MINISTRY OF HEALTH OF UKRAINE
NATIONAL UNIVERSITY OF PHARMACY
Faculty of Medical and Pharmaceutical Technologies
Department of Clinical Pharmacology and Clinical Pharmacy

PHARMACOTHERAPY WITH PHARMACOKINETICS

(the name of educational component)

WORK PROGRAM
of educational component

training for	**Master** (Higher Educational Level Name)
in specialty	**226 Pharmacy, Industrial Pharmacy** (Code and Specialty name)
field of knowledge	**22 Public health** (Code and Knowledge Field Name)
of educational program	**Pharmacy** (Language of Instruction — English) (Educational Program Title)
in specialization(s)	**—** (Name of specialization, if available)

Kharkiv-2022

The work program of the educational component «Pharmacotherapy with Pharmacokinetics» in specialty «226 Pharmacy, industrial pharmacy» educational program «Pharmacy» in specialization(s)___-___ for applicants for higher education 4th year of study.

EDUCATIONAL COURSE TEAM: PROPISNOVA Viktoriia, Associate Professor of Department of Clinical Pharmacology and Clinical Pharmacy NUPh, PhD
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(Enter the printed name and academic rank of the authors)

The work program has been considered and approved at the Meeting of the Department of Clinical Pharmacology and Clinical Pharmacy of NUPh.
Record from «02» September 2022 №1

Acting Head of the Department  Prof. Tetiana SAKHAROVA

The work program has been approved at the Meeting of the Methodical Committee on Biomedical Disciplines of NUPh.
Record from «12» September 2022 № 1

Head of the Committee  Prof. Nadia KONONENKO

1. Description of the educational component

Language of study: English.

Status of the educational component: Mandatory.

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

Prerequisites for studying the educational component: The educational component «Pharmacotherapy with Pharmacokinetics» is based on the study of biology and genetics fundamentals, normal physiology and human anatomy, microbiology with immunology fundamentals, pathological physiology, and pharmacology.

Information content of the educational component. 3 ECTS credits 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 train pharmacists in the basic principles and directions for conducting modern rational pharmacotherapy of the most common diseases of various types of 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 International medicine societies and associations.

The main tasks of the educational component «Pharmacotherapy with Pharmacokinetics» are to develop applicants' knowledge about basic pharmacokinetics processes, drug interaction, etiology, pathogenesis, clinical manifestations of 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 applicants's 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. Competency and planned educational outcomes

The educational component «Pharmacotherapy with Pharmacokinetics» ensures the acquisition of applicants for higher education with the following **competencies**:

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, and accept well-founded decisions.

GC 6. Knowledge and understanding of the subject area and understanding of the professional activity.

professional

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 the 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, pharmacoki-

netic, pharmacodynamic and physical and chemical characteristics of the medicine and other pharmaceutical product.

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

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

PLO 2. Apply knowledge from general and specialized disciplines in professional activity

PLO 14. To determine the advantages and disadvantages of medications of different pharmacological groups, taking into account their chemical, physical, and chemical, 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 due to the condition, features of the human body, and physical and chemical 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, 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, and duration);

• determine the possible influence of food on the 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.

possess:

- methods of searching, collecting, analyzing, interpreting, and providing medical information, collecting medical and allergic anamnesis;
- communicative technologies.

4. The educational component structure

Names of content modules and topics	The amount of hours			
	total	including		
		lec-tures	pract	self-study
1	*2*	*3*	*4*	*5*
MODULE 1 **Content module 1**. *Fundamental of pharmacokinetics. Pharmacotherapy in Cardiology, Neurology, and Pulmonology*				
Topic 1. Fundamentals of General Pharmacokinetics. Introduction and general problems of pharmacotherapy	10		4	6
Topic 2. Pharmacotherapy of diseases of the central and peripheral nervous system and mental disorders	10			10
Topic 3. Pharmacotherapy of cardiovascular system diseases and systemic rheumatic diseases	10	2	8	
Topic 4. Pharmacotherapy of respiratory diseases	10	1	4	5
Content module 1 control	5		2	3
Total content module 1	**45**	**3**	**18**	**24**
Content module 2. *Pharmacotherapy in Gastroenterology, Nephrology, Urology, Gynecology. Pharmacotherapy of skin, venereal, endocrine, allergic, hematologic, and infectious diseases. Pharmacotherapy in Pediatrics*				
Topic 5. Pharmacotherapy of diseases of the gastrointestinal tract and hepatobiliary system	10	1	4	5
Topic 6. Pharmacotherapy of diseases of the kidneys and urinary tract, genitals in men and women	10	1	4	5
Topic 7. Pharmacotherapy of skin and sexually transmitted diseases. Pharmacotherapy of endocrine diseases and metabolic disorders	10	1	4	5
Topic 8. Pharmacotherapy of allergic diseases. Pharmacotherapy of infectious diseases and diseases of the blood. Pharmacotherapy in pediatrics	10	2	4	4
Content module 2 control	5		2	3
Total content module 2	**45**	**5**	**18**	**22**
Semester credit from Module 1				
TOTAL AMOUNT OF HOURS OF THE MODULE 1	**90**	**8**	**36**	**46**
Total Hours for the educational component	**90**	**8**	**36**	**46**

5. Content of the educational component

MODULE 1

CONTENT MODULE 1. Fundamental of pharmacokinetics. Pharmacotherapy in Cardiology, Neurology, Pulmonology.

Topic 1. Fundamentals of General Pharmacokinetics. Introduction and general problems of pharmacotherapy. Methods of examination of the patient. The purpose and objectives of Pharmacotherapy with 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 are etiotropic, pathogenetic, symptomatic, replacement, and 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 and systemic rheumatic 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. Definition, epidemiology, etiology, pathogenesis, clinical picture, and rational pharmacotherapy of connective tissue diseases: acute rheumatic fever, rheumatoid arthritis, systemic lupus erythematous.

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, and influenza.

CONTENT MODULE 2. Pharmacotherapy in Gastroenterology, Nephrology, Urology, Gynecology. Pharmacotherapy of skin, venereal, endocrine, allergic, hematologic, and infectious diseases. Pharmacotherapy in pediatrics

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, and traveler’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 (pyelonephritis) and urinary tract infection (cystitis), chronic kidney disease, urolithiasis genital organs in men (prostatitis, erectile dysfunction, orchitis) and women (bacterial vaginitis, menopause, endometriosis, and amenorrhea).

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: hyperthyroidism, hypothyroidism, diabetes mellitus, Addison disease, diabetes insipidus, gigantism, acromegaly.

Topic 8. Pharmacotherapy of allergic 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: urticaria, angioedema, insect allergy, anaphylaxis. Definition, epidemiology, etiology, pathogenesis, clinical presentation, and rational pharmacotherapy of infectious diseases: Q-fever, encephalitis, leptospirosis, malaria amoebiasis, toxic shock syndrome, cholera, anthrax, plaque, blood diseases: anemia, chronic leukemia; childhood diseases: salmonellosis, scarlet fever.

SEMESTER CREDIT

6. Topics of lectures

№	Name of topic	Hours
1.	**Topic 1**. Fundamentals of General Pharmacokinetics. Introduction and general problems of pharmacotherapy	1
2.	**Topic 2**. Pharmacotherapy of diseases of the central and peripheral nervous system and mental disorders	1

3.	**Topic 3**. Pharmacotherapy of cardiovascular system diseases and systemic rheumatic diseases	2
4.	**Topic 4**. Pharmacotherapy of respiratory diseases	1
5.	**Topic 5**. Pharmacotherapy of diseases of the gastrointestinal tract and hepatobiliary system	1
6.	**Topic 6**. Pharmacotherapy of diseases of the kidneys and urinary tract, genitals in men and women	1
7.	**Topic 7**. Pharmacotherapy of skin and sexually transmitted diseases. Pharmacotherapy of endocrine diseases and metabolic disorders	1
8.	**Topic 8**. Pharmacotherapy of allergic diseases. Pharmacotherapy of infectious diseases and diseases of the blood. Pharmacotherapy in pediatrics	2
	Total hours	**8**

7. Topics of seminars — Not provided by curriculum.

8. Topics of practical lessons

№	Name of topic	Hours
1	*2*	*3*
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	
3	**Topic 3**. Pharmacotherapy of cardiovascular system diseases and systemic rheumatic diseases	8
4	**Topic 4**. Pharmacotherapy of respiratory diseases	4
5	**Content module 2 control**	2
6	**Topic 5**. Pharmacotherapy of diseases of the gastrointestinal tract and hepatobiliary system	4
7	**Topic 6**. Pharmacotherapy of diseases of the kidneys and urinary tract, genitals in men and women	4
8	**Topic 7**. Pharmacotherapy of skin and sexually transmitted diseases. Pharmacotherapy of endocrine diseases and metabolic disorders	4
9	**Topic 8**. Pharmacotherapy of allergic diseases. Pharmacotherapy of infectious diseases and diseases of the blood. Pharmacotherapy in pediatrics	4
10	**Content module 2 control**	2
	Total Hours	**36**

9. Topics of laboratorial lessons — Not provided by curriculum.

10. Self-study work

№	Name of topic	Hours
1	**Topic 1**. Fundamentals of General Pharmacokinetics. Introduction and general problems of pharmacotherapy	6
2	**Topic 2**. Pharmacotherapy of diseases of the central and peripheral nervous system and mental disorders	10
3	**Topic 3**. Pharmacotherapy of cardiovascular system diseases and systemic rheumatic diseases	
4	**Topic 4**. Pharmacotherapy of respiratory diseases	5
5	**Content module 2 control**	3
6	**Topic 5**. Pharmacotherapy of diseases of the gastrointestinal tract and hepatobiliary system	5
7	**Topic 6**. Pharmacotherapy of diseases of the kidneys and urinary tract, genitals in men and women	5

№	Name of topic	Hours
8	**Topic 7**. Pharmacotherapy of skin and sexually transmitted diseases. Pharmacotherapy of endocrine diseases and metabolic disorders	5
9	**Topic 8**. Pharmacotherapy of allergic diseases. Pharmacotherapy of infectious diseases and diseases of the blood. Pharmacotherapy in pediatrics	4
10	**Content module 2 control**	3
	SEMESTER CREDIT	
	Total Hours	**46**

Tasks for self-study work

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.

Definition, epidemiology, etiology, pathogenesis, clinical presentation, and rational pharmacotherapy of SARS, hospital-acquired pneumonia, tuberculosis.

Definition, epidemiology, pathogenesis, clinical picture, and rational pharmacotherapy of gastrointestinal diseases: chronic gastritis, ulcerative stomach, and duodenum, chronic viral hepatitis, chronic pancreatitis, traveler’s diarrhea.

Definition, epidemiology, etiology, pathogenesis, clinical picture, and rational pharmacotherapy of genital organ diseases in men (prostatitis, erectile dysfunction, orchitis) and women (bacterial vaginitis, menopause, endometriosis, and amenorrhea).

Definition, epidemiology, etiology, pathogenesis, clinical presentation, and rational pharmacotherapy of STD: syphilis, HPV, HIV, gonorrhea, chlamydia 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: Addison disease, diabetes insipidus, gigantism, acromegaly.

Definition, epidemiology, etiology, pathogenesis, clinical presentation, and rational pharmacotherapy of infectious diseases: Q-fever, encephalitis, leptospirosis, malaria amoebiasis, toxic shock syndrome, cholera, anthrax, plaque, blood diseases: chronic leukemia; childhood diseases: salmonellosis, scarlet fever.

11. Criteria and evaluation order of educational outcomes

The success of the applicant in each semester is estimated by a 100-point scale which consists of an assessment for theoretical and practical training at each class, self-study work, and results of content module control.

The maximum number of points, which the applicant can get during the studying of the module (credit) is 100, and the minimum number of points is 60.

During the assessment of the applicant’s knowledge, the advantage is given to the standardized quality monitoring — oral interview, written interview, test, control of practical skills

Current control										SUM
M1. Content module 1					M1. Content module 2					
T1	T2	T3	T4	Control	T6	T6	T7	T8	Control	60-100
4.5-7.5	4.5-7.5	4.5-7.5	4.5-7.5	12-20	4.5-7.5	4.5-7.5	4.5-7.5	4.5-7.5	12-20	

The ***rating of the current control*** is calculated on a cumulative basis. Depending on the curriculum of the current academic year, the number of classes per semester and the marks in practical classes

(seminars) may vary, but the overall ranking is in accordance with the ECTS scale. Study activity in practical class is estimated according to the criteria in **Table 1**.

Table 1. Criteria of study activity assessment on practical classes

Scale	Criteria
«5» excellent 90-100%	• Tasks for self-study for the lesson is done fully and correctly • Answers to theoretical questions on the topic of the lesson are given correctly and clearly • Practical tasks during the in-class work were carried out fully and correctly • Final test has been done within 90-100%.
«4» very good 82-89%	• Tasks for self-study or if the lesson can be done fully and correctly • Answers to theoretical questions on the topic of the lesson are given in full with negligible error • Practical tasks during the in-class work were carried out with negligible error • Final test has been done within 82-89%.
«4-» good 74-81%	• Tasks for self-study for the lesson are done with negligible error • Answers to theoretical questions on the topic of the lesson are given incomplete with error • Practical tasks during the in-class work were carried out with negligible deviation • Final test has been done within 74-81%.
«3» satisfac-tory 64-73%	• Tasks for self-study for the lesson are done with significant error • Answers to theoretical questions on the topic of the lesson are given incomplete or with signifi-cant error • Practical tasks during the in-class work were carried out with significant deviation • Final test has been done within 64-73%.
«3-» enough 60-63%	• Lesson self-study tasks have not been done partly with significant error • Answers to theoretical questions on the topic of the lesson are given incomplete with significant error • Practical tasks during the in-class work were carried out partly with significant deviation • Final test has been done within 60-63%.
«2» unsatis-factory 0-59%	• Lesson self-study tasks have not been done or are done incorrectly • Answers to theoretical questions on the topic of the lesson aren't given • Practical tasks during the in-class work weren't carried out are done incorrectly • Final test has done in within 0-59%

Current control includes an assessment of the applicant's theoretical knowledge, practical skills, and self-study work, as well as the control of the content module, and is conducted during the in-class work.

In-class work control is carried out in a practical (seminary) class. In accordance with the lesson objectives, the in-class work control can include oral interviews, individual interviews, testing, and assessment of practical tasks.

Control of self-study work assesses the level of knowledge that applicants acquire during their own self-study, and also by working out a list of questions submitted for self-study work in particular modules. It provides the inclusion of relevant questions to the content module control.

The scale of the content module rating, current rating, and the total points are presented in **Table 2**.

Table 2. Correspondence scale

Scale			Credit	Content module 50 points	Content 20 points	Current rating 30 points
«5»	excellent	90-100%	credit	45-50	18-20	27-30
«4»	very good	82-89%	credit	41-44.5	16.5-17.5	25-26.5
«4-»	good	74-81%	credit	37-40.5	15-16	22.5-24.5
«3»	satisfactory	64-73%	credit	32-36.5	13-14.5	19.5-22
«3-»	enough	60-63%	credit	30-31.5	12-12.5	18-19
«2»	unsatisfactory	0-59%	no credit	17.5-29.5	7-11.5	10.5-17.5

	—	0-17	0-6.5	0-10

Applicants who have completed all types of work provided by the curriculum and who have scored at least 18 points based on the results of current study activities are admitted to the **content module control**.

The content module control is standardized and includes the control of theoretical knowledge and practical training (control of practical skills) in the form of tests and situational tasks. The maximum points for the content module control is 20, minimum is 12 points

According to the total result of the current and content module control, a mark is assigned to the credit book according to the systems presented in **Table 3**.

Table 3. Rating scale in ECTS (*European Credit Transfer System*)

Rating assessment, points		Definition
90-100	A	excellent
82-89	B	good
74-81	C	
64-73	D	satisfactory
60-63	E	
35-59	F	unsatisfactory with the possibility of repeated pass
1-34	FX	unsatisfactory with an obligatory repeated course (additional work is necessary)

Applicants can get A, B, C, D, and E rates if they were granted credits for all modules of the educational component.

Applicants can get FX or F if they weren't granted at least one module of the educational component after completing their studies.

The FX ("2") is graded to applicants who have received the minimum quantity of points on the current academic activity but did not pass a content module control. They have the right to repeat the control test no more than 2 times within 2 weeks after the end of the semester according to the schedule approved by the rector.

Applicants who have got F (they did not complete a program at least one module or did not get the minimum quantity of points for the current academic activity) should repeat the course according to an individual curriculum.

12. Form of progress and semester supervision of academic achievements

Semester credit.

Criteria for the exam assessment

National scale	ECTS	Points	Criteria
5	**A – excellent**	**100-90**	Applicant of master level answers correct and comprehensive to all questions, theoretical knowledge can be freely used to solve practical problems
4	**B – very good**	**89-82**	Applicant of master level answers correctly to all questions, but not completely, theoretical knowledge can be freely used to solve practical problems
4-	**C - good**	**81-74**	The applicant of master level answers correctly to all questions, but with some errors that he found and corrected himself, theoretical knowledge can be used to solve practical problems
3	**D - satisfactory**	**73-64**	Applicant of master level answers correct but not complete on 75% of questions. During the answer, mistakes were made, and an applicant was able to correct them after clarifying the examiner's questions. Theoretical knowledge can be used to

National scale	ECTS	Points	Criteria
			solve practical problems, but practical tasks are not completed, and there are minor errors
3-	**E – enough**	**63-60**	Applicant of master level answers correct, but not complete, for 50% of questions. During the answer, mistakes were made, and an applicant was able to partially correct them after clarifying the examiner's questions. Theoretical knowledge can be used to solve practical problems, but only under the guidance of an examiner
2	**FX – unsatisfactory**	**59-35**	Applicant of master level answers correct, but partial, to less than 40% of questions, with errors that can not be corrected after clarifying questions of the examiner. Theoretical knowledge can not be used to solve practical problems, even partially
no permission	**F – unsatisfactory** with an obligatory repeated course (additional work is necessary)	**0-34**	The applicant of master level did not score 36 points for the current educational activity from the module, was not admitted to the final module control or the applicant did not score 24 points from the final module control

13. Methodological support

1) Educational program on an educational component
2) Work program on an educational component
3) Course schedule of lectures and practical classes
4) Learning success assessment system
5) List of theoretical questions and cases for content module controls
6) Set of tests
7) Set of cards for content module controls (cards, standard of answers, criteria of knowledge assessment)
8) Set of cards for comprehensive test (cards, standard of answers, criteria of knowledge assessment)
9) Methodical recommendations for practical classes
10) Methodical recommendations for self-study work
11) Methodical recommendations for content module control training
12) Guidelines, atlases, handbooks, manuals
13) Educational videos:
    - Multimedia lectures according to the schedule

14. Reading suggestions

The main reading suggestions

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

Supplementary reading suggestions

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) World Health Organization-International Society of Hypertension Guidelines for the Management of Hypertension. Guidelines Subcommittee. Feb 2018;17(2):151-83.
4) The Sanford Guide to Antimicrobial Therapy. Gilbert D.N., Moellering R.C., Eliopoulos G.M., Sande M.A. – 35th ed. – Sanford Guide, USA, 2015.- 132 p.

5) 2017 Infectious Diseases Society of America's Clinical Practice Guidelines for Healthcare-Associated Ventriculitis and Meningitis / A. R. Tunkel, R. Hasbun, A. Bhimraj et al. // Clin. Infect. Dis. – 2017. – Vol. 64, № 6. – P. 701–706.

6) Updated ILAE evidence review of antiepileptic drug efficacy and effectiveness as initial monotherapy for epileptic seizures and syndromes / T. Glauser, E. Ben-Menachem, B. Bourgeois et al. // Epilepsia. – 2013. – Vol. 54, № 3. – P. 551–563.

7) Practice guidelines for the management of bacterial meningitis / A. R. Tunkel, B. J. Hartman, S. L. Kaplan et al. // Clin. Infect. Dis. – 2014. – Vol. 39, № 9. – P. 1267–1284.

8) ESCMID guideline: diagnosis and treatment of acute bacterial meningitis / D. van de Beek, C. Cabellos, O. Dzupova et al. // Clin. Microbiol. Infect. – 2016. – Vol. 22, Suppl. 3. – P. S37–S62.

9) National Kidney Foundation practice guidelines for chronic kidney disease: evaluation, classification, and stratification / A. S. Levey, J. Coresh, E. Balk et al. // Ann. Intern. Med. – 2013. – Vol. 139, № 2. – P. 137–147.

10) Kidney Disease: Improving Global Outcomes (KDIGO) CKD Work Group. KDIGO 2012 Clinical Practice Guideline for the Evaluation and Management of Chronic Kidney Disease / A. Levin, P. E. Stevens, R. W. Bilous et al. // Kidney Int. Suppl. – 2013. – Vol. 3, № 1. – P. 1–150.

11) Management of hyperphosphataemia in chronic kidney disease: summary of National Institute for Health and Clinical Excellence (NICE) guideline / I. Dasgupta, R. Shroff, D. Bennett-Jones, G. McVeigh // Nephron Clin. Pract. – 2013. – Vol. 124, № 1–2. – P. 1–9.

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) WHO Guidelines for the Treatment of Treponema pallidum (Syphilis) / World Health Organization. – Geneva, 2016. – 60 p.

14) WHO Guidelines for the Treatment of Neisseria gonorrhoeae / World Health Organization. – Geneva, 2016. – 64 p.

15. Electronic Resources, including the Internet

1)*FDA* Approved drug products [Electronic resource] // Federal Drug Administration. – Access mode: https://www.accessdata.fda.gov/scripts/cder/daf/ (Date of access: 12.01.2023). – The name from the screen.

2) Medicines [Electronic resource] // European Medicines Agency. – Access mode: https://www.ema.europa.eu/en/medicines (Date of access: 12.01.2023). – The name from the screen.

3) NPhaU Library: [Electronic resource] / National University of Pharmacy. – Access mode : http://lib.nuph.edu.ua/?lng=ua

4) *https://pharmel.kharkiv.edu/moodle/enrol/index.php?id=4919*

5) *https://pharmel.kharkiv.edu/moodle/course/view.php?id=3394*