

SYLLABUS

1. General information on the course

Full course name	Pharmacology
Full official name of a higher education institution	Sumy State University
Full name of a structural unit	Medical Institute. Department of Biophysics, Biochemistry, Pharmacology and Biomolecular Engineering
Author(s)	Hlushchenko Nadiia Volodymyrivna, Vysotskyi Ihor Yuriiovich
Cycle/higher education level	The Second Level Of Higher Education, National Qualifications Framework Of Ukraine – The 7th Level, QF-LLL – The 7th Level, FQ-EHEA – The Second Cycle
Semester	18 weeks across 5 semester, 20 weeks across 6 semester
Workload	5 ECTS, 150 hours, out of which 90 hours are working hours with the lecturer (14 hours of lectures, 76 hours of seminars) and 60 hours of self-study of the material
Language(s)	English

2. Place in the study programme

Relation to curriculum	Compulsory course available for study programme "Medicine"
Prerequisites	human anatomy, Latin and medical terminology, biological and bioorganic chemistry, pathophysiology, physiology, microbiology, virology and immunology
Additional requirements	There are no specific requirements
Restrictions	There are no specific restrictions

3. Aims of the course

The aim is to achieve students' level of modern fundamental knowledge of general pharmacology, mastering a sufficient amount of theoretical knowledge and a level of practical skills to determine drugs group affiliation, their pharmacokinetics, pharmacodynamics, manifestations of possible side effects and symptoms of overdose, the main indications for the appointment and interaction with others medications.

4. Contents

Module 1. Medical prescription

Topic 1 Introduction in medical prescription.Solid Medicinal Forms

Definition of prescription, medicinal raw materials, medicinal substance , medicinal remedy , pharmaceutical remedy . Pharmacy. Definition of Pharmacopoeia, its types. Officinal drugs and Magistral drugs. Prescription: Structure and rules of Registration. Rules of Dosage. Measure of Weight and Volume. Rules of Registration of Prescriptions in Foreign Countries. Solid medicinal forms: powders,tablets,dragee,capsules,eye membranulas.

Topic 2 Soft Medicinal Forms

Soft Medicinal Forms: ointments, pastes,suppositories.

Topic 3 Liquid Medicinal Forms

Liquid Medicinal Forms.Solutions for external and internal use.Solutions for injections.Suspensions. Tinctures and Liquid Extracts.Infusions and Broths.Mixtures.Liniments.Aerosols.

Topic 4 Control of practical skills to medical prescription.

Written test "Medical prescription".

Module 2. General pharmacology. Drugs influencing peripheral nervous system

Topic 5 General pharmacology. Drug pharmacokinetics and pharmacodynamics. Drugs influencing afferent innervation

Definition of pharmacology. Pharmacology in the system of medical and biological sciences. The main sections pharmacology. The role of domestic and foreign scientists in the formation and development of pharmacology, as science. Drug pharmacokinetics. Routes of drug administration. Penetration of drugs through biological membranes. Drug distribution in organism. Drug biotransformation. Drug Excretion. Drug pharmacodynamics. Types of drug action. Principles of drug dosing. Phenomena occurring due to repeated drug administration. Combined drug use. Main and side drug effects. General principles of treatment of acute poisoning. Drugs influencing afferent innervation.

Topic 6 Drugs influencing efferent innervation. Cholinergic drugs. M- and N-Cholinomimetics. Cholinesterase Inhibitors. M-Cholinomimetic drugs. N-Cholinomimetic drugs

Anatomical and physiological properties of the autonomic nervous system. Modern ideas about the nervous synapses, neurotransmitters and receptors. The concept of cholinergic receptors. Pharmacological effects arising at excitation and inhibition of cholinergic receptors.Classification of cholinergic drugs. Cholinomimetic drugs. M-, N-cholinomimetics. Pharmacology of carbacholine. Cholinesterase Inhibitors, classification, mechanism of action, pharmacological effects, indications for administration,side effects. Comparative characteristics of cholinesterase inhibitors: Physostigmine, Galantamine, ,Neostigmine, Pyridostigmine. Acute poisoning by irreversibly-acting cholinesterase inhibitors, its urgent care. Reactivators of cholinesterase: dipyroxime (trimedoxime bromide), isonitrosine, and alloxime. M-Cholinomimetic Drugs. Pharmacology of pilocarpine, its effects on organ vision, smooth muscle of internal organs, exocrine gland secretion, cardiovascular and urogenital systems.Indications for its administration.The poisonings by M-cholinomimetics, its urgent care. N-Cholinomimetic Drugs.Pharmacological effects of nicotine. Chronic smoking as a medical and social problem.N-cholinomimetics using for stopping smoking.

Topic 7 Drugs affecting cholinergic synapses. M-cholinoblocking drugs (Muscarinic antagonists). N-Cholinoblocking Drugs

Cholinergic antagonists. M -and N-cholinoblocking drugs. Pharmacology of aprofene, spasmolytinum (diphenyltropine), and fempiverinium bromide. Indications for administration, side effects. M-cholinergic antagonists. Pharmacology of atropine, indications for its administration. Comparative characteristics of metacinium, ipratropium bromide, pirenzepine, homatropine, tropicamide, platyphyllin. Their indications for administration, side effects. Poisoning by M-cholinergic antagonists: clinical symptoms and treatment. N-Cholinoblocking Drugs. Ganglionic Blockers (Ganglioplegic Drugs): classification, mechanism of action, pharmacological effects, clinical applications, adverse effects. Characteristics of drugs: hygronium (trepirium), benzohexonium (hexamethonium), pentaminum (azamethonium). Classification of peripheral myorelaxants. Pharmacokinetics, pharmacodynamics of tubocurarine chloride. Indications for use, side effects. Comparative characteristics of peripheral myorelaxants : pipecuronium, pancuronium, atracurium. Clinical symptoms of overdose and assistance. The concept of decurarization. Pharmacological characteristics of depolarizing myorelaxants as dithylinum (succinylcholine, suxamethonium). Indications for clinical use. Treatment of its overdose.

Topic 8 Drugs affecting adrenergic synapses. Adrenergic agonists.

Drugs affecting adrenergic synapses. Modern ideas about the adrenergic receptors, its types, lokalisation. Classification of adrenergic drugs. Adrenergic agonists. Pharmacokinetics, pharmacodynamics of epinephrine. Its clinical application. Comparative characteristics of adrenergic agonists such as norepinephrine, ephedrine, phenylephrine, naphazoline, xylometazoline, salbutamol, fenoterol.

Topic 9 Adrenergic antagonists. Sympatholytics. Dopamine antagonists. Histaminergic agents. Serotonin agonists and antagonists

Antiadrenergic drugs. Adrenoblocking drugs. Features of application.

Topic 10 Test control of module 2. Theoretical part

Test control of module 2. Theoretical part "Drugs influencing peripheral nervous system".

Module 3. Drugs influencing central nervous system

Topic 11 General Anaesthetics. Hypnotic drugs. Antiepileptic and antiparkinsonic drugs. Pharmacology of ethyl alcohol

General anaesthetics. Inhalational anaesthetics, comparative characteristics, side effects. Combination of general anaesthetics with drugs from other groups. Drugs for non-inhalation anaesthesia. Hypnotic drugs. Classification according to chemical structure, comparative characteristics, indications for administration, side effects ("REM rebound" syndrome, drug dependence, tolerance, phenomenon of after-action). A treatment of poisoning by barbiturates. Anticonvulsants. Classification of antiparkinsonic drugs. Main mechanisms of action. Pharmacology of ethyl alcohol. Application of ethyl alcohol in medical practice. Acute and chronic poisoning by ethanol. Medicamental therapy of alcoholism. Mechanism of action of disulfiram.

Topic 12 Pharmacology of opioids and non-opioids analgesics

Analgesic drugs. General characteristics of analgesics. Classification. Management of pain. Opioid receptors. Pharmacological classes of opioids and action on opioid receptors. Mechanism of action. Pharmacology of morphine, its actions. Tolerance and physical dependence. Drug addiction as a socio-biological problem. Non-opioids analgesics. Classification of non-opioids analgesics according to chemical structure. General group characteristics. Mechanism of anti-inflammatory, analgesic and antipyretic action. Pharmacological characteristics of drugs: acetylsalicylic acid, paracetamol (acetaminophen), ibuprofen, mefenamic acid, diclofenac, indomethacin, piroxicam, nimesulide, meloxicam, celecoxib. Comparative characteristics, adverse effects.

Topic 13 Psychotropic drugs: neuroleptics (antipsychotic drugs), tranquilizers (anxiolytics), sedative drugs, lithium salts

Classification of psychotropic drugs. General characteristics of antipsychotic drugs (neuroleptics), classification according to chemical structure. The mechanism of antipsychotic effect. Pharmacological effects of aminazine (chlorpromazine), triflazine, phthorphenazine, haloperidol, droperidol, sulpiride, chlorprothixene, clozapine. Indications for the use, adverse effects. Neuroleptanalgesia. Anxiolytic drugs (tranquilizers). Classification. Benzodiazepines, mechanism of action. Pharmacology of phenazepam, chlordiazepoxide (chlozepidum), diazepam. Daytime anxiolytics (mezepam, hydazepam). Indications, contraindications for use, adverse effects. Dependence. The combined use of tranquilizers with another drugs. Salts of lithium (lithium carbonate, lithium oxybutirate), actions, therapeutic uses, side effects. Poisoning by lithium salts, clinical symptoms, treatment. Sedative drugs, classification, therapeutic uses. Chronic poisoning - bromism, the main symptoms and its treatment. Sedative drugs of the plant origin: tinctures infusions of Valeriana, motherwort (Leonurus), Passiflora, peony, etc.

Topic 14 Psychotropic drugs: psychostimulants, analeptics, nootropic drugs, antidepressants, adaptogens, psychodisleptics

Classification of psychostimulants. Pharmacological effects of phenylalkylamines, caffeine, sydnocarb. Therapeutic uses, adverse effects. Pharmacokinetics and pharmacodynamics of analeptics: caffeine-sodium benzoate, bemegrade, etimizole. Nootropic drugs (cognitive enhancers), classification, mechanism of action, therapeutic uses. Pharmacology of piracetam, aminalon, nicergoline, vinpocetine, pentoxifylline. Antidepressants, classification according to mechanism of action, chemical structure. Imipramine, amitriptyline, fluoxetine, fluvoxamine, sertraline, maprotiline, pyrasidole, incazanum. Comparative characteristic. Side effects of antidepressants. Pharmacology of psychodisleptics (hallucinogens).

Topic 15 Test control of module 2 and 3. Step-1, prescriptions

Step-1, prescriptions " Drugs influencing peripheral and central nervous system".

Topic 16 Test control of module 2. Theoretical part

Test control of module 2. Theoretical part "Drugs influencing central nervous system".

Module 4. Drugs influencing inner organs and metabolism

Topic 17 Drugs influencing respiratory system

Analeptics. Classification, pharmacokinetics, pharmacodynamics, therapeutic uses. Antitussive drugs: classification, mechanism of action, pharmacological effects, indications for use, and side effects of codeine, libexin. Expectorant drugs: classification, mechanism of action, pharmacological effects, clinical use, and side effects of acetylcysteinum, bromhexinum, ambroxole. Drugs used in asthma: classification according to mechanism of action, therapeutic uses, adverse effects.

Topic 18 Drugs influencing digestive system, part 1

Drugs used in hyposecretion of stomach. Drugs decreasing appetite (anorexic or anorexigenic drugs). Pharmacology of orlistat. Emetic drugs: mechanism of action, clinical use and contraindications of apomorphine. Antiemetic drugs: classification, mechanisms of action, clinical use, and side effects of antagonists of D2-dopaminergic receptors (metoclopramide), thiethylperazine, antagonists of 5-HT₃-serotonergic receptors, M-cholinoblocking drugs, antagonists of H₁-histaminergic receptors. Drugs used in hypersecretion of gastric glands and in disorders of trophism and regeneration of gastric mucosa. Characteristics of drugs creating mechanical protection of gastric mucosa: sucralfate, bismuth subcitrate and drugs increasing protective function of mucous barrier (carbenoxolone, misoprostol).

Topic 19 Drugs influencing digestive system, part 2

Drugs which affect the intestinal motility. Drugs stimulating intestinal motility: M-cholinergic agonists, cholinesterase inhibitors, agonists of 5-HT₄-serotonergic receptors and motilin receptors. Laxative drugs: classification, mechanisms of action, the peculiarities of clinical use of different drugs. Drugs inhibiting intestinal motility and reducing intestinal spasms: M-cholinoblockers, ganglion blocking drugs, myotropic spasmolytics. Antidiarrheal drugs. Pharmacology of astringent, enveloping drugs, loperamide. Antiflatulent drugs: preparations obtained from Peppermint leaves and Chamomile flowers.

Topic 20 Diuretic drugs. Drugs influencing myometrium. Drugs used to treat gout

Classification of diuretics based on the action mechanism and localization of their action, depending on the efficacy of diuretic activity and depending on speed of effect development. The pharmacological characteristic of potassium-sparing diuretics: spironolactone, eplerenone, triamterene and amiloride. Definition of forced diuresis. Osmotic diuretics: mannitol, mechanism of action, clinical use, and side effects. Diuretics of plant origin. Principles of combined diuretics treatment. Drugs used to treat gout. Mechanisms of action, indications, and side effects of different drugs. Drugs influencing myometrium. Classification of drugs which influence predominantly upon the contractile activity of myometrium. Characteristic of drugs which strengthen the contractile activity: oxytocin, pituitrinum, dinoprost, dinoprostone. Peculiarities of action of different drugs, their clinical use, and complications. Characteristic of drugs which weaken the contractile activity of myometrium. Pharmacological characteristics of drugs which influence predominantly upon the uterine tone: ergot alkaloids (ergotal, ergotamine, ergometrine), and cotarnine chloride. Mechanism of action, clinical use, and contraindications. Drugs which decrease the cervix uteri tone: atropine, dinoprost, dinoprostone, and myotropic spasmolytic drugs.

Topic 21 Cardiotoxic drugs. Cardiac glycosides

The classification of drugs used for treatment of congestive heart failure. Cardiotoxic drugs, classification. Pharmacokinetics and pharmacodynamics cardiac glycosides. Comparative characteristics of digitoxin, digoxin, strophanthin, corglycon, infusion of Adonis herb. Therapeutic use of cardiac glycosides. Contraindications. The adverse effects and complications of glycoside therapy. The treatment of cardiac glycoside overdose. Non-glycoside cardiotoxics: amrinonum, milrinonum, dophaminum, and dobutaminum. Indications for administration.

Topic 22 Antiarrhythmic drugs

Antiarrhythmic drugs. The main laws of formation of action potential in the heart. The types of arrhythmias and their causes. The classification of antiarrhythmic drugs. Pharmacological characteristics of sodium channel blockers. Mechanisms of action drugs from subgroups IA, IB, and IC. Peculiarities of quinidine, novocainamidum, lidocaine, dipheninum. Indications for use and side effects. Pharmacological characteristics of antiarrhythmic action of calcium channel blockers. Indications for use and side effects.

Topic 23 Antihypertensive and hypertensive drugs. Medications for cerebrovascular insufficiency

Antihypertensive drugs. Treatment strategies of hypertension. Modern classification of antihypertensive drugs. Pharmacological properties of basic and supporting antihypertensive agents. Hypertensive medicines.

Topic 24 Drugs to treat ischemic heart disease (antianginal drugs). Anti-atherosclerotic drugs

The classification of drugs used for treatment of angina pectoris. Drugs of group of organic nitrates. Nitroglycerin: mechanism of action, pharmacological effects. Clinical use of different medicinal forms with nitroglycerin, side effects. The cause of development of tolerance to nitroglycerin. The classification of blockers of calcium channels according to chemical structure. Mechanism of their action and pharmacological effects. Indication for use. Side effects of blockers of calcium channels.

Topic 25 Drugs influencing platelet aggregation, coagulation and fibrinolysis. Drugs that affect hematopoiesis

Drugs influencing platelet aggregation, coagulation and fibrinolysis. Classification of drugs which are used for prevention and treatment thrombosis. Classification of antiaggregants according to mechanism of action. Pharmacological characteristic of such drugs as aspirin, dipyridamole, abciximab, ticlopidine, clopidogrel: mechanism of action, used doses, clinical use, and side effects. Classification of anticoagulants. Pharmacological characteristic of directly acting anticoagulants (heparin, enoxaparin, fraxiparin, dalteparin, parnaparin, hirudin); mechanism of action, indications for application, and side effects. Indirectly acting anticoagulants (neodicumarinum, syncumarum, warfarin): mechanism of action, clinical use, and complications. Fibrinolytics (fibrinolysin, streptokinase, streptodectasum, urokinase, alteplase). Mechanisms of drugs action, indications, complications of fibrinolytic therapy. Procoagulants (drugs which increase blood coagulation): classification, mechanisms of action, clinical use. Antifibrinolytics (aminocaproic acid, tranexamic acid, drugs which contain aprotinin): mechanism action, effects, indications for use, side effects. Classification of drugs which stimulate the erythropoiesis. The pharmacological characteristic of peroral drugs for treatment of hypochromic anemia: representatives of mono-drugs with iron and combined drugs, mechanism of action, clinical applications, side effects.

Topic 26 Hormonal Drugs

Classification of hormonal drugs according to chemical structure. General features of action mechanisms of hormonal drugs, therapeutic uses. Drugs of hypothalamic hormones. Pharmacological characteristic of hormonal drugs of anterior pituitary: corticotropin, somatotropin, thyrotropin, gonadotropin menopausticum and gonadotropin chorionicum, lactin. Pharmacological characteristic of hormonal drugs of intermediate pituitary (intermedin). Pharmacological characteristic of hormonal drugs of posterior pituitary: oxytocin, adiurecrin. Antithyroid drugs: classification, mechanisms of action, indications for use, side effects. Pharmacological characteristic of hormonal drugs which regulate the calcium metabolism: calcitonin (calcitrium) and parathyroid hormonal drugs (parathyroidin and dihydrotachisterolum). Classification of antidiabetic drugs. Mechanism of action, pharmacological effects, indications for use, and side effects of insulin preparations. Pharmacological characteristic of synthetic antidiabetic drugs: sulfonylurea derivatives; biguanide derivatives; thiazolidinediones; glucosidase inhibitors. The classification of glucocorticoid hormone preparations. Mechanism of action, effects. Comparative characteristic of glucocorticoid hormone preparations. Indications for application of glucocorticoids. Side effects and complications of glucocorticoid therapy.

Topic 27 Anti-inflammatory, antiallergic, and immunotropic drugs

The classification of anti-inflammatory agents according to mechanism of their action. Steroid anti-inflammatory agents: mechanism of action, pharmacological effects, indications for application, and side effects. The mechanism of action of non-steroidal anti-inflammatory agents. The concepts about COX-1 and COX-2. The main effects of non-steroid anti-inflammatory agents: analgesic, anti-inflammatory, and antipyretic ones. Other pharmacological effects of non-steroid anti-inflammatory agents. The comparative characteristic of derivatives of salicylic acid, pyrazolone derivatives, anthranilic, indoleacetic, phenylacetic, phenylpropionic, and naphthylpropionic acid. Classification of antiallergic drugs used at allergic reactions of immediate type. Mechanism of action, pharmacological effects, clinical application of stabilizers of tissue basophil membranes and H1-blockers. Mechanism of antiallergic action of glucocorticoids. Their clinical use.

Topic 28 Test control of module 4.

Test control of module 4. Step-1, prescriptions " Drugs influencing inner organs and metabolism".

Topic 29 Test control of module 4. Theoretical part

Test control of module 4. Theoretical part "Drugs influencing inner organs and metabolism".

Module 5. Pharmacology of antimicrobial, antiviral, antiparasitic, antiprotozoal, antifungal, antitumoral drugs

Topic 30 Antiseptics and Disinfectants

Definition of terms "antiseptics" and "disinfectants". Classification of antiseptics and disinfectants. Pharmacological characteristic of different groups of antiseptics and disinfectants (representatives, mechanism and spectrum of action, clinical use): phenol derivatives; alcohols and aldehydes; dyes; detergents; nitrofurans derivatives; halogens; oxidizers; heavy metal drugs; acids and alkalis. The signs and treatment of poisonings by mercury drugs and by acids and alkalis.

Topic 31 Pharmacology of antibiotics

The definition of term “antibiotics”. The main principles of the chemotherapeutic drug use. Classification of antibiotics according to chemical structure, mechanism and spectrum of antibacterial action. Route of administration. The comparative characteristic of antibiotics, indications for use, adverse effects. Anaphylactic shock to penicillins and measures of assistance. Combinations of antimicrobial drugs. Drug resistance.

Topic 32 Pharmacology of fluoroquinolones and antimycobacterial drugs. Sulfanilamides and antimicrobial agents of different chemical structure

Pharmacological characteristic (mechanism of action, spectrum of action, therapeutic indications, and side effects) of synthetic antibacterial drugs with different chemical structure: nitrofurans derivatives; oxiquinolone, aminoquinoline, quinolone and fluoroquinolone derivatives (representatives of different generations); nitroimidazole derivatives. Chemical structure and classification of sulfonamides. Mechanism and spectrum of antibacterial action of sulfonamides. Pharmacokinetics, indications for use, and side effects of sulfonamides. Classification of antituberculosis drugs according to their efficiency. The clinical strategy of treatment of tuberculosis. The pharmacological characteristic of most effective drugs (chemical structure, mechanism and spectrum of action, pharmacokinetics, clinical use, and side effects): isoniazid and rifampicin. The pharmacological characteristic of drugs with high and moderate antituberculous activity.

Topic 33 Pharmacology of antiviral and antisyphilitic drugs. Antimalarial, antiprotozoal and antifungal drugs

Classification of antiviral drugs according to the type of viral infection. Antiviral drugs for treatment of respiratory, hepatic viral and herpes virus infections. Drugs for treatment of HIV Infection. Classification of drugs used for treatment of syphilis. Their pharmacological characteristics. The classification of antimalarial drugs according to drugs action against different forms of Plasmodium. Pharmacological characteristic (mechanism of action, pharmacokinetics, clinical use, and side effects) of antimalarial drugs. Classification of antiamebial drugs depending on their efficiency in various localization of Entamoeba histolytica. Pharmacological characteristic of antiamebial drugs. Drugs for treatment of lambliaiasis, trichomoniasis and toxoplasmosis. Pharmacological characteristic of metronidazole and furazolidone. Clinically useful agents for cutaneous, subcutaneous and systemic mycoses.

Topic 34 Antihelminthic drugs. Pharmacology of antitumoral agents

Anthelmintic drugs. Medicines for intestinal and extraintestinal helminthiasis. Pharmacology of benzimidazole and pyrimidine derivatives: pharmacokinetics and pharmacodynamics, spectrum of action, indications for use, side effects. Classification of the antitumoral drugs. The main principles of cancer chemotherapy. Pharmacological characteristic of antimetabolites, alkylating drugs, antibiotics which exhibit the antitumoral activity, steroid hormones and their antagonists, microtubule inhibitors, monoclonal antibodies and different synthetic antitumoral agents.

Topic 35 Radioprotectors. Drugs which accelerate the elimination of radionuclids from organism. Drugs used for transfusion therapy. Drugs containing alkaline salt and alkaline-earth metals. Treatment of acute poisoning.

Pharmacological characteristics of radioprotectors and drugs accelerating the elimination of radionuclids from organism: classification, mechanisms of action, effects, clinical use, and side effects of certain drugs. Classification of drugs used for rehydration and detoxication. Pharmacological characteristics of individual drugs: polyionic salt solutions and glucose-salt solutions; hypotonic, isotonic, and hypertonic solutions of sodium chloride; preparations containing potassium (potassium chloride, polarizing mixture, "Panangin", "Asparcamum"); drugs containing calcium (calcium chloride and calcium gluconate); magnesium sulfate. Pharmacological characteristics of drugs used for correction of acid-base balance: drugs used for correction of acidosis and of alkalosis. Pharmacological characteristics of plasma substituting drugs: albumin solution, dextran containing drugs (polyglucinum, rheopolyglucinum, rheogluman), gelatin, haemodesum, neohaemodesum. Drugs for parenteral feeding. Main principles of treatment of acute poisoning: prevention of further poison absorption into the blood; cessation of action of poison absorbed in the blood; acceleration of poison excretion from the blood; symptomatic therapy of acute poisoning.

Topic 36 Test control of module 5. Theoretical part

Test control of module 5. Theoretical part "Pharmacology of antimicrobial, antiviral, antiparasitic, antiprotozoal, antifungal, antitumoral drugs".

Topic 37 Concluding session Prescription

Concluding session. Prescription

Topic 38 Concluding session. Step-1

Concluding session. Step-1

5. Intended learning outcomes of the course

After successful study of the course, the student will be able to:

LO1	to collect medical information about the patient and analyze clinical data.
LO2	to determine the required set of laboratory and instrumental studies and to evaluate their results
LO3	to establish a provisional and clinical diagnosis of disease.
LO4	to determine the principles of treatment and treatment modality and to perform medical procedures

6. Role of the course in the achievement of programme learning outcomes

Programme learning outcomes achieved by the course.

For 222 Medicine:

PO6	To determine the nature and treatment principles (conservative, operative) in patients with diseases (according to the List 2) at a healthcare facility, at patient's home or during medical evacuation process (including in the field), based on the provisional clinical diagnosis and observing the relevant ethical and legal norms, by making a reasonable decision according to existing algorithms and standard procedures based on the principles of evidence-based medicine; if needed to go beyond the standard scheme, to substantiate the personalized recommendations under control of a supervising doctor at a medical facility.
PO11	To determine the appropriate approach in emergency medical care case under any circumstances, adhering to the relevant ethical and legal norms, by making an informed decision based on the main clinical syndrome (disease severity) and emergency diagnosis (according to the List 3) using standard schemes under limited time conditions based on the principles of evidence-based medicine.
PO12	To provide emergency medical assistance under any circumstances, adhering to the relevant ethical and legal norms, by making an informed decision based on the main clinical syndrome (disease severity) and emergency diagnosis (according to the List 3) using standard schemes and predetermined approach under limited time conditions based on the principles of evidence-based medicine.
PO13	To organize medical evacuation procedures among the population and the military under emergency and military operation conditions (including in the field), and during the phases of medical evacuation, given the existing system of medical evacuation provision.
PO18	To search for the necessary information in the professional literature and databases; to analyze, evaluate, and apply this information. To apply modern digital technologies, specialized software, statistical methods of data analysis to solve complex health problems.

7. Teaching and learning activities

7.1 Types of training

Topic 1. Introduction in medical prescription.Solid Medicinal Forms
pr.tr.1 "Introduction in medical prescription.Solid Medicinal Forms" (full-time course) Definition of prescription, medicinal raw materials, medicinal substance , medicinal remedy , pharmaceutical remedy . Pharmacy. Definition of Pharmacopoeia, its types.Officinal drugs and Magistral drugs. Prescription: Structure and rules of Registration.Rules of Dosage. Measure of Weight and Volume.Rules of Registration of Prescriptions in Foreign Countries. Solid medicinal forms:powders,tablets,dragee,capsules,eye membranulas.
Topic 2. Soft Medicinal Forms
pr.tr.2 "Soft Medicinal Forms" (full-time course) Soft Medicinal Forms: ointments, pastes,suppositories.
Topic 3. Liquid Medicinal Forms

pr.tr.3 "Liquid Medicinal Forms" (full-time course)

Liquid Medicinal Forms. Solutions for external and internal use. Solutions for injections. Suspensions. Tinctures and Liquid Extracts. Infusions and Broths. Mixtures. Liniments. Aerosols.

Topic 4. Control of practical skills to medical prescription.

pr.tr.4 "Control of practical skills to medical prescription." (full-time course)

Written test "Medical prescription".

Topic 5. General pharmacology. Drug pharmacokinetics and pharmacodynamics. Drugs influencing afferent innervation

lect.1 "History of pharmacology. The state of modern pharmacology. General pharmacology." (full-time course)

History of pharmacology. The state of modern pharmacology. General pharmacology.

pr.tr.5 "General pharmacology. Drug pharmacokinetics and pharmacodynamics. Drugs influencing afferent innervation" (full-time course)

Definition of pharmacology. Pharmacology in the system of medical and biological sciences. The main sections pharmacology. The role of domestic and foreign scientists in the formation and development of pharmacology, as science. Drug pharmacokinetics. Routes of drug administration. Penetration of drugs through biological membranes. Drug distribution in organism. Drug biotransformation. Drug Excretion. Drug pharmacodynamics. Types of drug action. Principles of drug dosing. Phenomena occurring due to repeated drug administration. Combined drug use. Main and side drug effects. General principles of treatment of acute poisoning. Drugs influencing afferent innervation.

Topic 6. Drugs influencing efferent innervation. Cholinergic drugs. M- and N-Cholinomimetics. Cholinesterase Inhibitors. M-Cholinomimetic drugs. N-Cholinomimetic drugs

lect.2 "Drugs influencing efferent innervation. Drugs affecting cholinergic synapses. Cholinergic drugs. M- and N-Cholinomimetics. Cholinesterase Inhibitors. M-Cholinergic antagonists. N-Cholinoblockers." (full-time course)

Drugs influencing efferent innervation. Drugs affecting cholinergic synapses. Cholinergic drugs. M- and N-Cholinomimetics. Cholinesterase Inhibitors. M-Cholinergic antagonists. N-Cholinoblockers.

pr.tr.6 "Drugs influencing efferent innervation. Cholinergic drugs. M- and N-Cholinomimetics. Cholinesterase Inhibitors. M-Cholinomimetic drugs. N-Cholinomimetic drugs" (full-time course)

Anatomical and physiological properties of the autonomic nervous system. Modern ideas about the nervous synapses, neurotransmitters and receptors. The concept of cholinergic receptors. Pharmacological effects arising at excitation and inhibition of cholinergic receptors. Classification of cholinergic drugs. Cholinomimetic drugs. M-, N-cholinomimetics. Pharmacology of carbacholine. Cholinesterase Inhibitors, classification, mechanism of action, pharmacological effects, indications for administration, side effects. Comparative characteristics of cholinesterase inhibitors: Physostigmine, Galantamine, Neostigmine, Pyridostigmine. Acute poisoning by irreversibly-acting cholinesterase inhibitors, its urgent care. Reactivators of cholinesterase: dipyroxime (trimedoxime bromide), isonitrosine, and alloxime. M-Cholinomimetic Drugs. Pharmacology of pilocarpine, its effects on organ vision, smooth muscle of internal organs, exocrine gland secretion, cardiovascular and urogenital systems. Indications for its administration. The poisonings by M-cholinomimetics, its urgent care. N-Cholinomimetic Drugs. Pharmacological effects of nicotine. Chronic smoking as a medical and social problem. N-cholinomimetics using for stopping smoking.

Topic 7. Drugs affecting cholinergic synapses. M-cholinoblocking drugs (Muscarinic antagonists). N-Cholinoblocking Drugs

pr.tr.7 "Drugs affecting cholinergic synapses. M-cholinoblocking drugs (Muscarinic antagonists). N-Cholinoblocking Drugs" (full-time course)

Cholinergic antagonists. M -and N-cholinoblocking drugs. Pharmacology of aprofene, spasmolytinum (diphenyltropine), and fempiverinium bromide. Indications for administration, side effects. M-cholinergic antagonists. Pharmacology of atropine, indications for its administration. Comparative characteristics of metacinium, ipratropium bromide, pirenzepine, homatropine, tropicamide, platyphyllin. Their indications for administration, side effects. Poisoning by M-cholinergic antagonists: clinical symptoms and treatment. N-Cholinoblocking Drugs. Ganglionic Blockers (Ganglioplegic Drugs): classification, mechanism of action, pharmacological effects, clinical applications, adverse effects. Characteristics of drugs: hygronium (trepirium), benzohexonium (hexamethonium), pentaminum (azamethonium). Classification of peripheral myorelaxants. Pharmacokinetics, pharmacodynamics of tubocurarine chloride. Indications for use, side effects. Comparative characteristics of peripheral myorelaxants : pipecuronium, pancuronium, atracurium. Clinical symptoms of overdose and assistance. The concept of decurarization. Pharmacological characteristics of depolarizing myorelaxants as dithylinum (succinylcholine, suxamethonium). Indications for clinical use. Treatment of its overdose.

Topic 8. Drugs affecting adrenergic synapses. Adrenergic agonists.

lect.3 "Drugs affecting adrenergic synapses. Adrenergic agonists and antagonists. Sympatholytics" (full-time course)

Drugs affecting adrenergic synapses. Adrenergic agonists and antagonists. Sympatholytics.

pr.tr.8 "Drugs affecting adrenergic synapses. Adrenergic agonists." (full-time course)

Drugs affecting adrenergic synapses. Modern ideas about the adrenergic receptors, its types, lokalisation. Classification of adrenergic drugs. Adrenergic agonists. Pharmacokinetics, pharmacodynamics of epinephrine. Its clinical application. Comparative characteristics of adrenergic agonists such as norepinephrine, ephedrine, phenylephrine, naphazoline, xylometazoline, salbutamol, fenoterol.

Topic 9. Adrenergic antagonists. Sympatholytics. Dopamine antagonists. Histaminergic agents. Serotonin agonists and antagonists

pr.tr.9 "Adrenergic antagonists. Sympatholytics. Dopamine antagonists. Histaminergic agents. Serotonin agonists and antagonists" (full-time course)

Antiadrenergic drugs. Adrenoblocking drugs. Features of application.

Topic 10. Test control of module 2. Theoretical part

pr.tr.10 "Test control of module 2. Theoretical part" (full-time course)

Test control of module 2. Theoretical part "Drugs influencing peripheral nervous system".

Topic 11. General Anaesthetics. Hypnotic drugs. Antiepileptic and antiparkinsonic drugs. Pharmacology of ethyl alcohol

pr.tr.11 "General Anaesthetics. Hypnotic drugs. Antiepileptic and antiparkinsonic drugs. Pharmacology of ethyl alcohol" (full-time course)

General anaesthetics. Inhalational anaesthetics, comparative characteristics, side effects. Combination of general anaesthetics with drugs from other groups. Drugs for non-inhalation anaesthesia. Hypnotic drugs. Classification according to chemical structure, comparative characteristics, indications for administration, side effects ("REM rebound" syndrome, drug dependence, tolerance, phenomenon of after-action). A treatment of poisoning by barbiturates. Anticonvulsants. Classification of antiparkinsonic drugs. Main mechanisms of action. Pharmacology of ethyl alcohol. Application of ethyl alcohol in medical practice. Acute and chronic poisoning by ethanol. Medicamental therapy of alcoholism. Mechanism of action of disulfiram.

Topic 12. Pharmacology of opioids and non-opioids analgesics

pr.tr.12 "Pharmacology of opioids and non-opioids analgesics" (full-time course)

Analgesic drugs. General characteristics of analgesics. Classification. Management of pain. Opioid receptors. Pharmacological classes of opioids and action on opioid receptors. Mechanism of action. Pharmacology of morphine, its actions. Tolerance and physical dependence. Drug addiction as a socio-biological problem. Non-opioids analgesics. Classification of non-opioids analgesics according to chemical structure. General group characteristics. Mechanism of anti-inflammatory, analgesic and antipyretic action. Pharmacological characteristics of drugs: acetylsalicylic acid, paracetamol (acetaminophen), ibuprofen, mefenamic acid, diclofenac, indomethacin, piroxicam, nimesulide, meloxicam, celecoxib. Comparative characteristics, adverse effects.

Topic 13. Psychotropic drugs: neuroleptics (antipsychotic drugs), tranquilizers (anxiolytics), sedative drugs, lithium salts

lect.4 "Psychotropic drugs. Pharmacology of neuroleptics (antipsychotic drugs), tranquilizers (anxiolytics), sedative drugs, lithium salts" (full-time course)

Psychotropic drugs. Pharmacology of neuroleptics (antipsychotic drugs), tranquilizers (anxiolytics), sedative drugs, lithium salts

pr.tr.13 "Psychotropic drugs: neuroleptics (antipsychotic drugs), tranquilizers (anxiolytics), sedative drugs, lithium salts" (full-time course)

Classification of psychotropic drugs. General characteristics of antipsychotic drugs (neuroleptics), classification according to chemical structure. The mechanism of antipsychotic effect. Pharmacological effects of aminazine (chlorpromazine), trifazine, phthorphenazine, haloperidol, droperidol, sulpiride, chlorprothixene, clozapine. Indications for the use, adverse effects. Neuroleptanalgesia. Anxiolytic drugs (tranquilizers). Classification. Benzodiazepines, mechanism of action. Pharmacology of phenazepam, chlordiazepoxide (chlozepidum), diazepam. Daytime anxiolytics (mezepam, hydazepam). Indications, contraindications for use, adverse effects. Dependence. The combined use of tranquilizers with another drugs. Salts of lithium (lithium carbonate, lithium oxybutirate), actions, therapeutic uses, side effects. Poisoning by lithium salts, clinical symptoms, treatment. Sedative drugs, classification, therapeutic uses. Chronic poisoning - bromism, the main symptoms and its treatment. Sedative drugs of the plant origin: tinctures infusions of Valeriana, motherwort (Leonurus), Passiflora, peony, etc.

Topic 14. Psychotropic drugs: psychostimulants, analeptics, nootropic drugs, antidepressants, adaptogens, psychodislectics

pr.tr.14 "Psychotropic drugs: psychostimulants, analeptics, nootropic drugs, antidepressants, adaptogens, psychodislectics" (full-time course)

Classification of psychostimulants. Pharmacological effects of phenylalkylamines, caffeine, sydnocarb. Therapeutic uses, adverse effects. Pharmacokinetics and pharmacodynamics of analeptics: caffeine-sodium benzoate, bemegrade, etimizole. Nootropic drugs (cognitive enhancers), classification, mechanism of action, therapeutic uses. Pharmacology of piracetam, aminalon, nicergoline, vinpocetine, pentoxifylline. Antidepressants, classification according to mechanism of action, chemical structure. Imipramine, amitriptyline, fluoxetine, fluvoxamine, sertraline, maprotiline, pyrasidole, incazanum. Comparative characteristic. Side effects of antidepressants. Pharmacology of psychodislectics (hallucinogens).

Topic 15. Test control of module 2 and 3. Step-1, prescriptions

pr.tr.15 "Test control of module 2 and 3. Step-1, prescriptions" (full-time course)

Step-1, prescriptions "Drugs influencing peripheral and central nervous system".

Topic 16. Test control of module 2. Theoretical part

pr.tr.16 "Test control of module 2. Theoretical part" (full-time course)

Test control of module 2. Theoretical part "Drugs influencing central nervous system".

Topic 17. Drugs influencing respiratory system

pr.tr.17 "Drugs influencing respiratory system" (full-time course)

Analeptics. Classification, pharmacokinetics, pharmacodynamics, therapeutic uses. Antitussive drugs: classification, mechanism of action, pharmacological effects, indications for use, and side effects of codeine, libexin. Expectorant drugs: classification, mechanism of action, pharmacological effects, clinical use, and side effects of acetylcysteinum, bromhexinum, ambroxole. Drugs used in asthma: classification according to mechanism of action, therapeutic uses, adverse effects.

Topic 18. Drugs influencing digestive system, part 1

pr.tr.18 "Drugs influencing digestive system, part 1" (full-time course)

Drugs used in hyposecretion of stomach. Drugs decreasing appetite (anorexic or anorexigenic drugs). Pharmacology of orlistat. Emetic drugs: mechanism of action, clinical use and contraindications of apomorphine. Antiemetic drugs: classification, mechanisms of action, clinical use, and side effects of antagonists of D2-dopaminergic receptors (metoclopramide), thiethylperazine, antagonists of 5-HT₃-serotonergic receptors, M-cholinoblocking drugs, antagonists of H₁-histaminergic receptors. Drugs used in hypersecretion of gastric glands and in disorders of trophism and regeneration of gastric mucosa. Characteristics of drugs creating mechanical protection of gastric mucosa: sucralfate, bismuth subcitrate and drugs increasing protective function of mucous barrier (carbenoxolone, misoprostol).

Topic 19. Drugs influencing digestive system, part 2

pr.tr.19 "Drugs influencing digestive system, part" (full-time course)

Drugs which affect the intestinal motility. Drugs stimulating intestinal motility: M-cholinergic agonists, cholinesterase inhibitors, agonists of 5-HT₄-serotonergic receptors and motilin receptors. Laxative drugs: classification, mechanisms of action, the peculiarities of clinical use of different drugs. Drugs inhibiting intestinal motility and reducing intestinal spasms: M-cholinoblockers, ganglion blocking drugs, myotropic spasmolytics. Antidiarrheal drugs. Pharmacology of astringent, enveloping drugs, loperamide. Antiflatulent drugs: preparations obtained from Peppermint leaves and Chamomile flowers.

Topic 20. Diuretic drugs. Drugs influencing myometrium. Drugs used to treat gout

pr.tr.20 "Diuretic drugs. Drugs influencing myometrium. Drugs used to treat gout" (full-time course)

Classification of diuretics based on the action mechanism and localization of their action, depending on the efficacy of diuretic activity and depending on speed of effect development. The pharmacological characteristic of potassium-sparing diuretics: spironolactone, eplerenone, triamterene and amiloride. Definition of forced diuresis. Osmotic diuretics: mannitol, mechanism of action, clinical use, and side effects. Diuretics of plant origin. Principles of combined diuretics treatment. Drugs used to treat gout. Mechanisms of action, indications, and side effects of different drugs. Drugs influencing myometrium. Classification of drugs which influence predominantly upon the contractile activity of myometrium. Characteristic of drugs which strengthen the contractile activity: oxytocin, pituitrinum, dinoprost, dinoprostone. Peculiarities of action of different drugs, their clinical use, and complications. Characteristic of drugs which weaken the contractile activity of myometrium. Pharmacological characteristics of drugs which influence predominantly upon the uterine tone: ergot alkaloids (ergotal, ergotamine, ergometrine), and cotarnine chloride. Mechanism of action, clinical use, and contraindications. Drugs which decrease the cervix uteri tone: atropine, dinoprost, dinoprostone, and myotropic spasmolytic drugs.

Topic 21. Cardiotonic drugs. Cardiac glycosides

lect.5 "Cardiotonic drugs. Cardiac glycosides." (full-time course)

Cardiotonic drugs. Cardiac glycosides.

pr.tr.21 "Cardiotonic drugs. Cardiac glycosides." (full-time course)

The classification of drugs used for treatment of congestive heart failure. Cardiotonic drugs, classification. Pharmacokinetics and pharmacodynamics cardiac glycosides. Comparative characteristics of digitoxin, digoxin, strophanthin, corglycon, infusion of Adonis herb. Therapeutic use of cardiac glycosides. Contraindications. The adverse effects and complications of glycoside therapy. The treatment of cardiac glycoside overdose. Non-glycoside cardiotonics: amrinonum, milrinonum, dophaminum, and dobutaminum. Indications for administration.

Topic 22. Antiarrhythmic drugs

pr.tr.22 "Antiarrhythmic drugs" (full-time course)

Antiarrhythmic drugs. The main laws of formation of action potential in the heart. The types of arrhythmias and their causes. The classification of antiarrhythmic drugs . Pharmacological characteristics of sodium channel blockers. Mechanisms of action drugs from subgroups IA, IB, and IC. Peculiarities of quinidine, novocainamidum, lidocaine, dipheninum. Indications for use and side effects. Pharmacological characteristics of antiarrhythmic action of calcium channel blockers. Indications for use and side effects.

Topic 23. Antihypertensive and hypertensive drugs. Medications for cerebrovascular insufficiency

lect.6 "Antihypertensive and hypertensive drugs. Medications for cerebrovascular insufficiency" (full-time course)

Antihypertensive and hypertensive drugs. Medications for cerebrovascular insufficiency.

pr.tr.23 "Antihypertensive and hypertensive drugs. Medications for cerebrovascular insufficiency" (full-time course)

Antihypertensive and hypertensive drugs. Modern classification of antihypertensive drugs. Pharmacological properties of basic and supporting antihypertensive agents. Hyperetensive medicines.

Topic 24. Drugs to treat ischemic heart disease (antianginal drugs). Anti-atherosclerotic drugs

pr.tr.24 "Drugs to treat ischemic heart disease (antianginal drugs). Anti-atherosclerotic drugs" (full-time course)

The classification of drugs used for treatment of angina pectoris. Drugs of group of organic nitrates. Nitroglycerin: mechanism of action, pharmacological effects. Clinical use of different medicinal forms with nitroglycerin, side effects. The cause of development of tolerance to nitroglycerin. The classification of blockers of calcium channels according to chemical structure. Mechanism of their action and pharmacological effects. Indication for use. Side effects of blockers of calcium channels.

Topic 25. Drugs influencing platelet aggregation, coagulation and fibrinolysis. Drugs that affect hematopoiesis

lect.7 "Drugs influencing platelet aggregation, coagulation and fibrinolysis. Drugs that affect hematopoiesis" (full-time course)

Drugs influencing platelet aggregation, coagulation and fibrinolysis. Drugs that affect hematopoiesis

pr.tr.25 "Drugs influencing platelet aggregation, coagulation and fibrinolysis. Drugs that affect hematopoiesis" (full-time course)

Drugs influencing platelet aggregation, coagulation and fibrinolysis. Classification of drugs which are used for prevention and treatment thrombosis. Classification of antiaggregants according to mechanism of action. Pharmacological characteristic of such drugs as aspirin, dipyridamole, abciximab, ticlopidine, clopidogrel: mechanism of action, used doses, clinical use, and side effects. Classification of anticoagulants. Pharmacological characteristic of directly acting anticoagulants (heparin, enoxaparin, fraxiparin, dalteparin, parnaparin, hirudin); mechanism of action, indications for application, and side effects. Indirectly acting anticoagulants (neodicumarinum, syncumarum, warfarin): mechanism of action, clinical use, and complications. Fibrinolytics (fibrinolysin, streptokinase, streptodectasum, urokinase, alteplase). Mechanisms of drugs action, indications, complications of fibrinolytic therapy. Procoagulants (drugs which increase blood coagulation): classification, mechanisms of action, clinical use. Antifibrinolytics (aminocapronic acid, tranexamic acid, drugs which containe aprotinin): mechanism action, effects, indications for use, side effects. Classification of drugs which stimulate the erythropoiesis. The pharmacological characteristic of peroral drugs for treatment of hypochromic anemia: representatives of mono-drugs with iron and combined drugs, mechanism of action, clinical applications, side effects.

Topic 26. Hormonal Drugs

pr.tr.26 "Hormonal Drugs" (full-time course)

Classification of hormonal drugs according to chemical structure. General features of action mechanisms of hormonal drugs, therapeutic uses. Drugs of hypothalamic hormones. Pharmacological characteristic of hormonal drugs of anterior pituitary: corticotropinum, somatotropinum, thyrotropinum, gonadotropinum menopausticum and gonadotropinum chorionicum, lactinum. Pharmacological characteristic of hormonal drugs of intermediate pituitary (intermedinum). Pharmacological characteristic of hormonal drugs of posterior pituitary: oxytocinum, adiurecrinum. Antithyroid drugs: classification, mechanisms of action, indications for use, side effects. Pharmacological characteristic of hormonal drugs which regulate the calcium metabolism: calcitonin (calcitrinum) and parathyroid hormonal drugs (parathyreoidinum and dihydrotachisterolum). Classification of antidiabetic drugs. Mechanism of action, pharmacological effects, indications for use, and side effects of insulin preparations. Pharmacological characteristic of synthetic antidiabetic drugs: sulfonylurea derivatives; biguanide derivatives; thiazolidinediones; glucosidase inhibitors. The classification of glucocorticoid hormone preparations. Mechanism of action, effects. Comparative characteristic of glucocorticoid hormone preparations. Indications for application of glucocorticoids. Side effects and complications of glucocorticoid therapy.

Topic 27. Anti-inflammatory, antiallergic, and immunotropic drugs

pr.tr.27 "Anti-inflammatory, antiallergic, and immunotropic drugs" (full-time course)

The classification of anti-inflammatory agents according to mechanism of their action. Steroid anti-inflammatory agents: mechanism of action, pharmacological effects, indications for application, and side effects. The mechanism of action of non-steroidal anti-inflammatory agents. The concepts about COX-1 and COX-2. The main effects of non-steroid anti-inflammatory agents: analgesic, anti-inflammatory, and antipyretic ones. Other pharmacological effects of non-steroid anti-inflammatory agents. The comparative characteristic of derivatives of salicylic acid, pyrazolone derivatives, anthranilic, indoleacetic, phenylacetic, phenylpropionic, and naphthylpropionic acid. Classification of antiallergic drugs used at allergic reactions of immediate type. Mechanism of action, pharmacological effects, clinical application of stabilizers of tissue basophil membranes and H1-blockers. Mechanism of antiallergic action of glucocorticoids. Their clinical use.

Topic 28. Test control of module 4.

pr.tr.28 "Test control of module 4." (full-time course)

Test control of module 4. Step-1, prescriptions " Drugs influencing inner organs and metabolism".

Topic 29. Test control of module 4. Theoretical part

pr.tr.29 "Test control of module 4. Theoretical part" (full-time course)

Test control of module 4. Theoretical part "Drugs influencing inner organs and metabolism ".

Topic 30. Antiseptics and Disinfectants

pr.tr.30 "Antiseptics and Disinfectants" (full-time course)

Definition of terms "antiseptics" and "disinfectants". Classification of antiseptics and disinfectants. Pharmacological characteristic of different groups of antiseptics and disinfectants (representatives, mechanism and spectrum of action, clinical use): phenol derivatives; alcohols and aldehydes; dyes; detergents; nitrofurans derivatives; halogens; oxidizers; heavy metal drugs; acids and alkalis. The signs and treatment of poisonings by mercury drugs and by acids and alkalis.

Topic 31. Pharmacology of antibiotics

pr.tr.30 "Pharmacology of antibiotics" (full-time course)

The definition of term "antibiotics". The main principles of the chemotherapeutic drug use. Classification of antibiotics according to chemical structure, mechanism and spectrum of antibacterial action. Route of administration. The comparative characteristic of antibiotics, indications for use, adverse effects. Anaphylactic shock to penicillins and measures of assistance. Combinations of antimicrobial drugs. Drug resistance.

Topic 32. Pharmacology of fluoroquinolones and antimycobacterial drugs. Sulfanilamides and antimicrobial agents of different chemical structure

pr.tr.32 "Pharmacology of fluoroquinolones and antituberculosis drugs. Sulfanilamides and antimicrobial agents of different chemical structure" (full-time course)

structurePharmacological characteristic (mechanism of action, spectrum of action, therapeutic indications, and side effects) of synthetic antibacterial drugs with different chemical structure: nitrofuran derivatives; oxiquinoline, aminoquinoline, quinolone and fluoroquinolone derivatives (representatives of different generations);nitroimidazole derivatives. Chemical structure and classification of sulfonamides. Mechanism and spectrum of antibacterial action of sulfonamides. Pharmacokinetics, indications for use, and side effects of sulfonamides. Classification of antituberculosis drugs according to their efficiency.The clinical strategy of treatment of tuberculosis.The pharmacological characteristic of most effective drugs (chemical structure, mechanism and spectrum of action, pharmacokinetics, clinical use, and side effects): isoniazid and rifampicin. The pharmacological characteristic of drugs with high and moderate antituberculous activity.

Topic 33. Pharmacology of antiviral and antisyphilitic drugs. Antimalarial, antoprotozoal and antifungal drugs

pr.tr.33 "Pharmacology of antiviral and antisyphilitic drugs. Antimalarial, antoprotozoal and antifungal drugs" (full-time course)

Pharmacology of antiviral and antisyphilitic drugs. Antimalarial, antoprotozoal and antifungal drugsClassification of antiviral drugs according to the type of viral infection. Antiviral drugs for treatment of respiratory, hepatic viral and herpes virus infections. Drugs for treatment of HIV Infection. Classification of drugs used for treatment of syphilis. Their pharmacological characteristics. The classification of antimalarial drugs according to drugs action against different forms of Plasmodium. Pharmacological characteristic (mechanism of action, pharmacokinetics, clinical use, and side effects) of antimalarial drugs. Classification of antiamebial drugs depending on their efficiency in various localization of Entamoeba histolytica. Pharmacological characteristic of antiamebial drugs. Drugs for treatment of lambliasis, trichomoniasis and toxoplasmosis. Pharmacological characteristic of metronidazole and furazolidone. Clinically useful agents for cutaneous, subcutaneous and systemic mycoses.

Topic 34. Antihelmintic drugs. Pharmacology of antitumoral agents

pr.tr.34 "Antihelmintic drugs. Pharmacology of antitumoral agents" (full-time course)

Anthelmintic drugs. Medicines for intestinal and extraintestinal helminthiasis. Pharmacology of benzimidazole and pyrimidine derivatives: pharmacokinetics and pharmacodynamics, spectrum of action, indications for use, side effects. Classification of the antitumoral drugs.The main principles of cancer chemotherapy. Pharmacological characteristic of antimetabolites, alkylating drugs, antibiotics which exhibit the antitumoral activity, steroid hormones abd their antagonists, microtubule inhibitors, monoclonal antibodies and different synthetic antitumoral agents.

Topic 35. Radioprotectors. Drugs which accelerate the elimination of radionuclids from organism. Drugs used for transfusion therapy. Drugs containing alkaline salt and alkaline-earth metals. Treatment of acute poisoning.

<p>pr.tr.35 "Radioprotectors. Drugs which accelerate the elimination of radionuclids from organism. Drugs used for transfusion therapy. Drugs containing alkaline salt and alkaline-earth metals. Treatment of acute poisoning" (full-time course)</p> <p>Pharmacological characteristics of radioprotectors and drugs accelerating the elimination of radionuclids from organism: classification, mechanisms of action, effects, clinical use, and side effects of certain drugs. Classification of drugs used for rehydration and detoxication. Pharmacological characteristics of individual drugs: polyionic salt solutions and glucose-salt solutions; hypotonic, isotonic, and hypertonic solutions of sodium chloride; preparations containing potassium (potassium chloride, polarizing mixture, "Panangin", "Asparcamum"); drugs containing calcium (calcium chloride and calcium gluconate); magnesium sulfate. Pharmacological characteristics of drugs used for correction of acid-base balance: drugs used for correction of acidosis and of alkalosis. Pharmacological characteristics of plasma substituting drugs: albumin solution, dextran containing drugs (polyglucinum, rheopolyglucinum, rheogluman), gelatin, haemodesum, neohaemodesum. Drugs for parenteral feeding. Main principles of treatment of acute poisoning: prevention of further poison absorption into the blood; cessation of action of poison absorbed in the blood; acceleration of poison excretion from the blood; symptomatic therapy of acute poisonin</p>
<p>Topic 36. Test control of module 5. Theoretical part</p>
<p>pr.tr.36 "Test control of module 5. Theoretical part" (full-time course)</p> <p>Test control of module 5. Theoretical part "Pharmacology of antimicrobial, antiviral, antiparasitic, antiprotozoal, antifungal, antitumoral drugs".</p>
<p>Topic 37. Concluding session Prescription</p>
<p>pr.tr.37 "Concluding session. Prescription" (full-time course)</p> <p>Concluding session. Prescription</p>
<p>Topic 38. Concluding session. Step-1</p>
<p>pr.tr.38 "Concluding session. Step-1" (full-time course)</p> <p>Concluding session. Step-1</p>

7.2 Learning activities

LA1	Completion of mandatory homework in the workbook
LA2	Performing of practical tasks
LA3	E-learning in systems (Mix SumDU platform, Google-meet)
LA4	Preparation for Step 1
LA5	Preparation for current and final control
LA6	Preparation for practical classes
LA7	Work with textbooks and relevant information sources
LA8	Self-study
LA9	Analysis of clinical cases

LA10	Exam preparation
LA11	Individual research project (student research work, article, thesis, etc.)

8. Teaching methods

Course involves learning through:

TM1	Method of illustrations
TM2	Interactive lectures
TM3	Method of demonstrations
TM4	Case-based learning (CBL)
TM5	Research-based learning (RBL)
TM6	Brainstorming

The discipline is taught using modern teaching methods (CBL, RBL), which promote not only the development of professional skills, but also stimulate creative and scientific activities and are aimed at training practice-oriented professionals.

The discipline provides students with the following soft skills: GC 1. Ability to abstract thinking, analysis, and synthesis. GC 2. Ability to learn, master modern knowledge, and apply the knowledge in practice. GC 3. Knowledge and understanding of the subject area and professional activity comprehension. GC 4. Ability to adapt and act in a new situation. GC 5. Ability to make reasoned decisions; teamwork ability; interpersonal skills. GC 7. Ability to use information and communication technologies. GC 8. Determination and persistence on the tasks and commitments undertaken.

9. Methods and criteria for assessment

9.1. Assessment criteria

ECTS	Definition	National scale	Rating scale
	Outstanding performance without errors	5 (Excellent)	$170 \leq RD \leq 200$
	Above the average standard but with minor errors	4 (Good)	$140 \leq RD < 169$
	Fair but with significant shortcomings	3 (Satisfactory)	$120 \leq RD < 139$
	Fail – some more work required before the credit can be awarded	2 (Fail)	$0 \leq RD < 119$

9.2 Formative assessment

FA1	Teacher's instructions in the process of performing practical tasks
FA2	Interviews and oral comments of the teacher on his results
FA3	Solving situational tasks from Step-1
FA4	Examination and evaluation of written assignments

FA5	Defense of an individual research project (speech at a conference, competition of scientific works))
FA6	Testing

9.3 Summative assessment

SA1	Current control works (intermediate modular control)
SA2	Final control: exam

Form of assessment:

5 semester		120 scores
SA1. Current control works (intermediate modular control)		120
	3x40	120
6 semester		80 scores
SA2. Final control: exam		80
		80

Form of assessment (special cases):

5 semester		120 scores
SA1. Current control works (intermediate modular control)		120
	In case of quarantine restrictions, practical classes are held online by using Mix SumDU platforms, Google-meet (3x40)	120
6 semester		80 scores
SA2. Final control: exam		80
	In case of quarantine restrictions, practical classes are held online by using Mix SumDU platforms, Google-meet	80

On every practical class the student gets one mark for computer testing or theoretical interrogation on 4-point system. Prescriptions written test is assessed as "passed" or not "passed". The marks set according to the traditional scale are converted into points according to the scale of conversion of traditional marks into rating points. The student gets a semester test (for 5-th semester) on the last lesson of the discipline based on the results of the current assessments. The minimal grade score for the current educational activities of the student is 120, the maximal - 200 points. Students with an average grade score lower than 3 (less than 120) for the 5th semester have to upgrade it at last class by taking computer- testing according to the thematic plan of the 5th semester topics. The student will successfully take the test if he gets at least 18 correct answers out of 30 questions of 24 out of 40. In this case, student will get average semester grade "3" = 120 points. The exam is held according to the schedule at the end of the 6th semester. The student is allowed to take exam , if student makes requirements of the curriculum, completes all types of planned educational work: successful testing "Step-1", writing annual prescriptions, implementation of all ODZ and protocols for each practical lesson and if he gets for the current educational activity at least 72 points. Exam tickets contain 3 theoretical questions on various topics and cover all sections of the discipline. The exam is credited to the student if he gets at least 48 points out of 80. Incentive points are added

to the grade for the discipline for participation in interuniversity competitions (7-12 points depending on the degree), participation in intra-university competitions (2-5 points depending on the prize)), implementation of an individual research project (abstracts 2 points). The total score in the discipline may not exceed 200 points.

10. Learning resources

10.1 Material and technical support

MTS1	Library funds
MTS2	Information and communication systems
MTS3	Graphic tools (drawings, maps, diagrams, posters, etc.)
MTS4	Computers, computer systems and networks
MTS5	Multimedia, video and sound reproduction, projection equipment (video cameras, projectors, screens, smart boards, etc.)
MTS6	Software (to support distance learning, online surveys, virtual laboratories, virtual patients, to create computer graphics, modeling, etc.)

10.2 Information and methodical support

Essential Reading	
1	Pharmacology [Текст] : textbook: in 2 parts. Part 2 / I. Yu. Vysotsky, R. A. Khramova, A. A. Kachanova. — Sumy : Sumy State University, 2020. — 569 p.
2	Pharmacology [Текст] : textbook: in 2 parts. Part 1 / I. Yu. Vysotsky, R. A. Khramova, A. A. Kachanova. — Sumy : Sumy State University, 2019. — 311 p.
3	Lippincott Illustrated Reviews: Pharmacology [Текст] / K. Whalen. — seventh edition. — Philadelphia : Wolters Kluwer, 2019. — 593 p.
Supplemental Reading	
1	Clinical Pharmacology [Текст] / M. J. Brown, P. Sharma, F. A. Mir, P. N. Bennett. — twelfth edition. — Edinburgh-London-New York-Oxford-Philadelphia-St Louis-Sydney : Elsevier, 2019. — 706 p.
2	Pharmacology [Текст] : textbook / V.M. Bobyrov, O.M. Vazhnicha, T.O. Devyatkina et all. — 4-ed; updated. — Vinnytsia : Nova Knyha, 2018. — 552 p.
3	General Pharmacology [Текст] : Course of Lectures on Pharmacology for the students of speciality 7.110101 "Medical care" of the full-time study / I. Yu. Vysotsky, R. A. Khramova, A. A. Kachanova. — Sumy : Sumy State University, 2017. — 42 p.
4	USMLE Step 1: Pharmacology [Текст] : Lecture Notes / Editors C. Davis, S.R. Harris. — New York : Kaplan, 2019. — 425 p.
5	Influence of magnesium on the state of the cardiovascular system in children with chronic tonsillitis / Smiyan, O.I., Man'ko, Y.A., Loboda, A.M. (et all) // Wiadomosci lekarskie -2020. - Vol. 73(5).- P. 904–908 (Scopus).
Web-based and electronic resources	

1	www.testcentr.org.ua
2	Up To Date http://www.uptodate.com • BMJ Clinical Evidence http://clinicalevidence.bmj.com • Medscape from WebMD http://www.medscape.com • National Guideline Clearinghouse https://www.guideline.gov/ • Centers for Disease Control and Pr
3	American College of Emergency Physicians https://www.acep.org/ • The National Association of Emergency Medical Technicians (NAEMT) http://www.naemt.org/ • The National Association of State EMS Officials https://nasems.org/
4	American College of Cardiology http://www.acc.org/ • American Heart Association http://news.heart.org/ • European Society of Cardiology http://www.escardio.org/