

Federal State Budget
Educational Institution of Higher Education
Dagestan State Medical University
Health Ministry of the Russian Federation
(FSBEI HE DSMY of the Ministry of Health of the Russian Federation)



WORK PROGRAM
Pharmacology

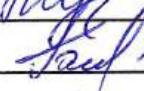
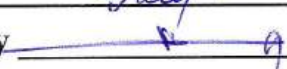
Discipline index – **Б1.О.28**
Specialty – **31. 05. 01 Medical Care**
Level of higher education: **specialty**
Graduate qualifications: **medical doctor**
Faculty: **General medicine**
Department: Pharmacology
Form of education: full-time
Course - III
Semester –V-VI
Total labor intensity - 7 credit units, 252 hours
Lectures - 26 hours
Practical classes – 86 hours
Student's self-study-104 hours
Control - 36 hours
Control form - exam in the VI semester

Makhachkala 2026

The work program of the discipline "Pharmacology" is designed in accordance with the work curriculum of the Higher Education Program for Higher Education in the specialty 31.05.01 General Medicine (higher education - specialty), approved by order No. 988 of the Ministry of Education and Science of the Russian Federation of 12/08/2020.

The work program was approved at a meeting of the Department of Pharmacology on 18.05.2026, protocol No. 8

Work program was agreed by:

1. Director of Science Library _____  V.R. Musaeva
2. Head of the EMW Department _____  G.G. Gadzhiev
3. Dean of the General Medicine Faculty _____  G.M. Dalgatov

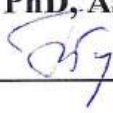
of the Department, PhD,
Associated Professor _____  Z. Sh. Magomedova

Compiled by:

Magomedova Z.Sh. - PhD,
associated Professor,
Head of the Department



Reviewer

Abakarov M.G. – PhD, Associate Professor, Head of the Clinic Pharmacology
Department _____ 

Saidov M.Z. – MD, Professor, Head of the Pathological Physiology
Department _____

1. THE GOALS AND OBJECTIVES OF THE DISCIPLINE:

The purpose of mastering the discipline is to provide students with the necessary knowledge and skills in the field of pharmacology, taking into account subsequent training and medical professional activities.

The tasks of mastering the discipline are:

- mastery of basic information on general pharmacology, mechanism of action, pharmacokinetics, pharmacodynamics and knowledge necessary when using the main groups of drugs;
- Obtaining ideas about drug toxicology and the principles of first aid for acute drug poisoning;
- the ability to choose a rational complex of drugs for treating patients, choose groups of drugs, specific drugs of this group, taking into account their pharmacodynamics and pharmacokinetics, take into account possible side effects, increase the immune activity of the body, determine the necessary drug treatment for emergency care for general diseases;
- the ability to write prescriptions for various dosage forms;
- the ability to choose the optimal dose and route of administration of the drug for specific diseases

II. List of planned learning results.

Competencies formed in the process of studying a discipline:

Code and the name of competency (or its part)	Code and name of the indicator of achievement of competence
Universalcompetencies (UC)	
UC-4 Able to apply modern communication technologies, including in a foreign language(s), for academic and professional interaction	ID6 UC-4 Applies medical terminology in Latin and foreign languages
Toknow: general principles for preparing prescriptions and compiling prescription writings for medicines	
Tobeable: to write prescriptions for medicines	
Topossess: skills in preparing prescription forms for prescribing various dosage forms of drugs	
Generalprofessionalcompetencies(GPC)	
GPC-7 Able to prescribe treatment and monitor its effectiveness and safety	ID1 GPC-7 Prescribes treatment for diseases, taking into account pharmacodynamic and pharmacokinetic parameters, drug compatibility, age, physiological and pathological conditions of the patient, avoiding polypharmacy
Toknow: classification and main characteristics of drugs, pharmacodynamics and pharmacokinetics, indications and contraindications for the use of drugs, side effects	
Tobeable: analyze the effect of drugs in terms of the totality of their pharmacological properties and the possibility of their use for therapeutic treatment;	
Topossess: skills in the use of medicines in the treatment, rehabilitation and prevention of various diseases and pathological conditions	

3. The place of the discipline (module) in the structure of the educational program

The discipline "Pharmacology" refers to the basic part of the B1.O, study cycle, studied in the 5th, 6th semesters. To study this discipline, the following knowledge and skills formed by the previous disciplines "Chemistry", "Biology", "Biochemistry", "Histology, embryology, cytology", "Normal physiology".

The discipline "Pharmacology" is the preceding one for the study of the disciplines: "Clinical

Pharmacology", "Faculty Therapy, Occupational Diseases", "Hospital Therapy", "Endocrinology", "Phthisiology", "Medical Prevention", "Fundamentals of Evidence-Based Medicine".

4. The complexity of the discipline (module) and types of contact work.

Type of study	Total hours	Semesters	
		V	VI
Contact work (total), including			
Classroom work	130	66	64
Including:			
Lectures (L)	26	14	12
Practical Activities (PA)	104	52	52
Laboratory work (LR)			
Student's self-study (SSS)	86	42	44
Type of intermediate certification Exam			36
Total labor hours credit unit	252 7	108 3	144 4

5. The structure and content of the discipline

5.1. Sections of the discipline and competencies that should be mastered in their study

№	competency index	Name of the discipline section	Section Content
1	ID6 UC-4	Introduction. General recipe	The recipe, its structure. General rules for making recipes. Prescription Forms. Liquid, soft, solid dosage forms. Dosage forms for injection. The rules for writing them out in recipes.
2	ID1 GPC-7	General Pharmacology	The definition of pharmacology, its place among other medical and biological sciences. The main stages of the development of pharmacology. The development of pharmacology in Russia. The principles of finding new drugs. The synthesis of new biologically active substances based on the study of the relationship between the chemical structure and action. Obtaining preparations from plant and animal raw materials. The importance of biotechnology in the creation of medicines. Basic principles and methods of testing new drugs. Pharmacokinetics of drugs. Enteral and parenteral routes of administration of drugs. Absorption of drugs with different routes of administration. The

			main mechanisms of absorption. Factors that alter the absorption of substances. The concept of the bioavailability of drugs. Distribution of drugs in the body, deposition. The transformation of drugs in the body. The value of microsomal liver enzymes. Ways of excretion of drugs. The concept of clearance, the half-elimination period of substances. Pharmacodynamics of drugs. The main biological substrates ("targets") with which medicinal substances interact. The concept of specific receptors, agonists and antagonists. Pharmacological effects (main, side, toxic). Types of drug action. Factors that change the pharmacokinetics and pharmacodynamics of drugs. Chemical structure and physicochemical properties of substances. The value of stereoisomerism, lipophilicity, polarity, degree of dissociation. The dependence of the effect on the dose (concentration) of the substance. Types of doses: medium and higher therapeutic, single, daily and course; toxic. The breadth of therapeutic action. The dependence of the effect of substances on gender and age, the state of the body. The role of genetic factors. The concept of chronopharmacology. Change in the action of substances during their repeated injections. Addiction, material and functional cumulation. Drug addiction. The combined use of drugs. The interaction of drugs. Synergism, antagonism. Antidotism. Side and toxic effects of drugs. Side effects of an allergic and non-allergic nature. The toxic effect of drugs. Teratogenicity, embryotoxicity. The importance of genetic factors in the development of adverse effects. Idiosyncrasy.
3	ID6 UC-4 ID1 GPC-7	Drugs Affecting to peripheral nervous department the system	Drugs, влияющие на афферентную иннервацию. Drugs for local anesthesia (local anesthetics). Classification. Mechanism of action. Comparative characteristics of drugs and their use for different types of anesthesia. Toxic effect of

			local anesthetics and measures to prevent it. Astringent, Coating, and Adsorbent Drugs. Principles of action. Indications for use. Irritating Drugs. Effect on the skin and mucous membranes. The value of reflexes arising from this. Distracting effect. Application. Drugs affecting efferent innervation: I. Drugs acting on cholinergic synapses. Muscarinic and nicotine-sensitive receptors (m- and n-cholinergic receptors). Subtypes of m- and n-cholinergic receptors. Classification of agents affecting the transmission of excitation in cholinergic synapses. M-Cholinomimetic Drugs. Effects arising from the excitation of different subtypes of m-cholinergic receptors. The effect of m-cholinomimetics on the eye (pupil size, intraocular pressure, accommodation), smooth muscles of internal organs, secretion of glands, heart and tone of blood vessels. Application. Treatment of poisoning with m-cholinomimetics. H-Cholinomimetic Drugs. The effects associated with the influence on the n-cholinergic receptors of the synocarotid zone, chromaffin cells of the adrenal medulla. Application. Toxic effect of nicotine. The use of n-cholinomimetic agents to facilitate smoking cessation. M, H-Cholinomimetic Drugs. The main effects of anethylcholine and carbacholine (muscarinic and nicotine-like effects). Indications for use. Side effects. Anticholinesterase Drugs. The nature of the interaction with acetylcholinesterase. The main effects. Comparative characteristics of drugs. Indications for use. Side and toxic effects of anticholinesterase drugs. The treatment of poisoning. The use of cholinesterase reagents for poisoning with organophosphorus compounds. M-anticholinergic Drugs. Effect on the eye, cardiovascular system, smooth muscles, exocrine glands. Action on the central nervous system. Application. Atropine
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			poisoning and help with poisoning. Features of the action and use of scopolamine, ipratropium, pirenzepine. H-anticholinergic Drugs. Ganglion Blocking Drugs. The main effects, the mechanism of their occurrence. Indications for use. Side effect. Drugs that block neuromuscular transmission. Classification. The mechanisms of action of depolarizing and antidepolarizing agents. Application. Side effects. Antagonists of anti depolarizing agents.II. Drugs acting on adrenergic synapses. Types and subtypes of adrenergic receptors. The functional role of synaptic and extrasynaptic adrenoceptors of various subtypes. Classification of drugs acting on adrenergic synapses. Adrenomimetic Drugs. Classification of direct-acting adrenergic agonists according to their interaction with different types of adrenergic receptors. Substances that stimulate α- and β-adrenergic receptors. The main properties of adrenaline (effect on the cardiovascular system, smooth muscles, metabolism). Application. Features of the action of norepinephrine. Effect on the heart, vascular tone. Application. α-adrenergic agonists. The main effects and application of mesatone. The action and use of galazolin. β-adrenergic agonists. Pharmacodynamics of isadrin. Application. β1-adrenomimetics: effects, application. β2-adrenergic agonists: effects, application. Indirect adrenomimetics (sympathomimetics). The mechanism of action of ephedrine. The main effects. Application. Side effects of various groups of adrenergic agonists. Adrenergic Blocking Drugs. Pharmacodynamics of α-blockers. Application. Side effects. The main properties and use of β-blockers. Side effects. β1-blockers. Drugs for the treatment of glaucoma. α, β-blockers. Properties, application. Sympatolytic Drugs. The mechanism of action and main effects. Application. Side effect.
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4	ID6 UC-4 ID1 GPC-7	Drugs Affecting to the central nervous system.	The concept of mediator and modulator systems brain and spinal cord as "targets" for drugs. Possible mechanisms for changing synaptic transmission. Substances of general and selective action. Drugs for general anesthesia (Drugs for general anesthesia, anesthetics). The history of the discovery and use of agents for general anesthesia. Stages of anesthesia, their general characteristics. The mechanisms of action of agents for general anesthesia. The concept of the breadth of narcotic action. Comparative characteristics of drugs for inhalation anesthesia (activity, rate of development of anesthesia, analgesic and muscle-relaxing properties, aftereffect, effect on the cardiovascular system, flammability). Features of the action of funds for non-inhalation anesthesia; their comparative assessment (the rate of development of anesthesia, analgesic and muscle-relaxing properties, duration of action, aftereffect). Side effects of general anesthesia. Ethanol. Resorptive action of ethyl alcohol: effect on the central nervous system. Antimicrobial properties. Local effects on the skin and mucous membranes. Application. Toxicological characteristics. Effect on the cardiovascular system, gastrointestinal tract, liver, endocrine system. Acute poisoning and its treatment. Alcoholism, its social aspects. Principles of pharmacotherapy of alcoholism. Hypnotic Drugs.Classification. The effect of sleeping pills on sleep patterns. Mechanisms of beneficial action. Derivatives of benzodiazepine are agonists of benzodiazepine receptors having pronounced sleeping pills. "Non-benzodiazepine" agonists of benzodiazepine receptors. Hypnotic properties of central histamine H1 receptor blockers. Derivatives of barbituric acid; their application. Side effect of sleeping pills. The possibility of drug dependence. Acute poisoning, the principles of its pharmacotherapy. Antagonists of sleeping
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		pills benzodiazepine Antiepileptic Drugs. The mechanisms of action of antiepileptic drugs. Comparative evaluation of the effectiveness of individual drugs in different forms of epilepsy. Drugs for the relief of epileptic status. Side effects of antiepileptic drugs. Antiparkinsonian Drugs. The basic principles of pharmacotherapy of Parkinson's disease and Parkinson's syndrome. The mechanisms of action of antiparkinsonian drugs that stimulate dopaminergic processes. MAO-B inhibitors; substances that inhibit COMT. Comparative evaluation of the effectiveness of individual drugs. The main side effects. The use of DOPA decarboxylase inhibitors, peripheral dopamine receptor blockers, "atypical" antipsychotics to reduce the side effects of levodopa. Painkillers (Analgesics). An idea of the systems of perception and regulation of pain in the body; opioid receptors and their endogenous ligands. Classification of painkillers. Opioid analgesics, analgesic mechanisms. Interaction with different subtypes of opioid receptors. Effects due to effects on the central nervous system. Effect on the function of internal organs. Comparative characteristics of agonists and partial agonists, opioid receptor antagonist agonists. Indications for use. The concept of antipsychotics. Side effects. Addictive. Drug addiction. Acute poisoning with opioid analgesics, the principles of its pharmacotherapy. Antagonists of opioid analgesics. Operating principle. Application. Non-opioid analgesics are predominantly of central action. Cyclooxygenase inhibitors. Sodium channel blockers, monoamine reuptake inhibitors, α2-adrenergic agonists, NMDA receptor antagonists, GABA-B mimetics. Differences from opioid analgesics. Application. Psychotropic Drugs. Antipsychotic Drugs (Antipsychotics). Classification. Antipsychotic activity. Effect on dopaminergic processes in the brain. Change in other neurotransmitter processes in the
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			central nervous system and peripheral tissues. Potentiation of the action of agents for general anesthesia and analgesics. Antiemetic effect. Comparative characteristics of antipsychotic drugs. “Atypical” Antipsychotic Drugs. The use of antipsychotics in medical practice. Side effects. Antidepressants. Classification. Inhibitors of neuronal uptake of monoamines are substances of indiscriminate and selective action. Effect on α-adrenoceptors, m-cholinergic receptors and histamine receptors; effects arising from this. Substances selectively inhibitory MAO-A. Comparative evaluation of drugs. The main side effects. Drugs for treating mania. Application. Main side effects. Anxiolytics (tranquilizers). Derivatives of benzodiazepine - agonists of benzodiazepine receptors Anxiolytic effect. Sedative, hypnotic anticonvulsant, muscle-relaxing amnestic effect. Anxiolytics with a weak sedative and hypnotic effect. Mechanism of action. Substances of different chemical structure. The use of anxiolytics. Side effects. The possibility of drug dependence. Sedative Drugs. Effect on the central nervous system. Application. Side effects. Psychostimulating Drugs. Mechanisms of psychostimulating action. Comparative characteristics of psychostimulating agents. Effect on the cardiovascular system. Indications for use. Side effects. The possibility of drug dependence. Nootropic Drugs. Effect on higher nervous activity. Indications for use. Analeptics. Mechanisms of a stimulating effect on the central nervous system. Effect on respiration and blood circulation. Application. Side effects.
5	ID6 UC-4 ID1 GPC-7	Drugs Affecting the function of the executive organs.	Drugs affecting the cardiovascular system. Cardiotonic Drugs. Cardiac glycosides. Pharmacodynamics of cardiac glycosides: effect on the strength and rhythm of heart contractions, conduction, automatism, metabolism in the myocardium. The mechanism of cardiotonic action of

			cardiac glycosides. Comparative characteristics of drugs (activity, absorption from the gastrointestinal tract, development speed and duration of action, cumulation). Application. Side effects. Treatment and prevention of intoxication with cardiac glycosides. Cardiotonic Drugs of Non-Glycoside Structure. The mechanism of cardiotonic action, application. Antiarrhythmic Drugs. Classification. Principles of action. Drugs used for tachyarrhythmias and extrasystoles. Drugs used for blockade of the conduction system of the heart. Drugs used for coronary heart disease. The basic principles for eliminating oxygen deficiency in angina pectoris (reducing the need for oxygen in the heart, increasing oxygen delivery to the heart). Drugs used to stop and prevent angina attacks (antianginal drugs). The mechanism of action of nitroglycerin. Long-acting nitroglycerin preparations. Antianginal properties of β-blockers, calcium channel blockers. The basic principles of drug treatment of myocardial infarction. Antihypertensive Drugs (Antihypertensive Drugs). Classification. Localization and mechanisms actions of neurotropic drugs. Drugs that affect the renin-angiotensin system. Myotropic Drugs (calcium channel blockers, potassium channel activators, nitric oxide donors, etc.). Antihypertensive effect of diuretics. Side effects of antihypertensive drugs, their prevention and elimination. Hypertensive Drugs (adrenaline, angiotensinamide). Localization and mechanism of action of adrenomimetic drugs, angiotensinamide. Application. Features of the action of dopamine. Diuretic Drugs. Classification. The mechanisms of action of diuretics that inhibit the function of the epithelium of the renal tubules. Their comparative assessment (effectiveness, rate of development and duration of the effect, effect on the ion balance). Potassium and magnesium preserving diuretics. Aldosterone
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			antagonists, effect on ion balance. The principle of action of osmotic diuretics. The use of diuretics. The principles of drug combination. Side effects. Drugs that affect respiratory function. Respiratory stimulants. Mechanisms of the stimulating effect of substances on respiration. Comparative characteristics of respiratory stimulants from the groups of analeptics and n-cholinomimetics. Routes of administration. Differences in duration of action. Application. Antitussive Drugs. Substances of central and peripheral action. Application. Side effects. The possibility of drug dependence and addiction. Expectorant Drugs. Expectorant Drugs Reflex and Direct Action. Mucolytic Drugs. Routes of administration. Indications for use. Side effects. Drugs used for bronchospasm. Bronchodilator Drugs. Differences in the mechanism of action of drugs from the groups of adrenergic agonists, m-anticholinergic antispasmodics and myotropic antispasmodics. Preparations of β2-adrenergic agonists and derivatives of methylxanthine prolonged action. Indications for the use of bronchodilators, their administration, side effects. The use of anti-allergic and anti-inflammatory drugs in bronchial asthma. Drugs used for pulmonary edema. The principles of action of drugs used to treat pulmonary edema. The choice of drugs depending on the mechanisms of its development. The use of morphine, diuretics. The appointment of vasodilating substances predominantly venotropic action. The use of cardiotonic agents for pulmonary edema associated with heart failure. Anti-foaming effect of ethyl alcohol. The use of antihypertensive drugs. Oxygen therapy. Drugs that affect digestive function. Drugs that affect appetite. Drugs that increase appetite. The mechanism of the stimulating effect of bitterness on appetite and gastric secretion. Indications for use. Drugs that lower appetite (anorexigenic Drugs). Mechanisms of
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		action. Use in the treatment of obesity. Drugs that affect the function of the salivary glands. Mechanisms of action. Application. Side effects. Drugs used in violation of the function of the glands of the stomach. Drugs replacement therapy (natural gastric juice, pepsin, dilute hydrochloric acid). Substitution therapy with a decrease in the secretory activity of the stomach. Drugs that lower the secretion of the glands of the stomach. The principles of action of substances that reduce the secretory function of the gastric glands (H^+, K^+ - ATPase blockers, histamine H_2-receptor blockers, m-anticholinergics). Antacid Drugs. Comparative characteristics of drugs. Indications for use. Side effects. Gastroprotectors. Principles of action. Use for peptic ulcer. Emetic and Antiemetic Drugs. The mechanism of action of emetics. Their application. Principles of action of antiemetics. Indications for the use of individual drugs. Drugs that affect liver function.Cholagogue. Drugs. Classification. The principle of action of agents that enhance the formation of bile. Use of preparations containing bile and herbal remedies. Drugs that promote bile secretion. Hepatoprotectors. The principle of action, indications for use. Drugs used for impaired pancreatic excretory function (pancreatin). Drugs replacement therapy for inadequate pancreatic function. Drugs that affect gastrointestinal motility.Drugs that inhibit gastrointestinal motility. Differences in the mechanism and localization of the action of drugs that inhibit the motility of the gastrointestinal tract. Application. Side effects. Drugs that enhance gastrointestinal motility. The difference in the mechanism and localization of the action of substances that enhance the motility of the gastrointestinal tract (cholinomimetic Drugs, anticholinesterase Drugs, prokinetic Drugs).
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			Application. Laxatives Drugs. Classification. The mechanism of action and the use of salt laxatives. Drugs that primarily affect the large intestine. Application. Sideeffects. Drugs that affect the tone and contractile activity of the myometrium. Medicinal Drugs Used to Enhance patrimonial activity. The effect of oxytocin on the myometrium. Pharmacological properties of prostaglandin preparations. Application. The use of β-adrenergic agonists as tocolytic agents. The mechanism of hemostatic action of ergot alkaloids in uterine bleeding. Drugs Affecting the Blood System Drugs affecting erythropoiesis. Drugs that stimulate erythropoiesis. Drugs used to treat hypochromic anemia. Iron preparations, the effect on blood formation. The use of recombinant human erythropoietins in case of anemia. The mechanism of the pharmacotherapeutic effect of cyanocobalamin, folic acid in hyperchromic anemia. Drugs that stimulate leukopoiesis. Mechanism of action. Indications for use. Platelet Aggressive Drugs Principles of action. Application. Drugs Affecting Blood Coagulation Substances that promote blood coagulation. The mechanism of action of vitamin K preparations, Vikasol. Application. Drugs used topically to stop bleeding. Substances that prevent blood coagulation (anticoagulants). Mechanisms of action of heparin and indirect anticoagulants. Application. Complications Antagonists of anticoagulants of direct and indirect action. Drugs Affecting Fibrinolysis Fibrinolytic Drugs. Principle of action Indications for use. Antifibrinolytic Drugs. Operating principle. Indications for use.
6	ID6 UC-4 ID1 GPC-7	Drugs Affecting on metabolic processes.	Hormone preparations, their synthetic substitutes and antagonists. Classification. Sources of receipt. Hypothalamic and pituitary hormone

			preparations The effect of hormones of the anterior pituitary gland on the activity of endocrine glands. Properties and use of corticotropin, growth hormone, thyrotropin, lactin and preparations of gonadotropin hormones. The effect of hypothalamic hormones on the secretion of hormones of the anterior pituitary gland. Hypothalamic hormone preparations. Application. Hormones of the posterior pituitary gland. Properties of oxytocin and vasopressin preparations. Application. Thyroid Hormone Drugs and Antithyroid Drugs The effect of thyroxine and triiodothyronine on metabolism. Application. The physiological role and use of calcitonin. Principles of pharmacotherapy of osteoporosis. Antithyroid Drugs. Mechanisms of action. Application. Side effects. The preparation of the hormone of the parathyroid glands. The effect of parathyroidin on the exchange of phosphorus and calcium. Application. Insulin and Synthetic Hypoglycemic Drugs The effect of insulin on metabolism. Preparations prolonged-acting insulin. Principles of action of synthetic hypoglycemic agents for oral administration. Indications for use. Side effects. Ovarian hormone preparations - estrogen and progestogen drugs The physiological significance of estrogens and gestagens. Application. Antiestrogenic and antigestagenic drugs. Application. The concept of hormonal birth control drugs for oral administration. Male sex hormone preparations (androgenic drugs) The effect of androgens on the body. Indications for use. Side effects. The concept of antiandrogenic drugs (androgen receptor blockers, 5α-reductase inhibitors). Application. Anabolic steroid Effect on protein metabolism. Indications and contraindications for use.
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			Side effects. Adrenal cortex hormone preparations (deoxycorticosterone acetate, hydrocortisone acetate, prednisone, dexamethasone, triamcinolone, sinaflan, beclomethasone). Classification. The main effect of mineralocorticoids. The effect of glucocorticoids on the metabolism of carbohydrates, proteins, fats, ions, water. Anti-inflammatory and anti-allergic effect of glucocorticoids. Application. Complications Vitamin preparations. Preparations of water-soluble vitamins. The role of B vitamins in metabolism. Effect on carbohydrate, fat and protein metabolism. Participation in redox processes. Effect on the nervous and cardiovascular systems, gastrointestinal tract, blood formation, epithelial integument and regeneration processes. Indications for use of individual drugs. The participation of ascorbic acid in redox processes. Effect on the permeability of the vascular wall. Application. The effect of rutin on the permeability of tissue membranes. Preparations of fat-soluble vitamins. Retinol Effect on the epithelial integument. Participation in the synthesis of visual purpura. Indications for use. Side effects. Ergocalciferol, cholecalciferol. Effect on the exchange of calcium and phosphorus. Application. Side effects. Phylloquinone. Its role in the process of blood coagulation. Application. Tocopherol, its biological significance, antioxidant properties. Application. Anti-Atherosclerotic Drugs Classification. Mechanisms of influence on lipid metabolism. Cholesterol synthesis inhibitors (lovastatin). Sequestrants of bile acids. Derivatives of Fibroic acids. Nicotinic acid and its derivatives. Antioxidants. Angioprotectors. Application. Side effects. Drugs that reduce uric acid in the body. The mechanism of action of uricosuric agents for gout. Indications and contraindications for
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			use. Side effects Drugs that affect uric acid synthesis.
7	ID6 UC-4 ID1 GPC-7	Anti Inflammatory Drugs. Drugs Affecting on immune theprocesses	Steroidal anti-inflammatory Drugs. Anti-inflammatory mechanisms. Application. Side effect. Nonsteroidal Anti-Inflammatory Drugs. Anti-inflammatory mechanisms. Effect on different isoforms of cyclooxygenase. Selective COX-2 Inhibitors. Application. Side effects. Drugs Affecting Immune Processes Glucocorticoids. The mechanism of their antiallergic action. Antihistamine Drugs-blockers of histamine H1 receptors. Their comparative assessment. Application. Side effects. Immunosuppressive properties of cytostatic agents. The use of antiallergic agents in allergic reactions of delayed and immediate types. The use of adrenergic agonists (adrenaline) and myotropic bronchodilators (aminophylline) in anaphylactic reactions. Immunomodulators for systemic and local use (tactivin and other thymus preparations, levamisole, interferons, interferonogens, polyoxidonium, imudon). Principles of action, features of application. Sideeffects.
8	ID6 UC-4 ID1 GPC-7	Antimicrobial Antiviral antifungal Drugs	Antiseptic and Disinfectant Drugs The concept of antiseptics and disinfection. The history of the use of antiseptic agents. Conditions determining antimicrobial activity. The main mechanisms of action of antiseptic agents on microorganisms. Detergents. The concept of anionic and cationic detergents. Their antimicrobial and detergent properties. Application. Derivatives of nitrofurantoin. Spectrum of antimicrobial action. Application. Antiseptics of aromatic series. Features of action and application. Metal compounds. Antimicrobial properties. Conditions determining antimicrobial activity. Local action (astringent, irritating and cauterizing effects). Features of the use of individual

			drugs. Characterization of resorptive action. Heavy metal salt poisoning. Help with poisoning. Principles of antidote therapy of poisoning. Halogenated compounds. Features of action and application. Oxidizing agents (hydrogen peroxide solution, potassium permanganate) Principles of action. Application. Aliphatic antiseptics. Antimicrobial properties. Application. Acids and alkalis. Antiseptic activity. Application. Dyes. Features of action and application. Different Drugs of Natural Origin. Features of action and application. Antibacterial Chemotherapeutic Drugs The history of the use of chemotherapeutic agents. The basic principles of chemotherapy. Criteria for evaluating chemotherapeutic drugs. Antibiotics History of the production and use of antibiotics. The main mechanisms of action of antibiotics. The principles of classification. The concept of primary and backup antibiotics. Penicillin antibiotics. Range of action. Routes of administration, distribution, duration of action and dosing of biosynthetic penicillins. Features of the action and application of semisynthetic penicillins (narrow and wide spectrum). Combined preparations of semisynthetic penicillins with β-lactamase inhibitors. General characteristics of cephalosporins I-IV generations. Differences in the spectrum of antimicrobial action. Carbapenems. The combination of imipenem with dipeptidase inhibitors (cilastatin). Monobactams. Range of action, application. Spectrum of action and use of glycopeptides. Properties of antibiotics of the macrolide and azalide group. Features of the action and use of lincosamides. The spectrum of action, route of
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			administration, distribution, duration of action and dosage of tetracycline antibiotics. Properties of chloramphenicol. Side effects. Aminoglycosides. Properties of streptomycin and other aminoglycosides. Side effect. Polymyxins. Features of the action. Side effects. Antibiotics of different chemical structure. Complications of antibiotic therapy, manifestations of side and toxic effects, antibiotics, prevention and treatment. Sulfanilamide preparations. The mechanism and spectrum of antibacterial action. Absorption, distribution, biotransformation and excretion. Duration of action, dosage of drugs. Possible complications when using sulfonamides, their prevention and treatment. The combined use of sulfonamides with trimethoprim. Operating principle. Quinolone derivatives. The mechanism and spectrum of antibacterial action of nalidixic acid. Features of fluoroquinolones (spectrum of activity, rate of development of bacterial resistance). Indications for use, side effects. Synthetic Antimicrobial Drugs of Different Chemical Structure. Spectra of the antibacterial action of drugs of different chemical structures. Indications for use. Side effects. Anti-TB Drugs. The concept of anti-TB drugs. The spectrum and mechanism of antibacterial action. Application. Side effect. Antisiphilitic Drugs. The concept of antisiphilitic drugs. Anti-spirochetal properties of benzylpenicillin preparations. The mechanism of action of bismuth preparations. Side effect. Antiviral Drugs. The focus and mechanisms of action of antiviral agents. Application. Properties and application of interferons. The use of interferonogenic drugs for viral infections. Drugs for treating HIV infections. Principles of action. Antiherpetic Drugs. Principles of action, application.
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			Influenza Drugs. Principles of action, application. Antifungal Drugs. Classification. Mechanisms of action. Antifungal antibiotics; spectrum of action, application. Synthetic Antifungal Drugs. The concept of anti-blastoma drugs. The principles of classification. Features of the spectrum of antitumor effects of drugs of different groups. Application. Complications, their prevention and treatment. Immunosuppressive properties of cytostatic agents.
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5.2 Sections of the discipline (module), types of educational activities and forms of current control

№ section	The name of the discipline section	Types of classwork, hours				Total hours
		In-class			Out-class	
		L	PC	LC	*SSS	
1	General recipe		12		6	18
2	General Pharmacology	2	3		6	11
3	Drugs, regulating functions of the peripheral nervous system	4	18		10	32
4	Drugs Regulating Central Nervous Function	4	17		10	31
5	Metabolic Drugs		2		10	12
6	Medicinal Drugs Regulating The Function Of The Executive Organs And Systems	8	33		18	59
7	Medicinal drugs that inhibit inflammation and affect immune processes	2	3		10	15
8	Antimicrobial Antiviral and Antiparasitic Drugs	6	16		16	38
	TOTAL	26	104		86	216

5.3. Title of lecture topics with hours

№ lecture	Section of the discipline	Lecture topics Titles	Number of hours per semester	
			V	VI
2	General pharmacology.	L.1 Introduction. General pharmacology	2	

3	Drugs regulating functions of the nerves system peripheral segment	L.2 Cholinomimeticanticholiner gicanticholinesterasedrugs.	2	
		L.3 Adrenomimetic Drugs. Adrenergic Blocking and Sympatholytic Drugs.	2	
4	Drugs regulating CNS functions	L.4 Narcotic analgesics. Non-narcotic analgesics	2	
		L.5 Antipsychic Drugs. Antidepressants. Lithium salts. Anxiolytics. Sedative Drugs. Psychostimulating Drugs. Nootropic Drugs. Analeptics.	2	
6	Drugs regulating executive organs and systems functions	L.6Cardiotonic Drugs. Antiarrhythmics.	2	
		L.7 Antianginal drugs.AntihypertensivesDiu retics	2	
		L.8. Drugs affecting respiratory system		2
		L.9. Drugs affecting blood system		2
7.	Medicinal drugs that inhibit inflammation and affect immune processes.	L. 10.Medicinal drugs that inhibit inflammation and affect immune processes.		2
8	Antimicrobial, antivirul, antiparasite drugs	L.11 Main principles of chemotherapy.Antibiotics.		2
		L.12. Sulfanilamide preparations. Synthetic Antimicrobial Drugs of Different Chemical Structure		2
		L.13 Antifungal Drugs. Anti-Viral Drugs. Anti-TB Drugs.		2
	TOTAL		14	12

5.4. The names of the practical classestopicswith the number of hours

№ section	Section of the discipline	Topics of practical classes	Forms of current control	Number of hours per semester	
				V	VI
1	General recipe	PC.1 Recipe. Solid drug forms	Prescriptions forms of writing	3	
		PC.2 Softdrug forms	Prescriptions forms of writing	3	

		PC.3 Liquid drug forms	Prescriptions forms of writing	3	
		PC.4 Final lesson on the	T. Recipe	3	
2	General Pharmacology	PC.5 General Pharmacology	S.T	3	
3	Drugs, regulating functions of the peripheral nervous system	PC.6 Anesthetizing, Enveloping, Astringent, Adsorbing and Irritating Drugs.	S.T. Recipe ST	3	
		PC.7 Cholinomimetic and Anticholinesterase Drugs	S.T. Recipe	3	
		PC.8 M, N- cholinoblockers	S.T. Recipe ST	3	
		PC.9 Adrenomimetics, sympathomimetics	S.T. Recipe ST	3	
		PC.10 Adrenoblockers and Sympatholytics.	S.T. Recipe ST	3	
		PC.11 The final lesson on the topic: "Drugs that affect peripheral innervation."	T. Recipe	3	
4	Drugs regulating CNS functions	PC.12 Drugs for anesthesia. Ethanol. Sleeping Pills.	S.T.	3	
		PC.13 Painkillers (Analgesics).	S.T.	3	
		PC.14 Antiepileptic Drugs. Anti-Parkinsonian Drugs	S.T.	3	
		PC.15 Neuroleptics Antidepressants. Lithium salts.	S.T.	3	
		PC.16 Anxiolytics. Sedative Drugs. Psychostimulating Drugs. Nootropics. Analeptics.	S.T.	3	
		PC.17 Final lesson: "Drugs Affecting the Central Nervous System"	T. Recipe. ST	2	
5	Drugs regulating metabolic processes	PC.18 Vitamins. Hormonal drugs	S.T. ST	2	
6	Medicinal Drugs Regulating The Function Of The Executive Organs And Systems	PC.19 Cardiotonics	S.T. ST		3
		PC.20 Antiarrhythmics	S.T. ST		3
		PC.21 Drugs used for coronary circulatory failure (antianginal drugs)	S.T. ST		3
		PC.22 Antihypertensive Drugs Hypertensive Drugs. Diuretic Drugs	S.T. ST		3
		PC.23 Final lesson on the topics: "Drugs Affecting the Cardiovascular System" and "Diuretic Drugs".	T. Recipe		3
		PC.24 Drugs that affect respiratory function.	S.T. ST		3

		PC.25,26 Drugs that affect digestive function.	S.T. ST		6
		PC.27 Drugs affecting blood formation. Drugs affecting platelet aggregation. Drugs affecting blood coagulation and fibrinolysis	S.T. ST		3
		PC.28 Medications that affect the myometrium	S.T. Recipe.		3
		PC.29 Final lesson on the topic: “Drugs that affect the functions of the executive organs”	S.T. Recipe ST		3
7	Medicinal drugs that inhibit inflammation and affect immune processes	PC.30 Medicinal drugs that inhibit inflammation and affect immune processes.	S.T. Recipe. ST		3
8	Antimicrobial, antiviral, antiparasite drugs	PC.31 Antiseptics and Disinfectant Drugs. Antibiotics I	S.T.		3
		PC.32 Antibiotics II	S.T.		3
		PC.33 Sulfanilamide preparations. Quinolone derivatives. Synthetic Antimicrobial Drugs of Different Chemical Structure.	S.T.		3
		PC.34. Anti-TB Drugs Anti-Syphilitic Drugs Anti-Viral Drugs	S.T.		3
		PC.35 Antiprotozoal Drugs Antifungal Drugs Antineoplastic Drugs	S.T.		2
		PC.35. Final lesson on the topic: “Chemotherapeutic drugs”	T. Recipe ST		2
TOTAL:				52	52

Laboratory practical work is not provided.

5.6. Educational provisions for the self-study in the discipline

5.6.1 A student's self-study

№ №	Section of the discipline	Name of the work	Labour capacity (hours)	Forms of control
1	General recipe	Work with literature sources, assignments in the form of prescribing for various drug	6	Recipe

		forms		
2	General Pharmacology	Work with sources of literature, including lecture material, writing an essays	6	P
3	Drugs, regulating functions of the peripheral nervous system	Work with sources of literature, including lecture material, completing assignments in the form of prescribing in accordance with the “List of curriculum drugs”, writing an essays, situational tasks	10	T
4	Drugs regulating CNS functions	Work with sources of literature, including lecture material, completing assignments in the form of prescribing in accordance with the “List of curriculum drugs”, writing an essays, situational tasks	10	T,P
5	Drugs regulating metabolic processes	Work with literature sources, including lecture material, assignments in the form of prescribing in accordance with the “List of curriculum drugs”	10	T
6	Medicinal Drugs Regulating The Function Of The Executive Organs And Systems	Working with literature sources, including lecture material, completing assignments in the form of prescribing in accordance with the List of curriculum drugs”	18	T,ST
7	Medicinal drugs that inhibit inflammation and affect immune processes	Work with literature sources, including lecture material, assignments in the form of prescribing in accordance with the “List of curriculum drugs”	10	T
8	Antimicrobial, antiviral, antiparasite drugs	Work with literature sources, including lecture material, assignments in the form of prescribing in accordance with the “List of curriculum drugs”;	16	T,ST
TOTAL:			86	
	Preparation to the exam*	Repetition and consolidation of what has been learned material (work with lecture material, educational literature); formulation of questions; pre-examination individual and group consultations with teacher.	36	E

5.6.2. Guidelines for students on mastering the discipline

(Appendix No. 3)

VI. EVALUATION TOOLS FOR ONGOING PERFORMANCE MONITORING AND MIDTERM CERTIFICATION ON THE RESULTS OF MASTERING THE DISCIPLINE

6.1. Current progress monitoring

6.1.1. The list of competencies indicating the stages of their formation in the process of mastering the work program of the discipline

№	Name of the discipline section	Controlled competency code	Form of control

1.	Introduction. General recipe.	ID 6 UC-4	1. Test-paper
2	General Pharmacology	ID 1 GPC-7	1..Interview
			2. Written test paper.
			3. Abstracts
3.	Drugs, regulating functions of the peripheral nervous system	ID 6 UC-4 ID 1 GPC-7	1. Test-paper on prescription.
			2. Interview on situational tasks.
			3. Written test paper.
4.	Drugs regulating CNS functions	ID 6 UC-4 ID 1 GPC-7	1. Test-paper on prescription.
			2. Interview on situational tasks.
			3. Written test paper.
			4. Abstracts
5.	Drugs regulating metabolic processes.	ID 6 UC-4 ID 1 GPC-7	1. Test-paper on prescription
			2. Interview on situational tasks
			3. Written test paper
6.	Medicinal Drugs Regulating The Function Of The Executive Organs	ID 6 UC-4 ID 1 GPC-7	1. Test-paper on prescription.
			2. Interview on situational tasks.
			3. Written test paper.
7.	Medicinal drugs that inhibit inflammation and affect immune processes	ID 6 UC-4 ID 1 GPC-7	1. Test-paper on prescription
			2. Interview on situational tasks
			3. Written test paper
8.	Antimicrobial, antiviral, antiparasite drugs	ID 6 UC-4 ID 1 GPC-7	1. Test-paper on prescription
			2. Interview on situational tasks.
			3. Written test paper.

6.1.2. Examples of assessment tools for current and midterm monitoring of academic performance

Prescriptionwriting

Раздел 1. General recipe

Controlled Competency Codes: ID6 UC-4

To prescribe:

10 tablets containing 0.01 Nitrosorbide (Nitrosorbidum). Assign 1 tablet 3 times a day.

To prescribe:

10 tablets containing 0.015 vikasol (Vicasolum). Assign 1 tablet 1 time per day.

To prescribe:

0 tablets containing 0.005 platyphyllinhydrotartrate (Platyphyllinihydrotartras). Assign 1 tablet 3 times a day.

To prescribe:

3 tablets containing 0.5 azithromycin (Azithromycinum). Assign 1 tablet 1 time per day.

To prescribe:

10 tablets containing 0.15 euphyllinum (Euphyllinum). Assign 1 powder 2 times a day.

To prescribe:

10 tablets containing 0.25 paracetamol (Paracetamolum). Prescribe 1 tablet for headache.

To prescribe:

20 capsules containing 1.0 iron ferrous sulfate (Ferrosi sulfas). Assign 1 capsule 3 times a day.

To prescribe:

40 capsules containing 0.15 of metacycline (Metacyclinum). Inside 2 capsules 2 times a day.

To prescribe:

20 gelatin capsules containing 0.25 methylthiouracil (Methylthiouracilum). Assign 1 capsule 3 times a day.

To prescribe:

40 gelatin capsules containing 0.15 rifampicin (Rifampicini). Assign 2 capsules 2 times a day before meals.

To prescribe:

10 capsules containing 0.05 triamterene (Triamterenum). Assign 1 capsule 2 times a day.

To prescribe:

10 capsules containing 0.15 clindamycin (Clindamycinum). Assign 1 capsule 4 times a day.

To prescribe:

20 dragees containing 0.05 diazolin (Diazolinum). Inside, 1 tablet 2 times a day after meals.

To prescribe:

50 dragees containing 0.025 chlorpromazine (Aminazinum). Assign 1 tablet 3 times a day.

To prescribe:

20 dragees containing 0.025 prozerin (Proserinum). Assign 1 tablet 2 times a day.

To prescribe:

20 dragees containing 0.005 bisacodyl (Bisacodilum). Inside 1 dragee 1 time in the evening.

To prescribe:

20 dragees containing 0.025 propazine (Propazinum). Assign 1 tablet 2 times a day

Criteria for assessing the current monitoring of progress (recipes):

- ✓ «Excellent»: 100-90%
- ✓ «Good»: 89-80%
- ✓ «Satisfactory»: 79-70%
- ✓ «Unsatisfactory»: <69%

Theme of the lesson number 7. Cholinomimetics and anticholinesterase agents.

Codes of controlled competencies: ID 1 GPC-7

1. Muscarino- and nicotine-sensitive receptors (M- and N-cholinergic receptors). Subtypes of M- and H-cholinergic receptors.
2. Classification of agents affecting the transmission of excitation in cholinergic synapses.
3. M-cholinomimetics. Effects arising from the excitation of different subtypes M-cholinergic receptors. The effect of M-cholinomimetics on the eye (pupil size, intraocular pressure, accommodation), smooth muscles of internal organs, secretion of glands, heart and tone of blood

vessels. Use.

4. Treatment of poisoning with M-cholinomimetics.

5. N-cholinomimetics. Effects associated with influence on H - cholinergic receptors sinocarotid zone of chromaffin cells of the adrenal medulla. Use.

6. Toxic effect of nicotine. The use of H - cholinomimetic agents for facilitate smoking cessation.

7. M-N-cholinomimetics. Main effects of acetylcholine and carbacholine (muscarino and nicatin-like action). Indications for use. Side effects

8. Anticholinesterase agents. The nature of the interaction with acetylcholinesterase. main effects. Comparative characteristics of drugs. Indications for use. Side effects and toxic effects of anticholinesterase agents. Treatment of poisoning. The use of cholinesterase reactivators in case of poisoning with organophosphate compounds.

Criteria for assessing the current control of progress (interview on control questions):

"Excellent":

The student has a deep knowledge of the educational material on the topic of practical classes. He formulates a complete and correct answer to the questions of the topic of the lesson, with compliance with the logic of the presentation of the material, shows the assimilation of the relationship of the main concepts used in the work, was able to answer all clarifying and additional questions. The student demonstrates knowledge of theoretical and practical material on the topic of the lesson.

"Good":

The student shows knowledge of the educational material, mastered the basic literature, and is able to answer almost completely all the additional and clarifying questions. Student demonstrates knowledge of theoretical and practical material on the topic of the lesson, with minor inaccuracies.

"Satisfactory":

The student as a whole masters the material of the practical lesson, but does not answer all clarifying and additional questions. The student has difficulty with the correct assessment of the proposed task, gives an incomplete answer, requiring teacher's hinting questions

"Unsatisfactory":

The student has significant gaps in the knowledge of the main educational material practical lesson. He does not fully disclose the content of the questions, and cannot answer clarifying and additional questions. The student gives an incorrect assessment of the situation, incorrectly chooses the algorithm of actions. Unsatisfactory grade is given to a student who refuses to answer questions on the topic of a practical lesson.

TESTING CONTROL

Section 3. Drugs affecting the peripheral nervous system

Codes of controlled competencies: ID 1 GPC-7

Variant 2.

1. The mechanism of action of dithylin (select several correct answers):

A. Causes blockade of M-cholinergic receptors.

- B. Causes persistent depolarization of the membrane.
 - B. Violates neuromuscular transmission.
 - D Blocks H-cholinergic receptors by the type of competition with acetylcholine.
2. Atropine removes bradycardia and AV block because (choose one correct answer):
- A. Blocks M-cholinergic receptors and reduces the effect of the vagus nerve on the heart.
 - B. Stimulates β -adrenergic receptors and increases the activity of the sympathetic nervous systems.
 - B. Blocks slow calcium channels and reduces myocardial contractility.
 - G. Blocks potassium channels and slows down the rate of repolarization.
3. Contraindication to the use of atropine is (select one correct answer):
- A. Renal colic.
 - B. Peptic ulcer of the stomach.
 - B. Acute myocarditis.
 - G. Glaucoma.
 - D. Myasthenia gravis.
4. The indication for the use of atropine as an emergency aid is(choose one correct answer):
- A. Anaphylactic shock.
 - B. AV block.
 - B. Overdose of peripheral muscle relaxants.
 - G. Hypoglycemic coma.
 - D. Hypertensive crisis.
5. An undesirable effect when using atropine is (select one correct answer):
- A. Dry mouth.
 - B. Bronchospasm.
 - B. Bradycardia.
 - D. Increased intracranial pressure.
 - D. Orthostatic hypotension.
6. Localization of α -adrenergic receptors (select several correct answers):
- A. Endings of parasympathetic nerves.
 - B. Sympathetic nerve endings.
 - B. Circular muscle of the iris.
 - D. Radial muscle of the iris.
 - D. Liver.
7. Localization of β -adrenergic receptors (select several correct answers):
- A. Bronchi.
 - B. Circular muscle of the iris.

B. Radial muscle of the iris.

G. Liver.

D. Heart.

8. α - adrenomimetics (select several correct answers):

A. Ephedrine.

B. Reserpine.

B. Adrenaline.

G. Mezaton.

D. Methyldopa.

9. β -agonists (select several correct answers):

A. Lobelin.

B. Orciprenaline.

B. Ephedrine.

G. Izadrin.

D. Anaprilin.

Criteria for assessing the current control of progress (testing):

"Excellent": 100-90%

"Good": 89-70%

"Satisfactory": 69-51%

"Unsatisfactory": <50%

SITUATIONAL TASKS

Codes of controlled competencies: ID6 UC-4; ID 1 GPC-7

Task number 1.

An 8-year-old boy with a foreign body in the eye turned to the rural hospital for help. So his father's words - possibly metal shavings. For a detailed examination and operation on the removal of a foreign body requires anesthesia. The hospital has only dosage forms of procaine (novocaine) and benzocaine (anesthesin). In the pharmacy, located in the village, you can get by prescription the necessary, chosen by the doctor, medicine.

Question 1. Can they use the above mentioned local anesthetics available in hospital?

Question 2. Which of the drugs is best used for terminal anesthesia in this case?

Question 3. If necessary, with what note will the doctor write out a prescription to speed up preparation of a dosage form of a medicinal product?

Task number 2.

In summer, a 30-year-old man was found in a park area in the position lying on his side, with clouded consciousness. Breathing speeded up, pulse 90 beats / min.; BP - 130/90; skin covers are pale; pupils are dilated. After 10 min. breathing became rare, superficial, clonic convulsions appeared, lips became cyanotic, lost consciousness, BP - 80/40. Alcohol poisoning is excluded. With more careful examination paid attention to the atrophy of the nasal mucosa.

Question 1. Presumptive diagnosis (with justification).

Question 2. Assistance measures.

Question 3. Forecast

Criteria for assessing the current monitoring of progress (situational tasks):

"Excellent":

The answer to the question is correct. Explanation of the course of her decision in detail, consistent, competent, with theoretical justifications (including from the lecture course), with the necessary schematic images, answers to additional questions are clear and direct.

"Good":

The answer to the question is correct. Explanation of the course of her decision in detail, but not logical enough, with single errors in details, some difficulties in theoretical justification (including from lecture material), in schematic representations with single errors; answers to additional questions are correct, but not clear enough.

"Satisfactorily":

The answer to the question is incorrect. Explanation of the course of its solution insufficiently complete, inconsistent, with errors, weak theoretical substantiation (including lecture material), with significant difficulties and errors in schematic drawings, answers to additional questions not clear enough, with errors in details.

"Unsatisfactory":

The answer to the question is given incorrectly. An explanation of the course of its solution is given incomplete, inconsistent, with gross errors, without theoretical justification (in including lecture material) answers to additional questions are wrong (missing).

6.2. Intermediate certification based on the results of mastering the discipline

6.2.1. Form of intermediate certification "exam": exam - semester VI

6.2.2. Intermediate certification procedure

a) oral interview

6.2.3. Example questions for preparing for the exam:

Sections "General pharmacology" and "Drugs affecting the peripheral nervous system"
(ID6 UC-4; ID 1 GPC-7)

1. Pharmacokinetics of drugs: routes of administration, absorption, distribution of drugs in the body. biological barriers. Deposit.
2. Chemical transformations (biotransformation, metabolism) of drugs in the body and the route of excretion of drugs.
3. Pharmacodynamics of drugs: types of action, localization and mechanism actions. Receptors. The main and side effects of drugs.
4. Dependence of the pharmacotherapeutic effect on the properties of drugs and conditions of their use, physicochemical properties, doses and concentrations, reuse of drugs.
5. Interaction of drugs. Types of interaction (pharmaceutical, pharmacological). Medicines interaction mechanism.
6. Substances that have a protective effect on nerve endings. Classification. Mechanism of action. Pharmacological characteristics drugs. Use. Irritants. Mechanism of action.
7. Local anesthetics. Classification. Mechanism of action. Requirements for local anesthetics. Comparative drug characteristics. Application. Side effects.
8. Cholinergic synapse, its structure. Classification of funds affecting transmission of excitation at cholinergic synapses. Examples of drugs.
9. M-, N-cholinomimetic agents. The main effects of acetylcholine and carbachol. Side effects.

6.2.4. Card example

Federal State Budgetary Educational Institution of Higher Education

"Dagestan State Medical University"

EXAMINATION CARD №. 1

In the discipline "Pharmacology"

For the 3rd year students of the specialty

"General Medicine"

1. Types of action of drugs on the body. Cellular "targets" medicinal substances. The concept of receptors, secondary transmitters, ionic channels, agonists and antagonists.
2. M-anticholinergics. Mechanism of action. Preparations. Pharmacological effects Indications and contraindications for use. Adverse reactions when applying them.
3. Antiarrhythmic drugs. Classification. The main properties of funds, blocking sodium channels (membrane stabilizing).
4. Write out in the form of a prescription and determine the group affiliation and indications for the use of - anaprilin

The card was compiled by c.m.s., head of the department. Magomedova Z.Sh.

Approved at a meeting of the department, protocol dated May 18, 2026. No. 8

Head of the Department: Candidate of Medical Sciences, Associate Professor Magomedova Z.Sh.

6.2.5. The system for evaluating the results of mastering the discipline, describing the scales of assessment, grading.

Assessment Metrics	Evaluation criteria			
	"unsatisfactory" (minimum level not reached)	"satisfactorily" (minimum level)	"Good" (average level)	"Excellent" (high level)
ID 6 UC-4				
To know	The student does not know the general principles of preparing prescriptions and compiling prescriptions for medicines	The student has mastered the main content of the material of the discipline, but has gaps in the assimilation of the material that do not prevent further assimilation of the educational material. Has unsystematized knowledge of the main provisions in the studied material	The student is able to independently highlight the main provisions in the studied material. Knows the main ideas of the training material	The student independently highlights the main provisions in the studied material. Shows deep knowledge and understanding of the discipline
To be able to	The student does not know how to write prescriptions for medicines	The student has difficulty writing out a prescription in Latin The student finds it difficult to generalize the	The student is able to independently write a prescription for a drug and analyze educational material	The student is able to consistently present the educational

		educational material		material and write prescriptions in Latin
To possess	The student does not have the skills to prepare prescription forms for prescribing various dosage forms of drugs	The student has the basic skills of filling prescriptions for medicines in the treatment, rehabilitation and prevention of various diseases and pathological conditions.	The student has knowledge of everything studied program material, the material is presented consistently, rarely makes minor errors and shortcomings in the reproduction of the studied material. The student is able to independently draw up prescription forms for prescribing various dosage forms	The student independently selects the main position in the studied material and is able to correctly write a prescription for a drug. The student shows a deep and complete knowledge of the entire volume of the studied discipline in terms of practical skills
ID1 GPC-7				
To know	The student is not able to independently identify the main provisions in the studied material of the discipline. Does not know the main content of the discipline material	The student has mastered the main content of the material of the discipline, but has gaps in the assimilation of the material that do not prevent further assimilation of the educational material. Has unsystematized knowledge of the main provisions in the studied material	The student is able to independently highlight the main provisions in the studied material. Knows the main ideas of the training material	The student independently singles out the main provisions in the studied material and is able to give a brief description of the main ideas of the studied material of the discipline. Knows the basic provisions of the educational material. Shows deep knowledge and understanding of the discipline
To be able	The student is not able to state the main provisions of the educational material	The student experiences difficulties in analyzing the action of drugs in terms of their pharmacological properties and the possibility of their use for therapeutic treatment. The student	The student is able to independently analyze the educational material. The student is able to use knowledge to generalize educational	The student is able to consistently present educational material. The student is able to carefully analyze

		inconsistently and not systematized presents the educational material The student finds it difficult to generalize the educational material	material	the effect of drugs on the basis of their pharmacological properties and the possibility of their use
To possess	The student is not proficient in the use of medicines	The student has basic skills in the use of medicines in the treatment, rehabilitation and prevention of various diseases and pathological conditions.	The student has knowledge of everything studied program material, the material presents consistently rarely makes minor errors and shortcomings in the reproduction of the studied material. The student is able to independently highlight the main provisions of the educational material	The student independently selects the main position in the studied material and is able to give a brief description of the main ideas of the studied material. The student has the skill of determining practical skills The student shows a deep and complete knowledge of the entire volume of the studied discipline in terms of practical skills

VII. EDUCATIONAL AND METHODOLOGICAL AND INFORMATION SUPPORT OF THE DISCIPLINES

7.1. The list of basic and additional literature necessary for mastering the discipline

Printed Sources:

№	Editions	The number of copies in the library
1	Pharmacology: textbook / under. ed. D.A. Kharkevich.-12th ed., Rev. and add. –Second edition, Textbook for medical students. – Москва: ГЭОТАР-Медиа, 2017	50

Electronicsources:

1	Kharkevitch, D. A. Pharmacology : textbook / D. A. Kharkevitch. - Translation of Russian textbook, 12th edition, revised and improved. - Moscow : GEOTAR-Media, 2023. - 2nd edition. - 680 с. - ISBN 978-5-9704-7088-6. - Текст :электронный // ЭБС "Консультант студента" : [сайт]. - URL : https://www.studentlibrary.ru/book/ISBN9785970470886.html
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7.2. Additional literature

Printed Sources:

№	Editions
1	2
1	Alyautdin, R. N. Pharmacology. Illustrated textbook / ed. R. N. Alyautdin. - Москва : ГЭОТАР-Медиа, 2020. - 312 с. - ISBN 978-5-9704-5665-1. - Текст : электронный // ЭБС "Консультант студента" : [сайт]. - URL : https://www.studentlibrary.ru/book/ISBN9785970456651.html
2	Pharmacology: Part 1. [Electronic resource] textbook / under. Ed. R.N. Alyautdina. - Moscow: GEOTAR-Media, 2021 http://www.studmedlibrary.ru/book/ISBN97859704620271.html
3.	Еникеева, Д. А. Pharmacology. Part 1. Workbook / Еникеева Д. А. , Бондарчук Н. Г. , Аляутдин Р. Н. , Фисенко В. П. - Москва : ГЭОТАР-Медиа, 2021. - 264 с. - ISBN 978-5-9704-6202-7. - Текст : электронный // ЭБС "Консультант студента" : [сайт]. - URL : https://www.studentlibrary.ru/book/ISBN9785970462027.html

7.3 The list of resources of the information and telecommunication network "Internet»:

№	ResourceName	Websiteaddress
1.	PubMed MEDLINE	http://www.pubmed.com
2.	Google scholar	http://scholar.google.com
3.	Scirus	http://www.scirus.com/srapp
4.	Medicalnews	info@univadis.ru
5.	HealthIssues. WHO Information	http://www.who.int/en/
6.	Ministry of Education and Science of the Russian Federation	http://минобрнауки.рф
7.	Ministry of Health of the Russian Federation	http://www.rosminzdrav.ru
8.	MinistryofHealth RD	http://minzdravrd.ru
9.	CyberLeninkScientificElectronicLibrary	http://cyberleninka.ru
10.	ElectronicScienceLibrary	https://elibrary.ru/defaultx.asp
11.	Federal Electronic Medical Library (FEMB)	http://feml.scsml.rssi.ru
12.	MedicalSearchEngine	http://www.medinfo.ru/
13.	Faculty of Fundamental Medicine, Moscow State University M.V. Lomonosov (publications).	http://www.fbm.msu.ru/sci/publications/
14.	Directoryofdrugs.	http://www.rlnet.ru/
15.	Electronic library of the Russian Federal Property Fund.	http://www.rfbr.ru/
16.	State Central Scientific Medical Library.	http://www.scsml.ru/
17.	Nedug.ru (medical information service).	http://www.nedug.ru/
18.	LibrariesontheInternet.	http://guide.aonb.ru/libraries1.htm
19.	Science and education on the Internet.	http://guide.aonb.ru/nauka.htm
20.	Electroniclibraryoftextbooks.	http://studentam.net
21.	Library.	www.MedBook.net.ru
22.	Electronicmedicalbooks.	http://www.med.book.net.ru/21shtm
23.	Portaltutorials - free RF.	http://учебники-

7.4 .INFORMATION TECHNOLOGY

When studying the discipline, a general package of documents of Internet materials is used that provide ample opportunity to improve university training in pharmacology with the aim of mastering the skills of educational activities. The standard features of most programs are the implementation of the didactic principle of visualization in training; their use enables students to apply various methods to solve the educational problem.

Teaching methods using information technology.

The methods of training using information technology used in the classroom "Pharmacology" include:

- demonstration of multimedia materials;
- A list of search engines (site mooodle.dgmu.ru).
- list of encyclopedic sites

VIII. MATERIAL AND TECHNICAL SUPPORT

№	Type of premises with a number (classroom, laboratory, computer class, etc.) indicating the address (location) of the building, clinical base, building, structure, premises, area of the room, its purpose (for independent work, practical training, current control, intermediate assessment, e-learning, lectures, etc.	Equipment identification
	Halls No. 2 and No. 3 at 1 A. Aliyev St., Biobuilding - for lectures. For practical classes: study rooms (audiences) of the department (3rd floor of the biological building, Aliyev str. 1) No. 4 (area 28 m², seats - 24, study tables - 12, pedestal - 1 pc, teacher's table - 1 pc, teacher's chair - 1 pc, marker board - 1 pc, washbasin - 1 pc) No. 5 (area 42 m², seats - 24, study tables - 12, marker board - 1 pc, washbasin - 1 pc, study cabinets - 5 pcs, teacher's table - 1 pc, chair - 1 pc.) No. 7 (area 65 m², seats-46, study tables -23, a table for a teacher -1 pc, a chair - 1 pc, a projector screen - 1 pc, a hanger - 1 pc, 1 washbasin - 1, a marker board - 1 pc.) No. 8 (area 24 m², study tables-14, seats-28 pcs, marker board-1 pc, teacher's table-1 pc chair-1 pc, washbasin-1 pc.) No. 9 (area 19 m², study tables - 10, seats - 20, teacher's table - 1 pc, chair - 1, board - 1 pc.) No. 10 (area 22 m², study tables - 15, seats - 30, teacher's table - 1 pc, chair - 1 pc, marker board - 1 pc, 1 washbasin - 1 pc.) Office of the head of department No. 2 (area 36 m², a set of office furniture - 1 pc., chairs - 10 pcs., armchairs - 2 pcs., vertical blinds - 2 pcs., cabinets - 5 pcs., washbasin - 1 pc.)	<u>For lectures:</u> projector - 3 pcs.. <u>For administrative use</u> Personal computers - 3 pcs, MFP "KYOCERA" - 1 pc. Refrigerator - 1 piece <u>For practical training and SSS</u> Demonstration preparations with annotations of preparations according to topics - 70 pcs Tables by topic - 100 pcs Laboratory couch - 1 pc Medical tonometer - 1 pc. Introductory booklets on preparations - 200 pcs.

	Assistant room No. 3 (area 14.5 m² study tables-3, seats-3, washbasin -1 pc, wardrobe - 1 pc,) Docent's room No. 6 (area 19m², tables-3, seats -2, cabinets 3 pcs, washbasin -1 pc,) Docent's room No. 1 - (area - 24 m², tables - 3, cabinets - 4, seats - 4, washbasin - 1 pc.) Independentwork - electronicreadingroom Bathroom - room No. 11, (area 24 m², washbasins - 2 pcs)	
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IX. USE OF INNOVATIVE (ACTIVE AND INTERACTIVE) TEACHING METHODS

Active teaching methods used in the study of this discipline make up 10% of the classroom volume.

	Name of the section (list those sections in which are used active and/or interactive forms (methods) training)	Type, name of the topic of the lesson with using forms of active and interactive teaching methods	Labor intensity* (hour.)
1	Medicinal facilities, regulating Functions of the central nervous system	Lecture "Narcotic and non-narcotic analgesics. Problematic lecture	2
2	Drugs that regulate functions executive bodies and systems	Practical lesson Antihypertensives". Seminar-discussion on the type of "Educational the conference"	2
3	Antimicrobial, antiviral, antifungal agents. Antiblastoma and immunoactive facilities	Practical lesson "Antibiotics". Solving multi-level tasks at the stage of classroom independent work.	2

X. METHODOLOGICAL SUPPORT OF THE DISCIPLINE

Guidelines for students - Appendix No. 3 (attached)

XI. FEATURES OF DISCIPLINE TRAINING ORGANIZING FOR THE DISABLED AND PERSONS WITH DISABLED HEALTH

11.1. Education of disabled people and persons with disabilities

If necessary, it is carried out by the department on the basis of an adapted working programs using special teaching methods and didactic materials compiled taking into account the peculiarities of psychophysical development, individual capabilities and health status of such students (student).

11.2. In order to master the curriculum of the discipline by disabled people and persons with Disabled Health the department provides:

- 1) for the disabled and persons with visual impairments:
 - placement in accessible to students who are blind or visually impaired, locations and in an adapted form of background information about the scheduled training sessions;
 - the presence of an assistant providing the student with the necessary assistance;
 - release of alternative formats for teaching materials (large print or audio files);
- 2) for the disabled and people with hearing disabilities:
 - appropriate sound means of reproduction of information;
- 3) for the disabled and persons with disabilities who have musculoskeletal disorders:
 - the possibility of unhindered access of students to classrooms, toilet rooms and other premises of the department. In case of impossibility unhindered access to the department to organize the educational process in a specially equipped center for individual and collective use of special technical training aids

for the disabled and people with disabilities health opportunities (1 A. Aliyev str., biological building, 1st floor).

11.3. The education of students with disabilities can be organized both jointly with other students and in separate groups.

11.4. The list of educational and methodological support for independent work of students in the discipline.

Educational and methodological materials for independent work of students from among the disabled and persons with disabilities are provided in forms adapted to the limitations of their health and perception of information:

Categories of students	Forms
hearing impairment	- in printed form; - in the form of an electronic document;
With visual impairment	- in printed form in enlarged type; - in the form of an electronic document; - in the form of an audio file;
With musculoskeletal apparatus disorders	- printed form; - in the form of an electronic document;

This list can be specified depending on the students contingent.

11.5. Evaluation Fund for Intermediate Attestation discipline students.

11.5.1. List of evaluation funds correlated with the planned results of mastering the educational program.

For students with disabilities Categories of students	Types of evaluation tools	Forms of control and evaluation of learning outcomes
Hearing impaired	test	predominantly written verification
Visually impaired	interview	predominantly oral check (individually)
With disorders of the musculoskeletal system	solution of remote tests, control questions	organization of control in EIOS DSMU, written examination

For students belonging to the category of disabled people and persons with disabilities, the time for preparing answers for the test is increased, it is allowed to prepare for the test using distance learning technologies.

11.5.2. Methodological materials that define the procedures for assessing knowledge, skills and (or) experience, characterizing the stages of formation competencies.

When carrying out the procedure for evaluating the learning outcomes of people with disabilities and persons with disabilities, the use of technical means necessary for them in connection with their individual characteristics is envisaged.

The procedure for evaluating the learning outcomes of people with disabilities and people with disabilities in the discipline provides for the provision of information in forms adapted to the limitations of their health and perception of information:

For persons with visual impairments:

- in printed form in enlarged type;
- in the form of an electronic document;
- in the form of an audio file.

For people with hearing impairments:

- in printed form;
- in the form of an electronic document.

For people with musculoskeletal disorders:

- in printed form;
- in the form of an electronic document;
- in the form of an audio file.

This list can be specified depending on the contingent of students.

When carrying out the procedure for evaluating the learning outcomes of people with disabilities and people with disabilities in a discipline (module), the following additional requirements are met, depending on individual characteristics of students:

1. instructions on the procedure for conducting the assessment procedure are provided in an accessible form (orally, in writing, orally using the services of a sign language interpreter);
2. an accessible form for providing assignments of assessment tools (in printed form, in printed form in an enlarged font, in the form of an electronic document, assignments are read out by an assistant, assignments are provided using sign language translation);
3. an accessible form of providing answers to tasks (in writing on paper, a set of answers on a computer, using the services of an assistant, orally).

If necessary, for students with disabilities and the disabled, the procedure for evaluating learning outcomes in a discipline (module) can be carried out in several stages.

The procedure for evaluating the learning outcomes of people with disabilities and persons with disabilities is allowed using remote educational technologies.

11.6. The list of basic and additional educational literature necessary for the development of the discipline.

For mastering the discipline, disabled people and persons with disabilities are provided with basic and additional educational literature in the form of an electronic document in the library fund and / or in electronic library systems. Also, special textbooks and teaching aids, other educational literature and special technical training aids for collective and individual use, as well as the services of sign language and sign language interpreters are provided free of charge.

11.7. Guidelines for students on mastering the discipline

Individual work is of great importance in mastering the discipline by disabled people and persons with disabilities. Under individual work two forms of interaction with the teacher are implied: individual educational work (consultations), i.e. additional explanation of the educational material and in-depth study of the material with those students who are interested in this, and individual educational work. Individual consultations on the subject are an important factor contributing to the individualization of education and the establishment of educational contact between the teacher and the student with a disability or a student with disabilities.

11.8. Description of the material and technical base necessary for the implementation of the

educational process in the discipline

Discipline mastering by disabled people and persons with disabilities is carried out using general and special purpose training tools:

- lecture audience - multimedia equipment, mobile radio class (for students with hearing impairments); power supplies for individual technical means;
- classroom for practical classes (seminars), multimedia equipment, mobile radio class (for students with hearing impairments);
- classroom for independent work - standard workstations with personal computers; workplace with a personal computer, screen reader, screen magnifier and braille display for visually impaired students.

In each classroom where people with disabilities and people with disabilities study, an appropriate number of places for students should be provided, taking into account their health limitations.

XII. Work change registration sheet

List of additions and
changes made to the
work program of the
discipline

Date

WP updated at the meeting of the department

Number of minutes
of the meeting of the
department

Signature of the head
of the department