

MINISTRY OF HEALTH OF UKRAINE
BUKOVINIAN STATE MEDICAL UNIVERSITY

"APPROVE"

Vice-rector for scientific and pedagogical work
Associate Professor Igor GERUSH
"06" 09 2021

**STUDENT GUIDE
(SYLLABUS)
of studying the discipline**

«**PHARMACOLOGY**»

Field of knowledge 22 Healthcare
(code and name of the field of knowledge)

Specialty 221 Dentistry
(code and name of the specialty)

Educational degree Master
(master, bachelor, junior bachelor)

Educational year 2-3

Form of study full-time
(full-time, part-time, distance)

Department pharmacology
(name of the department)

Approved at the methodical session of the department of pharmacology
"15" 06 2021 (Protocol № 15).

Head of the Department Igor ZAMORSKII
(signature)

Approved by the subject methodical commission for medical biological disciplines of the
physiological and physical/chemical profile
"30" 08 2021 (Protocol № 1).

Chairman of the subject methodical
commission Svitlana TKACHUK
(signature)

Chernivtsi – 2021

1. GENERAL INFORMATION ABOUT SCIENTIFIC AND PEDAGOGICAL STAFF WHO TEACH THE SUBJECT

Department	Pharmacology
Surname, name of scientific and pedagogical staff, scientific degree, academic status	Novychenko Svitlana – PhD, assistant novychenko.s@bsmu.edu.ua Drachuk Vira – PhD, assistant drachuck.vira@bsmu.edu.ua
Web page of the department on the official website of the university	https://www.bsmu.edu.ua/farmakologiyi/
Department website	http://pharmacology.bsmu.edu.ua/
E-mail	pharmacology@bsmu.edu.ua
Address	Chernivtsi, Popovycha str., 17
Contact phone	+38 (0372) 53-52-62

2. GENERAL INFORMATION ABOUT THE DISCIPLINE

Status of the discipline	normative
Number of credits	5,5
Total amount of hours	180
Lectures	30
Practical lessons	80
Individual work	70
Type of final control	final module control

3. DESCRIPTION OF THE DISCIPLINE (ABSTRACT)

Pharmacology is a branch of science that deals with the study of drugs and their actions on living systems. Medical pharmacology is defined as the science of substances used to prevent, diagnose, and treat disease. Pharmacology focuses on classification and main characteristics of drugs, their mechanism of action, clinical uses, adverse effects, important drug-drug interactions and contraindications.

4. POLICY OF THE SUBJECT

4.1. List of normative documents:

- Regulations on the organization of the educational process (<https://www.bsmu.edu.ua/wp-content/uploads/2020/03/polozhennya-pro-organizacziyu-osvitnogo-procesu-u-vdnzu-bukovinskij-derzhavnij-medichnij-universitet.pdf>);
- Instructions for assessing the educational activities of BSMU students in the implementation of the European credit transfer system of the educational process (<https://www.bsmu.edu.ua/wp-content/uploads/2020/03/bdmu-instrukcziya-shhodo-oczinyuvannya-%D1%94kts-2014-3.pdf>);
- Regulations on the procedure for reworking missed and uncredited classes (<https://www.bsmu.edu.ua/wp-content/uploads/2019/12/reworks.pdf>);
- Regulations on the appeal of the results of the final control of knowledge of higher education (<https://www.bsmu.edu.ua/wp-content/uploads/2020/07/polozhennya-pro-apelyacziyu-rezultativ-pidsumkovogo-kontrolyu-znan.pdf>);
- Codex of Academic Integrity (https://www.bsmu.edu.ua/wp-content/uploads/2019/12/kodeks_academic_faith.pdf);
- Moral and ethical codex of students (https://www.bsmu.edu.ua/wp-content/uploads/2019/12/ethics_code.docx);

- Regulations on the prevention and detection of academic plagiarism (<https://www.bsmu.edu.ua/wp-content/uploads/2019/12/antiplagiat-1.pdf>);
- Regulations on the procedure and conditions for students to choose elective courses (https://www.bsmu.edu.ua/wp-content/uploads/2020/04/nakaz_polozhennyz_vybirkovi_dyscopyliny_2020.pdf);
- Rules of internal labor regulations of the Higher State Educational Institution of Ukraine "Bukovinian State Medical University" (<https://www.bsmu.edu.ua/wp-content/uploads/2020/03/17.1-bdmu-kolektivnij-dogovor-dodatok.doc>).

4.2. Policy on adherence to the principles of academic integrity of higher education students:

- independent performance of educational tasks of current and final controls without the use of external sources of information;
- cheating during control of knowledge is prohibited;
- independent performance of individual tasks and correct registration of references to sources of information in case of borrowing of ideas, statements, information.

4.3. Policy on adherence to the principles and norms of ethics and deontology by higher education students:

- actions in professional and educational situations from the standpoint of academic integrity and professional ethics and deontology;
- compliance with the rules of internal regulations of the university, to be tolerant, friendly and balanced in communication with students and teachers, medical staff of health care institutions;
- awareness of the importance of examples of human behaviour in accordance with the norms of academic integrity and medical ethics.

4.4. Attendance policy for higher education students:

- attendance at all training sessions (lectures, practical (seminar) classes, final modular control) is mandatory for the purpose of current and final assessment of knowledge (except for respectable reasons).

4.5. Deadline policy and completion of missed or uncredited classes by higher education students:

- reworks of missed classes are held according to the schedule of missed or uncredited classes and consultations.

5. PRECISIONS AND POST-REQUIREMENTS OF THE EDUCATIONAL DISCIPLINE (INTERDISCIPLINARY RELATIONS)

List of disciplines, on which the study of academic discipline is based	List of academic disciplines, for which the basis is laid as a result of studying the discipline
Human Anatomy	Internal Medicine
Human Physiology	Clinical Pharmacology
Medical Biology	Surgery
Medical Chemistry	Pediatrics
Biochemistry	Latin language
Microbiology	
Pathology	

6. PURPOSE AND TASKS OF THE EDUCATIONAL DISCIPLINE:

6.1. The purpose of studying the discipline is to provide fundamental knowledge of the rational and scientific basis of therapeutics and general principles underlying the use of pharmacological agents in the practice of medicine. A secondary objective is to provide the opportunity for students to develop the skills needed to acquire and critically evaluate therapeutically relevant details of an ever-increasing number of pharmacological agents, advances in biomedical sciences, and evolving concepts of acceptable medical practice throughout their professional career.

6.2. The main tasks of studying the discipline are:

- gaining the complex knowledge of the basic pharmacological concepts, principles of rational drug therapy, pharmacology of drugs affecting the peripheral and central nervous system, cardiovascular system, drugs used in respiratory and gastrointestinal disorders, disorders of blood, pharmacology of anticancer and antimicrobial agents;
- study and evaluation of pharmacodynamic and pharmacokinetic parameters of drugs;
- mastering the methodology of comparative evaluation of different drugs;
- mastering the general methodology for selecting the optimal drug, its dose, route of administration and dosage regimen for a particular patient for effective and safe drug therapy, taking into account the patient's condition;
- mastering the principles of drug interaction;
- study the adverse effects of drugs, factors that increase the risk of their development, methods for prevention and correction;
- mastering the methods and criteria for assessing the effectiveness and safety of specific drugs in the treatment of various diseases;
- mastering the skills of obtaining and analysis of the pharmacological properties of drugs;
- gaining the knowledge of the poisonings, management of poisoned patient, common toxidromes, and pharmacology of antidotes.

7. COMPETENCIES, THE FORMATION OF WHICH IS CONTRIBUTED BY THE DISCIPLINE:

7.1. Integral competence:

Ability to solve complex problems and problems in the field of health care in the specialty "Dentistry" in a professional activity or in the learning process, which involves research and/ or innovation and is characterized by uncertainty of conditions and requirements.

7.2. General competencies:

GC 1. Ability for abstract thinking, analysis and synthesis.

GC2. Knowledge and understanding of the subject area and understanding of professional activity

GC 3. Ability to apply knowledge in practice.

GC 4. Ability to communicate in the state language both orally and in writing.

GC 5. Ability to communicate in English.

GC 6. Skills of using the information and communication technologies.

GC 7. Ability to search, process and analyze the information from various sources.

GC 8. Ability to adapt and act in a new situation.

GC 9. Ability to identify, set and solve problems.

GC 10. Ability to be critical and self-critical.

GC 11. Ability to work in a team.

GC 12. The desire to preserve the environment.

GC 13. Ability to act in a socially responsible and conscious manner.

GC 14. Ability to exercise personal rights and duties as a member of society, to understand the values of civil (free and democratic) society and the necessity of its sustainable development, supremacy of law, rights and freedoms of a human being and citizen of Ukraine.

GC 15. Ability to preserve and enhance moral, cultural, scientific values and social achievements based on the understanding of the history and development patterns of the subject area, its place in the overall system of knowledge about the nature and society and in the development of society, engineering and technology; to use different types and forms of motor activity for active recreation and healthy lifestyles.

7.3. Professional (special) competencies:

PC 9. Ability to treat major diseases of organs and tissues of the oral and maxillofacial area.

PC 11. Ability to determine the tactics, methods and provide emergency medical care.

PC 14. Ability to conduct normative medical documentation.

PC 15. Processing of public, social and medical information.

PC 16. Ability to organize and provide rehabilitation measures and medical care for patients with the diseases of organs and tissues of the oral and maxillofacial area.

PC 17. Ability to legally maintain one's own professional activity.

8. RESULTS OF STUDYING THE DISCIPLINE.

As a result of studying the discipline student must:

- PLO 8. To determine the approach, plan, type and principle of treatment of a dental disease (according to the list 2) by making an informed decision on the existing algorithms and standard schemes. .
- PLO 11. To carry out the treatment of major dental diseases according to the existing algorithms and standard schemes under the supervision of a physician in a medical institution (according to the list 2.1).
- PLO 13. To determine the tactics of emergency medical care, using the recommended algorithms, under any circumstances, based on the diagnosis of an emergency condition in a limited time (according to the list 4)

9. INFORMATIONAL SCOPE OF THE DISCIPLINE

Description of each module of the discipline:

180 hours (5,5 ECTS credits) are devoted to the study of the discipline, including **30** hours of lectures, **80** hours of practical classes and **70** hours of independent work. The program is structured on modules, content modules, topics.

Module 1. MEDICAL PRESCRIPTIONS. GENERAL PHARMACOLOGY.

PHARMACOLOGY OF DRUGS AFFECTING THE NERVOUS SYSTEM AND METABOLISM.

Content module 1. MEDICAL PRESCRIPTIONS

Introduction: definition, historical perspective, branches and scope of the subject of pharmacology and its relation with other medical disciplines. Nature and sources of drugs. Drug nomenclature and dosage forms. Routes of drugs administration; advantages and disadvantages of different routes. Concept of evidence-based medicine, essential medicines, and rational prescribing. Development of new drugs: pre-clinical and clinical phases of drug evaluation. Prescription writing

Topic 1. Introduction to medical prescriptions. Solid dosage forms.

Topic 2. Semi-solid dosage forms

Topic 3. Liquid dosage forms for internal uses.

Topic 4. Liquid dosage forms for external uses

Topic 5. Final test on medical prescriptions

Content module 2. GENERAL PHARMACOLOGY

Topic 6. General pharmacology. Pharmacokinetics. Pharmacodynamics.

Pharmacokinetic considerations: drug absorption, distribution, biotransformation and excretion. Pharmacokinetic concepts of bioavailability, apparent volume of distribution (aVd), half-life ($t_{1/2}$), and clearance (CL) that are used to decide the doses and rational dosing during the drug treatment.

Pharmacodynamics; site and mechanism of drug action, drug receptors and receptor regulation, concepts of agonists, antagonists, partial agonist and inverse agonist drugs. Quantitative aspect of drug action: analysis of dose response curve and therapeutic index (safety index). Factors affecting drug action and doses, how to prolong or shorten the drug action and effects. Drug interactions and concept of pharmacogenomics/-genetics in drug

action, effects and ADRs. Adverse drug reactions (ADRs) and role of pharmacovigilance activity in ADR monitoring.

Content module 3. PHARMACOLOGY OF DRUGS AFFECTING THE PERIPHERAL NERVOUS SYSTEM

Topic 7. Drugs affecting afferent innervations. Local anaesthetics.

Topic 8. Drugs acting on ANS. Cholinergic agonists

Introduction to Pharmacology of ANS. Cholinergic drugs: cholinoreceptor agonist and cholinesterase inhibiting drugs.

Topic 9. Drugs acting on ANS. Cholinergic blockers

Anticholinergic drugs: cholinoreceptor blocking agents

Topic 10. Drugs acting on ANS. Adrenergic agonists

Adrenergic drugs: adrenoceptor agonist and sympathomimetic drugs

Topic 11. Drugs acting on ANS. Adrenergic blockers.

Pharmacology of alfa- and beta-adrenergic blockers. Sympatolytics.

Content module 4. PHARMACOLOGY OF DRUGS AFFECTING THE CENTRAL NERVOUS SYSTEM

Topic 12. General anaesthetics

General anaesthetics with preanaesthetic medications

Topic 13. Pharmacology of analgesia

Opioid analgesic and antagonists

Topic 14. Sedative-hypnotic-anxiolytic drugs. Anticonvulsants

Introduction and basic concepts of drugs affecting CNS activity: Neurotransmitters and their pathways and important sites of CNS effect of drugs. Sedative-hypnotic drugs. Antianxiety drugs. Antiepileptic drugs.

Topic 15. Antipsychotics. Drugs used in Parkinson's disease and movement disorders

Antipsychotic /Neuroleptic drugs. Antiparkinsonian drugs and drugs for other neurodegenerative and movement disorders

Topic 16. Antidepressants. CNS stimulants

Antidepressants and drugs used in mania and bipolar disorder. Pharmacology of ethyl alcohol and other alcohols. Pharmacology of CNS stimulants, psychomimetic drugs, drug dependence and substance abuse

Content module 5. PHARMACOLOGY OF DRUGS AFFECTING METABOLISM.

Topic 17. Endocrine drugs

Pharmacology of pituitary and hypothalamic hormones. Thyroid hormones and antithyroid drugs. Drugs for diabetes mellitus: Insulin and oral antidiabetic agents. Adrenocorticosteroids. Estrogens, progesterone and inhibitors. Oral contraceptives & HRT.

Topic 18. Anti-inflammatory drugs. Drugs acting on immune system

Prostaglandins & leukotrienes. Histamine & H1-blockers, 5-HT agonists & antagonists. NSAIDs. Drug treatment of rheumatoid arthritis & other autoimmune diseases. Antihistamines. Immunosuppressants and immunomodulators.

Topic 19. Immunopharmacology. Training for **KROK-1.**

Classification of anti-inflammatory drugs. The main focus of the action. Characteristics of steroidal anti-inflammatory drugs, mechanism of action, indications and contraindications for use, side effects. Pharmacology of nonsteroidal anti-inflammatory drugs. Steroidal anti-inflammatory drugs. Pharmacological effects, indications, contraindications to use, dosage regimens. Comparative characteristic. Side effects of glucocorticoids.

Antiallergic drugs. Classification and general characteristics of antiallergic drugs. Drugs use in immediate-type hypersensitivity (glucocorticoids, antihistamines, fibrinolysis inhibitors, adrenomimetics, cholinoblockers, antispasmodics, bronchodilators). Features of application. The concept of histamine receptors. Drugs that affect the immune process. General characteristics. General characteristics of drugs that reduce tissue damage (steroidal and

nonsteroidal anti-inflammatory drugs). Pharmacology of immunosuppressants (cytostatic drugs, glucocorticoids, 4-aminoquinoline derivatives, gold preparations, mycolic acid preparations, monoclonal antibodies).

Topic 20. MODULE CONTROL I “Medical prescriptions. General pharmacology. Drugs affecting Nervous System and Metabolism”.

***Module 2. PHARMACOLOGY OF DRUGS AFFECTING MAJOR ORGAN SYSTEMS.
PHARMACOLOGY OF ANTIMICROBIAL DRUGS.
TREATMENT OF ACUTE POISONINGS***

Content module 1. DRUGS AFFECTING MAJOR ORGAN SYSTEMS

Topic 1. Drugs for disorders of the respiratory system

Antitussives, expectorants, mucolytics. Drug treatment of bronchial asthma, COPD.

Topic 2. Cardiovascular drugs. Antiarrhythmics. Drugs for heart failure

Digitalis & drug therapy of CHF. Antiarrhythmic drugs.

Topic 3. Coronary heart disease. Antianginal Drugs. Antihyperlipidemic drugs.

Antianginal drugs – nitrates, beta-blockers, calcium channel blockers and potassium channel openers. Treatment of angina. Drug therapy of myocardial infarction & peripheral vascular diseases. Antihyperlipidemic Drugs.

Topic 4. Antihypertensive drugs

General considerations and classification of antihypertensives. Central sympatholytics, ganglionic blockers, adrenergic neuron blockers & catecholamine depletors, alpha & beta adrenoceptor blockers, vasodilators, ACE inhibitors & angiotensin AT₂ receptor antagonists, Drug therapy of hypertension.

Topic 5. Diuretics.

General considerations & classification of diuretics, thiazide diuretics, loop diuretics, carbonic anhydrase inhibitors & osmotic diuretics, potassium sparing diuretics. Complications of diuretic therapy & use of diuretics in non-edematous disorders.

Topic 6. Drugs affecting the GIT

Drugs for gastric acidity, peptic ulcer & GERD.

Topic 7. Drugs affecting the GIT (II)

Antiemetic and prokinetic agents. Drugs for constipation and inflammatory bowel disease. Antidiarrhoeal agents

Topic 8. Drugs affecting blood coagulation

Antithrombotic drugs. Coagulants & anticoagulants.

Topic 9. Drugs affecting blood formation. Drugs affecting uterus

Fibrinolytics & antifibrinolytics. Antiplatelet drugs. Treatment of iron deficiency anemia, treatment of megaloblastic anemia. Plasma expanders.

Content module 2. ANTIMICROBIAL DRUGS

Topic 10. Antiseptics and disinfectants.

Topic 11. Synthetic chemotherapeutic drugs

Introduction and basic principles of chemotherapy of infection, infestation and neoplastic diseases and concepts of resistance to chemotherapeutic agents. Sulfonamides & Cotrimoxazole, Quinolones.

Topic 12. Antibiotics. Cell wall synthesis inhibitors. DNA synthesis inhibitors

Principles of antimicrobial therapy. β -Lactam antibiotics, penicillins & cephalosporins.

Topic 13. Antibiotics. Protein synthesis inhibitors. Antitubercular drugs

Tetracyclines, chloramphenicol, aminoglycoside antibiotics, macrolides. Chemotherapy of urinary tract infections, chemotherapy of sexually transmitted diseases. Chemotherapy of tuberculosis.

Topic 14. Antifungal drugs. Antiviral drugs

Topic 15. Antituberculous, antisyphilitic and antiprotozoal drugs

Topic 16. Antiprotozoal drugs. Anthelmintic drugs

Antimalarial drugs & chemotherapy of malaria, Antiamoebic drugs & chemotherapy of amoebiasis & other protozoal diseases, Anthelmintics.

Content module 5. TREATMENT OF ACUTE POISONINGS

Topic 17. Poisoning and toxidromes. Pharmacology of antidotes

Clinical Toxicology. Management of the poisoned patient. Common toxidromes. Pharmacology of antidotes.

Topic 18. Practical skills control

Topic 19. Training for KROK-1 (MCQs)

Topic 20. **MODULE II** “Drugs acting of organ systems. Antimicrobial drugs”.

10. STRUCTURE OF EDUCATIONAL DISCIPLINE

Names of content modules and topics	Amount of hours				
	Total	including			
		Classroom		Independent students' work	Individual work
		Lectures	Practicals		
1	2	3	4	5	6
Module 1 MEDICAL PRESCRIPTIONS GENERAL PHARMACOLOGY PHARMACOLOGY OF DRUGS AFFECTING THE NERVOUS SYSTEM AND METABOLISM					
Content module 1. MEDICAL PRESCRIPTIONS					
Topic 1. Introduction to medical prescriptions. Solid dosage forms	6	2	4	9	
Topic 2. Semi-solid dosage forms	2	0	2	0	
Topic 3. Liquid dosage forms I	2	0	2	0	
Topic 4. Liquid dosage forms II	2	0	2	0	
Topic 5. Final test on medical prescriptions	4	0	2	2	
Content module 2. GENERAL PHARMACOLOGY					
Topic 1. Pharmacokinetics	6	2	2	3	
Content module 3. PHARMACOLOGY OF DRUGS AFFECTING THE PERIPHERAL NERVOUS SYSTEM					
Topic 1. Drugs affecting afferent innervations	6	2	2	5	
Topic 2. Drugs acting on ANS. Cholinergic agonists	6	2	2	2	
Topic 3. Cholinergic blockers	4	0	2	2	
Topic 4. Adrenergic agonists	6	2	2	2	
Topic 5. Adrenergic blockers	6	2	2	2	
Content module 4. PHARMACOLOGY OF DRUGS AFFECTING THE CENTRAL NERVOUS SYSTEM					
Topic 1. General anaesthetics	6	2	2	2	
Topic 2. Pharmacology of analgesia	6	2	2	2	
Topic 3. Sedative-hypnotic-anxiolytic drugs. Anticonvulsants	6	2	2	2	
Topic 4. Antipsychotics. Drugs	6	2	2	2	

used in Parkinson's disease and movement disorders					
Topic 5. Antidepressants. CNS stimulants	4	0	2	2	
<i>Total on the content module 4</i>	26	6	10	10	
Content module 5. PHARMACOLOGY OF DRUGS AFFECTING METABOLISM					
Topic 1. Endocrine drugs	6	2	2	2	
Topic 2. Anti-inflammatory drugs. Drugs acting on immune system	6	2	2	2	
Topic 3. Drugs acting on immune system	4	0	2	2	
<i>Total on the content module 5</i>	16	4	6	6	
Final module control	2		2		
TOTAL HOURS Module 1	90	20	40	30	
Module 2					
PHARMACOLOGY OF DRUGS AFFECTING MAJOR ORGAN SYSTEMS					
PHARMACOLOGY OF ANTIMICROBIAL DRUGS					
TREATMENT OF ACUTE POISONINGS					
Content module 6. DRUGS AFFECTING MAJOR ORGAN SYSTEMS					
Topic 1. Drugs for disorders of the respiratory system	4	0	2	2	
Topic 2. Antiarrhythmics. Drugs for heart failure	6	2	2	4	
Topic 3. Antianginal drugs. Antihyperlipidemic drugs	6	2	2	2	
Topic 4. Antihypertensive drugs	6	2	2	4	
Content module 9. DRUGS AFFECTING KIDNEYS AND DIGESTIVE SYSTEM					
Topic 5. Diuretics. Drugs for gout	4	0	2	2	
Topic 6. Drugs affecting the GIT I	4	0	2	2	
Topic 7. Drugs used in gastrointestinal dysfunction II	2	0	2	0	
Content module 10. DRUGS AFFECTING BLOOD SYSTEM					
Topic 8 Drugs affecting blood coagulation	7	2	2	4	
Topic 9. Drugs affecting blood formation. Drugs affecting uterus	3	0	2	1	
Content module 11. ANTIMICROBIAL DRUGS					
Antiseptics and disinfectants	4	2	2	3	
Synthetic chemotherapeutic drugs	4	2	2	0	
Antibiotics. Cell wall synthesis inhibitors. DNA synthesis inhibitors	4	2	2	2	
Antibiotics. Protein synthesis inhibitors. Antitubercular drugs	4	1	2	0	
Antifungal drugs. Antiviral	2	0	2	0	

drugs					
Content module 12. ANTIPROTOZOAL DRUGS					
Antitubercular drugs	4	0	2	2	
Antiprotozoal drugs.	2	0	2	0	
Content module 13. ANTICANCER DRUGS. TREATMENT OF ACUTE POISONINGS					
Anticancer drugs. Antihelmintic drugs	4	0	2	2	
Poisoning and toxidromes. Pharmacology of antidotes	4	0	2	2	
Final on-line testing	4	0	2	2	
<i>Total on the content module</i>	2	0	2	0	
Final module control	2	0	2	0	
TOTAL HOURS	180	30	80	70	

11. THEMATIC PLAN OF LECTURES

№	Name of topic	Amount of hours
1.	General pharmacology.	2
2.	Drugs, affecting autonomic nervous system. Cholinergic drugs.	2
3.	Adrenergic agonists.	2
4.	Adrenergic antagonists	2
5.	General anesthetics	2
6.	Narcotic and non-narcotic analgesics. NSAIDs.	2
7.	CNS depressants: Sedative – hypnotic drugs. Anticonvulsants. Antipsychotics. CNS stimulants. Antidepressants.	2
8.	Hormonal agents and their antagonists.	2
9.	Anti-inflammatory drugs. Immunopharmacology	2
10	Drugs affecting the cardiovascular system: Cardiotonics. Antiarrhythmic drugs. Antianginal drugs	2
11	Drugs affecting the cardiovascular system: Antihypertensive drugs. Diuretics.	2
12	Drugs acting on Blood	2
13	Antiseptics and disinfectants	2
14	Synthetic chemotherapeutic drugs	2
15	Antibiotics	2
	Total	30

12. THEMATIC PLAN OF PRACTICAL (SEMINAR) CLASSES

№	Name of topic	Amount of hours
1.	Introduction to the medical prescriptions	2
2.	Liquid medical forms for external use and injections	2
3.	Liquid medical forms for internal use	2
4.	Semi-solid medical forms.	2
5.	Final test 1 (Medical prescriptions).	2
6.	General pharmacology.	2
7.	Drugs affecting afferent innervations. Local anesthetics.	2
8.	Cholinergic agonists.	2
9.	Cholinergic antagonists.	2
10	Adrenergic agonists.	2

11	Adrenergic antagonists.	2
12	FINAL TEST 2 (Drugs affecting ANS. General anesthetics.).	2
13	Narcotic and non-narcotic analgesics. NSAIDs.	2
14	CNS Depressants: Sedative-hypnotics. Anticonvulsants. Drugs used to treat Parkinson's disease.	2
15	CNS Depressants: Antipsychotics.	2
16	CNS Stimulants: Antidepressants. Psychomotor stimulants. Neurometabolic stimulants. Psychomimetic drugs. Adaptogens.	2
17	Hormonal agents and their antagonists.	2
18	Immunopharmacology. Training for KROK-1.	2
19	MODULE CONTROL I "Medical prescriptions. General pharmacology. Drugs affecting Nervous System and Metabolism".	2
20	Drugs for disorders of the respiratory system	2
21	Cardiovascular drugs. Antiarrhythmics. Drugs for heart failure	2
22	Antianginal drugs. Antihyperlipidemic drugs	2
23	Antihypertensive drugs	2
24	Diuretics. Drugs for Gout	2
25	Drugs affecting blood coagulation	2
26	Drugs affecting blood formation. Drugs affecting uterus	2
27	Drugs used in gastrointestinal dysfunction	2
28	Drugs affecting the GIT (II)	2
29	Antiseptics and disinfectants	2
30	Synthetic chemotherapeutic drugs	2
31	Antibiotics-I. Cell wall synthesis inhibitors. DNA synthesis inhibitors	2
32	Antibiotics-II. Protein synthesis inhibitors. Antitubercular drugs	2
33	Antifungal drugs. Antiviral drugs	2
34	Antituberculous, antisyphilitic and antiprotozoal drugs	2
35	Antiprotozoal drugs. Antihelminthic drugs	2
36	Poisoning and toxidromes. Pharmacology of antidotes	2
37	Practical skills control	2
38	Final on-line testing	2
39	Final Module 2 control "Pharmacology of drugs affecting major organ systems. Pharmacology of antimicrobial drugs. Treatment of acute poisonings"	2
	Total	40

13. THEMATIC PLAN OF INDIVIDUAL WORK

№	Name of topic	Amount of hours
1.	Drug metabolism. Drug-drug interactions.	4

2.	Adverse effects of drugs.	4
3.	Pharmacogenetics.	4
4.	N – Cholinergic agonists. Treatment of glaucoma.	4
5.	Serotonin related agonists & antagonists. Treatment of migraine	4
6.	Drugs of abuse. Alcohols	6
7.	Pharmacology of antidepressants.	6
8.	Case studies & MCQs for Module 1	6
9.	Immunomodulation therapy	5
10	Pharmacology of antidiarrheal drugs. Probiotics.	4
11	Rational clinical use of antimicrobials	6
12	Management of poisoned patient	6
13	Environmental & occupational toxicology	5
14	Case studies & MCQs for Module 2	6
	Total	70

LIST OF INDIVIDUAL TASKS (if provided)

The student can score an additional 2-12 points for:

- Preparation of a review of the scientific literature;
- Participation in the final round of the interuniversity student competition;
- Speech at a student scientific conference with a report;
- Create visual schemes of action in the form of a table and in the electronic version using the PowerPoint editor on the topics.
- Speeches at the scientific student group.
- Participation in scientific conferences.
- Publication of reports in the form of abstracts and articles in periodicals (journals, collections of scientific papers).
- Production of visual aids according to educational programs (tables, models, visual aids, graphological schemes of practical classes).
- Writing essays
- Active membership in the student scientific society
- Participation in scientific conferences
- Publication of abstracts / articles in periodicals (journals, abstract books).
- Production of visual aids according to educational programs (tables, etc.).
- Writing essays, literature review

14. LIST OF THEORETICAL TASKS TO THE FINAL MODULE CONTROL.

Module 1. MEDICAL PRESCRIPTIONS. GENERAL PHARMACOLOGY. PHARMACOLOGY OF DRUGS AFFECTING THE NERVOUS SYSTEM AND METABOLISM.

- Introduction: definition, historical perspective, branches and scope of the subject of pharmacology and its relation with other medical disciplines.
- Nature and sources of drugs.
- Drug nomenclature and dosage forms.
- Routes of drugs' administration; advantages and disadvantages of different routes.
- Concept of evidence-based medicine, essential medicines, and rational prescribing.
- Development of new drugs: pre-clinical and clinical phases of drug evaluation.
- Pharmacokinetic considerations: drug absorption, distribution, biotransformation and excretion.
- Pharmacokinetic concepts of bioavailability, apparent volume of distribution (aVd), half-life ($t_{1/2}$), and clearance (CL).
- Pharmacodynamics; site and mechanism of drug action, drug receptors and receptor regulation. Concepts of agonists, antagonists, partial agonist and inverse agonist drugs.

- Quantitative aspect of drug action: analysis of dose response curve and therapeutic index (safety index).
- Factors affecting drug action and doses, how to prolong or shorten the drug action and effects. Drug interactions and concept of pharmacogenomics/-genetics in drug action, effects and ADRs.
- Adverse drug reactions (ADRs) and role of pharmacovigilance activity in ADR monitoring.
- Drugs affecting afferent innervations. Pharmacology of Local anaesthetics.
- Introduction to pharmacology of ANS. Pharmacology of Cholinergic drugs: cholinergic agonist and cholinesterase inhibiting drugs.
- Pharmacology of Cholinergic blockers: muscarinic blockers, neuromuscular blockers, ganglionic blockers.
- Pharmacology of Adrenergic drugs: adrenoceptor agonist and sympathomimetic drugs
- Pharmacology of Adrenergic blockers.
- Pharmacology of General anaesthetics and preanaesthetic medications.
- Topic 13. Pharmacology of analgesia
- Pharmacology of Opioid analgesic and antagonists
- Introduction and basic concepts of drugs affecting CNS activity: Neurotransmitters and their pathways and important sites of CNS effect of drugs.
- Pharmacology of Sedative-hypnotic drugs. Antianxiety drugs.
- Pharmacology of Antiepileptic drugs.
- Pharmacology of Antipsychotic/Neuroleptic drugs.
- Pharmacology of Antiparkinsonian drugs and drugs for other neurodegenerative and movement disorders
- Pharmacology of Antidepressant and antimania drugs. Pharmacology of ethyl alcohol and other alcohols.
- Pharmacology of CNS stimulants, psychomimetic drugs, drug dependence and substance abuse
- Pharmacology of pituitary and hypothalamic hormones.
- Pharmacology of Thyroid hormones and antithyroid drugs.
- Drugs for diabetes mellitus: Insulin and oral antidiabetic agents.
- Pharmacology of Adrenocorticosteroids.
- Pharmacology of Estrogens, progesterone and inhibitors. Oral contraceptives & HRT
- Pharmacology of Anti-inflammatory drugs. Pharmacology of drugs acting on immune system.
- Prostaglandins & Leukotrienes, Histamine & H1 blockers, 5-HT agonists & antagonists. NSAIDs.
- Drug treatment of rheumatoid arthritis & other autoimmune diseases. Antihistamines. Pharmacology of Immunosuppressants and immunomodulators.
- Basic principles of cancer chemotherapy. Pharmacology of anticancer drugs. Problems associated with chemotherapy.
- Drugs of valerian and motherwort. Soothing and antispasmodic properties. Combined drugs (corvalol). Other sedatives of plant origin. Therapeutic uses.
- Psychostimulants, General characteristics, classification.
- Antidepressants (imipramine, amitriptyline, nialamide). General characteristics. Therapeutic uses, side effects.
- Nootropic drugs (nootropil, piracetam, cinnarizine, aminolon, cerebrolysin).
- Analeptics (caffeine, camphor, sulfocamphocaine, cordiamine, corazol, bemegrid). Pharmacodynamics of individual drugs. Ways of introduction. Appointment, therapeutic uses, contraindications.
- General tonics (lemongrass, ginseng, rhizome with valerian root, levezeya). Tonic effect. Appointment. Therapeutic uses.
- Classification of substances that affect the CNS.
- Drugs for inhalation and non-inhalation anesthesia (ether, fluorothane, nitrous oxide, thiopental sodium, sodium oxybutyrate, propanidide, ketamine).

- Stages of ether anesthesia.
- Features of action of separate drugs. Ways of their introduction. Therapeutic uses. Complications during and after anesthesia.
- Ethyl alcohol. Local action of ethyl alcohol. Therapeutic uses in medicine.
- Hypnotics (etaminal sodium, nitrazepam, phenobarbital). Mechanism of action. Influence on the structure of sleep. Indications for use. Side effects.
- Acute barbiturate poisoning, treatment. The possibility of drug dependence.

Module 2. PHARMACOLOGY OF DRUGS AFFECTING MAJOR ORGAN SYSTEMS. PHARMACOLOGY OF ANTIMICROBIAL DRUGS. TREATMENT OF ACUTE POISONINGS

- Pharmacology of Antitussives, expectorants, mucolytics.
- Drug treatment of bronchial asthma, COPD.
- Pharmacology of Antiarrhythmics.
- Pharmacology of Digitalis & drug therapy of CHF.
- Pharmacology of Antianginal Drugs – Nitrates, Beta-blockers, Calcium Channel Blockers and Potassium Channel Openers. Treatment of Angina.
- Drug therapy of Myocardial Infarction & Peripheral Vascular Diseases.
- Pharmacology of Antihyperlipidemic Drugs.
- General considerations and classification of Antihypertensives.
- Pharmacology of Central sympatholytics, Ganglionic blockers, Alpha & Beta adrenoceptor blockers, Vasodilators, ACE inhibitors & Angiotensin AT2 receptor antagonists
- Drug therapy of Hypertension.
- Pharmacology of Diuretics, Thiazide diuretics, Loop diuretics, Carbonic anhydrase inhibitors & Osmotic diuretics, Potassium sparing diuretics.
- Complications of diuretic therapy & use of diuretics in non-edematous disorders.
- Drugs used in blood disorders
- Antithrombotic drugs. Pharmacology of Coagulants & Anticoagulants.
- Pharmacology of Fibrinolytics & Antifibrinolytics. Antiplatelet drugs.
- Treatment of iron deficiency anemia. Treatment of megaloblastic anemias. Plasma expanders.
- Pharmacology of drugs for gastric acidity, peptic ulcer & GERD.
- Pharmacology of Antiemetic and prokinetic agents.
- Drugs for constipation and Inflammatory Bowel Disease.
- Pharmacology of antidiarrheal agents.
- Introduction and basic principles of chemotherapy of infection, infestation and neoplastic diseases and concepts of resistance to chemotherapeutic agents. Pharmacology of sulfonamides & cotrimoxazole.
- Pharmacology of Quinolones.
- Principles of antimicrobial therapy. Pharmacology of β -Lactam antibiotics, Penicillins & cephalosporins
- Pharmacology of tetracyclines, chloramphenicol, aminoglycoside antibiotics, macrolides. Chemotherapy of Urinary Tract Infections, Chemotherapy of Sexually transmitted Diseases, Chemotherapy of tuberculosis.
- Pharmacology of Antifungal drugs.
- Pharmacology of Antiviral drugs.
- Pharmacology of Antimalarial drugs & chemotherapy of malaria.
- Pharmacology of Antiamoebic drugs & chemotherapy of amoebiasis & other protozoal diseases.
- Pharmacology of Anthelmintics.
- Clinical Toxicology. Management of the poisoned patient.
- Common Toxidromes. Pharmacology of Antidotes.

15. LIST OF PRACTICAL SKILLS AND TASKS TO THE FINAL MODULE CONTROL

Give pharmacological characteristic of the listed drugs and write prescription

Module 1. MEDICAL PRESCRIPTIONS. GENERAL PHARMACOLOGY. PHARMACOLOGY OF DRUGS AFFECTING THE NERVOUS SYSTEM AND METABOLIS

- Lidocaine
- Pilocarpine
- Proserine (Neostigmine)
- Galantamine
- Atropin
- Dithylin (Succinylcholine)
- Adrenaline (Epinephrine)
- Noradrenaline
- Dobutamine
- Isadrin (Isoproterenol)
- Mesatone (Phenylephrine)
- Salbutamol
- Fenoterol
- Anaprilin (Propranolol)
- Metoprolol
- Ketamine
- Diazepam
- Nitrazepam
- Phenobarbital
- Zolpidem
- Natrium valproate (Valproic acid)
- Carbamazepine
- Lamotrigine
- Levodopa
- Aminazine (Clorpromazine)
- Droperidol
- Amitriptyline
- Fluoxetine
- Morphine
- Promedol (Trimeperidine)
- Fentanyl
- Tramadol
- Naloxon
- Acetylsalicylic acid (Aspirin)
- Ibuprofen
- Diclofenac
- Celecoxib
- Paracetamol
(Acetaminophen)

Module 2. PHARMACOLOGY OF DRUGS AFFECTING MAJOR ORGAN SYSTEMS. PHARMACOLOGY OF ANTIMICROBIAL DRUGS. TREATMENT OF ACUTE POISONINGS

- Codeine
- Dextromethorphan
- Glaucine
- Ambroxol
- Acetylcysteine
- Salbutamol
- Theophylline
- Ipratropium (Tiotropium)
- Beclomethasone
- Cromolyn
- Almagel
- Famotidin
- Omeprazole
- Ondansetron
- Metoclopramide
- Bisacodyl
- Loperamide
- Pancreatin
- Contrycal
- Drotaverine (No-spa)
- Oxytocin
- Digoxin
- Corglycon
- Strophantine
- Dobutamine
- Panangin
- Nitroglycerine
- Metoprolol
- Atenolol
- Verapamil
- Amiodarone
- Lisinopril
- Enalapril
- Losartan
- Amlodipine
- Clonidine
- Magnesium sulfate
- Atorvastatin
- Lovastatin
- Fenofibrate
- Hydrochlorthiazide
- Furosemide
- Spironolactone
- Mannitol (Mannit)
- Allopurinol
- Aspirin
- Heparin
- Protamine sulfate
- Warfarin
- Streptokinase

- Alteplase
- Clopidogrel
- Aminocaproic acid
- Vicasol (Vitamin K)
- Iron (Fercoven, Maltofer)
- Cyanocobalamin
- L-thyroxine
- Mercazolil (Methimazole)
- Propylthiouracil
- Insulin
- Glybenclamide
- Metformin
- Prednisolone
- Dexametasone
- Hydrocortisone
- Dimedrol (Diphenilhydramine)
- Loratadin
- Ketotifen
- Methotrexate
- Cisplatin
- Unithiol (Dimercaprol)
- Activated charcoal
- Biseptol (Co-trimoxazole)
- Sulfasalazine
- Benzylpenicillin (Penicillin G)
- Amoxicillin
- Amoxiclav
- Cefazoline
- Ceftriaxone
- Vancomycin
- Azithromycin
- Clarytromycin
- Doxycyclin
- Gentamycin
- Streptomycin
- Lincomycin
- Levomycetin (Chloramphenicol)
- Ciprofloxacin
- Levofloxacin
- Imipinem
- Clindamycin
- Amphotericin B
- Fluconazole
- Terbinafine
- Isoniazid
- Rifampin
- Ethambutol
- Acyclovir
- Ozeltamivir (Tamiflu)
- Zidovudin
- Chingamine (Chloroquine)
- Primaquine
- Metronidazol
- Mebendazole
- Albendazole

16. METHODS AND FORMS OF ASSESSMENT

During the study of the discipline, all types of student activities are subject to control, both current (at each lesson) and final (during control activities).

Modular control is a diagnosis of the student's assimilation of the module material (credit). The semester ends with a final module control.

The initial control of students' knowledge is carried out during practical classes and includes testing knowledge of theoretical and practical material studied in previous courses, conducted by frontal oral examination, or writing tests, which uses questions for tests.

Current control of students' knowledge is carried out during practical classes and includes testing of knowledge of theoretical material and control of mastering practical skills, which are provided by methodical development of classes on relevant topics. Testing of students' knowledge is carried out with the help of oral face-to-face interviews, solving test problems of varying severity, solving typical and atypical situational problems, as well as during checking the correctness of laboratory research tasks.

Intermediate control of students' knowledge is carried out during the final tests during the last lesson of the content module.

Final control of students' knowledge is carried out at the last practical lesson after completion of the module in the form of final modular control. Students find out the knowledge of theoretical material (according to the list of questions). In addition, students perform practical work that is attached to the ticket and solve situational problems, which is also taken into account when assessing their knowledge.

The final module control (PMC) is carried out after the completion of the study of all topics of the module at the last control session of the module.

Students who have attended all the classes provided by the curriculum in the discipline and received positive marks ("5", "4", "3"), as well as scored the number of points during the study of the module, not less than minimal.

A student who, for valid or non-valid reasons, has missed classes is allowed to work off academic arrears until a certain deadline.

The maximum number of points that a student can score during the final module control is 80.

Module control is conducted orally and in writing and include theory questions, case studies, MCQs, and prescribing drugs.

The final module control is considered credited if the student has scored at least 50 points.

Thus, the shares of the results of the assessment of current educational activities and the final module control are 60% and 40%, respectively.

- **17. METHODS AND FORMS OF IMPLEMENTATION OF THE CONTROL**

During the study of the discipline, all types of student activities are subject to control, both current (at each lesson) and final (during control activities).

Modular control is a diagnosis of the student's assimilation of the module material (credit). The semester ends with a final module control.

The initial control of students' knowledge is carried out during practical classes and includes testing knowledge of theoretical and practical material studied in previous courses, conducted by frontal oral examination, or writing tests, which uses questions for tests.

Current control of students' knowledge is carried out during practical classes and includes testing of knowledge of theoretical material and control of mastering practical skills, which are provided by methodical development of classes on relevant topics. Testing of students' knowledge is carried out with the help of oral face-to-face interviews, solving test problems of varying severity, solving typical and atypical situational problems, as well as during checking the correctness of laboratory research tasks.

Intermediate control of students' knowledge is carried out during the final tests during the last lesson of the content module.

Final control of students' knowledge is carried out at the last practical lesson after completion of the module in the form of final modular control. Students find out the knowledge of theoretical material (according to the list of questions). In addition, students perform practical work that is attached to the ticket and solve situational problems, which is also taken into account when assessing their knowledge.

The final module control (PMC) is carried out after the completion of the study of all topics of the module at the last control session of the module.

Students who have attended all the classes provided by the curriculum in the discipline and received positive marks ("5", "4", "3"), as well as scored the number of points during the study of the module, not less than minimal.

A student who, for valid or non-valid reasons, has missed classes is allowed to work off academic arrears until a certain deadline.

The maximum number of points that a student can score during the final module control is 80.

Module control is conducted orally and in writing and include theory questions, case studies, MCQs, and prescribing drugs.

The final module control is considered credited if the student has scored at least 50 points.

Thus, the shares of the results of the assessment of current educational activities and the final module control are 60% and 40%, respectively.

18. EVALUATION OF THE LEVEL OF STUDENT TRAINING IN THE DISCIPLINE

Procedure, methods and criteria for assessing the current educational activities, methods and criteria for assessing during the final module control, assessment of the discipline as a whole).

Distribution of points assigned to students (with notes: - on the maximum and minimum number of points for studying the module, - on the conversion of points into traditional grades "5", "4", "3", "2" when mastering the topic of the module; - on the minimum number of points for admission to the final modular control (FMC); - the minimum number of points for the modular control)

The maximum number of points for the modular control that a student can score for the discipline is calculated by multiplying the number of points corresponding to the grade "5" – 6 points × 18 topics = 108 with the addition of the points for the individual works. (last topic – final module is not taking), but not more, than 120 points.

The minimum number of points for the modular control points for the modular control for studying the module on the conversion of points into traditional grades "3"- 4 points × 18 topics = 72 but not less, than 70 points.

Obtaining the minimum number of points (120) per module is a prerequisite for grading "passed"

Number of module number of study hours / number of credits ECTS	Number of content modules, their numbers	Number of practical classes	Conversion into point of the traditional scale					Scores for individual task	Minimum score *
			Traditional scale						
			"5"	"4"	"3"	"2"			
Module 1	7 (№№ 6-8)	19 (18)	6	5	4	0	12	72	
Module 2	7 (№№ 6-8)	19 (18)	6	5	4	0	12	72	

17. RECOMMENDED LITERATURE

19.1 Basic

1. Basic & Clinical Pharmacology - Katzung BG (Ed), International Edition Lange Medical Books/ McGraw–Hill Medical Publishing Division, New York.
2. Essentials of Medical Pharmacology - Tripathi KD (Ed), Jaypee Brothers Medical Publishers (P) Ltd., New Delhi.
3. Lippincott Illustrated Reviews: Pharmacology - Karen Whalen (Ed), Wolters Kluwer, Philadelphia.
4. Goodman and Gilman's. The Pharmacological basis of Therapeutics (13th ed.)New York:McGraw-Hill, 2017
5. Zamorskii, T. Shchudrova, T. Kopchuk, S. Melnychuk, V. Drachuk Pharmacology. Guide to essential drugs. – Chernivtsi: Meduniversitet, 2018. – 145 p.: ill.

19.2. Auxillary

1. Katzung & Trevor's Pharmacology Examination & Board Review - Anthony J. Trevor, Bertram G. Katzung, Marieke Kruidering-Hall. McGraw-Hill Education, New York.
2. STEP 1 Lecture Notes: Pharmacology, Kaplan Medical, New York.
3. 6. Color Atlas of Pharmacology. Heinz Luellmann, Klaus Mohr, Lutz Hein: 3 revExp edition (August 27, 2005).
4. 7. David E., Golan M.D. Armen H, Tashjan Jr, Ehrin J. Principles of Pharmacology: The Pathophysiologic Basis of Drug Therapy, 2nd edition, 2007.

19.3 Information resources

1. <http://moodle.bsmu.edu.ua/course/category.php?id=1168>
2. <https://www.drugs.com/>

20. COMPILERS OF THE STUDENT HANDBOOK (SYLLABUS)

Novychenko Svitlana – Assistant, PhD