National Pirogov Memorial Medical University, Vinnytsya

«Approved»
Higher Educational Institition
Vice-Rector for Scientific and
Academic Work and International Links

Inna ANDRUSHKO
«30» August 2024

«**Agreed**»
Head of the Department of Pharmacy

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«30» August 2024 year

SYLLABUS
of academic discipline
Pharmacology

Specialty	226 Pharmacy, industrial pharmacy
Specialization	226.01 Pharmacy
Educational level	Master of Pharmacy
Educational programme	EPP "Pharmacy" (2023)
Academic year	2024-2025
Department	Department of Pharmacy
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Compiler of the syllabus	Assoc. prof. Alona Voronkina

1.Status and structure of the discipline

Status of discipline	Compulsory discipline
Discipline code in the EPP / place of discipline in the EPP	EC 29. Pharmacology // discipline of professional training
Course/semester	3rd year (V/VI semester)
Volume of discipline (total number of hours/ number of ECTS credits)	255 hours / 8.5 ECTS credits
Number of content modules	5
Structure of the discipline	Full-time form of study Lectures - 30 hours Practical classes - 124 hours Independent work - 101 hours Extramural studies Lectures - 12 hours Practical classes - 28 hours Independent work - 215 hours
Learning language	English
Form of education	Full-time, extramural

2. Description of the discipline

Summary of the course: The discipline is a mandatory component of the educational and professional program "Pharmacy ", the cycle of professional training of the Master of Pharmacy, designed for 8.5 credits, which students study during V - VI semesters in the 3rd year of study. The main focus of the program is the acquisition of knowledge in the discipline "Pharmacology", the study of which is necessary for the successful mastering of professional training disciplines. The subject area of the program is the study of changes that occur in the human body under the influence of drugs (pharmacodynamics) and the transformation of drugs in the human body from the moment of ingestion to the moment of excretion (pharmacokinetics). The program is focused on acquiring knowledge about drugs that affect the autonomic and central nervous system, executive organs, tissue metabolism and chemotherapeutic agents; provides the necessary knowledge of the classification and nomenclature of drugs, mechanisms of action, pharmacological and side effects, indications and contraindications for prescription, pharmacological safety of use, which will allow future specialists to advise patients on prescription and over-the-counter drugs, to provide quality pharmaceutical care when they are released. The main **tasks** of studying the subject "Pharmacology" is to provide students with theoretical knowledge on determining the group affiliation of drugs, their pharmacokinetics, pharmacodynamics, manifestations of possible side effects, symptoms of overdose, measures to prevent and help eliminate adverse reactions, the main indications for prescription and interaction with other drugs and the acquisition of practical skills in writing (correction) prescriptions for drugs in various dosage forms. **According** to the curriculum, the study of pharmacology is carried out in the 3rd year of study, and includes lectures and practical classes on the main groups of drugs.

On **practical classes**, modern classifications of medicines on the topic, mechanisms of action of drugs and their pharmacological effects, possible side effects, measures for their prevention, contraindications for use, comparative characteristics of drugs within groups, as well as drug interactions in combination, dosage are considered.

Lectures include modern achievements of pharmacological science, the latest data on the classification of drugs, pharmacological characteristics of groups of drugs, pharmacosafety and pharmacopoeia according to the protocols of the pharmacist, features of the use of drugs **in** certain categories of patients (children, pregnant women, elderly people, etc.), symptoms of overdose and assistance in case of drug poisoning.

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 course.

The discipline **program** includes two modules. Module 1 is studied in the 5th semester and ends with a test. Module 2 is studied in the 6th semester and ends with an exam 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 pharmacology. 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 and writing prescriptions.

Mastering of the topic is controlled at practical classes in accordance with specific goals, mastering of thematic sections - 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 action, the main pharmacological effects and indications for use. It also takes into account the indication of side effects and ways of correction to prevent them. Assessment is carried out by direct control by the teacher of the student's skills, as well as using tests. The final control (exam) of the subject is carried out after its completion. Assessment of the student's progress 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 pharmacology is based on the knowledge gained in the study of such disciplines as biology with the basics of genetics, human anatomy and physiology, pathological physiology, Latin, inorganic and organic chemistry, microbiology. The discipline is integrated with such disciplines of the curriculum as drug technology, pharmacognosy, pharmaceutical chemistry.

The purpose of the course and its significance for professional activity: formation of students' theoretical knowledge and acquisition of practical skills on the basic principles of justification of rational and safe for human health use of medicines for the treatment and prevention of diseases. Achieving the goal will prepare students for practical activities, quality performance of functional duties related to consulting on prescription and OTC medicines; with the implementation of pharmaceutical care in the selection and sale of OTC medicines by assessing the risk / benefit ratio, compatibility, indications and contraindications based on data on the health status of a particular patient, taking into account biopharmaceutical, pharmacokinetic, pharmacodynamic and physicochemical features

Postrequisite – Pharmacology provides the knowledge and skills necessary for further study of such disciplines as clinical pharmacy and pharmaceutical care, pharmacotherapy with pharmacokinetics. 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:

Competencies and learning outcomes, the formation of which contributes to the discipline (interrelationship with the normative content of the training of higher education applicants, formulated in terms of learning outcomes in the Standard).

According to the requirements of the standard, the discipline ensures students' acquisition of the following competencies:

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 (SC):

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. The 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 the solution of typical and complex specialized tasks of professional activity, including the development and production of medicinal products.

PLO 8. Develop and make effective decisions to solve complex/complex problems of pharmacy personally and based on the results of joint discussion; to formulate the goals of one's own activity and the activity of the collective, taking into account common and production interests, the general strategy and existing limitations, to determine optimal ways of achieving goals.

PLO 10. To carry out sanitary and educational work in professional activities in case of outbreaks of infectious, viral and parasitic diseases.

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

PLO 12. Promote health preservation, in particular disease prevention, 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 13. Predict and determine the influence of environmental factors on the quality and consumer characteristics of medicinal products of natural and synthetic origin and other products of the pharmacy assortment, organize their storage in accordance with their physical and chemical properties and the rules of Good Storage Practices (GSP).

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 over-the-counter medicines 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.

PLO 18. To ensure competitive positions and effective development of pharmaceutical organizations, including taking into account the results of marketing research and market processes at the national and international levels.

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;
- pharmacological characteristics of traditional and new drugs, logically link the mechanism of action with pharmacodynamics, pharmacodynamics with indications, and side effects with contraindications to the use of drugs;
- depending on the peculiarities of drug pharmacokinetics, determine the frequency of drug administration, its daily, course dose;
- indications and contraindications to the use of medicines;
- justify the adequate dosage form in accordance with the routes of administration of medicines;

be able to:

- determine the manifestations of side effects of drugs, symptoms of overdose of potent and poisonous drugs, choose methods of prevention and principles of treatment;
- correct medical prescriptions;
- predict the effects of drug interactions in their combined administration, drugs and food components, drugs and alcohol;
- search for pharmacological information in modern reference books, scientific and professional periodicals;
- provide comparative characteristics of medicines in terms of efficacy, safety, mechanism of action, indications for use, etc.

possess:

- pharmacological terminology;
- methods of analysis of efficacy and safety of prescription and non-prescription medicines;
- techniques and skills of pharmaceutical care in the selection and sale of OTC medicines by assessing the risk/benefit ratio, compatibility,
- indications and contraindications based on data on the health status of a particular patient, taking into account biopharmaceutical, pharmacokinetic, pharmacodynamic and physicochemical propetries of the drug.

4. Content and logistics of the discipline

Module 1 "General pharmacology. Drugs that affect the functions of the nervous system and mediator processes. Chemotherapeutic drugs". Content modules 3	V semester 120 hours/ 4 credits	Full-time form of study Lectures Topics № 1 - № 9 Practical classes Topics № 1 - № 27 Topics for independent study № 1 - № 10 Extramural study Lectures Topics № 1 - № 3 Practical classes Topics № 1 - № 7 Topics for independent study № 1 - № 15
Module 2 "Medicines that affect the functions of executive organs, blood system, metabolism and immunity". Content modules 2	VI semester 135 hours/ 4,5 credits	Full-time form of study Lectures Topics № 1 - № 6 Practical classes Topics № 1 - № 35 Topics for independent study № 1 - № 11 Correspondence form of study Lectures Topics № 1 - № 3 Practical classes Topics № 1 - № 7 Topics for independent study № 1 - № 13

The discipline (full-time) includes 62 topics, which are divided into 5 content modules.
The discipline includes (extramural) 14 topics, which are divided into 5 content modules

Topics of practical classes
(full-time form of study)

NO	The topic of the lesson	Hours
Module 1: General pharmacology. Drugs that affect the functions of the nervous system and mediator processes. Chemotherapeutic drugs.		
Content module 1: General pharmacology. Drugs that affect the functions of the autonomic nervous system and mediator processes.		
1.	Medical prescription, its prescription and control. Rules for prescribing solid dosage forms	2
2.	Rules for prescribing soft dosage forms	2
3.	Rules for prescribing liquid dosage forms	2
4.	General pharmacology. Pharmacokinetics. Pharmacodynamics	2
5.	Cholinomimetics. Anticholinesterase agents, reactivators cholinesterases	2
6.	M-cholinoblockers. N-cholinoblockers. M, N - cholinoblockers	2
7.	Adrenergic agonists: adrenomimetics, sympathomimetics	2
8.	Adrenergic antagonists: α-adrenoblockers, β-adrenoblockers, sympatholytics.	2
9.	Drugs that affect afferent inertia: local anesthetic agents, astringent, enveloping, adsorbing, irritating agents.	2
10.	Intermediates: dopaminotropic, serotoninotropic, histaminotropic, prostaglandins.	2
11.	**Final lesson of content module 1: General pharmacology. Drugs that affect the functions of the autonomic nervous system and mediator processes.**	
Content module 2. Drugs that affect the functions of the central nervous system		
12.	Pharmacological pain correctors: anesthetics, alcohols	2
13.	Narcotic analgesics.	2
14.	Non-narcotic analgesics. Analgesics-antipyretics. Spasmodic analgesics. Combined analgesics Pharmacological inflammation correctors (non-steroidal anti-inflammatory drugs).	2
15.	Antipsychotic drugs (neuroleptics). Anxiolytics (tranquilizers), sedatives (sedatives).	2

16.	Sleeping pills, antiepileptic, antiparkinsonian drugs.	2
17.	Analeptics, nootropic agents, psychomotor stimulants adaptogens, antidepressants, actoprotectors.	2
18.	**Final lesson of content module 2: Drugs affecting CNS functions**	2
Content module 3: Chemotherapeutic drugs		
19.	Synthetic antibacterial drugs: sulfonamides, nitrofuran derivatives, 8-oxyninoline. Pharmacological characteristics of fluoroquinolones.	2
20.	Pharmacological characteristics of β-lactam antibiotics: penicillins, cephalosporins, carbapenems, monobactams	2
21.	Pharmacological characteristics of macrolides and azalides, aminoglycosides and glycopeptides.	2
22.	Pharmacological characteristics of tetracyclines, chloramphenicol, lincomycins, rifampicins, polymyxins, fusidins, and antibiotics of different groups	2
23.	Antiviral drugs. Anti-tuberculosis and anticancer drugs.	2
24.	Antifungal medicinal products. Anthelmintic drugs Antiprotozoal drugs.	2
25.	Antiseptics and disinfectants.	2
26.	**Final lesson of content module 3: Chemotherapeutic drugs**	2
27.	**Control of module 1. credit**	2
Total hours for V semester		54
Module 2. Medicines that affect the functions of the executive organs, the blood system, metabolism and immunity.		
Content module 4. Medicinal products affecting the functions of executive bodies		
1.	Cardiac glycosides and non-glycoside cardiotonics.	2
2.	Antiarrhythmic drugs.	2
3.	Hypertensive drugs. Antihypertensive drugs: neurotropic drugs.	2
4.	Antihypertensive drugs: myotropic drugs.	2
5.	Hypotensive drugs: Drugs that affect the renin-angiotensin system and water-salt metabolism. Combination drugs.	2
6.	Diuretics. Uricosuric drugs.	2
7.	Antianginal drugs.	2
8.	Means that improve cerebral circulation.	2
9.	Hypolipidemic drugs.	2
10.	Agents affecting the respiratory system: bronchodilators.	2
11.	Agents affecting the respiratory system: antitussives, expectorants.	2
12.	Agents affecting the function of the digestive system: drugs that affect secretion.	2
13.	Hepatotropic drugs: choleretics, cholesecretics and hepatoprotectors.	2
14.	Drugs affecting the function of the digestive organs: drugs that affect motility, emetics, antiemetics.	2
15.	Drugs affecting the function of the digestive system: laxatives and antidiarrheal drugs. Antihelicobacterial and drugs for the treatment of dysbiosis.	2
16.	Uterine medicines.	2
17.	**Final lesson of content module 4: Medicines affecting the functions of organs**	2
Content module 5: Medicines that affect the blood system and metabolism		
18.	Aggregants and antiaggregants.	2
19.	Coagulants and anticoagulants of direct and indirect action.	2
20.	Activators and inhibitors of fibrinolysis.	2
21.	Pharmacology of iron preparations.	2
22.	Regulators of erythropoiesis and leukopoiesis	2
23.	Medicinal products with the activity of hormones of the hypothalamus (liberins and	2

	statins and their synthetic analogues), pituitary gland, pineal gland	
24.	Medicinal products with activity of thyroid and parathyroid hormones. Antithyroid medicinal products.	2
25.	Antidiabetic medicinal products. Insulins.	2
26.	Synthetic oral hypoglycemic medicinal products.	2
27.	Medicinal products with activity of adrenal hormones and their antagonists	2
28.	Medicinal products with the activity of gonadal hormones and their antagonists.	2
29.	Anabolic steroids. Contraceptives.	2
30.	Water-soluble vitamin and vitamin-like medicinal products.	2
31.	Fat-soluble vitamin and vitamin-like medicinal products	2
32.	Enzyme and antienzyme drugs	2
33.	Pharmacology of the immune system	2
34.	Pharmacosafety of the use of drugs. Principles of pharmacotherapy of acute drug poisoning. Antidotes.	2
35.	**Final lesson of content module 5: Medicines affecting the blood system and metabolism**	2
	Total hours for VI semester	70
	Total hours per year	124

Topics of practical classes
(extramural form of study)

No	The topic of the lesson	Hours
Module 1: General pharmacology. Drugs that affect the functions of the nervous system and mediator processes. Chemotherapeutic drugs.		
Content module 1: General pharmacology. Drugs that affect the functions of the autonomic nervous system and mediator processes.		
1.	Medical prescription, its prescription and control. Dosage forms.	2
2.	Drugs affecting the cholinergic synapse.	2
3.	Drugs affecting the adrenergic synapse.	2
Content module 2. Drugs that affect the functions of the central nervous system		
4.	Narcotic and non-narcotic analgesics.	2
5.	Neuroleptics. Tranquilizers, sedatives. Analeptics, nootropics, adaptogens, actoprotectors.	2
Content module 3: Chemotherapeutic drugs		
6.	Chemotherapeutic agents: sulfonamides, nitrofurans, fluoroquinolones, etc. 8-oxyquinoline.	2
7.	Antibiotics. Antiviral and antifungal agents. Credit.	2
	Total hours for V semester	**14**
Module 2. Medicines that affect the functions of the executive organs, the blood system, metabolism and immunity.		
Content module 4. Drugs affecting the functions of executive bodies		
1.	Cardiotonic drugs. Antiarrhythmic, antianginal drugs.	2
2.	Hypertensive, hypotensive, diuretic drugs.	2
3.	Agents affecting the gastrointestinal tract and myometrium. Enzymatic and anti-enzymatic agents.	2
Content module 5: Medicines that affect the blood system and metabolism		
4.	Medicines affecting blood coagulation and hematopoiesis	2
5.	Hormonal drugs	2
6.	Vitamin preparations	2
7.	Pharmacosafety of drug use. Treatment of acute drug poisoning.	2

	Total hours for VI semester	**14**
	Total hours per year	**28**

Topics of lectures
(full time form of study)

NO	Lecture topic	Hours
	V semester	2
1.	General pharmacology. Cholinergic agonists and antagonists.	2
2.	Adrenergic agonists and antagonists	2
3.	Opioid and non-opioid analgesics	2
4.	CNS depressants: neuroleptics, tranquilizers, sedatives. Sleeping pills, antiparkinsonian, antiepileptic.	2
5.	CNS stimulating drugs: antidepressants, psychomotor stimulants, analeptics, nootropics, adaptogens, actoprotectors.	2
6.	Chemotherapeutic agents: sulphonamides, nitrofurans, fluoroquinolones, similar to 8-oxyquinoline. 8-oxyquinoline. Pharmacological characteristics of antiviral drugs	2
7.	Pharmacological characteristics of antibiotics.	2
8.	Antiseptic and disinfectants.	2
9.	Pharmacological characteristics of antifungal, antiprotozoal and anthelmintic drugs.	2
	Total hours for V semester	**18**
	VI semester	
1.	Cardiac glycosides and non-glycoside cardiotonics. Antiarrhythmic drugs. Antianginal drugs. Means that improve cerebral circulation.	2
2.	Hypotensive agents. Hypertensive agents. Diuretics and uricosuric drugs. Hypolipidemic drugs.	2
3.	Medicines affecting the digestive organs. Uterine medicinal products	2
4.	Medicines affecting hematopoiesis and blood coagulation system.	2
5.	Pharmacology of hormonal drugs: hormonal drugs of the hypothalamus, pituitary gland, thyroid and parathyroid glands, adrenal cortex.	2
6.	Pharmacology of hormonal drugs: hormonal drugs, sex glands. Contraceptives and anabolic steroids. Antidiabetic drugs: insulins and oral hypoglycemic agents.	2
	Total hours for VI semester	**12**
	Total hours for the year	**30**

Topics of lectures
(extramural form of study)

No	Lecture topic	Hours
	V semester	
1.	Drugs affecting the authonomic nervous system.	2
2.	Drugs affecting the central nervous system.	2
3.	Chemotherapeutic drugs.	2
	Total hours for V semester	6
	VI semester	
1.	Drugs affecting the cardiovascular system	2
2.	Drugs affecting the digestive organs. Uterine medicines	2
3.	Medicines that affect hematopoiesis and the blood coagulation system.	2
	Total hours for VI semester	6
	Total hours for the year	12

Independent work
(full-time form of study)

NO	Topic title	Hours
V semester		
Module 1: General pharmacology. Drugs that affect the functions of the nervous system and mediator processes. Chemotherapeutic drugs.		
1.	Pharmacocorrection in case of overdose and poisoning with cholinotropic substances	5
2.	Pharmacocorrection in case of overdose of NSAIDs	4
3.	Medicines for the treatment of pain syndromes in chronic diseases	5
4.	The latest dosage forms and drug delivery systems (transdermal therapeutic systems, spinchalers, spacers, nebulizers, etc.) and their impact on the effectiveness of drugs	5
5.	Ways of medical and non-medical correction of undesirable (organotropic) effects of drugs	5
6.	Pharmacological characteristics of afferent nerve stimulants: bitter, expectorant, emetic	5
7.	Pharmacological characteristics of afferent nerve stimulants: irritants containing bee and snake venoms	4
8.	Pharmacological and toxicological aspects of drug addiction and substance abuse	5
9.	Principles of use of antidepressants and antineurotic drugs in conditions of rapid technological development of society and intense psychophysiological stress	5
10.	Pharmacological characteristics of modern anticonvulsants and antiparkinsonian drugs	5
Total		48
VI semester		
Module 2. Medicines that affect the functions of executive organs, blood system, metabolism and immunity.		
1.	Modern means of systemic hormonal therapy of chronic skin diseases	5
2.	Modern means of local hormonal therapy in acute and chronic somatic diseases	5
3.	Pharmacocorrection of undesirable effects in the use of glucocorticosteroids	5
4.	Pharmacocorrection of undesirable effects when using oral hypoglycemic agents	5
5.	Pharmacocorrection of undesirable effects when using indirect anticoagulants	5
6.	Pharmacological characteristics of drugs for the treatment of hemolytic, aplastic anemia	5
7.	Pharmacological characteristics of drugs - synthetic analogues of hypothalamic hormones	5
8.	Pharmacological characteristics of prostate correctors and erectile dysfunction correctors	5
9.	Pharmacological characteristics of drugs for systemic enzymotherapy: fibrinolytics, proteolytic enzymes, antienzymes and proteolysis inhibitors	5
10.	Pharmacological characteristics of drugs that affect the metabolism of bone and cartilage tissue	5
11.	Pharmacological characteristics of medicinal products for parenteral nutrition, plasma substitutes and detoxifiers	3
Total		53

Independent work
(extramural form of study)

No	**Topic title**	**Hours**

1	General pharmacology. Pharmacokinetics.	8
2	General pharmacology. Pharmacodynamics.	8
3	Pharmacological characteristics of intermediants: dopaminergic and serotoninergic.	6
4	Pharmacological characteristics of intermediants: histaminergic and prostaglandines.	6
5	Pharmacological characteristics of allergic reactions correctors.	8
6	Drugs, affecting respiratory system.	6
7	Drugs for general anestesia. Alcohols.	6
8	Pharmacological characteristics of antispasmodics and combined analgesics.	8
9	Pharmacological characteristics of hypnotic drugs.	8
10	Modern normothymic drugs, pharmacosafety during their use.	5
11	Pharmacological characteristics of antidepressants.	8
12	Pharmacological characteristics of anthelmintic agents.	5
13	Pharmacological characteristics of immunomodulators.	8
14	Pharmacological characteristics of means for the treatment of degenerative-dystrophic joint diseases.	5
15	Pharmacosafety and pharmacopeics when using means for the treatment of uterine bleeding in gynecology.	5
Total		100
VI семестр		
1.	Pharmacological characteristics of modern combined hypertensive drugs.	10
2.	Pharmacological characteristics of uricosuric drugs.	9
3.	Pharmacological characteristics of hypolipidemic drugs.	8
4.	Pharmacosafety and pharmacopeics when using modern combined hypotensive agents.	8
5.	Drugs affecting blood clotting, their pharmacological characteristics.	9
6.	Drugs affecting blood clotting, their pharmacological characteristics.	8
7.	Means for the treatment of allergic conditions, their pharmacological characteristics.	10
8.	Principles of providing emergency aid in case of poisoning by agents containing cardiac glycosides	8
9.	Antioxidants and antihypoxants. Medicines that affect the metabolism of bone and cartilage tissues.	8
10	Pharmacological characteristics of enzyme and anti-enzyme agents	9
11.	Plasma substitute solutions and solutions for parenteral nutrition, their pharmacological characteristics.	8
12.	Pharmacological characteristics of angioprotectors.	10
13.	Poisoning with drugs. Antidotes.	10
Total		115
Total for the year		215

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

Methodology of lectures: they are taught in classrooms, except that, materials are posted on the information resources of the department.

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

1) pharmacological characteristics of groups of drugs, pharmacological safety and pharmacological care according to the protocols of the pharmacist, features of the use of drugs in certain categories of patients (children, pregnant women, the elderly, etc;

2) correct medicinal prescriptions;

3) to predict the effects of drug interactions 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") /III course / Teaching materials / or at the link https://www.vnmu.edu.ua/department of pharmacy. 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 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 - exam	Methods: testing, oral questioning (according to the regulations on the organization of the educational process in Pirogov National Medical University (link https://www.vnmu.edu.ua/Загальна 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)

Current control	According to the four-point system of traditional grades: 5 "excellent," 4 "good," 3, "fair," 2, "unsatisfactory."
Intermediate sectional controls	According to the four-point system of traditional grades
Control of practical skills	According to the four-point system of traditional grades
Offset	On a 200-point scale (arithmetic mean grade for the semester is converted into points) Passed: from 120 to 200 points Not credited: less than 120 points (see the grading scale)

Final control of the discipline	Sum of points for pre-examination testing (12-20 points) and oral interview (38-60 points) (the discipline is included in KROK 1) Score for the exam: 71-80 points - "excellent" 61-70 points - "good" 50-60 points - "satisfactory" Less than 50 points - "unsatisfactory"/ did not pass
Assessment of discipline:	Current academic performance - from 72 to 120 points (conversion of the average traditional grade for practical classes 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 Total from 122 to 200 points.

Grading scale: national and ECTS

Sum of points for all types educational activities	Estimation of ESTS	Assessment on the national scale	
		for the examination, course project (work), practice	for credit
180-200	**A**	excellent	passed
170-179,99	**B**	well	
160-169,99	**C**		
141-159,99	**D**	satisfactorily	
122-140,99	**E**	satisfactory	
0-121,99	**FX**	unsatisfactory with the possibility of retaking	not enrolled with the possibility of retaking
	F	unsatisfactory with mandatory re-study of the discipline	not enrolled 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 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.

Policy in the conditions of distance learning. The procedure of distance learning is regulated by the Regulations on the introduction of elements of distance learning in the Pirogov National Medical University. The procedure for conducting practical classes and lectures, workouts and consultations during distance learning is published on the web page of the department.

Feedback with the teacher is carried out through the distance learning platform (Microsoft Teams), messengers or e-mail (at the choice of the teacher) during working 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 basic points of the organization of the educational process at NPMMU 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.vnmu.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 web page of the department (https://www.vnmu.edu.ua/Department_of_pharmacy/Student).

10. Questions for intermediate and final controls of the discipline are published on the web page of the department ((https://www.vnmu.edu.ua/Department_of_pharmacy/Student).

Syllabus in the discipline "Pharmacology" 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