Federal State Budgetary Educational Institution of Higher Education

"South Ural State Medical University" of Ministry of Health of the Russian Federation

Department of Pharmacology

**EDUCATIONAL PROGRAM OF DISCIPLINE (MODULE)**

**«B1.O.28 PHARMACOLOGY»**

Level of higher education: specialitet

Speciality: 31.05.01 General medicine

Profile of training: General medicine

Qualification (degree) of graduate: medical doctor

Form of education: full-time

Year of entrance start of educational program: 2022

Length of educational program: 6 years

Сurriculum content: credit units – 8,

 academic hours – 288.

City of Chelyabinsk, 2022

Program developers:

Associate Professor of Pharmacology Department L.S. Korotovskih

The educational program of the discipline (module) is compiled in accordance with the requirements of the Federal State Educational Standard of Higher Education of the specialty.

Specialty: 31.05.01 General Medicine, approved by the order of the Ministry of Education and Science of Russia dated 08/12/2020 No. 988, taking into account the labor functions of the professional standards: "General Practitioner (District Therapist)", approved by the Order of the Ministry of Labor of Russia dated 03/21/2017 No. 293n.

CONTENT OF EDUCATIONAL PROGRAMM

1. OBJECTIVES AND GOALS OF FULFILLING THE DISCIPLINE (MODULE)

2. PLANNED RESULTS OF TRAINING IN DISCIPLINE (MODULE), IN COMPAREMENT WITH PLANNED RESULTS OF FULFILLING THE WHOLE COURSE PROGRAMM

3. POSITION OF DISCIPLINE IN THE STRUCTURE OF COURSE PROGRAMM

4. TYPES OF EDUCATIONAL ACTIVITIES AND PROGRAMM VOLUME

5. CONTENT OF THE DISCIPLINE

5.1. PARTITION OF THE PROGRAMM, THEMES OF THE TOPICS AND TYPES OF CLASSES

5.2 CONTENT OF TOPICS, THEMES OF DISCIPLINES AND FORMS OF CURRENT CONTROL

6. MATERIAL, TECHNICAL, EDUCATIONAL AND METHOLOGICAL RESOURCES OF THE DISCIPLINE

6.1 TABLE OF BASIC AND ADDITIONAL LITERATURE

6.2 PROFESSIONAL DATABASES AND INTERNET RESOURCES, WITH SUPPORTED ACCESS FOR PARTICIPATING STUDENTS

6.3. SOFTWARE AND INFORMATION SYSTEMS, WHICH ARE USED IN THE COURSE OF EDUCATIONAL PROCESS BY DISCIPLINE

6.4 SPECIAL APARTMENTS, LABORATORIES AND LABORATORY EQUIPMENT

**1. AIM AND GOALS OF FULFILLING THE DISCIPLINE (MODULE)**

The purpose of mastering the discipline is to develop students' readiness to carry out a competent selection of the most effective and safe drugs and their combinations, taking into account the features of their pharmacodynamics and pharmacokinetics, for the treatment and prevention of diseases.

Objectives of mastering the discipline:

- to form the basis of theoretical knowledge about medicines, indications and contraindications for their use in various infectious and non-infectious diseases, about the features of prescription documents regulations;

- to develop basic knowledge of prescription document management, rules for storing medicines from the list of potent and poisonous ones, as well as lists of narcotic and psychotropic drugs;

- to develop the ability of analyzing the drugs action, with taking into account the totality of their pharmacological effects, mechanisms and localization of action and parameters of pharmacokinetics;

- to form the ability of estimation the possibilities of choice and usage of medicines on the basis of knowledge of their properties for the effective and safe prophylactics, pharmacotherapy and diagnostics of the affections of organism’s systems diseases;

- develop skills in writing recepies and forming of prescriptions, mastering writing of prescriptions for the number of drugs in different dosage forms, in conductance with various pathological conditions or diseases in patients, based on the special features of their pharmacodynamics and pharmacokinetics of said drugs;

- to form the ability of usage of medicines in hospitals.

**2. PLANNED RESULTS OF TRAINING IN DISCIPLINE (MODULE), IN COMPAREMENT WITH PLANNED RESULTS OF FULFILLING THE WHOLE COURSE PROGRAMM**

**Competencies, indicators and learning outcomes**

**GPC- 3** (General Professional Competence)

Has to be able to counteract the use of doping in sports and to combat it;

**GPC- 3.2**

Can estimate and classify the pharmacological preparations of various groups and classes, which use is forbidden by the commission of International Olimpic Committee;

**Has to know:**

GPC-3.2/Зn1 classification and basic characteristics of medicines, which use is forbidden by the commission of International Olimpic Committee;

**Has to be able:**

**GPC - 3.2/Um1** to analyse the action of medicines, according to their pharmacological group

**GPC - 3.2/Nv1** to use regulatory documents and reference literature for accomplishing professional tasks,

**GPC - 3.3**

Has to be ableto analyse biochemical and molecular biological mechanisms of cellular and tissue pathological processes development in the body of the sportsmen, after taking forbidden medicines;

**Has to know:**

**GPC-3.3/3n1** pharmacodynamics and pharmacokinetics, indications and contraindications for the usage of medicines, side effects of medicines, which are forbidden in sportive practice,

**Has to be able:**

**GPC-3.3/Um1** to analyse the addicitive potential of medicines, according to the combination of their pharmacological characteristics and possibility of their usage as doping,

**GPC-3.3/Hb1** to perform prescriptions of medicines, which belongs to the quantitative accounted group and to know the rules and documentary forms of their prescription,

**GPC-5**

Has to be ableto estimate the morphofunctional, physiological and pathological processes in the human organism, vital for solving of professional tasks

**GPC-5.1** to understand the etiology and pathogenesis of pathological processes due to the obtained systemic (fundamental) theoretical knowledge

**Has to know:**

**GPC-5.1/3n2** classification and major characteristics of medicines, pharmacodynamics and pharmacokinetics, indications and contraindications for the usage of said medicines and side effects in inflectional and mass non-infectional diseases

**Has to be able:**

**GPC-5.1/Um2** to analyze the action of medicines in unity of their pharmacological properties and possibility of their therapeutical usage, make prescriptions for treatment of certain diseases, according to their pharmacokinetics and pharmacodynamics

**GPC-5.1/Hb2** to prescribe remedies for treatment, rehabilitation and prophylactics of various diseases and pathological processes in adult patients

**3. POSITION OF DISCIPLINE IN THE STRUCTURE OF COURSE PROGRAMM**

Said discipline (module) Б1.О.28 «Pharmacology» belongs to the obligatory part of educational program and is studied in the semester 5 and 6.

While studying the discipline student is prepared to the certain types of professional activities and for solving of professional tasks, included in Federal State Educational Standard of Higher Education (FSES HE) and educational program.

**4. TYPES OF EDUCATIONAL ACTIVITIES AND PROGRAMM VOLUME**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Period of education** | **General labor cost (hours)** | **General labor costs (credit units)** | **Contact educational jobs (hours)** | **Lectures (hours)** | **Practical classes****(hours)** | **Exam (hours)** | **Preparation to the attestation (hours)** | **Self educational activities of the student (hours)** | **Attestation** |
| 5 | 108 | 3 | 84 | 16 | 68 |  |  | 24 |  |
| 6 | 180 | 5 | 73 | 14 | 56 | 3 | 33 | 74 | Exam (3) |
| Total | **288** | **8** | **157** | **30** | **124** | **3** | **33** | **98** |  |

**5. CONTENT OF THE DISCIPLINE**

**5.1. PARTITION OF THE PROGRAMM, THEMES OF THE TOPICS AND TYPES OF CLASSES**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name of topic** | **Total****(hours)** | **Lectures****(hours)** | **Planned results of training in connection with the results of fulfilling the course** |
| **Lectures** | **30** | **30** | GPC-3.2GPC-3.3GPC-5.1 |
| 1.1. Basics of pharmacology | 2 | 2 |  |
| 1.2. Cholinergic medicines | 2 | 2 |  |
| 1.3. Adrenergic medicines | 2 | 2 |  |
| 1.4. Anticonvulsive medicines | 2 | 2 |  |
| 1.5. Analgesic medicines | 2 | 2 |  |
| 1.6. Psychotropic medicines with suppressive action on CNS | 2 | 2 |  |
| 1.7. Antidepressants | 2 | 2 |  |
| 1.8. Medicines, acting on the digestive system | 2 | 2 |  |
| 1.9. Antiarrhythmic medicines | 2 | 2 |  |
| 1.10. Antihypertensive medicines | 2 | 2 |  |
| 1.11. Medicines, acting on blood  | 2 | 2 |  |
| 1.12. Hormonal medicines | 2 | 2 |  |
| 1.13. Antiinflammatory medicines | 2 | 2 |  |
| 1.14. Antibiotics | 2 | 2 |  |
| 1.15. Antiviral and antifungal medicines  | 2 | 2 |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Name of topic** | **Total****(hours)** | **Practical classes****(hours)** | **Planned results of training in connection with the results of fulfilling the course** |
| **Practical classes** | **124** | **124** | GPC-3.2GPC-3.3GPC-5.1 |
| 2.1. Recipie. Structure of recipie. Solid dosage forms. | 4 | 4 |  |
| 2.2. Semi-solid dosage forms | 4 | 4 |  |
| 2.3. Liquid dosage forms | 4 | 4 |  |
| 2.4. Credit: «Dosage forms» | 4 | 4 |  |
| 2.5. Basic pharmacology | 4 | 4 |  |
| 2.6. Medicines, acting on the afferent nervous system | 4 | 4 |  |
| 2.7.Medicines, acting on cholinergic synapse | 4 | 4 |  |
| 2.8. Medicines, acting on adrenergic synapse | 4 | 4 |  |
| 2.9. Credit: «Medicines, acting on peripheral nervous system» | 4 | 4 |  |
| 2.10. General anesthetics, Ethyl alcohol. Sleeping pills. | 4 | 4 |  |
| 2.11. Antiepileptic medicines. Antiparkinsonian medicines.  | 4 | 4 |  |
| 2.12. Analgesic medicines. | 4 | 4 |  |
| 2.13. Psychotropic medicines with depressive type of action | 4 | 4 |  |
| 2.14. Psychotropic medicines with stimulating type of action | 4 | 4 |  |
| 2.15. Credit: «Medicines, acting on central nervous system» | 4 | 4 |  |
| 2.16. Medicines, acting on respiratory system | 4 | 4 |  |
| 2.17 Medicines, acting on digestive system | 4 | 4 |  |
| 2.18 Antiarrhythmic medicines | 4 | 4 |  |
| 2.19. Antianginal and hypolipidemic medicines | 4 | 4 |  |
| 2.20. Antihypertensive medicines. Diuretics. | 4 | 4 |  |
| 2.21. Medicines, acting on blood. Medicines, acting on the tone and contractility of the uterus. | 4 | 4 |  |
| 2.22. Credit: «Medicines, acting on executive organs» | 4 | 4 |  |
| 2.23. Hormonal medicines of polypeptide and aminoacid nature. Medicines for the treatment of diabetes mellitus. | 4 | 4 |  |
| 2.24 Hormonal medicines of steroid nature. | 4 | 4 |  |
| 2.25. Antiinflammatory medicines. Antiallergic medicines. | 4 | 4 |  |
| 2.26. Antiseptics, desinfectants. Sulfanilamides. Synthetic antimicrobial remedies of various chemical structure. | 4 | 4 |  |
| 2.27. Antibiotics | 4 | 4 |  |
| 2.28. Antiviral, antituberculosis, antispirohetal medicines | 4 | 4 |  |
| 2.29. Antiprotozoal, antihelminthic, antifungal medicines. | 4 | 4 |  |
| 2.30. Credit: «Medicines, acting on metabolism and on typical pathological processes. Chemotherapeutic medicines» | 4 | 4 |  |
| 2.31. Antitumor medicines | 4 | 4 |  |
| 2.32. Test on prescription practical skills  | 4 | 4 |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Name of topic** | **Total****(hours)** | **Lectures****(hours)** | **Planned results of training in connection with the results of fulfilling the course** |
| **Self educational activities of the student**  | **98** | **98** | GPC-3.2GPC-3.3GPC-5.1 |
| 3.1. Pharmacokinetics and pharmacodynamics. Specificity of geriatric patient. | 6 | 6 |  |
| 3.2. Hazards of tobacco smoking, pharmacological means for treatment of nicotinicaddiction | 4 | 4 |  |
| 3.3. Nootropic medicines. Medicines, used in cerebro-vascular insufficiency | 6 | 6 |  |
| 3.4. Medicines, used in migraine treatment | 8 | 8 |  |
| 3.5. Combined medicines used in treatment of arterial hypertension | 16 | 16 |  |
| 3.6. Medicines, used in treatment of osteoporosis | 20 | 20 |  |
| 3.7. Medicines, acting on immunity | 20 | 20 |  |
| 3.8. Contemporary pro- and prebiotics | 18 | 18 |  |

**5.2 CONTENT OF TOPICS, THEMES OF DISCIPLINES AND FORMS OF CURRENT CONTROL**

**5.2.1. General table of control and estimation of lectures.**

|  |  |  |
| --- | --- | --- |
| Type (form) of control | Minimal successful pass credit | Maximal successful pass credit |
| Control of attendance | - | - |

**5.2.2. BRIEF DECRIPTION OF LECTURE TOPICS**

Topic 1.1. Basic pharmacology. Lecture – 2 hours.

Definition of pharmacology, its place among other medical and biological sciences. Basic terms and concepts. History of pharmacology. Sources and ways of obtaining new medicines. Pharmacokinetics: routes of administration, absorption, distribution, deposition, metabolism, excretion of drugs. Pharmacodynamics: types and principles of action of drugs, dependence of the effect on the properties and conditions of their use, the role of individual characteristics of the body for the manifestation of the action of drugs, types of pharmacotherapy.

Topic 1.2. Lecture - 2 hours.

Medicines, acting on cholinergic synapses. Classification of drugs acting on cholinergic synapses. Characteristics of the main groups: M,N –cholinomimetics of direct and indirect action (anticholinesterase agents), M-cholinomimetics, M - cholinoblockers, N-cholinomimetics, N-cholinoblockers of n (ganglioblocking agents) and m (peripheral myorelaxants) types.

Topic 1.3. Lecture - 2 hours.

Medicines, acting on adrenergic synapses. Classification of drugs acting on adrenergic synapses. Characteristics of the main groups: α, β-adrenergic agonists, α-adrenergic agonists, β-adrenergic agonists, blockers of various types and subtypes of adrenoreceptors.

Topic 1.4. Lecture - 2 hours.

Anticonvulsive and antiparkinsonian medicines. Pharmacophysiology of epilepsy. Classification of anticonvulsive drugs. Mechanism of anticonvulsive action of barbiturates, benzodiazepines, iminostilbenes, valproic acid derivatives. Side effects of anticonvulsive drugs. Classification of antiparkinsonian drugs. Pharmacodynamics of antiparkinsonian drugs.

Topic 1.5. Lecture - 2 hours.

Analgesics medicines. Physiology of pain. Main groups of analgesics. Classification of narcotic analgesics by origin and action on opioid receptors. Pharmacodynamics of narcotic analgesics, using morphine as an example. Comparative characteristics of medicines, belonging to the group. Indications, side effects, contraindications. Acute morphine poisoning, clinics, first aid.

Topic 1.6. Lecture - 2 hours.

Psychotropic medicines with suppressive action on CNS.

Neuroleptics, classification. Pharmacodynamics of antipsychotic medicines, using chlorpromazine as an example. Comparative characteristics of medicines, belonging to the group. Indications, side effects, contraindications. Benzodiazepine anxiolytics, main pharmacological effects, application.

Topic 1.7. Lecture - 2 hours.

Antidepressants.

Antidepressants, classification, concept of thymoleptics and thimerectics, individual characteristics of drug group. Indications, side effects, contraindications.

Topic 1.8. Lecture - 2 hours.

Medicines, acting on the digestive system

Classification of drugs, acting on the digestive organs. Pharmacodynamics of antisecretory and antacid agents. Gastroprotectors. Characteristics of laxatives and antidiarrheal drugs.

Topic 1.9. Lecture - 2 hours.

Antiarrhythmic medicines.

Classification of antiarrhythmic drugs. Pharmacodynamics of drugs, blocking ion channels of cardiomyocytes. Characteristics of the main groups, indications, side effects, contraindications.

Topic 1.10. Lecture - 2 hours.

Antihypertensive medicines.

Classification of antihypertensive medicines. Pharmacodynamics of medicines with central and peripheral neurotropic action. Calcium channel blockers: characteristics of the main groups. Drugs affecting the renin-angiotensin-aldosterone system: mechanisms for reducing blood pressure, indications, side effects, contraindications.

Topic 1.11. Lecture - 2 hours.

Medicines acting on blood coagulation, platelet aggregation and fibrinolysis.

Classification. Pharmacodynamics of antiplatelet agents, anticoagulants and fibrinolytic medicines.

Topic 1.12. Lecture - 2 hours.

Hormonal medicines.

Types of hormonal therapy. Fundamental mechanisms of hormonal medicines action. Characteristics of hormonal medicines of the thyroid gland and antithyroid agents. Insulin preparations, classification by duration of action, effect on metabolism, application. Synthetic antidiabetic agents, characteristics of certain groups, specific features of application.

Topic 1.13. Lecture - 2 hours.

Anti-inflammatory medicines.

Physiology of inflammation. Classification of anti-inflammatory medicines. Mechanism of action of steroidal and non-steroidal anti-inflammatory medicines, indications for use, side effects, contraindications.

Topic 1.14. Lecture - 2 hours.

Antibiotics.

Antibiotics which violate the synthesis of the microorganism cell wall. Natural and semi-synthetic penicillins, mechanism and spectrum of antimicrobial action, combination with β-lactamase inhibitors, application. Pharmacodynamics of cephalosporins, comparative characteristic. Antibiotics that violate the protein synthesis of the microorganism. Natural and semi-synthetic tetracyclines, mechanism and spectrum of antimicrobial action, application. Pharmacodynamics of aminoglycosides, macrolides and chloramphenicol. Comparative charactereristic of medicines.

Topic 1.15. Lecture - 2 hours.

Antiviral and antifungal medicines.

Classification by origin and direction of antiviral action. Anomalous nucleoside preparations, mechanism and spectrum of antiviral action, application. Characteristics of preparations for the treatment of influenza and acute respiratory viral infections. Interferon preparations, types of pharmacological activity, application, possible complications. Other antiviral agents. Classification of antifungal agents. Antibiotics for the treatment of various types of mycoses, features of action and application. Synthetic agents of the azole and allylamine groups, pharmacokinetics and pharmacodynamics, application. Antifungal drugs of other groups, brief description.

**5.2.3. General table of control and estimation of practical classes.**

|  |  |  |
| --- | --- | --- |
| Type (form) of control | Minimal successful pass credit | Maximal successful pass credit |
| Control task | 3 | 5 |

**5.2.4. BRIEF DECRIPTION OF PRACTICAL CLASSES**

Topic 2.1. Practical class - 4 hours.

Recepie. Structure of recepie. Solid dosage forms.

Regulatory documents, defining the rules for prescribing medicines, Prescription forms. Dosage forms. Prescription of solid dosage forms. Practice in prescription of powders, tablets, capsules, granules.

Topic 2.2. Practical class - 4 hours.

Semi-solid dosage forms.

Regulation of prescribing semi-solid dosage forms: ointments, pastes, liniments, gels, creams, suppositories, transdermal therapeutic systems. Practice in prescription of semi-solid dosage forms.

Topic 2.3. Practical class - 4 hours.

Liquid dosage forms.

Solutions for external use and for oral administration. Regulation of prescribing liquid dosage forms.

Dosage forms for injection, requirements for production of injection dosage forms. Liquid dosage forms from raw materials of plant origin: characteristics and features of prescribing infusions, decoctions, extracts and aerosols.

Topic 2.4. Practical class - 4 hours.

Credit: «Dosage forms».

Test of student’s knowledge of regulatory documentation for performing prescriptions, receptory forms and regulations for prescribing solid, semi-solid and liquid dosage forms.

Topic 2.5. Practical class - 4 hours.

Basics of pharmacology.

The concept of pharmacokinetics and pharmacodynamics. Absorption of medicines from the site of administration. Mechanisms of absorption, factors affecting the absorption of drugs. Enteral routes of administration of medicines. Bioavailability. The importance of routes of administration for the speed of onset, intensity and duration of the medicine’s effect. Parenteral routes of . The life stages of drug in the organism (distribution, deposition, metabolism). Metabolism of medicines. Excretion. The main principles of action of medicines in the organism (physical, chemical, physicochemical). The concept of specific receptors, agonists and antagonists. Types of action of drugs (local, resorptive, direct, indirect, reversible, irreversible, the role of reflex reactions). The concept of dose (average and highest therapeutic, single, daily, course, toxic, lethal). The dependence of the effect from the dose of the active substance. The width of therapeutic action (therapeutic range). Repeated administration of the medicine and connected events: habituation, cumulation, sensitization, addiction.

Topic 2.6. Practical class - 4 hours.

Medicines acting on afferent innervation.

Local anesthetics, astringents, adsorbents, irritants: classifications, mechanisms of action, use, adverse effects.

Topic 2.7. Practical class - 4 hours.

Medicines, acting on cholinergic synapse.

Structure of cholinergic synapse, stages of mediation, types of cholinergic receptors. Agents, acting on M-cholinergic receptors. Classification. Action on organs and systems of the body. Indications for use. Side effects. Poisoning and measures of assistance. Agents acting on N-cholinergic receptors. Classification. Pharmacodynamics of ganglion blockers and peripheral muscle relaxants. Action on organs and systems of the body. Indications for use. Side effects, manifestations of overdose and measures of assistance. Medicines, acting on M- and N-cholinergic receptors. Classification. Mechanisms of action, action on organs and systems of the body. Indications for use. Manifestations of side effects. Poisoning with anticholinesterase agents, measures of assistance.

Topic 2.8. Practical class - 4 hours.

Medicines, acting on adrenergic synapse.

Structure of the adrenergic synapse, stages of mediation, types of adrenergic receptors. Adrenergic agents. Classification, mechanisms of action, nature of action on organs and systems. Indications for use of adrenergic agents. Complications, side effects, main contraindications. Antiadrenergic agents. Classification. Mechanisms of action and effects of adrenoblocking and sympatholytic drugs. Indications for use, side effects, contraindications.

Topic 2.9. Practical class - 4 hours.

Credit: «Medicines, acting on peripheral nervous system»

Medicines acting on the afferent nervous system, cholinergic , adrenergic agents. Classifications, mechanisms of action, indications for the use, doses and forms of drugs of the specified groups.

Topic 2.10. Practical class - 4 hours.

General anesthetics, Ethyl alcohol. Sleeping pills.

General anesthetics. Theories of anesthesia. Classification, mechanisms of action. Comparative characteristics of inhalational and non-inhalational anesthetics. Way of use, possible complications. Hypnotics, sleeping pills. Classification, mechanisms of action, comparative characteristics. Indications for use, side effects. Symptoms of poisoning, measures of assistance. Ethyl alcohol. Effects on organs and systems of the body. Acute and chronic ethyl alcohol poisoning, measures of assistance. Indications for the use of ethyl alcohol in medical practice.

Topic 2.11. Practical class - 4 hours.

Antiepileptic medicines. Antiparkinsonian medicines.

Antiepileptic drugs. Classification, mechanisms of action, use in various clinical forms of epilepsy, side effects, Antiparkinsonian drugs. Classification, mechanisms of antiparkinsonian action. Comparative characteristics of drugs, side effects and their elimination.

Topic 2.12. Practical class - 4 hours.

Analgesic medicines.

Narcotic analgesics. Classification, mechanism of action, comparative characteristics. Indications for use, side effects . Clinics of acute and chronic poisoning with narcotic analgesics, measures of assistance. Non-narcotic analgesics of peripheral action. Classification of drugs, mechanisms of analgesic action. Comparative characteristics of drugs, indications for use. Side effects, contraindications for use.

Topic 2.13. Practical class - 4 hours.

Psychotropic medicines with depressive type of action.

Antipsychotics. Classification, mechanisms of antipsychotic and sedative effects. Comparative characteristics of drugs, indications for use, side effects. Anxiolytics. Classification. Mechanisms of action. Indications for use, side effects and contraindications. Sedatives. Classification. Mechanisms of action. Indications for use, side effects and contraindications Drugs for the treatment of mania. Pharmacodynamics of lithium preparations, usage, side effects.

Topic 2.14. Practical class - 4 hours.

Psychotropic medicines with stimulating type of action.

Psychostimulants. Classification. Pharmacodynamics of drugs and their comparative characteristics, use, side effects, main contraindications. Nootropics. Classification, mechanisms of action, main pharmacological effects, application features. Side effects, main contraindications. Analeptics. Classification. Comparative characteristics of drugs. Indications for use, possible complications, contraindications. Antidepressants. Classification. Mechanisms of action. Indications for use. Manifestations of side effects of drugs.

Topic 2.15. Practical class - 4 hours.

Credit: «Medicines, acting on central nervous system»

Test of student’s knowledge of classifications, mechanisms of action, indications, doses and manufacturing forms of anesthetics, ethyl alcohol, hypnotics, antiepileptic and antiparkinsonian drugs, analgesics, antipsychotic drugs, anxiolytics, sedatives, psychostimulants, antidepressants.

Topic 2.16. Practical class - 4 hours.

Medicines, acting on respiratory system.

Antitussives and expectorants. Classification of drugs. Mechanisms of action. Comparative characteristics of drugs, indications for use, side effects, main contraindications. Medicines used for treatment and prevention of bronchospasm. Classification. Pharmacodynamics of bronchodilators, use, side effects, main contraindications.

Topic 2.17. Practical class - 4 hours.

Medicines, acting on digestive system.

Drugs acting on the functions of the digestive organs. Classification of drugs acting on appetite and drugs used for disorders of the gastric glands function. Mechanisms of action, use, side effects, main contraindications. Drugs acting on gastric motility. Classification and mechanisms of action of antiemetics, use, side effects, main contraindications. Choleretic drugs: classification, pharmacodynamics, use. Drugs used for disorders of the excretory function of the pancreas: pharmacological effects, features of administration. Classification and mechanisms of action of laxatives, comparative characteristics of drugs, use, side effects, main contraindications.

Topic 2.18. Practical class - 4 hours.

Antiarrhythmic and cardiotonic medicines.

Antiarrhythmic drugs. Electrophysiology of impulse conduction in myocardium and the cardiac conduction system. Effect of ion exchange and the autonomic nervous system on excitability, conductivity and automatism. Classification, mechanisms of action and comparative characteristics of antiarrhythmic drugs, use, manifestations of side effects, contraindications. Cardiotonic drugs: cardiac glycosides. Classification of drugs. Mechanisms of realisation of cardiac and extracardiac effects, comparative characteristics of drugs, indications for use. Side effects of cardiac glycosides, measures for their prevention and treatment.

Topic 2.19. Practical class - 4 hours.

Antianginal and hypolipidemic medicines.

Drugs used for treatment of ischemic heart disease. Classification of drugs, pharmacodynamics, features of the use of antianginal drugs, side effects, comparative characteristics. Anti-atherosclerotic drugs. Classification, mechanisms of action of statins, fibrates, nicotinic acid, way of use, side effects.

Topic 2.20. Practical class - 4 hours.

 Antihypertensive medicines. Diuretics.

Antihypertensive agents with neurotropic action. Classification of drugs, mechanisms of blood pressure reduction, ways of administration, side effects, main contraindications. Antihypertensive agents with myotropic action and drugs acting on the renin- angiotensin system: classification, mechanisms of hypotensive activity, indications for use, side effects, contraindications. Diuretics. Classification, pharmacodynamics, comparative characteristics of drugs. Features of use, side effects, their prevention and correction.

Topic 2.21. Practical class - 4 hours.

Medicines, acting on blood. Medicines, acting on the tone and contractility of the uterus.

Medicines acting on hematopoiesis. Classification of medicines, pharmacodynamics of erythropoiesis and leukopoiesis stimulants. Application, possible complications, main contraindications. Drugs acting on blood clotting, platelet aggregation and fibrinolysis. Classification, mechanisms of action, comparative characteristics. Ways of application, possible complications and their correction. Drugs acting on the tone and contractile activity of the myometrium. Classification, mechanisms of action, indications for use, manifestations of side effects, contraindications.

Topic 2.22. Practical class - 4 hours.

Credit: «Medicines, acting on executive organs»

Testing of student’s knowledge of classifications, mechanisms of action, indications, doses and manufacturing forms of drugs acting on the respiratory system, digestive system, antiarrhythmic, cardiotonic drugs, medicines used in treatment of ischemic heart disease, antihypertensive and diuretic medicines, medicines acting on hematopoiesis and hemostasis, medicines acting on the tone and contractile activity of the myometrium.

Topic 2.23. Practical class - 4 hours.

Hormonal medicines of polypeptide and aminoacid nature. Medicines for the treatment of diabetes mellitus.

Polypeptide hormone preparations. Classification, specific and non-specific effects. Use of preparations, side effects, contraindications. Thyroid hormone preparations. Pharmacodynamics, use, sidee effects, contraindications. Antithyroid agents: mechanisms of action, side effects.

Topic 2.24. Practical class - 4 hours.

Hormonal medicines of steroid nature.

Preparations of steroid hormones. Classification. Manifestations of specific and non-specific action, use, side effects, their prevention and correction, main contraindications. Mechanism of action of glucocorticoids.

Topic 2.25. Practical class - 4 hours.

Antiinflammatory medicines. Antiallergic medicines.

Anti-inflammatory medicines. Classification. Mechanisms of action and comparative characteristics of steroidal and non-steroidal anti-inflammatory medicines. Indications for use, manifestations of negative effects, contraindications. Antiallergic medicines. Classification, mechanisms of action, comparative characteristics, indications for use, side effects, main contraindications.

Topic 2.26. Practical class - 4 hours.

Antiseptics, desinfectants. Sulfanilamides. Synthetic antimicrobial remedies of various chemical structure.

Antiseptics and disinfectants. Classification. Characteristics of halogen-containing compounds, oxidizers, heavy metal salts, acid and alkali preparations. Use of preparations, adverse effects and their prevention. Characteristics of preparations of the phenol group, dyes, nitrofuran derivatives, detergents, alcohols and aldehydes. Use, possible complications and their correction.

The concept of chemotherapy. Basic principles of chemotherapy. Sulfanilamide preparations. Classification, mechanism of action of sulfonamides, indications for the use of preparations. Complications, measures for their prevention and elimination. Synthetic antibacterial agents - derivatives of nitrofuran, nitroimidazole, quinolone, oxazolidinone. Classification of preparations, mechanisms of antimicrobial action. Use, side effects, main contraindications.

Topic 2.27. Practical class - 4 hours.

Antibiotics

Antibiotics that violate the synthesis of the cell wall of microorganisms. Classification, mechanism of action, comparative characteristics of penicillins and cephalosporins Application, adverse effects, main contraindications. Carbepenems, monobactams, glycopeptides and inhibitors of murein monomer synthesis. Classification, mechanism of action, comparative characteristics Application, side effects, main contraindications. Antibiotics that violate protein synthesis by microorganisms. Classification. Mechanisms of action of tetracyclines and aminoglycosidess, indications, ways of application, side effects, contraindications for use. Macrolides and related antibiotics: classification, mechanisms of antimicrobial action, indications, ways of application, adverse effects, main contraindications. Chloramphenicol, rifamycin group antibiotics: classification, mechanisms of antimicrobial action, indications, way of application, negative effects, main contraindications. Antibiotics that violate the permeability of cytoplasmic membranes of microorganisms. Classification, mechanisms of action, indications for use, manifestations of negative effects.

Topic 2.28. Practical class - 4 hours.

Antiviral, antituberculosis, antispirohetal medicines.

Antiviral agents. Classification. Mechanisms of implementation of antiviral action of synthetic drugs and interferons. Application, negative effect of drugs, contraindications. Anti-tuberculosis drugs. Classification, mechanisms of action of antibiotics and synthetic drugs. Principles of combination therapy, side effects, main contraindications. Antispirochetal agents. Classification of drugs. Mechanisms of action, application, negative effects, contraindications.

Topic 2.29. Practical class - 4 hours.

Antiprotozoal, antihelminthic, antifungal medicines.

Antifungal agents. Classification. Mechanisms of antifungal action of antibiotics and synthetic agents. Indications, side effects, main contraindications. Anthelmintic agents. Classification, mechanisms of action. Types of application in intestinal and extraintestinal helminthiases, side effects, main contraindications. Agents used for the prevention and treatment of malaria, amebiasis, giardiasis, trichomoniasis. Classification, mechanisms of antiprotozoal activity, indications for use, side effects.

Topic 2.30. Practical class - 4 hours.

Credit: «Medicines, acting on metabolism and on typical pathological processes. Chemotherapeutic medicines»

Test of student’s knowledge of classifications, mechanisms of action and main pharmacological effects for the following groups of medicines: hormonal, anti-inflammatory, antiallergic, vitamins, immune processes regulating agents, antiseptics and disinfectants, antibiotics, sulfanilamides, synthetic antibacterial agents of different chemical structure, antituberculosis, antiviral, antifungal, antiprotozoyal, anthelminthic.

Topic 2.31. Practical class - 2 hours.

Antitumor medicines.

Classification, mechanisms of antineoplastic action of drugs, indications, side effects and their correction, main contraindications.

Topic 2.32. Practical class - 2 hours.

Test on prescription practical skills

Prescribing of the main 100 drugs with recommended doses and manufacturing forms

**5.2.5. General table of control and estimation of self educational activities of the student**

|  |  |  |
| --- | --- | --- |
| Type (form) of control | Minimal successful pass credit | Maximal successful pass credit |
| Control task | 3 | 5 |

**5.2.6 self educational activities of the student**

Topic 3.1. Self educational activity of the student - 6 hours.

Features of pharmacokinetics and pharmacodynamics of medicines in elderly patient

Geriatric pharmacology, definition. Features of medicines pharmacokinetics in elderly patients. Features of pharmacodynamics in elderly and senile patients. Principles of calculating doses for elderly patients.

Topic 3.2. Self educational activity of the student - 4 hours.

Hazardous effects of tobacco smoking, pharmacological methods of combating nicotine addiction.

The effect of nicotine on the human organism. Medical and social aspects of smoking cessation. Herbal preparations for the treatment of nicotine addiction. N-cholinomimetic drugs for smoking cessation. Advantages and disadvantages of using of various dosage forms: inhalers, chewing gums, gum patches, transdermal therapeutic systems, tablets for oral administration.

Topic 3.3. Self educational activity of the student - 6 hours.

Nootropics. Medicines used in cerebrovascular insufficiency. Classification of nootropics. Mechanisms of action, use, negative effects, contraindications. Principles of pathogenetic pharmacocorrection of cerebral ischemia. Classification of drugs that improve cerebral blood flow. Pharmacology of calcium antagonist drugs, derivatives of ergot and periwinkle alkaloids. Pharmacology of GABA drugs, derivatives of nicotinic acid, derivatives of purine alkaloids.

Topic 3.4. Self educational activity of the student - 8 hours.

Medicines used in treatment of migraine. Ways of pharmacocorrection of cerebral blood flow disorders in migraine. Classification of drugs used in treatment of migraine. Pharmacology of drugs for relief of acute migraine attacks (ergot alkaloids, non-narcotic analgesics and non-steroidal anti-inflammatory drugs). Pharmacology of drugs for prevention of migraine attacks (β-blockers, tricyclic antidepressants, antiepileptic drugs).

Topic 3.5. Self educational activity of the student - 16 hours.

Combined medicines in the treatment of arterial hypertension. Ways of pharmacocorrection of hypertensive conditions. Classification of drugs used to treat arterial hypertension. Pharmacology of drugs acting on RAAS. Pharmacology of drugs with diuretic action. Principles of combination of drugs with antihypertensive action.

Topic 3.6. Self educational activity of the student - 20 hours.

Medicines used for the treatment of osteoporosis. Ways of pharmacocorrection of increased bone fragility. Classification of drugs used in osteoporosis. Characteristics of drugs that reduce bone resorption. Substances that increase bone mass. Medicines that restore the physiological structure of bone tissue.

Topic 3.7. Self educational activity of the student - 20 hours.

Medicines acting on immune processes. Classification. Immunostimulating agents, effect on the main links of immunogenesis, indications. Pharmacodynamics of immunosuppressants, indications, side effects, contraindications.

Topic 3.8. Self educational activity of the student - 18 hours.

Modern probiotics and prebiotics. The importance of normal microbiom for the body's vital functions. Probiotics, definition, classification. Mechanism of action of bifid and lacto-containing drugs. Indications for the use of probiotics. Prebiotics, definition, mechanism of action, indications for use, contraindications.

**5.2.7. INTERTERM ATTESTATION**

**Preparation for attestation** – 33 hours.

**5.2.8. EXAM**

The certification test is conducted in the form of an exam.

The ticket contains three questoins:

**Question 1**. Basic pharmacology or rules of prescription

**Question 2.** Special pharmacology

**Question 3.** Special pharmacology

When conducting the exam, at least 40 minutes are allocated for the preparation.

The student's answer lasts no more than 30 minutes.

**6. MATERIAL, TECHNICAL, EDUCATIONAL AND METHOLOGICAL RESOURCES OF THE DISCIPLINE**

**6.1 TABLE OF BASIC AND ADDITIONAL LITERATURE**

**Basic literature:**

1. Kharkevich, D.A. Pharmacology with a general formulation: textbook / D.A. Kharkevich. - Moscow: GEOTAR-Media, 2018. - 464 p. - ISBN 978-5-9704-4491-7. - Text: electronic. // Geotar: [site]. - URL: https://www.studentlibrary.ru/book/ISBN9785970444917.html (date of access: 04/26/2024). - Access mode: by subscription

2. Kharkevich, D.A. Pharmacology: textbook / D.A. Kharkevich. - Moscow: GEOTAR-Media, 2021. - 752 p. - 978-5-9704-5883-9. - Text: electronic. // Geotar: [site]. - URL: https://www.studentlibrary.ru/book/ISBN9785970458839.html (date of access: 26.04.2024). - Access mode: by subscription

3. Kharkevich, D.A. Pharmacology with a general prescription: textbook / D.A. Kharkevich. - Moscow: GEOTAR-Media, 2022. - 464 p. - 978-5-9704-7024-4. - Text: electronic. // Geotar: [site]. - URL: https://www.studentlibrary.ru/book/ISBN9785970470244.html (date of access: 26.04.2024). - Access mode: by subscription

**Additional literature:**

1. Vengerovsky, A.I. Pharmacology. Lecture course: textbook for universities / A.I. Vengerovsky. - 4th ed., revised and enlarged. - M .: GEOTAR-Media, 2015. - 736 - 978-5-9704-3322-5. - Text: direct.

2. Vengerovsky, A.I. Pharmacology: textbook / A.I. Vengerovsky. - Moscow: GEOTAR-Media, 2022. - 848 p. - ISBN 978-5-9704-6722-0. - Text: electronic. // Geotar: [site]. - URL: https://www.studentlibrary.ru/book/ISBN9785970467220.html (date accessed: 26.04.2024). - Access mode: by subscription

3. Alyautdin, R.N. Pharmacology. Ultra light: a tutorial / R.N. Alyautdin. - Moscow: GEOTAR-Media, 2018. - 592 p. - 978-5-9704-4330-9. - Text: electronic. // Geotar: [site]. - URL: https://www.studentlibrary.ru/book/ISBN9785970443309.html (date accessed: 26.04.2024). - Access mode: by subscription

4. Alyautdin, R.N. Pharmacology. Ultra light: a tutorial / R.N. Alyautdin. - Moscow: GEOTAR-Media, 2023. - 529 p. - 978-5-9704-7197-5. - Text: electronic. // Geotar: [site]. - URL: https://www.studentlibrary.ru/book/ISBN9785970471975.html (access date: 04/26/2024). - Access mode: by subscription

5. Alyautdin, R.N. Pharmacology. Illustrated textbook: textbook / R.N. Alyautdin. - Moscow: GEOTAR-Media, 2019. - 352 p. - 978-5-9704-4939-4. - Text: electronic. //Geotar: [website]. - URL: https://www.studentlibrary.ru/book/ISBN9785970449394.html (date of access: 26.04.2024). - Access mode: by subscription

6. Kulinenkov, O.S. Pharmacology in sports practice: monograph / O.S. Kulinenkov. - Moscow: Sport, 2022. - 216 p. - 978-5-907225-81-7. - Text: electronic. // Geotar: [site]. - URL: https://www.studentlibrary.ru/book/ISBN9785907225817.html (date of access: 26.04.2024). - Access mode: by subscription Prepared in the 1C:University system (000000051) Page 25 of 27

**6.2 PROFESSIONAL DATABASES AND INTERNET RESOURCES, WITH SUPPORTED ACCESS FOR PARTICIPATING STUDENTS**

1. Windows XP, 7, 8, 10 and higher

2. Microsoft Office 2007 (2010, 2013, 2016)

3. Kaspersky Endpoint Security antivirus

4. IRBIS 64 library automation system 5. Educational portal of the Federal State Budgetary Educational Institution of Higher Education South Ural State Medical University of the Ministry of Health of Russia <http://do.chelsma.ru>

6. Browsers

**6.3. SOFTWARE AND INFORMATION SYSTEMS, WHICH ARE USED IN THE COURSE OF EDUCATIONAL PROCESS BY DISCIPLINE**

Currently no used

**6.4 SPECIAL AUDITORIUMS, LABORATORIES AND LABORATORY EQUIPMENT**

**Auditorium K1-218**

Interactive multimedia complex for educational activities - 1 pc.

Student desk - 12 pcs.

Teacher's desk - 1 pc.

Teacher's chair - 1 pc.

Student chair - 23 pcs.

Blackboard - 1 pc.

**Auditorium K1-219**

Interactive multimedia complex for educational activities - 1 pc.

Student desk - 12 pcs.

Teacher's desk - 1 pc.

Teacher's chair - 1 pc.

Student chair - 23 pcs.

Blackboard - 1 pc.

**Auditorium K1-321**

Information board - 1 pc.

Interactive multimedia complex for educational activities - 1 pc.

Student desk - 12 pcs.

Teacher's desk - 1 pc.

Teacher's chair - 1 pc.

Student chair - 21 pcs.

**Auditorium K1-323**

Information board - 1 pc.

Interactive multimedia complex for educational activities - 1 pc.

Student desk - 12 pcs.

Teacher's desk - 1 pc.

Teacher's chair - 1 pc.

Student chair - 24 pcs.

**Auditorium K1-327**

Interactive multimedia complex for educational activities - 1 pc.

Student desk - 12 pcs.

Teacher's desk - 1 pc.

Teacher's chair - 1 pc.

Student chair - 22 pcs.

Educational board - 1 pc.

**Auditorium K1-328**

Interactive multimedia complex for educational activities - 1 pc.

Student desk - 12 pcs.

Teacher's desk - 1 pc.

Teacher's chair - 1 pc.

Student chair - 24 pcs.

Blackboard - 1