

MINISTRY OF HEALTH OF UKRAINE

Odessa National Medical University

Department of General and clinical pharmacology with the pharmacognosy



Approved

Vice-rector for scientific and pedagogical work

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01 September 2025

WORKING PROGRAM OF THE EDUCATIONAL DISCIPLINE
"CLINICAL PHARMACOLOGY"

Level of higher education: second (master's)

Field of knowledge: 22 "Healthcare"

Specialty: 222 "Medicine"

Educational and professional program: Medicine

The working program is based on the educational and professional program "Medicine" for training specialists of the second (master's) level of higher education in the specialty 222 "Medicine" of the field of knowledge 22 "Healthcare", approved by the Academic Council of ONMedU (minutes No. 10 of June 27, 2024) and the educational and professional program "Medicine" for training specialists of the second (master's) level of higher education in the specialty I 2 "Medicine" of the field of knowledge I "Healthcare and Social Security", approved by the Academic Council of ONMedU (minutes No. 10 of June 26, 2025).

Developers: Doctor of Medicine, Professor Rozhkovsky YA.V., PhD., associate professor Strechen S.B., PhD, associate professor Shemonayeva K.F., PhD, assistant Poludenko G.O.

The working program was approved at the meeting of the department of general and clinical pharmacology with the pharmacognosy Protocol No.1 dated 28.08.2025.

Head of the department  Yaroslav ROZHKOVSKEY

Agreed with OPP guarantor  Valery MARICHEREDA

Approved by the subject cycle methodical commission for therapeutical disciplines of ONMedU Protocol No. 1 dated 29.08.2025

Head of the subject cycle methodical commission for therapeutical disciplines of ONMedU Olena VOLOSHYNA 

Reviewed and approved at the meeting of the department _____

Protocol No. of " " 20

Head of Department _____

Reviewed and approved at the meeting of the department _____

Protocol No. of " " 20

Head of Department _____

1. Description of the discipline:

Name of indicators	Field of knowledge, specialty, specialization, level of higher education	Characteristics of the academic discipline		
The total number of: Credits: 2 Hours: 60	Field of knowledge 22 "Health care"	<i>Full-time education</i> <i>Mandatory discipline</i>		
		<i>Year of training:</i>	4	
	Specialty 222 "Medicine"	<i>Semester</i>	<i>VII, VIII</i>	
		<i>Lectures</i>	6 hours	
	Level of higher education second (master's)	<i>Practical classes</i>	30 hours	
		<i>Individual work</i>	24 hours	
		<i>including individual tasks</i>	0 hours	
	<i>The form of the final control is</i>	Test		

2. The purpose and tasks of the educational discipline, competences, program learning outcomes.

Purpose: training of specialists who possess a sufficient amount of theoretical knowledge and practical skills to carry out the most rational drug therapy for a specific patient, possess the methodology for choosing the most effective and safe drugs, as well as their combinations, taking into account the individual characteristics of the body, the course and form of the disease, the presence concomitant pathology, based on evidence-based medicine data.

The task: to provide the student with a higher education with a sufficient amount of theoretical knowledge and practical skills to carry out the most rational drug therapy for a specific patient, to master the methodology of individual selection of effective and safe drugs on the basis of pharmacokinetics, pharmacodynamics, possible manifestations of side effects, features of the course of the disease, the age of the patient, optimal dosage forms, making rational combinations of drugs.

The process of studying the discipline is aimed at forming elements of the following competencies:

General competences (GC):

GC1. Ability to abstract thinking, analysis and synthesis

GC2. Ability to learn and master modern knowledge

GC3. Ability to apply knowledge in practical situations

GC4. Knowledge and understanding of the subject area and understanding of professional activity

GC5. Ability to adapt and act in a new situation

GC6. Ability to make informed decisions

GC7. Ability to work in a team

GC8. Ability to interpersonal interaction

GC9. Ability to communicate in a foreign language

GC10. Ability to use information and communication technologies

GC11. Ability to search, process and analyze information from various sources

GC12. Determination and persistence in relation to assigned tasks and assumed responsibilities

GC13. Awareness of equal opportunities and gender issues

GC14. The ability to realize one's rights and responsibilities as a member of society, to be aware of the values of a public (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

GC15. 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 technology, to use various types and forms of motor activity for active recreation and leading a healthy lifestyle

GC16. The ability to make decisions and act in accordance with the principle of inadmissibility of corruption and any manifestations of dishonesty

GC17. The desire to preserve the environment

Special (professional, subject) competences (SC):

SC1. Ability to collect medical information about the patient and analyze clinical data

SC2. Ability to determine the necessary list of laboratory and instrumental studies and evaluate their results

SC3. Ability to establish a preliminary and clinical diagnosis of the disease

SC4. The ability to determine the necessary regime of work and rest in the treatment and prevention of diseases

SC5. The ability to determine the nature of nutrition in the treatment and prevention of diseases

SC6. Ability to determine the principles and nature of treatment and prevention of diseases

SC7. Ability to diagnose emergency conditions

SC8. Ability to determine tactics and provide emergency medical aid SK10. Ability to perform medical manipulations

SC11. The ability to solve medical problems in new or unfamiliar environments in the presence of incomplete or limited information, taking into account aspects of social and ethical responsibility, including an early intervention system

SC13. Ability to carry out sanitary and hygienic and preventive measures SK17. The ability to assess the impact of the environment, socio-economic and biological determinants on the state of health of an individual, family, population

SC25. Adherence to professional and academic integrity, to be responsible for the reliability of the obtained scientific results

Program learning outcomes (PLO):

PLO1. Have thorough knowledge of the structure of professional activity. To be able to carry out professional activities that require updating and integration of knowledge. To be responsible for professional development, the ability for further professional training with a high level of autonomy.

PLO3. Specialized conceptual knowledge that includes scientific achievements in the field of health care and is the basis for conducting research, critical understanding of problems in the field of medicine and related interdisciplinary problems, including the system of early intervention.

PLO4. Identify and identify leading clinical symptoms and syndromes (according to list 1); according to standard methods, using preliminary data of the patient's history, data of the patient's examination, knowledge about the person, his organs and systems, establish a preliminary clinical diagnosis of the disease (according to list 2).

PLO5. Collect complaints, history of life and diseases, evaluate psychomotor and physical development of the patient, state of organs and systems of the body, based on the results of laboratory and instrumental studies, evaluate information regarding the diagnosis (according to list 4), taking into account the age of the patient.

PLO6. Establish the final clinical diagnosis by making a reasoned decision and analyzing the received subjective and objective data of clinical, additional examination, differential diagnosis, observing the relevant ethical and legal norms, under the control of the head physician in the conditions of the health care institution (according to list 2).

PLO7. Assign and analyze additional (mandatory and optional) examination methods (laboratory, functional and/or instrumental) (according to list 4), patients with diseases of organs and body systems for differential diagnosis of diseases (according to list 2).

PLO8. Determine the main clinical syndrome or symptom that determines the severity of the condition of the victim/injured (according to list 3) by making a reasoned decision about the person's condition under any circumstances (in the conditions of a health care facility, outside its boundaries), including in conditions of emergency and hostilities, in field conditions, in conditions of lack of information and limited time.

PLO9. Determine the nature and principles of treatment (conservative, operative) of patients with diseases (according to list 2), taking into account the age of the patient, in the conditions of the health care institution, outside its borders and at the stages of medical evacuation, including in field conditions, on the basis of a preliminary clinical diagnosis, observing relevant ethical and legal norms, by making a reasoned decision according to existing algorithms and standard schemes, in case of the need to expand the standard scheme, be able to substantiate personalized recommendations under the control of the head physician in the conditions of a medical institution.

PLO14. Determine tactics and provide emergency medical care in emergency situations (according to list 3) in limited time in accordance with existing clinical protocols and treatment standards.

PLO17. Perform medical manipulations (according to list 5) in the conditions of a medical institution, at home or at work based on a previous clinical diagnosis and/or indicators of the patient's condition by making a reasoned decision, observing the relevant ethical and legal norms.

PLO21. Search for the necessary information in the professional literature and databases of other sources, analyze, evaluate and apply this information. PRN22. Apply modern digital technologies, specialized software, and statistical data analysis methods to solve complex healthcare problems.

PLO23. Assess the impact of the environment on human health in order to assess the morbidity of the population.

PLO25. It is clear and unambiguous to convey one's own knowledge, conclusions and arguments on health care problems and related issues to specialists and non-specialists.

PLO27. Communicate freely in the state language and in English, both orally and in writing to discuss professional activities, research and projects.

PLO28. Make effective decisions about health care problems, evaluate the necessary resources, take into account social, economic and ethical consequences.

Expected results of studying of the discipline:

As a result of studying the academic discipline, the student of higher education must:

Know: - the main ways of pharmacological correction of diseases, disorders of the function of organs and systems;

- nomenclature and classification of medicines;
- pharmacological and pharmacotherapeutic characteristics of the main groups of medicines;
- indications and contraindications for the use of medicinal products;
- manifestations of possible adverse drug reactions, symptoms of overdose with potent and poisonous drugs, methods of their prevention and principles of treatment.

Be able to: - write out and analyze prescriptions for medicinal products in various dosage forms in accordance with the modern legislation of Ukraine;

- to determine the group affiliation of medicines according to modern classifications;
- provide pharmacological and pharmacotherapeutic characteristics of medicinal products, logically link the mechanism of action with pharmacodynamics, pharmacodynamics with indications, and side effects with contraindications to their use;
- calculate a single dose of the medicinal product depending on the patient's age, body weight or body surface area;
- to determine, depending on the peculiarities of the pharmacokinetics of medicinal products, the frequency of taking the medicinal product, its daily, course dose in patients of different ages in accordance with concomitant diseases and the use of other medicinal products;
- justify the adequate dosage form according to the routes of administration;
- to predict the consequences of the interaction of drugs when they are combined, drugs and food components, drugs and alcohol;

- evaluate the benefit/risk ratio when using medicines;
- determine the manifestations of possible adverse drug reactions, symptoms of overdose with potent and poisonous drugs, methods of their prevention and principles of treatment;
- to create an algorithm for helping patients with acute drug poisoning with the use of antidotes in each specific case;
- analyze pharmacological information in modern reference books, scientific and professional periodicals;
- provide comparative characteristics of medicinal products according to indicators of effectiveness, safety, mechanism of action, indications for use, etc.;
- to provide rational pharmacotherapeutic assistance in the most common urgent conditions encountered in the clinic of internal diseases.

3. Content of the discipline

Lectures: Topic 1. General principles of clinical pharmacology and pharmacotherapy (clinical pharmacodynamics, pharmacokinetics of drugs, types of pharmacotherapy). Subject, tasks, goals of studying clinical pharmacology. Basic concepts. Algorithm for choosing pharmacotherapy and drugs for a specific patient.

Topic 2. Pharmacotoxicodynamics of drugs, side effects of drugs (types, examples). System of pharmacological surveillance for the safety of drug use in Ukraine and the world. Definition of side effects of drugs, classification of side effects, methods and methods of prevention and treatment. System of pharmacovigilance for the safety of drug use: principles of organization and implementation.

Topic 3. Drug interaction: types of interaction, examples. Polypragmasy: definition, the place of the doctor in preventing undesirable effects of drug interaction. Concept of mono- and combination pharmacotherapy. Types and types of drug interaction: definition, classification.

Practical classes: Topic 1. Clinical pharmacology of antihypertensive drugs. Principles of treatment of hypertension and symptomatic hypertension. Classification of antihypertensive drugs. Justification of the choice of the drug.

Topic 2. Clinical pharmacology of antihypertensive drugs. Etiopathogenetic principles of treatment of arterial hypotension. Classification of hypertensive drugs.

Topic 3. Urgent conditions in case of violation of vascular tone, principles of pharmacotherapy. Principles of treatment of hypertensive crises, acute hypotensive conditions.

Topic 4. Clinical pharmacology of antianginal drugs. Etiopathogenetic principles of treatment of ischemic heart disease. Classification of antianginal drugs. Features of selection and combined use of drugs (organic nitrates, beta-blockers, calcium channel blockers, sydnonimines). Methods of assessing the effectiveness and safety of use.

Topic 5. Clinical pharmacology of drugs that affect the blood system (antithrombotic drugs, coagulants, hemostatics) and lipid metabolism (hypolipidemic agents, drugs of metabolic type of action). Etiopathogenetic mechanisms of increased and decreased blood clotting ability. Classifications of drugs used to treat conditions of increased and decreased thrombus formation. Etiopathogenetic principles of atherosclerosis treatment. Classification of hypolipidemic drugs. Assessment of efficacy and safety of use. Side effects of drugs.

Topic 6. Urgent conditions, principles of treatment of acute angina attack, acute myocardial infarction, acute bleeding.

Topic 7. Clinical, biochemical, pathophysiological, pathomorphological definition of inflammation. Pathophysiology of the inflammatory process. Main symptoms of inflammation and the mechanism of their development.

Topic 8. Clinical pharmacology of nonsteroidal anti-inflammatory drugs. Classification of NSAIDs, mechanism of action, pharmacological effects, side effects.

Topic 9. Clinical pharmacology of steroidal anti-inflammatory drugs. Classification of corticosteroids, mechanism of action, pharmacological effects, side effects.

Topic 10. Clinical pharmacology of antibiotics. Principles of modern antibacterial therapy. Classification of antibiotics and other antimicrobial drugs. Selection of antibacterial agents in accordance with the sensitivity of microorganisms and localization of the process, severity of the disease. Side effects and contraindications to antibacterial therapy.

Topic 11. Clinical pharmacology of synthetic antimicrobial drugs (fluoroquinolones, nitroimidazoles, nitrofurans, sulfonamides). Clinical pharmacology of nitroimidazoles, fluoroquinolones, sulfonamides, nitrofurans, oxyquinolones, classifications, activity spectra, side effects.

Topic 12. Clinical pharmacology of antifungal, anthelmintic and antiviral drugs. Antiviral, anthelmintic and antifungal drugs - classifications, concepts of the mechanism of action, indications, contraindications to use, interaction features, assessment of safety of use.

Topic 13. Clinical and pharmacological characteristics of drugs that affect the functions of the gastrointestinal tract. Determination of the principles of pharmacotherapy of gastric and duodenal ulcers, gastritis, colitis, irritable bowel syndrome, gastroesophageal reflux disease. Modern principles of prevention and treatment of intestinal dysbacteriosis.

Topic 14. Clinical and pharmacological characteristics of drugs that affect the functions of the hepatobiliary system and pancreas. Modern principles of treatment of acute and chronic cholecystitis, hepatitis, pancreatitis. Methods of monitoring the effectiveness and safety of drug use.

Topic 15. Control of practical skills and theoretical knowledge. Test lesson.

4. Structure of studying discipline

Name of content modules and topics	Number of hours					
	Full-time study					
	In all	Including				
		Lectures	Practical classes	IWS		
<i>General issues of clinical pharmacology</i>						
1. Subject, problems of clinical pharmacology. Clinical pharmacodynamics, pharmacokinetics of drugs. Side effects of drugs. Types of drug interaction.	6	6	-	-		

<i>Applied aspects of clinical pharmacology</i>						
2. Clinical and pharmacological characteristics of antihypertensive drugs.	3	-	2	1		
3. Clinical and pharmacological characteristics of hypertensive drugs.	2	-	2	-		
4. Urgent conditions in case of impaired vascular tone, principles of pharmacotherapy.	2	-	2	-		
5. Clinical and pharmacological characteristics of antianginal drugs.	3	-	2	1		
6. Clinical pharmacology of drugs affecting the blood system (antithrombotic drugs, coagulants, hemostatics) and lipid metabolism (hypolipidemic drugs, drugs of metabolic type of action).	2	-	2	-		
7. Urgent conditions, principles of treatment of acute angina pectoris, acute myocardial infarction, acute bleeding.	2	-	2	-		
8. Clinical, biochemical, pathophysiological, pathomorphological definition of inflammation.	3	-	2	1		
9. Clinical pharmacology of non-steroidal anti-inflammatory drugs	3	-	2	1		
10. Clinical pharmacology of steroidal anti-inflammatory drugs	2	-	2	1		
11. Clinical and pharmacological characteristics of antibiotics	3	-	2	1		
12. Clinical and pharmacological characteristics of synthetic antibacterial drugs (sulfonamides, fluoroquinolones, nitrofurans, oxyquinolines, nitroimidazoles)	2	-	2	-		

13. Clinical pharmacology of antifungal, anthelmintic and antiviral drugs.	2	-	2	-		
14. Clinical and pharmacological characteristics of drugs that affect the functions of the gastrointestinal tract.	3	-	2	1		
15. Clinical and pharmacological characteristics of drugs that affect the functions of the hepatobiliary system and pancreas.	3	-	2	1		
16. Clinical and pharmacological characteristics of cardiac glycosides and non-glycoside positive inotropic drugs, antiarrhythmic drugs.	2	-	-	2		
17. Clinical and pharmacological characteristics of antiarrhythmic drugs.	2	-	-	2		
18. Clinical and pharmacological characteristics of drugs affecting on bronchial patency.	2	-	-	2		
19. Clinical pharmacology of antiallergic drugs	2	-	-	2		
20. Clinical and pharmacological characteristics of basic anti-inflammatory drugs and chondroprotectors.	2	-	-	2		
21. Clinical pharmacology of drugs that affect the condition of the central nervous system.	2	-	-	2		
22. Clinical and pharmacological characteristics of drugs used for the treatment of diseases of the endocrine glands.	2	-	-	2		
23. Preparation, writing, completion and protection of the "Drug Pharmacodynamics Research Protocol", workbook.	2	-	-	2		

24. Control of practical skills and theoretical knowledge. Test lesson.	3	-	2	1		
In all:	60	6	30	24		

5. TOPICS OF LECTURES / SEMINARS / PRACTICAL / LABORATORY CLASSES

5.1. Full-time education

5.1.1. Topics of lectures

Name of topic	Number of hours
Topic 1. General principles of clinical pharmacology and pharmacotherapy (clinical pharmacodynamics, pharmacokinetics of drugs, types of pharmacotherapy).	2
Topic 2. Pharmacotoxicodynamics of drugs, side effects of drugs (types, examples). System of pharmacological surveillance for the safety of drug use in Ukraine and the world.	2
Topic 3. Drug interaction: types of interaction, examples.	2
In all	6

5.1.2. Topics of seminar classes

Seminars are not provided.

5.1.3. Topics of practical classes

Name of topic	Number of hours
Topic 1. Clinical and pharmacological characteristics of antihypertensive drugs.	2
Topic 2. Clinical and pharmacological characteristics of hypertensive drugs.	2
Topic 3. Urgent conditions in case of impaired vascular tone, principles of pharmacotherapy.	2
Topic 4. Clinical and pharmacological characteristics of antianginal drugs.	2
Topic 5. Clinical pharmacology of drugs affecting the blood system (antithrombotic drugs, coagulants, hemostatics) and lipid metabolism (hypolipidemic drugs, drugs of metabolic type of action).	2
Topic 6. Urgent conditions, principles of treatment of acute angina pectoris, acute	2

myocardial infarction, acute bleeding.	
Topic 7. Clinical, biochemical, pathophysiological, pathomorphological definition of inflammation.	2
Topic 8. Clinical and pharmacological characteristics of non-steroidal antinflammatory drugs.	2
Topic 9. Clinical and pharmacological characteristics of steroidal antinflammatory drugs.	2
Topic 10. Clinical pharmacology of antibiotics.	2
Topic 11. Clinical pharmacology of synthetic antimicrobial drugs (fluoroquinolones, nitroimidazoles, nitrofurans, sulfonamides).	2
Topic 12. Clinical pharmacology of antifungal, anthelmintic and antiviral drugs.	2
Topic 13. Clinical and pharmacological characteristics of drugs that affect the functions of the gastrointestinal tract.	2
Topic 14. Clinical and pharmacological characteristics of drugs that affect the functions of the hepatobiliary system and pancreas.	2
Topic 15. Control of practical skills and theoretical knowledge. Test lesson.	2
In all	30

5.1.4. Topics of laboratory classes - laboratory classes are not provided

6. Independent work of students (IWS)

6.1. Full-time education

№	Topic	Number of hours
1.	Preparation for current practical classes and exams; preparation, writing and defense of a workbook, a protocol for studying the pharmacodynamics of drugs.	8
2.	Clinical and pharmacological characteristics of cardiac glycosides and non-glycoside positive inotropic drugs.	2
3.	Clinical and pharmacological characteristics of antiarrhythmic drugs.	2
4.	Clinical and pharmacological characteristics of drugs affecting on bronchial patency.	2
5.	Clinical and pharmacological characteristics of basic anti-inflammatory drugs and chondroprotectors.	2
5.	Clinical pharmacology of antiallergic drugs.	2

6.	Clinical and pharmacological characteristics of basic anti-inflammatory drugs and chondroprotectors.	2
7.	Clinical pharmacology of drugs that affect the condition of the central nervous system.	2
8.	Clinical and pharmacological characteristics of drugs used for the treatment of diseases of the endocrine glands.	2
	In all	24

7. FORMS AND METHODS OF TEACHING

Forms of teaching:

The discipline is taught in the form of lectures, practical classes; organization of independent work of the applicant.

Teaching methods:

Lectures: multimedia presentations.

Practical classes: conversation, role-playing games, solving situational problems, solving test problems.

Independent work: independent work with the textbook, independent work with the recommended basic and additional literature, with electronic information resources, independent solution of clinical tasks.

8. FORMS OF CONTROL AND CRITERIA FOR ASSESSING LEARNING OUTCOMES

Forms of current control: oral interview, testing, assessment of practical skills, assessment of communication skills during role-playing, solving situational tasks, assessment of activity in the lesson.

Form of final control: test.

Criteria for assessing the learning outcomes of higher education applicants during current control

Assessment criteria

Excellent

"5" The applicant actively participates in the discussion of the most complex questions on the topic of the lesson, gives at least 90% of correct answers to standardized test tasks, answers written tasks without errors, performs practical work and draws up a protocol.

Good

"4" The applicant participates in the discussion of the most complex questions on the topic, gives at least 75% of correct answers to standardized test tasks, makes some minor errors in answering written tasks, performs practical work and draws up a protocol.

Satisfactory

"3" The applicant participates in the discussion of the most complex questions on the topic, gives at least 60% of correct answers to standardized test tasks, makes significant errors in the answers to written tasks, performs practical work and draws up a protocol.

Unsatisfactory

"2" The applicant does not participate in the discussion of complex questions on the topic, gives less than 60% of correct answers to standardized test tasks, makes gross errors in the answers to written tasks or does not give answers to them at all, does not perform practical work and does not draw up a protocol.

A test is given to an applicant who has completed all the tasks of the work program of the academic discipline, actively participated in practical classes, completed and defended an individual assignment and has an average current grade of at least 3.0 and has no academic debt.

The test is carried out: in the last lesson before the beginning of the examination session - in the case of the tape learning system, in the last lesson - in the case of the cyclical learning system. The test score is the arithmetic mean of all components on the traditional four-point scale and has a value that is rounded using the statistical method to two decimal places.

9. Distribution of points received by students of higher education

The obtained average score for the academic discipline for applicants who have successfully mastered the work program of the academic discipline is converted from a traditional four-point scale to points on a 200-point scale, as shown in the table:
Conversion table of a traditional assessment into a multi-point scale

Traditional four-point scale	Multi-point 200-point scale
Excellent ("5")	185 - 200
Good ("4")	151 - 184
Satisfactory ("3")	120-150
Unsatisfactory ("2")	Below 120

A multi-point scale (200-point scale) characterizes the actual success rate of each applicant in mastering the educational component. The conversion of the traditional grade (average score for the academic discipline) into a 200-point grade is performed by the information and technical department of the University.

According to the obtained points on a 200-point scale, the achievements of the applicants are evaluated according to the ECTS rating scale. Further ranking according to the ECTS rating scale allows you to evaluate the achievements of students from the educational component who are studying in the same course of the same specialty, according to the points they received.

The ECTS scale is a relative-comparative rating, which establishes the applicant's belonging to the group of better or worse among the reference group of fellow students (faculty,

specialty). An "A" grade on the ECTS scale cannot be equal to an "excellent" grade, a "B" grade to a "good" grade, etc. When converting from a multi-point scale, the limits of grades "A", "B", "C", "D", "E" according to the ECTS scale do not coincide with the limits of grades "5", "4", "3" according to the traditional scale. Acquirers who have received grades of "FX" and "F" ("2") are not included in the list of ranked acquirers. The grade "FX" is awarded to students who have obtained the minimum number of points for the current learning activity, but who have not passed the final examination. A grade of "F" is assigned to students who have attended all classes in the discipline, but have not achieved a grade point average (3.00) for the current academic activity and are not admitted to the final examination.

Applicants who study in one course (one specialty), based on the number of points scored in the discipline, are ranked on the ECTS scale as follows:

Conversion of the traditional grade from the discipline and the sum of points on the ECTS scale

Evaluation on the ECTS scale Statistical indicator

A The best 10% of achievers

B The next 25% of applicants

C The next 30% of applicants

D The next 25% of earners

E The next 10% of earners

10. METHODOLOGICAL SUPPORT

- Syllabus of the academic discipline
- Working program of the academic discipline
- Methodological recommendations for practical classes
- Methodological recommendations for independent work of higher education applicants
- Multimedia presentations
- Illustrative materials
- Situational tasks
- Test tasks

11. QUESTIONS FOR THE PREPARATION FOR THE TEST

1. Clinical pharmacodynamics, definition, place and role in the choice of pharmacotherapy.
2. Clinical pharmacokinetics, definition, basic concepts, role in the choice of pharmacotherapy.
3. Classification of hypolipidemic drugs. Classification of dyslipidemias. A differentiated approach to the use of hypolipidemic drugs.
4. Mechanism of action, pharmacokinetics and pharmacodynamics, indications and contraindications for prescribing statins.
5. Groups of drugs related to antianginal and antiischemic drugs.
6. Mechanism of action, pharmacological effects, indications and contraindications for the appointment of nitrates.
7. Mechanism of action, pharmacological effects, indications and contraindications for prescribing beta-blockers.
8. Classification, mechanism of action, pharmacological effects, indications and contraindications for the appointment of calcium channel blockers.
9. Classification of beta blockers. Features of application. Dosage.
10. Antiplatelet drugs. Classification. Mechanisms of action. Dosing methods.
11. Thrombolytic agents. Indications and contraindications for thrombolysis. Assignment schemes.
12. Anticoagulants. Classification. Mechanisms of action. Adverse events.
13. Principles of drug selection for the treatment of an attack of angina pectoris, acute myocardial infarction.
14. Classification of antihypertensive drugs.

15. Mechanism of antihypertensive action, side effects when prescribing calcium channel blockers. Dosage principles.
16. Mechanism of antihypertensive action, side effects when prescribing beta-blockers. Dosage principles.
17. Mechanism of antihypertensive action, pharmacological effects, indications and contraindications, side effects when prescribing angiotensin-converting enzyme inhibitors. Dosage principles.
18. Principles of combined use of antihypertensive drugs.
19. Differentiated selection of drugs for the treatment of hypertensive crises.
20. Classification of antiarrhythmic drugs. Differentiated approach to prescribing antiarrhythmic drugs.
21. Classification of cardiac glycosides. Dosage principles. Cardiac and non-cardiac effects of cardiac glycosides. Indications for use. Clinical and ECG signs of intoxication with cardiac glycosides. Principles of treatment of intoxication with cardiac glycosides.
22. Differentiated selection of drugs for the treatment of cardiac asthma, pulmonary edema.
23. Non-glycoside positive inotropic drugs. Indications for use.
24. Classification of diuretic drugs.
25. Mechanism of action, pharmacokinetics and pharmacodynamics, indications and contraindications for prescribing loop diuretics.
26. Mechanism of action, pharmacokinetics and pharmacodynamics, indications and contraindications for prescribing thiazide and thiazide-like diuretics. Dosage principles.
27. Classification of drugs affecting bronchial patency.
28. Mechanism of action, pharmacokinetics, indications and contraindications for prescribing short- and long-acting beta-2 agonists. Dosage principles.
29. Methylxanthines, mechanism of action, pharmacological effects, side effects. Dosage principles.
30. Glucocorticosteroids. Pharmacokinetics and pharmacodynamics. Advantages of using inhaled glucocorticoids. Dosing regimes. Side effects that occur with long-term use of glucocorticosteroids.
31. Interaction of medicines. Kinds Clinical examples.
32. Types of side effects when using medicines.
33. Clinical and pharmacological classification of nonsteroidal anti-inflammatory drugs.
34. Mechanism of action, pharmacological effects of nonsteroidal anti-inflammatory drugs. Indications and contraindications. Side effects when using non-steroidal anti-inflammatory drugs, their prevention and treatment.
35. Modern principles of selection of antimicrobial drugs.
36. Adverse effects of antibacterial therapy, their prevention and treatment.
37. Classification, spectrum of activity, mechanism of action, features of clinical use of penicillins. Dosage principles.
38. Classification, spectrum of activity, mechanism of action, features of clinical use of cephalosporins. Dosage principles.
39. Classification, spectrum of activity, mechanism of action, features of clinical use of aminoglycosides. Dosage principles.
40. Classification, spectrum of activity, mechanism of action, features of clinical use of macrolides. Dosage principles.
41. Classification, spectrum of activity, mechanism of action, features of clinical use of fluoroquinolones. Dosage principles.
42. Spectrum of activity, mechanism of action, features of clinical use of nitroimidazoles and nitrofurans. Dosage principles.
43. Classification of drugs with antisecretory activity.
44. Clinical and pharmacological characteristics of proton pump inhibitors. Dosage principles.
45. Clinical and pharmacological characteristics of H₂ blockers of histamine receptors. Dosage principles.

46. Antacids. Classification, pharmacokinetics and pharmacodynamics. Principles of clinical application and dosage.
47. Hepatoprotectors. Classification. Pharmacokinetics and pharmacodynamics. Indications and contraindications for appointment. Dosage principles.
48. Choleretics and cholekinetics. Clinical and pharmacological features. Indications and contraindications for appointment. Dosage principles.
49. Enzymes and anti-enzymes. Classification. Pharmacological features. Indications for use. Dosage principles.
50. Classification, mechanism of action, pharmacokinetics, indications and contraindications for prescribing, side effects of antiallergic drugs. Dosage principles.
51. Modern laboratory methods of diagnosis of coronavirus infection: advantages, informativeness in the choice of pharmacotherapy.
52. The most common symptoms of the infectious and inflammatory process caused by the Covid-19 virus. Instrumental diagnostics.
53. Modern world and state protocols for providing medical care to patients with coronavirus infection, taking into account the main pathogenetic mechanisms of the disease.
54. The main groups of drugs for the pharmacotherapy of coronavirus infection and its complications, their clinical and pharmacological characteristics.
55. Immuno- and vaccine prevention of coronavirus infection. Types of vaccines. Their advantages and disadvantages.

12. Recommended literature:

Basic:

1. Betram G Katzung Basic and Clinical Pharmacology, 14th Edition. - McGraw-Hill Medical, 2018.- 1235 p.
2. T.R.Harrison and others Harrison's principles of internal medicine,19 th edition (Vols 1&2). – McGraw Hill education, 2015. – 3983 p.
3. Craham Douglas, Fiona Nicol, Colin Robertson Macleod's clinical Examination, 13 th edition. – Churchill Livingstone, 2013. – 471 p.

Additional :

- 1) Emergency management of internal diseases / Edited by O.Babak and O.Bilovol. – Kyiv: AUS Medicine Publishing, 2010. – 448 p.
- 2) Godovan V.V. Pharmacology in pictures and schemes. – Nova Knyha, 2021. - 464 p.
- 3) EDUCATIONAL AND METHODOICAL MANUAL to practical training in clinical pharmacology for the students of medical faculty / Strechen S.B., Tregub T.V., Bazalieieva I.V., Poludenko A.A. – Odessa, 2016.– 108 p.
- 4) Клініко-фармакологічний глосарій: навч. посібник / В.Й.Кресюн, В.В.Годован, С.Б.Стречень. – Одеса: ОНМедУ, 2015. – 328 с.

13. Electronic information resources:

1. State Expert Center of Ministry of Health of Ukraine <http://www.dec.gov.ua/index.php/ua/>
2. Ukrainian Scientific Pharmacopoeial Drug Quality Center <http://sphu.org/>

3. National Scientific Medical Library of Ukraine <http://library.gov.ua/>
4. National Library of Ukraine named after V.I. Vernadsky
<http://www.nbu.gov.ua/>
5. Resources for predicting inter-drug interactions (based on FDA instructions, in English) URL:
<http://www.drugs.com>
6. Resource-Directory of Medicines and Forecasting of Intercurricular Interactions (in English). URL:
<http://www.medscape.org>
9. Interregional Society of Evidence-Based Medicine: <http://www.osdm.org/index.php>
10. Bulletin of Evidence-Based Medicine: <http://www.evidence-update.ru>
11. European Society of Clinical Pharmacologists and Pharmacists: <http://www.eacpt.org>
12. Resources for drug interactions: <http://medicine.iupui.edu/flockart/>

Study protocol for the efficacy and safety of drug use (according to the supervision of patients)

Educational research work

Student _____

(Name, course, group, faculty)

Head _____

PROTOCOL

studies of the pharmacodynamics of the drug _____

Patient (name, age, body weight) _____

Clinical diagnosis: underlying disease _____

Complications of the underlying disease _____

Concomitant diseases _____

Study date: from _____ to _____

1. Treatment of the patient (provide in the form of prescriptions the 5 most significant drugs, including those selected for careful analysis)

2. The rationale for the appointment of drugs (international, commercial names, chemical structure, features of the introduction, pharmacokinetics, pharmacodynamics of drugs)

3. Expected therapeutic effect _____

4. Possible side effects _____

5. List the signs by which the therapeutic effectiveness of the drug will be monitored

Before treatment		After treatment
	Subjective	
A) _____		_____
B) _____		_____
C) _____		_____
D) _____		_____
E) _____		_____
	Objective	
A) _____		_____
B) _____		_____
C) _____		_____
D) _____		_____

Laboratory-instrumental

- A) _____
- B) _____
- C) _____
- D) _____

6. List the symptoms by which side effects of the drug will be controlled.

Side effects

The presence of a reaction in the patient (yes, no)

Subjective

- A) _____
- B) _____
- C) _____
- D) _____
- E) _____

Objective

- A) _____
- B) _____
- C) _____
- D) _____

Laboratory-instrumental

- A) _____
- B) _____
- C) _____
- D) _____

7. Evaluation of combination therapy (consider the possibility of co-administration of the studied drug with other drugs from section No. 1: pharmacokinetic, pharmacodynamic, pharmaceutical compatibility) _____

8. Conclusions and recommendations (effectiveness of treatment, prognosis of further use, the possibility of replacing other drugs) _____

The study conducted _____

Protocol checked _____

List of references literature