

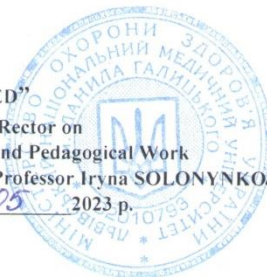
DANYLO HALYTSKY LVIV NATIONAL MEDICAL UNIVERSITY

Department of Endocrinology

“APPROVED”

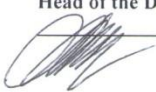
First Vice-Rector on
Scientific and Pedagogical Work
Associate Professor Iryna SOLONYNKO


“08” 05 2023 р.



DISCIPLINE PROGRAM

OC 29 Clinical pharmacology
Second (master's) level of higher education
Field of Knowledge 22 "Healthcare"
Specialty 221 "Dentistry"
Faculty, year: Dentistry, 4th year

Discussed and approved
at the educational-methodical meeting
of the Department of Endocrinology
Minutes No 13 dated "27" April 2023
Head of the Department
 Prof. Alina URBANOVYCH

Approved
by the Profile Methodical Board on
General Medicine Disciplines
Minutes No 2 dated 04 May 2023
Head of the Board
 Prof. Olena RADCHENKO

The discipline program "Clinical pharmacology" was developed and imported at the Department of Endocrinology of Danylo Halytskyi Lviv National Medical University for the 4th-year students of Dentistry Faculty by the Specialty 221 "Dentistry".

Changes and additions to the study program of the discipline during 2023-2024 academic year.

No	Content of changes (additions)	Minutes of the meeting of the Department, date	Notes
1.	Unchanged	No 13, "27" April 2023	

Program developers:

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Chair of the Department of Endocrinology
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Signature

A program of the discipline "**Clinical pharmacology**" is compiled in accordance with the Standard of Higher Education of Ukraine (hereinafter - Standard) of the second (Master's) level

Field of Knowledge: 22 Healthcare
Specialty: 221 "Dentistry"

Description of the discipline (annotation): clinical pharmacology includes the study of groups of medicines, their main mechanisms of action, features of their pharmacokinetics, pharmacodynamics, manifestations of side effects and symptoms of overdose, main indications for appointment and interaction with other drugs.

Knowledge of clinical pharmacology is based on experimental data and theoretical concepts of pharmacology and other medical and biological sciences and on the actual material of clinical disciplines. The student must be able to develop a strategy and tactics for treating the disease in a particular patient and exercise dynamic control over the effectiveness and safety of drug therapy.

Teaching clinical pharmacology is the most optimal on the clinical therapeutic base, taking into account the etiology of the disease, the main pathogenetic mechanisms of its formation, the clinical picture, the appropriate drugs with their comparative analysis and the choice of the necessary.

The main task when teaching the subject should be preparation of a specialist with sufficient theoretical knowledge and practical skills for conducting the most rational drug therapy in a particular patient, who has mastered methodology of individual selection of effective and safe drugs on the basis of pharmacokinetics, pharmacodynamics, possible manifestations of side effects, peculiarities of the course of the disease, the age of the patient, optimal dosage, preparation of rational combinations.

According to the curriculum, the study of clinical pharmacology at the medical faculty is carried out on the 7th semesters for the 4th year of study.

Structure of the discipline	Number of credits, hours			Year, semester	Type of assessment	
	In total	Classroom				Ind. Stud.
		lectures	practical classes			
Discipline: Clinical pharmacology	1 credit/ 30 hours	0	15	15	4th year (7th semester)	credit

The subject of the discipline is medicines and their effects on the patient's body, clinical pharmacokinetics, clinical pharmacodynamics of medicines, methods for monitoring the effectiveness and safety of the use of drugs.

A set of processes that determine the interaction of a certain organism with medicines, is denoted as the system "body - drug." The study of this system in interaction with the environment is the methodological basis of modern clinical pharmacology.

Interdisciplinary relations: educational discipline "Clinical Pharmacology" is based on students "knowledge of medical biology, normal and pathological physiology, microbiology, medical chemistry, general pharmacology, clinical disciplines, laboratory and functional diagnostics and lays the foundations for the formation of ideas and skills of applying general principles of medical therapy of basic diseases, syndromes and their manifestations.

1. The purpose and objectives of the discipline

1.1 The purpose of the discipline " Clinical Pharmacology " is to train specialists who have a sufficient amount of theoretical knowledge and practical skills to conduct the most rational medical therapy for a particular patient, have a methodology for choosing the most effective and safe drugs as well as their combinations, taking into account individual characteristics of the patient, the course and form of the disease, the presence of concomitant pathology, based on evidence data.

Final objectives of the discipline:

- choose the necessary medicines, adequate dosage form and dosage regimen when prescribing patients with basic diseases of internal organs, depending on the age category of patients;
- determine group affiliation of medicinal products according to modern classifications;
- determine the manifestations of possible side effects and symptoms of overdose, methods of their prevention and treatment;
- determine the main methods of clinical examination of patients to assess the effectiveness and safety of prescribing medicines and analyze their results;
- determine pharmacodynamics and pharmacokinetics of drugs and their mechanisms of action;
- justify the main indications for appointment, adequate dosage form, ways of introduction and interaction with other medicines depending on age;
- to conduct a survey of patients in order to collect medical history and to predict the possibility of complications of pharmacotherapy.
- interpret the patterns and peculiarities of the pathological and epidemiological process in infectious diseases, requiring special tactics of patient management.

1.2 The main goals of studying the discipline "Clinical Pharmacology " are to provide the student with a sufficient amount of theoretical knowledge and practical skills for conducting the most rational drug therapy in a particular patient, mastering the methodology of individual selection of effective and safe drugs on the basis of pharmacokinetics, pharmacodynamics, possible manifestations of side effects, peculiarities of the course of the disease, age of the patient, optimal dosage forms, compilation of rational combinations of drugs.

1.3. Abilities and results of education the formation of which the discipline contributes (interrelation with the normative content of training of higher education applicants, formulated in terms of study results in the Standard). According to the requirements of the Standard, the discipline ensures the acquisition of students skills:

- integral:

the ability to solve typical and complex specialized problems and practical problems in the field of health care, or in the process of training, which involves the conduct of research and/or implementation of innovations and is characterized by the complexity and uncertainty of conditions and requirements.

- general:

1. Be capable of abstract thinking, analysis and synthesis.
2. Knowledge and understanding of the subject area and understanding of professional activities.
3. Ability to apply knowledge in practical activities.
4. Ability to communicate in the state language both orally and in writing.
6. Skills in the use of information and communication technologies.
7. Ability to search, process and analyze information from different sources.
8. Ability to adapt and act in a new situation.
9. Ability to identify, formulate and solve problems.
10. Ability to be critical and self-critical.
11. Ability to work in a team.
13. Ability to act socially responsibly and consciously.
14. Ability to realize its rights and obligations as a member of society, to realize the values of civil (free democratic) society and the need for its sustainable development, rule of law, rights and freedoms of man and citizen in Ukraine.
15. The ability to preserve and multiply moral, cultural, scientific values and achievements of society on the basis of understanding the history and patterns of the development of the subject area, its place in the general system of knowledge about nature and society and the development of society, technology and technology, to use different types and forms of motor activity for active recreation and a healthy lifestyle.

- special (professional, subject):

1. Ability to collect medical information about the patient and analyze clinical data.
2. Ability to interpret the result of laboratory and instrumental studies.
3. Ability to diagnose: determine the previous, clinical, final, concomitant diagnosis, emergency conditions.
7. Ability to determine the tactics of patients with diseases of the organs and tissues of the oral cavity and maxillofacial area with concomitant somatic diseases.
14. Ability to maintain medical documentation.
15. Processing of governmental, social and medical information.

Skills matrix

№	Classification of competencies by NFQ	Knowledge	Ability	Communication	Autonomy and responsibility
1	2	3	4	5	6
General skills					
1.	Capability of abstract thinking, analysis and synthesis.	+	+	+	+
2.	Knowledge and understanding of the subject area and understanding of professional activities.	+	+	+	+
3.	Ability to apply knowledge in practical situations.	+	+	+	+
4.	Ability to communicate in Ukrainian language in both speaking and writing.	+	+	+	+
6.	Ability to use information and communication technologies.	+	+	+	+
7.	Ability to search, process and	+	+	+	+

	analyze information from different sources.								
8.	Ability to adapt and act in a new situation.	+	+	+	+	+	+	+	+
9.	Ability to identify, formulate and solve problems.	+	+	+	+	+	+	+	+
10.	Ability to be critical and self-critical	+	+	+	+	+	+	+	+
11.	Ability to work in a team.	+	+	+	+	+	+	+	+
13.	Ability to act socially responsibly and consciously.	+	+	+	+	+	+	+	+
14.	Ability to realize their rights and responsibilities as a member of society, to realize the values of a civil (free democratic) society and the need for its sustainable development, rule of law, rights and freedoms of a citizen in Ukraine.	+	+	+	+	+	+	+	+
15.	The ability to preserve and multiply moral, cultural, scientific values and achievements of society on the basis of understanding the history and patterns of the development of the subject area, its place in the general system of knowledge about nature and society and the development of society, technology and technology, to use different types and forms of motor activity for active recreation and healthy lifestyle.	+	+	+	+	+	+	+	+
Special (professional, subject) competences									
1.	Ability to collect medical information about the patient and analyze clinical data	+	+	+	+	+	+	+	+
2.	Ability to interpret the result of laboratory and instrumental studies.	+	+	+	+	+	+	+	+
3.	Ability to diagnose: determine the previous, clinical, final, concomitant diagnosis, emergency conditions.	+	+	+	+	+	+	+	+
7.	Ability to determine the tactics of patients with diseases of the organs and tissues of the oral cavity and maxillofacial area with concomitant somatic diseases.	+	+	+	+	+	+	+	+
14.	Ability to maintain medical documentation.	+	+	+	+	+	+	+	+
15.	Processing of governmental, social and medical information.	+	+	+	+	+	+	+	+

Training results for the discipline

According to the requirements of the Standard, students must:

Know:

- The main ways of pharmacological correction of diseases, disorders of organs and systems.
- Nomenclature and classification of medicines.

- Pharmacological and pharmacotherapeutic characteristics of the main groups of medicines.
- Indications and contraindications to the use of medicines
- Manifestations of possible adverse reactions of medicines, symptoms of overdose with potent and poisonous drugs, methods of their prevention and principles of treatment.

Be able to:

- Prescribe and analyze prescriptions for medicinal products in various forms in accordance with the current legislation of Ukraine.
- Determine group affiliation of medicines according to modern classifications;
- Provide pharmacological and pharmacotherapeutic characteristics to medicines, build logical connections between the mechanism of action and pharmacodynamics, pharmacodynamics and indications, side effects and contraindications to their use;
- Calculate a single dose of the drug depending on the age, body weight or surface area of the patient;
- Determine, depending on the peculiarities of pharmacokinetics, the multiplicity of the drug, its daily, course dose in patients of different ages in accordance with concomitant diseases and the use of other drugs;
- Justify an adequate dosage form in accordance with the methods of administration
- Predict the effects of the interaction of medicines with their combined administration, medicines and components of food, medicines and alcohol;
- Evaluate the benefit/risk ratio when using medicines;
- Make judgments about the possibility of adverse reactions of medicines in order to prevent them;
- Identify manifestations of possible adverse reactions of medicines, symptoms of overdose with potent and poisonous drugs, methods of their prevention and principles of treatment;
- Create an algorithm for helping patients with acute drug poisoning using antidotes in each case;
- Analyze pharmacological information in modern reference books, scientific and professional periodicals;
- Provide comparative characteristics of medicines in terms of effectiveness, safety, mechanism of action, indications for use, etc.;
- Provide rational pharmacotherapeutic care for the most common urgent conditions found in the clinic of internal diseases.

Program results of training for the discipline:

PRT 1. Select and identify leading clinical symptoms and syndromes (according to list 1); according to standard methods, using the previous data of the patient's history, the data of the patient's examination, knowledge about the person, his organs and systems, establish a probable nosological or syndromic preliminary clinical diagnosis of a dental disease (according to list 2).

PRT 2. Collect information about the patient's general condition, evaluate the patient's psychomotor and physical development, the condition of the maxillofacial organs, based on the results of laboratory and instrumental studies, evaluate information about the diagnosis (according to list 5).

PRT 3. Prescribe and analyze additional (mandatory and optional) examination methods (laboratory, X-ray, functional and/or instrumental) according to list 5, of patients with diseases of organs and tissues of the oral cavity and maxillofacial organs for differential diagnosis of diseases (according to the list 2).

PRT 4. Determine a final clinical diagnosis in compliance with the relevant ethical and legal norms, by making a reasoned decision and logical analysis of the received subjective and objective data of clinical, additional examination, carrying out differential diagnosis under the control of the head physician in the conditions of a medical institution (according to list 2.1).

PRT 5. Establish a diagnosis of emergency conditions under any circumstances (at home, on the street, in a medical institution), in conditions of emergency, martial law, lack of information and limited time (according to list 4).

PRT 8. Determine the approach, plan, type and principle of treatment of dental disease (according to list 2) by making a reasoned decision according to existing algorithms and standard schemes.

PRT 9. Determine the nature of work, rest and necessary diet in the treatment of dental diseases (according to list 2) on the basis of a preliminary or final clinical diagnosis by making a reasoned decision according to existing algorithms and standard schemes.

PRT 10. Determine the tactics of managing a dental patient with somatic pathology (according to list 3) by making a reasoned decision according to existing algorithms and standard schemes.

PRT 11. Carry out the treatment of the main dental diseases according to the existing algorithms and standard schemes under the control of the head doctor in the conditions of a medical institution (according to list 2.1).

PRT 13. To determine the tactics of providing emergency medical care, using the recommended algorithms, under any circumstances based on the diagnosis of an emergency condition in limited time (according to list 4).

PRT 14. Analyze and evaluate government, social and medical information using standard approaches and computer information technologies.

PRT 16. To form goals and determine the structure of personal activity based on the result of the analysis of certain social and personal needs.

PRT 17. To adhere a healthy lifestyle, use self-regulation and self-control techniques.

PRT 18. To be aware of and be guided in one's activities by civil rights, freedoms and duties, to raise the general educational cultural level.

PRT 19. To adhere with the requirements of ethics, bioethics and deontology in their professional activities.

PRT 20. To organize the necessary level of individual security (property and persons cared for) in case of typical dangerous situations in the individual field of activity.

PRT 21. To perform medical manipulations on the basis of a preliminary and/or final clinical diagnosis (according to lists 2, 2.1) for different segments of the population and in different conditions (according to list 6).

PRT 22. To perform medical dental manipulations on the basis of a preliminary and/or final clinical diagnosis (according to lists 2, 2.1) for different segments of the population and in different conditions (according to list 7).

PRT 23. To perform emergency medical care manipulations using standard schemes under any circumstances based on the diagnosis of an emergency (according to list 4) in limited time (according to lists 6, 7).

2. Information scope of educational discipline

30 hours are allocated to the study of the discipline "Clinical Pharmacology" which corresponds to the 1.0 credit ECTS.

The program includes general and applied aspects of clinical pharmacology.

General issues of clinical pharmacology examines the systemic approach to the study of the discipline, gives an idea of the subject, the purpose of its study, the connection with other sciences and the practical activities of the doctor.

Goal: to provide motivation for students to perceive and master specific material on special issues of clinical pharmacology.

Course objectives:

- to present an integral system of theoretical foundations of clinical pharmacology; factors contributing to the occurrence of changes in metabolism, the action of drugs, increase the risk of side effects;
- to outline ways to implement the main issues of clinical pharmacology in patients;
- to study pharmacokinetic parameters of drugs;
- to study pharmacodynamic parameters of drugs;
- to evaluate the possibility of drug interaction;
- to predict side effects;
- to introduce the concept of the system of pharmacological supervision in Ukraine and the main ways to solve the problem of prevention of complications in the application of drugs;
- to study the relationship between pharmacokinetics and pharmacodynamics of drugs;
- to study the features of pharmacokinetics, pharmacodynamics of drugs, depending on the functional state of the biological system (age, pregnancy, etc.).

Applied aspects of clinical pharmacology consider clinical pharmacology of medicines widely used in practical medicine.

Objective: to give methodology of choice of pharmacological groups and specific drugs taking into account the data of pharmacokinetics, pharmacodynamics, interaction and side effects depending on the patient's condition.

Course objectives:

- to teach the selection of the most effective and safe drugs;
- to determine the optimal dosage regime, choose the right method of administration taking into account the pharmacokinetic and pharmacodynamic parameters of drugs, as well as the age of the patient, sex and clinical condition of the patient;
- to assign an effective and safe combination of drugs in a specific clinical situation;
- to predict and detect in the early stages side effects of drugs and to perform its correction;
- to establish clinical and paraclinic parameters for monitoring the effectiveness and safety of the used drugs;
- determine the most accessible and objective methods of control and the frequency of their application;
- take into account the features of pharmacokinetics, pharmacodynamics of drugs in the compromise function of the cardiovascular, respiratory system, etc.;
- take into account the risk factors and clinical manifestations of side effects of drugs in monotherapy and in combination with drugs of another mechanism of action.

These can be performed only when students master the skills of clinical and diagnostic thinking from the main nosological units of human pathology and fundamental disciplines (pharmacology, therapy, pediatrics, surgery, obstetrics and gynecology and other clinical disciplines).

Topic 1.

Subject and objectives of clinical pharmacology. The basics of pharmacokinetics and pharmacodynamics. Interaction of drugs, types of side effects of drugs, complications of drug therapy.

Definition of the subject "clinical pharmacology." Methods for monitoring the effectiveness and safety of the use of various medicines.

Ways of administration, distribution, biotransformation, withdrawal of medicines. The mechanism of action of medicinal substances, their pharmacological effects and changes in the state of body functions in response to the influence of drugs.

Interaction of drugs in complex drug therapy, types and nature of interaction Clinical manifestations of drug interaction. Combined medicines. Advantages and disadvantages of combined drugs. Types of side effects of drugs. Complications of drug therapy. Classification of types of side effects of drugs. The main types of adverse reactions associated with pharmacological activity. The general concept of medicinal disease. The causes, the main clinical options and manifestations of a medicinal disease. Syndromes arising in response to the use of drugs as a manifestation of a medicinal disease (Lyell syndrome, Stephen-Johnson syndrome).

Topic 2.

Clinical and pharmacological characteristics of antianginal and anti-ischemic medicines.

Classification of antianginal drugs. Features of combined use of drugs (organic nitrates, β -adrenoblockers and calcium channel blockers). Dosage regimen. Indications and contraindications to the appointment. Factors that reduce resistance to drugs of this group. Methods for evaluating the effectiveness and safety of therapy.

Topic 3.

Clinical and pharmacological characteristics of drugs affecting the ability of blood to coagulate. Clinical and pharmacological characteristics of medicines affecting lipid metabolism

Drugs that affect blood clotting and fibrinolysis: agents that stimulate adhesion and aggregation of platelets, agents that increase the formation of fibrin thrombi, fibrinolysis inhibitors. Mechanism of action and adverse reactions when using heparins. Dosage mode. Advantages of low molecular weight heparins. Direct thrombin inhibitors. Indications, contraindications, possible adverse reactions when using direct thrombin inhibitors. Fibrinolytics. Possible complications of fibrinolytic therapy. Antiplatelet drugs. Mechanism of action. Features of use in patients with different pathologies. Classification of hypolipidemic medicines. Justification of the choice of the drug depending on the type of dyslipidemia. Dosage regimen, interaction with other groups of drugs. Evaluation of effectiveness and safety of application. Types of toxicity.

Topic 4.

Clinical and pharmacological characteristics of antihypertensive drugs

Principles of treatment of hypertension. Classification of antihypertensive drugs. Justification of the choice of the drug depending on the stage and degree of hypertension. Characteristics of drugs of the first and second line. Dosage regimen. Comparative characteristics of drugs, regarding the effectiveness and principle of choice, the compatibility of drugs with different variants of the course and the presence of concomitant pathology. Evaluation of effectiveness and safety of application. Choice of the drug and dosage regimen depending on age, pregnancy.

Topic 5.

Clinical and pharmacological characteristics of antiarrhythmic drugs.

Classification of antiarrhythmic drugs. Comparative characteristics of individual pharmacological groups. Features of the choice of drugs for certain types of arrhythmias. Dosage regimen. Interaction of antiarrhythmic drugs with each other in combination therapy and with drugs of other groups. Toxicity of antiarrhythmics. Evaluation of effectiveness and safety of application.

Topic 6.

Clinical and pharmacological characteristics of medicines affecting bronchial patency. Antihistamines.

Classification of means affecting bronchial patency. Pharmacokinetics and pharmacodynamics. Dosage regimen. Features of their combined use with glucocorticoids. Therapeutic effectiveness β_2 agonists, M-cholinoblocators, methylxanthins, etc. The choice of broncholytic agents in the removal of asthma and systematic therapy of GOLD, including - taking into account concomitant pathology. Comparative characteristic of their therapeutic value. Side effects of drugs, advantages and disadvantages of various pharmacological groups. Methods for evaluating the effectiveness and safety of therapy, taking into account the degree of bronchial obstruction and the state of central and peripheral hemodynamics. Classification of antiallergic agents: antihistamines, drugs that complicate the release of immediate-type mediators from mast cells, drugs that reduce vascular insight. Pharmacological effects. Application. Side effects. Contraindications to use. Clinical recommendations.

Topic 7.

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

Topic 8.

Clinical and pharmacological characteristics of local anesthetics.

Modern approaches to local anesthesia. Classification of local anesthetics by duration of action and chemical structure. Justification of individual choice of the drug depending on the mechanism of action and pharmacokinetic properties of the analgesic solution, indications and contraindications to its use. Dosage of drugs. Selection of the drug, dosage taking into account age and comorbid conditions. Evaluation of effectiveness and safety of application. Possible adverse reactions against the background of the use of local anesthetics.

Topic 9.

Anti-inflammatory drugs (steroid and non-steroid).

Classification of steroid and non-steroid anti-inflammatory drugs. Modern ideas about the mechanism of action. Comparative characteristic of anti-inflammatory action of drugs. Indications and contraindications for use. Dosage regimen. Schemes for the purpose of glucocorticoids. Compatibility of drugs in combined treatment of diseases. Side effects, methods of monitoring the effectiveness and safety of treatment. Classification of antiallergic agents: antihistamines, drugs that complicate the release of immediate-type mediators from mast cells, drugs that reduce vascular insight. Pharmacological effects. Application. Side effects. Contraindications to use. Clinical recommendations.

Topic 10.

Clinical and pharmacological characteristics of medicines affecting the functions of the digestive canal.

Determination of the principles of therapy for stomach ulcer and 12-colon ulcer, gastritis, colitis, enteritis, irritable bowel syndrome, gastro-esophageal reflux disease. The value of drugs affecting the secretory function of the stomach. Antihelicobacter therapy. Gastrocytoprotectors. Medication regulation of gastrointestinal motility. The meaning of symptomatic agents: anti-inflammatory and vomiting, weakening and antidiarrheal. Dosage regimen.

Topic 11.

Clinical and pharmacological characteristics of medicines affecting bone metabolism and mineralization of enamel.

Medicines that contain micro- and microelements and regulate metabolism in the hard tissues of the teeth and bone, contribute to normal growth, development, formation of hard tissues of the tooth and bone, contribute to their restoration and strengthening. Pharmacokinetics and pharmacodynamics of compartments that affect bone metabolism and channel mineralization, principles of their purpose, dosage, possible side effects, rational and safe use in clinical practice.

3. Structure of the discipline "CLINICAL PHARMACOLOGY"

Topic	Hours					
	Total	Full-time study				
		Specifically				
1	2	L	P	L	IW	IS
1. Subject and objectives of clinical pharmacology. The basics of pharmacokinetics and pharmacodynamics. Interaction of drugs, types of side effects of drugs, complications of drug therapy.	2	3	4	5	6	7
2. Clinical and pharmacological characteristics of antianginal and anti-ischemic medicines.		0	-	0	0	2
3. Clinical and pharmacological characteristics of drugs affecting the ability of blood to coagulate. Clinical and pharmacological characteristics of medicines affecting lipid metabolism.		0	2	0	0	1

4. Clinical and pharmacological characteristics of antihypertensive drugs.		0	2	0	0	1
5. Clinical and pharmacological characteristics of antiarrhythmic drugs.		0	-	0	0	2
6. Clinical and pharmacological characteristics of medicines affecting bronchial patency. Antihistamines.		0	2	0	0	1
7. Clinical and pharmacological characteristics of antibacterial drugs.		0	2	0	0	1
8. Clinical and pharmacological characteristics of local anesthetics.		0	2	0	0	1
9. Anti-inflammatory drugs (steroid and non-steroid).		0	2	0	0	1
10. Clinical and pharmacological characteristics of medicines affecting the functions of the digestive canal.		0	-	0	0	2
11. Clinical and pharmacological characteristics of medicines affecting bone metabolism and mineralization of enamel.		0	1	0	0	2
Hours, total/Credits, ECTS	30/1	0	15	0	0	15

Note. Classroom work- 50%, personal work - 50%.

4. Topic plan of lectures on discipline

Not specified by the curriculum in accordance with order No.883-z (attachment 1-5) of 15.03.22.

5. Topic plan of practical classes

№	Topic	Hours
1.	Subject and objectives of clinical pharmacology. The main provisions of pharmacokinetics and pharmacodynamics Interaction of drugs, types of side effects of drugs, complications of drug therapy.	2
2.	Clinical and pharmacological characteristics of drugs affecting the ability of blood to coagulate.	2
3.	Clinical and pharmacological characteristics of drugs affecting vascular tone.	2
4.	Clinical and pharmacological characteristics of drugs affecting bronchial patency. Antihistamines.	2
5.	Clinical and pharmacological characteristics of antibacterial drugs.	2
6.	Clinical and pharmacological characteristics of local anesthetics and antiseptics.	2
7.	Anti-inflammatory drugs (steroid and non-steroid).	2
8.	Clinical and pharmacological characteristics of medicines affecting bone metabolism and mineralization of enamel.	1
	Total	15

6. Topic plan of independent studying (IS)

№	Topic	Hours
1.	Clinical and pharmacological characteristics of antianginal and anti-ischemic medicines.	2
2.	Clinical pharmacology of antiarrhythmic drugs. Clinical and pharmacological characteristics of medicines affecting lipid metabolism.	2
3.	Clinical and pharmacological characteristics of medicines affecting the functions of the digestive canal.	2
4.	Preparation for practical classes - theoretical training.	9
	Total	15

The task for independent work includes the processing of topics on clinical pharmacology, not included in the mandatory plan of practical classes. The topics of independent work should include different facets of the action of drugs, or groups of drugs with detailed processing of pharmacodynamics and pharmacokinetics of medicines, differences in the action of different drugs within the same group; details of side effects of medicines; synergism of drugs of different groups for achievements of specific therapeutic effects, etc.

Creating and presenting multimedia presentations on the topics of independent work.

7. Personal assignments are not specified.

8. Teaching methods.

Practical, visual, verbal, work with a book, video method

- Types of control (current and final)
- Form of final control - differentiated credit
- Evaluation criteria

Types of educational activities of students according to the curriculum are:

- a) practical classes,
- b) independent work.

Educational classes are practical because they are organized in the following way:

1. Preparatory stage (organizational, setting and justifying educational goals, measuring the initial level of the students' knowledge).

2. The main stage (development of professional skills and skills in determining the general principles of pharmacokinetics, pharmacodynamics, prescribing, solving typical pharmacotherapeutic problems and test tasks).

3. The final stage (control of the final level of knowledge and skills, solving atypical problems, test tasks).

Summing up the general results. Tasks for the next classes.

Plan and organizational structure of lessons

№ з/п	Stages of the lesson	Duration	Tools	Equipment
1.	Preparatory stage	25 min.		
1.1.	Organizational questions	5 min.		
1.2.	Checking tasks that were set for independent preparation for classes.	10 min.	Textbooks	
1.3.	Control and assessment of the entry level of students	10 min.	Methodological materials of the department	
2.	The main stage	40 min.		
2.1.	Formation of professional skills (correction of prescriptions, control of determination by the student of group, therapeutic tasks, curation of specialized patients.	30 min.	Textbooks, tables, stands, clinical protocol, letters of medical appointments	Projector multimedia, laptop, board
2.2.	Solving situational tasks and their assessment	10 min.	Textbooks, tables, stands	
3.	The final stage	25 min.		
3.1.	Final test control	10 min.	Methodological materials of the department	
3.2.	General assessment of students' educational activities	10 min.	Criteria for evaluating students' knowledge	
3.3.	Organizational issues. Tasks for independent preparation for the next class.	5 min.	List of class, methodical materials for practical classes and independent work	

The process of studying is monitored during practical classes (current control) in accordance with specific goals and during individual work of the teacher with the students. It is recommended to use the following means of evaluation of the students' level of training: doing tests, solving situational problems, writing prescriptions, determining the belonging of drugs to the pharmacological and pharmacotherapeutic group according to the international classification, possible indications for usage; analysis and evaluation of the criteria for the effectiveness and safety of the use of drugs for a certain patient. During practical classes, audiovisual learning tools are used: tables, slides, drug collections, educational films, computer technology and others. At each practical class it is mandatory to conduct a clinical analysis of the patient pertaining to the topic of the class. This implies: formulation of the preliminary diagnosis, administering the necessary treatment, being aware of indications and contraindications to prescription of a particular drug, clinical manifestations of drugs of this group, negative manifestations of drugs of this group, interaction of various drugs, analysis and evaluation of the results of instrumental studies and parameters characterizing changes in the human body function under the influence of a specific drug.

The final control of the students' knowledge as well as the control of practical skills are carried out at the end of the class.

Tasks for independent work

Independent work includes studying of the topics on clinical pharmacology which are not included in the mandatory plan of practical classes. It should include different facets of the action of the drugs or their groups with detailed study of pharmacodynamics and pharmacokinetics of the drugs, differences in the action of different drugs within the same group; specification of the side effects of the medicines; synergies of the drugs of different groups to achieve specific therapeutic effects, etc.

Giving multimedia presentations on such topics.

9. Control methods

In order to intensify the educational process, systematically assimilate educational material, establish feedback with each student, timely control and correction of the educational process, increase motivation, reduce the omissions of educational classes, students' responsibility for the results of educational activities, the success of each student is evaluated according to the rating system.

Evaluation of the students' knowledge is one of the final stages of educational activity and determining the success of learning. The discipline score is set as an average of grades for current educational activities, which is exhibited when evaluating theoretical knowledge and practical skills in accordance with the lists determined by the discipline program.

10. Current control is carried out on practical exercises in accordance with specific goals. Following means of diagnostics of the level of preparation of students are recommended: test control (machine and machine-based), solution of situational problems, control of practical skills, in particular - the ability to properly conduct the patient's curative, assign and interpret the results of laboratory and instrumental examination, justify the diagnosis on the basis of analysis of clinical and auxiliary methods of examination.

When marking students' progress in studying each topic of the module, students are given grades on a 4-point (traditional) scale using the criteria of evaluation adopted in universities and approved by the cycle medical commission. This takes into account all types of work provided for by methodological development for the study of the topic.

Criteria for assessing knowledge in the discipline of clinical pharmacology

1. In the practical lesson, the student receives the mark "**excellent**":
 - If the student has shown full knowledge of the topic and has given complete and correct answers to the questions asked by the teacher.
 - Performs correction of the prescription leaves with explanations of the need for appointment or exclusion from the treatment regimen of the patient with a separate nosological form of specific medicines, their dosage, ways of administration, etc.
 - Freely oriented in group affiliation, mechanisms of action, side effects, indications and contraindications to the use of the drugs.
 - Clearly carries out the choice of medicines for urgent conditions, criteria for evaluating the effectiveness and safety of use.
2. The student receives the mark "**good**" if he/she:
 - Knows the subject studied in full complexity.
 - Gives correct but not quite full answers to additional questions, provides answers with the help of the teacher.
 - Conducts the correction of the prescription leaves but does not always provide explanations of the need for appointment or exclusion from the treatment regimen of the patient with a separate nosological form of specific medicines, their dosage, ways of administration, etc.
 - Well aware of doses and group affiliation, mechanisms of action, side effects, indications and contraindications to the use of drugs on the topic under study.
3. The student receives the mark "**satisfactory**" if:
 - The question is answered only with the help of the teacher, he/she does not always correctly focus on the mechanism of action of drugs, does not give a full list of indications and contraindications to the use of drugs.
 - Not always corrects the prescription leaves correctly without explaining the need for appointment or exclusion from the treatment regimen of the patient with a separate nosological form of specific medicines, their dosage, ways of administration, etc.
4. The mark "**unsatisfactory**" is received by a student who:
 - Cannot answer all questions even with the help of the teacher.
 - Does not correct the leaves of the appointment.
 - Additional questions are not answered, according to which the answer can be assessed as "satisfactory."

The student can make up for the missed topics but no more than 3 times, thereby getting the number of points more than the minimum to receive a credit on the discipline. Evaluation of the current educational activities: carried out at each practical class on the relevant topic and has a definition according to the ESTS system and the traditional scale adopted in Ukraine

For each topic students are given grades on a 4-point traditional scale, then for each student his average score is calculated for the discipline and according to Table 1 " " Instructions for assessing the educational activities of students... "is converted to the appropriate points."

The independent studying of students, which is provided in the topic along with the audit work, is evaluated during the current control of the topic at the appropriate lesson. The assimilation of topics, which are made only for independent studying, is controlled at the credits lesson.

The maximum number of points a student can score for the current educational activity in the study of the discipline is 200 points, the minimum - 120 points.

11. The form of final control of study success.

A semester test is a form of final control, which consists in assessing the student's mastering of the discipline's educational material solely on the basis of the results of performing all types of educational work provided for by the curriculum. The semester test is issued according to the results of the current control.

The assessment of the student's achievement in the discipline is provided by a rating and set on a multi-scale as an average arithmetic assessment of the assimilation of the corresponding modules and has a definition by the ESTS system and the traditional scale adopted in Ukraine.

12. The formula according to which students receive points

The calculation of the number of points for the current training is carried out on the basis of the grades received by the student on a 4-point (national) scale during the study of the discipline, by calculating the arithmetic mean (AM), rounded up to 2 characters after the decimal point. The resulting value is converted to points on a multi-point scale as follows:

$$X = (AM \times 200) : 5$$

Recalculation of the average mark for current activities into a multi-point scale for disciplines ending with a credit:

4-Point scale	200-Point scale
5	200
4.97	199
4.95	198
4.92	197
4.9	196
4.87	195
4.85	194
4.82	193
4.8	192
4.77	191
4.75	190
4.72	189
4.7	188
4.67	187
4.65	186
4.62	185
4.6	184
4.57	183
4.52	181
4.5	180
4.47	179

4-point scale	200-point scale
4.45	178
4.42	177
4.4	176
4.37	175
4.35	174
4.32	173
4.3	172
4.27	171
4.24	170
4.22	169
4.19	168
4.17	167
4.14	166
4.12	165
4.09	164
4.07	163
4.04	162
4.02	161
3.99	160
3.97	159
3.94	158

4-point scale	200-point scale
3.92	157
3.89	156
3.87	155
3.84	154
3.82	153
3.79	152
3.77	151
3.74	150
3.72	149
3.7	148
3.67	147
3.65	146
3.62	145
3.57	143
3.55	142
3.52	141
3.5	140
3.47	139
3.45	138
3.42	137
3.4	136
3.37	135
3.35	134

4-point scale	200-point scale
3.32	133
3.3	132
3.27	131
3.25	130
3.22	129
3.2	128
3.17	127
3.15	126
3.12	125
3.1	124
3.07	123
3.02	121
3	120
Less than 3	Unsatisfactory

Evaluation of individual tasks of the student.

The independent studying of students, which is provided in the topic along with studying in the classroom, is evaluated during the current control of the topic at the appropriate lesson. The assimilation of topics, which are made only for independent studying, is controlled at the credit class. The implementation of individual tasks is taken into account when deriving an assessment for a practical lesson in the conditions of their successful execution and confirmation. In no case can the total score for the current training activity exceed 200 points.

The maximum number of points a student can score for the current educational activity in the study of the discipline is 200 points.

The minimum number of points a student must score for the current educational activity in studying the discipline is 120 points.

The assessment of the student's achievement in the discipline is rated on a multi-scale as an average arithmetic assessment of the assimilation of the corresponding modules and has a definition by the ESTS system and the traditional scale adopted in Ukraine.

The score for the discipline on a 200-point scale is formed by adding the amount of points for the current student's educational activity and final control. The score on the 200-point scale is transformed into an estimate on the traditional (four-point) scale and after ranking - in assessment on the ECTS scale.

Objectivity of evaluation of students "educational activity should be checked by statistical methods (correlation coefficient between current success and results of final control).

According to the decision of the Academic Council of the University to the number of points scored by the student from the discipline "Internal Medicine, including endocrinology, medical genetics," encouraging points (not more than 12 points) for taking prizes at international and all-Ukrainian subject Olympiads can be added, but in no case the total score for the discipline can exceed 200 points.

Conversion of the number of points for semester control in the evaluation on the ECTS scale and on the four-point (traditional) scale.

Points for semester control are independently converted to both the ECTS scale and the four-point scale. Points of the ECTS scale to the four-point scale are not converted and vice versa.

Students who study in one course in one specialty, based on the number of points scored for semester control, are ranked on the ECTS scale as follows:

ЄКТС	Statistical indicator
«A»	Top 10% of students
«B»	Next 25% of students
«C»	Next 30% of students
«D»	Next 25% of students
«E»	Last 10% of students

Rating with the assignment of grades "A," "B," "C," "D," "E" is carried out by deans or other structural subdivision by the decision of the academic council educational department for students of this course who study in one specialty and have successfully completed the study of the discipline. Ranking of students - citizens of foreign countries is recommended by the decision of the Academic Council to conduct in the same array with students - citizens of Ukraine who study in the same specialty.

Students who have received "FX" and "F" ("2") grades are not included in the list of students who are graded even after the module has been reassigned. Such students automatically receive an "E" score after overpayment.

Grades in the discipline "FX," "F" ("2") are presented to students who are not enrolled at least one module in the discipline after completing its study.

The score "FX" is given to students who have scored the minimum number of points for the current educational activity, but who are not credited with the final control of the module. This category of students has the right to re-assign the final control over the approved schedule (but not later than the beginning of the next semester). Re-taking of the final test is allowed no more than two times.

The grade "F" is given to students who have attended all classes from the module, but have not scored a minimum number of points for current educational activities and are not allowed to complete control. This category of students has the right to re-study the module.

With dean's permission the student can increase the assessment of the discipline by reassigning the final control (no more than three times for the entire period of study).

Semester test scores of students who have successfully completed the discipline program are also converted by the department to a traditional four-point scale according to the absolute criteria as below in the Tab.

Points	Grade on a 4-point scale
170 - 200 балів	«5»
140 - 169 балів	«4»
139 - 120	«3»
< 120	«2»

The evaluation of ECTS to the traditional four-point scale is NOT converted because the ECTS scale and the four-point scale **are independent**.

The multiball and four-point scales characterize the actual success of each student in assimilating the discipline. The ECTS scale is a relative, comparative, rating that determines the student's belonging to the group of the best or the worst among the reference group of classmates (faculty, specialty). Therefore, the score "A" on the scale can not be equal to the estimate "excellent," and the score "B" - the assessment "good," etc. As a rule, when converting from a multiball scale, the boundaries of grades "A," "B," "C," "D," "E" on the ECTS scale do not coincide with the boundaries of the grades "5," "4," "3" on the traditional scale.

13. Methodological support

1. Study program of the discipline
2. Silabus training discipline.
3. Plans for practical classes and independent work of students.
4. Methodological guidelines for practical classes for students.
5. Methodological materials that ensure independent work of students.
6. Test and control tasks for practical classes.
7. List of questions for mastering discipline.
8. List of medicines for studying and writing prescriptions

14. Literature

Main:

1. "Applied Pharmacology for the Dental Hygienist" Elena Bablenis. Feb 27, 2019.-368p.
2. "Pharmacology for Dentistry" Tara Shanbhag , Smita Shenoy, Veena Nayak.1 January 2021. – 436 p.
3. "Oral Pharmacology for the Dental Hygienist 2nd Edition".Mea Weinberg, Cheryl Theile , James Burke Fine. - Dec 14, 2022.
4. "Clinical Aspects of Dental Materials Theory, Practice and Cases", ISBN, 2nd edition, Philadelphia, Lippincott Williams and Wilkins 2014.
5. Kenneth J. Anusavice3, "Phillip's Science of Dental Materials", 11th edition, Saunders 2013.
6. "Mosby's Dental Drug Reference 12th Edition". H. Jeske.June2, 2017. – 1512p.
7. "Pharmacology and Therapeutics for Dentistry 7th Edition". Frank J. Dowd , Bart Johnson, Angelo Mariotti.Oktober 11, 2016. – 864p.

Additional:

1. "Pharmacology and Therapeutics for Dentistry 6th Edition" John A. Yagiela, Frank J. Dowd , Bart Johnson, Angelo Mariotti, Enid A. Neidle. April 2, 2010. -960p.
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4. "Applied Pharmacology for the Dental Hygienist 6th Edition". Elena Bablenis Haveles BS. February 10, 2010. -400p.
5. "Lexi-Comp's Drug Information Handbook for Dentistry: Including Oral Medicine for Medically-compromised Patients & Specific Oral Conditions (Lexi-comp's Drug Reference Handbooks) 17th Edition". Richard L. Wynn (Editor), Ph.D. Meiller, Timothy F. (Editor), Harold L. Crossley. June 1, 2011. – 2232p.
6. "Straight Talk About Crooked Teeth".S. Kent Lauson. - May 1, 2012. – 240p.
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8. "Lippincott Williams & Wilkins' Dental Drug Reference 2nd Edition". Frieda Atherton Pickett. April 2, 2009. 866p.
9. Fallone CA, Chiba N, van Zanten SV et al. The Toronto consensus for the treatment of Helicobacter pylori infection in adults. Gastroenterology 2016; 151 (1): 51–69.
10. Graham D, Laine L. Toronto H. pylori Consensus Recommendations in Context. Gastroenterology 2016; 151 (1): 9–12.

15. Online resources

1. <https://researchguides.uic.edu/c.php?g=252179&p=1682625>
2. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3520036/>
3. <https://link.springer.com/book/10.1007/978-3-319-99852-7>
4. Interregional Society of Evidence-Based Medicine Specialists:<http://www.osdm.org/index.php>
6. European Society of Clinical Pharmacologists and Pharmacotherapists:<http://www.eacpt.org>
7. Resource for the interaction of medicines:<http://medicine.iupui.edu/flockart/>