

**MINISTRY OF HEALTH OF UKRAINE
ODESSA NATIONAL MEDICAL UNIVERSITY**

Faculty of medicine

Department of radiation diagnostics, therapy and radiation medicine and oncology

**Syllabus of the academic discipline
"Radiology"**

Scope of the academic discipline	Total number of hours per discipline: 90 hours, 3 credits. Semesters: IV. 2 year of study.
Days, time, place of educational discipline	According to the schedule of classes. Department of radiation diagnostics, therapy and radiation medicine and oncology. Odesa, st. Pishonivska, 1, 5-story building, 2nd floor, classrooms Odesa, st. Tinista, 8, ONMedU University Clinic, 1st floor, study rooms, CT room, densitometry room
Teacher(s)	V.M. Sokolov, doctor of medicine, professor, head of the department. Associate professors: Ph.D. V.M. Tsvihovskyi, Ph.D. Rozhkovska H.M. Assistants: Sliusarenko O.D., Dolgushyn O.O.
Contact Information	Help by phone: Dorofeeva Tamara Kuzmivna, acting head teacher of the department Onufrienko Tetyana Viktorivna, laboratory technician of the department Email: radiology@onmedu.edu.ua Face-to-face consultations: from 2:00 p.m. to 5:00 p.m. every Thursday, from 9:00 a.m. to 2:00 p.m. every Saturday Online consultations: from 4:00 p.m. to 6:00 p.m. every Thursday, from 9:00 a.m. to 2:00 p.m. every Saturday. A link to an online consultation is provided to each group during classes separately.

COMMUNICATION

Communication with applicants will be conducted in the classroom (face-to-face).

During distance learning, communication is carried out through the Microsoft Teams platform, as well as through e-mail correspondence, Viber messengers (through groups created in Viber for each group, separately through the head of the group).

ABSTRACT OF THE EDUCATIONAL DISCIPLINE

The subject of the discipline is modern radiation research methods and radiation signs of diseases of various organs and systems and the main methods of radiation therapy.

Prerequisites and post-requisites of the discipline (place of the discipline in the educational program):

Prerequisites: Ukrainian language (by professional direction), foreign language (by professional direction), Latin language and medical terminology, medical biology, medical and biological physics, biological and bioorganic chemistry, human anatomy, histology, physiology.

Post-requisites: pediatrics, internal medicine, surgery, obstetrics and gynecology, infectious diseases, epidemiology and principles of evidence-based medicine, oncology and radiation medicine, traumatology and orthopedics, phthiology, anesthesiology and intensive care, emergency and emergency medical care, general practice (family medicine).

Purpose of the discipline: training of future doctors in the diagnostic possibilities of radiation methods with the definition of radiation semiotics of diseases; teaching the basics of radiation therapy, taking into account indications and contraindications.

Tasks of the discipline:

1. Mastery of the ability to determine from the existing radiological methods of examination the optimal method of radiological examination for detecting functional and morphological changes in the pathology of various organs and systems.

2. Formation of skills to analyze the radiation semiotics of functional and morphological changes in the pathology of various organs and systems.

3. Mastering the ability to determine the optimal method of radiation therapy for the treatment of tumor and non-tumor diseases.

Expected results:

As a result of studying the academic discipline, the applicant must:

Know:

- physical and technical foundations of radiation research methods of various organs and systems
- the possibilities of various methods of radiation research of various organs and systems
- indications and contraindications for the appointment of each radiodiagnostic method
- radiation semiotics of diseases of various organs and systems
- the possibilities of different methods of radiation therapy in the treatment of patients

Be able:

- choose the optimal method of radiological examination to detect functional and morphological changes in the pathology of various organs and systems: lungs, mediastinum, heart and blood vessels, gastrointestinal tract, urinary system, bones and joints, central nervous system, thyroid gland
- evaluate radiation semiotics to detect functional and morphological changes in the pathology of the lungs, cardiovascular system, gastrointestinal tract, genitourinary system, musculoskeletal system, central nervous system, endocrine system.
- analyze the results of X-ray studies and, based on them, give an assessment of normality and pathology
- establish the most likely or syndromic diagnosis based on the detected functional and morphological changes.
- choose the optimal method of radiological research for the diagnosis of emergency conditions and diagnose emergency conditions using these methods.
- choose the optimal method of radiation therapy, taking into account the results of radiation and laboratory studies.

DESCRIPTION OF THE EDUCATIONAL DISCIPLINE

Forms and methods of education

The discipline will be taught in lectures (10 hours); practical classes (48 hours); organization of the applicant's independent work (32 hours).

Teaching methods:

Lectures.

Practical training:

- verbal methods: conversation, explanation, discussion, discussion of clinical cases, survey of applicants with clarification of key issues of the subject;
- visual methods: illustration (including multimedia presentations), radiographs, computer tomograms;
- practical methods: performance of test tasks, description of radiographs.

Independent work:

- independent work with recommended basic and additional literature, with electronic information resources, preparation for practical classes;

Content of the academic discipline

Topic 1. Basic properties of ionizing radiation. Biological effect of ionizing radiation on healthy and pathologically changed cells. Radioactivity and dose. Dosimetry of ionizing radiation

Types of radiation used in medical practice. Ionizing and non-ionizing radiation. Sources of radiation. Penetrating ability of ionizing radiation. Biological effect of irradiation. Effect of ionizing radiation on the cell. Somatic, genetic and stochastic effects of ionizing radiation. Species, individual, tissue differences in radiosensitivity. Radiotherapy interval and means of increasing it (oxygenation and hypoxia; hyperthermia, etc.). Radiomodifying agents (radiosensitizers and radioprotectors). Bergognier-Tribando rule. Radioactivity, units of radioactivity and methods of their determination. Dose of ionizing radiation. Units of exposure, absorbed, equivalent, effective doses. Types of dosimeters Limiting permissible doses (GDD) for different categories of the population and in emergency situations. Local and general exposure

Topic 2. Physical and technical foundations of X-ray diagnostics, computer tomography, ultrasound, magnetic resonance imaging and radionuclide research.

Structure and principle of operation of equipment for X-ray, CT, ultrasound, MRI and radionuclide studies. Characteristics of the radiation used in these studies. Principles of image acquisition with radiation research methods (radiation source and detector) Methodology of X-ray research: X-ray, X-ray, fluorography, computer tomography (CT). Methods of ultrasound diagnostic research: one-dimensional echography, sonography (ultrasound scanning), dopplerography. Features of visualization of organs and tissues during ultrasound examinations. The essence of the phenomenon of nuclear magnetic resonance and its physical characteristics. Radionuclide research methodology. Advantages and disadvantages of each method. Indications and contraindications for this or that method of radiation examination, the purpose of the methods is the study of morphology or (and) function, projections and sections of the study. Natural and artificial contrast. Contrast agents. Indications and requirements for their use.

Topic 3. Radiological methods of research of respiratory organs.

Methods of X-ray examination of the organs of the chest cavity. Lungs: fluorography, radiography (viewing, laterography), radiography, bronchography, tomography, computer tomography, magnetic resonance tomography, perfusion and inhalation scintigraphy, sonography. Indications and contraindications for prescribing this or that research method. Principles of image acquisition (radiation source and detector); natural and artificial contrast; projections and sections of the study.

Topic 4. Radiation signs of inflammatory diseases of the respiratory organs.

Radiological signs of inflammatory diseases of the respiratory organs: darkening of the lung field or its part, lightening of the lung field or its part, changes in the lung pattern and the root of the lung, displacement of mediastinal organs. Characteristics of eclipses by size, number, intensity, shape, structure, contours. Radiation semiotics of acute and chronic inflammatory processes of respiratory organs: bronchitis; pneumonia and their complications (abscess, destruction, pleurisy); pneumo-, hydro-, hydropneumothorax.

Topic 5. Radiation signs of pulmonary tuberculosis.

Primary and secondary forms of pulmonary tuberculosis. Radiation signs of the secondary form: focal, infiltrative, disseminated, disintegrating, fibrous. Features of tuberculosis in childhood:

primary tuberculosis complex and tuberculosis of intrathoracic lymph nodes (tumorous and infiltrative forms). Complications of pulmonary tuberculosis: pleurisy, pleural empyema. Algorithm of X-ray examination for pulmonary tuberculosis.

Topic 6. Radiation signs of lung tumors.

Forms of lung tumors. X-ray diagnostics of benign (intra-bronchial and external bronchial, epithelial and non-epithelial) lung tumors. Radiation diagnosis of malignant lung tumors. Radiation signs of central and peripheral cancer, metastatic lung lesions

Topic 7. Radiological research methods and radiological signs of diseases of the cardiovascular system.

Radiological methods of heart and blood vessel research and their characteristics (x-ray, x-ray, echocardiography, doppler echocardiography, radiocardiography, radioventriculography, myocardial scintigraphy, computer tomography, magnetic resonance tomography, angiocardiology, ventriculography, coronary angiography, aortography, cavography).

Classification of research methods according to sequence (primary, additional), invasiveness (non-invasive, invasive), obtained information (morphological, functional). Indications and contraindications for the use of radiological methods of research of the heart and blood vessels. The concept of X-ray endovascular interventions and indications for their use. Radiological signs of damage to the heart and blood vessels. Changes in the position of the heart: oblique, vertical, horizontal, dextroposition. Extracardiac causes of changes in the position of the heart. Changes in the shape of the heart (mitral, aortic, trapezoidal), causes of their formation. Algorithms of X-ray research and the main X-ray symptoms in some heart diseases: coronary disease and its complications, acquired (mitral, aortic) and congenital (with impoverished, enhanced and unchanged pulmonary circulation) heart defects, myocarditis, pericarditis.

Topic 8. Radiological methods of research of the gastrointestinal tract.

X-ray research methods: X-ray examination and X-ray of the abdominal cavity, X-ray of the esophagus, stomach, small intestine, large intestine (irigoscopy). Preparation for research. The plan of radiation research. Indications and contraindications for carrying out this or that radiation method of gastrointestinal tract research. Normal radiological anatomy of the organs of the alimentary canal: location and anatomical structure of the esophagus, stomach, small and large intestines. Artificial contrast of organs using X-ray positive and X-ray negative contrast substances. Normal radiological anatomy of the organs of the alimentary canal: location and anatomical structure of the esophagus, stomach, small and large intestines.

Topic 9. Radiation signs of diseases of the gastrointestinal tract.

The main radiological signs of the pathology of the alimentary canal: free gas in the abdominal cavity, areas of intestinal distention, shadows of foreign bodies and calculi, narrowing (diffuse, local, symmetrical, asymmetrical), expansion (diffuse, local, symmetrical, asymmetrical), irregularity of the contour (straightening, "niche", filling defect), mucosal changes (remodeling of the relief, "niche", filling defect).

Radiation signs of foreign bodies: esophagus, stomach and complications. X-ray examination for perforation of the hollow organ of the abdominal cavity, tumors of the esophagus, stomach. Conductive radiation syndromes of achalasia, dilatation of the esophagus, cicatricial strictures. Leading radiation syndromes of diseases of the alimentary canal: "acute abdomen"; inflammation (esophagitis, gastritis); gastric ulcer; malignant (cancer); benign (polyps) tumors; functional disorder (atonia, hypotension, hypertension, reflux).

Topic 10. Radiological research methods and radiological anatomy of the hepatobiliary system. Radiation signs of diseases of the hepatobiliary system.

Radiological methods of studying the liver and biliary tract: ultrasound, x-ray (cholecystography, cholangiography), radionuclide (hepatography, hepatobiliscintigraphy, hepatoscintigraphy with colloids, SPECT of the liver), CT and MRI. Indications and contraindications for X-ray examination of the liver and gallbladder. Radiation methods of functional research of the liver and gall bladder. Preparation of patients for research.

Radiological anatomy of the liver and biliary tract. Ultrasound, CT, MRI: localization,

number, shape, size, structure, contours of the pathological cell (cells). The nature of the cell during radionuclide examination is the degree of RFP accumulation (normal, increased, decreased). The nature of the cell in magnetic resonance imaging is the intensity of the signal in the magnetic field (hypo-, hyper-, iso-, an-).

Radiation signs of tumor (primary or secondary) and cystic lesions of the liver, hepatitis, cirrhosis. Calculous cholecystitis - radiological research methods and radiological signs.

Topic 11. Radiological research methods and radiological anatomy of the urinary system.

X-ray studies of the urinary system: inspection urography, intravenous excretory urography, antegrade and retrograde pyelography, cystography, sonography, CT and MRI of the kidneys, radionuclide diagnostics. Radiopaque and radioactive pharmaceutical preparations. Classification of RFP. Radiological anatomy and physiology of kidneys and urinary tract. Preparation of patients for research. Indications and contraindications for radiation examination.

Algorithm of X-ray examination for pathology of kidneys and urinary tracts: malformations, inflammatory diseases, urolithiasis, renal colic, tumors and cysts, kidney injuries.

Topic 12. Radiation signs of kidney and urinary tract diseases. Radiological signs of congenital developmental anomalies and kidney tumors.

Radiation signs of inflammatory diseases, developmental anomalies and tumors of the urinary system. Algorithm of radiation examination in kidney pathology: urolithiasis, congenital and acquired hydronephrosis, vesicoureteral reflux, renal colic, tumors and cysts, kidney injuries.

Topic 13. Radiological research methods and radiological anatomy of the musculoskeletal system. Densitometry.

Radiation methods of research: X-ray, radionuclide methods, ultrasound, CT, MRI. X-ray methods of bone and joint research: X-ray, tomography, fistulography, pneumoarthrography, angiography, densitometry.

Normal radiological anatomy of bones and joints: structure in the X-ray image, age-related features of the structure. Procedure for studying and describing the results of X-ray examination of bones and joints.

Radiographic signs of functional and morphological changes in the pathology of bones and joints. Changes in shape, size, position of bones, inconsistency of joint ends; changes in contours (periostitis, periostosis), changes in structure (osteoporosis, osteosclerosis, destruction, osteonecrosis, osteolysis, atrophy), changes in the joint space (narrowing, disappearance, compaction of joint surfaces, marginal bone growths).

Topic 14. Radiological signs of traumatic injuries of the upper and lower extremities, injuries of the skull, spine, pelvic bones.

Radiological signs of traumatic damage to bones and joints - fractures, dislocations. Types of debris displacement. Peculiarities of fractures in children and the elderly. X-ray picture of normal fracture healing. Complication of fracture healing. Radiological signs of traumatic damage to the skull, spine, pelvic bones - fractures, dislocations. Types of debris displacement. Peculiarities of fractures in children and the elderly. Complication of fracture healing. Algorithm of research in case of trauma to the skull, spine, pelvic bones.

Topic 15. Radiation signs of inflammatory diseases of the musculoskeletal system.

Radiological signs of inflammatory lesions of the musculoskeletal system: arthritis, osteomyelitis (acute and chronic), tuberculosis of bones and joints.

Topic 16. Radiological signs of tumors of the musculoskeletal system.

Radiological signs of bone tumors: benign (chondromas, osteomas, osteochondromas), malignant (osteogenic sarcoma, Ewing's sarcoma, osteoblastoclastoma, metastases). Radionuclide semiotics of tumor damage to bones and joints (primary and secondary), inflammatory processes.

Topic 17. Radiation methods in endocrinology. Radiation signs of diseases of the thyroid gland.

Radiological imaging methods of the thyroid gland: ultrasound, radionuclide, X-ray, CT, MRI. Indications and contraindications for this or that radiological method of thyroid research.

The main RFP. Preparation of patients for radionuclide examination of the thyroid gland. Radionuclide study of the functional state of the thyroid gland; accumulation test with ^{131}I , dynamic thyroscintigraphy with $^{99\text{m}}\text{Tc}$ -pertechnetate.

Radiation anatomy and physiology of the thyroid gland. Radiation semiotics of thyroid pathology: hypo-, hyperthyroidism, tumor lesions, inflammatory processes, abnormal location.

Topic 18. Radiological research methods and radiological anatomy of the reproductive system, mammary gland. Radiation signs of diseases of the reproductive system and breast.

Radiation methods of research genitals and mammary gland: ultrasound, x-ray, CT, MRI.

Radiological anatomy of genital organs and breast. Possibilities and main indications and contraindications for radiation examination. Radiation semiotics of genital and breast diseases: inflammatory processes, tumors.

Topic 19. Radiological research methods and radiological anatomy of the central nervous system. Radiation signs of diseases and injuries of the central nervous system.

X-ray techniques for studying the skull and brain (cranial X-ray, ventriculography, cisternography). Angiographic methods of CNS research. CT and MRI of the brain and spinal cord. Radionuclide studies of the central nervous system (static scintigraphy, SPECT, PET studies). RFPs used for radionuclide research of the central nervous system. Ultrasound of diseases in children.

Radiological anatomy of the skull and brain. Radiological anatomy of the spine and spinal cord.

The main radiation signs of CNS pathology: traumatic damage to the skull, brain, spine and spinal cord; vascular diseases of the brain (stroke, intracerebral hematomas); infectious and inflammatory diseases of the brain. Radiation signs of brain tumors. Pituitary tumors. Interventional neuroradiology.

Topic 20. Radiation signs of emergency conditions.

X-ray, radionuclide, ultrasound, magnetic resonance imaging signs of emergency conditions - myocardial infarction, pulmonary edema, hydropericardium, hydrothorax, pneumothorax, pulmonary embolism, foreign bodies in the bronchi, alimentary canal, intestinal obstruction, perforation of a cavity organ in the abdominal cavity, traumatic injuries The choice of the method of radiation examination for the diagnosis of a certain urgent condition.

Topic 21. Radiation therapy methods: X-ray therapy; contact methods; long distance gamma therapy and radiation therapy with high energy sources.

Basic principles of radiation therapy. Classification of radiation therapy methods. Radical, palliative, symptomatic treatment. Characteristics of combined, complex methods of treatment and the combined beam method. General and local radiation reactions with different methods of radiation therapy. Means of their prevention.

The main methods of contact radiation therapy: application, intracavitary, intratissue. Structure and forms of radiation sources. Closed and open sources of ionizing radiation. Long-range and near-range methods of external irradiation. Use of high-energy sources for the treatment of malignant tumors (betatron, linear and cyclic accelerators).

Topic 22. Basics of radiation therapy for tumor and non-tumor diseases.

Justification of radiotherapy of non-neoplastic diseases. Anti-inflammatory, desensitizing, analgesic effects of ionizing radiation. Indications and contraindications for radiation therapy. The basics of radiation therapy for non-neoplastic diseases, for example: radiculitis, inflammatory diseases of the rectum, fingers and hand, skin and subcutaneous tissue, osteomyelitis. Anti-inflammatory, analgesic, antispastic effects of radiation therapy.

Radiation treatment plan for oncological diseases. Basics of radiation therapy of tumors on the example of: tumors of the lungs, esophagus, stomach, colon, mammary glands, uterus.

Topic 23. Radiation diagnostics in oncology.

The main methods of radiation diagnostics used in oncology. Their advantages and

disadvantages. Cancer screening. Screening Program Requirements. Directions of radiation diagnostics, which are implemented at various stages of providing oncological care. The value of PET in the diagnosis of neoplasms.

Topic 24. Final control of mastering the discipline.

List of recommended literature:

Main:

1. Kovalskyi O. V. Radiology. Radiation therapy. X-ray diagnostics: tutorial. for students higher honey. education closing IV level of accreditation / O. V. Kovalskyi, D. S. Mechev, V. P. Danylevich. - 2nd edition. - Vinnytsia: New Book, 2017. - 512 p.
2. Radiology (radiodiagnosis and radiation therapy). Kyiv, Book plus, 2013. -743 p.
3. Radiology (radiodiagnosis and radiation therapy). Test tasks. Part 1. Kyiv, Book plus. 2015. - 104 p.
4. Radiology (radiodiagnosis and radiation therapy). Test tasks. Part 2. Kyiv, Book plus. 2015. - 168 p.
5. Radiology (radiodiagnosis and radiation therapy). Test tasks. Part 3. Kyiv, Book plus. 2015. - 248 p.
6. Radiodiagnostic methods Study guide (Department of Medical Research Protocol No. 5 dated 05.25.17) N.V. Tumanska, K.S. Barska. 143 p
7. Radiology. Educational and methodological complex of the educational discipline "Radiology" for students of the III year of the I and II medical faculty of the VNMZ of the educational and qualification level "specialist" in the direction 1201 "Medicine" of the specialty 7.12010001 "Medical business", 8.12010002 "Pediatrics" / N.V. Tumanska, S.O. Myagkov, O.G. Nordio, T.M. Kichangina - Zaporizhzhia: ZDMU, 2018. - 153 p.
9. Koval G.Yu., Mechev D.S., Sivachenko T.P. etc.; In general ed. G.Yu. Blacksmith. Radiation diagnostics - K.: Medicine of Ukraine, 2009. T.1., T.2.
10. Radiation diagnostics: [In 4 volumes] / Koval G.Yu., Mechev D.S., Miroshnychenko S.I., Sharmazanova O.P. etc./Edited by G.Yu. Koval.— K.: Medicine of Ukraine: T. I. — 2018.— 302 p.: ill. ISBN 978-617-7769-00-1 T.2. — 2020. — 768 p.
11. Mechev D.S., Murashko V.O., Kovalenko Yu.M. Application of sources of ionizing radiation in medicine (manual). Kyiv, - 2010, 105 p.
12. Radiology: textbook /S.Yu. Kravchuk – K.: VSV "Medicine". 2019. - 296
13. Radiation diagnostics of oncological diseases of various organs and systems: a study guide / I.O. Voronzhev [and others]; Hark. honey. Acad. postgraduate of Education, Faculty of Education radiology and pediatrics. radiology - Kharkiv: Disa plus, 2018. - 471 p. : fig. - Bibliography: p. 463-471.

Additional:

1. Informational and analytical bulletin "Radiological Herald"
2. Means of protecting the body against the action of ionizing radiation: study guide / L.M. Vasko, V.F. Pocherniaeva, V.P. Bashtan, VSV "Medicine" - 2019. - 212 p.
3. Scientific and practical magazine "RADIATION DIAGNOSTICS, RADIATION THERAPY".
4. NRBU 1997.
5. "X-ray diagnostics" edited by V.I. Milka, T.V. Topchii, A.P. Lazar, et al., "New Book", 2005
6. OSPU-2000
7. 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"
8. Ma O. J., Mathier J. R. Ultrasound research in emergency medicine. Bynom, 2014, 558 p.
9. Mechev D. S., V. O. Murashko, Yu. M. Kovalenko Application of sources of ionizing radiation in medicine (manual). Kyiv, - 2010, 105 p.

10. D. A. Lazar, D. S. Mechev, V. D. Rozumenko, T. I. Rozumenko, T. I. Chebotaryova/Radiation therapy of brain tumors. Kyiv, Medicine of Ukraine, 2010.170 p.
11. Korychensky A.N. Synopsis of a doctor of ultrasound diagnostics: System of description and data processing of ultrasound examination of breast glands US BI-RADS. Studies of modern ultrasound diagnostics. Issue 10. — K.: VBO "Ukrainian Doppler Club", 2013. — 120 p.
12. Koval G.Yu., Mechev D.S., Sivachenko T.P. etc.; In general ed. G.Yu. Blacksmith. Radiation diagnostics - K.: Medicine of Ukraine, 2009. T.1., T.2.
13. Yu.Yu. Shevchenko, Adapted textbook on radiology (First module): textbook. - Sumy: Sumy State University, 2019. - [Electronic resource].
14. Chen M. Basic Radiology / Michael YM Chen, Thomas L. Pope, David J. Ott. — 2nd ed. — McGraw Hill Professional, 2010. — 408 p.
MA Flower, Webb's Physics of Medical Imaging. – 2nd ed. - CRC Press, 2012. - 864

Information resources.

1. Free full-text archive of biomedical and life sciences journals at the National Library of Medicine, National Institutes of Health (NIH/NLM), PubMed:<https://www.ncbi.nlm.nih.gov/pmc>
2. Information and legal system with the full scope of the main regulatory documents of Ukraine and legislative innovations:<https://ips.ligazakon.net/document/view/RE10832?an=22>
3. International joint educational web resource on radiology: <https://radiopaedia.org>
4. Educational web resource on radiology:<http://radiologyassistant.nl>
5. Educational web resource on radiology:<http://learningradiology.com>
6. Educational web resource on radiology:<http://www.radiologyeducation.com/>
7. Ukrainian portal of ultrasound diagnostics: <http://www.ultrasound.net.ua/>

EVALUATION

Current control: individual survey on the questions of the relevant topic, evaluation of the description of research results, evaluation of the performance of test tasks by topic.

Final control: oral differential assessment.

Evaluation of the current educational activity in a practical session:

1. Evaluation of theoretical knowledge on the subject of the lesson:
 - methods: survey
 - maximum score – 5, minimum score – 3, unsatisfactory score – 2.
2. Evaluation of the description of research results:
 - methods: oral description of research results
 - maximum score – 5, minimum score – 3, unsatisfactory score – 2.
3. Evaluation of the performance of test tasks by topics:
 - maximum score – 5, minimum score – 3, unsatisfactory score – 2.

The grade for one practical session is the arithmetic average of all components and can only have a whole value (5, 4, 3, 2), which is rounded according to the statistical method.

Current evaluation criteria in practical training

Rating	Evaluation criteria
Perfectly "5"	The applicant takes an active part in practical training; demonstrates deep knowledge, gives complete and detailed answers to questions; takes an active part in the discussion of the results of the radiological examination, correctly and consistently compiles the algorithm of the radiological examination in relation to a certain pathology; uses additional educational and methodological and scientific literature; expresses his own reasoning, gives appropriate examples, demonstrates

	<p>clinical thinking.</p> <p>The test tasks are completed in full, all 100% of the answers to the questions are correct, the answers to the open questions are complete and justified.</p>
Fine "4"	<p>The applicant participates in a practical session; knows the material well; demonstrates the necessary knowledge, but gives answers to questions with some errors; participates in the discussion of the results of radiation examination, correctly compiles the algorithm of radiation examination in relation to a certain pathology, uses basic educational and methodological and scientific literature; expresses his own opinion on the subject of the lesson.</p> <p>The test tasks are completed in full, at least 70% of the answers to the questions are correct, the answers to the open questions are generally correct, but there are some errors in the definitions.</p> <p>The winner expresses his opinion on the subject of the lesson, demonstrates clinical thinking.</p>
Satisfactorily "3"	<p>The acquirer sometimes participates in a practical activity; partially speaks and asks questions; makes mistakes when answering questions; shows passive work in practical classes; the radiological research algorithm for a certain pathology is inconsistent with significant errors; shows fragmentary knowledge of the conceptual apparatus and literary sources.</p> <p>The testing was carried out in full, at least 50% of the answers are correct, the answers to the open questions are not logical, with obvious errors in the definitions.</p> <p>The winner does not express his opinion on the topic of the lesson.</p>
Unsatisfactorily "2"	<p>The acquirer does not participate in the practical session, is only an observer; never speaks or asks questions, disinterested in learning the material; does not take part in the discussion of the results of radiological examination, incorrectly compiles the algorithm of radiological examination for a certain pathology, gives incorrect answers to questions, shows unsatisfactory knowledge of the conceptual apparatus and literary sources.</p> <p>Testing not done.</p>

Only those applicants who have fulfilled the requirements of the training program in the discipline, have no academic debt and their average score for the current educational activity in the discipline is at least 3.00 are admitted to the final control in the form of a differentiated credit.

The structure of the final control of mastering the discipline

The content of the evaluated activity	Scores
Independent description of the radiograph of the chest cavity	2
Independent description of the radiograph of the musculoskeletal system)	1
Answer to 2 (two) theoretical questions.	2

Criteria for evaluating the learning outcomes of education seekers at differentiated assessment

Rating	Evaluation criteria
Perfectly	The applicant demonstrates deep knowledge, gives complete and detailed answers to questions; interprets the results of both proposed radiological studies freely and without error; expresses his own reasoning, gives appropriate examples, demonstrates clinical thinking Answers to open questions are complete and substantiated.

Fine	The acquirer has a good command of the material; demonstrates the necessary knowledge, but gives answers to questions with some errors; correctly evaluates the results of research, but allows minor inaccuracies; expresses own opinion, demonstrates clinical thinking. The answers to the open questions are generally correct, but there are some errors in the definitions.
Satisfactorily	The applicant makes mistakes when answering questions; does not have enough material for evaluating the results of radiological studies, the description of radiographs is not complete, leading radiological syndromes are detected with errors; does not express his opinion. Answers to open questions are not logical, with obvious significant errors in definitions.
Unsatisfactorily	The applicant makes mistakes when answering questions; does not have sufficient knowledge of the material for evaluating the results of radiological studies, does not express his opinion. Answers to open questions are not logical, with obvious significant errors in definitions.

The obtained average score for the academic discipline for applicants who have successfully mastered the work program of the academic discipline is converted from a traditional four-point scale to points on a 200-point scale, as shown in the table:

Table of conversion of a traditional assessment into a multi-point assessment:

Traditional four-point scale	Multipoint 200-point scale
Excellent ("5")	185-200
Добре («4»)	151-184
Задовільно («3»)	120-150
Незадовільно («2»)	Нижче 120

INDEPENDENT WORK OF HIGHER EDUCATION ACQUIRES

Independent work involves:

- work with recommended basic and additional literature, with electronic information resources
- preparation for each practical session

EDUCATIONAL DISCIPLINE POLICY

Deadlines and Rescheduling Policy:

- Absences of classes for non-respectable reasons will be worked out according to the schedule of the teacher on duty.
- Absences for valid reasons are worked out according to an individual schedule with the permission of the dean's office.

Academic Integrity Policy:

Applicants must observe academic integrity, namely:

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

used research methods and sources of information.

Unacceptable in educational activities for participants of the educational process are:

- the use of family or official ties to obtain a positive or higher grade during any form of control of academic performance or academic merit;
- use of prohibited auxiliary materials or technical means (cheat sheets, notes, micro-earphones, telephones, smartphones, tablets, etc.) during control measures;
- going through procedures for monitoring the results of training by fake persons.

For violation of academic integrity, students may be held to the following academic responsibility:

- a decrease in the results of assessment of the control work, assessment in class, credit, etc.;
- retaking the assessment (test, credit, etc.);
- assignment of additional control measures (additional individual tasks, control works, tests, etc.);
- conducting an additional inspection of other works authored by the violator.

Attendance and Tardiness Policy:

A student who is late for class can attend it, but if the teacher has put "nb" in the journal, he must complete it in the general order.

Uniforms: a medical gown that completely covers outer clothing, a mask, and a change of shoes.

Equipment: notebook, pen.

State of health: applicants suffering from acute infectious diseases, including respiratory diseases, are not allowed to attend classes.

Use of mobile devices:

Mobile devices may be used by students with the permission of the instructor if they are needed for the assignment.

Behavior in the audience:

The behavior of applicants and teachers in the classrooms should be working and calm, strictly comply with the rules established Regulations on academic integrity and ethics of academic relations at Odessa National Medical University, in accordance with Code of Academic Ethics and Relations of the University Community of Odessa National Medical University, Regulation on prevention and detection of academic plagiarism in research and educational work of higher education applicants, scientists and teachers of Odesa National Medical University.