PRIVATE HIGHER EDUCATIONAL ESTABLISHMENT
«INTERNATIONAL ACADEMY OF ECOLOGY AND MEDICINE»

Department of fundamental disciplines with a course of pharmacology

SYLLABUS OF THE EDUCATIONAL DISCIPLINE

" Pharmacology "

LEVEL OF HIGHER EDUCATION The second (master's) level
DEGREE OF HIGHER EDUCATION Master
AREA OF KNOWLEDGE 22 "Health care"
SPECIALTY 221 "Dentistry"

Reviewed and approved
at the meeting of the Department of fundamental disciplines with a course of pharmacology

Protocol № 1 of « 01 » 09 2020
Head of the department Doctor of Biological Sciences, associate professor
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1. General information	
Subject	**Pharmacology**
Lector	K. Marchenko-Tolsta
Teacher's contact phone number	093 558-31-36
Teacher's e-mail	k.marchenko-tolsta@kmu.edu.ua
Discipline format	Normative discipline.
The volume of the discipline	180 hours
Link to the distance learning site	maem.kiev.ua
Consultations	Tuesday of each week 16.00-17.30
2. Annotation to the course	
The subject of study of the discipline "Pharmacology" is the study of the efficacy and safety features of drugs in physiological and pathological conditions in patients with various diseases, taking into account the individual reactivity of the organism, the etiology and pathogenesis of the disease and the rules for prescribing prescriptions; a set of processes that occurs when drugs interact with biological systems (the human body or experimental animals); regularities between the chemical structure, physicochemical and quantum-chemical properties and the pharmacological action of drugs; the use of medicines for the treatment of patients and for prophylactic purposes.	**Interdisciplinary links.** Pharmacology as an academic discipline: a) is based on the study by students of medical biology, normal and pathological physiology, microbiology, medicinal chemistry, pharmacology, clinical disciplines, laboratory and functional diagnostics and integrates with these disciplines; b) lays the foundations for the study of clinical disciplines by students, provides for the integration of teaching with these disciplines and the formation of skills to apply knowledge of clinical pharmacology in the process of further education and in professional activity; c) lays the foundations for the formation of ideas about the general principles of drug therapy for major diseases and their individual manifestations.
3. Purpose and objectives of the course	

The main tasks of studying the discipline "Pharmacology" are: providing students with theoretical knowledge on determining the group affiliation of drugs, their pharmacokinetics, pharmacodynamics, manifestations of possible adverse reactions, symptoms of overdose, measures to prevent the occurrence and help eliminate unwanted reactions, the main indications for prescribing and interacting with other drugs and the acquisition of practical skills, in in particular, writing prescriptions for drugs in various dosage forms.	The **goals** of training of **the discipline:** **Goal** teaching the discipline "Pharmacology" follows from the goals of the educational and professional training program for applicants for the second educational (master's) level of higher education and are determined by the content of those systemic knowledge and skills that a doctor must master. The knowledge that students receive in the academic discipline "Pharmacology" is basic for the block of disciplines that provide natural science and vocational training.

4. Competencies and learning outcomes

As a result of learning of of the discipline student have to

know:

The main ways of pharmacological correction of diseases, dysfunctions of organs and systems.

-Nomenclature and classification of medicines.

-Pharmacological characteristics of essential medicines.

-Indications and contraindications for the use of medicines

-Manifestations of possible adverse reactions of drugs, symptoms of overdose with potent and poisonous drugs, methods of their prevention and principles of treatment.

-Rules for writing prescriptions for drugs in various dosage forms in accordance with modern Ukrainian legislation.

be able to:

-Write out and analyze prescriptions for medicines in various dosage forms in accordance with the modern legislation of Ukraine.

-Determine the group affiliation of medicines according to modern classifications;

-Provide pharmacological characteristics to drugs, it is logical to link the mechanism of action with pharmacodynamics, pharmacodynamics to indications, and side effects with contraindications to their use;

-Calculate a single dose of the drug depending on the age, body weight or body surface area of the patient;

-To determine, depending on the characteristics of the pharmacokinetics of drugs, the frequency of taking 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 route of administration

-Predict the consequences of the interaction of drugs with their combined administration, drugs and food components, drugs and alcohol;

-Assess the benefit / risk ratio of medicinal products;

-Make judgments about the possibility of adverse drug reactions in order to prevent them;

-To determine the manifestations of possible adverse reactions of drugs, 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 with the use of antidotes in each case;

-Analyze pharmacological information in modern reference books, scientific and professional periodicals;
-Provide comparative characteristics of medicinal products in terms of efficacy, safety, mechanism of action, indications for use, etc.

In accordance with the requirements of the standard, the discipline provides students with the acquisition of competence:

- *integral*: - Ability to solve typical and complex specialized tasks and practical problems in professional activities in the field of health care, or in the learning process, which involves microbiological research and / or implementation of an innovation and is characterized by complexity and uncertainty of conditions and requirements.
- *common*: - Ability to apply knowledge in practical situations. Ability to effectuate selfregulation, to have a healthy lifestyle, ability to adapt and act in a new situation. Ability to choose a communication strategy; ability to work in a team; interpersonal interaction. Skills in the use of information and communication technologies. Ability to abstract thinking, analysis and synthesis, the ability to learn and to be trained modernly. Definiteness and persistence in terms of tasks and responsibilities. Ability to act socially responsibly and with public awareness. The desire to preserve the environment. Universal competencies that do not depend on the subject area, but are important for the successful further professional and social activities of the applicant in various fields and for his personal development.
- *special* (professional, subjective): - Ability to evaluate the results of laboratory and instrumental research. Ability to carry out sanitary and hygienic preventive measures. Ability to plan preventive and anti-epidemic measures for infectious diseases. Ability to analyze of the state, social, economic and medical information. Ability to assess the impact of socio-economic and biological determinants on the health of the individual, family, population. Ability to apply scientifically substantiated psychological methods of effective work with colleagues, medical staff, patients and their relatives, readiness to interact with other people. Awareness of the individual in the culture of other peoples.

Matrix of competencies

№	Competence	Knowledge	Skills	Communication	Autonomy and responsibility
Integral competence					
The ability to solve typical and complex tasks and practical problems in the professional activity in the field of health care, or in the learning process, involves research and / or the implementation of innovations and is characterized by the complexity and uncertainty of conditions and requirements.					
General competences					
1	Ability to apply knowledge human pharmacology in practical situations	Have specialized conceptual knowledge acquired in the learning process	To be able to solve complex tasks and problems arising in professional activity	It is clear and unambiguous communication of one's own conclusions, knowledge and explanations, which are justified by specialists and non-specialists	Responsible for making decisions in difficult conditions

2	Knowledge and understanding of the subject area of human pharmacology	Have in-depth knowledge of the structure of professional activity	Be able to carry out professional activities, needs updating and integration of knowledge	The ability to effectively form a communication strategy in professional activity	Be responsible for development, the ability to further vocational training with a high level of autonomy
3	Ability to choose a communication strategy, ability to work in a team, interpersonal skills	Know tactics and communication strategies, laws and methods of communicative behavior	Be able to choose communication methods and strategies to ensure effective teamwork	Use communication strategies and interpersonal skills	Be responsible for the choice and tactics of communication
4	Ability for abstract thinking, analysis and synthesis, ability to learn and be modernly trained	Know the ways of analysis, synthesis and further modern education	Be able to analyze information, make informed decisions, be able to obtain modern knowledge	Make appropriate connections to achieve goals	Be responsible for the timely acquisition of modern knowledge
5	Skills in using information and communication technologies	Have in-depth knowledge of information and communication technologies used in professional activities	To be able to use information and communication technologies in the professional industry needs updating and integration of knowledge.	Use information and communication technologies in professional activities	Be responsible for the development of professional knowledge and skills.
6	Ability to evaluate and ensure the quality of work performed	Know methods for assessing performance indicators	Be able to provide quality work	Make connections to ensure quality work is done	Be responsible for quality execution works
7	Certainty and persistence in the tasks and responsibilities taken	Know the responsibilities and ways to accomplish the assigned tasks	Be able to define goals and objectives; be persistent and conscientious in the performance of duties	Establish interpersonal connections to effectively complete tasks and responsibilities	Be responsible for high-quality performance of the assigned tasks
Special (professional, subject) competencies					
1	The ability to determine the principles and nature of the treatment of diseases.	Know the leading clinical symptoms and syndromes (according to list 1); according to standard methods, using the preliminary data of the patient's history, the patient's examination data, knowledge about the person, his organs and systems, establish a probable nosological or syndromic	Determine the nature of treatment (conservative, operative) of the disease (according to list 2), in the conditions of a healthcare institution, at the patient's home and at the stages of medical evacuation, incl. when, in the field, on the basis of a preliminary clinical diagnosis, using knowledge about a person, his organs and systems, adhering	It is clear and unambiguous communication of one's own conclusions, knowledge and explanations on this issue	Be responsible for quality work done

		preliminary clinical diagnosis of the disease (according to list 2)	to the relevant ethical and legal norms, by making an informed decision on the existing algorithms and standard schemes.			
2	The ability to determine the nature of nutrition in the treatment of diseases	Know the role and characteristics of nutrition in the treatment of diseases	Be able to correctly pick up adequate methods nutrition in the treatment of diseases	To characterize the features of the course of diseases and the influence of the nature of nutrition on the course of diseases	Be responsible for making a decision when choosing the nature of food in the treatment of diseases.	
3	Ability to determine the tactics of providing emergency medical care	Know the tactics of providing emergency medical care	Be able to correctly to determine the principles of providing emergency medical care (according to list 2), in the conditions of a healthcare institution, at the patient's home and at the stages of medical evacuation, incl. when, in the field, on the basis of a preliminary clinical diagnosis, using knowledge about a person, his organs and systems, adhering to the relevant ethical and legal norms, by making an informed decision on existing algorithms and standard schemes. be able to correctly pick up pharmacological preparations during emergency medical care	Establish links for discussion when choosing pharmacological drugs	Be responsible for making a decision when the choice of pharmacological preparations.	
4	Ability to maintain medical records	Have specialized knowledge of medical records	Be able to write prescriptions correctly	Clearly and understandably justify the choice of a drug for treatment, inform the patient about the rule of taking the medicine	Be responsible for the correct maintenance of medical records	

5. Organization of course training

The volume of the course			
Type of lesson		***Total amount of hours 180***	
Lectures		30	
Practical classes		80	
Independent work		70	
Course signs			
Semesters: the 4th, the 5th	Specialty 221 "Dentistry"	Course (year of study) : the 2nd, the 3rd	Normative discipline

Course thematics

The program of the discipline is structured into 2 modules:

Module 1. "Medical prescription. General pharmacology. Drugs that affect the nervous and cardiovascular systems "

Submodule 1. Medical prescription. General pharmacology.

Submodule 2. Drugs that affect the peripheral nervous system.

Submodule 3. Drugs that affect the functions of the central nervous system. Psychotropic drugs.

Submodule 4. Pharmacology of drugs that affect the cardiovascular system.

Module 2. "Drugs that affect the functions of organs, systems and metabolism. Chemotherapeutic drugs. Antidotes."

Submodule 5. Drugs that affect the respiratory system, gastrointestinal tract, kidney function and reproductive processes.

Submodule 6. Pharmacology of drugs that affect blood function. Medicines that affect metabolism.

Submodule 7. Chemotherapeutic drugs.

Submodule 8. Antidotes. Macro and micronutrient preparations. Plasma substitutes and preparations for parenteral nutrition.

THEMATIC PLAN OF LECTURES

	The 2nd course. The 4th semester.	
№	**Topic**	**Hours**
1	General pharmacology. Pharmacokinetics, pharmacodynamics and basic mechanisms of action of drugs.	2
2	Side action of medicinal agents.	2
3	Cholinergic and adrenergic agonists and antagonists.	2
4	Pharmacology of drugs influencing on the CNS. Analgesics.	2
5	Antiarrhythmic and cardiotonic agents. Antianginal drugs.	2
6	Drugs that affect the function of the digestive system.	2
7	Drugs that affect hemostasis.	2
8	Hormonal drugs.	2
9	Antidiabetic drugs.	2

10	Anti-inflammatory and anti-allergic drugs.	2
	Total	**20**
	The 3rd course. The 5th semester.	
№	**Topic**	**Hours**
1	Antiseptics and disinfectant drugs.	2
2	Synthetic antimicrobial drugs. Antimycotics.	2
3	Pharmacology of beta-lactam antibiotics.	2
4	Pharmacology of antibiotics of different groups. Principles of rational antibiotic therapy.	2
5	Principles of treatment of acute drug poisoning. Antidotes.	2
	Total	**10**

THEMATIC PLAN OF PRACTICAL CLASSES

The 2nd course. The 4th semester.

Module 1. "Medical prescription. General pharmacology. Drugs that affect the nervous and cardiovascular systems "

№	Topic name	Hours
Content module 1. Medical prescription.		
1	Introduction to the medical recipe. The Law of Ukraine"On Medicinal Products". Solid dosage medical forms. Soft dosage medical forms. Medical forms for injections.	2
2	Liquid dosage medical forms.	2
3	Non- dosage medicinal forms. Dental paste.	2
4	Control of practical skills accordantly to general prescription.	2
5	General Pharmacology. History of Pharmacology. Pharmacokinetics. The control of practical skills, which are need for using of handbooks devoted to characteristic of medicinal agents.	2
6	General Pharmacology. Pharmacodynamics of Medicinal agents. Principles of Classification of Medicinal agents.	2
Content module 2. Drugs that affect the peripheral nervous system.		
7	Anesthetic, astringent, enveloping, adsorbing, irritating drugs.	2
8	Medicines acting on the transmission of excitation in cholinergic synapses. Cholinomimetics. Anticholinesterase drugs.	2
9	Medicines acting on the transmission of excitation in cholinergic synapses. M-cholinoblockers. N-cholinoblockers.	2
10	Medicinal products that affect the transmission of excitation in adrenergic synapses. Adrenomimetics, sympathomimetics.	2

11	Medicinal products that affect the transmission of excitation in adrenergic synapses. Anti adrenergic drugs, sympatholytics . Dopaminergic medicines.	2
Content module 3. Drugs that affect the functions of the central nervous system. Psychotropic drugs.		
12	Drug for anesthesia. Anticonvulsants and antiparkinsonian drugs.	2
13	Pharmacology opiates (Narcotic) analgesics.	2
14	Pharmacology non- opiates (nonnarcotic) analgesics.	2
15	Neuroleptics, tranquilizers , hypnotics , sedative medical means a nd regularities.	2
16	Psychomotor stimulants, antidepressants, nootropic medical drugs,adaptogens. Analeptics.	2
Content module 4. Pharmacology of drugs that affect the cardiovascular system.		
17	Cardiotonic drugs. Heart glycosides. Antiarrhythmic drugs.	2
18	Drugs used to treat patients with coronary heart disease (antianginal medical means). Hypolipidemic drugs. Angioprotectors.	2
19	Antihypertensive drugs. Medicinal products affecting the function of the kidneys.	2
20	Final modular control Control of practical training. Test control of theoretical training	2
	Total	**40**

The 3rd course. The 5th semester.

Module 2. "Drugs that affect the functions of organs, systems and metabolism. Chemotherapeutic drugs. Antidotes."

№	Topic name	Hours
Content module 5. Drugs that affect the respiratory system, gastrointestinal tract, kidney function and reproductive processes.		
21	Medicines that affect the respiratory system.	2
22	Medicines that affect the gastrointestinal tract.	2
23	Medicines that affect the gastrointestinal tract. (cont).	2
24	Medicines that affect kidney function and reproductive processes.	2
Content module 6. Pharmacology of drugs that affect blood function. Medicines that affect metabolism.		
25	Drugs that affect the blood coagulation system and fibrinolysis.	2
26	Drugs that affect blood formation. Anticancer drugs.	2
27	Water soluble vitamin preparations. Enzymes and antiferments.	2
28	Fat-soluble vitamin preparations.	2
29	Hormonal drugs (peptide structure), their synthetic substitutes and antagonists.	2
30	Hormonal drugs (steroid structure), their synthetic substitutes and antagonists	2
31	Anti-inflammatory, anti-allergic and immunotropic drugs.	2
Content module 7. Chemotherapeutic drugs.		

32	Antiseptic and disinfectant medicines.	2
33	Antiseptic and disinfectant medicines (contin.)	2
34	Synthetic antimicrobial drugs. Antimycotic drugs.	2
35	Pharmacology of beta-lactam antibiotics.	2
36	Pharmacology of antibiotics of different groups.	2
37	Anti-TB drugs. Spirochetotic drugs. Antiviral drugs.	2
38	Antiprotozoal drugs. Anthelmintic drugs.	2
Content module 8. Antidotes. Macro and micronutrient preparations. Plasma substitutes and preparations for parenteral nutrition.		
39	Preparations of macro- and microelements. Plasma substitutes and preparations for parenteral nutrition. Test control for informative modules 7-8.	2
40	Principles of treatment of acute drug poisoning. Antidotes. Test control.	2
	Total	**40**

THEMATIC PLAN OF INDEPENDENT WORK OF STUDENTS (IWS)

The 2nd course. The 4th semester.

Module 1. "Medical prescription. General pharmacology. Medicines affecting the nervous and cardiovascular system "

№	Topic name	Hours	Control type
I.	Preparation for practical training - theoretical preparation and practical skills development	**20**	Current control
II.	Independent study of topics that are not included in the classroom plan:	**8**	FMC
1	Phenomena that occur with repeated and combined administration of the drug.	2	-«-
2	Drugs that affect H-cholinoreceptors. Toxicology of nicotine. Medicines to facilitate smoking cessation.	2	-«-
3	Intermediates. Pharmacology of dopamine and histaminergic drugs. Stimulants and blockers of serotonin receptors.	2	-«-
4	Pharmacology of ethyl alcohol. Medicines for the treatment of alcoholism.	2	-«-
III.	Preparation for the final modular control of the assimilation of module 1.	**2**	FMC
	Total	**30**	

The 3rd course. The 5th semester.

Module 2. "Medicines affecting the functions of organs, systems and metabolism. Chemotherapy drugs. Antidotes "

№	Topic name	Hours	Control type

I.	Preparation for practical training - theoretical preparation and practical skills development	**20**	Current control
II.	Independent study of topics that are not included in the classroom plan:	**16**	FMC
1	Probiotics, prebiotics and symbiotics.	2	-«-
2	Preparations of macro- and microelements.	2	-«-
3	Enzyme and anti-enzymatic drugs.	2	-«-
4	Drugs for local bleeding.	2	-«-
5	Drugs for recalcification and stimulation of odontogenesis.	2	-«-
6	Drugs that affect the metabolism of bone and cartilage.	2	-«-
7	Pharmacology of drugs for the treatment of periodontal diseases.	2	-«-
8	Dentist pharmacological first aid kit.	2	-«-
III.	Preparation for the final modular control of the assimilation of module 2.	**4**	FMC
	Total	**40**	

THE LIST OF THEORETICAL QUESTIONS FOR PREPARATION OF STUDENTS FOR THE FINAL MODULAR CONTROL.

MODULE 1: "Medical prescription. General pharmacology. Medicines affecting the nervous and cardiovascular system "

Determination of pharmacology and its place among other medical and biological sciences. The origin and formation of experimental pharmacology, the development of pharmacology in the Ukraine and other countries (NM Maksimovich-Ambodik, VI Dybkovsky, R. Bukhgeim, O. Shmideberg, JO Petrovskiy, MP Kravkov, SV Anichkov, VV Zakusov, A. Waldman, OI Circassian, PV Rodionov, JB Maksimovic, MS Kharchenko, G. Laborer, from Lugansk, NS Shvarsalon, SG Zakrividoroga, AA Gavrilyuk, SI Khrustalev, Y. Ivanov).

Basic principles and methods of testing new drugs substances.Preclinical and clinical studies (Phase I - IV). Concept on placebo.Functions of the State Pharmacological Center MoH Ukraine. Law of Ukraine "On Medicines".

The concept of **pharmacokinetics** medicines. Route of administration of medicines and their comparative analysis of the dependence of the pharmacological action of the routes of administration. Absorption (suction) of drugs. Basic mechanisms and factors that influence this process. The concept of bioavailability and bioequivalence of drugs. Distribution of drugs in the body, penetration through the histohematogenous barriers (placental, blood-brain), accumulation in the body. Biotransformation of drugs, its types, the values of microsomal liver enzymes. Ways of removing drugs from the body. The concept of the basic pharmacokinetic parameters (constant the rate of absorption, half-life, stationary concentration, the clearance of the drug). Age-related pharmacokinetics (in children during the first years of life and old age persons). Determine the dose, dosage forms. Breadth of therapeutic action. The concentration of drug in medicine modified form or biological fluids. Depending on the value of "concentration (dose) - the effect of" in pharmacology.

Pharmacodynamics medicines. The concept of the receptors (agonists, antagonists). Types of action of drugs. Types and modes of action of drugs. The dependence of the pharmacological effect on the properties of drugs. The dependence of the pharmacological effect of age and sex of the patient's physiologic characteristics of the organism, pathological conditions. Features of the child's body reaction to the medication. The principles of drug dosing for children and elderly persons age. The value of climatic and anthropogenic factors for the pharmacological action of drugs.

Pharmacogenetics. Hereditary defects in enzyme systems, which are found in the application of drugs. The concept of chronopharmacology. Circadian and seasonal features of pharmacodynamics, pharmacokinetics, toxicity and drug use.

Side effects of drugs. Features of drugs in their changing, re-research institutes. The concept of cumulation. Tolerance, tachyphylaxis, dependence on the action of drugs. The concept of withdrawal and return. Medical and social aspects of the struggle with the drug dependence. Combined effects of drugs - synergy, antagonism (both species antidotizm). Incompatibility of drugs. The concept of drug safety. Types of indirect action. An overdose of absolute and relative. Intolerance. Idiosyncrasy. Allergic reactions. Mutagenicity, teratogenicity, embryotoxicity, fetotoxicity, capacity of carcinogenicity. The system of oversight of the pharmacological pa in the world and Ukraine. Basic principles and types of drug interactions. Characterization of physico-chemical (pharmaceutical), pharmacokinetic and farmakodinami-agency drug interactions.

Concept **a medical recipe.** Determine the terms drug, medicine, medical form, a drug. Recipe. General rules of prescription, the forms of prescription forms. Terms of prescriptions for medicines that contain potent, poisonous and narcotic substances. Clinical forms. Types of medical forms, especially the prescription in recipes. Requirements for medical forms for injection.

Means, which influence **on the afferent innervation.** Funds for local anesthesia. Classification by chemical structure and to use for different types of anesthesia. Requirements of local anesthetic drugs: *novocaine, anestezina, lidocaine, trimekaina, bupivacaine.* The mechanism of action. Preparations based on *articaine.* Comparative characteristics of local anesthetics. Indications for use. The purpose and possible combination with agonists.Side effects of local anesthetics, the activities of its prevention and treatment. Toxicology of cocaine. Organic and inorganic binders. The mechanism of action, indications for use. Pharmacological characteristics of drugs: *tannin, bismuth nitrate basic, herb St. John's wort, sage leaves, chamomile flowers.* General characteristics of envelop. The mechanism of action, indications for use *(mucus starch, flax seed).* Classification of adsorbent. The mechanism of action. Indications for use. Preparations based on activated carbon *(activated carbon, carboloy, etc.).* Synthetic sorbents *(enterosgel).* Principles of hemodialysis but enterosorbtion. Tools that can irritate the sensory nerve ending. Classification of annoying. The mechanism of action. Indications for use. Pharmacodynamics *ammonia, menthol, mustard, oil, turpentine purified.* Bitter, emetic, laxative, expectorant, means of reflex action. General Information.

Means, which influence **on the efferent innervation.** Anatomical and physiological properties of the autonomic nervous system. Modern concepts of neural synapses, neurotransmitters and receptors. Classification of assets that affect the **cholinergic** nervous system. But the M-N-cholinomimetic funds. Pharmacology, mechanism of action, indications for use, collateral specified action.Features of the organophosphorus compounds. Acute OP and assistance. Pharmacology reaktivatorami s WCF.

Pharmacological characterization of **M-cholinomimetics.** Muscarine poisoning, help with this, antidote therapy. The funds, which affect the H-cholinoretseptory. The pharmacological effects of nicotine. Smoking as a medical and social problem. Funds are used to combat tobacco smoking.

M-anticholinergic funds. Pharmacological characteristics of *atropine sulfate* and other drug groups. Indications for use. Acute poisoning with atropine and plants that contain atropine. Activities help.

General characteristics of **H-anticholinergics.** Classification of ganglion blocking. The mechanism of action. Pharmacological effects, indications for use, an indirect effect. Classification and pharmacology of muscle relaxants. Indications for use, collateral specified action. Help with an overdose.

The funds, which affect the **adrenergic** innervation. Classification and pharmacological characteristics of adrenergic agonists. Pharmacology *epinephrine hydrochloride.* Indications for use. Comparative characteristics of adrenergic agonists. Side effect. Antiadrenergic funds. Features of alphablockers, mechanism of action and pharmacological effects of beta-blocker of the century. Comparative characteristics of drugs. The concept of intrinsic sympathomimetic activity. Pharmacology in simpatol ITIC. The mechanism of action and indications for use, side effects.

Funds **for anesthesia.** General characteristics of the state of anesthesia. The history of the discovery of anesthesia (D. Morton, F. Inozemtsev, M.I. Pirogov, etc.). Types of anesthesia. Classification of funds for anesthesia. Theories of anesthesia. Tools for inhalation anesthesia. Comparative characteristics, collateral specified action. Combined use of funds for anesthesia with drugs of other pharmacological groups. Drugs for non-inhalation anesthesia. Classification according to duration of action. Pharmacological characteristics. The concept of sedation, in the course of Mr., the base, combined anesthesia. Pharmacology and toxicology of ethyl alcohol, used in clinical practice. Acute and chronic alcohol poisoning, events assistance. The principle of treatment for alcoholism. The mechanism of action *teturama (disulfiram).*

Hypnotics funds. Classification by chemical structure. General characteristics of hypnotic drugs and mechanisms of action. Indications for use, side effects. Acute poisoning by barbiturates, event assistance. **Antiepileptic** funds. The classification of antiepileptic drugs, as indicated by the application. Comparative characteristics, side effects. **Antiparkinsonian** funds. Classification of antiparkinsonian drugs. The main mechanisms of action. The use in clinical practice.

Narcotic analgesics. Classification by chemical structure, origin and kinship to the op-IAT receptors.The mechanism of action. Pharmacology *morphine hydrochloride.* Comparative characteristics of narcotic analgesics. Indications for use and side effects. Clinic of acute toxicity of drugs and events support. Characteristics *nalorfina hydrochloride, naloxone, naltrexone.* Clinic medicine dependence, the concept of abstinence syndrome, treatment methods. Drug addiction as a social and biological problem.

Non-narcotic analgesics. The classification of non-narcotic analgesics on the chemical structure. General characteristics of the group. Mechanisms of analgesic, antipyretic, anti-inflammatory action. Pharmacological characteristics of drugs. Comparative characteristics, side effects.

Psychotropic drugs. Classification, general information. The concept of disleptiki. Neuroleptics. Classification of neuroleptic in the chemical structure. The mechanism of action of antipsychotic neuroleptic of the century. The side effects of neuroleptic. The concept of neuroleptanalgesia. Pharmacology of tranquilizers. Classification, mechanism of tranquilizing action, concept of benzodiazepine receptors. Pharmacology *hlozepida, sibazona (diazepam), phenazepam.* Comparative characteristics. Daytime tranquilizers. The concept of atypical tranquilizers. Indications and contraindications to the use of tranquilizers, side effects of tranquilizers. Drug addiction. The concept of ataralgesia. Pharmacology of lithium salts. *Lithium carbonate.* Side effects. Acute lithium salts. Help in cases of poisoning. Sedatives. Classification of sedatives. Pharmacology bromides. Indications for use. Side effects. Bromism - clinic, treatment and prevention. Herbal sedatives (*valerian tincture, motherwort tincture, corvaldin*).

Psychomotor stimulants. General characteristics of psychostimulant s (*caffeine-benzoate sodium).* Pharmacokinetics and pharmacodynamics, indications for use, side effects. The main pharmacological effects *sidnokarba.* The concept of psychodysleptic and amphetamine. Formation of dependence, social value. Pharmacology of antidepressants. Classification of antidepressants on the mechanism of action and chemical structure. Comparative characteristics. Side effects of antidepressants.

Classification **nootropic** means *(piracetam, cavinton, sermion, pentoxifylline, sodium hydroxybutyrate).* Pharmacology and mechanisms of action of nootropic. Indications for use. Pharmacology of adaptogens and actoprotector. The concept of adaptogens and actoprotector. Indications for use. Pharmacology analeptics. Classification by mechanism of action and chemical structure. Pharmacokinetics and pharmacodynamics *kordiamine, caffeine, sodium benzoate, camphor, sulfokamfokain, bemegride, etimizole.* Indications for use.

Cardiac facilities. Classification, Pharmacokinetics and pharmacodynamics of cardiac glycosides. Comparative characteristics of *strophanthin, korglikon, digoxin, digitoxin, herbal infusions adonis.* Indications and contraindications for use. Side effects of cardiac glycosides. Acute and chronic poisoning with cardiac glycosides. The activities of assistance and prevention. Pharmacological characterization of cardiac ikozidnyh negl *(dobutamine, dopamine).* **Antiarrhythmic funds.** The general pharmacological characteristics. The causes of and ways to treat arrhythmias. Classification of antiarrhythmic drugs. Pharmacokinetics and pharmacodynamics of antiarrhythmic drugs with membrane stabilizing action (*lidocaine hydrochloride, ethacyzin, propafenol),* beta-blockers, blockers of potassium and calcium channel in the treatment of heart rhythm. The mechanism of action of potassium preparations as antiarrhythmic agents.

Classification and general pharmacological characteristics **antianginal drugs.** Pharmacokinetics and pharmacodynamics *nitroglycerin and its analogs,* side effects. The mechanism of action of calcium channel blockers (calcium antagonists). Pharmacological characterization. Features of the application in the treatment of patients with coronary heart disease (beta-blockers, vasodilators myotropic actions, such as reflex action and energy supply means). Indications and contraindications for use, side effects. The concept of "steal" syndrome. Principles for the treatment of myocardial infarction.

Antihypertensive drugs. Ways of pharmacological correction of high blood pressure. The current clinical classification of antihypertensive agents. Pharmacological characterization of antihypertensive drugs. Principles of combination anti-hypertensive drugs. Medical treatment for hypertensive crisis is

Lipid-lowering drugs. The total lipid-lowering pharmacological characteristics of x, the direction of action. Classification of lipid-lowering drugs on the mechanism of action. The concept of angioprotectors. Pharmacokinetics and pharmacodynamics of drugs. The use of anticoagulants, antioxidants, angioprotectors direct action in the treatment of lipid-lowering conditions. Characteristics of drugs. The mechanism of action. Indications for use and side effects.

MODULE 2: "Medicines affecting the functions of executive organs and systems. Chemotherapy drugs. Antidotes"

Antitussives. Classification antitussives. General characteristics of the drugs. Side effect expectorants. Classification of expectorants on the mechanism of action. Pharmacokinetics and pharmacodynamics, side effects of expectorants, stimulants surfactant synthesis, bronchodilators. Funds that are used in pulmonary edema.

Funds **that affect appetite.** The general pharmacological characteristics, classification of assets that affect the appetite and is used to treat anorexia and bulimia. Anorectics: classification, comparative characteristics, side effects. Pharmacology *fepranona, mazindol.* **Vomiting, and antiemetics.** The mechanism of action of vomiting, and antiemetics. General characteristics of antiemetics: neuroleptics, M-anticholinergics, antihistamines drugs and menthol and local anesthetics. Pharmacokinetics and pharmacodynamics *metoclopramide (raglan, tserukal).* Side effects.

The funds used in violation of **function of the gastric glands.** Classification and pharmacological characteristics of the total funds, which suppress the secretion of gastric glands. Treatment of gastric ulcer, duodenal ulcer and hyperacid gastritis. Pharmacological characteristics of antihistamine blockers of H2-receptors and M-cholinergic antagonists, proton pump blockers. Side effects. **Antacids.** Pharmacodynamics *sodium bicarbonate,* indications for use, side effects. Pharmacology *magnesium oxide, aluminum hydroxide.* Comparative characteristics of antacids. Principles of combination *(almagel, маalox)* in clinical practice. The concept of gastroprotektor s *(sucralfate, bismuth ditsitrat)* and gastroprotectors *(мizoproston).* Funds that are used in violation of the excretory function of the pancreas. Classification of pankreaprotektorno of action. Indications for use.

Bile means. Classification, mechanism of action and general description of the tools that stimulate the formation of bile. Indications for use. Hepatoprotectors and cholelitholytic drugs. **Laxatives.**

The classification of laxatives on the mechanism of action of the localization and origin. The pharmacokinetics, pharmacodynamics, indications for the use of laxatives. Pharmacology of castor oil. Combination products with laxative properties. General characteristics of agents with anti-laxative action (astringent, absorbent, enveloping, plant preparations - St. John's wort, blueberries). Pharmacology *loperamide hydrochloride (Immodium).* Indications for use. Side effect. Carminative agents: *preparations of peppermint, chamomile flowers.*

Diuretics. Classification by chemical structure, localization, activity and mechanism of action. Pharmacokinetics and pharmacodynamics *furosemide, dihlotiazida, klopamida, ethacrynic acid,* indications for use, side effects. Potassium-sparing and osmotic diuretics. The concept of forced diuresis. Side effect. Herbs that have a diuretic effect. The principle of combined use of diuretics. Drugs for the treatment of gout. Classification of assets. General characteristics, side effects. Means, which influence **on the myometrium.** General characteristics of uterotonics (prostaglandins, hormones, calcium, cholinomimetics, and soon.) and tocolytics. Funds are used to stop uterine bleeding. Pharmacological characteristic of the alkaloids of uterine horns. Indications for use. Side effects, acute and chronic poisoning, poisoning help.

The classification of funds that are used for prevention and treatment of thrombosis. General characteristics of **antiplatelet agents.** The mechanism of action and indications for use. Classification **anticoagulants.** Pharmacology of *heparin.* Indications and contraindications for use. Collateral specified action and help in overdose. Preparations of *low molecular weight heparin.* Anticoagulants of indirect action. Pharmacology of 4-hydroxycoumarin and indandione derivatives. Indications for use. Collateral specified action of indirect anticoagulants. General characteristics of **fibrinolytic** funds. Pharmacology *fibrinolysin, streptoliaza, alteplase (actilyse).* Indications for use. Side effect. Classification **coagulants.** Pharmacology *vikasole.* Indications for use. Pharmacology of that increase ing blood clotting. Indications for the use of antifibrinolytic agents.

Funds that **affect the blood system.** Classification and general characteristics of drugs that affect hematopoiesis. Stimulants of erythropoiesis. Classification and general characteristics of stimulators of erythropoiesis. Indications for use. Funds that are used in hypochromic anemia. Pharmacokinetics, pharmacodynamics of iron. Combination products *(gemostimulin, ferkoven, ferropleks).* Indications for use. Side effect. Acute poisoning with iron and events support. Pharmacology *koamide.* Pharmacological characteristics of products for treatment of hyperchromic anemia. Pharmacology *folic acid and cyanocobalamine.* Antianemic natural remedies. Drugs that affect leucopoiesis. The mechanism of action of stimulants leucopoiesis. Indications for use.

Vitamin preparations. Vitamin therapy. Classification of vitamin preparations. General characteristics of water-soluble vitamins. Pharmacology *thiamine bromide, riboflavin, pyridoxine, nicotinic acid, cyanocobalamin, folic acid, ascorbic acid, calcium pangamat, calcium pantothenate.* Indications for use, side effects. The concept of bioflavonoids, coenzyme preparations. Characterization of fat-soluble vitamins. Pharmacology *retinol acetate, ergocalciferol, tocopherol acetate, vikasola.* Indications and contraindications for use. Side effects. Multivitamin preparations. The concept of antivitamin.

Enzyme preparations and enzyme inhibitors. Classification of enzyme preparations. The mechanism of action and indications for the use of drugs peptidases, proteases, nucleases, hyaluronic acid. Combined enzyme preparations. Indications for their use. General characteristics of the enzyme inhibitors.

Hormonal drugs hypothalamus and pituitary gland. The mechanism of action of *corticotropin* and its analogs, indications for use, side effects. Pharmacology of gonadotropic hormone preparations. Pharmacodynamics of drugs and the rear of the pituitary gland. Indications for use. Pharmacology of thyroid hormones form of the breast. Antithyroid drugs. Indications and contraindications for use, side effects. Preparations of *calcitonin.* Indications for use. Hypoglycemic agents. Classification of hypoglycemic agents. Pharmacology of insulin. Help with hyperglycemic coma. An overdose of *insulin,* hypoglycemic coma for help. Insulin preparations with prolonged action. Synthetic antidiabetic agents. Classification, mechanism of action, indications for use. Comparative characteristics of side effects. Sex hormones. Classification of sex hormones. General

characteristics of female sex hormones. The mechanism of action and indications for the use of estrogens, antiestrogens, gestagenic drugs, antigestagenic agents. Side effects of drugs of female sex hormones and their antagonists. Birth control (contraception) means. Classification, principles combinations, indications and contraindications for use, side effects. Comparative characteristics of contraceptive drugs. Preparations of male sex hormones. Pharmacological characterization. Indications for use, side effects. Antagonists of androgen hormones.

Hormonal drugs **glucocorticoids.** Pharmacological effects, indications, contraindications, dosing regimen. Comparative characteristics. Side effects of glucocorticoids. **Antiallergic agents.** Classification and general characteristics of antiallergic agents. The funds are used for immediate hypersensitivity. The concept of histamine receptors. Pharmacology of H1- and H2- histamine blockers. Pharmacokinetics, pharmacodynamics, indications for the use of *sodium cromolyn, ketotifen.* The principles of care in anaphylactic shock. The funds, which affect the immune system. Classification of promoters of immunity. Immunosuppressive agents (antimetabolites, glucocorticoids, enzymes).

Antiseptic and disinfectant. The concept of antiseptic and des infections. The history of the use of antiseptic agents. Classification of antiseptics and disinfectants in chemical structure.Pharmacology of antiseptic and disinfectants inorganic nature. Mechanism of action of halogens and halogen compounds. Indications for use, side effects. Acute poisoning by these means and measures services. The mechanism of action, indications for the use of oxidants (*hydrogen peroxide, potassium permanganate)* and products of acids and alkalis *(salicylic acid, ammonia).* The dependence of the pharmacological effect of the concentration of the solution. Pharmacology of drugs of salts of heavy metals. The mechanism of action, the conditions that determine the antimicrobial activity of the preparations of salts of heavy metals. Schmidberg series. Features of drugs of mercury, lead, silver, bismuth, copper and zinc. Side effects of drugs of heavy metal salts. Acute poisoning. Help for acute poisoning with salts of heavy metals, the first principles of antidote therapy.

Antiseptics and disinfectants - Derivatives of the aromatic series. Mechanism of action of phenol. Side effects. Acute *phenol, assistance.* The mechanism of action of nitrofurans, indications and contraindications for use. Comparative characteristics of drugs. The mechanism of action of antimicrobial drugs dyes. Pharmacological characteristics of drugs. Indications for use. Antiseptic aliphatic series. Pharmacokinetics, Pharmacodynamics of *formaldehyde.* Side effect. The mechanism of action and indications for use *hexamethylenetetramine.* The mechanism of antimicrobial action of *ethyl alcohol.* Pharmacology of surfactants. The mechanism of action, indications for the use of detergents.

Sulfa drugs. The classification for the duration of action and pharmacokinetics of features. Pharmacokinetics and pharmacodynamics of the spectrum antimicrobial action of sulfonamides. Indications for use. Side effects and ways to prevent them. Combination of *trimethoprim* and *salicylates.* Synthetic antimicrobials. Derivatives of a *quinolone.* Classification, mechanism of action, indications for use, side effects. Characteristics of drugs. Feature of the application in medical practice, fluoroquinolone derivatives inolona.

Antibiotic. Classification of chemotherapeutic agents. The concept of e antibiosis, antibiotics, the spectrum of action of antibiotics. History of the discovery and introduction of antibiotics in medical practice. Principles of antibiotic therapy. Classification of antibiotics according to chemical structure, spectrum and mechanism of action. The group of penicillins. Classification, mechanism of action and spectrum. Pharmacokinetics of the penicillin group of drugs. Indications for use, side and toxic effects. Features combination with clavulanic acid, sulbactam, tazobactam. Cephalosporin group of antibiotics Pharmacology of the century. Classification of generations. The mechanism of action and spectrum. The reading and comparative analysis of drugs of cephalosporins. Side effect.

Antibiotics of the macrolide and azalide group. General description of the mechanism and range of action, indications for use, side effects. Pharmacology *erythromycin, clarithromycin, azithromycin.*

Antibiotics tetracycline group. The pharmacokinetics, mechanism and spectrum of action, indications and contraindications for use, side effects and their preventione. Antibiotics are a group of nitrobenzene *(chloramphenicol).* The mechanism of action and spectrum of action, indications for use, collateral specified action, the possibility of severe intoxication in infants. Pharmacology of aminoglycosides antibiotics, classification. Comparative characteristics, mechanism of action, indications and contraindications, side effects. Antibiotics are a group of cyclic polypeptides *(polymyxins).* Pharmacological characterization of *polymyxin.* The mechanism and spectrum of action, indications for use, route of administration, collateral specified action. Principles of combination antibiotics.

Antifungal (antimycotic) agents. Classification of antimycotic (antifungal) drugs by origin and choice for a specific type of mycosis. Pharmacological characteristics of antibiotic yen floor structure and antifungal drugs of other groups. Indications for use, side effects. **Antiviral agents.** Classification of antiviral drugs on the mechanism of action and indications for use. Pharmacological characteristics of drugs that are prescribed to patients with influenza. The funds are used for herpes infections. Possibilities of using antiviral agents in treatment of patients with AIDS. **Antihelminthic drugs.** Classification of anthelmintic drugs. Pharmacology *mebendazole, levamisole, pyrantel, piperazine adipinata, naftamone, pirviniya pamoate, fenasale.* Funds that are used in extraintestinal helminthiasis *(ditrazin, hloksila, sodium antimonyl tartrate, praziquantel).*

Anti-tuberculosis drugs. Basic principles of treatment and prevention of tuberculosis. Classification of medicines used to treat tuberculosis. Derivatives pharmacology TINC. Side effects and ways to prevent them. Pharmacology *rifampicin* and other anti-TB antibiotics. Pharmacological characteristics of drugs of different chemical groups: *ethionamide, protionamid, ethambutol, pyrazinamide, ciprofloxacin, ofloxacin, sodium p-aminosalicylates.* Side effects. **Anti-spirochete drugs.** General characteristics of anti-spirochete drugs. Principles of treatment of syphilis. Classification antispirochete drugs. Features of the use of antibiotics, bismuth preparations in the treatment of syphilis.

Antiprotozoal drugs. Antimalarial drugs. Basic principles of prevention and treatment of malaria. Classification of antimalarial drugs. The mechanism of action. Pharmacological characteristics of *hingamine, hloridin, quinine, primaquine, hinotsida.* Indications and contraindications for use, the collateral specified action. Drug therapy malarial coma. Drugs for the treatment of trichomoniasis. Pharmacology *metronidazole, tinidazole* and *furazolidone.* For the treatment of patients with chlamydia (macrolides, *doxycycline, metronidazol*). The funds are used for the treatment of patients with amebiasis.

Classification, Pharmacology *metronidazole, emetine hydrochloride, hingamine, hiniofon, tetracycline*. For the treatment of patients with giardiasis. Pharmacological characteristics of *metronidazole, tinidazole, furazolidone, aminohinole.* The funds are used for the treatment of patients with toxoplasmosis. Pharmacological characteristics of *hloridin, hingamine, aminohinole,* sulfonamides.

Antitumor (Antineoplastic) funds. Classification and general characteristics of anticancer agents. The mechanism of action, indications for use, side effects of anticancer agents alkylating, antimetabolites, alkaloids, antibiotics, hormones and their antagonists, enzymes of animal origin. Complication of chemotherapy. The concept of radioisotope preparations.

Preparations based **on inorganic acids** and **alkalis.** Local and resorbing action of acids and alkalis. Indications for use. Acute acid and alkalimi. Activities help. Preparations of alkali and alkaline earth metals *(sodium chloride, potassium chloride, magnesium sulfate, calcium chloride, calcium gluconate).* Pharmacological effects, indications for use, route of administration. **Plasma replacement drugs.** General characteristics of plasma substitutes and indications for the use of *saline solutions, alkaline solutions, sugars,* drugs for parenteral nutrition.

Basic principles of drug therapy of acute poisoning by medicines-governmental means. Causes and symptoms of acute poisoning by drugs of different pharmacological groups. Methods of active detoxification of vomiting, laxatives, envelop, binders and adsorbents. The use of active diuretics (forced diuresis), hemodialysis, peritoneal dialysis, hyperbaric oxygenation, but hemo-liter imfosorbtsii. The concept and types of antidote therapy. Pharmacology *unitiole, acetylcysteine,*

tetatsina-calcium, penicillamine, deferoxamine, reaktivatoriv holinesterazi. The principles of symptomatic treatment of acute poisoning.	
6. Course evaluation system	
General course evaluation system	**Current control** is performed based on the control of theoretical knowledge, skills and abilities in practical classes. Independent study students are assessed in practical classes, and is an integral part of the final grade of the student. Current control is performed during the training sessions and aims at checking the assimilation of students learning the material. Forms of current control are: a) test tasks with a choice of one correct answer, with the definition of the correct sequence of actions, with determination of the conformity, defining the specific portion of the photo or diagram ("detection"); b) individual oral questioning, interview; c) the solution of typical situational tasks; g) identification of pathogens and carriers of pathogens of parasitic diseases in the photographs, macro - and micropreparats; d) control of practical skills; e) the typical problems of genetics and medical genetics. Grades on the national scale ("excellent" - 5, "good" - 4, "satisfactory" - 3, "unsatisfactory" - 2), received by students, are displayed in the journals of attendance and academic group performance. **Final control** The final control is the form of a differentiated credit at the end of the 1st semester and an exam at the end of the 2nd semester upon completion of the course of medical biology. The semester exam is a form of final control of mastering by the student of theoretical and practical material on academic discipline. The final control (exam) is carried out at the last control lesson. Students are admitted to the FC who have attended all the classes provided by the curriculum in the discipline and while studying the module scored the number of points not less than the minimum (**72 points**). A student who, for good or bad reasons, has missed classes, is allowed to rework academic debt for a certain period of time. **Evaluation of current educational activities.** During the assessment of mastering each topic for the current educational activity of the student scores are set on a 4-point (national) assessment scale. This takes into account all types of work provided by the discipline program. The student must receive a score on each topic. Scores on the traditional scale are converted into points. The final assessment of the

current academic activity is the arithmetic mean (the sum of scores for each lesson is divided by the number of lessons per semester) and translated into points according to **Table 2.**

Table 2. Conversion of the average score for the current activity into a multi-point scale (for disciplines completed by diff.credit, exam)

4-point scale	120-point scale	4-point scale	120-point scale	4-point scale	120-point scale	4-point scale	120-point scale
5	120	4,45	107	3,91	94	3,37	81
4,95	119	4,41	106	3,87	93	3,33	80
4,91	118	4,37	105	3,83	92	3,29	79
4,87	117	4,33	104	3,79	91	3,25	78
4,83	116	4,29	103	3,74	90	3,2	77
4,79	115	4,25	102	3,7	89	3,16	76
4,75	114	4,2	101	3,66	88	3,12	75
4,7	113	4,16	100	3,62	87	3,08	74
4,66	112	4,12	99	3,58	86	3,04	73
4,62	111	4,08	98	3,54	85	3	**72**
4,58	110	4,04	97	3,49	84	<3	Not enoug
4,54	109	3,99	96	3,45	83		
4,5	108	3,95	95	3,41	82		

The maximum number *of points that a student can collect for current educational activity during semester in order to be admitted to the exam is* ***120 points.***

The minimum number *of points that a student can collect for current educational activity during semester in order to be admitted to the exam is* ***72 points.***

Calculating of the number of points is based on obtained marks of student according to traditional scale while learning subject during the semester, by calculating the arithmetic mean (AM) that is rounded to two signs after comma.

Evaluation of independent work of students. Independent work of students, which is provided by the topic of the lesson together with the classroom work, is evaluated during the current control of the topic in the relevant lesson. Assimilation of topics that are submitted only for independent work is checked during the final module control.

Evaluation of final control.

The maximum number of points that a student can score during the exam is **80 points.**

The final control is considered credited if the student scored at least 60% of the maximum amount of points (for a 200-point scale - at least **50 points**).

Determining the number of points that a student scored in the discipline: the number of points that a student scored in the discipline is defined as the sum

<table>
<tr><td></td><td>of points for the current academic activity (Table1) and for the final control (diff.credit, exam) (Table 3).
Table 3. Scale of assessment of differentiated (exam) credit:
<table>
<tr><td>Traditional scale</td><td>Points</td></tr>
<tr><td>«5»</td><td>70-80</td></tr>
<tr><td>«4»</td><td>60-69</td></tr>
<tr><td>«3»</td><td>50-59</td></tr>
</table></td></tr>
<tr><td>Requirements for written work</td><td>The final written work is performed in the form of a test.</td></tr>
<tr><td>Practical classes</td><td>Classroom work</td></tr>
<tr><td colspan="2">The 2nd course. The 4th semester</td></tr>
<tr><td colspan="2">Module 1. "Medical prescription. General pharmacology. Drugs affecting the nervous and cardiovascular systems"</td></tr>
<tr><td colspan="2">Topics 1-3:
Classroom work - score from 2 to 5 for each topic.</td></tr>
<tr><td colspan="2">Topic 4: Test control - 40 tests. Score from 2 to 5.
Evaluation criteria
<table>
<tr><td>Rating</td><td>«3»</td><td>«4»</td><td>«5»</td></tr>
<tr><td>Number of correct answers</td><td>20-29</td><td>30-34</td><td>35-40</td></tr>
</table></td></tr>
<tr><td colspan="2">Topics 5-19:
Classroom work - score from 2 to 5 for each topic.</td></tr>
<tr><td colspan="2">Topic 20: Diff.credit (Semester control): practical training theoretical training.
Final module control1 is evaluated from 50 to 80 points and consists of:
Test control - 40 tests = 40 points (1 point for the correct answer to 1 test).
Answer to 2 theoretical questions of 20 points for each = 40 points. Amount: 80.
Scale of assessment:
<table>
<tr><td>Traditional scale</td><td>Points</td></tr>
<tr><td>«5»</td><td>70-80</td></tr>
<tr><td>«4»</td><td>60-69</td></tr>
<tr><td>«3»</td><td>50-59</td></tr>
</table></td></tr>
<tr><td colspan="2">The 3rd course. The 5th semester</td></tr>
<tr><td colspan="2">Module 2. "Medicines affecting the functions of organs, systems and metabolism. Chemotherapy drugs. antidotes "</td></tr>
<tr><td colspan="2">Topics 1-19:
Classroom work - score from 2 to 5 for each topic.</td></tr>
<tr><td colspan="2">Topic 20:
Classroom work - score from 2 to 5
Test control - 40 tests. Score from 2 to 5.
Evaluation criteria
<table>
<tr><td>Rating</td><td>«3»</td><td>«4»</td><td>«5»</td></tr>
<tr><td>Number of correct answers</td><td>20-29</td><td>30-34</td><td>35-40</td></tr>
</table></td></tr>
<tr><td colspan="2"></td></tr>
<tr><td colspan="2">At the end of the course there is an exam.
The structure of the examination ticket to Microbiology, virology and immunology
1. Theoretical question
2. Theoretical question</td></tr>
</table>

3. Theoretical question
4. Practical skills

THE CRITERIA FOR EVALUATION
PRACTICAL SKILLS AND THEORETICAL QUESTIONS

Number of practical skills	«5»	«4»	«3»	The answer is a card to the practical skills	For each answer to the practical skill student receives from 10 to 16 points: «5» - 16 points; «4» - 13 points; «3» - 10 points.
1	16	13	10		
Number of Theoretical question	«5»	«4»	«3»	Oral answer the card on theoretical questions	For each answer to the practical skill student receives from 10 to 16 points: «5» - 16 points; «4» - 13 points; «3» - 10 points.
1	16	13	10		
2	16	13	10		
3	16	13	10		
The sum of points	**80**	**65**	**50**		

Students who have completed all types of work provided by the curriculum and scored the number of points for the current success not less than the minimum (72) are admitted to the exam. The total grade for the module and the discipline consists of a total grade for the activities in the current classes and the final control of student knowledge. Current activity is estimated from 72 to 120 points. Thus, the minimum number of points per module should be: **72 + 50 = 122** points. Maximum number: **120 + 80 = 200** points.

Rating scale:

National scale	Points scale
«5»	70-80
«4»	60-69
«3»	50-59

LIST OF THEQUESTIONS FOR EXAM
PHARMACOLOGICAL TASKS

Identify the drug, its pharmacological group and indication. Explain mechanism of action.

1. A derivative of the para-aminobenzoic acid (PABA). It is not soluble in water, used in aspersions, ointments, pastes, tablets, capsules, and suppositories. It is used topically and reduces feeling of pain and itch.

2. An amorphous phytogenous powder of brown color which is water and spirit-soluble. It coagulates mucous surface layer with albuminate forming, causes local vasoconstriction, decreasing of permeability and inflammatory.

3. A plant origin substance (alkaloid) causes pupil dilatation, paralysis of accommodation, an increase of intraocular pressure, an increase of heart rate, decreases the tone of the smooth muscles. Sweat gland secretions are greatly reduced, bronchial and salivary secretions are decreased. It is used in the case of intestinal colic, renal colic, cholecystalgia, gastric and duodenal ulcer.

4. A substance, which acts as a mediator, causes vasoconstriction, stimulates heart, increases blood pressure, relaxes gastrointestinal and bronchiolar smooth muscles, and causes

hyperglycemia and an increase in tissue metabolism. It is used in the case of allergic reaction, hypoglycemic coma, shock, and collapse. Topically it causes vasoconstriction.

5. A substance, which acts as mediator, causes vasoconstriction, an increase in blood pressure. It has a weak stimulatory effect on the heart and practically does not cause bronchodilatation. It is used in the case of shock, collapse, and hypotension.

6. A synthetic adrenoblocker. It decreases the heart rate, cardiac output and oxygen consumption. It prevents influence of adrenaline on the heart, increases the tone of the bronchial smooth muscles. It is used in the case of angina pectoris, arrhythmias, and essential hypertension.

7. A phytogenous or synthetic substance which causes iris-contraction, spasm of accommodation, decreases intraocular pressure, increases secretory activity, increases the tone of the smooth muscles. It does not influence on the transmission of the nerve impulses in ganglions and myoneural junctions. It is used I the case of glaucoma, stomach, intestinal, and bladder atony. In the case of poisoning by this substance atropinum is used.

8. A phytogenous substance, which inhibits the release of neurotransmitter from peripheral adrenergic neurons and acts via catecholamine depletion. It has hypotensive action and is used for treatment of hypertension.
   Patient may develop orthostatic [postural] hypotension, and diarrhea.

9. A synthetic drug which decreases blood pressure, increases peripheric circulation, decreases intestinal and stomach motility, reduces secretion of the glands, inhibits receptors of the chromaffin tissue of the adrenal glands and carotid sinuses. It has no influence on M-cholinergic receptors but inhibits N-cholinergic receptors. It is used to decrease blood pressure in the case of hypertensic crisis and in the case of peripheral vasospasm (obliterating endarteritis). It may cause disorder of accommodation, intestinal and bladder atony, orthostatic hypotension.

10. A synthetic drug which acts by blocking transmission at the neuronal junction, its duration of action is 5-10 min, and anticholinesterase drug strengthen its action. It is used to relax muscles. Side effects: myalgia in the postoperative period, arrhythmia.

11. A 32-year-old patient was intravenously administered a drug, which is a derivative of barbituric acid. It is a white powder with tints of blue. It is produced in sterile vials. Intravenous administration causes narcosis in a few minutes without stage of excitation. It tonicizes vagus nerve, causes laryngospasm, and hypersecretion. It is used for intravenous and rectal narcosis.

12. A 20-year-old patient with renal colic was administered subcutaneously a neogalenical drug which is a derivative of opium and contains about 50% of morphine. It is effective in cases of traumatic and spasmodic pain. It causes habitation and addiction.

13. A schizophrenic 26-year-old patient was prescribed a derivative of phenothiazine in dragee. It has antipsychotic properties, antiemetic, antihistamine and hypothermic action, anticonvulsant potency, decreases motor activity. It potentiates action of hypnotics, opioid analgesics and local anesthetics.

14. A 19-year-old patient with neurosis was prescribed a derivative of benzodiazepine. This drug has anxiolityc, antianxiety, antiphonic, and anticonvulsant properties. It reduces delirium and hallucinations.

15. A 30-year-old patient suffering from hypotension was prescribed a drug derived from a plant. It is a hypotoxic alkaloid which is similar to natural metabolites. It's a psychotonic. It acts mainly on the cortex of cerebrum but along with that it stimulates vital centers of the medulla oblongata. It has central and peripheral action on the cardiovascular system.

16. A derivative of barbituric acid that is not readily solved in water and is produced in tablets. It causes 6-8 hours sleep. It has ability to cumulate. Also it has antiepileptic, antihypertensive, and sedative properties.

17. A 56-year-old patient with Parkinson's disease was prescribed an antiparkinson's drug, which readily penetrates through blood-brain barrier and into neurons. In neurons it turns into dophamine that is an inhibitory transmitter.

18. A 20-year-old patient with endogenous depression was prescribed a drug which has tricyclic structure. It does not influence monoamine oxidase. It has mood elevating properties along with prominent sedative action. It has M-cholinoblocking and antihistaminic action. It does not cause aggravation of delirium and hallucinations. It does not disturb sleep and is used in the case of agitation and depression.

19. A derivative of pyrazolone readily solved in water. It is produced in ampoules and tablets and is prescribed orally and parenterally. It has rapid onset but short duration of action and is used in the case of headache, toothache, neuralgia, and myalgia. Its side effects: leukopenia, drug agranulocytosis, allergic reactions. Anaphylactic shock is possible.

20. A 2-year-old child with high temperature was prescribed a derivative of aniline. It has analgesic and antipyretic properties but almost does not have anti-inflammatory action. It is used in the cases of headache, myalgia, neuralgia, and fever. Its side effects: cyanosis, methemoglobinemia, anemia, leukopenia, allergic reactions, jaundice, collapse, kidney affection.

21. A derivative of GABA that readily penetrates through blood-brain barrier. It has narcotic, analgesic, sedative, and hypnotic action. Duration of action is 1.5-3 hours.

22. A derivative of the para-aminobenzoic acid (PABA). It is not solved in water, used in aspersions, ointments, pastes, tablets, capsules, and suppositories. It is used topically and reduces feeling of pain and itch.

23. An amorphous phytogenous powder of brown color which is water and spirit-soluble. It coagulates mucous surface layer with albuminate forming, causes local vasoconstriction, decreasing of permeability and inflammatory.

24. A plant origin substance (alkaloid) causes pupil dilatation, paralysis of accommodation, an increase of intraocular pressure, an increase of heart rate, decreases the tone of the smooth muscles. Sweat gland secretions are greatly reduced, bronchial and salivary secretions are decreased. It is used in the case of intestinal colic, renal colic, cholecystalgia, gastric and duodenal ulcer.

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28. A phytogenous or synthetic substance which causes iris-contraction, spasm of accommodation, decreases intraocular pressure, increases secretory activity, increases the tone of the smooth muscles. It does not influence on the transmission of the nerve impulses in ganglions and myoneural junctions. It is used I the case of glaucoma, stomach, intestinal, and bladder atony. In the case of poisoning by this substance atropinum is used.

29. A phytogenous substance, which inhibits the release of neurotransmitter from peripheral adrenergic neurons and acts via catecholamine depletion. It has hypotensive action and is used for treatment of hypertension. Patient may develop orthostatic [postural] hypotension, and diarrhea.

30. A synthetic drug which decreases blood pressure, increases peripheric circulation, decreases intestinal and stomach motility, reduces secretion of the glands, inhibits receptors of the chromaffin tissue of the adrenal glands and carotid sinuses. It has no influence on M-cholinergic receptors but inhibits N-cholinergic receptors. It is used to decrease blood pressure in the case of hypertensic crisis and in the case of peripheral vasospasm (obliterating endarteritis). It may cause disorder of accommodation, intestinal and bladder atony, orthostatic hypotension.

31. A synthetic drug which acts by blocking transmission at the neuronal junction, its duration of action is 5-10 min, and anticholinesterase drug strengthen its action. It is used to relax muscles. Side effects: myalgia in the postoperative period, arrhythmia.

32. A second-generation H_1 histamine antagonist drug used to treat allergies. Structurally, it is closely related to tricyclic antidepressants. The drug is available as tablets, oral suspension, and syrup; is indicated for the symptomatic relief of allergy such as hay fever (allergic rhinitis), urticaria (hives), and other skin allergies. For allergic rhinitis (hay fever) is effective for both nasal and eye symptoms: sneezing, runny nose, itchy or burning eyes. As a 'non-sedating' antihistamine, the drug causes less but still significant sedation and psychomotor retardation than the older antihistamines (first-generation) because it penetrates the blood brain barrier only to a smaller extent.

33. A drug is an analogue of natural hormone produced by the pancreas which is central to regulating carbohydrate and fat metabolism in the body. The drug is used medically to treat all patients with type 1 diabetes and over 40% of those with type 2 diabetes. The drug is now manufactured for widespread clinical use by recombinant DNA technology. It cannot be taken orally because, like nearly all other proteins introduced into the gastrointestinal tract, it is reduced to fragments, whereupon all activity is lost. The drug is usually taken as subcutaneous injections.

34. A synthetic corticosteroid drug (without fluorine atoms) that is particularly effective as an immunosuppressant. It is used to treat certain inflammatory diseases and allergic reactions, but has significant adverse effects. Because it suppresses the immune system, it leaves

patients more susceptible to infections. It is usually taken orally but can be delivered by intramuscular injection or intravenous injection.

35. A naturally-occurring fatty acid ester form of fat-soluble vitamin with potential antioxidant, antineoplastic and chemopreventive activities. Night blindness—the inability to see well in dim light—is associated with a deficiency of this vitamin. Too much dose of this vitamin in retinoid form can be harmful or fatal, resulting in what is known as hypervitaminosis.

36. A drug of C-21 steroid hormone involved in the female menstrual cycle, pregnancy (supports gestation) and embryogenesis. It is used to treat recurrent pregnancy loss, and for prevention of preterm birth in pregnant women. The hormone transforms proliferative endometrium into secretory endometrium, inhibits (at the usual dose range) the secretion of pituitary gonadotropins, which in turn prevents follicular maturation and ovulation. It is contraindicated to patients with thrombotic disorders (thrombophlebitis, cerebrovascular disorders, pulmonary embolism, and retinal thrombosis).

37. A drug of vitamin, which occurs naturally in foods such as citrus fruit, tomatoes, potatoes, and leafy vegetables. It is important for bones and connective tissues, muscles, and blood vessels. It also helps the body absorb iron. There are two forms of the vitamin which are believed to be important in oxidation-reduction reactions. Vitamin deficiency results in scurvy. Collagenous structures are primarily affected, lesions develop in bones and blood vessels. Administration of the drug of vitamin completely reverses the symptoms of deficiency.

Circumstance of admission to the final control	1. Semester control at the end of the 1st semester is provided in the form of a differential credit. (Table 2) Provides a final score on a 120-point scale as the sum of scores for the current control of knowledge (oral examination, written survey, tests, verification of identification of micropreparations, abstracts), the results of 2 content modules. 2. Students are allowed to take the differentiated credit, exam only if there is no debt for the implementation of the curriculum.

7. Course policy

The organization of the educational process is carried out with the use of the European Credit Transfer System (ECTS) to assess student performance. The points gained in the current survey, independent work and points of the final control are credited. This must take into account the student's presence in class and his activity during practical work. Inadmissible: absences and late classes; use of a mobile phone, tablet or other mobile devices during the lesson (except for the cases provided by the curriculum and methodical recommendations of the teacher); copying and plagiarism; untimely performance of the task, the presence of unsatisfactory grades for 50% or more of the submitted theoretical and practical material.

8. RECOMMENDED LITERATURE	
Basic: 1. Chekman I.S., Gorchacova N.O., Panasenko N.I., Bech P.O. Pharmacology. Vinnytsya: Nova knyha Publishers, 2006. 384p. 2. Firdaus M. Review of Pharmacology, 7th edition. Karachi: Riaz Medical Publishers, 2007. 190 p. 3. Ganziy T.V. Study Guide to Basic Pharmacology. Kharkiv: Fakt, 2005. 264 p. 4. Katzung B.G. Basic and Clinical Pharmacology, 9th edition. New-York: Lange, 2004. 1202 p. 5. Laurence D.R., Bennet P.N., Brown M.G. Clinical Pharmacology, 8th edition. London: ChurchillLivingstone Elsevier, 1998. 710 p.	**Additional:** 1. Lippincott's Illustrated Reviews: Pharmacology, 4th Edition / Ed.: R.Finkel, M.A. Clark, L.X. Cubeddu. – Lippincott Wlliams Wilkins, 2008. – 560 p. 2. Lullman H, Albrcht Z., Klaus M, Detlef B. Color Atlas of Pharmacology. Stuttgart – New-York: Thieme, 2000. 386 p. 7. Rang H.P., Dale M.M., Ritter J.M., Moore P.K. Rang's and Dale's Pharmacology, 6th edition. London: Churchill-Livingstone Elsevier, 2007. 830 p. 3. Stefanov O., Kucher V. Pharmacology with general prescription: text-book for English-speaking students, 2nd edition. K., 2007. 318 p. 4. Stringer J.L. Basic Concepts in Pharmacology. A students survival guide, 2nd edition. McGrow- Hill International Edition, 2001. 286 p.

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