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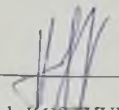
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PETRUSHENKO

"30" 08-2023

"AGREED"

Head of the Department

 prof. of HEI Oleksandr KOSTYUK

"28" 08 2023 year

**SYLLABUS  
of academic discipline  
"RADIOLOGY"**

Specialty	222 Medicine
Educational level	the second (master's) level
Educational programme	EPP Medicine, 2022
Academic year	2023-2024
Department	Radiation diagnostics, radiation therapy and oncology
Lecturer (if lectures are given)	Ass-prof. Koliadenko S.V., O.S., ass. Zorich M.O.
Contact information	Radiology Department, <a href="mailto:x-ray@vnmnu.edu.ua">x-ray@vnmnu.edu.ua</a> National Pirogov Memorial Medical University, Vinnytsya, Pirogov's str., 46, (0432)509498
Syllabus compiler	Ass-prof. Koliadenko S.V.

## 1. Status and structure of the discipline

Discipline status	Compulsory
Discipline code in EPP/discipline place in EPP	EC/ CC 26// discipline of general training or professional training
Course / semester	3rd year (V-VI semester)
The amount of discipline (the total number of hours /number of credits ECTS)	120 hours / 4 credits ECTS
Number of content modules	1 module
The structure of the discipline	Lectures - 16 hours Practical classes - 54 hours Independent work - 50 hours
Language of study	English
Form of study	Eye, (when introducing martial law and quarantine measures - remote eye)

## 2. Description of the discipline

### Short annotation of the course, relevance.

Radiation diagnostics studies the application of various radiation in order to recognize numerous diseases, to study the morphology and function of human organs and systems in normal and pathological conditions. The role of radiological diagnostics in the training of future doctors is constantly increasing. This is due to the fact that radiological methods of research occupy a leading place in the diagnosis of most diseases. In recent decades, medical radiology has been supplemented by new research methods (computed tomography and magnetic resonance imaging, ultrasound, positron and single-photon emission tomography, interventional methods). Therefore, a graduate of a medical school is required to be able to choose the optimal radiological morphological changes in the pathology of various organs and systems from a large number of currently available radiological methods and to interpret the data of radiological research methods for clinical diagnosis. The clinician should be able to evaluate the possibilities of different methods of radiation therapy and choose the optimal one for the treatment of tumor and non-tumor diseases.

**Prerequisites.** Mastering the discipline "Radiology" is based on the study of medical biology, parasitology and genetics by students; medical and biological physics; biological chemistry; bioorganic chemistry; bioorganic chemistry; human anatomy; normal physiology and integrates with these disciplines, based on knowledge of pathomorphology and pathological physiology, which students receive in parallel with the study of radiology.

### The purpose of the course and its significance for professional activities

The purpose of teaching the discipline "Radiology" is to train future doctors in the diagnostic capabilities of radiation methods with the determination of radiation semiotics of diseases; learning the basics radiation therapy, taking into account the indications and contraindications.

### Postrequisites

The study of the discipline lays the foundations for students to study propaedeutics of internal medicine with patient care; general surgery with anesthesiology and patient care; propaedeutics of children's diseases with child care, which involves the integration of teaching with these disciplines and the formation of skills to apply knowledge of radiology in the process of further education and professional activities.

**3. Learning outcomes. After successful study of the discipline the applicant will be able to:**

- interpret the principles of obtaining a medical image by different radiological methods of research and their purpose;
- choose the optimal method of radiological examination to detect functional and morphological changes in pathology: lungs and mediastinum; heart and blood vessels; gastrointestinal tract; hepatobiliary system; urinary system; genital system and breast; bones and joints; central nervous system; thyroid gland;
- analyze general radiation semiotics: - X-ray (including computed tomography); - radionuclide; - ultrasonic; - magnetic resonance imaging of internal organs;
- to analyze the radiation semiotics of functional and morphological changes in pathology: lungs and mediastinum; heart and blood vessels; gastrointestinal tract; hepatobiliary system; urinary system; genital system and breast; bones and joints; central nervous system; thyroid gland;
- on the basis of the clinical picture of emergencies to choose the optimal method of radiological examination for their diagnosis and evaluate the results of the examination;
- interpret the principles of radiation therapy, evaluate the treatment options and the impact on the body of various methods of radiation therapy for tumors and non-neoplastic diseases;
- choose the most rational means of protection of medical staff and patients during diagnostic and treatment procedures related to the use of ionizing radiation;
- make a plan of radiological examination of the patient; write a referral for radiation research;
- draw up a protocol of X-ray examination, formulate an X-ray conclusion;

**4. Content and logistic of the discipline**

Thematic module 1 Introduction to radiology. Biological action of ionizing radiation. Dosimetry.	5th semester 5 hours / credits	Lecture № 1 Practical classes №№ 1 Topics for self-study №№ 1-2
Thematic module 2 Principles and methods of radiation therapy. 5th semester	5th semester 7 hours / credits	Lecture № 1 Practical classes №№ 2-3 Topics for self-study №№ 3-5
Thematic module 3 Imaging methods in radiological diagnostics.	5th semester / 12 hours / credits	Lectures № 2 Practical classes №№ 4-6 Topics for self-study №№ 6-11
Thematic module 4 Complex radiological diagnostics of musculoskeletal diseases	5th semester 13h / credits	Lecture № 3 Practical classes №№ 7-10 Topics for self-study №№ 12-13
Thematic module 5 Complex radiological diagnosis of diseases of the thoracic cavity.	5th semester / 17 hours / credits	Lectures № 4-5 Practical classes №№ 11-14 Topics for self-study №№ 14-17
Thematic module 6: Comprehensive radiological diagnosis of diseases of the abdominal cavity.	6 semester / 20 hours / credits	Lectures № 6 Practical classes №№ 15-19 Topics for self-study №№ 18-20
Thematic module 7: Complex radiological diagnostics of diseases of the urinary system.	6 semester / 7 hours / credits	Lectures № 7 Practical classes №№ 20 Topics for self-study №№ 21
Thematic module 8: Complex radiological diagnosis of	6 semester / 15 hours / credits	Practical classes №№ 21-23 Topics for self-study №№ 22-24

diseases of the breast, genital and endocrine system.		
Thematic module 9. Complex radiological diagnosis of CNS diseases, oncology and emergencies.	6 semester 17 hours / credits	Lectures № 8 Practical classes №№ 25-26 Topics for self-study №№25-29

The course includes 27 topics, which are divided into 8 thematic modules.

**Thematic module 1. Introduction to radiology. Biological action of ionizing radiation. Dosimetry.**

Topic № 1. Basic properties of ionizing radiation. Biological effect of ionizing radiation on a healthy and pathologically altered cell. Radioactivity and dose. Dosimetry of ionizing radiation: units and methods for determining radioactivity and radiation dose.

**Thematic module 2. Principles and methods of radiation therapy.**

Topic № 2. Basics of radiation therapy of tumor and non-tumor diseases.

Topic № 3. Methods of radiation therapy: radiotherapy; contact methods; long-range gamma therapy and radiation therapy with high energy sources.

**Thematic module 3. Methods of visualization in radiological diagnostics.**

Topic № 4. Physical and technical bases of X-ray diagnostics and computed tomography.

Topic № 5 Physical and technical bases of radionuclide research.

Topic № 6. Physical and technical bases of ultrasound diagnostics and magnetic resonance imaging.

**Thematic module 4. Complex radiological diagnostics of diseases of the musculoskeletal system.**

Topic № 7. Radiation research methods, radiation anatomy and semiotics of the musculoskeletal system.

Topic № 8. Radiation signs of inflammatory diseases of the musculoskeletal system ..

Topic № 9. Radiation signs of tumors of the musculoskeletal system.

Topic № 10. Radiation signs of traumatic injuries and degenerative-dystrophic diseases of the musculoskeletal system.

**Thematic module 5. Complex radiological diagnosis of diseases of the thoracic cavity.**

Topic № 11. Radiation methods of research of respiratory organs and cardiovascular system.

Topic № 12. Radiation signs of inflammatory diseases of the respiratory system.

Topic № 13. Radiation diagnosis of respiratory tuberculosis.

Topic № 14. Radiation signs of lung tumors.

Topic № 15. Radiation signs of diseases of the cardiovascular system.

**Thematic module 6: Complex radiological diagnostics of diseases of the digestive system and abdominal organs.**

Topic № 16. Radiation methods for the study of the gastrointestinal tract. Radiation signs of diseases of the gastrointestinal tract.

Topic № 17. Radiation diagnosis of esophageal diseases.

Topic № 18. Radiation diagnosis of gastric diseases.

Topic №19. Radiation diagnosis of intestinal diseases.

Topic № 20. Radiation research methods, radiation anatomy of the hepatobiliary system. Radiation signs of diseases of the hepatobiliary system.



**Thematic module 7. Complex radiological diagnostics of diseases of the urinary system.**

Topic № 21. Radiation research methods and radiation anatomy of the urinary system. Radiation signs of kidney and urinary tract diseases. Radiation signs of developmental abnormalities and tumors of the urinary system.

**Thematic module 8. Complex radiological diagnosis of diseases of the breast, genital and endocrine systems.**

Topic № 22. Radiation research methods and radiation anatomy of the breast. Radiation signs of breast diseases.

Topic № 23. Radiation research methods and radiation anatomy of the reproductive system. Radiation signs of diseases of the genital system.

Topic № 24. Radiation research methods in endocrinology. Radiation signs of thyroid gland disease.

**Content module 9. Complex radiological diagnosis of CNS diseases, oncology and emergencies.**

Topic № 25. Radiation research methods and radiation anatomy of the CNS. Radiation signs of diseases and injuries of the CNS.

Topic № 26. Radiation diagnostics in oncology.

Topic № 27. Complex radiological diagnostics of emergencies.

Topic № 28. Control of the acquisition of practical skills in the discipline

Topic № 29. Differential credit.

Types of education according to the curriculum are: a) lectures, b) practical classes, c) independent work of students, d) consultations.

The lecture course discovers the problematic issues of the relevant sections of radiology.

In practical classes, students write down protocols of their research in workbooks, make a summary on the topic and solve clinically-oriented situational tasks and tests.

The student's independent work involves preparation for practical classes and development of practical skills, study of topics for independent extracurricular work, preparation of presentations, tables, processing of scientific literature and writing reviews of the provided topics for individual work. Control of mastering the topics of independent extracurricular work is carried out at intermediate control classes and final control of the discipline.

Individual work includes the study of scientific literature, preparation of reviews on the topics provided for presentation at the meetings of the student scientific circle, the implementation of scientific and practical researches, participation in specialized competitions, scientific and practical conferences and organization of students' research works.

Thematic plans of lectures, calendar plans of practical classes, thematic plan of independent extracurricular work, volume and directions of individual work are published on the website of the department.

The route for obtaining materials: Department Radiology / for students / Full-time education / (specialty) / 3 course / Educational materials / or through the link

<https://www.vnmu.edu.ua/department/department/5401> department Radiology#. Access to the materials is carried out through the student's corporate account [s000XXX@vnmu.edu.ua](mailto:s000XXX@vnmu.edu.ua).

**5. Forms and methods of monitoring academic performance**

Current control in practical studies	Methods of testing, structured written work, solving situational problems, describing the results of primary radiological, CT, MRI, ultrasound and radionuclide studies in pathology of various organs and systems, structured by the procedure of control of practical skills in conditions close to real.
Control of mastering the thematic section of the discipline at intermediate control lessons after 5 semesters	Intermediate control is credited if the student has mastered certain sections of the discipline in full, as evidenced by the current assessment of each practical lesson, and attended a lecture course. To assess the intermediate control, the calculation of the arithmetic average traditional grade for the semester is performed, the credit is credited with a minimum grade on the ECTS scale of at least 120 points (average score "3"). The obtained value of the average traditional grade is translated into points according to the scale of conversion of traditional grades into rating points (200 points), adopted by the decision of the Academic Council of National Pirogov Memorial Medical University, Vinnytsya,
Final control of mastering practical skills in the discipline for 5-6 semesters.	According to the Regulation of the Academic process in National Pirogov Memorial Medical University, Vinnytsya. (link <a href="https://www.vnmu.edu.ua/General%20information">https://www.vnmu.edu.ua/General information</a> )
Final control of the discipline - Radiology (grading test)	Methods: pre-examination testing, oral questioning (according to the Regulation of the Academic process in National Pirogov Memorial Medical University, Vinnytsya. (link <a href="https://www.vnmu.edu.ua/General%20information">https://www.vnmu.edu.ua/General information</a> ))
Learning success diagnostic tools	Theoretical questions, tests, clinically-oriented situational tasks, practical tasks, practical skills demonstration

## 6. Assessment criteria.

Knowledge assessment is carried out in accordance with the Regulations of the Academic process in National Pirogov Memorial Medical University, Vinnytsya (link [https://www.vnmu.edu.ua/General information](https://www.vnmu.edu.ua/General%20information))

Continuous assessment	On a four point system of traditional assessments: 5 «excellent», 4 «good», 3 «satisfactory», 2 «unsatisfactory»
Midpoint separation assessment	On a four-point system of traditional assessments
Control of practical skills	According to the four-point system of traditional assessments
Pass-fail exam	On a 200-point scale (the arithmetic average grade for the semester is converted into points) Credited: 120 to 200 points Not credited: less than 120 points (See Grading Scale)
Final control of the discipline	Sum of points for pre-examination testing (12-20 points) and oral questioning (38-60 points) Exam grade:

	71-80 points - "excellent" 61-70 points - "good" 50-60 points - "satisfactory" Less than 50 points - "unsatisfactory" / did not pass
Discipline assessments:	Current academic assessment - from 72 to 120 points (conversion of the average traditional assessment of practical class on a 120-point scale): 60% of the grade for the discipline Final control - from 50 to 80 points: 40% of the grade for the discipline Individual work - from 1 to 12 points From 122 to 200 points in total.

#### Discipline Score Scale: National and ECTS

The sum of grades for all types of educational activities	Score ECTS	Score on a national scale	
		For exam, course project (work), practice	for credit test
180-200	A	excellent	credited
170-179,99	B	good	
160-169,99	C		
141-159,90	D	satisfactory	
122-140,99	E	satisfactory	
121.99-61	FX	unsatisfactory with the possibility of reassembly	is not credited with the possibility of reassembling
1-60	F	unsatisfactory with a mandatory reexamination of discipline	is not credited with mandatory reexamination of discipline

#### 7. Policy of discipline / course

The student has the right to receive high-quality educational services, access to contemporary scientific and educational information, qualified tutoring during the study of discipline and mastering practical skills. The policy of the department during the providing of educational services is a student-centered, based on normative documents of the Ministry of Education and the Ministry of Health of Ukraine, the Statute of the University and the Procedure for the Providing of Educational Services regulated by the main principles of the organization of the educational process in National Pirogov Memorial Medical University, Vinnytsya, and the principles of academic integrity ( link <https://www.vnmu.edu.ua/General> information).

**Adherence to the rules of National Pirogov Memorial Medical University, Vinnytsya, safety techniques in practical classes.**

Observance of the rules of the VNMU regulations, safety precautions at practical classes. Instruction on safety techniques with electrical devices, safety of handling sources of ionizing radiation and in rooms with an increased radioactive background, handling during the "Air Alarm" signal is conducted at the first practical lesson by the teacher. The instructed students are registered in the Safety Instruction Journal. A student who has not been instructed is not allowed to perform practical work.

#### **Requirements for preparation for practical classes.**

The student should be prepared for a practical lesson, testing tasks for the current topic should be solved in a workbook, diagrams and tables are filled.

A student should come to class on time, without delay. A student who is more than 10 minutes late is not allowed to the practical class and must work it in the prescribed manner.

In practical classes, the student must be dressed in a work uniform (medical gown, hat). Students who do not have a work uniform are not allowed to practice.

The student must follow the rules of safety in practical rooms and at the department.

When discussing theoretical issues, students should demonstrate tolerance, courtesy and respect for their colleagues and the teacher; when performing practical tasks, the workplace should be kept in order and be cleaned after performing practical work.

#### **Usage of mobile phones and other electronic devices.**

The use of mobile phones and other electronic devices in the classroom is allowed only during electronic testing or surveys.

**Academic integrity.** When studying the discipline, the student must be guided by the Code of Academic Integrity and Corporate Ethics of National Pirogov Memorial Medical University, Vinnytsya, (link: <https://www.vnmu.edu.ua/General> information)/ Code of Academic Integrity).. In case of violation of the norms of academic integrity during the current and final controls student receives a grade of "2" and must work it out to his teacher in the prescribed manner within two weeks after receiving an unsatisfactory assessment).

**Missed classes.** Missed classes are working out in the manner prescribed by Regulations of the Academic process in National Pirogov Memorial Medical University, Vinnytsya, (link <https://www.vnmu.edu.ua/General> information) at the time of workout schedule (published on the website of the department <https://www.vnmu.edu.ua/departament/departament/5401> ) to the teacher on duty. To work out missed lesson student must provide a completed workbook protocol on the relevant topic, take a test and answer questions in writing or orally to the topic of the lesson. The reworking of missed lectures is carried out after providing a thesis of lecture material, or writing an abstract, or preparing own presentation on the topic of missed lecture.

**The procedure for admission to the discipline final control** is given in the Regulation of the Academic process in National Pirogov Memorial Medical University, Vinnytsya, (link <https://www.vnmu.edu.ua/General> information). Students who do not have missed practical classes and lectures and received an average traditional grade of at least "3" are allowed to final control.

**Additional points.** Individual points in the discipline that student can receive for individual work, is determined by the results of his individual work according to Regulation of the



Academic process in National Pirogov Memorial Medical University, Vinnytsya, (link [https://www.vnmu.edu.ua/General information](https://www.vnmu.edu.ua/General%20information)) and policy of the course.

**Conflict resolution.** In case of misunderstandings and complaints to the teacher because of the quality of educational services, knowledge assessment and other conflict situations, student should submit his / her claims to the teacher. If the issue is not resolved, the student has a right to apply to the head of the department according to Complaints Consideration Procedure ([https://www.vnmu.edu.ua/ General information / Basic documents](https://www.vnmu.edu.ua/General%20information/Basic%20documents)).

**Politics in terms of remote learning.** Distance learning regulated by the Regulations of the elements of remote learning in National Pirogov Memorial Medical University, Vinnytsya, (<https://www.vnmu.edu.ua/> / General information). The main training platforms for studying are Microsoft Team and Google Meets. Practical classes and lectures, exercises and consultations during distance learning is published on the website of the department ([https://www.vnmu.edu.ua/department/ departament/5401/](https://www.vnmu.edu.ua/department/departament/5401/) / Department of Radiology/ Student or ([https://www.vnmu.edu.ua/department/ departament/5401/](https://www.vnmu.edu.ua/department/departament/5401/) /Department of Radiology/ News).

Feedback from teachers is via messengers (Viber, Telegram, WhatsApp) or e-mail (at the teacher's choice) during working hours.

#### 8. Educational resources.

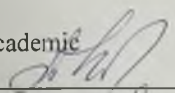
Educational and methodological support of the discipline is published on the website of the department (<https://www.vnmu.edu.ua/department/departament/5401/> department of Radiology/ for students). Consultations are held twice a week according to the schedule.

**The timetable and distribution of groups** with assigned teachers are published on the web page of the department <https://www.vnmu.edu.ua/department/departament/5401/> / department Radiology/for students).

**Questions to the intermediate and final semester control** (credit) of the discipline are published on the web page of the department ([https://www.vnmu.edu.ua /departament/ departament/5401/](https://www.vnmu.edu.ua/departament/departament/5401/) / department Radiology / for students).

The syllabus of the discipline "RADIOLOGY" was discussed and approved at the meeting of the department of Radiation Diagnostics, Radiation Therapy and Oncology (record № 1, dated "08" 08 — 2023)

Responsible for the academic

Discipline  Assistant Tamara KOVALENKO

Head of the department

 prof. of HEI Oleksandr KOSTYUK