

MINISTRY OF HEALTH OF UKRAINE

ODESSA NATIONAL MEDICAL UNIVERSITY

Department of Radiation Diagnostics, Therapy and Radiation Medicine and Oncology

APPROVE

Vice-rector for scientific and pedagogical work

Eduard Buryachkivskyi

September 1, 2023

**ACADEMIC CURRICULUM OF THE ACADEMIC DISCIPLINE
"RADIOLOGY"**

Level of higher education: second (master's)

Branch of knowledge: 22 "Health care"

Specialty: 222 "Medicine"

Educational and professional program: Medicine

The academic curriculum is composed on the basis of the educational and professional program "Medicine" for the training of specialists of the second (master's) level of higher education in the specialty 222 "Medicine" of the field of knowledge 22 "Health care", approved by the Academic Council of ONMedU (protocol No. 8 of June 29, 2023).

Developers:

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The academic curriculum was approved at the meeting of the department of radiation diagnostics, therapy and radiation medicine and oncology
Protocol No. 1 dated August 30, 2023.

Head of the department

 Viktor SOKOLOV

Agreed with the PAC guarantor

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Approved by the subject cycle methodical commission for therapeutic disciplines of ONMedU
Protocol No. 1 dated August 31, 2023.

Head of the subject cycle methodical commission for therapeutic disciplines of ONMedU

 Olena VOLOSHYNA

Reviewed and approved at the meeting of the department

Protocol No. ___ of "___" _____ 20__

Head of Department _____

(signature) (First Name Surname)

Reviewed and approved at the meeting of the department

Protocol No. ___ of "___" _____ 20__

Head of Department _____

(signature) (First Name Surname)

1. Description of the academic discipline:

Name of indicators	Discipline, specialty, specialisation, level of higher education	Characteristics of the academic discipline
Total:	Discipline: 22 «Health care»	<i>Full-time education</i> <i>Mandatory discipline</i>
Credits: 3	Specialty: 222 «Medicine»	<i>Year of training: 2</i>
Hours: 90	Higher education level:	<i>Semester IV</i>
Content	second (master's)	<i>Lectures (10 hours)</i>
modules: 8		<i>Seminars (0 hours)</i>
		<i>Practical (48 hours)</i>
		<i>Laboratory (0 hours)</i>
		<i>Independent work (32 hours)</i>
		<i>including individual tasks (0 hours)</i>
		<i>The form of the final control is a differentiated assessment.</i>

2. The purpose and missions of the academic discipline, competences, programme learning outcomes.

The **purpose of discipline**: training of prospective physicians in the diagnostic possibilities of radiological examination methods with definition of the radiological semiotics of diseases; teaching the basics of radiotherapy taking into account the indications and contraindications.

The **missions**:

1. Master the ability to determine the optimal method of radiological examination from the existing ones in order to detect functional and morphological changes in the pathology of various organs and systems.
2. Shape the ability to analyse radiological semiotics of functional and morphological changes in the pathology of various organs and systems.
3. Master the ability to determine the optimal method of radiotherapy for the treatment of tumourous and non-tumourous diseases.

The process of studying the discipline is aimed at forming elements of the following competencies:

General (GC):

- GC1. The ability to abstract thinking, analysis and synthesis according to the requirements of the NRK
- 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

GC14. The ability to realize one's rights and responsibilities as a member of society, to be aware of the values of a public (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 an understanding of 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 technologies, to use various types and forms of motor activity for active recreation and leading a healthy lifestyle

GC16. The ability to evaluate and ensure the quality of the work performed

GC17. The desire to preserve the environment

Special (SC):

SC1. Ability to collect medical information about the patient and analyze clinical data

SC2. Ability to determine the necessary list of laboratory and instrumental studies and evaluate their results

SC3. Ability to establish a preliminary and clinical diagnosis of the disease

SC7. Ability to diagnose emergency conditions

SC8. Ability to determine tactics and provide emergency medical care

SC9. Ability to carry out medical evacuation measures

SC10. Ability to perform medical manipulations

SC16. Ability to maintain medical documentation, including electronic forms

SC23. The ability to develop and implement scientific and applied projects in the field of health care

SC24. Adherence to ethical principles when working with patients and laboratory animals

SC25. Adherence to professional and academic integrity, to be responsible for the reliability of the obtained scientific results

SC26. The ability to determine the management tactics of persons subject to dispensary supervision

SC27. The ability to diagnose and determine the management tactics of patients with extrapulmonary and widespread forms of tuberculosis, including co-infection of TB/HIV with a chemoresistant course

Program learning outcomes (PLO):

PLO1. 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.

PLO2. Understanding and knowledge of fundamental and clinical biomedical sciences, at a level sufficient for solving professional tasks in the field of health care.

PLO3. Specialized conceptual knowledge, which 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.

PLO4. Identify and identify leading clinical symptoms and syndromes (according to list 1); according to standard methods, using preliminary data of the patient's history, data of the patient's examination, knowledge about the person, his organs and systems, establish a preliminary clinical diagnosis of the disease (according to list 2).

PLO5. Collect complaints, history of life and diseases, evaluate psychomotor and physical development of the patient, state of organs and systems of the body, based on the results of laboratory and instrumental studies, evaluate information regarding the diagnosis (according to list 4), taking into account the age of the patient.

PLO6. To establish a final clinical diagnosis by making a reasoned decision and analyzing the received subjective and objective data of clinical, additional examination, carrying out differential diagnosis, observing the relevant ethical and legal norms, under the control of the managing physician in the conditions of the health care institution (according to the list 2).

PLO7. Assign and analyze additional (mandatory and optional) examination methods (laboratory, functional and/or instrumental) (according to list 4) of patients with diseases of organs and body systems for differential diagnosis of diseases (according to list 2).

PLO8. Determine the main clinical syndrome or symptom that determines the severity of the victim's condition (according to list 3) by making a reasoned decision about 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.

PLO9. 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 a 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 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 substantiate personalized recommendations under the control of the head physician in the conditions of a medical institution.

PLO14. Determine tactics and provide emergency medical care in emergency situations (according to list 3) in limited time in accordance with existing clinical protocols and treatment standards.

PLO18. 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 the person's professional activity, etc. Maintain medical documentation regarding the patient and the contingent of the population on the basis of regulatory documents.

PLO21. Search for the necessary information in the professional literature and databases of other sources, analyze, evaluate and apply this information.

As a result of studying the academic discipline, the student of higher education must:

Acknowledge:

- physical-technical basics of radiation methods for the examination of organs and systems
- the possibilities of different methods of radiological examination of different organs and systems
- indications and contraindications to the prescription of each radiodiagnostic method radiological semiotics of diseases of various organs and systems

Suffice:

- to determine and arbitrate the optimal method of radiological examination in order 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.
- to evaluate radiological semiotics in order 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.
- to analyse the results of the radiological examinations and, in relation to them, make an assessment of the norm and pathology.
- to formulate the most probable or syndromic diagnosis based on the determined functional and morphological changes.
- to determine and arbitrate the optimal method of radiological examination for the diagnosis of emergency cases and to apply the methods for diagnosing emergency conditions.
- to determine and arbitrate the optimal method of radiotherapy in relation to the results of radiological examinations and laboratory tests.

3. Academic discipline content

Content module 1.

Introduction to radiology. Biological effect of ionising radiation. Dosimetry.

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.

Content module 2.

Complex radiation diagnosis of diseases of the chest cavity.

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.

Content module 3.

Comprehensive radiation diagnosis of diseases of the abdominal cavity.

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 their complications. X-ray examination in case of perforation of the hollow organ of the abdominal cavity, pathology of the stomach, intestinal obstruction. 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) 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.

Content module 4.

Complex radiation diagnosis of diseases of the urinary system

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.

Content module 5.

Complex radiation diagnosis of diseases of the musculoskeletal system.

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.

Content module 6.

Comprehensive radiation diagnostics in endocrinology. Radiation signs of diseases of the thyroid gland, breast gland and reproductive system

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.

Content module 7.

Comprehensive radiation diagnosis of CNS diseases and emergency conditions.

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.

Content module 8.

Radiation diagnostics in oncology. Principles and methods of radiation therapy.

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.

4. Academic discipline structure

Topic names	Hours					
	Total	including				
		lectur es	seminars	practical	lab	SIW
Content module 1.						
Introduction to radiology. Biological effect of ionizing radiation. Dosimetry.						
Visualization methods in radiation diagnostics						
Topic 1. Basic properties of ionizing radiation. Biological effect of ionizing radiation on healthy and pathologically changed cells. Radioactivity and dose. Dosimetry of	4	1	0	2	0	1

ionizing radiation						
Topic 2. Physical and technical foundations of X-ray diagnostics, computer tomography, ultrasound, magnetic resonance imaging and radionuclide research.	4	1	0	2	0	1
<i>Together according to content module 1</i>	8	2	0	4	0	2
Content module 2.						
Complex radiation diagnosis of diseases of the chest cavity.						
Topic 3. Radiological methods of research of respiratory organs.	4	1	0	2	0	1
Topic 4. Radiation signs of inflammatory diseases of the respiratory organs.	3	0	0	2	0	1
Topic 5. Radiation signs of pulmonary tuberculosis.	4	0	0	2	0	2
Topic 6. Radiation signs of lung tumors.	3	0	0	2	0	1
Topic 7. Radiation methods of research of the cardiovascular system. Radiation signs of diseases of the cardiovascular system.	5	1	0	2	0	2
<i>Together according to content module 2</i>	19	2	0	10	0	7

Content module 3.

Comprehensive radiation diagnosis of diseases of the abdominal cavity.

Topic 8. Radiological methods of research of the gastrointestinal tract.	4	1	0	2	0	1
Topic 9. Radiation signs of diseases of the gastrointestinal tract.	4	1	0	2	0	1
Topic 10. Radiological research methods and radiological anatomy of the hepatobiliary system. Radiation signs	3	0	0	2	0	1

of diseases of the hepatobiliary system.						
<i>Together according to content module 3</i>	11	2	0	6	0	3
Content module 4.						
Complex radiation diagnosis of diseases of the urinary system.						
Topic 11. Radiological research methods and radiological anatomy of the urinary system.	4	0	0	2	0	2
Topic 12. Radiation signs of kidney and urinary tract diseases. Radiological signs of congenital developmental anomalies and kidney tumors.	4	0	0	2	0	2
<i>Together according to content module 4</i>	8	0	0	4	0	4
Content module 5.						
Complex radiation diagnosis of diseases of the musculoskeletal system.						
Topic 13. Radiological research methods and radiological anatomy of the musculoskeletal system. Densitometry.	3	0	0	2	0	1
Topic 14. Radiation signs of traumatic injuries of upper and lower limbs, skull, spine, pelvic bones.	4	1	0	2	0	1
Topic 15. Radiation signs of inflammatory diseases of the musculoskeletal system.	4	1	0	2	0	1
Topic 16. Radiological signs of tumors of the musculoskeletal system.	3	0	0	2	0	1
<i>Together according to content module 5</i>	14	2	0	8	0	4
Content module 6.						
Comprehensive radiation diagnostics in endocrinology. Radiation signs of diseases of the thyroid gland, breast gland and reproductive system						
Topic 17. Radiation methods in	3	0	0	2	0	1

endocrinology. Radiation signs of diseases of the thyroid gland.						
Topic 18. Radiological research methods and radiological anatomy of the reproductive system, mammary gland. Radiation signs of diseases of the reproductive system and breast.	3	0	0	2	0	1
<i>Together according to content module 6</i>	6	0	0	4	0	2
Content module 7. Comprehensive radiation diagnosis of CNS diseases and emergency conditions.						
Topic 19. Radiological research methods and radiological anatomy of the central nervous system. Radiation signs of diseases and injuries of the central nervous system.	4	0	0	2	0	2
Topic 20. Radiation signs of emergency conditions.	3	0	0	2	0	1
<i>Together according to content module 8</i>	7	0	0	4	0	3
Content module 8. Principles and methods of radiation therapy. Radiation diagnostics in oncology.						
Topic 21. Basics of radiation therapy for tumor and non-tumor diseases.	4	1	0	2	0	1
Topic 22. Radiation therapy methods: X-ray therapy; contact methods; long distance gamma therapy and radiation therapy with high energy sources.	4	1	0	2	0	1
Topic 23. Radiation diagnostics in oncology.	4	0	0	2	0	2
<i>Together according to</i>	12	2	0	6	0	4

<i>content module 9</i>						
<i>Individual tasks</i>	0	0	0	0	0	0
<i>Diff. test</i>	5	0	0	2	0	3
Only hours	90	10	0	48	0	32

5. Topics of lectures / seminars / practical classes / laboratory classes

5.1. Lecture topics

№	Topic name	Hours
1	Lecture 1. Topics 1 - 2. Basic properties of ionizing radiation. Biological effect of ionizing radiation. Radioactivity and dose. Dosimetry of ionizing radiation. Physical and technical foundations of radiation research methods.	2
2	Lecture 2. Topic 5.7. Radiological research methods and radiological anatomy of chest cavity organs. Basics of radiation semiotics of the pathology of the chest cavity.	2
3	Lecture 3. Topics 8,10. Radiological research methods and radiological anatomy of abdominal organs. Basics of radiation semiotics of the pathology of abdominal organs.	2
4	Lecture 4. Topic 13,14. Radiation signs of diseases of the musculoskeletal system.	2
5	Lecture 5. Topic 21,22. Principles and methods of radiation therapy.	2
Total hours		10

5.2. Seminar topics

Seminar classes are not provided.

5.3. Practical class topics

No	Topic name	How many hours?
1.	Topic 1. Practical lesson 1. Basic properties of ionizing radiation. Biological effect of ionizing radiation on healthy and pathologically changed cells. Radioactivity and dose. Dosimetry of ionizing radiation	2
2.	Topic 2. Practical lesson 2. Physical and technical foundations of X-ray diagnostics, computer tomography, ultrasound, magnetic resonance imaging and radionuclide research.	2
3.	Topic 3. Practical lesson 3. Radiological methods of research of respiratory organs.	2
4.	Topic 4. Practical lesson 4. Radiation signs of inflammatory diseases of the respiratory organs.	2
5.	Topic 5. Practical lesson 5. Radiation signs of pulmonary tuberculosis.	2
6.	Topic 6. Practical lesson 6.	2

	Radiation signs of lung tumors.	
7.	Topic 7. Practical lesson 7. Radiation methods of research of the cardiovascular system. Radiation signs of diseases of the cardiovascular system.	2
8.	Topic 8. Practical lesson 8. Radiological methods of research of the gastrointestinal tract.	2
9.	Topic 9. Practical lesson 9. Radiation signs of diseases of the gastrointestinal tract.	2
10.	Topic 10. Practical lesson 10. Radiological research methods and radiological anatomy of the hepatobiliary system. Radiation signs of diseases of the hepatobiliary system.	2
11.	Topic 11. Practical lesson 11. Radiological research methods and radiological anatomy of the urinary system.	2
12.	Topic 12. Practical lesson 12. Radiological signs of diseases of the kidneys and urinary tract. Radiological signs of congenital developmental anomalies and kidney tumors.	2
13.	Topic 13. Practical lesson 13. Radiological research methods and radiological anatomy of the locomotor system. Densitometry.	2
14.	Topic 14. Practical lesson 14. Radiation signs of traumatic injuries of upper and lower limbs, skull, spine, pelvic bones.	2
15.	Topic 15. Practical lesson 15. Radiation signs of inflammatory diseases of the musculoskeletal system.	2
16.	Topic 16. Practical lesson 16. Radiological signs of tumors of the musculoskeletal system.	2
17.	Topic 17. Practical lesson 17. Radiation methods in endocrinology. Radiation signs of diseases of the thyroid gland.	2
18.	Topic 18. Practical lesson 18. Radiological research methods and radiological anatomy of the reproductive system, mammary gland. Radiation signs of diseases of the reproductive system and breast.	2
19.	Topic 19. Practical lesson 19. Radiological research methods and radiological anatomy of the central nervous system. Radiation signs of diseases and injuries of the central nervous system.	2
20.	Topic 20. Practical lesson 20. Radiation signs of emergency conditions.	2
21.	Topic 21. Practical lesson 21. Radiation therapy methods: X-ray therapy; contact methods; long distance gamma therapy and radiation therapy with high energy sources.	2
22.	Topic 22. Practical lesson 22. Basics of radiation therapy for tumor and non-tumor diseases	2
23.	Topic 23. Practical lesson 23. Radiation diagnostics in oncology.	2
24.	Differentiated scoring	2
	Total	48

5.4. Laboratory class topics

Laboratory classes are not provided.

6. Independent work of a student of higher education

№	Topic name	Hours
1	Preparation for practical class 1	1
2	Preparation for practical class 2	1
3	Preparation for practical class 3	1
4	Preparation for practical class 4	1
5	Preparation for practical class 5	2
6	Preparation for practical class 6	1
7	Preparation for practical class 7	2
8	Preparation for practical class 8	1
9	Preparation for practical class 9	1
10	Preparation for practical class 10	1
11	Preparation for practical class 11	2
12	Preparation for practical class 12	2
13	Preparation for practical class 13	1
14	Preparation for practical class 14	1
15	Preparation for practical class 15	1
16	Preparation for practical class 16	1
17	Preparation for practical class 17	1
18	Preparation for practical class 18	1
19	Preparation for practical class 19	2
20	Preparation for practical lesson 20	1
21	Preparation for practical class 21	1
22	Preparation for practical class 22	1
23	Preparation for practical class 23	2
24	Preparation for differentiated assessment	3
Total		32

7. Teaching methods

Lectures.

Practical classes: collaborating: explanation, discussion, debriefing and case studies, interviews to clarify the central themes of the discipline; demonstrating: illustrative methods (including multimedia presentations, radiographs, CT-images etc); training: testing, image description.

Independent work: independent work with recommended basic and additional literature, electronic resources, preparation for practical classes.

8. Forms of control and evaluation methods (including criteria for evaluating learning outcomes)

Ongoing 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.

Criteria for evaluation of the ongoing educational activity in a practical session:

Grade	Evaluation criteria
Excellent «5»	The student participates actively in practical sessions; demonstrates in-depth knowledge, provides complete and detailed answers to questions; takes an active part in the discussion of the results of the radiological examination, correctly and consistently sets the algorithm of the radiological examination in relation to a certain pathology; uses additional educational and methodological and scientific literature; expresses their own reasoning, gives clinically appropriate examples, demonstrates critical thinking. 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.
Good «4»	The students participates in a practical session; well aware of the material; demonstrates sufficient knowledge, but mistaken when answering questions; participates in the discussion of the results of radiation examination, correctly sets 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. 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 mistakes in the definitions. The student expresses their opinion on the subject of the lesson, demonstrates clinical thinking.
Satisfactory	The student irregularly participates in a practical session; rarely speaks up and

«3»	<p>asks questions; makes mistakes when answering questions; shows passive work in practical sessions; the radiological examination algorithm for a certain pathology is inconsistent with fallacy; shows fragmentary knowledge of the concepts 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 misunderstanding of the definitions.</p> <p>The student does not express their opinion on the topic of the lesson.</p>
Insufficient «2»	<p>The student does not participate in a practical session, acts as an observer; never speaks up or asks questions, disinterested in learning the material; participates not in the discussion of the results of radiological examination, incorrectly sets the algorithm of radiological examination for a certain pathology, gives incorrect answers to questions, shows insufficient awareness of the concepts and literary sources.</p> <p>Testing not passed.</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.

Learning outcome evaluation during the final control

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

Criteria for evaluating the learning outcomes of the students taking differentiated assessment

Grade	Evaluation criteria
Excellent	<p>The applicant demonstrates in-depth knowledge, gives complete and detailed answers to questions; interprets confidently and infallibly the results of both cases studies; expresses their own reasoning, gives appropriate examples, demonstrates clinical thinking.</p> <p>The answers to open questions are complete and substantiated.</p>
Good	<p>The student is well aware of the material; demonstrates sufficient knowledge, but gives answers to questions with some fallacy; correctly evaluates the results of examination, but allows minor inaccuracies; expresses own opinion, demonstrates clinical thinking.</p> <p>The answers to the open questions are generally correct, but there are some obvious mistakes in the definitions.</p>
Satisfactory	<p>The student makes mistakes when answering questions; does not possess enough knowledge of the material in order to evaluate the results of radiological exams, the description of images is not complete, main radiological syndromes are detected with fallacy; does not express their opinion.</p> <p>Answers to open questions are not logical, with obvious significant mistakes in definitions.</p>
Insufficient	<p>The student is mistaken when answering questions; has insufficient knowledge of the material in order to evaluate the results of radiological exams, does not</p>

express their opinion. Answers to open questions are not logical, with obvious significant mistakes in definitions.
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9. Partition of grades received by higher education applicants

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:

$$\text{Average grade (ongoing grade for the discipline) x 40}$$

Table of conversion of a traditional into a multi-grade assessment

National assessment grade for the discipline	Total for the discipline
Excellent («5»)	185 – 200
Good («4»)	151 – 184
Satisfactory («3»)	120 – 150
Insufficient («2»)	Below 120

A multi-point scale (200-point scale) characterizes the actual success of each applicant in learning the educational component. The conversion of the traditional grade (average score for the academic discipline) into a 200-point grade is performed by the information and technical department of the University.

According to the obtained points on a 200-point scale, the achievements of the applicants are evaluated according to the ECTS rating scale. Further ranking according to the ECTS rating scale allows you to evaluate the achievements of students from the educational component who are studying in the same course of the same specialty, according to the points they received. The ECTS scale is a relative-comparative rating, which establishes the applicant's belonging to the group of better or worse among the reference group of fellow students (faculty, specialty). An "A" grade on the ECTS scale cannot be equal to an "excellent" grade, a "B" grade to a "good" grade, etc. When converting from a multi-point scale, the limits of grades "A", "B", "C", "D", "E" according to the ECTS scale do not coincide with the limits of grades "5", "4", "3" according to the traditional scale. Acquirers who have received grades of "FX" and "F" ("2") are not included in the list of ranked acquirers. The grade "FX" is awarded to students who have obtained the minimum number of points for the current learning activity, but who have not passed the final examination. A grade of "F" is assigned to students who have attended all classes in the discipline, but have not achieved a grade point average (3.00) for the current academic activity and are not admitted to the final examination.

Applicants who study in one course (one specialty), based on the number of points scored in the discipline, are ranked on the ECTS scale as follows:

Conversion of the traditional grade from the discipline and the sum of grades on the ECTS scale

Evaluation on the ECTS scale	Statistical indicator
A	Top 10% of the class
B	The next 25% of the class
C	The next 30% of the class
D	The next 25% of the class
E	The next 10% of the class

10. Methodological support

Working program of the academic discipline
 Syllabus
 Methodical developments for lectures
 Methodical developments for practical classes
 Multimedia presentations
 X-rays, computer tomography

11. Questions for preparing for the final inspection

1. Biological action of ionizing radiation at all levels of the body's organization. Species, individual and age variations of radiosensitivity. Mutagenic effect of radiation.
2. Methods and types of means of protection when working with sources of ionizing radiation.
3. Radioactivity - units of radioactivity. Types of radioactive decay.
4. Limits of permissible doses (MDD) of human exposure and different categories staff Categories of patients referred for radionuclide studies. Permissible doses of their exposure.
5. Exposure, absorbed, equivalent and integral doses of ionizing radiation. Non-systemic and systemic units of determination of doses.
6. Mechanism of radiation damage to tumor cells. Radiotherapy interval and radiomodifying factors.
7. Classification of radiation therapy methods.
8. Characteristics of the method of long-distance X-ray therapy. Devices. Indications and contraindications for use.
9. Types of long-distance X-ray therapy. Physical and technical conditions of operation of devices. Purpose of tubes and filters.
10. Characteristics of the method of short-distance X-ray therapy. Devices. Indications and contraindications for use.
11. Characteristics of the intracavity radiation therapy method. Structure and forms of radiation sources. Indications and contraindications for use.
12. Characteristics of the intratissue radiation therapy method. Structure and forms of radioactive preparations. Indications and contraindications for use.
13. Techniques of combined, complex methods of treatment and connective-radiation method of treatment of diseases for malignant tumors. Radiation therapy programs.
14. Indications for radiation therapy in non-neoplastic diseases (inflammatory, dystrophic).
15. Radionuclide method of research "in vitro" - its meaning.
16. Characteristics of radionuclide diagnostic methods "in vivo": radiometry, radiography, scanning, scintigraphy.
17. The main methods of X-ray examination: X-ray and X-ray, their advantages and disadvantages.
18. Protection of personnel and patients from the action of ionizing radiation during X-ray examinations.
19. Classification of radiopaque substances, their use in radiological diagnostics. Complications arising from the use of radiopaque substances.
20. Physical and technical basics of computer tomography, diagnostic capabilities of the method.
21. Physical and technical foundations of magnetic resonance imaging, diagnostic capabilities of the method.
22. Normal chest cavity in the X-ray image. Normal x-ray lung anatomy.
23. Lung pattern, its substrate. Changes in the pulmonary pattern.
24. Roots of the lungs: anatomical substrate and X-ray picture. X-ray signs of lung root pathology.
25. X-ray semiotics of lung diseases: leading X-ray syndromes.
26. Radiation signs of pneumonia and their complications.
27. X-ray diagnosis of pleurisy.

28. Classification of pulmonary tuberculosis.
29. Urgent X-ray diagnosis of chest cavity pathology: pneumothorax, hydropneumothorax, hydrothorax, atelectasis.
30. Classification of lung cancer. X-ray diagnosis of various forms of lung cancer.
31. Central lung cancer, X-ray and differential diagnosis, complications.
32. Methods of X-ray diagnostics of the study of the heart and large vessels.
33. Normal x-ray anatomy of the heart and large vessels. Arcs of the heart in a direct frontal projection.
34. General principles of x-ray examination of the alimentary canal. Methods of X-ray examination of the esophagus and its normal X-ray picture.
35. Methods of X-ray examination of the stomach and its normal X-ray picture.
36. X-ray diagnosis of peptic ulcer disease of the stomach and duodenum.
37. Methods of X-ray examination of the colon, normal X-ray anatomy of the colon.
38. X-ray diagnosis of intestinal obstruction, causes, differential diagnosis.
39. Methods of radiation diagnosis of diseases of the liver, gall bladder, bile ducts and pancreas.
40. Methods of radiation diagnosis of kidney, ureter, bladder diseases.
41. Radiological signs of kidney diseases: hydronephrosis.
42. Methods of radiation diagnosis of diseases of bones and joints.
43. X-ray semiotics of bone and joint diseases.
44. X-ray signs of bone fractures. Peculiarities of childhood.
45. Features of X-ray imaging of bones in children. Age characteristics of fractures.
46. X-ray diagnosis of osteomyelitis. X-ray diagnosis of primary and chronic forms of osteomyelitis.
47. Classification and X-ray diagnosis of bone tumors.

12. 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.
1. Myagkov O.P., Myagkov S.O. Atlas of radiation diagnostics of tumors of bones and soft tissues. - Zaporizhzhia. – Shamrai G.S. - 2017. - 296 p.
9. 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.
10. Radiology: a textbook /S.Yu. Kravchuk – K.: VSV "Medicine". 2019. - 296

1. 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:

- Informational and analytical bulletin "Radiological Herald"
- 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.
- Scientific and practical magazine "RADIATION DIAGNOSTICS, RADIATION THERAPY". ● NRBU 1997.
- "X-ray diagnostics" edited by V.I. Milka, T.V. Topchii, A.P. Lazar, et al., "New Book", 2005
- OSPU-2000
- 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"
- Ma O. J., Mathier J. R. Ultrasound research in emergency medicine. Bynom, 2014, 558 p.
- Mechev D. S., V. O. Murashko, Yu. M. Kovalenko Application of sources of ionizing radiation in medicine (manual). Kyiv, - 2010, 105 p.
- 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.
- 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.
- 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.
- Yu.Yu. Shevchenko, Adapted textbook on radiology (First module): textbook. - Sumy: Sumy State University, 2019. - [Electronic resource].
- 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

13. Electronic information resources

- 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>
- 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>
- International joint educational web resource on radiology: <https://radiopaedia.org>
- Educational web resource on radiology:<http://radiologyassistant.nl>
- Educational web resource on radiology:<http://learningradiology.com>
- Educational web resource on radiology:<http://www.radiologyeducation.com/>
- Ukrainian portal of ultrasound diagnostics: <http://www.ultrasound.net.ua/>