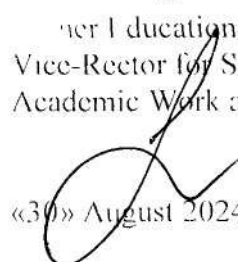



National Pirogov Memorial Medical University, Vinnytsya

Higher Educational Institution
Vice-Rector for Scientific and
Academic Work and International Links


«30» August 2024 Inna ANDRUSHKO

«Agreed»

Head of the Department of Pharmacy


«30» August 2024 year Olena KRYVOVIAZ

SYLLABUS
of academic discipline

Drugs resistance: mechanisms, prevention, ways overcoming

Specialty	226 Pharmacy, industrial pharmacy
Specialization	226.01 Pharmacy
Educational level	Master of Pharmacy
Educational program	EPP "Pharmacy" (2023)
Academic year	2024 - 2025
Department	Department of Pharmacy
Responsible information	Assoc. prof. Alona Voronkina pharmacy, Vinnytsya Vinnytsya, Pirogov str. 56
Compiler of the syllabus	Assoc. prof. Alona Voronkina

1. Status and structure of the discipline

Status of discipline	elective
Discipline code in the EPP / place of discipline in the EPP	EC 39. Drug resistance: mechanisms, prevention, ways overcoming // discipline of professional training
Course/semester	3rd year (VI semester)
Volume of discipline (total number of hours/ number of ECTS credits)	90 hours / 3 ECTS credits
Number of modules	1
Structure of the discipline	Full-time form of study Lectures - 10 hours Practical classes - 30 hours Independent work - 50 hours Extramural form of study Lectures - 4 hours Practical classes - 8 hours Independent work - 78 hours
Language of instruction	Ukrainian, English
Form of study	Full-time, extramural (or remote according to the order)

2. Description of the discipline

Brief summary of the course, relevance. Discipline "Drug resistance: mechanisms, prevention, ways overcoming" is elective and belongs to the cycle of disciplines of vocational training of specialists in the specialty "Pharmacy, industrial pharmacy". The discipline lays the foundations for the rational and effective use of drugs in modern medicine, helps prevent the development of drug resistance. Knowledge of the causes and types of drug resistance development minimizes the risks of unjustified use of drugs. The main **objectives** of the discipline are: the formation of the concept of "resistance" to drugs, resistant pathogens; deepening and systematization of knowledge about the main causes of development and types of resistance to drugs; expanding knowledge of the mechanisms of resistance to drugs; development of measures to curb the development of resistance to drugs; development of ways to overcome and prevent resistance to drugs; development of measures to minimize the risks of unjustified use of drugs in medicine and other fields (including the development of new drugs).

According to the curriculum, the discipline is studied in the 3rd year of study, and includes lectures and practical classes, independent extracurricular work of students.

In practical classes, groups of drugs to which resistance most often develops, possible mechanisms of drug resistance, their causes and types, prevention measures and ways to overcome them are considered.

The lectures of the discipline "Drug resistance: mechanisms, prevention, ways overcoming" highlight the problematic issues of resistance to antimicrobial drugs, antihypertensive and antianginal drugs, insulin resistance and resistance to oral hypoglycemic drugs, antithrombotic agents, antituberculosis, antiviral, antitumor drugs. Familiarize higher education students with the concept of resistant pathogens that are dangerous not only for patients but also for other people. Pay attention to prevention measures and ways to overcome drug resistance, taking into account modern medical advances.

The organization of the educational process is carried out according to the credit-transfer system. The volume of students' workload is described in ECTS credits - credits that are credited to students upon successful completion of the module (credit).

The discipline program includes two content modules. Content module 1 consists of 6 topics, studied during the 6th semester. Content module 2 consists of 9 topics, lasts for 6 semesters, ends with a credit in the discipline.

Types of training sessions according to the curriculum are lectures, practical classes, independent work of students.

The topics of the lecture course reveal the problematic issues of the relevant sections of the discipline "Drug resistance: mechanisms, prevention, ways overcoming".

Practical classes according to the method of their organization are theoretical, because they include

- written (test) control of knowledge acquisition by students;
- oral control of knowledge acquisition by students (questioning on the topic of the lesson);
- work with samples of drugs;
- work with reference literature;
- solving pharmacotherapeutic problems;
- correction of prescription prescriptions.

Mastering of the topic is controlled at practical classes in accordance with specific goals, mastering of content modules - at practical final classes. The following means of diagnosing the level of students' training are used: tests (written and computer), solving situational problems, oral questioning. The control of practical skills is realized on the basis of prescription (correction) of prescriptions for certain drugs, the ability to determine the pharmacological group of the drug, as well as the indication of the mechanism of drug resistance, ways to prevent and overcome resistance. Assessment is carried out by direct control by the teacher of the student's skills, as well as using tests.

The final control (credit) of the subject is carried out after its completion. Assessment of student performance in the discipline is a rating and is set on a multi-point scale and has a definition according to the ECTS system and the scale adopted in Ukraine.

Prerequisite – the study of the discipline is based on the knowledge gained in the study of such disciplines as pharmacology, microbiology with the basics of immunology, biological chemistry, human anatomy and physiology, pathological physiology. The discipline is integrated with such disciplines of the curriculum as pharmacotherapy with pharmacokinetics, pharmaceutical chemistry.

The purpose of the course and its importance for professional activity: to acquaint higher education students with the concept of resistance to antimicrobial drugs, antihypertensive and antianginal drugs, insulin resistance and resistance to oral hypoglycemic drugs, antithrombotic drugs, antituberculosis, antiviral, antineoplastic drugs. To acquaint higher education students with the concept of resistant pathogens that are dangerous not only for patients but also for other people. Achieving the goal will prepare students for practical activities, quality performance of functional duties related to counseling on prescription and over-the-counter drugs.

Postrequisite – the discipline provides the knowledge and skills necessary for further study of such disciplines as clinical pharmacy and pharmaceutical care, pharmacotherapy with pharmacokinetics, biopharmacy. The discipline is one of the main elements of professional training, contributes to the formation of pharmaceutical thinking, provides basic knowledge necessary for pharmaceutical activities.

3. Learning outcomes of the discipline:

Competences and learning outcomes, the formation of which contributes to the discipline.

Integral (IC):

The ability to solve typical and complex specialized tasks and practical problems in professional pharmaceutical activity using the provisions, theories and methods of fundamental, chemical, technological, biomedical and socio-economic sciences; integrate knowledge and solve complex issues, formulate judgments based on insufficient or limited information; clearly and unambiguously convey their conclusions and knowledge, rationally justifying them, to a professional and non-professional audience.

General competences (GC):

GC 2. Ability to abstract thinking, analysis and synthesis.

GC 3. Knowledge and understanding of the subject area and understanding of professional activity.

GC 5. The ability to communicate in the state language both orally and in writing, the ability to communicate in a foreign language (mainly English) at a level that ensures effective professional activity.

GC 6. Skills in using information and communication technologies.

GC 8. The ability to evaluate and ensure the quality of performed works.

GC 9. Ability to conduct research at the appropriate level.

GC 10. The ability to realize one's rights and responsibilities as a member of society, to realize the values of a civil (free democratic) society and the need for its sustainable development, the rule of law, the rights and freedoms of a person and a citizen in Ukraine.

GC 11. 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 different types and forms motor activity for active recreation and leading a healthy lifestyle.

Special (professional, subject) competences (PC):

PC 1. Ability to collect, interpret and apply data necessary for professional activity, research and implementation of innovative projects in the field of pharmacy.

PC 2. Ability to integrate knowledge and solve complex pharmacy problems in broad or multidisciplinary contexts.

PC 4. Ability to use knowledge of regulatory and legislative acts of Ukraine and recommendations of proper pharmaceutical practices in professional activity.

PC 5. The ability to demonstrate and apply in practical activities communicative communication skills, fundamental principles of pharmaceutical ethics and deontology, based on moral obligations and values, ethical standards of professional behavior and responsibility in accordance with the Code of Ethics of pharmaceutical workers of Ukraine and WHO guidelines.

PC 6. The ability to clearly and unambiguously convey one's own knowledge, conclusions and arguments in the field of pharmacy to specialists and non-specialists, in particular to people who are studying.

PC 7. The ability to carry out sanitary and educational work among the population for the purpose of prevention of common diseases, prevention of dangerous infectious, viral and parasitic diseases, as well as for the purpose of promoting timely detection and support of adherence to the treatment of these diseases according to their medical and biological characteristics and microbiological features .

PC 8. Ability to provide pre-medical assistance to the sick and injured in extreme situations and emergencies.

PC 9. Ability to consult on prescription and non-prescription drugs and other products of the pharmacy assortment and aspects of healthy nutrition, pharmaceutical care during the selection and sale of drugs of natural and synthetic origin by assessing the risk/benefit ratio, compatibility, taking into account their biopharmaceutical, pharmacokinetic and physico-chemical and chemical features, indications/contraindications to their applications, guided by data on the state of health of a particular patient.

PC 10. Ability to monitor the effectiveness and safety of the population's use of medicinal products according to data on their clinical and pharmaceutical characteristics.

Integrative final program learning outcomes, the formation of which is facilitated by the educational discipline.

PLO 1. Apply special knowledge and abilities/skills from general and professional disciplines in professional activities.

PLO 2. Critically consider scientific and applied problems in the field of pharmacy.

PLO 3. Assess and ensure the quality and efficiency of activities in the field of pharmacy.

PLO 4. To comply with the norms of the sanitary and hygienic regime and the requirements of safety equipment when performing professional activities.

PLO 6. To carry out professional communication in the state language, using oral communication skills in a foreign language. Analyzing specialized texts and translating foreign language information sources.

PLO 7. Demonstrate the ability to independently search, analyze and synthesize information from various sources, including professional literature, patents, databases; its assessment, in particular, using statistical analysis, as well as the application of these results for implementation of typical

and complex specialized tasks of professional activity, including in relation to the development and production of medicinal products.

PLO 11. Provide pre-medical assistance to patients with urgent conditions and victims in extreme situations.

PLO 12. Contribute to the preservation of health, in particular the prevention of diseases, the rational prescription and use of medicinal products. To faithfully fulfill one's professional duties, to comply with the legislation on the promotion and advertising of medicinal products. Possess psychological communication skills to achieve trust and mutual understanding with colleagues, doctors, patients, consumers.

PLO 14. Determine the advantages and disadvantages of drugs of various pharmacological groups, taking into account their chemical, physicochemical, biopharmaceutical, pharmacokinetic and pharmacodynamic characteristics. Recommend to consumers non-prescription drugs and other products of the pharmacy assortment with the provision of advisory assistance and pharmaceutical care.

PLO 15. Formulate, argue, clearly and concretely convey to specialists and non-specialists, including those seeking higher education, information based on one's own knowledge and professional experience, the main trends in the development of world pharmacy and related industries.

PLO 16. To record cases of manifestations of side effects when using medicinal products of natural and synthetic origin; evaluate the factors that can affect the processes of absorption, distribution, deposition, metabolism and excretion of drugs and are determined by the condition and characteristics of the human body and the pharmaceutical characteristics of drugs.

Learning outcomes for the discipline:

According to the requirements of the educational and professional program, students should:
know:

- group affiliation of drugs according to modern classifications;
- mechanisms of drug resistance development;
- the main causes of drug resistance and their types;
- ways to overcome resistance and its prevention;
- measures to minimize the risks of unjustified use of drugs;

be able to

- identify manifestations of drug resistance and choose methods of prevention and ways to overcome them
- correct drug prescriptions;
- predict the effects of drug interactions in their combined administration;
- search for pharmacological information in modern reference books, scientific and professional periodicals;

to own:

- pharmacological terminology;
- methods of analysis of efficacy and safety of prescription and non-prescription medicines;
- techniques and skills of providing pharmaceutical care during the selection and sale of OTC drugs

4. Content and logistics of the discipline

Module 1: Drug resistance: mechanisms, prevention, overcoming ways	VI semester 90 years / 3 credits	Full-time form: Lectures № 1 - № 5 Practical classes № 1 - № 15 Topics for self-study № 1 - № 15 Extramural form: Lectures № 1 - № 2 Practical classes № 1 - № 4 Topics for self-study № 1 - № 20
--	-------------------------------------	--

The discipline (full-time form) includes 15 topics, which are structured into 1 module.

The discipline (extramural form) includes 4 topics, which are structured into 1 module.

Topics of lectures for 3rd year students
(full-time form)

№	Lecture topic	hours
1	Drug resistance: definition, main causes and types of drug resistance. The concept of resistant pathogens. Ways to overcome and prevent drug resistance, the formation of measures to minimize the risks of unjustified use of drugs in medicine.	2
2	Antibiotic resistance. Resistance to β -lactam antibiotics: penicillins, cephalosporins, monobactams, carbapenems. Antibiotic resistance to macrolides, aminoglycosides, tetracyclines, chloramphenicols, lincosamides, fusidines and antibiotics of different chemical groups	2
3	Resistance to sulfonamides, nitrofurantoin derivatives, 8-oxyquinoline, nitroimidazole, fluoroquinolones	2
4	Resistance to antituberculosis and antitumor drugs. Resistance to antiviral drugs	2
5	Resistance to drugs used in diseases of the cardiovascular system: antihypertensive, diuretics, antianginal, antiplatelet drugs.	2
	Total:	10

Topics of lectures for 3rd year students
(extramural form)

№	Lecture topic	hours
1	Drug resistance: definition, main causes and types of drug resistance. The concept of resistant pathogens. Ways to overcome and prevent drug resistance, the formation of measures to minimize the risks of unjustified use of drugs in medicine.	2
2	Antibiotic resistance. Resistance to β -lactam antibiotics: penicillins, cephalosporins, monobactams, carbapenems. Antibiotic resistance to macrolides, aminoglycosides, tetracyclines, chloramphenicols, lincosamides, fusidines and antibiotics of different chemical groups	2
	Total:	4

Topics of practical classes for 3rd year students
(full-time form)

№	Name of the topic of the practical class	Hours
1	Drug resistance: definition, main causes and types of drug resistance.	2
2	Antibiotic resistance. Resistance to β -lactam antibiotics: penicillins, cephalosporins, monobactams, carbapenems.	2
3	Resistance to macrolides, aminoglycosides, tetracyclines, chloramphenicols, lincosamides, fusidines and antibiotics of different chemical groups.	2
4	Resistance to sulfonamides, nitrofurantoin derivatives, 8-oxyquinoline, nitroimidazole, fluoroquinolones.	2
5	Resistance to antituberculosis and antitumor drugs. Resistance to antiviral drugs.	2
6.	Resistance to antiseptic and disinfectants.	2
7.	Resistance to drugs used in diseases of the cardiovascular system.	2
8.	Resistance to drugs used in diseases of the respiratory system.	2
9.	Resistance to drugs used in diseases of the urinary system.	2
10.	Resistance to drugs used in diseases of the gastrointestinal tract.	2
11.	Resistance to drugs used in diseases of the central nervous system.	2
12.	Insulin resistance and resistance to oral hypoglycemic agents.	2
13.	Resistance to drugs used in pain syndrome: narcotic and non-narcotic analgesics	2
14.	Resistance to drugs used in allergic diseases.	2
15.	Final lesson on module № 1. Credit.	2
	Total	30,0

Topics of practical classes for 3rd year students
(extramural form)

№	Name of the topic of the practical lesson	Hours
1	Drug resistance: definition, main causes and types of drug resistance. Antibiotic resistance. Resistance to sulfonamides, nitrofurantoin derivatives, 8-oxyquinoline, nitroimidazole, fluoroquinolones.	2
2.	Resistance to antituberculosis and antitumor drugs. Resistance to antiviral drugs. Resistance to antiseptic and disinfectants.	2
3.	Resistance to drugs used in diseases of the cardiovascular system: hypotensive, diuretic, antianginal, antiplatelet drugs. Insulin resistance and resistance to oral hypoglycemic drugs.	2
4.	Resistance to drugs used in diseases of the respiratory system and the central nervous system. Resistance to drugs used for pain syndrome: narcotic and non-narcotic analgesics. Test.	2
	Total	8

List of topics for independent work of students
(full-time form)

№	Topic	hours
1.	The concept of resistant pathogens.	2
2.	Ways to overcome and prevent drug resistance.	2
3.	Inhibitors of β -lactamases	2
4.	Resistance to metronidazole	2
5.	Antiretroviral resistance	2
6.	Resistance to antimalarial drugs	2
7.	Resistance to antiprotozoal agents	2
8.	Resistance to antifungal agents	2
9.	Resistance to anthelmintic agents	2
10.	Liposomal forms of antitumor drugs	2
11.	Aspirin resistance: types, causes, mechanisms	2
12.	Resistance to clopidogrel	2
13.	Resistance to thrombolytics (fibrinolytics)	2
14.	Resistance to antihypertensive drugs	2
15.	Resistance to adrenomimetics	2
16.	Resistance to bronchodilators	2
17.	Diuretic resistance: types, causes, mechanisms	2
18.	Steroid resistance: types, causes, mechanisms	2
19.	Resistance to hormonal drugs	2
20.	Resistance to antidepressants	2
21.	Resistance to antihelicobacterial agents	2
22.	Resistance to sleeping pills	2
23.	Resistance to anticonvulsant drugs	2
24.	Resistance to antiparkinsonian drugs	2
25.	Resistance to antihistamines	2
	Total:	50

List of topics for independent work of students
(extramural form)

№	Topic	hours
1.	The concept of resistant pathogens.	3
2.	Ways to overcome and prevent drug resistance.	2

3.	Principles of the rational use of antibacterial drugs.	2
4.	Inhibitors of β -lactamases	3
5.	Resistance to metronidazole	2
6.	Antiretroviral resistance	3
7.	Resistance to antimalarial drugs	3
8.	Resistance to antiprotozoal agents	3
9.	Resistance to antifungal agents	3
10.	Resistance to anthelmintic agents	2
11.	Macropinocytosis as a mechanism of resistance to antitumor drugs	2
12.	Liposomal forms of antitumor drugs	3
13.	Aspirin resistance: types, causes, mechanisms	3
14.	Resistance to clopidogrel	2
15.	Tolerance to nitrates: types, causes, mechanisms	3
16.	Resistance to thrombolytics (fibrinolytics)	2
17.	Resistance to heparins	2
18.	Resistance to antihypertensive drugs	3
19.	Resistance to adrenomimetics	3
20.	Resistance to sympatholytics	2
21.	Resistance to bronchodilators	3
22.	Diuretic resistance: types, causes, mechanisms	3
23.	Steroid resistance: types, causes, mechanisms	3
24.	Resistance to hormonal drugs	3
25.	Resistance to antidepressants	3
26.	Resistance to antihelminthic agents	2
27.	Resistance to sleeping pills	3
28.	Resistance to anticonvulsant drugs	2
29.	Resistance to antiparkinsonian drugs	3
30.	Resistance to antihistamines	2
	Total:	50

The topics of the lecture course reveal the problematic issues of the relevant sections of the discipline.

Practical classes provide theoretical substantiation of the main issues of the topic and mastering the following practical skills:

- 1) identify manifestations of drug resistance and choose methods of prevention and ways to overcome them;
- 2) correct drug prescriptions;
- 3) predict the consequences of drug interaction in their combined administration;
- 4) search for pharmacological information in modern reference books, scientific and professional periodicals;
- 5) to formulate measures to minimize the risks of unjustified use of drugs in medicine and other fields.

Independent work of the student involves preparation for practical classes and intermediate controls, studying topics for independent extracurricular work, writing essays, preparing presentations, tables. 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 meetings of the student scientific circle, implementation of scientific and practical research, participation in specialized competitions, scientific and practical conferences, competitions of student research papers.

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

The route for obtaining materials: Department of pharmacy/ Student / Full-time study / (specialty "pharmacy, industrial pharmacy") / 3rd course / Teaching materials / or at the link [https://www.vnmu.edu.ua/departament of pharmacy#](https://www.vnmu.edu.ua/departament%20of%20pharmacy#). Access to materials is carried out from the student's corporate account s000XXX@vnmu.edu.ua.

5. Forms and methods of monitoring learning progress

Current control in practical classes	Methods: oral or written questioning, testing, solving situational problems, correction of medical prescriptions
Control of mastering the thematic section of the discipline at intermediate control classes	Methods: oral or written questioning, testing, solving situational problems, control of practical skills
Final control of the discipline - <u>credit</u>	Methods: testing, oral survey (according to the regulations on the organization of the educational process in Pirogov National Medical University) (link https://www.vnmu.edu.ua/General information/ Basic documents)
Means of diagnostics of learning progress	Theoretical questions, tests, situational tasks, practical tasks, demonstration of practical skills

6. Evaluation criteria

Assessment of knowledge is carried out in accordance with the Regulations on the organization of the educational process in the Pirogov National Medical University (link [https://www.vnmu.edu.ua/Загальна information / Basic documents](https://www.vnmu.edu.ua/Загальна%20інформація/Basic%20documents))

Current control	According to the four-point system of traditional grades: 5 "excellent," 4 "good," 3, "satisfactory," 2, "unsatisfactory."
Offset	On a 200-point scale (arithmetic mean grade for the semester is converted into points) Passed: from 122 to 200 points Not credited: less than 122 points (see the grading scale)

Grading scale: national and ECTS

Sum of points for all types of learning activities	Estimation of ECTS	Assessment on the national scale	
		for the examination, course project (work), practice	for credit
180-200	A	perfectly	enrolled
170-179,99	B	well	
160-169,99	C		
141-159,99	D	satisfactorily	
122-140,99	E	satisfactorily	
0-121,99	FX	unsatisfactory with the possibility of retaking	unsatisfactory with the possibility of retaking
	F	unsatisfactory with mandatory re-study of the discipline	unsatisfactory with mandatory re-study of the discipline

7. Discipline/course policy

The student has the right to receive quality educational services, access to modern scientific and educational information, qualified advisory assistance in the study of the discipline / course and

mastering practical skills. The policy of the department in the provision of educational services is student-centered, based on the regulations of the Ministry of Education and the Ministry of Health of Ukraine, the Statute of the Pirogov National Medical University and the procedure for providing educational services regulated by the Regulations on the organization of the educational process at the Pirogov National Medical University, and on the principles of academic integrity.

Compliance with the rules of order of VNMU, safety in practical classes. Safety briefing is conducted at the first practical lesson by the teacher. The briefing is registered in the Safety Briefing Journal. A student who has not been briefed is not allowed to participate in practical classes.

In the case of the announcement of the signal "**Air raid alarm**" or other warning signals, the teacher stops the class, informs the students of higher education about the need to proceed to the shelter of civil defense and stay there until the signal is canceled. The teacher informs the students of higher education about further actions after canceling the signal: to continue the class or to recommend completing the material independently with a further survey at the next class (order No. 505 dated 08/30/2023).

Requirements for preparation for practical classes. The student must be prepared for practical classes, tasks to prepare for the current topic must be completed.

You should come to class on time, without being late. A student who is late is not allowed to the class and must work it out in the prescribed manner.

During practical classes, the student must be dressed in a working uniform. Students who do not have working uniforms are not allowed to attend classes.

The student must follow the safety rules in practical classes and while being in the premises of the department.

During the discussion of theoretical issues, students must demonstrate tolerance, courtesy and respect for their colleagues and the teacher; when performing practical tasks, the workplace must be kept in order and cleaned up after practical work.

Use of mobile phones and other electronic devices. The use of mobile phones and other electronic devices in the classroom is allowed only at the direction of the teacher.

Academic integrity. During the study of the discipline, the student must be guided by the Code of Academic Integrity of the Pirogov National Medical University. In case of violation of the norms of academic integrity during the current and final controls, the student receives a grade of "2" and must work it out in the prescribed manner within two weeks.

Missing classes. Missed classes are worked out in the manner prescribed in the Regulations on the organization of the educational process at the Pirogov National Medical University at the time determined by the schedule of workouts published on the website of the department and posted on the information stands of the department.

The procedure for admission to the final control of the discipline is given in the Regulations on the organization of the educational process in the Pirogov National Medical University. Students who have no missed unworked classroom classes provided by the curriculum of the discipline / course and have scored the minimum number of points corresponding to the national scale "3" are allowed to the final control.

Additional individual points. Individual points in the discipline in accordance with the Regulations on the organization of the educational process in the Pirogov National Medical University, a student can receive for individual work in case of its successful implementation. The number of points depending on the volume and importance of such work can be in the range of 6 - 12.

Resolution of conflict issues. In case of conflict situations, the applicant for higher education has the right to submit an appeal, which is considered in accordance with the Regulations on the consideration of appeals of applicants for higher education in the Pirogov National Medical University.

Politics in terms of distance learning. The order of distance learning is regulated by the Regulations on the introduction of elements of distance learning in National Pirogov Memorial Medical University, Vinnytsya. The procedure for conducting practical classes and lectures, reworks and consultations on distance learning is published on the website of the department.

Teacher feedback is provided through the distance learning platform (Microsoft Teams), messengers or e-mail (at the teacher's choice) during business hours.

A student of higher education has the right to receive quality educational services, to have access to modern scientific and educational information, qualified advisory assistance during the study of the discipline and mastering practical skills. The policy of the department during the provision of educational services is student-centered, based on regulatory documents of the Ministry of Education and the Ministry of Health of Ukraine, the university charter and the procedure for providing educational services, regulated by the order of the organization of the educational process at NPMU and the principles of academic integrity.

8. Training resources

Educational and methodological support of the discipline is published on the website of the department (<https://www.npmu.edu.ua> Department of Pharmacy / Student). Consultations are held twice a week according to the consultation schedule.

9. The schedule and distribution of groups by teachers is published on the website of the department (<https://www.npmu.edu.ua> Department of Pharmacy / Student).

10. Questions to the intermediate and final control of the discipline are published on the website of the department (<https://www.npmu.edu.ua> Department of Pharmacy / Student).

Syllabus in the discipline "Drugs resistance, mechanisms, prevention, ways overcoming" was discussed and approved at the meeting of the pharmacy department (protocol №1, from "30" August 2024 year)

Responsible for the academic
discipline

Alona VORONKINA

Head of the department



Olena KRYVOVIAZ

