



MINISTRY OF HEALTH OF UKRAINE
NATIONAL UNIVERSITY OF PHARMACY
Department Pharmacology and Pharmacotherapy

Pharmacotherapy with Pharmacokinetics

WORK PROGRAM
of educational component

training for _____ Second (Master's) level of higher education _____
(Higher Educational Level Name)
in specialty _____ 226 Pharmacy, Industrial pharmacy _____
(Code and Specialty Name)
field of knowledge _____ 22 Healthcare _____
(Code and Specialty Name)
of educational program _____ Pharmacy _____
(Educational Program Name)
in specialization (s) _____
(Specialization Name)

Kharkiv-2022
(year of creation)

The work program of the educational component Pharmacotherapy with Pharmacokinetics in specialty 226 Pharmacy, Industrial pharmacy educational program Pharmacy for applicants for higher education 4 year of study.

EDUCATIONAL COURSE TEAM:

SHTRYGOL' Sergiy , head of the department, professor, MD,

KIRYEV Igor., professor, MD,

ZHABOTYNSKA Nataliia, associate professor, PHD,

RYABOVA Oksana, associate professor, PHD.

Work program has been considered and approved at the Department Meeting Pharmacology and Pharmacotherapy

Record from «23» august 2022 № 1

Head of the Department


(signature)

Prof. Sergiy SHTRYGOL'
(first name LAST NAME)

Educational program has been approved at the meeting of the Methodical Commission of

Record from «12» September 2022 № 1

Head of Specialized Committee



Prof. Nadia KONONENKO
(surname and initials)

1. Description of the educational component

Language of study: English

Status of the educational component: compulsory

Prerequisites for studying the educational component: study of the educational component "Pharmacotherapy with pharmacokinetics" is based on basic knowledge gained by students in the study of such educational components as "Human anatomy", "Normal physiology", "Biology with the Basics of Genetics", "Microbiology with the Basics of Epidemiology", "Pathological physiology", "Pharmacology".

The subject of educational component study «Pharmacotherapy with Pharmacokinetics» is study is modern schemes for rational pharmacotherapy of the most common diseases various organs and systems, basic principles of individual choice the most effective and safe medicines on the basis of pharmacodynamics data and pharmacokinetics, taking into account the possible manifestation of their side effects.

Information content of the educational component. 3 ECTS credit 90 hours are assigned to the study of the educational component.

2. Objectives and tasks of the educational component

The purpose of teaching the educational component «Pharmacotherapy with Pharmacokinetics» is to teach students of higher education the basic principles and directions conducting modern rational pharmacotherapy of the most common diseases of various types bodies and systems based on the principles of evidence-based medicine, international clinical guidelines (recommendations), adapted guidelines and unified clinical guidelines protocols for providing medical assistance to the population, approved by the Ministry of Health of Ukraine.

The main tasks of the educational component «Pharmacotherapy with Pharmacokinetics» is the formation of students' knowledge about basic pharmacokinetics processes, drug interaction, etiology, pathogenesis, clinical manifestations common diseases, principles of modern rational pharmacotherapy of various diseases and rational approaches to the treatment of a specific patient taking into account individual characteristics of the patient, pharmacological, biopharmaceutical and pharmacokinetic properties of drugs and their side effects, as well as development of students' abilities and skills in drawing up schemes in a rational and safe manner pharmacotherapy of various diseases and optimal combinations of drugs at conducting pharmacotherapy.

3. Competence and planned educational outcomes

Educational component «Pharmacotherapy with Pharmacokinetics» ensures the acquisition of applicants for higher education the following **competences**:

integral:

Ability to solve typical and complex specialized problems and critically understand and solve practical problems in professional pharmaceutical and/or research and innovation activities with the application of provisions, theories and methods fundamental, chemical, technological, biomedical and socio-economic sciences; integrate knowledge and solve complex issues, formulate judgments for insufficient or limited information; clearly and unambiguously communicate own knowledge, conclusions

and their relevance to professional and non-professional audiences.

general:

GC 2. Ability to apply knowledge in practical situations, make reasonable decisions.

GC6. Knowledge and understanding of the subject area and understanding of professional activity.

professional (special):

PC 2. Ability to provide medical advice on prescription and over-the-counter medications and other products of the pharmacy range; pharmaceutical care during the selection and sale of over-the-counter medications by assessing the risk / benefit, compatibility, indications and contraindications based on data on the health of a particular patient, taking into account biopharmaceutical, pharmacokinetic, pharmacodynamic and physicochemical characteristics of the medicine and other pharmaceutical products.

PC 4. Ability to ensure the rational use of prescription and over-the-counter medications and other pharmaceutical products in accordance with physicochemical, pharmacological characteristics, biochemical, pathophysiological features of a particular disease and pharmacotherapeutic regimens for its treatment.

Integrative final program learning outcomes (PLO), the formation of which is facilitated by the educational component

PLO 2. To apply knowledge of general and professional disciplines in professional activities.

PLO 14. To determine the advantages and disadvantages of medications of different pharmacological groups, taking into account their chemical, physicochemical, biopharmaceutical, pharmacokinetic and pharmacodynamic features. To recommend to consumers over-the-counter medications and other products of the pharmaceutical range with the provision of counseling and pharmaceutical care.

PLO 16. To determine the influence of factors influencing the processes of absorption, distribution, deposition, metabolism and excretion of the drug and due to the condition, features of the human body and physico-chemical properties of medications.

As a result of studying the educational component, the applicant for higher education will be *know:*

- the influence of endogenous factors (genetic, age and sexual anatomical and physiological human characteristics, diseases of individual organs and systems) on pharmacokinetics and pharmacodynamics (pharmacological and toxicological properties) of drugs;
- interaction of medicinal substances and food at the stages of absorption, metabolism and breeding; concept of bioequivalence of medicines and principles of their clinical study;
- modern schemes and directions of pharmacotherapy of the most common diseases;
- clinical manifestations (symptoms and syndromes) of diseases for which they are prescribed medicines;

be able to:

- determine the influence of factors that depend on the state and characteristics of the organism human (physiological, pathological, etc.) on the processes of absorption, distribution, deposition, metabolism and elimination of the drug, based on the results of the survey and anamnesis the patient;
- on the basis of anatomical and physiological characteristics of a person, pharmacological properties of drugs and dosage forms to determine the optimal regimen administration of drugs (time, frequency, duration);
- determine the possible influence of food on pharmacokinetic and pharmacological properties of medicines (time and amount of absorption, duration of action, route output, the possibility of unwanted action, etc.) to increase efficiency and reduction of side effects.

4. The educational component structure

Names of content modules and topics	The amount of hours											
	full time study						part time study					
	the whole amount	including					the whole amount	including				
		1	Sem .	practic al lessons	lab .	self-stud y		1	sem .	practic al lessons.	lab .	self-stud y
<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>	<i>8</i>	<i>9</i>	<i>10</i>	<i>11</i>	<i>12</i>	<i>13</i>
Thematic module 1. General pharmacotherapy and pharmacokinetics issues. Methods of examination of the patient. Pharmacotherapy in neurology and cardiology												
Topic 1. Fundamentals of General Pharmacokinetics. Introduction and general problems of pharmacotherapy	9	-	-	4	-	5	-	-	-	-	-	-
Topic 2. Pharmacotherapy of diseases of the central and peripheral nervous system and mental disorders.	11	1	-	4	-	6	-	-	-	-	-	-
Topic 3. Pharmacotherapy of cardiovascular diseases. Control Content Module № 1	12	1	-	4	-	7						
The whole amount of hours for the Content Module 1	32	-	-	12	-	18	-	-	-	-	-	-
Thematic module 2. Pharmacotherapy in Pulmonology, Phthisiology, Gastroenterology, Nephrology, Urology, Gynecology												
Topic 4. Pharmacotherapy of respiratory diseases	11	1	-	4	-	6	-	-	-	-	-	-
Topic 5. Pharmacotherapy	11	1	-	4	-	6	-	-	-	-	-	-

py of diseases of the gastrointestinal tract and hepatobiliary system.												
Topic 6. Pharmacotherapy of diseases of the kidneys and urinary tract, genitals in men and women. Finale Control Content Module № 2	11	1	-	4	-	6	-	-	-	-	-	-
The whole amount of hours for the Content Module 2	33	-	-	12	-	18	-	-	-	-	-	-
Thematic module 3. Pharmacotherapy of skin, venereal, endocrine, allergic, rheumatic, hematologic, infectious diseases. Pharmacotherapy in pediatrics												
Topic 7. Pharmacotherapy of skin diseases. Pharmacotherapy of sexually transmitted diseases. Pharmacotherapy of endocrinology diseases and metabolic disorders.	11	2	-	4	-	5	-	-	-	-	-	-
Topic 8. Pharmacotherapy of systemic rheumatic diseases and pharmacotherapy of allergy diseases. Pharmacotherapy of infection diseases Pharmacotherapy of blood	10	1	-	4	-	5	-	-	-	-	-	-

diseases Control												
Content Module № 3	2	-	-	2	-	-	-	-	-	-	-	-
The whole amount of hours for the Content module 3	21	3	-	10	-	10	-	-	-	-	-	-
Semester differential credit from module	2	-	-	2	-	-	-	-	-	-	-	-
Examination	-	-	-	-	-	-	-	-	-	-	-	-
<i>The whole amount of hours for the course</i>	90	8	-	36	-	46	-	-	-	-	-	-

5. Contents of the educational component

Content module 1. General pharmacotherapy and pharmacokinetics issues. Methods of examination of the patient. Pharmacotherapy in neurology and cardiology

Topic 1. Fundamentals of General Pharmacokinetics. Introduction and general problems of pharmacotherapy. Methods of examination of the patient. The purpose and objectives of pharmacotherapy and pharmacokinetics. Basic provisions of pharmacotherapy. Basic pharmacokinetic parameters. Transport of medicinal substances through biological membranes. Means of transport. Features of absorption of medicinal substances at different routes of administration of drugs. Kinetic processes of drug distribution in the human body. The main ways of biotransformation of medicinal substances. Factors affecting drug metabolism. Ways and mechanisms of drug excretion. The concept of full clearance. Types of drug interaction. Types of side effects of drugs. Methods of controlling the side effects of drugs. The main directions of pharmacotherapy: etiotropic, pathogenetic, symptomatic, replacement, prophylactic. Methods of examination of the patient: subjective, objective and additional.

Topic 2. Pharmacotherapy of diseases of the central and peripheral nervous system and mental disorders. Definition, epidemiology, etiology, pathogenesis, clinical presentation and rational pharmacotherapy of diseases of the central and peripheral nervous system: migraines, Parkinson's disease, epilepsy, stroke, meningitis, neuropathic pain.

Topic 3. Pharmacotherapy of cardiovascular system diseases. Definition, epidemiology, etiology, pathogenesis, clinical picture and rational pharmacotherapy of diseases of the cardiovascular system: coronary heart disease (angina pectoris, myocardial infarction), atherosclerosis, arterial hypertension, hypertensive crisis, chronic heart failure, chronic heart disease shock, collapse), myocarditis.

Control Content Module № 1

Content module 2. Pharmacotherapy in Pulmonology, Phthisiology, Gastroenterology, Nephrology, Urology, Gynecology

Topic 4. Pharmacotherapy of respiratory diseases. Definition, epidemiology, etiology, pathogenesis, clinical presentation and rational pharmacotherapy of COPD, SARS, acute bronchitis, community-acquired and hospital-acquired pneumonia, bronchial asthma, tuberculosis, influenza.

Topic 5. Pharmacotherapy of diseases of the gastrointestinal tract and hepatobiliary system. Definition, epidemiology, pathogenesis, clinical picture and rational pharmacotherapy of gastrointestinal

diseases: chronic gastritis, ulcerative stomach and duodenum, chronic viral hepatitis, ulcerative colitis, Crohn's disease, chronic pancreatitis, Traveller's diarrhea.

Topic 6. Pharmacotherapy of diseases of the kidneys and urinary tract, genitals in men and women. Definition, epidemiology, etiology, pathogenesis, clinical picture and rational pharmacotherapy of infection diseases of the kidneys (pyelonephrities) and urinary tract infection (cystitis), chronic kidney disease, urolithiasis genital organs in men (prostatitis, erectile dysfunction, orchitis) and women (bacterial vaginitis, menopause, endometriosis, amenorrhea).

Control Content Module № 2

Content module 3. Pharmacotherapy of skin, venereal, endocrine, allergic, rheumatic, hematologic, infectious diseases. Pharmacotherapy in pediatrics

Topic 7. Pharmacotherapy of skin and sexually transmitted diseases. Pharmacotherapy of endocrine diseases and metabolic disorders. Definition, epidemiology, etiology, pathogenesis, clinical presentation and rational pharmacotherapy of STD: syphilis, HPV, HIV, gonorrhea, chlamydial infection, trichomoniasis, genital herpes. Definition, epidemiology, etiology, pathogenesis, clinical presentation and rational pharmacotherapy of skin: dermatophytoses, acne, scabies, folliculitis, atopic and seborrheic dermatitis. Definition, epidemiology, etiology, pathogenesis, clinical presentation and rational pharmacotherapy of endocrine diseases and metabolic disorders: acromegaly, hyperthyroidism, hypothyroidism, diabetes mellitus, Addison disease, diabetes insipidus, gigantism, acromegaly.

Topic 8. Pharmacotherapy of allergic diseases and of systemic rheumatic diseases. Pharmacotherapy of infectious diseases and diseases of the blood. Pharmacotherapy in pediatrics. Definition, epidemiology, etiology, pathogenesis, clinical presentation and rational pharmacotherapy of allergic diseases and connective tissue diseases: acute rheumatic fever, urticaria, angioedema, insect allergy, rheumatoid arthritis, anaphylaxis, systemic lupus erythematosus. Definition, epidemiology, etiology, pathogenesis, clinical presentation and rational pharmacotherapy of infectious diseases: Q fever, encephalitis, leptospirosis, malaria, amoebiasis, toxic shock syndrome, cholera, antrax, plague, blood diseases: anemia, chronic leukemia; childhood diseases: salmonellosis, scarlet fever.

Control Content Module №3

6. Topics of lectures

№	Name of topic	The amount of hours	
		full time study	part time study
1	Topic 1. Pharmacotherapy of nervous system diseases.	1	-
2	Topic 2 Pharmacotherapy of cardiovascular diseases.	1	-
3	Topic 3 Pharmacotherapy of pulmonary diseases.	1	-
4	Topic 4 Pharmacotherapy of gastrointestinal diseases.	1	-
5	Topic 5 Pharmacotherapy of urinary tract diseases.	1	-
6	Topic 6 Pharmacotherapy of sexually transmitted diseases.	1	-
7	Topic 7 Pharmacotherapy of endocrinology diseases.	1	-
8	Topic 8 Pharmacotherapy of allergic diseases	1	-
The whole amount of hours		8	-

7. Topics of seminars

(not predicted by the work program)

8. Topics of practical lessons

№	Name of topic	The amount of hours	
		full time study	part time study

1	Topic 1. Fundamentals of General Pharmacokinetics. Introduction and general problems of pharmacotherapy.	4	-
2	Topic 2 Pharmacotherapy of diseases of the central and peripheral nervous system and mental disorders.	4	-
3	Topic 3 Pharmacotherapy of cardiovascular system diseases. <i>Control Content Module № 1</i>	4	-
4	Topic 4 Pharmacotherapy of respiratory diseases.	4	-
5	Topic 5 Pharmacotherapy of diseases of the gastrointestinal tract and hepatobiliary system.	4	-
6	Topic 6 Pharmacotherapy of diseases of the kidneys and urinary tract, genitals in men and women. <i>Control Content Module № 2</i>	4	-
7	Topic 7 Pharmacotherapy of skin and sexually transmitted diseases. Pharmacotherapy of endocrine diseases and metabolic disorders.	4	-
8	Topic 8 Pharmacotherapy of allergic diseases and of systemic rheumatic diseases. Pharmacotherapy of infectious diseases and diseases of the blood. Pharmacotherapy in pediatrics.	4	-
9	<i>Control Content Module № 3</i>	2	
	Topic 9 Semester differential credit of the module	2	
The whole amount of hours		36	-

9. Topics of laboratorial lessons (not predicted by the work program)

10. Self-study work

№	Name of topic	The amount of hours	
		full time study	part time study
1	Topic 1. Fundamentals of General Pharmacokinetics. Introduction and general problems of pharmacotherapy.	5	-
2	Topic 2 Pharmacotherapy of diseases of the central and peripheral nervous system and mental disorders.	6	-
3	Topic 3 Pharmacotherapy of cardiovascular system diseases. <i>Control Content Module № 1</i>	6	-
4	Topic 4 Pharmacotherapy of respiratory diseases.	5	-
5	Topic 5 Pharmacotherapy of diseases of the gastrointestinal tract and hepatobiliary system.	5	-
6	Topic 6 Pharmacotherapy of diseases of the kidneys and urinary tract, genitals in men and women. <i>Control Content Module № 2</i>	5	-
7	Topic 7 Pharmacotherapy of skin and sexually transmitted diseases. Pharmacotherapy of endocrine diseases and metabolic disorders.	7	-
8	Topic 8 Pharmacotherapy of allergic diseases and of systemic rheumatic diseases. Pharmacotherapy of infectious diseases and diseases of the blood. Pharmacotherapy in pediatrics. <i>Control Content Module № 3</i>	7	-
The whole amount of hours		46	-

Tasks for Self-study work

1. Study definition, etiology, pathogenesis, symptoms and pharmacotherapy of meningitis.
2. Study definition, etiology, pathogenesis, symptoms and pharmacotherapy of Parkinson's disease.
3. Study definition, etiology, pathogenesis, symptoms and pharmacotherapy of neuropathic pain.
4. Study definition, etiology, pathogenesis, symptoms and pharmacotherapy of pericarditis.
5. Study definition, etiology, pathogenesis, symptoms and pharmacotherapy of endocarditis.
6. Study definition, etiology, pathogenesis, symptoms and pharmacotherapy of bronchial asthma.
7. Study definition, etiology, pathogenesis, symptoms and pharmacotherapy of hospital pneumonia.
8. Study definition, etiology, pathogenesis, symptoms and pharmacotherapy of chronic obstructive pulmonary diseases.
9. Study definition, etiology, pathogenesis, symptoms and pharmacotherapy of H. pylori infection.
10. Study definition, etiology, pathogenesis, symptoms and pharmacotherapy of chronic gastritis.
11. Study definition, etiology, pathogenesis, symptoms and pharmacotherapy of inflammatory bowel disease.
12. Study definition, etiology, pathogenesis, symptoms and pharmacotherapy of chronic viral hepatitis.
13. Study definition, etiology, pathogenesis, symptoms and pharmacotherapy of urinary tract infections.
14. Study definition, etiology, pathogenesis, symptoms and pharmacotherapy of nephrolithiasis.
15. Study definition, etiology, pathogenesis, symptoms and pharmacotherapy of chronic kidney disease.
16. Study definition, etiology, pathogenesis, symptoms and pharmacotherapy of prostatitis.
17. Study definition, etiology, pathogenesis, symptoms and pharmacotherapy of urethritis.
18. Study definition, etiology, pathogenesis, symptoms and pharmacotherapy of vaginitis.
19. Study definition, etiology, pathogenesis, symptoms and pharmacotherapy of menopause.
20. Study definition, etiology, pathogenesis, symptoms and pharmacotherapy of gonorrhea.
21. Study definition, etiology, pathogenesis, symptoms and pharmacotherapy of chlamydial infection.
22. Study definition, etiology, pathogenesis, symptoms and pharmacotherapy of trichomoniasis.
23. Study definition, etiology, pathogenesis, symptoms and pharmacotherapy of genital herpes.
24. Study definition, etiology, pathogenesis, symptoms and pharmacotherapy of folliculitis.
25. Study definition, etiology, pathogenesis, symptoms and pharmacotherapy of seborrheic dermatitis.
26. Study definition, etiology, pathogenesis, symptoms and pharmacotherapy of contact dermatitis.
27. Study definition, etiology, pathogenesis, symptoms and pharmacotherapy of psoriasis.
28. Study definition, etiology, pathogenesis, symptoms and pharmacotherapy of atopic dermatitis.
29. Study definition, etiology, pathogenesis, symptoms and pharmacotherapy of acne.
30. Study definition, etiology, pathogenesis, symptoms and pharmacotherapy of scabies.
31. Study definition, etiology, pathogenesis, symptoms and pharmacotherapy of dermatophytoses.
32. Study definition, etiology, pathogenesis, symptoms and pharmacotherapy of Addison diseases.
33. Study definition, etiology, pathogenesis, symptoms and pharmacotherapy of Cushing

syndrome.

34. Study definition, etiology, pathogenesis, symptoms and pharmacotherapy of gigantism.
35. Study definition, etiology, pathogenesis, symptoms and pharmacotherapy of acromegaly.
36. Study definition, etiology, pathogenesis, symptoms and pharmacotherapy of anaphylaxis.
37. Study definition, etiology, pathogenesis, symptoms and pharmacotherapy of insect allergy.
38. Study definition, etiology, pathogenesis, symptoms and pharmacotherapy of acute rheumatic fever.
39. Study definition, etiology, pathogenesis, symptoms and pharmacotherapy of systemic lupus erythematosus.
40. Study definition, etiology, pathogenesis, symptoms and pharmacotherapy of rheumatoid arthritis
41. Study the pharmacokinetics of drug using to pharmacotherapy of anaphylaxis
42. Study definition, etiology, pathogenesis, symptoms and pharmacotherapy of malaria.
43. Study definition, etiology, pathogenesis, symptoms and pharmacotherapy of amebiasis.
44. Study definition, etiology, pathogenesis, symptoms and pharmacotherapy of leptospirosis.
45. Study definition, etiology, pathogenesis, symptoms and pharmacotherapy of Q fever.
46. Study definition, etiology, pathogenesis, symptoms and pharmacotherapy of iron deficiency anemia.
47. Study definition, etiology, pathogenesis, symptoms and pharmacotherapy of megaloblastic anemias.
48. Study definition, etiology, pathogenesis, symptoms and pharmacotherapy of leukemias.

Supervision of independent work of higher education applicants is carried out during practical classes in the form of test tasks and situational problems and control content modules.

11.Criteria and evaluation order of educational outcome

Practical classes	Grade	Number of points	Criteria for assessing
Practical lesson №1-3	perfectly	4,5-5	Tests - 4 points Other types of work - 1 point (practical skills, solving situational problems).
	good / very good	3,5-4	
	satisfactorily	3	
	unsatisfactorily	0-2,5	
Content module 1 assimilation		0-15	Tests – 9 points Solving situational problems – 4 points Practical skills – 2 points
Total for the content module 1		18-30	Current points + points for Content module 1 assimilation
Practical lesson №4-6	perfectly	4,5-5	Tests - 4 points Other types of work - 1 points (practical skills, solving situational problems).
	good / very good	3,5-4	
	satisfactorily	3	
	unsatisfactorily	0-2,5	
Content Module 2 assimilation		0-15	Tests – 9 points Solving situational

			problems – 4 points Practical skills – 2 points
Total for the Content Module 2		18-30	Current points + points for Content Module 2 assimilation
Practical lesson №7,8	perfectly	9-10	Tests - 8 points Other types of work - 2 points (practical skills, solving situational problems).
	good / very good	7,5-8,5	
	satisfactorily	7-6	
	unsatisfactorily	0-5,5	
Content Module 3 assimilation		12-20	Tests – 14 points Solving situational problems – 4 points Practical skills – 2 points
Total for the Content Module 3		24-40	Current points + points for Content Module 3 assimilation
All for Module "Pharmacotherapy of pharmacokinetics"		60-100	Total for the Content Module 1+2+3

EVALUATION MODULE FOR THE EDUCATIONAL COMPONENT

National scale	Scale ECTS	Rating score, points
5 – excellent	A – excellent	90-100
4 – good	B – very good	82-89
	C – good	74-81
3 – satisfactorily	D – satisfactorily	64-73
	E – enough (meets minimum criteria)	60-63
2 – unsatisfactorily	FX – unsatisfactorily	35 59
not allowed	F – unsatisfactorily (need more wor)	1-34

Grade "excellent" for practical lesson provided a conscious, correct and complete mastery of the material. Answers to theoretical questions confident, well-reasoned and logical. The student is able to apply their own knowledge and skills in carrying out case studies and provided the correct answer to all achievement tests.

Grade «good» for conscious and complete answer to the theoretical question, but with some inaccuracies which the student corrects itself. The answer is quite justified, minor infraction sequence. The student independently, but with some help of the teacher is able to apply their knowledge and skills in carrying out case studies and provided the correct answer at least 75% of the test performance.

Grade "satisfactory" exhibited for conscious, with minor errors answer the questions that the student corrects with the help of a teacher. There are some violations of logic and consistency. The student is able to independently apply the knowledge and perform situational problems with the instructions of the teacher and gave the correct answer at least 60% of the test performance.

Grade "unsatisfactory" exhibited in response to large errors and gaps where there are only fragments of knowledge. Lack of autonomy in the use of the knowledge and execution of situational problems and if given the correct answer at least 60% achievement tests.

12. Forms of progress and semester supervision of academic achievements

Current control is carried out on the basis of test control, oral survey, performance of situational problems and practical skills for each topic and control of educational content modules component which include test, situational problems and practical skills on all content topics module. Semester control is conducted in the form of a semester credit (grade).

13. Methodological support

Educational content (lecture notes), plans for practical (seminar) classes, tasks for practical work, independent work, questions, problems, assignments or cases for current and semester control of knowledge and skills of higher education students.

14. Reading suggestions

The main reading

1. Lectures of pharmacotherapy with pharmacokinetics: Tutorial for foreign students of higher education staff / I.V. Kiryev, N.V. Zhabotynska, O.A. Riabova et al. – Kharkiv : NUPH : 2019. – 139 p.

Supplementary reading suggestion

1. Barbara G. Wells, Joseph T. Dipiro, Terry L. Schwinghammer, Cecily V. Dipiro Pharmacotherapy handbook. 2017: 1164.
2. John E. Murphy Clinical pharmacokinetics 7th Edition 2021:450
3. Katzung B.G., & Vanderah T.W.(Eds.), (2021). Basic & Clinical Pharmacology, 15e. McGraw Hill. <https://accessmedicine.mhmedical.com/content.aspx?bookid=2988§ionid=250593594>
4. From applied clinical pharmacokinetics, second edition. Bauer L.A. (Ed.), (2015). Applied Clinical Pharmacokinetics, 3e. McGraw Hill. <https://accesspharmacy.mhmedical.com/content.aspx?bookid=1374§ionid=74719411>
5. Global Initiative for Asthma. Global Strategy for Asthma Management and Prevention, 2023. Updated May, 2022. Available at: www.ginasthma.org.
6. World Health Organization-International Society of Hypertension Guidelines for the Management of Hypertension. Guidelines Subcommittee. Feb 2018; 17(2):151-83.
7. David N. Gilbert, Henry F. Chambers et al. The Sanford Guide to Antimicrobial Therapy 2023 (Pocket Edition) ISBN 10: 1944272232 ISBN 13: 9781944272234 P.339
8. 2017 Infectious Diseases Society of America's Clinical Practice Guidelines for Healthcare-Associated Ventilator-Associated Pneumonia and Meningitis / A. R. Tunkel, R. Hasbun, A. Bhimraj et al. // Clin. Infect. Dis. – 2017. – Vol. 64, № 6. – P. 701–706.
9. Emilio Perucca. Antiepileptic drugs: evolution of our knowledge and changes in drug trials. Epileptic Disorders. 2019; 21(4):319-329. doi:10.1684/epd.2019.1083
10. ESCMID guideline: diagnosis and treatment of acute bacterial meningitis / D. van de Beek, C. Cabellos, O. Dzunpova et al. // Clin. Microbiol. Infect. – 2016. – Vol. 22, Suppl. 3. – P. S37–S62.
11. KDIGO 2021 Clinical Practice Guideline for the Management of Blood Pressure in Chronic Kidney Disease Cheung, Alfred K. et al. Kidney International, Volume 99, Issue 3, S1 - S87

12. Guidelines for the management of chronic kidney disease / A. Levin, B. Hemmelgarn, B. Culleton et al. // CMAJ. – 2018. – Vol. 179, № 11. – P. 1154–1162.
13. Sexually transmitted diseases treatment guidelines, 2021 / MMWR / July 23, 2021 / Vol. 70 / No. 4/ P. 135
14. Malfertheiner P, Megraud F. At all. European Helicobacter and Microbiota Study group. Management of Helicobacter pylori infection: the Maastricht VI/Florence consensus report. Gut. 2022 Aug 8;gutjnl-2022-327745. <http://doi.org/10.1136/gutjnl-2022-327745>.

15. Information resources on the Internet

1. NPhaU. Online tests. Preparation for independent testing of KPOK [Electronic resource] / National University of Pharmacy. – Access mode: <http://tests.nuph.edu.ua/>
2. Website of the Department of Pharmacology and Pharmacotherapy [Electronic resource] / National University of Pharmacy. – Access mode: <https://pharmacolpharmacother.nuph.edu.ua/en/>
3. NPhaU Library: [Electronic resource] / National University of Pharmacy. – Access mode: <http://lib.nuph.edu.ua/?lng=ua>