persons he cares for) in case of typical dangerous situations in the individual field of activity.	PRS 24	GC1, GC2, GC3, GC4, GC5, GC6, GC10,GC12;
It is clear and unambiguous to convey one's own knowledge, conclusions and arguments on health care problems and related issues to specialists and non-specialists.	PRS 25	GC1, GC2, GC3, GC4, GC5, GC6; PC21.
To communicate freely in the national and English languages, both orally and in writing to discuss professional activities, research and projects.	PRS 27	GC1, GC2, GC3, GC5, GC6, GC11, GC12. PC21, PC25.

6. Format and scope of the discipline

Format of discipline	Full-time	
Type of class	Amount of hours	Amount of groups
Lectures	14	
Practical classes	45	
Independent work	61	

7. Topics and content of discipline

Occupation type code	Topic	Content of studying	Code of learning outcome	Teacher
Medical Radiology				
L - 1	Basic principles and methods of radiation therapy. Physical and biological foundations of radiation therapy. Selected radiation therapy schemes for malignant tumors and non-neoplastic diseases.	To acquire basic knowledge about the basic principles and methods of radiation therapy, physical and biological foundations of radiation therapy, selected schemes of radiation therapy for malignant tumors and non-neoplastic diseases.	K – 1-4, 6-8 A – 1-3, 9 C – 1-8	Ass. Prof. Verveha B.M.
L - 2	Diagnostic Ultrasound imaging in medicine. Principle of the method, structure and types of devices. Ultrasound examination of the internal organs and the thyroid gland. Application of diagnostic Ultrasound in obstetrics (to diagnose pregnancy and its terms, to identify fetal abnormalities) and in gynecology (detection of the inflammatory processes, tumors, and female genital tract anomalies).	To master basic knowledge of Diagnostic Ultrasound imaging, of internal organs, thyroid gland, application of Ultrasound diagnostics in obstetrics and gynecology.	K – 13 A – 3 C – 1-8, 16, 21, 24, 25	Ass. Prof. Verveha B.M.
L - 3	The science of Medical Radiology. Characteristics of methods of radionuclide diagnostics. The indications and contraindications for radionuclide diagnostics. Radionuclide diagnosis of diseases of the thyroid gland, the hepatobiliary system, the cardiovascular system, the respiratory system, the kidney, and the malignant tumors.	To master the basic knowledge of radionuclide diagnostics of diseases of the thyroid gland, the hepatobiliary system, the cardiovascular system, the respiratory system, the kidneys and the malignant tumors	K – 8, 10, 15 A – 3, 9-11 C – 1-8, 16, 21, 24, 25	Ass. Prof. Verveha B.M.

P – 1	<p>Organization of the radiological service. Peculiarities of the radiotherapy departments organization. Methods and means of protection against ionizing radiation. Basic Sanitary Rules for Radiation Safety of Ukraine (OSPU-2000). The norms of radiation safety of Ukraine (NRSU). Basic properties of ionizing radiation. The mechanism of action on healthy and pathologically changed cells. Radioactivity and dose. Dosimetry. Units of radioactivity and radiation doses. Structure of radiometers and dosimeters.</p>	<p>To acquire basic knowledge about the peculiarities of the organization of radiotherapy departments, methods and means of protection against ionizing radiation, the main properties of ionizing radiation, the mechanism of action on healthy and pathologically changed cells, radioactivity, dosimetry, the structure of radiometers and dosimeters.</p>	<p>K – 1-4, 17 A – 2, 3 C – 1-8, 21</p>	<p>Ass. Prof. Verveha B.M.</p>
P – 2	<p>Basic principles and tasks of radiation therapy. Radiotherapy interval. Radiomodifying agents. Radiotherapy for malignant tumors and for non-neoplastic diseases. Selection of radiation sources. Indications and contraindications for radiation therapy.</p>	<p>To master the basic knowledge of radiation therapy, radiation therapy for malignant tumor and for non-neoplastic diseases. Selection of radiation sources, indications and contraindications for radiation therapy.</p>	<p>K – 1-4, 6, 7 A – 1, 2,3 C – 1-8, 10</p>	<p>Ass. Prof. Verveha B.M.</p>
P – 3	<p>Types of external beam radiotherapy. X-ray therapy of malignant tumors and non-neoplastic lesions. Long-distance gamma therapy. Radiotherapy with high energy sources. The methods of contact radiation therapy. Treatment with incorporated radionuclides.</p>	<p>To master the basic knowledge external beam radiotherapy, x-ray therapy of malignant tumors and non-neoplastic lesions, long-distance gamma therapy, radiation therapy with high-energy sources, methods of contact radiation therapy. Treatment with incorporated radionuclides.</p>	<p>K – 1, 9 A – 1, 3 C – 1-8, 10</p>	<p>Ass. Prof. Verveha B.M.</p>

P – 4	The role and place of ultrasound diagnostics in the complex of diagnostic radiology. Biological effects of ultrasound.	To master the basic knowledge of ultrasound diagnostics in the complex of diagnostic radiology. Biological effects of ultrasound.	K – 13 A – 3 C – 1-8, 10	Ass. Prof. Verveha B.M.
P – 5	Determination of types of radiopharmaceuticals and calculation of activities. Disposal of radioactive waste. Basic principles of radionuclide diagnostics. Scheme of the assessing of the scanogram. Radionuclide methods in endocrinology. The radiopharmaceuticals used for the evaluation of the thyroid function. Assessing of the thyroid gland function by means of ¹³¹ I, ^{99m} Tc - intake tests. Radioimmunoassay – estimation of T3, T4, TSH. Radionuclide visualisation of the thyroid gland: scanning, scintigraphy. Thyroid disease diagnostic algorithm, diagnostic value.	To master the basic knowledge of radionuclide methods in endocrinology. The radiopharmaceuticals used for the evaluation of the thyroid function. Determination of the function of the thyroid gland using the ¹³¹ I absorption test and the ^{99m} Tc absorption test. Radioimmunoassay – estimation of T3, T4, TSH, radionuclide visualisation of the thyroid gland: scanning, scintigraphy, thyroid disease diagnostic algorithm, diagnostic value.	K – 15,16 A – 3 C – 1-8, 10	Ass. Prof. Verveha B.M.
P – 6	Radionuclide methods of assessing hepatobiliary system. Radiopharmaceuticals and radionuclide diagnostic procedures for evaluating function of the polygonal hepatic cells: hepatography, hepato-biliscintigraphy. Evaluating function of the reticular-endothelium system, radionuclide visualisation of the liver: scanning, scintigraphy. Radionuclide diagnostic of the gall bladder motor function. Diagnostic algorithm, diagnostic value.	To master the basic knowledge of radionuclide methods of assessing the hepatobiliary system. Radiopharmaceuticals and radionuclide diagnostic procedures for evaluating function of the polygonal hepatic cells: hepatography, hepato-biliscintigraphy. Evaluating function of the reticular-endothelium system, radionuclide visualisation of the liver: scanning, scintigraphy. Radionuclide methods of examination of the motor function of the gallbladder. Diagnostic algorithm, diagnostic value.	K – 10, 14 - 16 A – 3, 4 C – 1-8, 10	Ass. Prof. Verveha B.M.

P – 7	Radionuclide methods of assessing kidneys. Radiopharmaceuticals which are used for evaluation of urinary system. Radionuclide tubular and glomerular renography. Radionuclide visualisation of the kidneys: scanning, scintigraphy. Diagnostic algorithm, diagnostic value.	To master the basic knowledge of radionuclide methods of assessing kidneys. Radiopharmaceuticals which are used for evaluation of urinary system. Radionuclide tubular renography. Radionuclide glomerular renography, renoscintigraphy. Radionuclide visualisation of kidneys: scanning, scintigraphy. Diagnostic algorithm, diagnostic value.	K – 11, 12, 16 A – 3, 5 C – 1-8, 10	Ass. Prof. Verveha B.M.
P – 8	Radionuclide methods in oncology. Tumortropic radiopharmaceuticals. Positive and negative scanning and scintigraphy. Diagnostic of the malignant tumors with radioactive phosphor. Methods of the positive visualisation of the liver, lungs, bone, thyroid gland, brain, retroperitoneal and soft tissue tumors.	To master the basic knowledge of radionuclide methods in oncology. Tumortropic radiopharmaceuticals. Positive and negative scanning and scintigraphy. Diagnostic of the malignant tumors with radioactive phosphor. Methods of the positive visualisation of the liver, lungs, bone, thyroid gland, brain, retroperitoneal and soft tissue tumors.	K – 16, 18 A – 3, 9 C – 1-8, 10	Ass. Prof. Verveha B.M.
P – 9	Radionuclide diagnostics of the cardiovascular system. Radiocardiology, myocardium visualisation.	To master the basic knowledge of radionuclide diagnostics of the cardiovascular system. Radiocardiology, myocardium visualisation.	K – 15, 16 A – 3, 8 C – 1-8, 10	Ass. Prof. Verveha B.M.
P – 10	Radionuclide diagnostics of the lungs: assessing of the ventilatory function, pulmonary blood circulation, pulmonary visualisation.	To master the basic knowledge of radionuclide diagnostics of the lungs: assessing of the ventilatory function, pulmonary blood circulation, pulmonary visualisation.	K – 8, 22 A – 3, 10 C – 1-8, 10	Ass. Prof. Verveha B.M.

P – 11	Radionuclide diagnostics of the musculoskeletal system and central nervous system.	To master the basic knowledge of radionuclide diagnostics of musculoskeletal system and central nervous system.	K – 8, 28, 29 A – 3, 16, 17 C – 1-8, 10	Ass. Prof. Verveha B.M.
IWS- 1	Biological effect of ionizing radiation.	To master the basic knowledge of the biological effect of ionizing radiation.	K – 17 A – 3 C – 1-8, 21	Ass. Prof. Verveha B.M.
IWS – 2	Radiotherapy equipment, their advantages. Determination of the irradiation field.	To master the basic knowledge for using radiotherapeutic X-ray machine, the determination of the irradiation field	K – 1-3, 5 A – 3, 6 C – 1-8, 21	Ass. Prof. Verveha B.M.
IWS – 3	Radiation therapy for thyroid cancer.	To master the basic knowledge of radiation therapy for thyroid cancer.	K – 1-3, 6, 7, 15, 16 A – 3, 9 C – 1-8, 21	Ass. Prof. Verveha B.M.
IWS – 4	Dopplerography. Determination of blood flow parameters in the extremity vessels.	To master the basic knowledge of dopplerography. Determination of blood flow parameters in the extremity vessels.	K – 13, 23 A – 3, 11 C – 1-8, 21	Ass. Prof. Verveha B.M.
IWS – 5	Radionuclide diagnostics in endocrinology (pancreas, adrenal glands, pituitary gland).	To master the basic knowledge of radionuclide diagnostics in endocrinology (pancreas, adrenal glands, pituitary gland)	K – 1-3, 15 A – 3 C – 1-8, 21	Ass. Prof. Verveha B.M.
IWS – 6	Diagnosis of malignancies of the hepatobiliary system.	To master the basic knowledge of diagnosis of malignancies of the hepatobiliary system.	K – 15, 16, 18, 19 A – 3, 9, 13 C – 1-8, 21	
IWS – 7	Radioimmunological analysis in uro-nephrology. Vasorenal hypertension. Diagnostic methods "in vivo" and "in vitro".	To master the basic knowledge of radioimmunological analysis in uro-nephrology. Vasorenal hypertension. Diagnostic methods "in vivo" and "in vitro"	K – 8, 12, 19 A – 3, 14 C – 1-8, 21	
IWS – 8	Classification and characteristics of tumor markers.	Learn the classification and characteristics of tumor markers.	K – 18 A – 1, 3, 9 C – 1-8, 21	
IWS – 9	Sonographic diagnosis of congenital heart disease.	To master the basic knowledge of sonographic diagnosis of congenital heart disease.	K – 8, 23 A – 3, 11 C – 1-8, 21	

IWS – 10	Imaging of occupational lung disease.	To master the basic knowledge of imaging of occupational lung disease.	K – 8, 22 A – 3, 10 C – 1-8, 21	
IWS –11	Radionuclide semiotics of tumor lesions of bones and joints.	To master the basic knowledge of radionuclide semiotics of tumor lesions of bones and joints.	K – 8, 29 A – 3, 9, 16 C – 1-8, 21	
Medical Roentgenology				
L - 1	Basic methods of the image obtaining in medical radiology (X-rays, CT, MRI). Defence principles from the radiation exposure of the patients and labour-protective measures for radiological units personnel. Indications and contraindications for radiological studies, dose limitation for the X-ray procedure. Basic and additional methods of the X-ray examination for the evaluation of the respiratory system. Peculiarities of the visualizing according to the age and constitutional normal range. X-ray semiotics of the respiratory tract diseases.	To master the basic knowledge of the image obtaining in medical radiology (X-rays, CT, MRI). Defence principles from the radiation exposure of the patients and labour-protective measures for radiological units personnel. Indications and contraindications for radiological studies, dose limitation for the X-ray procedure. Basic and additional methods of the X-ray examination for the evaluation of the respiratory system. Peculiarities of the visualizing according to the age and constitutional normal range. X-ray semiotics of the respiratory tract diseases.	K – 1, 21, 32, 33 A – 3 C – 1-8, 16, 21, 24, 25	Ass. Prof. Verveha B.M.
L - 2	X-ray examination of the heart and large vessels. Peculiarities of the visualizing according to the age and constitutional normal range. X-ray semiotics of the heart and large vessels pathology (coronary heart disease, myocardial infarction, arterial hypertension, congenital and acquired valve diseases, aneurisms, non-specific inflammatory diseases, tumours).	To learn methods of X-ray examination of the heart and large vessels. Peculiarities of the visualizing according to the age and constitutional normal range. X-ray semiotics of the heart and large vessels pathology (coronary heart disease, myocardial infarction, arterial hypertension, congenital and acquired valve diseases, aneurisms, non-specific inflammatory diseases, tumours).	K – 8, 23 A – 3, 8, 11 C – 1-8, 16, 21, 24, 25	Ass. Prof. Verveha B.M.

L - 3	X-ray examination of the gastrointestinal tract, urinary tract, liver and bile ducts. X-ray semiotics of the gastrointestinal tract, urinary tract, liver and bile ducts diseases. X-ray examination in the emergency cases (injuries, haemorrhages, pain syndrome, obstruction).	To learn methods of X-ray examination of the gastrointestinal tract, urinary tract, liver and bile ducts. X-ray semiotics of the gastrointestinal tract, urinary tract, liver and bile ducts diseases. X-ray examination in the emergency cases (injuries, haemorrhages, pain syndrome, obstruction).	K – 8, 21, 25 A – 3, 12, 13, 14 C – 1-8, 16, 21, 24, 25	Ass. Prof. Verveha B.M.
L - 4	Methods of the X-ray examination of the bones and joints. Age peculiarities of the bones and joints visualizing. X-ray semiotics of the diseases and injuries of the bones and joints. X-ray examination of the central nervous system. X-ray semiotics of the skull, spine, brain and spinal cord injuries. X-ray studies and X-ray semiotics of the main diseases in otolaryngology and ophthalmology. X-ray diagnostic of emergency cases.	To learn methods of the X-ray examination of the bones and joints. Age peculiarities of the bones and joints visualizing. X-ray semiotics of the diseases and injuries of the bones and joints. X-ray examination of the central nervous system. X-ray semiotics of the skull, spine, brain and spinal cord injuries. X-ray studies and X-ray semiotics of the main diseases in otolaryngology and ophthalmology. X-ray diagnostic of emergency cases.	K – 8, 28 – 31 A – 3, 16 – 18 C – 1-8, 16, 21, 24, 25	Ass. Prof. Verveha B.M.
P – 1	X-ray methods of imaging (source of radiation, object of the study, detector of the radiation). Artificial contrasting of the object. Basic and special methods of the X-ray studies.	To master the basic knowledge of the X-ray methods of imaging (source of radiation, object of the study, detector of the radiation). Artificial contrasting of the object. Basic and special methods of the X-ray studies.	K – 8, 21 A – 3 C – 1-8, 16, 21, 24, 25	Ass. Prof. Verveha B.M.

P – 2	X-ray methods of the lung assessment, normal X-ray anatomy of the lung. Basic X-ray symptoms of the lung pathology. X-ray semiotics of the lung diseases (acute and chronic pneumonia, pulmonary artery thrombosis, chronic bronchitis, emphysema, limited nonspecific pneumosclerosis, tuberculosis, primary and metastatic cancer, pleuritis). Algorithm for X-ray examination of the organs of the chest.	To master the basic knowledge of the X-ray methods of the lung assessment, normal X-ray anatomy of the lung. Basic X-ray symptoms of the lung pathology. X-ray semiotics of the lung diseases (acute and chronic pneumonia, pulmonary artery thrombosis, chronic bronchitis, emphysema, limited nonspecific pneumosclerosis, tuberculosis, primary and metastatic cancer, pleuritis). Algorithm for X-ray examination of the organs of the chest.	K – 8, 22, 33, 34 A – 3, 7, 19 C – 1-8, 16, 21, 24, 25	Ass. Prof. Verveha B.M.
P– 3	X-ray methods of imaging of the heart and great vessels. Features of visualization in norm according to the age and constitution of the patient. X-ray semiotics of diseases of the heart and large vessels (ischemic heart disease, myocardial infarction, hypertensive heart disease, congenital and acquired defects, aneurysms, nonspecific inflammatory processes, tumors).	To master the basic knowledge of the X-ray methods of imaging of the heart and great vessels. Features of visualization in norm according to the age and constitution of the patient. X-ray semiotics of diseases of the heart and large vessels (ischemic heart disease, myocardial infarction, hypertensive heart disease, congenital and acquired defects, aneurysms, nonspecific inflammatory processes, tumors).	K – 8, 23 A – 3, 8 C – 1-8, 16, 21, 24, 25	Ass. Prof. Verveha B.M.

P – 4	X-ray examination of salivary glands and gastrointestinal tract. X-ray signs of salivary gland diseases. X-ray semiotics of diseases of the gastrointestinal tract. Emergency radiology (trauma, bleeding, pain syndrome, obstruction).	To master the basic knowledge of the X-ray examination of salivary glands and gastrointestinal tract. X-ray signs of salivary gland diseases. X-ray semiotics of diseases of the gastrointestinal tract. Emergency radiology (trauma, bleeding, pain syndrome, obstruction).	K – 8, 24, 25 A – 3, 12 C – 1-8, 16, 21, 24, 25	Ass. Prof. Verveha B.M.
P – 5	Radiological examination of the hepatobiliary system. Radiological signs of gallbladder, liver and biliary tract diseases.	To master the basic knowledge of the radiological examination of the hepatobiliary system. Radiological signs of gallbladder, liver and biliary tract diseases.	K – 8, 25 A – 3, 13 C – 1-8, 16, 21, 24, 25	Ass. Prof. Verveha B.M.
P – 6	X-ray examination of the urinary system. X-ray anatomy and physiology of the urinary system. Radiological signs of urinary tract pathology.	To master the basic knowledge of the X-ray examination of the urinary system. X-ray anatomy and physiology of the urinary system. Radiological signs of kidney and urinary tract pathology	K – 8, 26 A – 3, 14 C – 1-8, 16, 21, 24, 25	Ass. Prof. Verveha B.M.
P – 7	X-ray examination of the reproductive system and mammary glands. Radiological signs of pathology of the reproductive system and mammary glands.	To master the basic knowledge of the X-ray examination of the reproductive system and mammary glands. Radiological signs of pathology of the reproductive system and mammary glands.	K – 8, 27 A – 3, 15 C – 1-8, 16, 21, 24, 25	Ass. Prof. Verveha B.M.
P – 8	X-ray examination of the bones and joints. Radiographic findings of the bones and joints associated with aging. The types of bone remodeling. Radiological signs of diseases and injuries of the bones and joints. X-ray semiotics of benign and malignant tumors of the bone and joint in adults and children.	To master the basic knowledge of the X-ray examination of the bones and joints. Radiographic findings of the bones and joints associated with aging. The types of bone remodeling. Radiological signs of diseases and injuries of the bones and joints. X-ray semiotics of benign and malignant tumors of the bone and joint in adults and children.	K – 8, 28, 29 A – 3, 16 C – 1-8, 16, 21, 24, 25	Ass. Prof. Verveha B.M.

P – 9	X-ray examination of the central nervous system. Radiological signs of pathology of the skull, spine, brain and spinal cord.	To master the basic knowledge of the X-ray examination of the central nervous system. Radiological signs of pathology of the skull, spine, brain and spinal cord.	K – 8, 30 A – 3, 17 C – 1-8, 16, 21, 24, 25	Ass. Prof. Verveha B.M.
P – 10	X-ray studies in otorhinolaryngology and ophthalmology. Radiological signs of diseases in otorhinolaryngology and ophthalmology.	To master the basic knowledge of the X-ray studies in otorhinolaryngology and ophthalmology. Radiological signs of diseases in otorhinolaryngology and ophthalmology.	K – 8, 31 A – 3, 18 C – 1-8, 16, 21, 24, 25	Ass. Prof. Verveha B.M.
P – 11	Computed tomography scans and magnetic resonance imaging are modern diagnostic methods.	To master the basic knowledge of the Computed tomography scans and magnetic resonance imaging are modern diagnostic methods.	K – 8, 32 A – 3 C – 1-8, 16, 21, 24, 25	Ass. Prof. Verveha B.M.
IWS- 1	Basic and special methods of the X-ray studies of the respiratory system in paediatrics. X-ray semiotics of the professional lung diseases.	To master the basic and special methods of the X-ray studies of the respiratory system in paediatrics. X-ray semiotics of the professional lung diseases.	K – 22 A – 7 C – 1-8, 16, 21, 24, 25	Ass. Prof. Verveha B.M.
IWS – 2	Radiographic features of viral pneumonia.	To master the basic knowledge of the X-ray studies of viral pneumonia.	K – 33 A – 19 C – 1-8, 16, 21, 24, 25	Ass. Prof. Verveha B.M.
IWS – 3	Special methods of X-ray examination of the heart and great vessels. X-ray semiotics of diseases of the heart and great vessels in pediatrics	To learn special methods of X-ray examination of the heart and great vessels. X-ray semiotics of diseases of the heart and great vessels in pediatrics	K – 23 A – 11 C – 1-8, 16, 21, 24, 25	Ass. Prof. Verveha B.M.
IWS– 4	Special methods of X-ray examination of the large intestine	To learn special methods of X-ray examination of the large intestine	K – 25 A – 12 C – 1-8, 16, 21, 24, 25	Ass. Prof. Verveha B.M.
IWS – 5	Special methods of X-ray examination of the liver and bile ducts.	To learn special methods of X-ray examination of the liver and bile ducts.	K – 25 A – 13 C – 1-8, 16, 21, 24, 25	Ass. Prof. Verveha B.M.

IWS – 6	X-ray semiotics of diseases of the urinary tract in children.	To learn X-ray semiotics of diseases of the urinary tract in children.	K – 26 A – 14 C – 1-8, 16, 21, 24, 25	Ass. Prof. Verveha B.M.
IWS – 7	X-ray semiotics of genital tumors.	To learn X-ray semiotics of genital tumors.	K – 27 A – 15 C – 1-8, 16, 21, 24, 25	Ass. Prof. Verveha B.M.
IWS – 8	Radiographic age peculiarities of the bones and joints in paediatrics. X-ray peculiarities of the bone fractures in kids (epiphysiolysis, subperiostal fracture), inborn hip dislocation.	To master the basic knowledge of the radiographic age peculiarities of the bones and joints in paediatrics. X-ray peculiarities of the bone fractures in kids (epiphysiolysis, subperiostal fracture), inborn hip dislocation.	K – 28, 29 A – 16 C – 1-8, 16, 21, 24, 25	Ass. Prof. Verveha B.M.
IWS – 9	X-ray examination for evaluating injuries of the skull and spine. Pneumoencelelography.	To learn X-ray examination for evaluating injuries of the skull and spine. Pneumoencelelography.	K – 30 A – 17 C – 1-8, 16, 21, 24, 25	Ass. Prof. Verveha B.M.
IWS – 10	X-ray semiotics of the benign and malignant tumours otorhinolaryngology and ophthalmology.	To learn X-ray semiotics of the benign and malignant tumours otorhinolaryngology and ophthalmology.	K – 31 A – 18 C – 1-8, 16, 21, 24, 25	Ass. Prof. Verveha B.M.
IWS – 11	Computed tomography of the pathology of the bone and joints (diagnosis of tumors).	To master the basic knowledge of the Computed tomography of the pathology of the bone and joints (diagnosis of tumors).	K – 32, 34 A – 3 C – 1-8, 16, 21, 24, 25	Ass. Prof. Verveha B.M.

- 1) Test control of knowledge.
- 2) Situational tasks.
- 3) Oral survey and discussion of the topic.
- 4) Multimedia presentations.
- 5) Video materials, results of X-ray examination, ultrasound, MRI, CT
- 6) Visualization of X-ray radiological cases.

8. Verification of training results

Current control

Learning outcome code	Class type code	Method of verification of learning results	Enrollment criteria
K – 1-34 A – 1-19 C – 1-14, 1- 3, 7-10, 16, 21, 24, 25	L – 1-7 P – 1-22 IWS – 1-22	Types of educational activities of students according to the curriculum are: a) lectures; b) practical classes; c) independent work of students (IWS) The lecture course consists of 7 lectures. The topics of the lecture	Assessment of knowledge: Excellent ("5") - The student correctly answered 90-100% of tests of format A. Correctly, clearly and logically and completely answers all standardized questions of the current topic, including questions of the lecture course

		<p>course reveal the problematic issues of the relevant sections of Radiology. During lectures, students develop basic theoretical knowledge, provide a motivational component and a generally oriented stage of mastering scientific knowledge during students' independent work. In the lecture course, various didactic tools are used as much as possible. Lectures are the presentation of material necessary for the student to understand the subject while preparing for practical classes. Practical classes are clinical, aimed at monitoring the assimilation of theoretical material and the formation of practical skills and abilities, as well as the ability to analyze and apply the acquired knowledge to solve situational tasks, held on the clinical bases of the department. Each lesson begins with a test control in order to assess the initial level of knowledge and determine the degree of readiness of students for the lesson. The next stage of the lesson consists in the student's practical work with the description of the X-ray examination or radionuclide diagnostic of the thematic patient. Control is carried out by assessing the student's performance of practical skills, the ability to solve typical situational tasks. At the final stage for assessment of the student's mastery of the topic, he is asked to answer situational problems. The duration of one practical lesson of the topic and taking into account the norms of the weekly classroom load is 2.0 academic hours.</p>	<p>and independent work. Closely connects theory with practice and correctly demonstrates performance (knowledge) of practical skills. Solves situational tasks of increased complexity, knows how to summarize the material.</p> <p>Good ("4") - The student correctly answered 70-89% of tests of format A. Correctly and essentially answers the standardized questions of the current topic, lecture course and independent work. Demonstrates performance (knowledge) of practical skills. Correctly uses theoretical knowledge when solving practical tasks. Able to solve situational tasks of easy and medium complexity. Possesses the necessary practical skills and methods of their implementation in an amount that exceeds the required minimum.</p> <p>Satisfactory ("3") - The student correctly answered 50-69% of tests of format A. Incompletely, with the help of additional questions, answers standardized questions of the current topic, lecture course and independent work. Student cannot independently construct a clear, logical answer. During the answer and demonstration of practical skills, the student makes mistakes. The student solves only the easiest tasks.</p> <p>Unsatisfactory ("2") - The student answered less than 50% of the tests of form A. The student does not know the material of the current topic, cannot construct a logical answer, does not answer additional questions, does not understand the content of the material. During the answer and demonstration of practical skills, he makes significant, gross mistakes.</p>
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Final control		
General system of assesment	Participation in work during the semester/ differentiated credit-60%/40% on a 200-point scale	
Scales of assesment	traditional 4-point scale, multi-point (200-point) scale, ECTS rating scale	
Conditions of admission to the final control	The student attended all practical classes and received at least 66 points for the current performance	
Type of final control Differentiated credit	Methodology of final control All topics submitted for current control must be included. Grades from a 4-point scale are converted into points on a multi-point (200-point) scale in accordance with the Regulation "Criteria, rules and procedures for evaluating the results of students' educational activities"	Enrollment criteria The maximum number of points is 80. The minimum number of points is 50.
Evaluation criteria for the differentiated credit		
Differentiated credit	<p>The form of the final control is standardized, includes the control of theoretical and practical training and . consists of the following stages:</p> <p>I stage - a written answer to the test tasks of format A (form with computer check). The student answers the test package. Each package contains 66 tests in A-format and is valued at 1 point for each correct answer.</p> <p>II stage - a written answer to 7 situational tasks, to which the student must answer in writing form. Each correct answer is valued at 2 points.</p> <p>The maximum number of points that a student can score when taking a differentiated credit is 80 points.</p> <p>The minimum number of points for the differential credit is at least 50 points.</p>	<p>The grade in the discipline, which ends with a differentiated credit, is determined as the sum of points for the current educational activity (at least 72 points) and points for d differential credit (at least 50 points).</p> <p>Discipline points for students who have successfully completed the program are converted into a traditional 4-point scale according to absolute criteria:</p> <p>From 170 to 200 points - excellent; From 140 to 169 points is good; From 139 points to the minimum number of points that the student must score - satisfactory; Below the minimum number of points that a student must score (<50) is unsatisfactory.</p>

The calculation of the number of points is carried out on the basis of the grades received by the student on a 4-point (national) scale during the study of the discipline, by calculating the arithmetic mean (AM), rounded to two decimal places. The obtained value is converted into points on a multi-point scale as follows: $x = \frac{AM \times 120}{5}$

9. Politics of discipline

The policy of the academic discipline is determined by the system of requirements for the student when studying the discipline "Radiology" and is based on the principles of academic integrity.

Students are explained the value of acquiring new knowledge, academic norms that must be followed, why they are important, what academic integrity is, what its values and functions are, how students can contribute to its development by their actions; the essence, peculiarities and reasons for the inadmissibility of academic plagiarism are explained, students of higher education are encouraged to independently complete educational tasks, correctly refer to sources of information in case of borrowing ideas, statements, and information.

The policy of the academic discipline is:

in mandatory observance of academic integrity by students, namely:

- independent performance of all types of jobs, tasks, forms of control provided for by the work schedule the program of this academic discipline;
- references to sources of information in the case of using ideas, developments, statements, information;
- compliance with the legislation on copyright and international rights;
- provision of reliable information about the results of one's own educational (scientific) activity, used research methods and sources of information.

compliance with the principles and norms of ethics and deontology by students of higher education:

- actions in professional and educational situations from the standpoint of academic integrity and professional ethics and deontology;
- compliance with the internal rules of the clinical base of the department, to be tolerant, friendly and balanced in communication with students and teachers, patients, medical personnel of health care institutions;
- awareness of the significance of examples of human behavior in accordance with academic standards integrity and medical ethics.

attendance of classes by students of higher education:

- attendance at all classes is mandatory for the purpose of current and final assessment knowledge (except for good reason).

repassins of topics and practice of missed classes by students of higher education:

- missed classes are made up according to the schedule
- rewriting the topic of the lesson for which the student received a negative grade is held at convenient time for the teacher and the student outside of classes, the maximum grade is "good"; rewriting the topic during ongoing training and final control for the purpose of promotion assessment is not allowed

10.Literature

Basic

1. Myagkov O.P., Myagkov S.O. Atlas of radiation diagnostics of bone and soft tissue tumors. - Zaporizhzhia. - Shamrai G.S. - 2017. - 296 p.
2. Kravchuk S. Yu. Radiology [Text]: textbook /S. Yu. Kravchuk. - K.: Medicine, 2019. - 296 p.
3. Kovalsky O.V. Radiology. Radiation therapy. Radiation diagnostics [Text]: textbook /O.V. Kovalskyi, D.S. Mechev, V.P. Danylevich.-2nd ed.-Vinnytsia: New Book, 2017.-512 p.
4. Kovalsky O. Radiology. Radiotherapy. Diagnostic Imaging [Text] : textbook for students of higher med. educational establishments of IVth accreditation level/O. Kovalsky, D. Mechev, V. Danylevych.-2nd ed.-Vinnytsia: Nova Knyha, 2017.-504 p.
5. Barannyk E.A. Girnyk S.A., Tovstiyak V.V. Ultrasound Doppler methods of medical diagnostics. H.: KHNU named after V. N. Karazina. 2006. – 20 p.
6. Mathias Hofer. Computer tomography. Basic guide. - 2008
7. M. I. Spuziyak. Extended lectures on x-ray diagnostics of diseases of the support and movement system. Kharkiv. 2009. 295 p.
8. Under the editorship of A. P. Lazar. Selected lectures on radionuclide diagnostics and radiation therapy. Vinnytsia. New book. 2007. 196 p.
9. D.S. Mechev, M.I. Pylypenko. V.O. Rogozhyn European Charter of Training in Diagnostic Radiology - 2005 (translated from English) Kyiv. Medicine of Ukraine. 2007. - 124 p.

Additional

1. Essential radiology for medical students, interns and residents //A.Ahuja.-OMF publishing.-2017.- 518 p.
2. OSPU-2000.
3. NRBU 1998.
4. Order of the Ministry of Health of Ukraine No. 340 dated November 28, 1997. "On improving the organization of the radiation diagnostics and radiation therapy service".
5. Myagkov O.P., Myagkov S.O. Atlas of radiation diagnostics of bone and soft tissue tumors. - Zaporizhzhia. – Shamrai G.S. - 2017. - 296 p.
6. Essential radiology for medical students, interns and residents//A.Ahuja.-OMF publishing. 2017. 518 p.
7. Rife, Meller. Atlas of sectional human anatomy using CT and MRI sections as an example. 2010
8. D. A. Lazar, D. S. Mechev, V. D. Rozumenko, T. I. Rozumenko, T. I. Chebotaryova / Radiotherapy of brain tumors. Kyiv. Medicine of Ukraine. 2010. 170 p.
9. O. P. Myagkov, S. O. Myagkov. Atlas of radiation diagnostics of diseases and injuries of the skull. Zaporizhzhia. Tandem. 2008. 192 p.

Information resources

During discipline, studying due to the use of local and global computer networks, students use the following information resources and knowledge bases:

- 1 - Ministry of Health - <http://www.moz.gov.ua/ua/portal/>
- 2 - Wikipedia - <http://uk.wikipedia.org>
- 3 - UpToDate - <http://www.uptodate.com/home>
- 4 - Access Medicine - <http://accessmedicine.mhmedical.com>
- 5 - PubMed - <https://www.ncbi.nlm.nih.gov/pmc/>

Electronic versions of educational and methodological support:

Methodological recommendations for practical classes and independent work in radiology for students of the III year of the medical faculty by specialty: 222 - "Medicine", fields of knowledge 22 "Health care"
Access method: <http://misa.meduniv.lviv.ua/course/index.php?categoryid=635>

11. Equipment, logistical and software support of the discipline

Methodological support of the lecture course:

1. Abstracts of lectures.
2. Methodical recommendations for lectures.
3. Lecture presentations.
4. Educational video materials on the topic of the lecture.

Methodical support of practical classes:

1. Methodical recommendations for practical classes for teachers.
2. Methodical recommendations for practical classes for students.
3. Variants of tests to check the initial level of knowledge on each topic.
4. Variants of situational tasks to check mastery of topics.
5. Variants of tasks (theoretical and practical) for final control.
6. Clinical Radiology practice cases.

Material and technical support:

1. Multimedia projector.

12. Additional information

Department page

https://new.meduniv.lviv.ua/uploads/repository/kaf/kaf_radiology/03.%D0%A1%D0%B8%D0%BB%D0%B0%D0%B1%D1%83%D1%81%D0%B8/Sylabus_Radiologiya_3_medychnyj.pdf

Complier of the syllabus:

Bohdana VERVEHA,
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(Signature)

Head of the Department

Igor DATS, PhD, associate professor

(Signature)