

MINISTRY OF HEALTH OF UKRAINE

Odesa National Medical University

Department of General and clinical pharmacology with the pharmacognosy



APPROVED

Vice-rector for scientific and pedagogical activity

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WORKING PROGRAM OF EDUCATIONAL DISCIPLINE

"CLINICAL PHARMACOLOGY"

(Full-time education)

**Level of higher education:** second (master's)

**Field of knowledge:** 22 "Health care"

**Specialty:** 222 "Medicine"

**Educational and professional program:** "Medicine"



## 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: 3  Hours: 90  Content modules: 2	Field of knowledge 22 "Health care"	<i>Full-time education</i>	
		<i>Elective discipline</i>	
	Specialty 222 "Medicine"	<i>Year of training:</i>	5
		<i>Semester</i>	IX, X
		<i>Lectures</i>	0 hours
		<i>Practical classes</i>	30 hours
		<i>Individual work</i>	60 hours
		<i>including individual tasks</i>	0 hours
Level of higher education second (master's)	<i>The form of the final control is</i>	<i>Test</i>	

## 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:**

**Integral competence:** The ability to solve typical and complex problems, including those of a research and innovation nature in the field of medicine. Ability to continue learning with a high degree of autonomy.

### **General competences:**

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 evaluate and ensure the quality of the work performed

GC17. The desire to preserve the environment

### **Special (professional, subject) competences:**

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. 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

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:**

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.

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.

***To master the skills:***

- Analysis of pharmacotherapeutic and clinical-pharmacological tasks.
- Prescription rules and the correctness of the prescription form.
- Learning and carrying out the simplest methods of examining the patient to control the effectiveness and safety of pharmacotherapy.
- Possession of information about modern standards and formularies for the treatment of diseases of internal organs.

### **3. Content of the discipline**

#### **Subsection 1. General issues of clinical pharmacology.**

**Topic 1. Subject, problems of clinical pharmacology. Clinical pharmacodynamics, pharmacokinetics of drugs. Side effects of drugs. Types of drug interaction. Clinical and pharmacological characteristics of nonsteroidal anti-inflammatory drugs.** Subject, tasks, goals of studying clinical pharmacology. Basic concepts of the discipline. Algorithm for the selection of drugs for a specific patient. Basic principles of pharmacodynamics, pharmacokinetics, pharmacotoxicodynamics of drugs. Types of side effects of drugs, methods of prevention and treatment. The concept of combined pharmacotherapy, drug interactions, types and types of interactions. Modern concepts of pathological physiology and pathological anatomy of inflammation. Classification of nonsteroidal anti-inflammatory drugs. Modern ideas about the mechanism of action. Comparative characteristics of the anti-inflammatory effect of drugs. Indications and contraindications for use. Dosage regime.

#### **Subsection 2. Applied aspects of clinical pharmacology.**

**Topic 2. Clinical and pharmacological characteristics of antihypertensive, hypertensive and antianginal drugs.**

Principles of treatment of essential hypertension and symptomatic hypertension. Classification of antihypertensive drugs. Justification of the choice of the drug depending on the stage and degree of arterial hypertension and the type of hemodynamics. Characteristics of first- and second-line drugs. Dosage regime.



Comparative characteristics of drugs, in terms of effectiveness, compatibility of drugs with different variants of the course and the presence of concomitant pathology. The choice of the drug and dosage regimen depending on age, presence of pregnancy. Assessment of effectiveness and safety of use. Principles of treatment of hypertensive crises.

Etiopathogenetic principles of arterial hypotension treatment. Classification of hypertensive drugs. Comparative characteristics of drugs, choice of drugs and dosage regime. Assessment of effectiveness and safety of application.

Etiopathogenetic principles of treatment of ischemic heart disease. Classification of antianginal drugs. Peculiarities of the choice and combined use of drugs (organic nitrates, beta-adrenergic blockers, calcium channel blockers, sydnonimins). Dosage regime. Indications and contraindications for appointment. Factors that reduce resistance to drugs of this group. Methods of evaluating the effectiveness and safety of application.

**Topic 3. Clinical pharmacology of drugs affecting the blood system (antithrombotic drugs, coagulants, hemostatics) and lipid metabolism (hypolipidemic drugs, drugs of metabolic type of action).**

Etiopathogenetic mechanisms of increased and decreased ability of blood to clot. Classifications of drugs that are used for the treatment of conditions of increased and decreased thrombus formation. Features of the use of thrombolytics, anticoagulants, antiaggregants, procoagulants. Methods of assessing the effectiveness and safety of their application.

Etiopathogenetic principles of treatment of atherosclerosis. Classification of hypolipidemic drugs. Justification of the choice of the drug depending on the class of dyslipidemia. Dosage regime, interaction with other groups of drugs. Assessment of effectiveness and safety of use. Side effect of drugs.

**Topic 4. Clinical and pharmacological characteristics of drugs used for etiotropic treatment of diseases of internal organs (antibiotics, sulfonamides, fluoroquinolones, nitrofurans, oxyquinolones, nitroimidazoles, antiviral and antifungal drugs).**

Principles of modern antibacterial therapy. Classification of antibiotics and other antimicrobial drugs. The role of antibiotics and other chemotherapeutic drugs in infectious and purulent-inflammatory diseases. The choice of antibacterial agents in accordance with the sensitivity of microorganisms and the localization of the process, the severity of the disease. Side effects and contraindications to antibacterial therapy. The choice of antimicrobial drugs depending on pharmacokinetics. Age characteristics of antibacterial therapy. Antibiotic resistance and ways to overcome it.

Clinical pharmacology of nitroimidazoles, fluoroquinolones, sulfonamides, nitrofurans, oxyquinolones - current state of possible use.

Antiviral and antifungal drugs - classifications, concepts of the mechanism of action, indications, contraindications to use, features of interaction, assessment of safety of use.

**Topic 5. Clinical and pharmacological characteristics of drugs affecting the functions of the gastrointestinal tract, hepatobiliary system and pancreas.**

**Control of practical skills and theoretical knowledge. Credit class.**

Determination of the principles of pharmacotherapy of gastric and duodenal ulcers, gastritis, colitis, irritable bowel syndrome, gastroesophageal reflux disease. The value of drugs affecting the secretory function of the stomach (proton pump inhibitors, H<sub>2</sub>-histamine blockers, M-cholinergic blockers; secretory function stimulants). Antihelicobacter therapy (drugs, doses, duration). Gastrocytoprotectors. Medicinal regulation of motility of the gastrointestinal tract. The value of symptomatic agents: antiemetics and emetics, laxatives and antidiarrheals. Dosage regime. Modern principles of prevention and treatment of intestinal dysbiosis.

Modern principles of treatment of acute and chronic cholecystitis, hepatitis, pancreatitis. Justification of the choice and characteristics of preparations with enzymatic and anti-enzymatic properties. Peculiarities of simultaneous use of drugs. Pharmacokinetics and pharmacodynamics of cholagogues, choleretics, hepatoprotectors, antispasmodics. Indications and contraindications for appointment. Side effect. Dosage regime. Methods of controlling the effectiveness and safety of drug use.

Only students who have no academic debt and have an average score for the current educational activity of at least 3.00 are admitted to the final certification. Final control should be standardized. The average score for the discipline (traditional assessment) is calculated as the arithmetic average of the current performance.

The obtained grade for the discipline is considered as the percentage of assimilation of the required volume of knowledge from the elective discipline "Clinical Pharmacology".

**Topic IWS 1. Clinical and pharmacological characteristics of cardiac glycosides and non-glycoside positive inotropic drugs, antiarrhythmic drugs.**

Etiology and pathogenesis of acute and chronic heart failure. Modern principles of treatment of acute and chronic heart failure. Pharmacokinetics and pharmacodynamics of the main representatives of cardiac glycosides. The role and place of cardiac glycosides in complex therapy of heart failure. Dosage regime. Significance of ECG and echocardiography, clinical control during therapy with cardiac glycosides. Peculiarities of differentiated use of cardiac glycosides and other drugs in chronic heart failure depending on the type of myocardial dysfunction. Intoxication by cardiac glycosides. Non-glycoside and synthetic cardiotonic drugs.

Electrophysiological mechanisms of various disorders of heart rhythm and conduction. Classification of antiarrhythmic drugs. Comparative characteristics of individual pharmacological groups. Peculiarities of the choice of drugs for the treatment of various types of arrhythmia and their preventive therapy. The role of agents affecting electrolyte metabolism, cardiac glycosides in the fight against arrhythmias. Dosage regime. Interaction of antiarrhythmic drugs with each other and with drugs of other pharmacological groups. Assessment of effectiveness and safety of application.

### **Topic IWS 2. Clinical and pharmacological characteristics of drugs affecting on bronchial patency.**

Modern ideas about the etiology and pathogenesis of bronchial obstruction syndrome. Classification of drugs affecting bronchial patency. Pharmacokinetics and pharmacodynamics. Dosage regime. Features of their combined use. Therapeutic effectiveness of beta-2-agonists, M-choline blockers, methylxanthines. The choice of bronchodilator drugs for the relief of an attack of bronchial asthma and the systematic therapy of COPD, including taking into account concomitant pathology. Comparative characteristics of their therapeutic value. Side effects of drugs, advantages and disadvantages of different pharmacological groups. Methods of evaluating the effectiveness and safety of therapy taking into account the degree of bronchial obstruction, sputum viscosity, and the state of central and peripheral hemodynamics.

### **Topic IWS 3. Clinical and pharmacological characteristics of steroid, basic anti-inflammatory drugs and chondroprotectors.**

Modern concepts of pathological physiology and pathological anatomy of inflammation. Classification of steroid and basic anti-inflammatory drugs. Modern ideas about the mechanism of action. Comparative characteristics of the anti-inflammatory effect of drugs. Indications and contraindications for use. Dosage regime. Schemes for prescribing glucocorticosteroids. Compatibility of drugs in the combined therapy of diseases. Side effects, methods of monitoring the effectiveness and safety of the use of anti-inflammatory drugs.

Chondroprotectors - classification, mechanism of action, indications for use.

### **Topic IWS 4. Clinical pharmacology of antiallergic drugs and drugs that suppress and stimulate immunity.**

Concept of allergy. Types of allergic complications. Classification of antiallergic agents: antihistamines, stabilizers of mast cell membranes, drugs that reduce vascular permeability. Pharmacological effects, dosage principles. Side effects: methods of prevention and treatment. Methods of controlling the effectiveness and safety of application.

The concept of immunity. Classification of drugs that affect the immune response and body protection. Pharmacological effects, dosage principles. Side effects: methods of prevention and treatment. Methods of controlling the effectiveness and safety of application.

**Topic IWS 5. Clinical pharmacology of drugs that affect the condition of the central nervous system.**

Classification of drugs affecting the functions of the central nervous system. Drugs that stimulate and suppress the function of the central nervous system. Features of clinical application. Dosage regime. Methods of controlling the effectiveness and safety of their application.

**Topic IWS 6. Clinical and pharmacological characteristics of drugs used for the treatment of diseases of the endocrine glands.**

Modern principles and approaches to the treatment of diseases of the thyroid gland, pituitary gland, hypothalamus, and adrenal glands. Selection and control of the effectiveness and safety of the use of appropriate drugs.

Diabetes mellitus: classification, pathogenesis, modern principles of pharmacotherapy and drug pharmacology.

**Topic IWS 7. Preparation, writing, completion and protection of the "Drug Pharmacodynamics Research Protocol".**

**4. Structure of studying discipline**

Name of content modules and topics	Number of hours					
	Full-time study					
	In all	Including				
Practical classes		IWS				
<i>Subsection 1. 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. Clinical and pharmacological characteristics of nonsteroidal anti-inflammatory drugs.	8	6	2			
<i>Subsection 2. Applied aspects of clinical pharmacology.</i>						
2. Clinical and pharmacological characteristics of antihypertensive, hypertensive and antianginal drugs.	10	6	4			
3. Clinical pharmacology of	10	6	4			

drugs affecting the blood system (antithrombotic drugs, coagulants, hemostatics) and lipid metabolism (hypolipidemic drugs, drugs of metabolic type of action).						
4. Clinical and pharmacological characteristics of drugs used for etiotropic treatment of diseases of internal organs (antibiotics, sulfonamides, fluoroquinolones, nitrofurans, oxyquinolines, nitroimidazoles, antiviral and antifungal drugs).	10	6	4			
5. Clinical and pharmacological characteristics of drugs affecting the functions of the gastrointestinal tract, hepatobiliary system and pancreas.  Control of practical skills and theoretical knowledge. Credit class.	10	6	4			
6. Clinical and pharmacological characteristics of cardiac glycosides and non-glycoside positive inotropic drugs, antiarrhythmic drugs.	6	-	6			
7. Clinical and pharmacological characteristics of drugs affecting on bronchial patency.	6	-	6			
8. Clinical and pharmacological characteristics of steroid, basic anti-inflammatory drugs and chondroprotectors.	6	-	6			
9. Clinical pharmacology of antiallergic drugs and drugs that suppress and stimulate immunity.	6	-	6			
10. Clinical pharmacology of drugs that affect the condition of the central nervous system.	6	-	6			
11. Clinical and pharmacological characteristics of drugs used for the treatment of diseases of the	6	-	6			

endocrine glands.						
12. Preparation, writing, completion and protection of the "Drug Pharmacodynamics Research Protocol".	6	-	6			
<b>In all:</b>	<b>90</b>	<b>30</b>	<b>60</b>			

## 5. Topics of lectures/seminars/practical/laboratory classes

5.1. Topics of lectures - lectures are not provided

5.2. Topics of seminar classes - seminar classes are not provided

### 5.3. Topics of practical classes

№	Topic	Number of hours
1.	Subject, problems of clinical pharmacology. Clinical pharmacodynamics, pharmacokinetics of drugs. Side effects of drugs. Types of drug interaction. Clinical and pharmacological characteristics of nonsteroidal anti-inflammatory drugs.	6
2.	Clinical and pharmacological characteristics of antihypertensive, hypertensive and antianginal drugs.	6
3.	Clinical pharmacology of drugs affecting the blood system (antithrombotic drugs, coagulants, hemostatics) and lipid metabolism (hypolipidemic drugs, drugs of metabolic type of action).	6
4.	Clinical and pharmacological characteristics of drugs used for etiotropic treatment of diseases of internal organs (antibiotics, sulfonamides, fluoroquinolones, nitrofurans, oxyquinolines, nitroimidazoles, antiviral and antifungal drugs).	6
5.	Clinical and pharmacological characteristics of drugs affecting the functions of the gastrointestinal tract, hepatobiliary system and pancreas.  Control of practical skills and theoretical knowledge. Credit class.	6
	<b>In all</b>	<b>30</b>

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

## 6. Independent work of students (IWS)

№	Topic	Number of hours
1.	Subject, problems of clinical pharmacology. Clinical pharmacodynamics, pharmacokinetics of drugs. Side effects of drugs. Types of drug interaction. Clinical and pharmacological characteristics	2

	of nonsteroidal anti-inflammatory drugs.	
2.	Clinical and pharmacological characteristics of antihypertensive, hypertensive and antianginal drugs.	4
3.	Clinical pharmacology of drugs affecting the blood system (antithrombotic drugs, coagulants, hemostatics) and lipid metabolism (hypolipidemic drugs, drugs of metabolic type of action).	4
4.	Clinical and pharmacological characteristics of drugs used for etiotropic treatment of diseases of internal organs (antibiotics, sulfonamides, fluoroquinolones, nitrofurans, oxyquinolines, nitroimidazoles, antiviral and antifungal drugs).	4
5.	Clinical and pharmacological characteristics of drugs affecting the functions of the gastrointestinal tract, hepatobiliary system and pancreas.  Control of practical skills and theoretical knowledge. Credit class.	4
6.	Clinical and pharmacological characteristics of cardiac glycosides and non-glycoside positive inotropic drugs, antiarrhythmic drugs.	6
7.	Clinical and pharmacological characteristics of drugs affecting on bronchial patency.	6
8.	Clinical and pharmacological characteristics of steroid, basic anti-inflammatory drugs and chondroprotectors.	6
9.	Clinical pharmacology of antiallergic drugs and drugs that suppress and stimulate immunity.	6
10.	Clinical pharmacology of drugs that affect the condition of the central nervous system.	6
11.	Clinical and pharmacological characteristics of drugs used for the treatment of diseases of the endocrine glands.	6
12.	Preparation, writing, completion and protection of the "Drug Pharmacodynamics Research Protocol".	6
	<b>In all</b>	<b>60</b>

## 7. Studing methods

**Practical classes:** conversation, solving clinical situational taskas, formation of professional skills and abilities in determining the general principles of prescribing drugs and combined use of drugs, writing prescriptions, solving typical clinical-pharmacological and pharmacotherapeutic taskss and test taskss; analysis and evaluation of efficiency and safety criteria of mono- and combined pharmacotherapy in a specific patient.

**Independent work:** independent work with the textbook, independent work with a bank of test tasks in the discipline, independent solution of clinical-pharmacological and pharmacotherapeutic tasks.

## **8. Methods and forms of control and evaluation methods**

**(including criteria for evaluating learning outcomes)**

Current control: oral survey, testing, assessment of performance of practical skills, problem solving.

Final control: credit.

Evaluation of the current educational activity in a practical session:

1. Evaluation of theoretical knowledge on the subject of the lesson:

- methods: survey, solving a situational problem

- maximum score – 5, minimum score – 3, unsatisfactory score – 2.

2. Assessment of practical skills on the topic of the lesson:

- methods: assessment of the correctness of the performance of practical skills

- maximum score – 5, minimum score – 3, unsatisfactory score – 2.

The grade for one practical session is the arithmetic average of all components and can only have a whole value (5, 4, 3, 2), which is rounded according to the statistical method.

### **Current evaluation criteria in practical training**

#### **Evaluation criteria**

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

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

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



"2" The applicant does not participate in the discussion of complex questions on the topic, gives less than 60% correct answers to standardized test tasks, makes gross mistakes in 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.

Credit is given to the applicant who completed all tasks of the work program of the academic discipline, took an active part 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.

Assessment is carried out: at the last lesson before the beginning of the examination session - with the tape system of learning, at the last lesson - with the cyclical system of learning. The credit score is the arithmetic mean of all components according to the traditional four-point scale and has a value that is rounded according to the statistics method with two decimal places after the decimal point.

### **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. List of questions for credit class.**

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 H<sub>2</sub> 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. Cholagogues and choleretics. 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.

## **LIST OF PRACTICAL SKILLS, THE ACQUISITION OF WHICH IS CONTROLLED DURING THE CREDIT "CLINICAL PHARMACOLOGY"**

**I. Analysis of pharmacotherapeutic and clinical-pharmacological tasks.**

**II. Prescription rules and the correctness of the prescription form.**

**III. Control of learning and carrying out the simplest methods of examination of the patient.**

## **11. Methodological support:**

- The working program of an elective academic discipline
- Syllabus of elective academic discipline
- Textbooks:
  - Betram G Katzung Basic and Clinical Pharmacology, 14th Edition. - McGraw-Hill Medical, 2018.- 1235 p.
  - Clinical pharmacology: Manual for practical classes. – 2-nd edition / Edited by O.V.Kraydashenko. – Vinnytsya: Nova Khyna Publishers, 2010. – 192 p.
  - Emergency management of internal diseases / Edited by O.Babak and O.Bilovol. – Kyiv: AUS Medicine Publishing, 2010. – 448 p.
- Multimedia presentations
- Situational clinical-pharmacological and pharmacotherapeutic tasks
- Methodical manual of practical classes
- Electronic bank of test tasks by subdivisions of the discipline.

## **12. Recommended literature:**

### **Basic:**

1. Betram G Katzung Basic and Clinical Pharmacology, 14th Edition. - McGraw-Hill Medical, 2018.- 1235 p.
2. Pharmacology in rehabilitation. – 4-th edition / Charles D. Ciccone, PT. – USA, 2007. – 653 p.
3. Clinical pharmacology: Manual for practical classes. – 2-nd edition / Edited by O.V.Kraydashenko. – Vinnytsya: Nova Khyna Publishers, 2010. – 192 p.
4. T.R.Harrison and others Harrison's principles of internal medicine, 19th edition (Vols 1&2). – McGraw Hill education, 2015. – 3983 p.
5. Craham Douglas, Fiona Nicol, Colin Robertson Macleod's clinical Examination, 13th 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 METHODOLOGICAL 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.nbuv.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**