
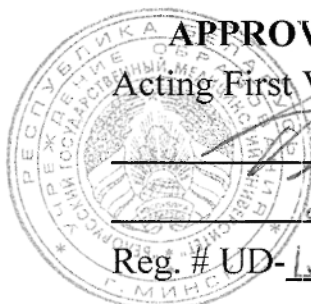


**MINISTRY OF HEALTH OF THE REPUBLIC OF BELARUS  
EDUCATIONAL INSTITUTION  
BELARUSIAN STATE MEDICAL UNIVERSITY**

**APPROVED**  
Acting First Vice-Rector, Professor  
  
V.V.Roudenok  
  
8.10.2018  
Reg. # UD-1.642/1819 /edu

**CLINICAL PHARMACOLOGY**

**Curriculum of higher educational institution  
in the educational discipline for the specialty:**

**1-79 01 01 General Medicine**

Curriculum is based on the standard educational program «Clinical Pharmacology», approved 03.10.2018, registration # TD-L. 642/tip

**COMPILERS:**

A.V.Khapalyuk, Head of the Department of Clinical Pharmacology of the Educational Institution «Belarusian State Medical University», Doctor of Medical Sciences, Professor

**RECOMMENDED FOR APPROVAL**

by the Clinical Pharmacology Department of the Educational Institution «Belarusian State Medical University»

(protocol # 15 dated 14.09.2018);

by the Methodological Commission of General Medicine of the Educational Institution «Belarusian State Medical University»

(protocol № 1 of 9.10.2018)

## EXPLANATORY NOTE

«Clinical pharmacology» is the discipline that contains systematic scientific knowledge about the effects of medicinal products on the human body in order to increase the effectiveness and safety of their clinical use.

The purpose of teaching and studying the discipline «Clinical Pharmacology» is to acquire students' scientific knowledge of the clinical pharmacodynamics and pharmacokinetics of drugs, drug interactions and adverse reactions, strategies for differentiated choice and individual use of drugs in the treatment of diseases.

The tasks of studying the discipline are to develop the students' academic competences, based on the ability to self-search educational and information resources, as well as acquire and understand the knowledge of:

- basic concepts of clinical pharmacology;
- clinical pharmacokinetics and pharmacodynamics of drugs, drug interactions and undesirable (side) reactions;
- principles of choosing the most effective and safe medicines for individual treatment of diseases in patients;
- optimal dosage regimens for medicinal products;
- clinically valid combinations of drugs that can be used in specific clinical situations.

The tasks of teaching the discipline include the formation of students' social, personal and professional competences, based on the knowledge and application of:

- clinically justified principles of rational choice of medicines for pharmacotherapy, meeting modern requirements for its effectiveness and safety;
- methods for monitoring the safety of ongoing pharmacotherapy.

Teaching and successful learning of the discipline (name of the discipline) is carried out on the basis of the knowledge and skills previously acquired by the students in the following disciplines:

**General chemistry.** Elements of chemical thermodynamics. Elements of chemical kinetics. Estimation of pH buffer system.

**Medical Biology and General Genetics.** Molecular genetic and cellular levels of the organization. Genetic bases of biological species. Genetic pathology and its manifestations. Biosphere level of organization of the living. Ecology.

**Biological Chemistry.** The structure, function, metabolism of proteins, lipids, carbohydrates. Biochemistry of muscle, connective and nervous tissues, blood biochemistry. Water and mineral metabolism. Biochemical processes in healthy and diseased organism. Value of biochemical indicators in the diagnosis of pathological states.

**Normal Physiology.** Role of organism reactivity in the occurrence of diseases. Physiology of the circulatory, respiratory, digestive, endocrine, excretory systems, the central and peripheral nervous system, blood and lymphatic system.

**Pathological Physiology.** Damage to the cells, disturbances of protein, fat, carbohydrate and mineral metabolism. Disorders of local and general circulation. Immunological processes. Allergy. Inflammation. Pathology of the respiratory,

digestive, endocrine, excretory systems, the central and peripheral nervous system, blood and lymphatic system.

**Microbiology. Virology. Immunology.** Microbial flora and viruses that cause disease in humans. The human immune system. Antigens. Specific and non-specific organism protection factors.

**General Hygiene and Military Hygiene.** The impact of the environment on the development and course of pathologic processes. Occupational hazards and their effect on the organs and systems. Sanitary-hygienic standards of the environment, water and food.

**Pharmacology. General Pharmacology.** Pharmacokinetics and pharmacodynamics of drugs. Drugs regulating functions of the central and peripheral nervous system. Drugs that effect the function of the respiratory, cardiovascular, digestive system. Antimicrobial, antiviral, and antiparasitic agents. Hormonal, vitamin drugs. Drugs used for the correction of the hemostatic system.

**Internal illnesses.** Principles of the patient's examination. Bases of semiotics, diagnosis and treatment of diseases of the cardiovascular, respiratory, digestive, endocrine system, the kidney and urinary tract, blood and blood-forming organs, musculoskeletal and connective tissue. Clinical picture, diagnosis and emergency medical care to patients with life-threatening conditions. Clinical manifestations of occupational diseases.

**Infectious diseases.** General issues of infectious pathology. Intestinal infections and infestations. Droplet infection. Viral hepatitis. Quarantine and especially dangerous infections. Zoonotic infections. Vector-borne infections. Acute neuroinfections. HIV-associated diseases.

**Surgical diseases.** Aseptic and antiseptic. Bleeding, hemostasis. Common disorders of vital activity in surgery and its treatment. Acute surgical pathology. Wounds and wound infection. Infusion and transfusion. General and local anesthesia. Specialty surgery.

**Obstetrics and Gynecology.** Physiology and pathology of pregnancy. Course and management of the labor. Obstetrical surgery. Pathology of the puerperal period. Gynecological disorders.

**As a result of studying the discipline (name of the discipline) the student should**

**know:**

- nomenclature and main classes of medicines;
- pharmacological properties and bases of the medicines clinical use;
- rules for the new medicines clinical approbation and registration;
- bases of the medicines pharmacodynamics and pharmacokinetics, peculiarities of the medicines use depending on the patient's age;
- clinical-pharmacological characteristics of essential medicines used in therapy (surgery, obstetrics and gynecology, anesthesiology) in order to choose the optimal and safest drug for the patient's individual pharmacotherapy;
- principles of the diseases rational and safe pharmacotherapy;
- problems of drug allergy, principles of its prevention and treatment;

- methods of preventing adverse drug reactions;

**be able to:**

- prescribe the doctor's prescription;
- collect pharmacological and allergic medical history and select medicines to treat a particular patient;
- inform patients about the drugs nature, the rules of administration and possible side reactions;
- provide emergency medical care for patients with anaphylactic shock;
- correct the dosage regimen for pathological changes in the functions of organs and systems responsible for biotransformation and elimination of drugs, as well as in the medicines combined use;
- evaluate scientific information on the medicines and other means effectiveness, work with reference and other literature on medicines;

**master:**

- methods of choosing the optimal drug for the particular patient's treatment, taking into account its effectiveness, safety profile and acceptability;
- methods for assessing the efficacy and safety of ongoing pharmacotherapy.

The structure of the curriculum in the educational discipline (name of the discipline): 2 sections.

A total of 140 academic hours are devoted to the study of the academic discipline. Classroom hours according to the types of studies are lectures – 12 hours, practical classes - 56 hours, students' independent work (self-study) - 72 hours.

Current assessment is carried out according to the syllabus of the specialty in the form of an exam (11<sup>th</sup> semester).

Form of higher education - full-time

**Total number** of hours for the study of the discipline is 140 academic hours. Classroom hours according to the types of studies: lectures - 12 hours, laboratory studies (practical classes - 56 hours), student independent work (self-study) - 72 hours.

Current assessment is carried out according to the syllabus of the specialty in the form of an examination (11 semester).

Form of higher education – full-time.

**ALLOCATION OF ACADEMIC TIME  
ACCORDING TO THE SEMESTERS OF STUDY**

Code, name of the specialty	Semester	Number of academic hours					Current assessment
		Total	in-class	including		out-of-class self-studies	
				lectures	practical classes		
<b>1-79 01 01 General Medicine</b>	11	140	68	12	56	72	Exam

## THEMATIC PLAN

Section (topic) name	Number of academic hours	
	lectures	practical classes (laboratory or seminars)
<b>1. GENERAL ISSUES OF CLINICAL PHARMACOLOGY</b>	<b>4</b>	<b>7</b>
1.1. Introduction to the academic discipline "Clinical Pharmacology". Nomenclature of medicines. Original and generic medicines. Clinical trials and state registration of medicines. Types of medicines equivalence. Basis of Evidence-Based Medicine. Prescribing rules.	2	4
1.2. Clinical pharmacokinetics and pharmacodynamics of drugs. Drug Interactions. Unwanted (adverse) reactions to medications. Principles of drug use in women during pregnancy and lactation, elderly patients, patients with liver and kidney disease	2	3
<b>2. Clinical Pharmacology of Drugs</b>	<b>8</b>	<b>49</b>
2.1. Medicines and receptors. Clinical pharmacology of antiallergic drugs. Anaphylaxis, emergency medical care	-	4
2.2. Clinical pharmacology of antibacterial drugs. Basics of rational antibiotic therapy	2	3
2.3. Clinical pharmacology of antiviral, antifungal and antiprotozoal drugs. Principles of treatment of acute respiratory viral infections	2	4
2.4. Clinical pharmacology of steroid and non-steroidal anti-inflammatory drugs, narcotic analgesics	-	3
2.5. Clinical pharmacology of drugs used in the respiratory system diseases	-	7
2.6. Clinical pharmacology of medicines used in cardiology	2	7
2.7. Clinical pharmacology of medicines used in gastroenterology	-	7
2.8. Clinical pharmacology of drugs affecting the hemostatic system	-	7
2.9. Clinical pharmacology of anti-anemia drugs	-	4
2.10. Clinical pharmacology of medicines used for the treatment of type 2 diabetes and thyroid diseases	2	3
<b>Total hours</b>	<b>12</b>	<b>56</b>

## CONTENT OF THE EDUCATIONAL MATERIAL

### 1. General issues of Clinical Pharmacology

#### 1.1. Introduction to the academic discipline "Clinical Pharmacology".

**Nomenclature of medicines. Original and generic medicines. Clinical trials and state registration of medicines. Types of the medicines equivalence. Basis of Evidence-Based Medicine. Prescribing rules.**

Goals and objectives of the educational discipline "Clinical Pharmacology", the main stages of the clinical pharmacology development, the relationship with other science and special educational disciplines. Clinical pharmacology as the basis of rational pharmacotherapy. Basic principles of evidence-based medicine.

Nomenclature of medicinal products (international non-proprietary and trade names). Principles of the medicines development. Original and generic medicines.

The purpose, objectives and methods of medicines clinical trials. Medical, methodological and ethical aspects of clinical trials. Ethics Committee, its role and tasks. Types and phases of clinical trials. Biological and therapeutic equivalence of drugs. Principles of the study of generic medicines bioequivalence. State registration of medicines. Basic provisions of evidence-based medicine.

Medicines for prescription and non-prescription drugs. The procedure for issuing a doctor's prescription for medicines, sold at the full cost pharmacy, for narcotic and psychotropic substances, for medicines on preferential terms, including free of charge.

#### 1.2. Clinical pharmacokinetics and pharmacodynamics of drugs. Drug Interactions. Unwanted (adverse) reactions to medications. Principles of drug use in women during pregnancy and lactation, elderly patients, patients with liver and kidney disease

Clinical pharmacokinetics. Ways of drug administration, their characteristics. Distribution of drugs in the human body. Metabolism of medicines. Basic pharmacokinetic parameters. Bioavailability of drugs. Factors affecting the pharmacokinetics of medicines. Features of drugs pharmacokinetics for prolonged use. Clinical pharmacodynamics and evaluation of its main parameters. The dose-effect relationship. The relationship between pharmacokinetics and pharmacodynamics.

Combined use of medicines. Types of drug interactions. Polypharmacy. Peculiarities of pharmacokinetics and pharmacodynamics of medicines in elderly patients, women during pregnancy and lactation, patients with liver and kidney diseases. Identify, register and prevent unwanted (adverse) reactions. Notification of suspected adverse reaction to the drug. Informing patients about possible manifestations of unwanted (adverse) reactions to medicines.

### 2. Clinical Pharmacology of Drugs

#### 2.1. Medicines and receptors. Clinical pharmacology of antiallergic drugs. Anaphylaxis, emergency medical care.

The concept of receptors, the types of receptors. Types of interaction of drugs with receptors. The development mechanism of immediate-type hypersensitivity reactions (urticaria, Quincke's edema, anaphylaxis, etc.).



Clinico-pharmacological characteristics of the main groups of antiallergic drugs. Anaphylaxis, medicinal anaphylactic shock. Clinical manifestation, diagnosis, and prevention of the drug anaphylactic shock. Prehospital and hospital stages of providing emergency medical care for anaphylactic shock.

## **2.2. Clinical pharmacology of antibacterial drugs. Basics of rational antibiotic therapy**

Classification and clinical pharmacology of antibacterial drugs.

Features of the infectious disease course depending on the pathogen nature, the organism reactivity. Principles of combined antibacterial therapy. Monitoring the effectiveness and safety of antibiotic treatment.

## **2.3. Clinical pharmacology of antiviral, antifungal and antiprotozoal drugs. Principles of treatment of acute respiratory viral infections**

Classification of antiviral drugs. Clinico-pharmacological characteristics of anti-influenza drugs, anti-herpes and antiretroviral drugs, interferons, immunobiological drugs. Principles of the treatment of acute respiratory viral infections.

Modern principles of pharmacological therapy of the most common fungal and parasitic diseases.

Classification of antifungal medicines for local and systemic use.

Clinical pharmacology of the main groups of the drugs used to treat parasitic diseases.

## **2.4. Clinical pharmacology of steroid and non-steroidal anti-inflammatory drugs, narcotic analgesics**

Clinical-pharmacological characteristics of non-steroidal anti-inflammatory drugs. Clinical-pharmacological characteristics of glucocorticoids. Narcotic analgesics. Non-opioid medicines of central action with analgesic activity. Analgesics with the action mixed mechanism.

The tactics of using nonsteroidal anti-inflammatory and combined medicines for hyperthermic and pain syndrome.

## **2.5. Clinical pharmacology of drugs used in the respiratory system diseases**

Clinical-pharmacological characteristics of the antitussive drugs of central, peripheral, mixed effect. Expectorant and mucolytic drugs, especially their use. Drugs for the relief of bronchial obstructive syndrome (beta-2-adrenomimetics, M-cholinoblockers, xanthines, combined drugs). Clinical-pharmacological characteristics and features of the use of drugs for the basic anti-inflammatory therapy of bronchial asthma. Application of stabilizers of the mast cells membranes.

Phytotherapy in pulmonology.

## **2.6. Clinical pharmacology of medicines used in cardiology**

Clinical-pharmacological characteristics of antihypertensive drugs: diuretics,  $\beta$ -adrenoblockers, slow calcium channel blockers, angiotensin converting enzyme inhibitors, angiotensin receptor blockers, central  $\alpha_2$  and imidazoline receptor agonists. Representatives of antihypertensive drugs other groups:  $\alpha$ -adrenoblockers, inhibitors of renin synthesis, direct antagonists of aldosterone, etc. Principles of arterial hypertension modern pharmacotherapy.

Clinical-pharmacological characteristics of anti-anginal and anti-ischemic drugs:  $\beta$ -adrenoblockers, slow calcium channel blockers, nitrates, sydnonimines, cardiac cytoprotectors.

Medicines that correct lipid metabolism.

Modern principles of the treatment of ischemic heart disease.

Clinical-pharmacological characteristics of antiarrhythmic drugs, Vogen-Williams classification, mechanisms of antiarrhythmic action, indications and contraindications to their use, safety control.

Medicines used in the treatment of disorders of the heart conduction system.

### **2.7. Clinical pharmacology of medicines used in gastroenterology**

Clinical-pharmacological characteristics of antisecretory drugs, antacids. Medicines that have a protective effect and enhance the regeneration of the gastrointestinal tract mucous membrane. Diagrams of Helicobacter eradication. Classification of antiemetic drugs. Drugs affecting the motor function of the gastrointestinal tract. Enzyme drugs of substitution therapy. The use of choleric drugs and hepatoprotectors. Antidiarrheal and laxative drugs. Drugs that regulate intestinal microbiocenosis.

Phytotherapy of the digestive system diseases.

### **2.8. Clinical pharmacology of drugs affecting the hemostatic system**

The main causes leading to the function disruption of the blood coagulation and anticoagulation systems. Clinical-pharmacological characteristics of antiplatelet agents, direct and indirect anticoagulants, thrombolytic drugs.

Essential medicines used to reduce the activity of the blood coagulation system (proagregants, procoagulants, inhibitors of fibrinolysis), indications and contraindications to the use, methods of assessing the effectiveness.

### **2.9. Clinical pharmacology of anti-anemia drugs**

Classification of anemia. Iron deficiency, B12 and folic deficiency anemia: etiology, clinical manifestations and principles of pharmacotherapy. Clinico-pharmacological characteristics of anti-anemic drugs. Indications and contraindications to the use of iron-containing drugs and cyanocobalamin. Criteria for the effectiveness of ongoing pharmacological therapy.

### **2.10. Clinical pharmacology of medicines used for the treatment of type 2 diabetes and thyroid diseases**

Clinical-pharmacological characteristics of derivatives of sulfonylurea, biguanides, meglitinides, thiazolidinediones and incretins. Derivatives of insulin. Indications and contraindications, methods of monitoring the effectiveness and safety of insulin therapy.

Drugs for replacement therapy for hypothyroidism. Clinico-pharmacological characteristics of antithyroid drugs.

## EDUCATIONAL DISCIPLINE CURRICULAR CHART

Section, topic #	Section (topic) name	number of hours			Form of control
		lectures	practical classes (laboratory or seminars)	out-of-class self-studies	
	11 semester				
<b>1</b>	<b>General issues of Clinical Pharmacology</b>	4	7	8	<u>Oral forms:</u> interviews; seminar reports; cases and tests. <u>Written forms:</u> tests; control questioning; writing out prescriptions for medicines; filling out the card «Expert evaluation of the conducted pharmacotherapy».
1.1	Introduction to the academic discipline «Clinical Pharmacology». Nomenclature of medicines. Original and generic medicines. Clinical trials and state registration of medicines. Types of the medicines equivalence. Basis of Evidence-Based Medicine. Prescribing rules.				<u>Oral forms:</u> interviews; seminar reports; cases and tests. <u>Written forms:</u> tests; control questioning; writing out prescriptions for medicines; filling out the card «Expert evaluation of the conducted pharmacotherapy».
1.2	Clinical pharmacokinetics and pharmacodynamics of drugs. Drug Interactions. Unwanted (adverse) reactions to medications. Principles of drug use in women during pregnancy and lactation, elderly patients, patients with liver and kidney disease				<u>Oral-written forms:</u> accounts of classroom practical exercises with oral defense.
<b>2</b>	<b>Clinical Pharmacology of Drugs</b>	2	7	8	<u>Oral forms:</u> interviews; seminar reports; cases and tests. <u>Written forms:</u> tests; control questioning; writing out prescriptions for medicines; filling out the card «Expert evaluation of the conducted pharmacotherapy».
2.1	Medicines and receptors. Clinical pharmacology of antiallergic drugs. Anaphylaxis emergency medical care				<u>Oral forms:</u> interviews; seminar reports; cases and tests. <u>Written forms:</u> tests; control questioning; writing out prescriptions for medicines; filling out the card «Expert evaluation of the conducted pharmacotherapy».
2.2	Clinical pharmacology of antibacterial drugs. Basics of rational antibiotic therapy				<u>Oral forms:</u> interviews; seminar reports; cases and tests. <u>Written forms:</u> tests; control questioning; writing out prescriptions for medicines; filling out the card «Expert evaluation of the conducted pharmacotherapy».

					<u>Oral-written forms:</u> accounts of classroom practical exercises with oral defense.
2	<b>Clinical Pharmacology of Drugs</b>	2	7	12	<u>Oral forms:</u> interviews; seminar reports; cases and tests. <u>Written forms:</u> tests; control questioning; writing out prescriptions for medicines; filling out the card «Expert evaluation of the conducted pharmacotherapy».
2.3	Clinical pharmacology of antiviral, antifungal and antiprotozoal drugs Principles of treatment of acute respiratory viral infections				<u>Oral-written forms:</u> accounts of classroom practical exercises with oral defense.
2	<b>Clinical Pharmacology of Drugs</b>				<u>Oral-written forms:</u> accounts of classroom practical exercises with oral defense.
2.4	Clinical pharmacology of steroid and non-steroidal anti-inflammatory drugs, narcotic analgesics				<u>Oral-written forms:</u> accounts of classroom practical exercises with oral defense.
2	<b>Clinical Pharmacology of Drugs</b>	-	7	8	<u>Oral forms:</u> interviews; seminar reports; cases; and tests. <u>Written forms:</u> tests; control questioning; writing out prescriptions for medicines; filling out the card «Expert evaluation of the conducted pharmacotherapy».
2.5	Clinical pharmacology of drugs used in the respiratory system diseases				<u>Oral-written forms:</u> accounts of classroom practical exercises with oral defense.
2	<b>Clinical Pharmacology of Drugs</b>	2	7	12	<u>Oral forms:</u> accounts of classroom practical exercises with oral defense.

2.6	Clinical pharmacology of medicines used in cardiology			<p>interviews; seminar reports; cases and tests.  <u>Written forms:</u>  tests; control questioning; writing out prescriptions for medicines; filling out the card «Expert evaluation of the conducted pharmacotherapy».  <u>Oral-written forms:</u>  accounts of classroom practical exercises with oral defense.</p>
2 2.7	<b>Clinical Pharmacology of Drugs</b> Clinical pharmacology of medicines used in gastroenterology	-	7 8	<p><u>Oral forms:</u>  interviews; seminar reports; cases and tests.  <u>Written forms:</u>  tests; control questioning; writing out prescriptions for medicines; filling out the card «Expert evaluation of the conducted pharmacotherapy».  <u>Oral-written forms:</u>  accounts of classroom practical exercises with oral defense.</p>
2 2.8	<b>Clinical Pharmacology of Drugs</b> Clinical pharmacology of drugs affecting the hemostatic system	-	7 6	<p><u>Oral forms:</u>  interviews; seminar reports; cases and tests.  <u>Written forms:</u>  tests; control questioning; writing out prescriptions for medicines; filling out the card «Expert evaluation of the conducted pharmacotherapy».</p>

		<u>Oral-written forms:</u> accounts of classroom practical exercises with oral defense.
2	2	<u>Oral forms:</u> interviews; seminar reports; cases and tests.
2.9	7	<u>Written forms:</u> tests; control questioning; writing out prescriptions for medicines; filling out the card «Expert evaluation of the conducted pharmacotherapy».
2.10	10	<u>Oral-written forms:</u> accounts of classroom practical exercises with oral defense.
<b>Total</b>	<b>12</b>	<b>56</b>
		<b>72</b>

## INFORMATION AND INSTRUCTIONAL UNIT

### LITERATURE

#### **Basic (relevant):**

1. Peter N. Bennett, Morris J. Brown. Clinical Pharmacology, 11e, 2012
2. Bertram Katzung, Anthony Trevor. Basic and Clinical Pharmacology, 13 E , 2014
3. Goodman and Gilman's The Pharmacological Basis of Therapeutics, Twelfth Edition, 2011

#### **Additional:**

1. Arthur J. Atkinson et al. Principles of Clinical Pharmacology. Third Edition
2. James M Ritter et al. A Textbook of Clinical Pharmacology and Therapeutics 5Ed. 2008
3. D.G. Grahame-Smith, J.K. Aronson. Oxford Textbook of Clinical Pharmacology and Drug Therapy. Hardcover – May, 2002

### METHODOLOGICAL RECOMMENDATIONS ON ORGANIZATION AND IMPLEMENTATION OF THE STUDENTS' INDEPENDENT WORK ON THE EDUCATIONAL DISCIPLINE

Time allocated for independent work can be used by students to:

- preparation for the lectures and practical exercises;
- preparation for the exam in the academic discipline;
- study of topics (questions) taken for the independent study;
- performance of research assignments;
- preparation of thematic reports, abstracts, presentations;
- performance of practical tasks (patient's supervision and expert evaluation of ongoing pharmacotherapy, prescription writing).

The main methods of independent work organization:

- the abstract writing and presentation;
- the report presentation;
- study of the topics and problems that are not addressed in the lecture;
- clinical analysis of the patients with ongoing pharmacotherapy evaluation and the card registration «Expert evaluation of pharmacotherapy», writing out prescriptions;
- computerized testing;
- preparation and participation in the education active forms.

Control of independent work can be carried out in the form of:

- control tests;
- discussion of abstracts;
- assessing the oral response to the question, the message, the report, the solution of situational problems in practical exercises;
- checking abstracts, test results;

- checking the prescription correctness;
- individual conversation.

### **LIST OF AVAILABLE DIAGNOSTIC TOOLS**

The following forms are used for competence assessment:

1. Oral forms:
  - interviews;
  - seminar reports;
  - cases and tests.
2. Written forms:
  - tests;
  - control questioning;
  - writing out prescriptions for medicines;
  - filling out the card «Expert evaluation of the conducted pharmacotherapy»;
3. Oral-written forms:
  - accounts of classroom practical exercises with oral defense.

### **LIST OF PRACTICAL SKILLS**

- Prescribing of drugs.
- Collection of pharmacological and allergological history.
- Informing the patient about the drugs nature, the rules of administration and possible side reactions.
- Evaluation of scientific information on the medicines effectiveness.
- Correction of the dosing regimen for pathological changes in the functions of organs and systems responsible for drugs biotransformation and elimination.

### **LIST OF LECTURES**

#### **1. General issues of Clinical Pharmacology**

1.1. Introduction to the academic discipline «Clinical Pharmacology». Nomenclature of medicines. Original and generic medicines. Clinical trials and state registration of medicines. Types of medicines equivalence. Fundamentals of Evidence-Based Medicine. Prescribing rules.

1.2. Clinical pharmacokinetics and pharmacodynamics of drugs. Drug Interactions. Unwanted (adverse) reactions to medications. Principles of drug use in women during pregnancy and lactation, elderly patients, patients with liver and kidney disease

#### **2. Clinical Pharmacology of Drugs**

2.1. Clinical pharmacology of antibacterial drugs. Basics of rational antibiotic therapy



- 2.2. Clinical pharmacology of antiviral, antifungal and antiprotozoal drugs. Principles of the treatment of acute respiratory viral infections
- 2.3. Clinical pharmacology of medicines used in cardiology
- 2.4. Clinical pharmacology of medicines used for the treatment of type 2 diabetes and thyroid diseases

## **LIST OF LABORATORY (PRACTICAL) STUDIES**

### **1. General issues of clinical pharmacology**

1.1. Introduction to the academic discipline «Clinical Pharmacology». Nomenclature of medicines. Original and generic medicines. Clinical trials and state registration of medicines. Types of medicines equivalence. Fundamentals of Evidence-Based Medicine. Prescribing rules.

1.2. Clinical pharmacokinetics and pharmacodynamics of drugs. Drug Interactions. Unwanted (adverse) reactions to medications. Principles of drug use in women during pregnancy and lactation, elderly patients, patients with liver and kidney disease

### **2. Clinical pharmacology of drugs**

2.1. Medicines and receptors. Clinical pharmacology of antiallergic drugs. Anaphylaxis, emergency medical care

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2.4. Clinical pharmacology of steroid and non-steroidal anti-inflammatory drugs, narcotic analgesics

2.5. Clinical pharmacology of drugs used in the respiratory system diseases

2.6. Clinical pharmacology of medicines used in cardiology

2.7. Clinical pharmacology of medicines used in gastroenterology

2.8. Clinical pharmacology of drugs affecting the hemostatic system

2.9. Clinical pharmacology of anti-anemia drugs

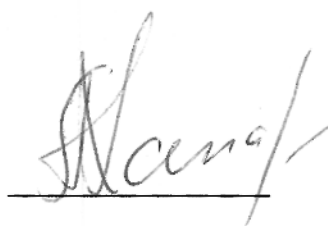
2.10. Clinical pharmacology of medicines used for the treatment of type 2 diabetes and thyroid diseases

**PROTOCOL OF THE CURRICULUM APPROVAL  
BY OTHER DEPARTMENTS**

Name of the discipline requiring approval	Department	Amendments to the curriculum of the academic discipline	Decision of the department, which composed the curriculum (date, protocol #)
Pharmacology	Pharmacology	No offers were received	protocol 15 dated 20.06.2018

**COMPILERS/AUTHORS:**

Head of the Clinical Pharmacology  
Department of the Educational  
Institution "Belarusian State Medical  
University",  
Professor



A.V. Khapalyuk

Associate professor of the Clinical  
Pharmacology Department of the  
Educational Institution "Belarusian  
State Medical University"



I.N. Kozhanova

signature

Curriculum content, composition and the accompanying documents comply with the established requirements

Dean of the Medical Faculty for  
International Students of the  
Educational Institution  
"Belarusian State Medical  
University"

03.10. 2018



A.V. Gayduk

Methodologist of the Educational  
Institution  
"Belarusian State Medical  
University"

03.10. 2018



S.A. Kharytonava

Head of the Foreign Languages  
Department of the Educational  
Institution  
"Belarusian State Medical  
University"

03.10. 2018



M.N. Petrova

### Information about the curriculum authors (compilers)

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MINISTRY OF HEALTH OF THE REPUBLIC OF BELARUS  
EDUCATIONAL INSTITUTION  
BELARUSIAN STATE MEDICAL UNIVERSITY

Контрольный  
экземпляр

**APPROVED**  
Acting First Vice-Rector, Professor  
V.V.Roudenok  
18.10.2018  
Reg. # UD-L.642/1819 /edu

**CLINICAL PHARMACOLOGY**

**Curriculum of higher educational institution  
in the educational discipline for the specialty:**

**1-79 01 01 General Medicine**

Curriculum is based on the standard educational program «Clinical Pharmacology», approved 03.10.2018, registration # TD-L. 642/tip

**COMPILERS:**

A.V.Khapalyuk, Head of the Department of Clinical Pharmacology of the Educational Institution «Belarusian State Medical University», Doctor of Medical Sciences, Professor

**RECOMMENDED FOR APPROVAL**

by the Clinical Pharmacology Department of the Educational Institution «Belarusian State Medical University»

(protocol # 15 dated 14.09.2018);

by the Methodological Commission of General Medicine of the Educational Institution «Belarusian State Medical University»

(protocol № 1 of 9.10.2018)

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- methods for monitoring the safety of ongoing pharmacotherapy.

Teaching and successful learning of the discipline (name of the discipline) is carried out on the basis of the knowledge and skills previously acquired by the students in the following disciplines:

**General chemistry.** Elements of chemical thermodynamics. Elements of chemical kinetics. Estimation of pH buffer system.

**Medical Biology and General Genetics.** Molecular genetic and cellular levels of the organization. Genetic bases of biological species. Genetic pathology and its manifestations. Biosphere level of organization of the living. Ecology.

**Biological Chemistry.** The structure, function, metabolism of proteins, lipids, carbohydrates. Biochemistry of muscle, connective and nervous tissues, blood biochemistry. Water and mineral metabolism. Biochemical processes in healthy and diseased organism. Value of biochemical indicators in the diagnosis of pathological states.

**Normal Physiology.** Role of organism reactivity in the occurrence of diseases. Physiology of the circulatory, respiratory, digestive, endocrine, excretory systems, the central and peripheral nervous system, blood and lymphatic system.

**Pathological Physiology.** Damage to the cells, disturbances of protein, fat, carbohydrate and mineral metabolism. Disorders of local and general circulation. Immunological processes. Allergy. Inflammation. Pathology of the respiratory,

digestive, endocrine, excretory systems, the central and peripheral nervous system, blood and lymphatic system.

**Microbiology. Virology. Immunology.** Microbial flora and viruses that cause disease in humans. The human immune system. Antigens. Specific and non-specific organism protection factors.

**General Hygiene and Military Hygiene.** The impact of the environment on the development and course of pathologic processes. Occupational hazards and their effect on the organs and systems. Sanitary-hygienic standards of the environment, water and food.

**Pharmacology. General Pharmacology.** Pharmacokinetics and pharmacodynamics of drugs. Drugs regulating functions of the central and peripheral nervous system. Drugs that effect the function of the respiratory, cardiovascular, digestive system. Antimicrobial, antiviral, and antiparasitic agents. Hormonal, vitamin drugs. Drugs used for the correction of the hemostatic system.

**Internal illnesses.** Principles of the patient's examination. Bases of semiotics, diagnosis and treatment of diseases of the cardiovascular, respiratory, digestive, endocrine system, the kidney and urinary tract, blood and blood-forming organs, musculoskeletal and connective tissue. Clinical picture, diagnosis and emergency medical care to patients with life-threatening conditions. Clinical manifestations of occupational diseases.

**Infectious diseases.** General issues of infectious pathology. Intestinal infections and infestations. Droplet infection. Viral hepatitis. Quarantine and especially dangerous infections. Zoonotic infections. Vector-borne infections. Acute neuroinfections. HIV-associated diseases.

**Surgical diseases.** Aseptic and antiseptic. Bleeding, hemostasis. Common disorders of vital activity in surgery and its treatment. Acute surgical pathology. Wounds and wound infection. Infusion and transfusion. General and local anesthesia. Specialty surgery.

**Obstetrics and Gynecology.** Physiology and pathology of pregnancy. Course and management of the labor. Obstetrical surgery. Pathology of the puerperal period. Gynecological disorders.

**As a result of studying the discipline (name of the discipline) the student should**

**know:**

- nomenclature and main classes of medicines;
- pharmacological properties and bases of the medicines clinical use;
- rules for the new medicines clinical approbation and registration;
- bases of the medicines pharmacodynamics and pharmacokinetics, peculiarities of the medicines use depending on the patient's age;
- clinical-pharmacological characteristics of essential medicines used in therapy (surgery, obstetrics and gynecology, anesthesiology) in order to choose the optimal and safest drug for the patient's individual pharmacotherapy;
- principles of the diseases rational and safe pharmacotherapy;
- problems of drug allergy, principles of its prevention and treatment;



- methods of preventing adverse drug reactions;

**be able to:**

- prescribe the doctor's prescription;
- collect pharmacological and allergic medical history and select medicines to treat a particular patient;
- inform patients about the drugs nature, the rules of administration and possible side reactions;
- provide emergency medical care for patients with anaphylactic shock;
- correct the dosage regimen for pathological changes in the functions of organs and systems responsible for biotransformation and elimination of drugs, as well as in the medicines combined use;
- evaluate scientific information on the medicines and other means effectiveness, work with reference and other literature on medicines;

**master:**

- methods of choosing the optimal drug for the particular patient's treatment, taking into account its effectiveness, safety profile and acceptability;
- methods for assessing the efficacy and safety of ongoing pharmacotherapy.

The structure of the curriculum in the educational discipline (name of the discipline): 2 sections.

A total of 140 academic hours are devoted to the study of the academic discipline. Classroom hours according to the types of studies are lectures – 12 hours, practical classes - 56 hours, students' independent work (self-study) - 72 hours.

Current assessment is carried out according to the syllabus of the specialty in the form of an exam (11<sup>th</sup> semester).

Form of higher education - full-time

**Total number** of hours for the study of the discipline is 140 academic hours. Classroom hours according to the types of studies: lectures - 12 hours, laboratory studies (practical classes - 56 hours), student independent work (self-study) - 72 hours.

Current assessment is carried out according to the syllabus of the specialty in the form of an examination (11 semester).

Form of higher education – full-time.

**ALLOCATION OF ACADEMIC TIME  
ACCORDING TO THE SEMESTERS OF STUDY**

Code, name of the specialty	Semester	Number of academic hours					Current assessment
		Total	in-class	including		out-of-class self-studies	
				lectures	practical classes		
<b>1-79 01 01 General Medicine</b>	11	140	68	12	56	72	Exam

## THEMATIC PLAN

Section (topic) name	Number of academic hours	
	lectures	practical classes <i>(laboratory or seminars)</i>
<b>1. GENERAL ISSUES OF CLINICAL PHARMACOLOGY</b>	<b>4</b>	<b>7</b>
1.1. Introduction to the academic discipline "Clinical Pharmacology". Nomenclature of medicines. Original and generic medicines. Clinical trials and state registration of medicines. Types of medicines equivalence. Basis of Evidence-Based Medicine. Prescribing rules.	2	4
1.2. Clinical pharmacokinetics and pharmacodynamics of drugs. Drug Interactions. Unwanted (adverse) reactions to medications. Principles of drug use in women during pregnancy and lactation, elderly patients, patients with liver and kidney disease	2	3
<b>2. Clinical Pharmacology of Drugs</b>	<b>8</b>	<b>49</b>
2.1. Medicines and receptors. Clinical pharmacology of antiallergic drugs. Anaphylaxis, emergency medical care	-	4
2.2. Clinical pharmacology of antibacterial drugs. Basics of rational antibiotic therapy	2	3
2.3. Clinical pharmacology of antiviral, antifungal and antiprotozoal drugs. Principles of treatment of acute respiratory viral infections	2	4
2.4. Clinical pharmacology of steroid and non-steroidal anti-inflammatory drugs, narcotic analgesics	-	3
2.5. Clinical pharmacology of drugs used in the respiratory system diseases	-	7
2.6. Clinical pharmacology of medicines used in cardiology	2	7
2.7. Clinical pharmacology of medicines used in gastroenterology	-	7
2.8. Clinical pharmacology of drugs affecting the hemostatic system	-	7
2.9. Clinical pharmacology of anti-anemia drugs	-	4
2.10. Clinical pharmacology of medicines used for the treatment of type 2 diabetes and thyroid diseases	2	3
<b>Total hours</b>	<b>12</b>	<b>56</b>

## CONTENT OF THE EDUCATIONAL MATERIAL

### 1. General issues of Clinical Pharmacology

#### 1.1. Introduction to the academic discipline "Clinical Pharmacology". Nomenclature of medicines. Original and generic medicines. Clinical trials and state registration of medicines. Types of the medicines equivalence. Basis of Evidence-Based Medicine. Prescribing rules.

Goals and objectives of the educational discipline "Clinical Pharmacology", the main stages of the clinical pharmacology development, the relationship with other science and special educational disciplines. Clinical pharmacology as the basis of rational pharmacotherapy. Basic principles of evidence-based medicine.

Nomenclature of medicinal products (international non-proprietary and trade names). Principles of the medicines development. Original and generic medicines. The purpose, objectives and methods of medicines clinical trials. Medical, methodological and ethical aspects of clinical trials. Ethics Committee, its role and tasks. Types and phases of clinical trials. Biological and therapeutic equivalence of drugs. Principles of the study of generic medicines bioequivalence. State registration of medicines. Basic provisions of evidence-based medicine.

Medicines for prescription and non-prescription drugs. The procedure for issuing a doctor's prescription for medicines, sold at the full cost pharmacy, for narcotic and psychotropic substances, for medicines on preferential terms, including free of charge.

#### 1.2. Clinical pharmacokinetics and pharmacodynamics of drugs. Drug Interactions. Unwanted (adverse) reactions to medications. Principles of drug use in women during pregnancy and lactation, elderly patients, patients with liver and kidney disease

Clinical pharmacokinetics. Ways of drug administration, their characteristics. Distribution of drugs in the human body. Metabolism of medicines. Basic pharmacokinetic parameters. Bioavailability of drugs. Factors affecting the pharmacokinetics of medicines. Features of drugs pharmacokinetics for prolonged use. Clinical pharmacodynamics and evaluation of its main parameters. The dose-effect relationship. The relationship between pharmacokinetics and pharmacodynamics.

Combined use of medicines. Types of drug interactions. Polypharmacy. Peculiarities of pharmacokinetics and pharmacodynamics of medicines in elderly patients, women during pregnancy and lactation, patients with liver and kidney diseases. Identify, register and prevent unwanted (adverse) reactions. Notification of suspected adverse reaction to the drug. Informing patients about possible manifestations of unwanted (adverse) reactions to medicines.

### 2. Clinical Pharmacology of Drugs

#### 2.1. Medicines and receptors. Clinical pharmacology of anti-allergic drugs. Anaphylaxis, emergency medical care.

The concept of receptors, the types of receptors. Types of interaction of drugs with receptors. The development mechanism of immediate-type hypersensitivity reactions (urticaria, Quincke's edema, anaphylaxis, etc.).

Clinico-pharmacological characteristics of the main groups of antiallergic drugs. Anaphylaxis, medicinal anaphylactic shock. Clinical manifestation, diagnosis, and prevention of the drug anaphylactic shock. Prehospital and hospital stages of providing emergency medical care for anaphylactic shock.

## **2.2. Clinical pharmacology of antibacterial drugs. Basics of rational antibiotic therapy**

Classification and clinical pharmacology of antibacterial drugs.

Features of the infectious disease course depending on the pathogen nature, the organism reactivity. Principles of combined antibacterial therapy. Monitoring the effectiveness and safety of antibiotic treatment.

## **2.3. Clinical pharmacology of antiviral, antifungal and antiprotozoal drugs. Principles of treatment of acute respiratory viral infections**

Classification of antiviral drugs. Clinico-pharmacological characteristics of anti-influenza drugs, anti-herpes and antiretroviral drugs, interferons, immunobiological drugs. Principles of the treatment of acute respiratory viral infections.

Modern principles of pharmacological therapy of the most common fungal and parasitic diseases.

Classification of antifungal medicines for local and systemic use.

Clinical pharmacology of the main groups of the drugs used to treat parasitic diseases.

## **2.4. Clinical pharmacology of steroid and non-steroidal anti-inflammatory drugs, narcotic analgesics**

Clinical-pharmacological characteristics of non-steroidal anti-inflammatory drugs. Clinical-pharmacological characteristics of glucocorticoids. Narcotic analgesics. Non-opioid medicines of central action with analgesic activity. Analgesics with the action mixed mechanism.

The tactics of using nonsteroidal anti-inflammatory and combined medicines for hyperthermic and pain syndrome.

## **2.5. Clinical pharmacology of drugs used in the respiratory system diseases**

Clinical-pharmacological characteristics of the antitussive drugs of central, peripheral, mixed effect. Expectorant and mucolytic drugs, especially their use. Drugs for the relief of bronchial obstructive syndrome (beta-2-adrenomimetics, M-cholinoblockers, xanthines, combined drugs). Clinical-pharmacological characteristics and features of the use of drugs for the basic anti-inflammatory therapy of bronchial asthma. Application of stabilizers of the mast cells membranes.

Phytotherapy in pulmonology.

## **2.6. Clinical pharmacology of medicines used in cardiology**

Clinical-pharmacological characteristics of antihypertensive drugs: diuretics,  $\beta$ -adrenoblockers, slow calcium channel blockers, angiotensin converting enzyme inhibitors, angiotensin receptor blockers, central  $\alpha_2$  and imidazoline receptor agonists. Representatives of antihypertensive drugs other groups:  $\alpha$ -adrenoblockers, inhibitors of renin synthesis, direct antagonists of aldosterone, etc. Principles of arterial hypertension modern pharmacotherapy.

Clinical-pharmacological characteristics of anti-anginal and anti-ischemic drugs:  $\beta$ -adrenoblockers, slow calcium channel blockers, nitrates, sydnonimines, cardiac cytoprotectors.

Medicines that correct lipid metabolism.

Modern principles of the treatment of ischemic heart disease.

Clinical-pharmacological characteristics of antiarrhythmic drugs, Vogen-Williams classification, mechanisms of antiarrhythmic action, indications and contraindications to their use, safety control.

Medicines used in the treatment of disorders of the heart conduction system.

### **2.7. Clinical pharmacology of medicines used in gastroenterology**

Clinical-pharmacological characteristics of antisecretory drugs, antacids. Medicines that have a protective effect and enhance the regeneration of the gastrointestinal tract mucous membrane. Diagrams of Helicobacter eradication. Classification of antiemetic drugs. Drugs affecting the motor function of the gastrointestinal tract. Enzyme drugs of substitution therapy. The use of choleric drugs and hepatoprotectors. Antidiarrheal and laxative drugs. Drugs that regulate intestinal microbiocenosis.

Phytotherapy of the digestive system diseases.

### **2.8. Clinical pharmacology of drugs affecting the hemostatic system**

The main causes leading to the function disruption of the blood coagulation and anticoagulation systems. Clinical-pharmacological characteristics of antiplatelet agents, direct and indirect anticoagulants, thrombolytic drugs.

Essential medicines used to reduce the activity of the blood coagulation system (proagregants, procoagulants, inhibitors of fibrinolysis), indications and contraindications to the use, methods of assessing the effectiveness.

### **2.9. Clinical pharmacology of anti-anemia drugs**

Classification of anemia. Iron deficiency, B12 and folic deficiency anemia: etiology, clinical manifestations and principles of pharmacotherapy. Clinico-pharmacological characteristics of anti-anemic drugs. Indications and contraindications to the use of iron-containing drugs and cyanocobalamin. Criteria for the effectiveness of ongoing pharmacological therapy.

### **2.10. Clinical pharmacology of medicines used for the treatment of type 2 diabetes and thyroid diseases**

Clinical-pharmacological characteristics of derivatives of sulfonylurea, biguanides, meglitinides, thiazolidinediones and incretins. Derivatives of insulin. Indications and contraindications, methods of monitoring the effectiveness and safety of insulin therapy.

Drugs for replacement therapy for hypothyroidism. Clinico-pharmacological characteristics of antithyroid drugs.

## EDUCATIONAL DISCIPLINE CURRICULAR CHART

Section, topic #	Section (topic) name	number of hours			Form of control
		lectures	practical classes (laboratory or seminars)	out-of-class self-studies	
	11 semester				
<b>1</b>	<b>General issues of Clinical Pharmacology</b>	4	7	8	<u>Oral forms:</u> interviews; seminar reports; cases and tests. <u>Written forms:</u> tests; control questioning; writing out prescriptions for medicines; filling out the card «Expert evaluation of the conducted pharmacotherapy».
1.1	Introduction to the academic discipline «Clinical Pharmacology». Nomenclature of medicines. Original and generic medicines. Clinical trials and state registration of medicines. Types of the medicines equivalence. Basis of Evidence-Based Medicine. Prescribing rules.				
1.2	Clinical pharmacokinetics and pharmacodynamics of drugs. Drug interactions. Unwanted (adverse) reactions to medications. Principles of drug use in women during pregnancy and lactation, elderly patients, patients with liver and kidney disease				<u>Oral-written forms:</u> accounts of classroom practical exercises with oral defense.
<b>2</b>	<b>Clinical Pharmacology of Drugs</b>	2	7	8	<u>Oral forms:</u> interviews; seminar reports; cases and tests. <u>Written forms:</u> tests; control questioning; writing out prescriptions for medicines; filling out the card «Expert evaluation of the conducted pharmacotherapy».
2.1	Medicines and receptors. Clinical pharmacology of antiallergic drugs. Anaphylaxis, emergency medical care				
2.2	Clinical pharmacology of antibacterial drugs. Basics of rational antibiotic therapy				

					<u>Oral-written forms:</u> accounts of classroom practical exercises with oral defense.
2	<b>Clinical Pharmacology of Drugs</b>	2	7	12	<u>Oral forms:</u> interviews; seminar reports; cases and tests. <u>Written forms:</u> tests; control questioning; writing out prescriptions for medicines; filling out the card «Expert evaluation of the conducted pharmacotherapy».
2.3	Clinical pharmacology of antiviral, antifungal and antiprotozoal drugs. Principles of treatment of acute respiratory viral infections				<u>Oral-written forms:</u> accounts of classroom practical exercises with oral defense.
2	<b>Clinical Pharmacology of Drugs</b>	-	7	8	<u>Oral forms:</u> interviews; seminar reports; cases and tests. <u>Written forms:</u> tests; control questioning; writing out prescriptions for medicines; filling out the card «Expert evaluation of the conducted pharmacotherapy».
2.4	Clinical pharmacology of steroid and non-steroidal anti-inflammatory drugs, narcotic analgesics				<u>Oral-written forms:</u> accounts of classroom practical exercises with oral defense.
2	<b>Clinical Pharmacology of Drugs</b>				<u>Oral forms:</u> interviews; seminar reports; cases and tests. <u>Written forms:</u> tests; control questioning; writing out prescriptions for medicines; filling out the card «Expert evaluation of the conducted pharmacotherapy».
2.5	Clinical pharmacology of drugs used in the respiratory system diseases				<u>Oral-written forms:</u> accounts of classroom practical exercises with oral defense.
2	<b>Clinical Pharmacology of Drugs</b>	2	7	12	<u>Oral forms:</u> accounts of classroom practical exercises with oral defense.



2.6	Clinical pharmacology of medicines used in cardiology				<p>interviews; seminar reports; cases and tests.  <u>Written forms:</u>  tests; control questioning; writing out prescriptions for medicines; filling out the card «Expert evaluation of the conducted pharmacotherapy».  <u>Oral-written forms:</u>  accounts of classroom practical exercises with oral defense.</p>
2	<b>Clinical Pharmacology of Drugs</b>	-	7	8	<p><u>Oral forms:</u>  interviews; seminar reports; cases and tests.  <u>Written forms:</u>  tests; control questioning; writing out prescriptions for medicines; filling out the card «Expert evaluation of the conducted pharmacotherapy».  <u>Oral-written forms:</u>  accounts of classroom practical exercises with oral defense.</p>
2	<b>Clinical Pharmacology of Drugs</b>	-	7	6	<p><u>Oral forms:</u>  interviews; seminar reports; cases and tests.  <u>Written forms:</u>  tests; control questioning; writing out prescriptions for medicines; filling out the card «Expert evaluation of the conducted pharmacotherapy».</p>
2.8	Clinical pharmacology of drugs affecting the hemostatic system				

2		2	7	10	<u>Oral-written forms:</u> accounts of classroom practical exercises with oral defense.
2.9	<b>Clinical Pharmacology of Drugs</b> Clinical pharmacology of anti-anemia drugs				<u>Oral forms:</u> interviews; seminar reports; cases and tests.
2.10	Clinical pharmacology of medicines used for the treatment of type 2 diabetes and thyroid diseases				<u>Written forms:</u> tests; control questioning; writing out prescriptions for medicines; filling out the card «Expert evaluation of the conducted pharmacotherapy».
	<b>Total</b>	<b>12</b>	<b>56</b>	<b>72</b>	<u>Oral-written forms:</u> accounts of classroom practical exercises with oral defense.

## INFORMATION AND INSTRUCTIONAL UNIT

### LITERATURE

#### **Basic (relevant):**

1. Peter N. Bennett, Morris J. Brown. Clinical Pharmacology, 11e, 2012
2. Bertram Katzung, Anthony Trevor. Basic and Clinical Pharmacology, 13 E , 2014
3. Goodman and Gilman's The Pharmacological Basis of Therapeutics, Twelfth Edition, 2011

#### **Additional:**

1. Arthur J. Atkinson et al. Principles of Clinical Pharmacology. Third Edition
2. James M Ritter et al. A Textbook of Clinical Pharmacology and Therapeutics 5Ed. 2008
3. D.G. Grahame-Smith, J.K. Aronson. Oxford Textbook of Clinical Pharmacology and Drug Therapy. Hardcover – May, 2002

### METHODOLOGICAL RECOMMENDATIONS ON ORGANIZATION AND IMPLEMENTATION OF THE STUDENTS' INDEPENDENT WORK ON THE EDUCATIONAL DISCIPLINE

Time allocated for independent work can be used by students to:

- preparation for the lectures and practical exercises;
- preparation for the exam in the academic discipline;
- study of topics (questions) taken for the independent study;
- performance of research assignments;
- preparation of thematic reports, abstracts, presentations;
- performance of practical tasks (patient's supervision and expert evaluation of ongoing pharmacotherapy, prescription writing).

The main methods of independent work organization:

- the abstract writing and presentation;
- the report presentation;
- study of the topics and problems that are not addressed in the lecture;
- clinical analysis of the patients with ongoing pharmacotherapy evaluation and the card registration «Expert evaluation of pharmacotherapy», writing out prescriptions;
- computerized testing;
- preparation and participation in the education active forms.

Control of independent work can be carried out in the form of:

- control tests;
- discussion of abstracts;
- assessing the oral response to the question, the message, the report, the solution of situational problems in practical exercises;
- checking abstracts, test results;

- checking the prescription correctness;
- individual conversation.

### **LIST OF AVAILABLE DIAGNOSTIC TOOLS**

The following forms are used for competence assessment:

1. Oral forms:
  - interviews;
  - seminar reports;
  - cases and tests.
2. Written forms:
  - tests;
  - control questioning;
  - writing out prescriptions for medicines;
  - filling out the card «Expert evaluation of the conducted pharmacotherapy»;
3. Oral-written forms:
  - accounts of classroom practical exercises with oral defense.

### **LIST OF PRACTICAL SKILLS**

- Prescribing of drugs.
- Collection of pharmacological and allergological history.
- Informing the patient about the drugs nature, the rules of administration and possible side reactions.
- Evaluation of scientific information on the medicines effectiveness.
- Correction of the dosing regimen for pathological changes in the functions of organs and systems responsible for drugs biotransformation and elimination.

### **LIST OF LECTURES**

#### **1. General issues of Clinical Pharmacology**

1.1. Introduction to the academic discipline «Clinical Pharmacology». Nomenclature of medicines. Original and generic medicines. Clinical trials and state registration of medicines. Types of medicines equivalence. Fundamentals of Evidence-Based Medicine. Prescribing rules.

1.2. Clinical pharmacokinetics and pharmacodynamics of drugs. Drug Interactions. Unwanted (adverse) reactions to medications. Principles of drug use in women during pregnancy and lactation, elderly patients, patients with liver and kidney disease

#### **2. Clinical Pharmacology of Drugs**

2.1. Clinical pharmacology of antibacterial drugs. Basics of rational antibiotic therapy

- 2.2. Clinical pharmacology of antiviral, antifungal and antiprotozoal drugs. Principles of the treatment of acute respiratory viral infections
- 2.3. Clinical pharmacology of medicines used in cardiology
- 2.4. Clinical pharmacology of medicines used for the treatment of type 2 diabetes and thyroid diseases

## **LIST OF LABORATORY (PRACTICAL) STUDIES**

### **1. General issues of clinical pharmacology**

1.1. Introduction to the academic discipline «Clinical Pharmacology». Nomenclature of medicines. Original and generic medicines. Clinical trials and state registration of medicines. Types of medicines equivalence. Fundamentals of Evidence-Based Medicine. Prescribing rules.

1.2. Clinical pharmacokinetics and pharmacodynamics of drugs. Drug Interactions. Unwanted (adverse) reactions to medications. Principles of drug use in women during pregnancy and lactation, elderly patients, patients with liver and kidney disease

### **2. Clinical pharmacology of drugs**

2.1. Medicines and receptors. Clinical pharmacology of antiallergic drugs. Anaphylaxis, emergency medical care

2.2. Clinical pharmacology of antibacterial drugs. Basics of rational antibiotic therapy

2.3. Clinical pharmacology of antiviral, antifungal and antiprotozoal drugs. Principles of the treatment of acute respiratory viral infections

2.4. Clinical pharmacology of steroid and non-steroidal anti-inflammatory drugs, narcotic analgesics

2.5. Clinical pharmacology of drugs used in the respiratory system diseases

2.6. Clinical pharmacology of medicines used in cardiology

2.7. Clinical pharmacology of medicines used in gastroenterology

2.8. Clinical pharmacology of drugs affecting the hemostatic system

2.9. Clinical pharmacology of anti-anemia drugs

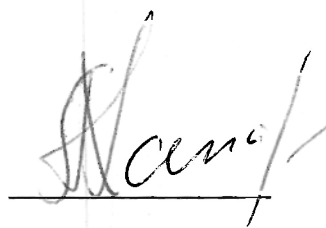
2.10. Clinical pharmacology of medicines used for the treatment of type 2 diabetes and thyroid diseases

**PROTOCOL OF THE CURRICULUM APPROVAL  
BY OTHER DEPARTMENTS**

Name of the discipline requiring approval	Department	Amendments to the curriculum of the academic discipline	Decision of the department, which composed the curriculum (date, protocol # )
Pharmacology	Pharmacology	No offers were received	protocol 15 dated 20.06.2018

**COMPILERS/AUTHORS:**

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signature

Curriculum content, composition and the accompanying documents comply with the established requirements

Dean of the Medical Faculty for  
International Students of the  
Educational Institution  
"Belarusian State Medical  
University"

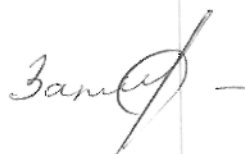
03.10. 2018



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