Ministry of Education and Science of Ukraine

V.N. Karazin Kharkiv National University

Department of General Practice-Family Medicine

**«APPROVED»**

### Vice-President

### for Research and Education \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Anton V. Panteleimonov

“\_\_\_\_” \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_2020

Working program of educational discipline

**«Pharmacology»**

(name of the discipline)

level of higher education second (master)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

education sector 22 "Public health"\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(code and name)

specialty 222 "Medicine"\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(code and name)

type of discipline required\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(required / optional)

faculty medical\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2020 / 2021 **academic year**

The program is recommended for approval by the Academic Council of the Medical Faculty

 “28” August 2020, Minutes № 11

DEVELOPERS OF THE PROGRAM: PhD, Medical Sciences, Professor, Head of the Department of General Practice-Family Medicine Nikolenko E.Ya., PhD, Medical Sciences, Associate Professor of the Department of General Practice-Family Medicine Kratenko G.S., PhD, Pharmaceutical Sciences, Assistance of the Department of General Practice-Family Medicine Gaidukova O.O.

The program was approved at a meeting of the Department of General Practice-Family Medicine of the Medical Faculty

Minutes of “28” August 2020 № 1

Head of the Department of General Practice-Family Medicine

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ E. Ya. Nikolenko

 (signature) (surname and initials)

The program was approved by the Methodical Commission of the Medical Faculty

Minutes of “28” August 2020 № 11

Chairman of the Methodical Commission of the Medical Faculty

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ O. L. Govalenkova

 (signature) (surname and initials)

**INTRODUCTION**

The program of the discipline "Pharmacology" elaborated in accordance with the educational and professional training program

second (master's) level of higher education

education sector: 22 "Public health"

specialty: 222 "Medicine"

educational qualification: "Master of Medicine"

professional qualification: "Doctor"

**1. Description of the discipline**

The working curriculum for the discipline "Pharmacology" for the 2020/2021 academic year has been developed and compiled in accordance with the following regulations:

* educational and qualification characteristics (EQC) and educational and professional programs (EPP) of training, approved by the resolution of the Cabinet of Ministers of Ukraine dated 29.04.15. for № 266 direction of training "On approval of the list of industries and knowledge and specialties in which the training of higher education";
* curriculum for training specialists in the field of knowledge 22 "Health", specialty 222 "Medicine", educational qualification level "Master", professional qualification "Doctor" for approved by the order of the Ministry of Education and Science of Ukraine from 06.11.2015. №1151 "On the peculiarities of the introduction of the list of branches of knowledge and specialties for which higher education is carried out" approved by the resolution of the Cabinet of Ministers of Ukraine dated 29.04.15 for № 266;
* methodological recommendations for the development of standards of higher education, approved by the order of the Ministry of Education and Science of Ukraine from 01.06.2016. № 600 “On approval of recommendations for the development of higher education standards” as amended by the order of the Ministry of Education and Science of Ukraine dated 21.12.2017. for № 1648;
* requirements for the development of training programs according to the order of the Ministry of Health of Ukraine № 476 from 18.07.2016 "On amendments to the order №290 of 05.05.2016";
* instructions on the system of assessment of students' educational activities in the conditions of implementation of the European credit-transfer system of organization of the educational process, approved by the Ministry of Health of Ukraine on April 15, 2014;
* Order of the Rector of Kharkiv National University "On the organization of the educational process in the first semester of 2020/2021 academic year" from 07.08.2020 and quarantine restrictions established by the Resolution of the Cabinet of Ministers of Ukraine of 22.07.2020 №641 "On the establishment of quarantine and the introduction of enhanced anti-epidemic measures in areas with a significant spread of acute respiratory disease COVID-19 caused by coronavirus SARS-CoV-2".

**The subject of pharmacology** are interactions taking place between drugs and living organisms; use of drugs for the treatment and prophylaxis of diseases.

**Interdisciplinary connections:**

Pharmacology is based on studying medical biology, medical physics, medical chemistry, biological and bioorganic chemistry, normal and pathological physiology, Latin; provides the basis for studying clinical subjects, involves integration with the subjects and is intended to develop skills of applying knowledge of pharmacology in the future studying and professional activity.

* 1. **The aim of teaching the discipline**

The aim of teaching pharmacology is development of theoretical knowledge and formation of practical skills related to principles of justification of rational medicines use for the treatment and prophylaxis of diseases. Achieving this goal would provide preparing of students for their professional activity, qualitative performance of functional obligations related to justification of rational medicines use, formulation of treatment regimens with their further implementation.

* 1. **The main learning objectives**

**The main learning objectives** is generation of knowledge of pharmacological groups of drugs, their pharmacokinetics, pharmacodynamics, adverse effects, symptoms of drugs overdose, clinical indications, interactions with other drugs, formation of skills of prescribing drugs in different dosage forms.

* 1. **Normative content of training**

According to the requirements of High Education Standard, discipline pharmacology provides formation of student’s competencies:

* *integral:* ability to solve typical and complex practical problems in professional activity; to use obtained knowledge, skills, personal qualities, capabilities, values to meet the challenges of practical work.
* *general:* ability to analyze and synthesize, to organize and plan, ability to use knowledge’s in practical situations; to evaluate and provide the quality of the work performed, ability to the behave in a socially responsible way.
* *special (professional):* ability to explain the main mechanisms of drugs action and the main pharmacological effects based on the changes of physiological functions of human cells, organs and systems; ability to choose pathological states requiring use of certain drugs; ability to choose adequately the dose of drug, its dosage form; ability to choose the drug taking into consideration its safety.

Details of the competence ere set out below in the matrix table of competences according to NFC (National Framework of Competencies) descriptions.

**The Matrix of Competence**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| № | Competence | Knowledge | Skills | Communication | Autonomy and responsibility |
| 1. | Ability to determine pharmaocinetics and pharmacodynamics of drugs | To know pharmaocinetic and pharmacodynamic parameters of drugs | Be able to use knowledge about the mechanism of acting, pharmaocinetic and pharmacodynamic parameters of drugs while indication medicatiions for treatment of patients | To use corectly professional terms in scienctific community | To be responsible for correct pharmacological characterization of drugs |
| 2. | Ability to justify the main clinical indicationfor drugs, adequate dosage forms, routes of administration, interactions with other drugs | To know the characteristics of the main routes of sdministration of drugs, mechanism of their absorbtion and distribution, metabolism and elimination | Be able to use obtaines knowledge while choosen the drug for cpecific clinical conditional | To use corectly professional terms in scienctific community | Be responsible for prescribing ofdrugs for treatment of patients |
| 3. | Ability to identify manifestations of adverse effects of drugs and symptoms of overdose; and to correct and prevent them | To know mechanisms of adverse effects development and ways of their correction | Be able to interpret adverse effects development and their correction | To use correctly professional terms in scientific community | To responsible for correct interpritation of adverse effects development and their correction |
| 4. | Ability to elaborate the algorithm of first aid to treat acute drug overdose | To know characterization of antidotes | Be able to use first aid algoritm for the treatment of acute drug overdose | To use correctly professional terms in scientific community | Be responcible for correct first aid algorithm for the treatment of acute drug overdose |
| 5. | Ability to write and analize prescriptions for drugs from different pharmacological groups and in different dosage forms | Principles of prescriptions order writting | Be able to use principles of prescription order writing for different medications | To use correctly professional terms in scientific community | Be responcible for prper prescription order writting |

* 1. **Number of credits - 7 credits. The total number of hours is 210 hours.**
	2. **Characteristics of the academic discipline**

|  |
| --- |
| Normative |
| Blended / full-time study |
| Year of preparation |
| 3rd |
| Semester |
| 5th, 6th |
| Lectures |
| 30  |
| Practical training |
| 70 |
| Laboratory exercises |
| 0 |
| Self work |
| 110  |
| Individual tasks |
| 0 |

* 1. **Planned learning outcomes**

As a result of studying the discipline, students must achieve the following learning outcomes:

*know:*

* basic principles of pharmacological correction of main pathological disorders;
* nomenclature and classification of medicines;
* pharmacological characteristic of the main pharmacological groups and mechanisms of their action;
* indications to the administration of medicine, appropriate medicinal form, routes of administration and drug-drug interaction;
* side and adverse effects of drugs, symptoms of overdose; its prevention and treatment.

*be able to:*

* to define the pharmacological group of drugs appropriate to the modern classifications;
* to determine the pharmacodynamics and pharmacokinetics of drugs and their mechanism of action;
* to explain adequate medical form, ways of introduction and drug-drug interaction with other medicine;
* identify signs of possible side effects and overdose symptoms, methods of prevention and treatment;
* make an algorithm of pharmacotherapy in acute poisonings;
* explain the dependency of drugs action and age of patients, concomitant diseases and pharmacotherapy;
* write out the prescription in different medicinal forms.

**2. Program content**

The program includes three modules:

* **Module 1: Medical prescription. General pharmacology. Drugs acting on the nervous system:**

Section 1: Medical prescription. General pharmacology.

Section 2: Pharmacology of drugs acting on the peripheral nervous system.

Section 3: Pharmacology of drugs acting on the central nervous system.

* **Module 2: Pharmacology of drugs affecting metabolism and the function of organs and systems:**

Section 4: Pharmacology of drugs affecting on the function of organs and systems.

Section 5: Pharmacology of drugs affecting metabolism, inflammation, immune process.

* **Module 3: Pharmacology of chemotherapeutic agents.**

Section 6: Pharmacology of chemotherapeutic agents. Principles of treatment of acute poisonings of drugs.

**Module 1: Medical prescription. General pharmacology.**

**Drugs acting on the nervous system.**

**Section 1:** **Medical prescription. General pharmacology.**

*Specific goals:*

* *generalize and analyze the characteristics of solid and semi-solid medicinal forms, peculiarities of their production, routes of administration and rules of prescribing.*
* *generalize and analyze the characteristics of liquid medicinal forms, peculiarities of their production, routes of administration and rules of prescribing.*
* *generalize and analyze the characteristics of new dosage forms, peculiarities of their production, routes of administration and rules of prescribing.*
* *evaluate the value of a property written signature.*
* *generalize and analyze the main pharmacological terms.*
* *generalize and analyze the basic laws of the pharmacokinetics.*
* *generalize and analyze the basic laws of the pharmacodynamics.*
* *to evaluate the importance of pharmacology as a fundamental discipline for the development of other disciplines and areas in medicine.*
* *analyze the main stages of the development of pharmacology as a science.*

**Topic 1. Medical prescription.**

Rules of drug prescribing. Part of prescription. Types of prescription forms. Analysis of the structure and content of the medical prescription. Classification of dosage forms.

**Topic 2. The solid medicinal forms.**

Solid and semi solid medicinal forms: powders, dusting powders, tablets, capsules, lozenges, caramels, dragees, microdragee, spansules, granules, suppositories. Rules of prescribing.

**Topic 3. The soft medicinal forms.**

Soft medicinal forms: ointments, pastes, liniments, plasters, poultices, baths. Rules of prescribing.

**Topic 4. The liquid medicinal forms.**

Liquid medicinal forms: mixtures, drops for internal usage, tinctures, extracts, infusions, decoctions, slime, syrups, aromatic water, emulsions, suspensions, drinks, carbonated drinks, elixirs, balms, enema, inhalation aerosols. Rules of prescribing. Routes of administration.

**CURRENT CONTROL:** solving situational tasks, test control of theoretical knowledge’s.

**Topic 5. General Pharmacology. History of Pharmacology.**

Determination of pharmacology. Pharmacology in the medical and biological sciences. The main sections of pharmacology: theoretical, experimental, physico, chemical, biochemical, physiological and clinical. New areas of pharmacology: pediatric, geriatric, radiation, immunopharmacology, psychopharmacology, pharmacogenetics, chronopharmacology. Modern development of pharmacology in Ukraine. The main achievements of the national pharmacologists.

Pharmacokinetics of drugs. Route of administration (enteral and parenteral varieties). Types of absorption and their underlying mechanisms (active transport, passive and facilitated diffusion, filtration, pinocytosis). The concept of bioavailability and bioequivalence. Binding of drugs to plasma proteins and other biolygands. The distribution of drugs in the body. Penetration through histohematogenous barriers; placental, blood-brain and others. Depositing medication.

Biotransformation of drugs, its species. The concept of basic pharmacokinetic parameters (absorption rate constant, period of cemi-elimination stationary concentration, clearance of drug). Age peculiarities of pharmacokinetics (children in the first years of life and in the elderly). Determination of dose, dose types: single, daily, course, impact, fragmented, supportive, preventive, therapeutic, middle and higher therapeutic, toxic and lethal. Latitude therapeutic effect. The concentration of drug in medicinal forms or biological fluid. Value depends "concentration (dose) - effect" in pharmacology. Pharmacodynamics of drugs. The concept of receptors, including specific, agonists, antagonists. Synergy, potentiation, antagonism of drugs action. Types of drugs (direct, indirect, reflex, local, resorptive, selective, reversible, irreversible, specific and nonspecific, the main and side). Types and methods of action of drugs. Metabolism (proteins, lipids, carbohydrates, electrolytes) as an object influence of drugs.

Factors affecting the pharmacodynamics and pharmacokinetics.

Features of drugs in their re-use. The concept of material and functional cumulation. Tolerance or addiction (as variety - tachyphylaxis), dependence on drugs action (mental, physical). The concept of withdrawal and return synaroms. Medical and social aspects of the fight against drug addiction. Combined action of drugs - synergy (summation, potentiation), antagonism. Incompatibility of drugs.

The concept of the safety of medicines. Side effects of medicines. Types of side effects. Overdose absolute and relative (toxic effects). Lactose. Idiosyncrasy. Allergic reaction. Mutagenicity, Teratogenicity, embryotoxic fetotoxyc effects, carcinogenicity. Pharmacovigilance system in the world and Ukraine. Basic principles and types of interaction of drugs. Characteristic of physico-chemical (pharmaceutical), pharmacokinetic and pharmacodynamic drug interactions.

**Section 2: Pharmacology of drugs acting on the peripheral nervous system.**

*Specific goals:*

* *to generalize and analyze* the main ways of pharmacological correction (exposure) of *dysfunction sensory nervous system.*
* *to explain and analyze the basic classification of drugs that affect the afferent nervous system.*
* *to explain the pharmacological characterization of basic drugs, explain the mechanisms of action.*
* *to analyze the indications for the use of medicines in accordance knowledge of pharmacodynamics.*
* *evaluate the ratio benefit / risk for use of drugs that affect the peripheral nervous system.*
* *develop an algorithm for patients with acute poisoning by cocaine, muscarinic, anticholinergic agents, atropine nicotine. To understand the applicability of antidotes in each case.*
* *to explain the dependence of drugs that affect the peripheral nervous system of features pharmacokinetics in patients of all ages, concomitant diseases and their treatment.*
* *remove judgments about the potential side effects of drugs to prevent them.*
* *writing and analyzing prescriptions for drugs that affect the function of the efferent nervous system.*

**Topic 6. The drugs acting on afferent nervous system, local anaesthetics, astringents, covering, adsorbing and irritant drugs.**

Drugs affecting the afferent innervation. Classification of drugs affecting the afferent innervation. Drugs for local anesthesia. Classification according to chemical structure and use for different types of anesthesia. Requirements for the preparations of local anesthetics. Pharmacology of esters (novocaine, trimecaine, anestezine benzocaine) and substitution of amides (xykaine, articaine, bupivacaine). Comparative characteristics of local anesthetics and complex preparations based on them. Indications. Purpose and features of combination with adrenergic agonists. Adverse effects of local anesthetics, measures of prevention and treatment. Toxicology of cocaine. Astringent medicines. Organic and inorganic astrinsents drugs. The mechanism of action, indications for use. Pharmacological characterization of tannin, bismuth nitrate, herb hyperici, folium salvaie, chamomile flowers. Complex products based on them. Coating drugs. General characteristics of the coating drug. The mechanism of action, indications (mucus starch, flax seed). Adsorbing drugs. Classification of adsorbing agents. Mechanism of action. Indications. Preparations of carbon (activated charcoal). Synthetic sorbents (enterosgel). Principles of hemodialysis and enterosorption. Drugs that irritate sensitive nerve ending. Classification of irritants. Mechanism of action. Effects on the skin and mucous membranes. Indications.

**Topic 7. Cholinomimetics.**

Anatomical and physiological properties of the autonomic nervous system. Modern understanding of nerve synapses, neurotransmitters and receptors. Classification of drugs affecting the autonomic nervous system. Drugs that affect the function of cholinergic nerves. The concept of cholinergic receptors. Classification of affecting the function of cholinergic nerves. Pharmacological effects arising from the excitation and inhibition of cholinergic receptors. Cholinomimetic drugs M-and N-cholinomimetic drugs. Pharmacology carbacholin. M-cholinomimetics. Pharmacological characterization of pilocarpine hydrochloride. Impact on eyesight, smooth muscles of internal organs, glands secretion, cardiovascular and urogenital system. Indications. Acute muscarinic poisoning. Assistance measures, antidote therapy. N-cholinomimetics. Pharmacological effects of Nicotine. Smoking as a medical and social problem. Drugs used to treat tobacco dependence.

Anticholinestherase drugs and cholinesterase reactivators. Classification of anticholinesterase agents. The mechanism of action, pharmacological effects, indications, side effects. Comparison of anticholinesterase agents (Neostigmine, Galantamine hydrobromide, Pyridostigmine bromide). Features of organophosphorous compounds (POS). Acute poisoning POS and assistance. Pharmacology reactivators POS (Alloxime).

**Topic 8. Cholinoblockers.**

Cholinoblockers drugs. M-and N-cholinoblockers. Indications. Side Effects. M-cholonoblocker drugs. Pharmacological characterization of Atropine sulfate. Indications. Acute poisoning Atropine and plants that contain it. Measures assistance. Plathyphyllinum hydrotartras, Scopoluminum hydrobromidum, extract of Belladonna, Ipratropium bromide, Pirenzepin. Comparative characteristics. Indications. Side Effects.

Classification ganglionblockers. Mechanism of action. Pharmacological effects, indications, side effects. Characteristics of drugs: Benzohexonium, Higronium, Pentamine.

Classification of myroleraxants. Pharmacokinetics, pharmacodynamics Tubocurarine chloride. Indications, side effects. Comparison of muscle relaxants Pipekuronium bromide, Rocuronium bromide. Clinical symptoms of overdose and helping overdose nondepolarizing (curareform) muscle relaxants. Pharmacological characterization of Dytylin muscle relaxants. Indications. Overdosage treatment.

**Topic 9. Adrenomimetics.**

Drugs that affect the adrenergic innervation. Modern concepts of adrenergic receptors, their types and localization. Classification of influencing the adrenergic innervation. Adrenomimetics. Pharmacological characteristic of agonists. Pharmacokinetics, pharmacodynamics of Epinephrine (Adrenaline hydrochloride). Indications. Comparison of agonists (Norepinephrine / Noradrenaline, Ephedrine hydrochloride, Phenylephrine / Mezatone / Naftizin, Salbutamol, Fenoterol). Indication. Side effects.

**Topic 10. Antiadrenergic drugs. Dophaminergic and histaminergic drugs.**

Anti-adrenergic drugs. Adrenoceptors blocking drugs. Uses of α-blockers (Doxazosin, Terazosin), mechanism of action and pharmacological effects of β-blockers. Comparison of Propranolol / Talinolole, Atenolol, Metoprolol. The concept of intrinsic sympatnomimetic activity. Sympatholytics (Reserpine, Octadyn). Mechanism of action and indications for use, side effects. Dopaminergic, serotonergic, histaminergic and GABA-ergic drugs. General ideas. Pharmacodynamics, mechanism of action, indications, side effects.

**Section 3: Pharmacology of drugs acting on the central nervous system.**

*Specific goals:*

* *summarize and analyze the basic ways of pharmacological correction (exposure) disorders of the central nervous system.*
* *explain basic classifications of drugs that suppress the central nervous system.*
* *explain the pharmacological characterization of basic drugs, explain the mechanisms of action.*
* *interpret the ratio of indications for the use of medicines in accordance knowledge pharmacodynamics.*
* *assess the benefit / risk for use of drugs that affect the central nervous system.*
* *create algorithm care for patients with acute poisoning by hypnotics, morphine and other narcotic analgesics, amphetamines.*
* *to understand the applicability of antidotes in each case.*
* *to explain the dependence of action of drugs affecting the central nervous system of features pharmacokinetics in patients of all ages, concomitant diseases and their treatment.*
* *remove judgments about the potential side effects of drugs to prevent them.*
* *draw and prescriptions for drugs that depress the central nervous system.*

**Topic 11. The drugs for general anaesthesia. Pharmacology and toxycology of Ethanol.**

History of discovery of an anesthetic. Types of anesthesia. Classification of an anesthetic. Requirements for equipment for anesthesia. Theories of anesthesia. Drugs for inhalation anesthesia. Ether as an anesthetic, isoflurane, nitrous oxide. Comparative characteristics, side effects. Combined use of an anesthetic medication with other pharmacological groups. Drugs for introvenous anesthesia. Classification by duration. Pharmacological characterization Ketamine, Thiopental sodium, Sodium oxybutyrate. Comparison of drugs. The concept of sedation, introductory, basic, combined anesthesia. Alcohol. Drugs for Treating alcoholism. Pharmacology and toxicology of alcohol, use in clinical practice. Acute and chronic alcohol poisoning treatment. The principle of treatment of alcoholism. The mechanism of action Teturum (Disulfiramum).

**Topic 12. Analgetics (opioids).**

Classification. Ways to eliminate pain. The concept of opiate receptors. Narcotic analgesics. Classification according to chemical structure, origin and affinity to opiate receptors. Mechanism of action. Pharmacology of Morphine hydrochloride. Features of the influencing of the drug on CNS. Omnopon, Codeine phosphate, Promedol, Fentanyl, Pentazocine, Tramadol, Buprenorphine. Comparative characteristics. Indications. Side Effects. Acute poisoning by narcotic analgesics. Clinical manifestations and assistance measures. Characteristic of Nalorfine hydrochloride, Naloxone, Naltrexone. Drug dependency occurs to narcotic analgesics, clinical manifestations, the concept of withdrawal symptoms, treatments. Addiction as a social and biological problem. Non-narcotic analgesics.

**Topic 13. Analgetics (nonopioids). Nonsteroidal anti-inflammatory medicines (pain pharmacocorrectors).**

Classification of non-narcotic analgesics in chemical structure. General characteristics of the group. Mechanisms of analgesic, antipyretic, anti-inflammatory action. Pharmacological characterization of drugs: Acetylsalicylic acid, Acetaminophen, Ibuprofen, Mefenamic acid, Diclofenac sodium, Indomethacin, Piroxicam, Nimesulide, Amizon, Meloxicam (Movalis), Celecoxib. Comparative characteristics, indication, side effects.

**Topic 14. Neuroleptics, tranquilizers (anxiolytics).**

General characteristics of neuroleptics, classification drugs to chemical structure. General characteristics. The mechanism of antipsychotic action of neuroleptics. Pharmacological effects Aminazine. Triftazin, Droperidol, Haloperidol, Clozapine, Chlorprothixene, Sulpiride, Flourfenazyn. Comparative characteristics, indications for use. Side effects of neuroleptics. The concept of neuroleptanalgesia

Tranquilizers. Classification of tranquilizers. The mechanism of action of tranquilizies. Stimulation of benzodiazepine receptors. Pharmacology Chlozepide, Diazepam (Sibazon) Fenazepam. Comparative characteristics. Daily tranquilizers (Gidazepam, Medazepam). Indications and contraindications for use of tranquilizers and their side effects. Drug addiction. Combined use of drugs from other pharmacological groups.

**Topic 15. Hypnotic and sedatives drugs.**

Hypnotic drugs. Modern ideas about the nature of sleep. Main types insomnias. Classification of hypnotics in chemical structure and their general characteristics. Possible mechanisms of action. Phenobarbital, Nitrazepam, Bromizoval, Donormil, Chloral hydrate, Zopiklon, Zolpidem. Comparison of hypnotics different groups. Indications, side effects (impact syndrome, aftereffect, drug addiction). Acute poisoning with barbiturates, assistance measures.

Sedative drugs. Classification of sedatives. Pharmacology of bromides. Indications. Side Effects. Bromizm – clinical signs, treatment and prevention. Sedative drugs of plant origin (tincture of Valerian, tinctura Bursae pastoris, Corvaldin).

**Topic 16. Drugs for treatment of epilepsy and Parkinson’s disease.**

Anticonvulsant drugs. Seizures as a manifestation of the symptoms of various pathological conditions. The use of drugs of different pharmacological groups to address the court (tranquilizers, muscle relaxants, sedatives, narcotic drugs myotropic antispasmodics). Antiepileptic drugs. Classification of antiepileptic drugs by indication for use. Phenobarbital, Diphenine, Carbamazepine, Clonazepam, Aethosuccimid, Sodium Valproate, Lamotrigine. Comparative characteristics, side effects of antiepileptic agents. Antiparkinsonian drugs. Classification of drugs. Basic mechanisms of action. Levodopa, Amantadine, Biperiden, Selegilin, Nakom. Use in clinical practice. Drugs to treat muscle spasticity (benzodiazepines, GABA-ergic drugs (Baclofen) Midokalm). General characteristics.

**Topic 17. Antidepressants, lithium salts.**

Classification antidepressant, mechanism of action and chemical structure. Imizyn, Amitriptyline, Maprotiline, Pirazidol, Fluoxetine, Fluvoxamine, Sertraline. Monoamine oxidase inhibitors (Izocarboxazyd, Phenelzine). Comparative characteristics. Side effects of antidepressants. Salts of lithium. Lithium carbonate. Pharmacokinetics and pharmacodynamics, indications for use. Side Effects. Acute poisoning by lithium salts. Help for poisoning.

**Topic 18. Analeptics, psychomor stimulants, nootrops, drugs influencing on brain blood circulation. Treatment of migraine.**

Drugs that stimulate the central nervous system. Classification of psychotropic drugs excitatory action. Psychomotor stimulants. General characteristics of psychostimulants. Caffeine-sodium benzoate. Pharmacokinetics and pharmacodynamics, indications, side effects. The main pharmacological effects of Sidnocarb. Pharmacokinetics and pharmacodynamics of Caffeine-sodium benzoate. Indications. Drugs that give rise to addiction, drug and substance abuse. General characteristics of the basic substances (hallucinogens, opiates, opioids, surrogates opium, Amphetamines, Cocaine, antidepressants, barbiturates, tranquilizers, Alcohol, Nicotine, etc.). The social importance. Formation of addiction. Control measures.

Nootropic drugs. Classification of nootropic agents. Possible mechanisms of action. Indications for use. Pharmacology of Piracetam, Aminalon, Vinpocetine, Cavinton, Sermion, Pentoxyhlline, Sodium Oxybutyrate. The concept of psyhodysleptycs and amphetamines. Formation addiction social value. Adaptogens and actoprotektors. The concept of adaptogens and aktoprotektors. Indications. Tincture of ginseng, Schisandra tincture, liquid extract of Eleutherococcus, Pantocrinum, Bemithylum. Basic properties of drugs, comparative characteristics.

**CONTROL OF THE MODULE 1.** Control of practical skills; test control theoretical training.

**FINAL MODULE CONTROL:** control practical skills; test control theoretical training.

**Module 2: Pharmacology of drugs affecting metabolism and the function of organs and systems.**

**Section 4: Pharmacology of drugs affecting on the function of organs and systems.**

*Specific goals:*

* *to generalize and analyze the main ways of pharmacological correction of executive organs functions.*
* *explain and analyze the classification of drugs affecting the system of executive organs.*
* *explain the characteristics of the main pharmacological agents, explain the mechanisms of action.*
* *develop an algorithm of assistance measures in emergency situations.*
* *explain the dependence of the action of the drugs affecting of executive organs depending from characteristics of pharmacokinetics in patients of different ages and health.*
* *make judgments about the possibility of side effects of drugs in order to prevent them.*
* *writing and analyzing of prescription orders for drugs that affect the function of executive organs and systems.*

**Topic 19. Cardiotonic, antiarrhythmic drugs. Antianginal drugs.**

Classification and general characteristics of drugs affecting the cardiovascular system. Cardiotonis. Classification cardiotonic agents. Pharmacokinetics and pharmacodynamics of cardiac glycosides. Comparison of Strophanthin, Corglikon, Digoxin, Adonis herb infusions. Indications and contraindications for use. Side effects of cardiac glycosides. Acute and chronic poisoning cardiac glycosides. Measures care and prevention. Pharmacological characterization non-glycosides cardiotonic agents. Dobutamine, Dopamine. Indications. Antiarrhythmic drugs. General pharmacological characterization of antiarrhythmic drugs. Causes of arrhythmias and ways of treatment. Classification of antiarrhythmic drugs for indications for use and mechanism of action. Pharmacokinetics and pharmacodynamics of antiarrhythmic drugs with membrane stabilizing effect (Quinidine sulfate, Novokainamid). Comparison of drugs. Pharmacokinetics and pharmacodynamics of subgroups lidocaine hydrochloride (Trimecaine, Diphenine). Indications. β-blockers (Inderal, Atenolol, Metoprolol), potassium blockers (Amiodarone) and calcium channels blockers (Verapamil, Diltiazem) in the treatment of disorders of cardiac rhythm. The mechanism of action of antiarrhythmic drugs potassium and magnesium. Drugs used in bradycardia (M-cholinoblockers, adrenomimetics, Glucagon).

Classification and general pharmacological characterization of antianginal drugs. Pharmacokinetics and pharmacodynamics of nitroglycerin, side effects. Comparative pharmacological characteristics of drugs that contain nitroglycerin (Sustak, Isosorbide dinitrate, Isosorbide mononitrate). The mechanism of action of calcium channel blockers (calcium antagonists). Pharmacological characterization of Verapamil, Amlodipine. Features used in the treatment of patients with coronary heart disease β-blockers (Inderal, Atenolol, Metoprolol), vasodilators myotropic action (Dipyridamole, Papaverine hydrochloride, Drotaverine (Nospanum) reflex type of (Validol) and utility vehicles (Trimetazidine, ATP-long, antioxidants, antihypoxants). Indications and contraindications for use, side effects. notion of steal syndrome. Principles of the treatment of myocardial infarction. General characteristic pharmacological groups prescribed in myocardial infarction.

**Topic 20. Hypertensive and antihypertensive drugs. Hypolipidemics drugs.**

Ways pharmacological correction of high blood pressure. Modern clinical classification of antihypertensive agents. Pharmacological characterization of antihypertensive agent’s core group. Pharmacology of β-blockers - Propranolol (Inderal), Atenolol, Talinolol, Metoprolol; α1-blockers: Prazosin, Doxazosin; α-and β-blockers: Labetololu, Carvedilol ACE inhibitors: Captopril (Capoten), Enalapril, Lisinopril; blockers angiotensin II (Losartan), calcium antagonists (Nifedytpin, Amlodipine), diuretics (Clopamid, Furosemide, Dyhlotiazyd, Spironolactone). Medicines additional group. Pharmacological characterization of central α2-agonists: Clonidine; sympatholytics: Reserpine, Metildofa, peripheral vasodilators: Pentoxifylline, Sodium nitroprusside, Drotaverine (Nospanum), Papaverine hydrochloride, Magnesium sulfate. Principles of combination antihypertensive drugs. Comparative pharmacological characteristics listed groups, the rate of hypotensive effect. Medical aid for hypertensive crisis. Classification of hypertensive mechanism of action.

General pharmacological characterization of lipid-lowering drugs, action orientation. Classification of hypolipidemic drugs, mechanism of action. Pharmacokinetics and pharmacodynamics of Cholestyramine, Lovastatin, Essenciale, Fenofibrate. The use of anticoagulants (Heparin), antioxidants (Tocopherol acetate) in treatment hiperlipidemic states. Characteristics of drugs. Mechanism of action. Side Effects. Indications and side effects.

**Topic 21. Drugs improving brain blood circulation.**

Drugs that improve microcirculation in the brain. Basic principles of treatment and prevention of cerebrovascular failure. The use of antiplatelet agents (Acetylsalicylic acid, Clopidogrel, Dipyridamole), anticoagulants (Heparin, Syncumar, Warfarin), fibrinolytics (Streptokinase), calcium channel blockers (Cynarysin, Nymodipin), derivatives of ergot alkaloids (Nicergoline), ginseng alkaloids derivatives (Aminolone), purines derivatives (Pentoxifylline) and others. Drugs used Alzheimer’s disease.

**Topic 22. Drugs acting on renal function and myometrium. Drugs for treatment of gout, uricosuric agents.**

Classification of diuretics in chemical structure, localization, activity and mechanism of action. Pharmacokinetics and pharmacodynamics of Furosemide, Hydrochlorothiazide, Clopamide, indications, side effects. Comparative pharmacological characteristics of drugs that retain potassium - Spironolactone, Triamterene. The concept of forced diuresis Osmotic diuretics (Mannitol). Indications. Side effects. Herbs that have a diuretic effect: herb Horsetail leaves Ortosyfone, Lespenefryle. The principle of combined use of diuretic drugs.



**Topic 23. Respiratory system drugs.**

Stimulants breathing. Classification of respiratory stimulants. Pharmacological characterization Aetymizole. Camphor, Sulfokamfokain. Pharmacokinetics, pharmacodynamics, indications for use. Antitussive drugs. Classification antitussives. General characteristics of Codeine phosphate, Glautsin, Okseladyn, Libeksyn. Side effects. Expectorants. Classification expectorants, mechanism of action. The pharmacological characteristics of drugs Thermopsis herbs, roots infusion Althea, Mukaltin, crystalline Trypsin, Bromhexine, Ambroxol, Acetylcysteine. Pharmacokinetics and pharmacodynamics, side effects. Stimulants synthesis of surfactant. General characteristics of surfactant synthesis stimulants. Classification bronchodilators. Pharmacology adrenomimetics: Salbutamol, Orciprenaline sulphate, Fenoterol, M-holinoblockers: Ipratropium bromide, Tiotropium bromide. Myotropic bronchodilators - Theophylline, Aminophylline. Pharmacokinetics, pharmacodynamics, side effects. Applicability antiallergic, desensitizing agents. General characteristics of Cromolyn sodium, Ketotifen and topical anti-inflammatory drugs: Beclomethasone dipropionate. Drugs used in pulmonary edema. Tactics assist with pulmonary edema, choice of drugs (Strophanthin, Digoxin, Corglikon, Hihronium, Pentamino, Benzoheksonium, Furosemide, Mannitol, Mezaton, Ephedrine hydrochloride, Morphine hydrochloride, Fentanyl, Ethyl alcohol, steroids).

**Topic 24. Drugs acting on digestive system.**

Drugs that affect appetite. General pharmacological characteristics, classification of drugs affecting appetite and used for the treatment of anorexia and bulimia. Drugs that stimulate the appetite: bitterness (wormwood, centaury normal), drugs of different chemical groups (insulin, psychotropics, anabolic steroids). Anorexigenic drugs: classification, comparative characteristics, side effects. Emetic and antiemetic drugs (Metoclopramide, Ondasetron). The mechanism of action of emetics and their application. Pharmacological characterization of emetics centrally acting (Apomorphine hydrochloride). General Characteristics of antiemetic drugs: neuroleptics, M-holinoblockers, antihistamines. Pharmacokinetics and pharmacodynamics of Metoclopramide. Side Effects. Drugs used in the dysfunction of gastric glands. General pharmacological characterization of stimulating the secretion of gastric glands and used for diagnostic purposes (Pentagastrin) and substitution (Pepsin, gastric juice natural, diluted hydrochloric acid). Classification and general pharmacological characterization of drugs, which inhibit the secretion of gastric glands. Use in treatment of gastric ulcer, duodenal ulcer. Pharmacological characterization of histamine H2-blockers receptor (Ranitidine, Famotidine), Comparative characteristics of drugs. Pharmacological characterization of proton pump inhibitors (Omeprazole). Antacids agents. General pharmacological characterization tools that reduce the acidity of gastric juice. Pharmacodynamics of sodium bicarbonate as an antacid, indications, side effects. Pharmacology of magnesium oxide, aluminum hydroxide. Comparison of antacid. Principles combination. The use of combined preparations (Almagel, Maalox) in clinical practice. Gastro protectors. General pharmacological characteristics of drugs that reproduce the mechanical protection of the mucous membrane and drugs that increase mucosal resistance to the action of damaging factors (Misoprostol). Drugs used in violation of the excretory function of the pancreas. Classification of stimulating the excretory function of the pancreas and used for replacement therapy (pancreatin, panzinorm forte, forte mezim, Festal, Creon). Indications. Characteristics of drugs that inhibit the activity of the excretory pancreas (kontrikal, acid aminokapronovaya). Indications. General characteristics of stimulating the formation of bile. The mechanism of action of choleretic containing bile and natural bile acids ("Alohol" holenzim, henodezoksiholevoy acid), vegetable (immortelle flower, corn stigmas, hips, holosas). Pharmacological characterization tools that increase the outflow of bile - holekinetiki (cholecystokinin, magnesium sulfate, M-holinoblockers, antispasmodics myotropic action). Indications. Hepatoprotectors. The mechanism of action of stimulating the liver function (legalon, darsyl, Essenciale, Gepabene, Thiotriazolin, vitamins). Indications. Drugs affecting intestinal motility. Tools that eliminate intestinal atony. M-cholinomimetics and anticholinergic drugsin treating intestinal atony. Laxatives. Classification of laxatives for localized action and origin. Pharmacokinetics, pharmacodynamics, indications for use of saline laxatives (magnesium sulfate). Application of acute poisoning. Pharmacological characterization of laxatives containing antrahlikozyds (drugs buckthorn, senna). Indications. Pharmacology of castor oil. Indications and contraindications for use. Synthetic laxatives zasobyl (hutalaks, Duphalac, bisacodyl). Mechanism of action. Indications. Combination of drugs with laxative effect (kafiol, rehulaks). Drugs that inhibit intestinal motor function. Pharmacology means eliminating intestinal spasm. Pharmacology of loperamide hydrochloride (Imodium). Indications. Side effects.

**Section 5: Pharmacology of drugs affecting metabolism, inflammation, immune process.**

*Specific goals:*

* *to generalize and analyze the pharmacological characteristics of drugs that affect metabolism, inflammation, and immune process.*
* *analyze the classification of drugs that affect metabolism, inflammation, and immune process.*
* *explain the pharmacological effects od drugs that affect metabolism, inflammation, and immune process.*
* *to create an algorithm for assistance to patients in urgent conditions (hypoglycemic and hyperglycemic coma, anaphylactic shock, spasmophilia)****.***
* *to analyze the indication to administration of vitamins and hormonal drugs in cases of substitutions or prophylactic therapy.*
* *writing and analyzing of prescription orders for drugs that affect metabolism, inflammation, and immune process.*

**Topic 25. Drugs acting on erythropoesis and leucopoesis. Drugs acting on blood coagulation.**

Drugs that affect the system haemopoiesis. Classification of drugs affecting the blood system. General characteristics of drugs that affect the blood. Drugs that affect erythropoiesis. Stimulants of erythropoiesis. Classification and general characteristics of stimulants of erythropoiesis. Indications. Drugs affecting leucopoiesis. The mechanism of action of stimulants (sodium Nukleinat, methyluracil, pentoxyl, leukogen, molgramostyn). Indications. General characteristics of drugs that inhibit leucopoiesis (mercaptopurine, metotrexat, thyofhosfhamid). Indications, side effects. Drugs that affect platelet aggregation, blood coagulation and fibrinolysis. Classification of drugs that are used for prevention and treatment of thrombosis. General characteristics of drugs that reduce platelet aggregation. The mechanism of action of acetylsalicylic acid, dipyridamole, ticlopidine (tyklid), clopidogrel, pentoxyphyllyne. Classification of anticoagulants. Pharmacokinetics, pharmacodynamics of heparin. Indications and contraindications for use. Side effects. An overdose of heparin, treatment (protamine sulfate). Preparations of LMWH (fraxyparin). Indirect anticoagulants. Pharmacology of 4-oxycumarune (warfarin sinkumar) and indandione (fenilin). Indications. Side effects of indirect anticoagulants. General characteristics of fibrinolytic agents. Pharmacology of fibrinolysin, streptolyse, alteplase (aktylize). Indications. Adverse reactions. Classification of coagulants. Pharmacokinetics, pharmacodynamics of vikasole. Indications. Pharmacology drugs increase blood clotting (hemostatic sponge, gelatin, calcium supplements, etamzylat). Indications of antifibrinolythics (acid aminocapronic, contrikal).

**Topic 26. Vitamin and antivitamin drugs. Enzymatics and enzymaticinhibitors.**

Drugs used in hypochromic anemia. Pharmacokinetics, pharmacodynamics iron preparations (iron ferrous sulfate, Ferrum Lek). Combination drugs (tardyferon, ferkoven, ferroplex). Indications. Side effects. Acute poisoning with iron and assistance measures. Pharmacology of coamide. Preparations erythropoietin. Indications. Side effects. Pharmacological characterization of drugs used for the treatment of hyperchromic anemia. Pharmacokinetics, pharmacodynamics of cyanocobalamin and folic acid. Phytotherapeutic remedies and animal origin used in anemic conditions. ). Plasma fluid. General characteristics of plasma substitutes. Pharmacodynamics and indications for use of saline (isotonic sodium chloride solution, Ringer-Locke Trisol), alkaline solutions (sodium bicarbonate, trysamin), sugars (glucose), products containing components of human blood (human albumin), synthetic drugs ( reopolyglukine). Preparations for parenteral nutrition: lipofundyn. Phlebotropic medicines. General characteristics and classification of drugs that affect the tone of the veins. Neurohumoral regulation of vascular tone and its pharmacological regulation. Indications and general characteristics of venotonics (detralex, AESCUSAN). Side effects of drugs and its prevention.

**Topic 27. Hormonal drugs (peptides). Hormonal drugs (steroides).**

Classification of hormones in origin. Mechanism of action of hormones. Indications. Hormones of the hypothalamus and pituitary. Mechanism of corticotropin, indications, side effects. Synthetic analogs of corticotropin. Pharmacological characterization of gonadotropic hormones (human chorionic gonadotropin, gonadotropin menopausal). Pharmacodynamics drugs posterior pituitary (oxytocin) and synthetic analogues. Indications. Pharmacology thyroid hormones (L-thyroxine, triiodothyronine hydrochloride). Anti-thyroid drugs (mercazolil, iodine). Indications and contraindications for use, side effects. Preparations of calcitonin (caltcitrin, miocaltcik). Indications. Adrenocorticoids (cortisone acetate, hydrocortisone acetate). Pharmacological effects, indications, contraindications for use, dosing regimen. Comparative characteristics. Side Effects. Pharmacology of desoxycorticosterone acetate. Indications. Sexual hormones. Classification of sex hormones. General characteristics of drugs female sex hormones. Mechanism of action and indications for use of estrogen drugs (estrone, estradiol dipropionate, ethinyl estradiol, sinestrol), anti-estrogenic (tamoxifen), progestin (progesterone ocsiprogesterone capronate) and antigestagenies (mifepristone) drugs. Side effects of drugs of female sex hormones and their antagonists. Birth control (contraceptive) means. Classification principles combinations, indications and contraindications for use, side effects. Comparison of contraceptive drugs (Marvelon, Postinor, Depo-Provera, Logest). Preparation of male sex hormones. Pharmacological characterization of testosterone propionate, methyltestosterone, testenate. Indications, side effects. Androgenic hormone antagonists (cyproterone, flutamide). Pharmacology of anabolic steroids. The mechanism of action, indications of fenoboline, retabolil, methandrostenolone. Side effects of anabolic steroids. Non-steroidal anabolic drugs (riboxsin, potassium orotate). Indications, side effects.

**Topic 28. Antidiabetics. Anti-inflammatory and anti-allergic drugs, immunomodulators.**

Hypoglycemic drugs. Classification of hypoglycemic agents. Pharmacokinetics, pharmacodynamics, indications and contraindications to the use of insulin. Side effects. Treatment of hyperglycemic coma. An overdose of insulin, help with hypoglycemic coma. Insulin with prolonged action. Synthetic anti-diabetic drugs. Classification, mechanism of action, indications for use. Pharmacology of glibenclamide, metformin, acarboze. Comparative characteristics, side effects. Antiallergic drugs. Classification and general characteristics of antiallergic agents. Drugs used in the immediate type hypersensitivity (glucocorticoids, antigistaminics, inhibitors of fibrinolysis, cholinoblockers, antispasmodics, bronchodilators). Precautions. The concept of histamine receptors. Pharmacology of antihistaminic drugs - blocking histamine H1 receptors (diphenhydramine, suprastin, fenkarol, diazolin, loratadine, Promethazine, dezloratydyn). Comparative characteristics, side effects. Pharmacokinetics, pharmacodynamics, indications for use of cromolyn sodium, ketotifen. Principles of care in anaphylactic shock. Drugs used in delayed-type hypersensitivity. General characteristics. Pharmacology of immunosuppressive drugs (cytotoxic drugs, glucocorticoids) that affect the immune processes. General characteristics of drugs that reduce tissue damage (steroidal and non-steroidal anti-inflammatory drugs). Drugs that affect the immune system. Classification stimulators of immunity. Pharmacology of drugs from thymus (timalin), leykopoesis stimulants a (sodium Nukleinat, methyluracil), interferons and vaccines. Immunosuppressive drugs (antimetabolites, alkylating compounds, glucocorticoids, enzymes). Indications, side effects.

**Module 3: Pharmacology of chemotherapeutic agents.**

*Specific goals:*

* *to generalize and analyze the main characteristics of antiseptics and desinfectants and chemotherapeutic agents.*
* *to interpret modern classification of medicines used to treat diseases caused by pathogenic agents.*
* *summarize and analyze the pharmacological characteristic of the main antiseptics and desinfectants and chemotherapeutic agents, explain the mechanism of their action.*
* *estimate the benefit / risk ratio of chemotherapeutic agents. Predict and prevent side effects.*
* *to create a rational combination of chemotherapeutic agents for various disease.*
* *writing and analyzing of prescription order for chemotherapeutic agents.*
* *create algorithm care for patients with acute poisoning of medicines.*
* *predict and prevent symptoms of adverse action.*
* *to anticipate and prevent the manifestation of side effects of major antidotes.*
* *writing and analyzing prescriptions for basic antidotes.*

**Topic 29. Antiseptics and desinfectants.**

Requirements for modern antiseptics. Classification of antiseptics and disinfectants in chemical structure. Pharmacology of antiseptics and disinfectants inorganic nature. The mechanism of action of halogens and halogen-containing compounds (drugs Chlorine: chlorhexidine bigluconate, iodine: iodine solution in alcohol, combined preparations: iodcerrine, iodinol). Indications, side effects. Acute and chronic poisoning and assistance measures. The mechanism of action, indications oxidants: hydrogen peroxide, potassium permanganate. Dependence pharmacological effect on the concentration of the solution. Antiseptic and disinfectant action of drugs acids and alkalines (boric acid, ammonia). Mechanism and types of salts of heavy metals. Factors determining the antimicrobial activity of preparations of salts of heavy metals. Shmideberge index. Features of the preparations of mercury, lead, silver, bismuth, copper, zinc. Side effects of drugs of heavy metals. Acute poisoning. Help in acute poisoning by salts of heavy metals, principles of antidote therapy. Pharmacology of antiseptics and disinfectants organic nature. Derivative aromatic. The mechanism of action of drugs of phenol (phenol, resorcine, birch tar, balsam liniment on Vishnevsky, Ichthyol). Side Effects. Acute poisoning phenol treatment. Mechanism of nitrofuranes, indications and contraindications for use. Comparison of drugs (furaeillin). The mechanism of action of antimicrobial drugs dyes. Pharmacological characterization of brilliant green, methylene blue, etakrydynu lactate. Indications. Derivatives of aliphatic drugs. Pharmacokinetics, pharmacodynamics of formaldehyde. Side effects. Mechanism of antimicrobial action of ethanol. Pharmacology of detergents substances. The mechanism of action, indications for use of detergents: aethoninum, decametoxine, chlorhexidine bigluconate. Herbal: chlorophyllipt. Quinoline Derivatives I - IV generation. Classification, mechanism of action, indications, side effects. Characteristics of drugs (Nitroxoline, Nalidixic acid). Feature use in medical practice derivatives fluoroquinolones (ofloxacin, ciprofloxacin). Derivatives of nitrofuran. The mechanism of action, indications, routes of administration, side effects (furatsillin, furazolidone, Furamagum). Antiviral medicines. Synthetic antimicrobial drugs different chemical structure.

**Topic 30. Antibiotics.**

The concept of antibiosis, antibiotics, spectrum antibiotics. History of discovery and introduction of antibiotics in medical practice. L. Paster, I.I. Mechnikov, O. Flemming, H.V. Flori, E.B. Cheyn, Z.V. Yermolyeva, Z. Vaksman. Principles of antibiotic therapy. Classification of antibiotics in chemical structure, spectrum and mechanism of action. Penicillin. Classification. The mechanism, range and duration. Administration. The pharmacological characteristics of drugs penicillin (benzylpenicillin sodium and potassium salts, benzathine benzylpenicillin, bicilline - 1, bitcilline - 3 bicillina - 5, oxacillin sodium, ampicillin, ampiox, amoxicillin). Comparison of drugs, indications, side and toxic effects. Anaphylaxis to penicillins and assistance measures. Principles and purpose of drug combinations penicillin along with β-lactamase inhibitors: clavulanic acid (amoxiclav), sulbactam, tazobactam. Group cephalosporins. Classification of drugs by way of introduction and generations. Mechanism and spectrum of action. Indications. Comparison of preparations of cephalosporin (cefazolin, cegcalexin, cefotaxime, ceftriaxone, cefpirom). Side effects of cephalosporins. The pharmacological characteristics of drugs carbapenems (meropenem) and monobactams (aztreonam). Mechanism and spectrum of action, indications, side effects. General characteristics, mechanism and spectrum of action, indications for use, side effects. Pharmacological characterization of erythromycin, clarithromycin, azithromycin, spiramycin. Principles of combination therapy with other groups (tetracyclines). Preparations tetracycline (tetracycline, doxycycline hydrochloride, metatsyklinu hydrochloride). Pharmacokinetics, mechanism and spectrum of action, indications and contraindications for use, side effects and their prevention. Preparations of chloramphenicol (chloramphenicol). Mechanism and spectrum of action, indications, side effects, the possibility of severe intoxication in infants. Combination with other antimicrobial agents. Pharmacology of drugs aminoglycosides (streptomycin, gentamicin sulfate, amikacin sulfate). Comparative characteristics, mechanism of action, indications and contraindications for use, side effects. Principles combination with other antimicrobial agents. Cyclic polypeptides (polymyxins). Mechanism and spectrum of action, indications, routes of administration, side effects. Polyenes. Pharmacological characterization (nystatin, amphotericin B). Indications. Rifamitcine. The mechanism of action, indications, side effects. Features of rifampicin in clinical practice. Lincosamides. Pharmacokinetics, of pharmacodynamics lincomycin hydrochloride. Indications. Side effects. Pharmacology fuzidin sodium. Indications. Side effects.

**Topic 31. Sulfonamides and antimicrobials of different chemical structure.**

Sulfanilamides. Classification sulfanilamides the duration of action and pharmacokinetic characteristics. Pharmacokinetics and pharmacodynamics of sulfonamides. Spectrum of antimicrobial action of microorganism’s sensitivity to drugs of this group. Indications. Side effects and ways to prevent it. Comparison of drugs (phthalazol, sulfadimezyn, sulfacyl sodium sulfadimetokhxin, sulfapirydazyn, sulfalen). Purpose combination sulfonamides with trimethoprim (co-trimoxazole (Bactrim, Biseptol) and salicylic acid (salazosulfapirydyn, salazopirydazyn).

General characteristics of antisyphilitic agents. Principles of treatment of syphilis. Classification of antisyphilitic drugs. Features of antibiotics (penicillins, macrolides, cephalosporins), bismuth (biyoqinol) in the treatment of syphilis. TB drugs. Basic principles of treatment and prevention of tuberculosis. Classes of drugs used to treat tuberculosis. Pharmacokinetics, pharmacodynamics derivatives of isonicotinic acid (HINA) isoniaside. Side effects occurring with prolonged use, and ways to prevent them. Pharmacological characterization of rifampicin. Features long-term use. Preparations of antibiotics in the treatment of tuberculosis (streptomycin, kanamycin, cycloserine, amikacin). The pharmacological characteristics of drugs of different chemical groups etionamid, protionamid, ethambutol, pyrazinamide, ciprofloxacin, ofloxacin, sodium para-aminosalitsylat. Side Effects.

**Topic 32. Antituberculosis, antiviral, antispirochete agents. Antifungal drugs. Antiprotozoals and antihelmintics.**

Classification of antimalarial agents. Mechanism of action. Pharmacological characterization Chingamina Chloridina). Indications and contraindications for use, side effects. Drug therapy of malarial coma. Anthelmintic drugs. Classification of anthelmintic drugs. Feature use of the various types of helminthiasis. Pharmacological characterization drugs that are used to treat intestinal helminthiasis. Pharmacokinetics and pharmacodynamics, spectrum mebendazole, Albendazole. Indications, side effects. Precautions Levamisole, Pyrantel, piperazine adipinate, naphthamone. Drugs used in extraintestinal helminthosis - praziquantel. Drugs used to treat trichomoniasis. Pharmacokinetics, pharmacodynamics of metronidazole. Indications and side effects. Tinidazole, ornidazole and furazolidone in the treatment of trichomoniasis. Drugs for treatment of chlamydia. Pharmacological characterization of macrolide, doxycycline, metronidazole. Drugs used for the treatment of amoebiasis. Classification protyamebnyh drugs. Pharmacological characterization of metronidazole. Drugs for treatment of giardiasis. Pharmacological characterization of metronidazole, tinidazole, furazolidone, aminoquinole. Drugs used to treat patients with toxoplasmosis. Pharmacological characterization of chioridine chingamine, sulfanilamides. Drugs for the treatment of leishmaniasis. Features use in leishmaniasis, side effects. Characteristics of drugs with antileushmanic action. Drugs for treatment of balantidiasis. Use of antibiotics (aminoglycosides and tetracyclines) in treatment balantidiasis.

**Topic 33. Anticancer agents. Preparations of acids, basis and salts. Glucose Radioprotectors. Principles of acute poisoning treatment.**

Classification, general characteristics, indications for use of anticancer drugs. Pharmacology of alkylating agents (sarkolizyn, dopan, chlorbutin, miyelosan), antimetabolites (methotrexate, mercaptopurine, fluoro uracil), anthracycline, antibiotics (doxarubitcyn) alkaloids (vincristine, vinblastine). Acids, alkalines, alkaline agents and alkaline earth metals. Glucose. Oxygen. Local and resorptive action of acids and alkalines. Indications. Preparations acids: salicylic acid, boric acid, hydrochloric acid diluted. Preparations alkalis: sodium bicarbonate, magnesium oxide, ammonia solution. Acute poisoning by acids and alkalines. Measures assistance. Preparations of sodium: sodium chloride. Pharmacological effects of isotonic, hypertonic and hypotonic sodium chloride solution. Indications. Preparations Potassium: potassium chloride, asparcam (Panangin). Pharmacodynamics, indications for use. Preparations of magnesium: magnesium sulfate. Pharmacokinetics, pharmacodynamics. The dependence of the effect of the route of administration. Indications. Calcium supplements: calcium chloride, calcium gluconate. Pharmacological effects, indications, routes of administration. Glucose, as a medicine. Energy, antitoxic, osmotic action, indications for use of isotonic and hypertonic glucose solution. Medical use of oxygen. Indications. Basic principles of pharmacotherapy of acute poisoning drugs. Causes of acute poisoning. Symptoms of acute poisoning by drugs of different pharmacological groups. Methods of active detoxification using vomiting, laxatives, enveloping, astringents and adsorbents. Application of active diuretics to remove toxic substances from the blood (forced diuresis), using hemodialysis, peritoneal dialysis, hyperbaric oxygenation, hemo- and lympho-sorbtion. The concept of antidotes. Types of antidote therapy. Pharmacology of unithiol, acetylcysteine, Tetacinum-calcium, penicillamine, deferoxamine, cholinesterase reactivators. Principles of symptomatic treatment of acute poisoning. The concept of radioprotectors, general characteristics, mechanism of action, classification. Basic principles of application. Pharmacology of cystamine hydrochloride. Use of enterosgel, sulfur compounds, vitamins, antioxidants, hormones, complexones.

**3. The structure of the discipline**

|  |  |
| --- | --- |
| Name of modules and topics | Number of hours |
| full-time education | full-time education |
| Total | including | Total | including |
| L | Sem | Lab | Pract | SW | L | Sem | Lab | Pract | SW |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| **Module 1. Medical prescription. General pharmacology. Drugs acting on the nervous system** |
| Topic 1. Medical prescription. |  |  |  |  | 2 | 2 |  |  |  |  |  |  |
| Topic 2. The solid medicinal forms. |  |  |  |  | 2 | 2 |  |  |  |  |  |  |
| Topic 3. The soft medicinal forms. |  |  |  |  | 2 | 2 |  |  |  |  |  |  |
| Topic 4. The liquid medicinal forms.  |  |  |  |  | 2 | 2 |  |  |  |  |  |  |
| Topic 5. General Pharmacology. History of Pharmacology. |  | 2 |  |  | 2 | 4 |  |  |  |  |  |  |
| Topic 6. The drugs acting on afferent nervous system, local anaesthetics, astringents, covering, adsorbing and irritant drugs. |  |  |  |  | 2 | 2 |  |  |  |  |  |  |
| Topic 7. Cholinomimetics. |  | 2 |  |  | 2 | 2 |  |  |  |  |  |  |
| Topic 8. Cholinoblockers. |  |  |  | 2 | 2 |  |  |  |  |  |  |
| Topic 9. Adrenomimetics. |  | 2 |  |  | 2 | 2 |  |  |  |  |  |  |
| Topic 10. Antiadrenergic drugs. Dophaminergic and histaminergic drugs. |  |  |  | 2 | 2 |  |  |  |  |  |  |
| Topic 11. The drugs for general anaesthesia. Pharmacology and toxycology of Ethanol. |  | 2 |  |  | 2 | 2 |  |  |  |  |  |  |
| Topic 12. Analgetics (opioids). |  |  |  | 2 | 2 |  |  |  |  |  |  |
| Topic 13. Analgetics (nonopioids). Nonsteroidal anti-inflammatory medicines (pain pharmacocorrectors). |  |  |  | 2 | 2 |  |  |  |  |  |  |
| Topic 14. Neuroleptics, tranquilizers (anxiolytics). |  | 2 |  |  | 2 | 2 |  |  |  |  |  |  |
| Topic 15. Hypnotic and sedatives drugs. |  |  |  | 2 | 2 |  |  |  |  |  |  |
| Topic 16. Drugs for treatment of epilepsy and Parkinson’s disease. |  |  |  | 2 | 2 |  |  |  |  |  |  |
| Topic 17. Antidepressants, lithium salts. |  | 2 |  |  | 2 | 2 |  |  |  |  |  |  |
| Topic 18. Analeptics, psychomor stimulants, nootrops, drugs influencing on brain blood circulation. Treatment of migraine. |  |  |  | 2 | 4 |  |  |  |  |  |  |
| *Module control 1.* |  |  |  |  | 2 | 7 |  |  |  |  |  |  |
| **Module 2. Pharmacology of drugs affecting metabolism and the function of organs and systems** |
| Topic 19. Cardiotonic, antiarrhythmic drugs. Antianginal drugs. |  | 2 |  |  |  |  |  |  |  |  | 2 | 4 |
| Topic 20. Hypertensive and antihypertensive drugs. Hypolipidemics drugs. |  | 2 |  |  |  |  |  |  |  |  | 2 | 4 |
| Topic 21. Drugs improving brain blood circulation. Drugs acting on renal function and myometrium. Drugs for treatment of gout, uricosuric agents. |  |  |  |  |  |  |  |  |  | 2 | 4 |
| Topic 22. Respiratory system drugs. |  | 2 |  |  |  |  |  |  |  |  | 2 | 4 |
| Topic 23. Drugs acting on digestive system. |  | 2 |  |  |  |  |  |  |  |  | 2 | 4 |
| Topic 24. Drugs acting on erythropoesis and leucopoesis. Drugs acting on blood coagulation. |  |  |  |  |  |  |  | 2 |  |  | 2 | 4 |
| Topic 25. Vitamin and antivitamin drugs. Enzymatics and enzymaticinhibitors. |  |  |  |  |  |  |  |  |  |  | 2 | 4 |
| Topic 26. Hormonal drugs (peptides). Hormonal drugs (steroides). |  |  |  |  |  |  |  | 2 |  |  | 2 | 4 |
| Topic 27. Antidiabetics. Anti-inflammatory and anti-allergic drugs, immunomodulators. |  |  |  |  |  |  |  | 2 |  |  | 2 | 4 |
| *Module control 2.* |  |  |  |  |  |  |  |  |  |  | 2 | 4 |
| **Module 3. Pharmacology of chemotherapeutic agents** |
| Topic 28. Antiseptics and desinfectants. |  |  |  |  |  |  |  | 2 |  |  | 2 | 2 |
| Topic 29. Antibiotics. |  |  |  |  |  |  |  |  |  | 2 | 4 |
| Topic 30. Sulfonamides and antimicrobials of different chemical structure. |  |  |  |  |  |  |  |  |  | 2 | 4 |
| Topic 31. Antituberculosis, antiviral, antispirochete agents. Antifungal drugs. Antiprotozoals and antihelmintics. |  |  |  |  |  |  |  | 2 |  |  | 2 | 4 |
| Topic 32. Anticancer agents. Preparations of acids, basis and salts. Glucose Radioprotectors. Principles of acute poisoning treatment. |  |  |  |  |  |  |  |  |  | 2 | 4 |
| *Module control 3.* |  |  |  |  |  |  |  |  |  |  | 2 | 5 |
| Total | 105 | 20 |  |  | 38 | 47 | 105 | 10 |  |  | 32 | 63 |

**4.** **Topics of lectures**

|  |  |
| --- | --- |
| **№ TOPIC** | **HOURS** |
| 1. Introduction into Pharmacology. History of Pharmacology. General Pharmacology.
 | 2(remotely) |
| 1. Drugs affecting autonomic nervous system. Cholineric agonists. Cholineric antagonists.
 | 2(remotely) |
| 1. Adrenergic agonists. Adrenergic antagonists.
 | 2(remotely) |
| 1. Drugs suppression the CNS. The drugs for general anaesthesia. Opioids and nonopioid analgetics.
 | 2(remotely) |
| 1. Drugs suppression the CNS. Neuroleptics, tranquilizers (anxiolytics). Hypnotic and sedatives drugs. Drugs for treatment of epilepsy and Parkinson’s disease.
 | 2(remotely) |
| 1. Drugs stimulating the CNS. Antidepressants, lithium salts. Analeptics, psychomor stimulants, nootrops, drugs influencing on brain blood circulation. Treatment of migraine.
 | 2(remotely) |
| 1. Cardiac glycosides and other inotropic drugs. Antiarrhythmic drugs. Antianginal drugs.
 | 2(remotely) |
| 1. Hypertensive and antihypertensive drugs. Hypolipidemics drugs. Drugs improving brain blood circulation. Drugs acting on renal function and myometrium. Drugs for treatment of gout, uricosuric agents.
 | 2(remotely) |
| 1. Drugs affecting the respiratory system.
 | 2(remotely) |
| 1. Drugs acting on digestive system.
 | 2(remotely) |
| **TOTAL V semester** | 20 |
| 1. Haemostatics, anticoagulants and antiplatelet agents.
 | 2(remotely) |
| 1. Hormones and related drugs.
 | 2(remotely) |
| 1. Antidiabetics. Anti-inflammatory drugs and anti-allergic drugs.
 | 2(remotely) |
| 1. Antiseptics and desinfectants. Antibiotics. Sulfonamides and other synthetic antimicrobials. Antiprotozoals.
 | 2(remotely) |
| 1. Antituberculosis, antiviral, antifungal, antihelmintic drugs. Anticancer drugs. Drug overdose and poisoning.
 | 2(remotely) |
| **TOTAL VI semester** | 10 |
| **TOTALY** | 30 |

**5. Topics of practical training**

|  |  |
| --- | --- |
| **№ TOPIC**  | **HOURS** |
| V semester (MODULE I) |
| 1. Medical prescription. | 2 |
| 2. The solid medicinal forms. | 2 |
| 3. The soft medicinal forms. | 2 |
| 4. The liquid medicinal forms.  | 2 |
| 5. General Pharmacology. History of Pharmacology. | 2 |
| 6. The drugs acting on afferent nervous system, local anaesthetics, astringents, covering, adsorbing and irritant drugs. | 2 |
| 7. Cholinomimetics. | 2 |
| 8. Cholinoblockers. | 2 |
| 9. Adrenomimetics. | 2 |
| 10. Antiadrenergic drugs. Dophaminergic and histaminergic drugs. | 2 |
| 11. The drugs for general anaesthesia. Pharmacology and toxycology of Ethanol. | 2 |
| 12. Analgetics (opioids). | 2 |
| 13. Analgetics (nonopioids). Nonsteroidal anti-inflammatory medicines (pain pharmacocorrectors). | 2 |
| 14. Neuroleptics, tranquilizers (anxiolytics), lithium salts. | 2 |
| 15. Hypnotic and sedatives drugs. | 2 |
| 16. Drugs for treatment of epilepsy and Parkinson’s disease. | 2 |
| 17. Antidepressants | 2 |
| 18. Analeptics, psychomor stimulants, nootrops, drugs influencing on brain blood circulation. Treatment of migraine. | 2 |
| MODULE I  | 2 |
| **TOTAL** **V semester** | 38 |
| VI semester (MODULE II) |
| 19. Cardiotonic, antiarrhythmic drugs. Antianginal drugs. | 2 |
| 20. Hypertensive and antihypertensive drugs. Hypolipidemics drugs. | 2 |
| 21. Drugs improving brain blood circulation. Drugs acting on renal function and myometrium. Drugs for treatment of gout, uricosuric agents. | 2 |
| 22. Respiratory system drugs. | 2 |
| 23. Drugs acting on digestive system. | 2 |
| 24. Drugs acting on erythropoesis and leucopoesis. Drugs acting on blood coagulation. | 2 |
| 25. Vitamin and antivitamin drugs. Enzymatics and enzymaticinhibitors. | 2 |
| 26. Hormonal drugs (peptides). Hormonal drugs (steroides). | 2 |
| 27. Antidiabetics. Anti-inflammatory and anti-allergic drugs, immunomodulators. | 2 |
| MODULE II | 2 |
| VI semester (MODULE III) |
| 28. Antiseptics and desinfectants. | 2 |
| 29. Antibiotics. | 2 |
| 30. Sulfonamides and antimicrobials of different chemical structure. | 2 |
| 31. Antituberculosis, antiviral, antispirochete agents. Antifungal drugs. Antiprotozoals and antihelmintics. | 2 |
| 32. Anticancer agents. Preparations of acids, basis and salts. Glucose Radioprotectors. Principles of acute poisoning treatment. | 2 |
| MODULE III | 2 |
| **TOTAL VI semester** | 32 |
| **TOTALY** | 70 |

**6. Topics of self-control work**

|  |  |  |
| --- | --- | --- |
| **№** | **TOPIC** | **HOURS** |
| 1. | Preparation for practical training | 84 |
| 2. | Self-study of topics not included to the list of practical training | 20 |
| 2.1 | History of pharmacology | 1 |
| 2.2 | Novel forms of drug delivery systems, and their impact on the effectiveness of medications | 1 |
| 2.3 | Biotransformation of medicines and drug-drug interaction  | 1 |
| 2.4 | Adverse effects of drugs. Drug dependence and its social importance | 1 |
| 2.5 | Pharmacogenomics | 1 |
| 2.6 | Drugs of abuse | 1 |
| 2.7 | Biostimulyators, their use in medicine | 1 |
| 2.8 | Prostatoprotectors. Correctors of erectile function | 1 |
| 2.9 | Pharmacology of cerebroprotective drugs  | 1 |
| 2.10 | Pharmacological characteristics of herbal drugs | 1 |
| 2.11 | Vaccines and their usage in medicine  | 1 |
| 2.12 | Peculiarities of nitric oxide | 1 |
| 2.13 | Vasoactive peptides, their usage | 1 |
| 2.14 | Radioprotectors  | 1 |
| 2.15 | Probiotics, prokinetics | 1 |
| 2.16 | Hormonal contraception. | 1 |
| 2.17 | Drugs for parenteral nutrition. Plasma substitutes | 1 |
| 2.18 | Principles of combined antibioticotherapy | 1 |
| 2.19 | Problem of antibiotic resistance of microorganisms to antibiotics | 1 |
| 2.20 | Heavy metal intoxications | 1 |
| 3. | Preparation for final exam | 6 |
| **TOTALY** | **110** |

**Methodological training materials (included)**

* Situational tasks
* Reference answers to situational tasks
* Methodical recommendations for students to practical training in the following topic

**7. Tasks for students individual work**

1. To participate in scientific pharmacology club and present the results at scientific forums.

2. To participate at students Pharmacology Olympiads.

3. To make a project for peculiarities of the therapeutic use of medications.

8. Methods of control

Means of control students.

1. Means of current knowledge control.

To control the output level of knowledge of students in the class applied:

1) written responses to test items;

2) prescribing for individual tasks.

To control the output level of knowledge of students in the class applied:

1) written responses to test items;

2) solving situational problems;

3) prescription dictation.

2. Means of final control of student learning.

1) Control of practical skills - writing prescriptions for drugs listed in the module;

2) control of theoretical knowledge - tests.

FORMS OF CONTROL

Forms of control and evaluation system implemented in accordance with the discipline and instruction about the assessment system for training of students in credit-modular system of educational process, approved by the Ministry of Health of Ukraine (2005). Assessment for the module is defined as a sum of current educational activities (in points) and evaluation of the final module control (in points), which is exposed in the assessment of theoretical knowledge and practical skills according to lists supplied by discipline.

9. Scheme of calculation of points

V semester

|  |  |  |  |
| --- | --- | --- | --- |
| Practical training | Module I (Current educational activities) | Maximum | Minimum |
| Content Module I |
| 1 | Topic 1, 2 | 8 | 4 |
| 2 | Topic 3, 4 | 20 | 10 |
| 3 | Topic 5, 6 | 8 | 4 |
| 4 | Topic 7, 8 | 8 | 4 |
| 5 | Topic 9, 10 | 8 | 4 |
| 6 | Topic 11, 12 | 8 | 4 |
| 7 | Topic 13, 14 | 8 | 4 |
| 8 | Topic 15, 16 | 8 | 4 |
| 9 | Topic 17, 18 | 8 | 4 |
| 10 | Module control | 36 | 18 |
|  | Total | 120 | 60 |
|  | Final control | 80 | 60 |
|  | Total amount of points | 200 | 120 |

VI semester

|  |  |  |  |
| --- | --- | --- | --- |
| Practical training | Module II and III (Current educational activities) | Maximum | Minimum |
| Content Module II |
| 1 | Topic 19, 20 | 8 | 4 |
| 2 | Topic 21, 22 | 8 | 4 |
| 3 | Topic 23, 24 | 8 | 4 |
| 4 | Topic 25, 26 | 8 | 4 |
| 5 | Topic 27. Module control | 36 | 18 |
| Content Module III |
| 6 | Topic 28, 29 | 8 | 4 |
| 7 | Topic 30, 31 | 8 | 4 |
| 8 | Topic 32. Module control | 36 | 18 |
|  | Total | 120 | 60 |
|  | Final control | 80 | 60 |
|  | Total amount of points | 200 | 120 |

10. Scale of assessment

|  |  |
| --- | --- |
| The sum of points for all types of educational activityduring the semester | Score |
| for a four-level rating scale | for a two-level rating scale |
| 180 - 200 | "excellent" | - |
| 150 - 179 | "good" | - |
| 120 - 149 | "satisfactorily" | - |
| < 120 | "Unsatisfactory" | - |

11. [**Theoretical questions for the final control (exam)**](https://dist.karazin.ua/moodle/mod/page/view.php?id=120771)

1. Definition of pharmacology as a science, its main aim, and tasks.

2. Sources of medical agents.

3. Main principles and methods of medical agents testing.

4. Pharmacokinetics of drugs.

5. Pharmacodynamics of drugs.

6. Routes and mechanisms of drugs absorption.

7. Routes and mechanisms of drugs excretion.

8. Mechanisms of absorption of drugs in the digestive tract.

9. Factors that influence the absorption of drugs in the digestive tract.

10. Concept of specific receptors, agonists, and antagonists.

11. Bioavailability of medicines.

12. Drugs metabolism.

13. Accumulation of drugs.

14. Types of therapeutic and toxic doses.

15. Types of pharmacological effects.

16. Role of chemical structure, physical and chemical properties in the action of drugs on an organism.

17. Dependence of pharmacological effect from dose (concentration) of medication.

18. Gender and age as factors of drugs action.

19. Peculiarities of a combination of drugs.

20. Synergism, its types, and practical significance.

21. Antagonism, its types, and practical significance.

22. Main antidotes, their use for the treatment of various types of toxicity.

23. Negative side effects of medical agents of allergic nature.

24. Negative side effects of medical agents of non-allergic nature.

25. Toxic action of medical agents.

26. Embriotoxic, fetotoxic, teratogenic action of drugs and poisons.

27. Individual intolerance of the drug (idiosyncrasy).

28. Significance of genetic factors in the development of negative effects of medical agents.

29. Premorbidity as a factor of drugs pharmacodynamics.

30. Cholinergic synapse, its chemical structure, and function. Main effects of acetylcholine. Choline receptors, its localization. Classification of medical agents that affect choline receptors.

31. Adrenergic receptors, its localization. Classification of medical agents that affect adrenergic receptors.

32. Termination of exposure (decontamination) of poisons. Prevention of absorption of ingested poisons.

33. Antidotes.

34. Enhancement of poisons elimination.

35. Pathogenetic (symptomatic) therapy of acute poisonings.

36. Medical and social aspects of medical addiction.

37. Principles of treatment of acute and chronic morphine abuse.

38. The peculiarities of prescribing of narcotics and psychotropic medications.

SPECIAL PHARMACOLOGY

1. Classification of general anesthetics, its general physical-chemical characteristics, and principles of action. Inhale anesthetics, their pharmacodynamics, and use, comparative characteristics

2. Intravenous anesthetics, its pharmacodynamics, comparative characteristics.

3. Pharmacodynamics, the therapeutic use of ether group of local anesthetics

(anaesthesinum=benzocaine, Novocain).

4. Pharmacodynamics, the therapeutic use of amide group of local anesthetics

(xycaine=lidocaine, trimecaine).

5. Acute intoxication with a local anesthetic, its treatment, and prevention.

6. Astringents, slime agents and absorbents, irritants: mechanism of action, therapeutic use.

7. Anticholinesterase drugs: mechanism of action, pharmacodynamics, therapeutic use, and side effects.

8. M-cholinomimetic drugs: mechanism of action, pharmacodynamics, therapeutic use.

9. M-cholinoblockers: mechanism of action, pharmacodynamics, therapeutic use, and side effects.

10. Ganglion blockers: mechanism of action, indication, and contra-indication for use, typical complications.

11. Neuromuscular blockers (myorelaxants): mechanism of action, pharmacodynamics, therapeutic use.

12. Pharmacodynamics, mechanism of action and use of adrenaline (norepinephrine), its side effects.

13. Pharmacodynamics, mechanism of action and use of ephedrine, its side effects.

14. Pharmacological characteristic of Noradrenaline, Adrenaline, Mesaton (phenylephrine), Izadrine (Isoproterenol) and Salbutamol.

15. α-adrenoblockers: pharmacodynamics, mechanism of action and use, side effects.

16. β-adrenoblockers: pharmacodynamics, mechanism of action and use, side effects.

17. Sympatholytic drugs, pharmacodynamics, mechanism of action and use, side effects.

18. Comparative pharmacological characteristic of opioid analgesics.

19. Opioid and non-opioid analgesics: mechanism of action, therapeutic use for different types of pain.

20. Morphine: pharmacokinetics, pharmacodynamics, mechanism of action and therapeutic use.

21. Non-opioid analgesics: classification, pharmacodynamics, use, and side effects.

22. Ethyl alcohol, pharmacodynamics, and use in medical practice.

23. Anti-epileptic drugs: classification, pharmacodynamics, mechanism of action, use and side effects.

24. Drug treatment of Parkinson’s disease and Parkinson’s syndrome, its side effects.

25. Neuroleptics: classification, pharmacodynamics, mechanism of action, use and side effects.

26. Tranquilizers: drugs, pharmacodynamics, mechanism of action, use and side effects.

27. Benzodiazepines as a sedative, anti-convulsive drugs, its pharmacodynamics, and use.

28. Sedative agents: drugs, their pharmacodynamics, mechanism of action, use and side effects.

29. Psychostimulatory drugs: pharmacodynamics, mechanism of action, use and side effects.

30. Analeptics: drugs, their pharmacodynamics, mechanism of action, use and side effects.

31. Antidepressants: drugs, their pharmacodynamics, mechanism of action, use and side effects.

32. Adaptogens: drugs, pharmacodynamics, and use.

33. Cardiac and extracardiac effects of cardiac glycosides.

34. Mechanism of cardiac effects of glycosides and its use.

35. Cardiac effects of glycosides, typical ECG changes.

36. Symptoms and principles of treatment of cardiac glycosides intoxication, its prophylaxis.

37. Non-glycosides inotropic drugs, their pharmacodynamics, mechanism of action, use and side effects.

38. Pharmacological characteristics and use of clonidine (clopheline) and methyldopa.

39. Pharmacokinetics, mechanism of action and use of beta-blockers, side effects.

40. Pharmacodynamics, mechanism of action, use of Ca-channel blockers.

41. Myotropic hypotensive drugs (natrium nitroprusside, magnesium sulfate, appresin): pharmacodynamics, mechanism of action, use.

42. Inhibitors of angiotensin-converting enzyme (ACE inhibitors): mechanism of action, use, side effects.

43. The main principles of hypertensive crisis treatment.

44. Antianginal drugs: classification, pharmacokinetics, mechanism of action, use.

45. Pharmacological characteristic and use of nitroglycerin.

46. Peculiarities of beta-blockers and Ca-channel blockers as antianginal medications, its side effects.

47. Pharmacology of medications for prevention and treatment of angina pectoris attacks.

48. Main principles of treatment of acute myocardial; infarction.

49. Pharmacology of Quinidine and Novocainamide.

50. Pharmacological characteristic and use of Xycaine, Anaprilin, Ethmosine and Verapamil as antiarrhythmic drugs.

51. Pharmacology of Amiodarone: mechanism of action, use, side effects.

52. Anti-coughing and expectoration drugs, pharmacodynamics, mechanism of action, use.

53. Bronchodilators , mechanism of action, use, side effects.

54. Medication for the treatment of lung edema.

55. Mechanism of action and use of emetic and anti-emetic drugs.

56. Mechanism of action of H2-histamine blockers, M1-cholinoblockers, blockers of Na + -K-

ATP, cholinergic and adhesive drugs, its use for the treatment of peptic ulcer.

57. Antacids: mechanism of action, use, side effects.

58. Principles of combinative treatment of peptic ulcers.

59. Classification of cholagogue agents, mechanism of action, use.

60. Drugs for treatment of acute and chronic pancreatitis, their pharmacodynamics, mechanism of action.

61. Hepatoprotectors: drugs, mechanism of action, use.

62. Laxative drugs, mechanism of action, use.

63. Diuretics, mechanism of action, use.

64. Highly effective diuretics: pharmacodynamics, mechanism of action, use, side effects.

65. Treatment of acute and chronic gout.

66. Pharmacology of drugs affecting myometrium activity.

67. Pharmacology of drugs that are used for the treatment of hypo- and hyperchromic anemias.

68. Pharmacology of drugs that stimulate leukopoiesis.

69. Antiplatelet medications: mechanisms of action and therapeutic use.

70. Pharmacological characteristics and use of hemostatic.

71. Pharmacodynamics, mechanisms of action and use of heparin.

72. Indirect acting anticoagulants: pharmacodynamics, therapeutic use, its antagonists, prophylaxis of complications.

73. Mechanism of fibrinolytic action of streptokinase. Principles of action of Contrikal and aminocaproic acid.

74. Drugs of anterior pituitary hormones, their pharmacodynamics, therapeutic use.

75. Pharmacological properties and use of thyroid gland hormones drugs.

76. Antithyroid drugs: mechanism of action and use.

77. Comparative characteristic of insulins, its therapeutic use.

78. Oral hypoglycemic drugs: mechanism of action, indications to use, side effects.

79. Glucocorticoids: pharmacodynamics, therapeutic use.

80. Complications of glucocorticoid’s therapy, its prophylaxis.

81. Glucocorticoids as antiallergic agents, mechanism of action and use.

82. Withdrawal syndrome in glucocorticoid therapy, its mechanism, prevention, and treatment.

83. Pharmacodynamics and use of mineralocorticoids.

84. Pharmacodynamics and use of estrogens and progestogens.

85. Oral contraceptives: classification, dosing, side effects.

86. Pharmacology and use of androgens and anabolic steroids.

87. Effect of group B vitamins on metabolism and its therapeutic use.

88. Pharmacodynamics, mechanism of action and use of ascorbic acid and Rutin.

89. The biological significance of vitamin E, its therapeutic use.

90. Vitamin A drugs, its pharmacodynamics, use, and side effects. Hypervitaminosis A.

91. Vitamin D drugs, its pharmacodynamics, use, and side effects. Hypervitaminosis D.

92. Enzymes and anti-enzymatic medications: pharmacodynamics and use.

93. Lipid-lowering drugs: classification, mechanism of action and therapeutic use.

94. Pharmacodynamics and use of sodium and potassium drugs. Drug-drug interaction with cardiac glycosides.

95. Magnesium drugs, its pharmacodynamics, mechanism of action and use.

96. Calcium drugs, its pharmacodynamics, and use. Regulation of calcium metabolism.

97. Steroidal anti-inflammatory drugs: mechanism of action, therapeutic use, and side effects.

98. Non-steroidal anti-inflammatory drugs: mechanism of action, therapeutic use, and side effects.

99. Anti-allergic agents: classification, mechanism of action and use, side effects.

100. Principles of treatment of anaphylactic shock.

101. Antiseptic agents from the group of oxidizers and halogens: mechanism of action and use.

102. Biosynthetic penicillins: antimicrobial spectrum, pharmacokinetics, use, and side effects.

103. Semi-synthetic penicillins: antimicrobial spectrum, pharmacokinetics, use, and side effects.

104. Cephalosporins: classification, antimicrobial spectrum, use, side effects and complications.

105. Aminoglycosides: antimicrobial spectrum, use, adverse reactions.

106. Tetracyclines and Chloramphenicol: drugs, the spectrum of antimicrobial action, use, side effects.

107. Macrolides: spectrum of action, use, side effects.

108. Side effects and possible complications of antibiotics therapy, their prophylaxis, and treatment.

109. Sulphonamides: classification, antimicrobial spectrum, mechanism of action.

110. Fluoroquinolones, pharmacodynamics, and use.

111. Antituberculosis drugs: classification, mechanism, and a spectrum of action, side effects, principles of tuberculosis chemotherapy.

112. Anti-syphilitic agents: pharmacodynamics, mechanism of action, use.

113. Classification, mechanism of action and use of antihelminthic drugs.

114. Antifungal agents: classification, a spectrum of action, use, side effects.

12. [**List of drugs for the final control (exam)**](https://dist.karazin.ua/moodle/mod/page/view.php?id=120771)

Acetylsalicylic acid.

Aeron and Cerucal.

Aminazine.

Amitriptyline.

Anapriline.

Atropine.

Benzylpenicilline.

Biseptole

Captopril.

Chlorpromazine.

Cinnarizine (stugeron).

Dibazole.

Diclofenac sodium.

Digitoxin and Digoxin.

Dimedrole.

Drotaverine hydrochloride.

Ephedrine hydrochloride.

Fibrinolysine.

Furosemide.

Heparine.

Hydrochlorothiazide.

Insuline.

Isadrine.

Lidocaine.

Livorine.

Magnesium sulfate.

Metronidazole.

Morphine.

Nitroglycerine.

Novocaine (Procaine).

Papaverine hydrochloride

Promedol.

Prozerine.

Retabolil.

Rezerpine.

Riboflavin.

Talinolol (Cordanum).

Tetracycline.

Tocopheryl acetate.

Verapamil hydrochloride.

**List of drugs for write out of prescription orders.**

Acetylsalicylic acid (tablets),

Aminazin (tablets),

Anaprilin (tablets),

Apomorphine hydrochloride (ampoules)

Atropine sulfate (ampoules),

Beciptole (tablets).

Benzylpenicillin sodium salt (bottle),

Biseptol (tablets)

Bromheksin (ampoules),

Bromhexine (tablets),

Butamide (tablets),

Captopril (tablets),

Chlorpromazine (tablets),

Cinnarizine (tablets),

Cyancobalamine (ampoule),

Diazoline (tablets),

Diazole (ampoules),

Diazole (tablets).

Diclofenac (ampoules),

Diclofenac sodium (tablets),

Digitoxin (tablets),

Digoxin (ampoules),

Dimedrol (ampoules),

Diphenhydramine (ampoules),

Drotaverin hydrochloride (ampoules),

Ephedrine hydrochloride (ampoules).

Fibrinolysin (bottle).

Furosemide (tablets),

Gentamicine sulfate (ointment).

Glibutid (tablets),

Heparin (bottle),

Hydrochlorotiaside (tablets),

Izadrin (bottle).

Levorin (tablets),

Lidocaine (ampoules),

Magnesium sulfate (ampoules),

Methotrexate (tablets),

Metoclopramide (ampoules),

Morphine hydrochloride (ampoules),

Neostigmine methylsulfate (ampules),

Nitriglycerine (tablets),

Noradrenaline (ampoules),

Octadine in tabs.

Ofloxacin (tablets),

Papaverine hydrochloride (ampoules),

Paracetamol (tablets),

Phenobarbital (tablets),

Piroxicam (tablets),

Prednisolone (tablets),

Prozerin (ampoules),

Pyridoxine (tablets),

Ranitidine (tablets),

Reserpine (tablets).,

Retabolil (ampoules),

Rezerpine (tablets),

Riboflavin (tablets),

Rifampicin (capsules).

Senadaxine (tablets),

Senadeksin (tablets),

Sulfadimethoxine (tablets),

Talinolol (tablets),

Tetracycline (ointment),

Thiamine bromide (tablets),

Timalin (flask),

Tocopherole acetate (ampoules),

Tolbutamide (tablets),

Validol (tablets),

Verapamile hydrochloride (ampoules)

Verapamile hydrochloride (tablets),

Hydrochlorotiaside (tablets),

Nitriglycerine (tablets),

Rezerpine (tablets),

Dimedrol (ampoules),

Captopril (tablets)

13. Example of [**final control (exam)**](https://dist.karazin.ua/moodle/mod/page/view.php?id=120771) **card**

**Card 1.**

1. The selectiveness of the drug actions. The range of the pharmacological activity and the polyvalence.
2. Narcotic analgetics. Mechanism of action. Pharmacodynamics and pharmacokinetics. Morphine synthetic substitutes. The social dangers of drug abuse.
3. Аnticoagulants of direct action.  Pharmacodynamic of Heparin, use of the drug. Antagonists of Heparin .
4. Pharmacology of Talinolol ( Cordanum).

WRITE PRESCRIPTIONS: Talinolol (tabl), Drotaverin (ampoules), Benzylpenicillin sodium salt (bottle), Biseptol (tablets), Izadrin (bottle).

TASK:  An ambulance delivered to the surgical department a patient with an open chest injury with symptoms of internal bleeding, aggravated by a reflex cough. What drug from the group of narcotic analgesics should be prescribed for first aid to this patient?

14. Recommended literature

14.1. Main literature

1. Bertram G. Katzung. Basic and Clinical Pharmacology: McGraw-Hill Professional, 2007. – 1179 p.
2. Chekman I., Gorchakova N., Panasenko N., Bekh P. – Pharmacology textbook. – Nova knyha. – Vinnytsya, 2006. –382 p.
3. Drogovoz S.M. Pharmacology – Cito!: Textbook. – Kharkiv, 2012. – 192 p.
4. Hardman J.G., Limbrid L.E., Molinoff P.B., Ruddon R.W., Goodman Gilman A. The pharmacological basis of therapeutics, 9th edition. McGraw-Hill, New York. – 1996. - 1905 pp.
5. Harvey R.A., Chample P.C., Howland R.D., Mycek M.J. Pharmacology 3rd edition: Lippincott Williams, Philadelphia, 2006. – 552 p.
6. Janet L. Stringer. Basic Concepts in Pharmacology: McGraw Hill Professional, 2006. – 302 p.
7. Katzung B.G. – Basic and clinical Pharmacology, 9th edition: Lange, New York, 2004. – 1202 p.
8. Kharkevich D.A. – Pharmacology. Textbook for medical students. –GEOSTAR-Media –Moscow, 2008. – 672 p.
9. Kratenko A.S., Redkin R.G., Nikolenko E.Ya., Savchenko V.N., Sokruto O.V., Vovk K.V. Lecture book for medical students course “Pharmacology with medical prescription:Pharmacology of the drugs acting on the function of organs and systems. Vitaminic, hormonal, anti-inflammatory, immunomodulating and enzymatic agents”. V.N. Karazin National University, Kharkiv, 2016. – 186 pp.
10. Pharmacology (Chekman IS, Tumanov VA Gorchakov N. et al.): High School, 2001 -518 p.
11. Redkin R.G., Kratenko A.S., Nikolenko E.Ya., Savchenko V.N., Sokruto O.V., Vovk K.V. Lecture book for medical students Course “Pharmacology with medical prescription” (Module I, Unit I) //V.N. Karazin National University, Kharkiv, 2017. – 62 pp.
12. Redkin R.G., Kratenko A.S., Nikolenko E.Ya., Savchenko V.N., Sokruto O.V., Vovk K.V. Lecture book for medical students. Course “Pharmacology with medical prescription”. General pharmacology. V.N. Karazin National University, Kharkiv, 2014. – 22 pp.
13. Redkin R.G., Kratenko A.S., Nikolenko E.Ya., Savchenko V.N., Sokruto O.V., Vovk K.V. Lecture book for medical students Course “Pharmacology with medical prescription: “Pharmacology of the medicine afferenting on nervous system”. V.N. Karazin National University, Kharkiv, 2014. – 138 pp.
14. Redkin R.G., Kratenko A.S., Nikolenko E.Ya., Sokruto O.V. Lecture book for medical students course “Pharmacology with medical prescription”/ “Pharmacology of antimicrobial, antiviral, antiparasitic, antiprotozoal, antifungal and anticancer drugs. Preparations of acids, bases and salts. Glucose. Principles of acute poisoning treatment”. V.N. Karazin National University, Kharkiv, 2017. – 214 pp.
15. Seth Elsevier. Textbook of Pharmacology. – India, 2008. – 1000 p.
16. Stefanov O., Kucher V. Pharmacology with general prescriptions. Textbook for students. – Kiev, 2011. – 335 p.
17. Sudeb Mondal. Basic Undergraduate Pharmacology: Academic Publishers, 2003. – 405 p.
18. Trevor A., Katzung B., Masters S. Pharmacology: McGraw-Hill Professional, 2008. – 631 p.
19. WHO Model Prescribing Information. Geneva: World Health Organization. A series of authoritative booklets with unbiased drug information for the prescriber, including most drugs on the WHO Model List of Essential Drugs. Each module deals with one therapeutic group. The series is not yet complete. [<http://apps.who.int/medicinedocs/pdf/whozip23e/whozip23e.pdf>]

14.2. Additional literature

1. General Medical Council (2006) *Good Medical* *Practice* London, General Medical Council, available at [www.gmc-uk.org/gmp](http://www.gmc-uk.org/gmp)
2. Checkman I., Gorchacova N., Panasenko N., Bekh P. Pharmacology. – Vinnytsya: Nova Knyha Publishers, 2006. – 385 p.
3. General Medical Council. Tomorrow's Doctors. 2009. Available at <http://www.gmc-uk.org/education/undergraduate/tomorrows_doctors_2009.asp>
4. Державна Фармакопея України/Державне підприємство «Науково-експертний фармакопейний центр». — 1-е вид. — Харків: РІРЕГ, 2001. — 556 с.
5. James M Ritter, Lionel D Lewis, Timothy GK Mant and Albert Ferro. A Textbook of Clinical Pharmacology and Therapeutics, 5Ed – 2008. – 476 pp.
6. O. Stefanov, V. Kucher. Pharmacology with general prescriptions. Textbook for students – Kiev, 2011. – 335 p.